

Infrastructure-Led Housing Value Formation in Emerging Cities: A Sustainability-Based Regression Analysis from Abeokuta, Nigeria

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Abstract- Rapid urbanisation in emerging Nigerian cities has intensified pressure on housing systems, resulting in declining housing quality, infrastructural deficits, and fluctuating rental values. This study examines the interrelationship between housing quality, infrastructure provision, and rental value dynamics in Abeokuta from a sustainability perspective. Using a mixed-methods approach, primary data were derived from household surveys (n = 100), property assessments, and rental market analysis, and analysed using multiple regression techniques. Findings reveal that housing quality attributes, such as building condition, spatial adequacy, and environmental performance, significantly influence rental values. Infrastructural variables, including road accessibility, electricity supply, drainage, and healthcare facilities, were identified as dominant determinants of rental variations, accounting for a substantial share of rental differentials across residential estates. Multiple regression analysis ($R^2 \approx 0.64$) revealed that infrastructure variables exert a stronger predictive influence, while housing quality contributes to value differentiation. The study further shows that improvements in urban infrastructure and renewal interventions are associated with measurable increases in rental values and neighbourhood desirability. However, persistent deficits in basic services continue to undermine housing sustainability and affordability. This study contributes by integrating housing quality and infrastructure into a sustainability-based analytical framework to explain dynamics in rental values in emerging cities. The study concludes that integrating sustainable housing attributes with strategic infrastructure investment is critical for enhancing rental value stability and urban liveability in Abeokuta and similar Nigerian cities.

Keywords: *Housing Quality; Infrastructure Deficits; Rental Values; Sustainable Housing; Abeokuta*

I. INTRODUCTION

Rapid urbanisation continues to exert significant pressure on housing systems globally, particularly in developing regions where demand persistently outpaces supply [1][2][3]. In sub-Saharan Africa, and Nigeria in particular, this challenge manifests as a persistent housing deficit driven by population growth, rural–urban migration, and inadequate infrastructure provision [4][5]. International projections further indicate sustained urban expansion, intensifying the urgency for scalable, affordable, and adaptable housing solutions [1]. In Nigeria, these pressures are compounded by rising construction costs, dependence on conventional building materials, and weak housing administration systems, resulting in affordability constraints and rigid built environments [6][7][8][9][10].

Beyond affordability concerns, environmental sustainability has emerged as a critical dimension of housing delivery. The construction sector remains a major contributor to global greenhouse gas emissions due to its reliance on energy-intensive materials such as cement and steel [11]. Global sustainability frameworks emphasise the urgent need to reduce embodied carbon and transition towards low-impact material systems [11]. Although sustainable housing models and low-cost construction innovations are gaining global traction, their adoption in Nigeria remains constrained by technological limitations, regulatory rigidity, and weak institutional integration [12][13]. These challenges underscore the need for housing delivery approaches that integrate environmental performance with local adaptability.

Housing quality and infrastructure provision are central to understanding housing performance and

market dynamics. Housing quality extends beyond physical attributes to include spatial adequacy, environmental comfort, sanitation, and access to services, all of which determine habitability and residential satisfaction [14][15][16][17][18]. However, in many Nigerian cities, these attributes are compromised by weak planning systems, informal housing development, and poor environmental conditions, resulting in substandard living environments and adverse public health outcomes [19][20][4].

Concurrently, infrastructure—comprising roads, electricity, water supply, drainage, healthcare, and security—plays a critical role in shaping residential desirability and property values [21][22][23]. Empirical evidence consistently shows that the availability of infrastructure strongly influences rental values, often outweighing structural housing attributes in emerging urban contexts [24][25][26][27]. This aligns with urban economic and hedonic pricing theories, which posit that housing values are influenced not only by structural characteristics but also by environmental and locational attributes [28][29].

Despite these insights, existing literature reveals significant gaps. First, housing quality and infrastructure are often examined as independent determinants of rental values, with limited integration of their combined effects within unified analytical frameworks [28][29]. Second, sustainability is rarely incorporated as a mediating variable linking housing attributes to environmental and socio-economic outcomes, despite evidence that environmental conditions influence rental pricing and housing desirability [30]. Third, empirical research is disproportionately concentrated in large metropolitan areas, leaving intermediate cities such as Abeokuta underexplored, even though such cities exhibit unique housing market dynamics [31][32][33]. These gaps constrain the development of comprehensive, context-responsive models capable of explaining housing market behaviour in rapidly urbanising environments.

Against this backdrop, this study investigates the interrelationship between housing quality, infrastructure provision, and rental value dynamics in

Abeokuta within a sustainability framework. It seeks to provide empirical evidence on how housing quality influences rental values, examine the extent to which infrastructure determines variations in rents, and evaluate the combined effects of these variables on housing market outcomes. Furthermore, the study explores how sustainability conditions mediate the relationship between housing attributes and rental values, thereby extending existing theoretical frameworks.

To operationalise these objectives, the study addresses four interrelated research questions: it examines how housing quality influences rental values; evaluates the extent to which infrastructure provision affects rental value dynamics; analyses the combined effects of housing quality and infrastructure on rental outcomes; and investigates how sustainability mediates these relationships within the housing system. Correspondingly, the study tests the null hypotheses that housing quality and infrastructure have no significant effect on rental values, and that the combined variables do not significantly predict rental values, while further assessing the mediating role of sustainability in shaping these relationships.

By integrating housing quality, infrastructure provision, and sustainability into a unified analytical model, this study advances the discourse on sustainable urban housing in emerging cities. Empirically, it provides evidence on the determinants of rental values in Abeokuta; theoretically, it extends the hedonic pricing framework by incorporating sustainability mediation [29]; methodologically, it applies a regression-based analytical approach; and practically, it offers policy-relevant insights for improving housing delivery and infrastructure planning in Nigeria and similar developing contexts.

II. LITERATURE REVIEW

- Theoretical Foundations: Housing, Infrastructure, and Sustainability Integration

The dynamics of housing markets have traditionally been explained through hedonic pricing theory, which posits that property values are determined by a bundle of structural, locational, and environmental

attributes [29]. Within this framework, housing quality and infrastructure constitute key components that shape residential desirability and pricing. Complementing this, urban planning and infrastructure theories emphasise that accessibility, service provision, and spatial organisation are critical determinants of housing performance and market outcomes [28].

Recent scholarship has extended these perspectives by incorporating sustainability theory, which recognises that environmental quality, energy efficiency, and infrastructure reliability significantly influence both housing performance and long-term value stability [30]. In this context, sustainability is not merely an outcome but a mediating construct that links housing attributes to socio-economic and environmental performance.

Accordingly, this study adopts an integrated analytical framework in which housing quality (HQ) and infrastructure provision (INF) function as primary explanatory variables, location (LOC) acts as a contextual moderator, and sustainability (SUS) serves as a mediating variable influencing rental value (RV). This integration provides a more comprehensive explanation of housing market behaviour in emerging urban contexts.

- Housing Quality and Residential Outcomes

Housing quality is a multidimensional concept encompassing structural condition, spatial adequacy, environmental comfort, sanitation, and access to services. Contemporary studies employ composite indices such as the Housing and Environmental Quality Index (HEQI) to capture these dimensions holistically [14][15]. Empirical evidence demonstrates that housing quality significantly influences residents' well-being, health outcomes, and social costs [16].

In developing contexts, poor housing conditions are closely associated with reduced residential satisfaction and increased vulnerability to environmental and health risks [17][18]. Furthermore, housing quality directly affects rental values by shaping perceptions of comfort, safety, and liveability. However, in many Nigerian cities,

housing quality is constrained by socio-economic inequalities and weak regulatory systems, resulting in widespread informal housing development and substandard living conditions [7][10].

Critically, the relationship between housing quality and rental values is not linear. While improvements in quality generally increase property values, affordability constraints often limit the extent to which such improvements are reflected in rental pricing, particularly in low-income and informal housing markets [8][9]. This underscores the need to examine housing quality within broader systemic and contextual frameworks.

- Infrastructure Provision and Rental Value Dynamics

Infrastructure provision plays a fundamental role in shaping housing market outcomes. Key components—including transportation networks, electricity supply, water systems, drainage, and social services—directly influence accessibility, functionality, and environmental quality [21][22][23]. Empirical studies consistently demonstrate that infrastructure availability exerts a strong positive effect on property values, often surpassing the influence of structural housing attributes [24][25][26].

Road accessibility, for instance, enhances connectivity and reduces transportation costs, thereby increasing residential desirability and rental values [24]. Similarly, reliable electricity and water supply improve living conditions and reduce household operational costs, further contributing to property value appreciation [22][23]. Conversely, infrastructural deficiencies—such as poor drainage and unreliable utilities—can significantly depress rental values and undermine housing performance [25][27].

In emerging urban contexts, where infrastructural deficits are prevalent, infrastructure provision often serves as a primary determinant of housing value formation. This highlights the need to prioritise infrastructure development as a central component of housing policy and planning strategies.

- Sustainability and Environmental Mediation in Housing Systems

The environmental dimension of housing has gained increasing attention due to the construction sector's significant contribution to global greenhouse gas emissions [11]. Sustainable housing models emphasise integrating energy efficiency, resource conservation, and environmental resilience into housing design and delivery [12][13].

Recent studies suggest that sustainability factors—such as environmental quality, infrastructure reliability, and energy performance—play a mediating role in housing market dynamics [30]. For instance, improved drainage systems and environmental sanitation not only enhance living conditions but also increase property values by reducing environmental risks. Similarly, energy-efficient housing reduces long-term operational costs, making properties more attractive to tenants.

Despite these insights, sustainability is often treated as a peripheral consideration in housing studies, rather than as a central analytical variable. This study addresses this gap by explicitly incorporating sustainability as a mediating construct linking housing quality and infrastructure to rental value outcomes.

- Housing Systems and Contextual Constraints in Nigeria

Complex structural and institutional challenges characterise housing delivery in Nigeria. Rapid urbanisation, combined with inadequate infrastructure and weak regulatory frameworks, has led to the proliferation of informal settlements and substandard housing conditions [4][5][19][20]. In many cases, housing development occurs outside formal planning systems, resulting in poor environmental conditions and limited access to basic services.

Medium-sized cities such as Abeokuta exhibit unique housing dynamics, in which formal and informal systems coexist, leading to significant variations in housing quality and infrastructure provision [6][10]. Comparative studies indicate that rental values in

such contexts are highly sensitive to environmental conditions and the availability of infrastructure, reflecting the interplay between physical and socio-economic factors [31][32][33].

Furthermore, urban renewal initiatives and planning interventions can significantly influence housing markets by altering land values and improving infrastructure provision [34]. However, the effectiveness of such interventions depends on institutional capacity, governance structures, and community participation.

- Integrative Framework for Housing Value Formation

Synthesising the foregoing, housing value formation can be conceptualised as a function of multiple interacting variables. The relationship can be expressed as:

$$RV = \beta_0 + \beta_1 HQ + \beta_2 INF + \beta_3 LOC + \epsilon$$

where rental value (RV) is influenced by housing quality (HQ), infrastructure provision (INF), and location (LOC).

To incorporate sustainability as a mediating variable, the model is extended as follows:

$$\begin{aligned} SUS &= \alpha_0 + \alpha_1 HQ + \alpha_2 INF + v \\ RV &= \gamma_0 + \gamma_1 HQ + \gamma_2 INF + \gamma_3 SUS + \eta \end{aligned}$$

This formulation reflects a systems-based perspective, in which housing quality and infrastructure jointly influence sustainability outcomes, which in turn affect rental values. Such an approach provides a more comprehensive framework for analysing housing markets in emerging urban contexts.

- Synthesis and Research Gap

The reviewed literature demonstrates significant progress in understanding the determinants of housing quality, infrastructure provision, and rental value dynamics. However, several critical gaps remain. First, existing studies often examine housing quality and infrastructure as independent variables, with limited integration into unified analytical frameworks [28][29]. Second, sustainability is rarely incorporated as a mediating factor, despite its

growing importance in housing performance and environmental outcomes [30]. Third, empirical research is disproportionately concentrated in major metropolitan areas, leaving intermediate cities such as Abeokuta underexplored [31][32][33].

These gaps highlight the need for an integrated approach that simultaneously considers housing quality, infrastructure provision, and sustainability within a unified analytical framework. Accordingly, this study develops and empirically tests such a model, contributing to both theoretical advancement and practical policy development in the context of sustainable housing delivery in emerging Nigerian cities.

III. METHODOLOGY

- Research Design and Analytical Framework

This study adopts a mixed-methods research design, integrating quantitative and qualitative approaches to examine the interrelationships among housing quality, infrastructure provision, and rental value dynamics in Abeokuta. The design is grounded in hedonic pricing theory and sustainability-based housing analysis, enabling the assessment of both structural and environmental determinants of housing values.

The analytical framework conceptualises housing quality (HQ) and infrastructure provision (INF) as independent variables, location (LOC) as a contextual factor, and sustainability (SUS) as a mediating variable influencing rental value (RV). This integrated approach aligns with contemporary housing research that emphasises the interaction between physical, environmental, and socio-economic factors in determining housing outcomes.

- Study Area and Sampling Strategy

The study was conducted in Abeokuta, Ogun State, Nigeria, a medium-sized city characterised by a mix of traditional, transitional, and planned residential zones. The city provides an appropriate case for examining housing dynamics in emerging urban contexts due to its rapid growth, infrastructural variability, and diverse housing typologies.

A stratified sampling technique was adopted to ensure representation across three residential zones:

- Core (traditional areas)
- Transitional (mixed-development zones)
- Planned estates

The sample size was determined using the Yamane (1967) formula:

$$n = \frac{N}{1 + N(e^2)}$$

where n is the sample size, N is the population, and e is the margin of error (0.05).

Based on this, a total of 100 respondents were selected, comprising household heads and adult residents. In addition, key informant interviews were conducted with estate surveyors, urban planners, and housing professionals to enrich the analysis.

- Data Collection Methods

Primary data were collected through structured questionnaires, field observations, and expert interviews. The questionnaire captured information on:

- Housing characteristics (condition, size, facilities)
- Infrastructure availability (roads, electricity, drainage, water)
- Rental values (annual rent)
- Environmental and sustainability conditions

Secondary data were obtained from housing studies, planning reports, and relevant literature to support contextual analysis.

- Variable Measurement and Operationalisation

The study operationalised variables as follows:

Table I: Operational Definition and Measurement of Study Variables

Variable	Description	Measurement
Rental Value (RV)	Annual rent paid per dwelling	Continuous (₦)
Housing Quality (HQ)	Condition, rooms, ventilation, and sanitation	Composite index
Infrastructure	Roads, electricity,	Composite index

Variable	Description	Measurement
(INF)	drainage, water	
Sustainability (SUS)	Environmental quality, energy, and drainage resilience	Composite index
Location (LOC)	Core, transitional, planned	Categorical

Housing and infrastructure indices were constructed using multi-criteria scoring methods, consistent with previous housing quality assessment frameworks.

- Model Specification and Inferential Analysis

The primary regression model is specified as:

$$RV = \beta_0 + \beta_1 HQ + \beta_2 INF + \beta_3 LOC + \epsilon$$

To capture variable-level effects, the model is further expanded as:

$$RV = \beta_0 + \beta_1 RA + \beta_2 EL + \beta_3 DR + \beta_4 BC + \beta_5 NR + \beta_6 MF + \epsilon$$

Where:

- RA = Road accessibility
- EL = Electricity supply
- DR = Drainage
- BC = Building condition
- NR = Number of rooms
- MF = Modern facilities

To assess the mediating role of sustainability, the following equations were estimated:

$$SUS = \alpha_0 + \alpha_1 HQ + \alpha_2 INF + v$$

$$RV = \gamma_0 + \gamma_1 HQ + \gamma_2 INF + \gamma_3 SUS + \eta$$

Inferential analysis included:

- Descriptive statistics (mean, standard deviation)
 - Correlation analysis (Pearson's r)
 - Multiple regression analysis
 - Mediation analysis
- Statistical significance was tested at $p < 0.05$, with model validity assessed using:
- Coefficient of determination (R^2)
 - Adjusted R^2
 - Variance Inflation Factor ($VIF < 5$) to test multicollinearity
 - Validity, Reliability, and Ethical Considerations

Validity was ensured using standardised measurement indicators and alignment with established housing assessment frameworks. Reliability was assessed using internal consistency measures to ensure the robustness of the composite indices.

Ethical considerations included obtaining informed consent, ensuring respondent confidentiality, and maintaining voluntary participation throughout the study. The research involved non-sensitive data and complied with standard academic ethical guidelines.

IV. RESULTS AND DISCUSSION

- Overview of Data and Descriptive Statistics

A total of 100 valid responses were analysed across three residential zones: core (34%), transitional (33%), and planned estates (33%). This distribution ensured balanced representation of housing typologies and infrastructural conditions in Abeokuta.

Table II: Descriptive Statistics of Key Variables

Variable	Mean	Std. Dev.	Min	Max
Rental Value (₦/year)	285,000	112,500	90,000	600,000
Housing Quality Index (HQ)	3.42	0.78	1.80	4.90
Infrastructure Index (INF)	3.15	0.85	1.50	4.80
Sustainability Index (SUS)	3.08	0.81	1.40	4.70

The results show moderate variation in housing and infrastructure conditions, reflecting spatial inequality across residential zones. Rental values are significantly higher in planned estates compared to core areas, indicating strong location and infrastructure effects.

• Rental Value Distribution by Residential Zone

Rental values vary significantly across spatial zones, reflecting differences in infrastructure provision and housing quality.

Table III: Rental Value by Residential Zone

Zone	Mean Rent (₦)	Std. Dev.	% Difference (from Core)
Core	180,000	65,000	—
Transitional	275,000	90,000	+52.8%
Planned Estate	400,000	110,000	+122.2%

The findings indicate that rental values in planned estates are more than double those in core areas. This supports the argument that infrastructure and environmental quality strongly influence housing values.

• Correlation Analysis of Key Variables

Correlation analysis was conducted to examine relationships among housing quality, infrastructure, sustainability, and rental values.

Table IV: Correlation Matrix

Variable	RV	HQ	INF	SUS
RV	1.00	0.62	0.71	0.66
HQ	0.62	1.00	0.58	0.64
INF	0.71	0.58	1.00	0.69
SUS	0.66	0.64	0.69	1.00

The results show:

- Strong positive relationship between infrastructure and rental value ($r = 0.71$)
- Moderate relationship between housing quality and rental value ($r = 0.62$)
- Strong linkage between infrastructure and sustainability ($r = 0.69$)

These findings confirm that infrastructure plays a dominant role, while sustainability is closely linked to both housing quality and infrastructure.

• Regression Analysis of Determinants of Rental Value

The multiple regression model was used to estimate the effects of housing quality, infrastructure, and location on rental value.

Table V: Regression Results

Variable	Coefficient (β)	Std. Error	t-value	p-value	95% CI	VIF
Constant	72,000	18,500	3.89	0.000	[35,500–108,500]	—
Road Accessibility (RA)	0.42	0.09	4.67	0.000	[0.24–0.60]	2.1
Electricity (EL)	0.36	0.10	3.60	0.001	[0.16–0.56]	2.3
Drainage (DR)	0.31	0.11	2.82	0.003	[0.09–0.53]	2.0
Building Condition (BC)	0.28	0.10	2.80	0.005	[0.08–0.48]	2.4
Number of Rooms (NR)	0.22	0.09	2.44	0.016	[0.04–0.40]	1.8
Modern Facilities (MF)	0.19	0.08	2.38	0.019	[0.03–0.35]	2.2

Model summary:

- $R^2 = 0.64$
- Adjusted $R^2 = 0.62$
- F-statistic = 18.73 ($p < 0.001$)

The model explains 64% of the variation in rental values, indicating strong explanatory power. Infrastructure variables—particularly road accessibility, electricity, and drainage—emerge as the most significant predictors, confirming their dominant role in shaping rental value.

- Mediation Analysis: Role of Sustainability

To examine the mediating role of sustainability, a two-stage regression analysis was conducted.

Stage 1: Effect of HQ and INF on Sustainability

$$SUS = \alpha_0 + \alpha_1 HQ + \alpha_2 INF + v$$

Results:

- HQ → SUS: $\beta = 0.41$, $p < 0.01$
- INF → SUS: $\beta = 0.47$, $p < 0.01$

Stage 2: Effect of SUS on Rental Value

$$RV = \gamma_0 + \gamma_1 HQ + \gamma_2 INF + \gamma_3 SUS + \eta$$

Results:

- SUS → RV: $\beta = 0.33$, $p < 0.01$
- HQ effect reduced from 0.28 → 0.19
- INF effect reduced from 0.42 → 0.31

These results indicate partial mediation, meaning sustainability significantly transmits the effects of housing quality and infrastructure to rental values.

- Hypothesis Testing

Based on regression and mediation results:

- H₀₁: Housing quality has no significant effect → Rejected ($p < 0.05$)
- H₀₂: Infrastructure has no significant effect → Rejected ($p < 0.01$)
- H₀₃: Combined variables do not predict rental value → Rejected ($R^2 = 0.64$)
- H₀₄: Sustainability does not mediate → Rejected (partial mediation confirmed)

- Synthesis of Results

The results demonstrate that a hierarchy of determinants shapes the dynamics of rental values in Abeokuta. Infrastructure emerges as the strongest predictor, followed by housing quality, while sustainability plays a significant mediating role.

Spatial analysis further reveals that planned estates command significantly higher rental values due to superior infrastructure and environmental conditions. The integration of descriptive, inferential, and mediation analyses confirms that housing markets in emerging cities are best explained by a systems-based model rather than by isolated variables.

IV. DISCUSSION

- Infrastructure as the Dominant Driver of Rental Value Formation

The findings demonstrate that infrastructure provision is the most significant determinant of rental value dynamics in Abeokuta, with road accessibility, electricity supply, and drainage systems exhibiting the highest regression coefficients. This confirms the proposition that housing markets in emerging urban contexts are infrastructure-led rather than structure-led, particularly where service deficits are prevalent. This result aligns with prior studies, which show that infrastructure availability significantly enhances residential desirability and property values by improving accessibility, functionality, and environmental quality [21][22][23].

The strong correlation between infrastructure and rental values ($r = 0.71$) further reinforces the centrality of infrastructure in housing market performance. Empirical evidence from Lagos and other African cities similarly indicates that transport networks and utility services are key drivers of spatial value differentiation [24][27].

From a theoretical perspective, this finding extends hedonic pricing theory by demonstrating that, in developing contexts, infrastructure variables often outweigh structural housing attributes in determining property values [29]. It also supports planning-based perspectives that emphasise the role of spatial systems and service delivery in shaping urban housing outcomes [28].

- Housing Quality as a Secondary but Significant Determinant

While infrastructure emerges as the dominant factor, housing quality remains a statistically significant determinant of rental values. Variables such as building condition, number of rooms, and availability of modern facilities contribute meaningfully to value formation, although their effects are comparatively smaller than those of infrastructure.

This finding corroborates existing literature on housing quality, which highlights its role in

influencing residential satisfaction, health outcomes, and social well-being [14][15][16]. However, the relatively low coefficients for housing quality suggest that its impact is moderated by broader systemic conditions, particularly infrastructure availability and affordability constraints.

In informal and low-income housing markets, improvements in structural quality may not translate proportionally into higher rental values due to limited purchasing power and constrained housing demand [8][9]. This reinforces the argument that housing quality should be understood within a broader system of interdependent variables, rather than as an isolated determinant of value.

- Sustainability as a Mediating Mechanism

A key contribution of this study lies in demonstrating the mediating role of sustainability in housing value formation. The mediation analysis reveals that sustainability significantly transmits the effects of housing quality and infrastructure on rental values, with a partial reduction in the direct effects of these variables when sustainability is included in the model.

This finding supports emerging scholarship that positions sustainability as a critical factor in housing performance, influencing both environmental quality and economic outcomes [11][12][13]. The positive relationship between sustainability and rental value ($\beta = 0.33$, $p < 0.01$) indicates that environmentally efficient and well-serviced housing environments are increasingly valued in urban housing markets.

Furthermore, the mediating role of sustainability aligns with recent studies demonstrating that environmental conditions, including sanitation, drainage, and energy efficiency, significantly influence rental pricing and housing desirability [30]. This extends traditional housing models by incorporating environmental performance as a core analytical dimension, rather than a peripheral consideration.

- Spatial Inequality and Housing Market Segmentation

The observed variation in rental values across residential zones highlights spatial inequality and housing market segmentation in Abeokuta. Planned estates command significantly higher rents compared to core areas, reflecting disparities in infrastructure provision, environmental quality, and housing standards.

This pattern is consistent with findings from other Nigerian cities, where formal and informal housing systems coexist, creating uneven distribution of services and value [31][32][33]. In particular, the lower rental values observed in core areas can be attributed to infrastructural deficits, environmental degradation, and higher levels of informality, which reduce the desirability of residential areas [4][20].

The results also suggest that urban renewal and infrastructure investment can significantly influence housing market dynamics by improving environmental conditions and increasing property values [34].

However, such interventions must be carefully managed to avoid displacement and ensure equitable access to improved housing conditions.

- Systems-Based Interpretation and Framework Validation

The combined findings provide strong empirical support for a systems-based interpretation of housing value formation, in which housing quality, infrastructure, and sustainability interact to shape rental outcomes. The regression model ($R^2 = 0.64$) demonstrates that these variables collectively explain a substantial proportion of variation in rental values, confirming the validity of the integrated analytical framework.

Importantly, the results indicate that housing performance is not determined by isolated variables but by the interaction of multiple interconnected factors. Infrastructure enhances housing functionality and environmental quality; housing quality influences comfort and usability; and sustainability mediates

these relationships by integrating environmental and socio-economic considerations.

This validates the proposed framework as an extension of existing housing theories, combining elements of hedonic pricing, planning theory, and sustainability analysis into a unified model. By doing so, the study advances the discourse on housing delivery in emerging urban contexts and provides a more comprehensive explanation of rental value dynamics.

- Implications for Policy and Practice

The findings have significant implications for housing policy and urban planning in Nigeria. First, the dominant role of infrastructure suggests that investment in basic services should be prioritised to improve housing affordability and value. Second, the mediating role of sustainability highlights the importance of integrating environmental considerations into housing design and delivery.

Third, the persistence of spatial inequality underscores the need for inclusive planning approaches that address disparities between formal and informal housing systems. Finally, the systems-based nature of housing value formation suggests that integrated policy frameworks, rather than isolated interventions, are required to achieve sustainable housing outcomes.

.VI. RECOMMENDATIONS AND CONCLUSION

- Recommendations

The findings of this study demonstrate that housing value formation in Abeokuta is strongly influenced by infrastructure provision, housing quality, and sustainability conditions. Based on these insights, the following recommendations are proposed to enhance sustainable housing delivery and rental value stability in emerging Nigerian cities.

First, governments should prioritise infrastructure-led housing development by setting measurable targets for improving road accessibility, electricity reliability, water supply, and drainage systems. Rather than focusing solely on housing construction,

policy interventions should adopt a service-first approach, recognising that infrastructure provision is the primary driver of housing functionality and market value. Establishing integrated infrastructure planning frameworks will improve coordination among agencies and ensure efficient allocation of resources.

Second, housing policies should promote quality-enhancing design standards that improve building conditions, spatial adequacy, and access to modern facilities. While housing quality is not the dominant determinant of rental value, it remains essential for enhancing residential satisfaction and long-term housing performance. Regulatory bodies should enforce minimum standards while supporting incremental upgrading strategies, particularly in informal settlements where improvements can significantly enhance living conditions.

Third, sustainability considerations should be systematically integrated into housing delivery systems. This includes adopting environmentally responsive design strategies, improving drainage and waste management systems, and promoting energy-efficient housing solutions. The results indicate that sustainability plays a critical role in enhancing both environmental performance and housing value, making it essential for long-term urban development. Fourth, urban planning strategies should address spatial inequality and housing market segmentation by prioritising investments in underserved areas, particularly core and transitional zones. Targeted infrastructure upgrades in these areas can significantly improve housing conditions and reduce disparities in rental values. Planning interventions should also ensure that urban renewal efforts are inclusive and do not result in the displacement or exclusion of vulnerable populations.

Fifth, there is a need to strengthen institutional coordination and governance frameworks in housing delivery. Fragmentation among planning authorities, housing agencies, and infrastructure providers often reduces the effectiveness of policy interventions. Integrated governance systems, supported by digital planning tools and coordinated policy frameworks, can enhance efficiency, transparency, and accountability in housing development.

- Conclusion

This study examined the interrelationship between housing quality, infrastructure provision, and rental value dynamics in Abeokuta within a sustainability framework. The findings provide clear empirical evidence that infrastructure is the dominant driver of rental value formation, while housing quality plays a secondary but significant role. Sustainability was found to mediate these relationships, underscoring its importance in housing performance and value determination.

The analysis demonstrates that the combined effects of housing quality, infrastructure, and sustainability explain a substantial proportion of variation in rental values, validating the integrated analytical framework developed in this study. Spatial analysis further reveals significant disparities across residential zones, highlighting the role of infrastructure and environmental conditions in shaping housing market segmentation.

- Contributions to Knowledge

This study makes four key contributions.

Empirical Contribution: It provides context-specific evidence on the determinants of rental values in a medium-sized Nigerian city, addressing a major gap in housing research.

Theoretical Contribution: It advances an integrated framework that extends traditional housing market theories by incorporating sustainability as a mediating factor.

Methodological Contribution: It applies a mixed-method, regression-based approach with mediation analysis, offering a robust analytical model for examining housing systems.

Practical Contribution: It offers actionable insights for improving housing delivery through infrastructure investment, sustainability integration, and inclusive planning strategies.

- Final Statement

Overall, the study demonstrates that sustainable housing in emerging urban contexts is not solely a function of structural improvements but rather the outcome of coordinated interactions between infrastructure, housing quality, and environmental conditions. The evidence supports a systems-based interpretation, in which housing performance depends on the integration of physical, environmental, and socio-economic factors.

Achieving sustainable and affordable housing, therefore, requires a shift from fragmented interventions to integrated housing–infrastructure development models that prioritise service delivery, environmental sustainability, and inclusive urban planning. This study provides a validated framework and an empirical foundation to guide future research, policy development, and practical interventions to address housing challenges in Nigeria and similar developing contexts.

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