ER Environmental Review Journal

Volume 10 No. 1, 2025.
ISSN:1118-7190

Research Article

Affordability and the Demand for Green Buildings: Evidence from Abuja, Nigeria

Shuaib Kolawole Lawal[1], Charles Chukwunwike Egolum[2] and Chinaza Henry Obineme[2]
[1]Department of Estate Management and Valuation, Federal Polytechnic, Nasarawa.
[2]Department of Estate Management, Nnamdi Azikiwe University, Awka Nigeria
*Corresponding Author: Charles Chukwunwike Egolum, E-mail: cc.egolum@unizik.edu.ng

Abstract
The study examined the perspectives on affordability and demand for emerging green building concepts in the Abuja real property market. The study population comprised 241 firms of estate surveying and valuation in the Federal Capital Territory, Abuja, being the up-to-date financial list of firms of the Estate Surveyors and Valuers Registration Board of Nigeria for the year 2024. Survey research design was adopted with structured questionnaires administered to 241 respondents. The data obtained were analyzed using descriptive statistics and logistic regression. The findings reveal that affordability variables were among the critical factors that determined demand for green building in Abuja. It was recommended that the government be directly involved in providing green buildings as well as providing a conducive investment environment for investors in order to enhance the affordability of green buildings in Abuja.

Keywords: Affordability, Green building, Demand, Abuja, Estate Surveyors and Valuers

Article History: Received: June 10, 2025 Accepted: June 20, 2025 Published: July 15, 2025

1. Introduction

According to UN Habitat (2014), shelter is a basic necessity of life and an inalienable right of every citizen of any state. It is the structural envelope that shields both animate and inanimate things from the direct external aggression of weather elements. Inadequate shelter can lead to a myriad of social and health issues, affecting not only individual well-being but also community stability. Ensuring access to safe and secure housing is therefore key to encouraging sustainable development and improving quality of life for all. As a result, building operations and the provision of shelter have become integral to human activities on Earth and are projects that have always been part of human existence. However, modernisation and civilisation led to technological advancements that made building operations easier and faster than conventional methods, particularly the provision of modern housing. Therefore, the craving for modern and comfortable apartments, coupled with the ever-growing population, has increased the application of technology to building designs, materials, and construction activities (Meena *et al.*, 2022). These have led to the reviews of the impact of building and its elements on the environment.

The study of Crawford (2021) found that the construction industry slowly but progressively contributes the most to carbon emissions in the atmosphere, aggravating global warming, which has recently intensified. This finding was corroborated by the studies of Juan et al. (2019), which observed that 32% of total global energy use was attributed to building operations, which contributes

to atmospheric carbon dioxide. Envisaging the monumental catastrophe that would result from the untamed climate change menace, governments of many countries of the world, especially the developed economies, adopted policies designed to mitigate the effect of climate change, among which was the introduction of sustainable development through green building technology. The step became imperative because building and construction industries were seen as one of the major culprits fomenting global warming (Crawford, 2021; International Energy Agency, 2023). Green building is the practice of creating healthier and more resource-efficient models of construction, renovation, operation, maintenance and demolition (United States Environmental Protection Agency, 2024).

Although shelter is a basic necessity of life which qualifies as a social infrastructure, its provision is not solely funded by government. Since real estate is an investment medium that attracts private sector involvement, hence, the entrance of the price mechanism which allocates land resources according to willingness and ability to pay. This is to ensure capital is recouped as well as return on investment achieved within a reasonable time frame, taking into consideration the rate of return on the investments. The ability to pay is what is referred to as affordability (Babatunde, 2017).

Despite the global call for the adoption of green building through global initiatives promoting eco-friendly practices in construction and the tangible benefits of green buildings, such as energy efficiency, water conservation, and improved indoor air quality, their adoption and patronage remain low in Nigeria and other developing nations (Nwachukwu, 2023). This low adoption rate contrasts with the significant construction activity in Abuja to accommodate its growing population, where several property development companies are promoting sustainable buildings. Hence, there is a need to examine affordability variables in determining demand for green building in the Abuja real property market. This paper therefore explored the effect of affordability variables on demand for green building in the Abuja property market. To answer this, the study tested a null hypothesis that affordability concern does not affect demand for green building in Abuja.

Green building, also known as sustainable or eco-friendly building, is a construction concept or model that underscores resource efficiency, ecological responsibility, and occupant well-being in the design, construction, and operation of the building throughout its life cycle. The US Environmental Protection Agency (EPA, 2023) defined green buildings as the design and construction of structures using resource-efficient and environmentally friendly techniques throughout the entire building life cycle, encompassing planning, design, construction, operation, maintenance, renovation, and demolition. This technique builds upon and advances the traditional architectural design principles of economy, utility, durability, and comfort. Taiwo and Adeboye (2013) define sustainable development as fulfilling present needs without jeopardising the ability of future generations to meet their own needs.

Furthermore, the concept of green building focuses on the conservation of water, energy, and materials during the construction and maintenance of buildings, with a view to mitigating or eliminating adverse impacts on the environment and its inhabitants. This is achieved through the implementation of techniques and practices that promote energy and resource conservation across a

building's life cycle, encompassing planning, development, operation, maintenance, redesign, and demolition (Oyebode, 2018; Lin, 2021; Ramakrishna et al., 2021).

However, prospective tenants or owner-occupiers must pay a premium to gain access to the green building. Investments in green building, though attractive due to their catalogue of benefits, are capital intensive, which always scares away investors from dabbling in them (Geng et al., 2019). The greatest impediment for real estate developers is the belief that initial capital outlay may not be recouped within record time considering the massive capital expenditure (Geng *et al.*, 2019; Li *et al.*, 2021), perhaps as a result of demand uncertainty. Furthermore, the study by Razali et al. (2017) identified several misunderstandings in the investment process that caused investors to delay their investments in green buildings; these misunderstandings serve as impediments to sustainable property investment, including the belief that such investments jeopardise financial return security. Consequently, expectations that consideration would be given to green building technology, especially now that the world is gearing towards energy-efficient and environmentally friendly developments, have been threatened.

It was discovered from literature that over the past decades, an increasing amount of empirical research has monitored the economic performance of green buildings by analysing reported construction costs, rental values, selling prices, and occupancy rates. The studies of Dwaikat and Ali (2016) and Zhang et al. (2018) examined green building affordability through the lens of diverse locations, building types, and rating systems and found that most of the incremental costs for all certification levels vary from -0.4 to 21 per cent and -0.4 to 11 per cent between green buildings and conventional buildings. Corroborating the above findings, Koirala, Bohara, and Berrens (2014) estimated that the energy efficiency rules IECC 2003-06 led to a 23.25 per cent rise in housing rents. Robinson, Simons, Lee, & Kern (2016) estimated that the total expressed willingness to pay for green features, based on contingent valuation analysis, was 9.3 per cent.

Nonetheless, the majority of these studies were carried out in developed countries with little or no tangible study on green building affordability in Abuja and, by extension, Nigeria as a whole; hence, the justification for this study.

2. Materials and Methods

2.1. Study Area

The Federal Capital Territory (FCT) is situated in the North-Central zone of Nigeria and hence occupies a pivotal position on the map. It is located between the Greenwich meridian's longitudes of 6^{o} 20'E and 7^{o} 33'E, and the equator's latitudes of 8^{o}30'N and 9^{o} 20'N.

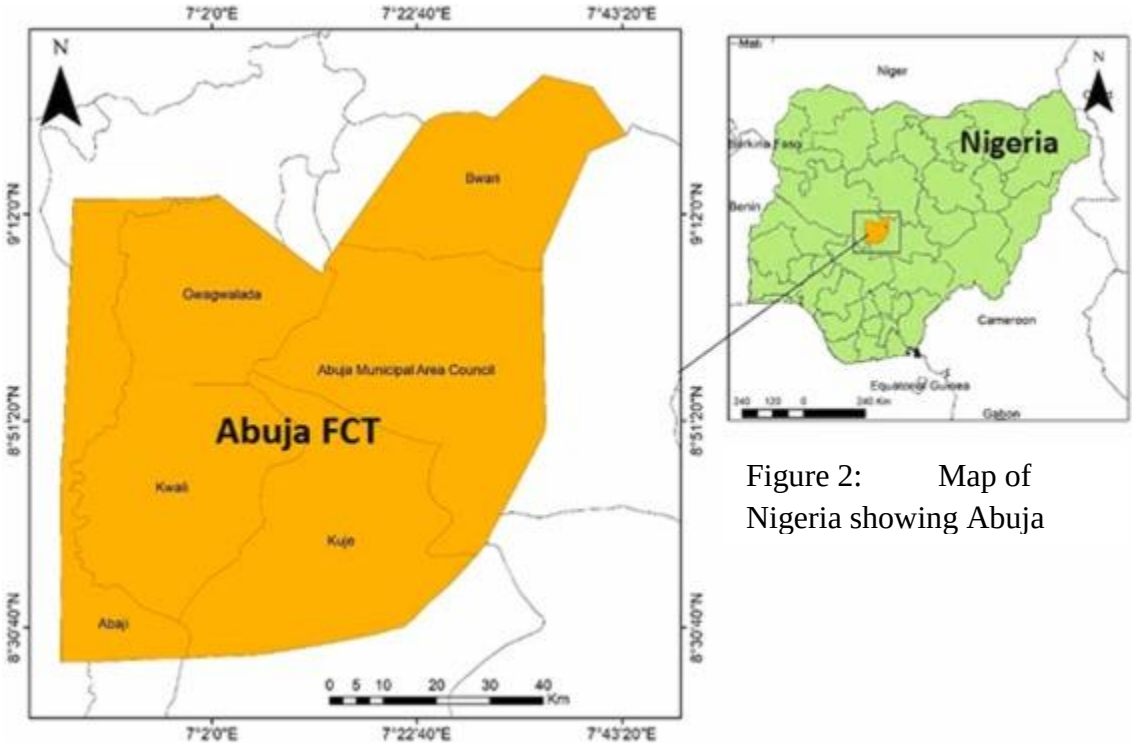


Figure 1: Map of Abuja and its Various Districts Source: Abuja City Master plan, 2015

Figure 2: Map of Nigeria showing Abuja

2.2. Data Collection

Primary source of data was employed to elicit data for this study. Two hundred and forty-one (241) structured questionnaires were administered to respondents, out of which 233, representing 96.7%, were duly completed and returned. Descriptive statistics, logistic regression, and logistic regression model parameter estimates were used for the analysis.

2.3. Data analysis

Table 1: Demographic Characteristics of Estate Surveyors and Valuers in Abuja

Category	**Variable**	**Frequency**	**Percentage (%)**
Gender Distribution	Male	195	83.7%
	Female	38	16.3%
	Total	**233**	**100%**
Academic Qualifications	None	0	0%
	O' Level	0	0%
	ND/NCE	0	0%

	HND/B.Sc	190	81.5%
	M.Sc/Ph.D	43	18.5%
	Total	**233**	**100%**
Professional Cadre	Non-Professional	0	0%
	Probationer/Graduate	0	0%
	Associate	199	85.4%
	Fellow	34	14.6%
	Total	**233**	**100%**
Years of Experience	0 - 5 years	10	4.3%
	5 - 10 years	56	24%
	10 - 15 years	129	55.4%
	Above 15 years	38	16.3%
	Total	**233**	**100%**
Aspects of Real Estate Engagement	Environmental Impact Assessment (EIA)	12	5.2%
	Agency	233	100%
	Management	214	91.8%
	Marketing	212	91%
	Land Acquisition& Subdivision	64	27.5%
	Property Development	39	16.7%
	Valuation	233	100%
	Feasibility / Viability Studies	41	17.6%
	Total	**233**	**100%**
Properties Mgt Portfolio Locations	AMAC	190	81.5%
	Abaji	0	0%
	Bwari	38	16.3%
	Gwagwalada	1	0.43%
	Kuje	3	1.3%
	Kwali	0	0%
	Total	**233**	**100%**

Source: Field Survey, 2025

Table 1 provides valuable information about the demographic and professional features of estate surveyors and valuers working within the Abuja real estate market. The study reveals a pronounced gender disparity in estate surveying and valuation profession, with males representing 83.7% and females 16.3% of respondents, indicating the preservation of conventional male dominance in Abuja's real estate sector. Practitioners are highly educated, with 81.5% possessing Higher National Diplomas (HND) or Bachelor of Science (B.Sc.) degrees, and 18.5% holding Master of Science (M.Sc.) or Doctor of Philosophy (PhD) degrees. Entry requires a minimum of an O'Level certificate, followed by professional examinations. The professional cadre is primarily comprised of Associate professionals (85.4%), with a lesser proportion of Fellows (14.6%), and all participants were professional members of the Nigerian Institution of Estate Surveyors and Valuers.

The majority of the respondents had considerable professional experience, with 55.4% possessing 10-15 years and 24% having 5-10 years. All participants (100%) engaged in valuation and agency. Furthermore, 91.8% engage in property management and 91% include real estate marketing, while a lesser proportion engages in land acquisition (27.5%), property development (16.7%), and feasibility studies (17.6%). A limited number of respondents (5.2%) engaged in Environmental Impact Assessments (EIAs) which suggested that sustainability practices remain uncommon among estate surveyors and valuers. Property management portfolios of respondents are predominantly located in the Abuja Municipal Area Council (AMAC) (81.5%), with minimal representation in Bwari (16.3%), Gwagwalada (0.43%), and Kuje (1.3%), indicating these regions possess limited investment attractiveness due to market demand, infrastructure, and economic considerations.

2.4 Effect of Affordability on Demand for GB in the Abuja Property Market

The research investigates key elements, including client perceptions about costs together with property maintenance expenses as well as financial barriers which shape sustainable property demand. These factors not only influence individual purchasing decisions but also have broader implications for market stability and growth. Understanding how affordability affects demand can help stakeholders develop strategies that enhance access to housing and promote sustainable development in the region. The study uses statistical data analysis based on logistic regression to identify the barriers which make affordable green buildings less accessible. The research findings analyse cost-related obstacles experienced by prospective buyers and tenants with possible remedies to increase the availability of green construction technology.

The Abuja property market's green building adoption was further analysed through the ordinal logistic regression model, as shown in Tables 2, 3 and 4.

Table 2: Descriptive Statistics of Ordinal Logistic Regression on Affordability Factors

Affordability Factor	Mean Score	Standard Deviation
The 33% of income earmarked for housing is inadequate	4.39	1.02
Most civil servants cannot afford green buildings	4.37	1.14
Initial capital to acquire green buildings is exorbitant	4.35	1.00
Green building rents are excessively high	4.25	1.06
The cost outweighs the benefits of GB to most clients	4.19	1.20
Green buildings are very costly to maintain	2.44	1.32
Inaccessibility of mortgage facility	4.31	1.10
Where available, interest rate on mortgage is very high	4.29	1.15
Conditions attached to loan security are not favourable	4.22	1.12
GB materials cost contribute to unaffordability of GB	4.34	1.09

Table 3: Logistic Regression Model Parameter Estimates

Variable	Coefficient	Standard Error	t-statistic	p-value	95%Confidence Interval
Constant	-4.12	1.88	-2.19	0.029	(-7.80, -0.44)
Mean Score	1.07	0.41	2.61	0.009	(0.27, 1.87)

Table 4: Model Fit Statistics of the Ordinal Logistic Regression

Metric	**Value**
Log-Likelihood (Null Model)	-1475.44
Log-Likelihood (Full Model)	-1175.88
Chi-Square Statistic	599.12
Degrees of Freedom	4
p-value	0.000

3. Results and Discussion

Table 2 contains descriptive statistics about affordability variables used in the systematic analysis of Abuja's green building market's adoption through ordinal logistic regression. Relevant data points show the extent of respondent agreement regarding what makes it difficult for them to adopt green building practices. The most commonly agreed upon affordability factor scored by study participants was that housing 33% of income is insufficient to afford green buildings. The mean rating reached 4.39 with a standard deviation of 1.02. Numerous survey participants show unanimous agreement regarding the insufficient nature of the current income distribution towards green housing expenses.

The affordability concerns for civil servants and the high acquisition costs of green buildings remained closely related, as indicated by mean ratings at 4.37 and 4.35. Study participants view both affordability barriers as important hindrances based on the distributions of their responses. Renter respondents rated green building lease prices as being too expensive (mean = 4.25; SD = 1.06). At the same time participants gave high ratings to the idea that green buildings cost more than their benefits (mean = 4.19; SD = 1.20). Research participants demonstrate ongoing reservations about how green building expenses compare to traditional construction due to doubts about their total costs. This reflects persistent scepticism among potential adopters regarding the cost-effectiveness of green buildings compared to conventional alternatives.

Survey participants indicated strong disagreement toward the maintenance expenses associated with green buildings since their overall mean score reached 2.44 (Standard Deviation = 1.32). Results show that although acquisition costs as well as rent expenses create significant obstacles to affordability, ongoing maintenance costs do not pose as major barriers. Mortgage

financing limitations received equally high mean scores from respondents. The cited agreement reached a high level regarding the three major impediments to obtaining green buildings through mortgages (mean = 4.31, SD = 1.10; mean = 4.29, SD = 1.15; mean = 4.22, SD = 1.12). These findings demonstrate significant consensus on financial barriers to green building acquisition. Respondents determined that the cost of sustainable building materials hinders affordability, with a mean score of 4.34 (SD = 1.09).

The mean scores from participants demonstrating a high level of agreement reveal that property affordability problems run deep throughout the Abuja market concerning purchase expenses and rental costs, along with insufficient mortgage options. Maintenance expenses exhibit lower agreement levels than other factors, which demonstrates that initial purchasing obstacles continue to dominate the affordability concerns in the market.

Table 3 displays the computed parameter estimates from performing ordinal logistic regression to study the relationship between financial viability (affordability) factors and demand for green buildings in the Abuja real estate market. The table contains parameter estimates together with standard errors, t-statistics and p-values along with confidence interval margins for the model constant and the explanatory variable which uses the composite mean score of affordability factors. The fixed term from the model calculation produced a -4.12 value, while its standard error amounted to 1.88. The statistical significance of the constant at the 5% level derives from its t-statistic of -2.19 along with its p-value of 0.029. The negative value of the constant shows that, even without affordability worries, the adoption rate for green buildings remains low in the market.

Research results indicated that the Mean Score variable, which calculated the average respondent ratings across affordability factors, yielded a positive coefficient of 1.07. The results demonstrate that increased affordability concerns have a positive direct impact on reducing the chances of adopting green building practices. The obtained standard error value stands at 0.41 along with a t-statistic of 2.61, which produces a p-value of 0.009 that falls significantly below the accepted 0.05 threshold. The 95% confidence interval between 0.27 and 1.87 of the mean score coefficient demonstrates precise estimate accuracy as well as the unlikelihood of the true population parameter being either zero or negative. This outcome shows that each point increase in affordability concern average scores produces a substantial decrease in the log odds of taking up green buildings, thus similarly establishing affordability as a key barrier which agrees with the findings of of Dwaikat and Ali (2016) and Zhanget al., (2018). Therefore, the hypothesis (Ho) that there is no relationship between affordability variables and demand for green building in Abuja is rejected.

Table 4 shows the model fit statistics from a statistical analysis to determine the role of affordability factors in green building adoption within Abuja's real estate market. The statistical metrics present valuable information about how well the fitted model explains data along with its reliability when compared to a basic model. The log-likelihood value of the null model, measuring a model with just an intercept but no explanatory variables, amounted to -1475.44. The baseline log-likelihood value of -1475.44 functions as a standard to measure the improvement of the full model after including affordability parameters. The full model log-likelihood value became -1175.88 after adding the predictive variables, which indicated enhanced model-data alignment. Chi-square

statistics derive from the difference between these two log-likelihood values, and it reaches 599.12 in this analysis. The quantitative value from this measurement indicates how effectively the affordability factors boost the predictive power of the model for estimating green building adoption compared to the basic null model. The Degrees of Freedom (df) evaluates to 4 because the analysis model incorporates 4 explanatory variables. A p-value of 0.000 indicates statistical significance at a level far below 0.05. Statistical significance proves that the model fit improves meaningfully because the affordability factors are contained within it. The values from the fit statistics confirm that adding affordability factors as predictors in the ordinal logistic regression model creates a better explanation of green building adoption compared to a model missing these predictors. Results from the chi-square value analysis and significant p-value demonstrate that affordability elements strongly influence property market adoption decisions in Abuja's real estate sector.

Research results showed that the Mean Score variable, which calculated the average respondent ratings across affordability factors, yielded a positive coefficient of 1.07. The results demonstrate that increased affordability concerns have a positive direct impact on reducing the chances of demanding green building. The obtained standard error value stands at 0.41 along with a t-statistic of 2.61, which produces a p-value of 0.009 that falls significantly below the accepted 0.05 threshold. The 95% confidence interval between 0.27 and 1.87 of the mean score coefficient demonstrates precise estimate accuracy as well as the unlikelihood of the true population parameter being either zero or negative. This outcome indicates that for each one-point increase in the average scores of affordability concerns, there is a significant decrease in the log odds of adopting green buildings, thereby reinforcing the idea that affordability is a major barrier. Therefore, the hypothesis (Ho) that there is no relationship between affordability variables and demand for green building in Abuja is rejected.

4. Conclusion and Recommendation

Conclusively, green buildings are found to be very expensive, and affordability is a major determinant of their demand. The results demonstrated that increased affordability concerns have a positive direct impact on reducing the chances of demanding green building.

Accommodation, being one of the social responsibilities of government, should attract both short-term and long-term policy intervention from government through the provision of low-interest mortgage finance, incentives for developers and direct involvement in green building development that will culminate in subsidized green building. Such initiatives could not only alleviate financial burdens for potential homeowners but also promote sustainable living in the society. By prioritizing eco-friendly construction, the government could foster a culture of environmental responsibility while simultaneously addressing housing shortages.Furthermore, the government should set machinery in motion for long-term strategies, namely capacity building for stakeholders, industry training, regulatory frameworks, etc. Developers should also take special interest in developing low-

income green buildings that will take advantage of weather elements to provide natural lighting and internal air quality for occupants.

In summary, to increase the accessibility of green buildings, the government should undertake the combination of incentive programmes and subsidies together with alternative financing models and financial support required to overcome initial investment as well as enact regulatory frameworks for sustainable buildings. If recommendations are pursued by both state and non-state actors, demand for green building would improve.

References

Babatunde F. A., (2017), Factors of affordability in housing in the city of Ibadan, Nigeria. A Ph.D Thesis submitted to the Department of Urban and Regional Planning Faculty of Built Environment, universiti Teknologi Malaysia

Crawford, R. H (2021). Greenhouse Gas Emissions of Global Construction Industries. *In Proceedings of the Creative Construction Conference (CCC2021), Budapest,Hungary,*28–30 June2021

Dwaikat, L. N.; Ali, K. N. (2016) Green buildings cost premium: Are view of empirical evidence. *EnergyBuild.*110, 396–403.

Geng, Y.; Ji, W.; Wang, Z.; Lin, B.; Zhu, Y. (2019). A review of operating performance in green buildings: Energy use, indoor environmental quality and occupants at is faction. *Energy Build.*, 183, 500–514.

Juan, Y. K., Chi, H. Y., and Chen, H.H.(2021).Virtual Reality-based decisionsupport model for interior design and decoration of an office building. *Eng. Constr. Archit. Manag.* 28(1), 229–245. doi: 10.1108/ECAM-03-2019-0138.

Juan, Y. K., Hsing, N. P., and Hsu, Y. H. (2019). Applying the Kano two dimensional model and quality function deployment to develop sustainable planning strategies for public housing in Taiwan. *Journal Housing and Built Environment.* 34(1).

International Energy Agency, (2023). Buildings- Energy System - IEA. www.iea.org
Koirala, B. S., Bohara, A. K., & Berrens, R. P. (2014). Estimating the net implicit price of energy efficient building codes on US households. *Energy Policy*, *73*, 667–675.

Li, Y., Rong, Y., Ahmad, U. M., Wang, X., Zuo, J., and Mao, G. (2021). A comprehensive review ongreen buildings research: Biometric analysis during 1998–2018. *Environmental. Science*. 265–282. doi:10.1007/s10901-018-9627-

Lin, L. W., (2021). Mandatory corporate social responsibility legislation around the world: Emergent varieties and national experiences, 23. *University of Pennsylvania Journal of Business Law.* 429. Available at: https://scholarship.law.upenn.edu/jbl/vol23/iss2/3

Meena, C. S., Kumar, A., Jain, S., Rehman, A. U., Mishra, S., Sharma, N. K., Bajaj, M., Shafifiq, M., Eldin, E. T., (2022). Innovation in green building sector for sustainable future. *Energies* 2022, 15, 6631.

Oyebode, O. J. (2018). Green building: Imperative panacea for environmental sustainability and life cycle construction in Nigeria. *World Journal of Research and Review (WJRR,)* ISSN: 2455- 3956. 7, (3), 15-29.

Ramakrishna,N.,Abjijeet,R.,Prateek,A.andAnkit,S.(2021).Greenbuildings, sustainability and value premium: An empirical study of pune. *Proceedings of the 2nd International Conference on Sustain ability and Equity (ICSE-2021),*2,14-22.

Razali, M. N.; Yunus, M., N.; Zainudin, A. Z. andLee Y. M, J.(2017) Sustainable property development by Southeast Asian property companies. *Property Management*, 35,109–126.

Robinson, S., Simons, R., Lee, E., & Kern, A. (2016). Demand for green buildings: Office tenants' stated willingness-to-pay for green features. *Journal of Real Estate Research*, *38*(3), 423–452.

Royal Institute of Chartered Surveyor (2023). Sustainability Report 2023: Global challenges and opportunities for real estate and construction. RICS. rics.org

Royal Society and National Academy of Science (2020). *Climate Change: Evidences andCauses.*Update2020.

UN-HABITAT, (2014). *Sustainable building design for tropical climates: principles and applications for Eastern Africa.*UN-Habitat. Unhabitat.org

Taiwo, A. and Adeboye, A. (2013). Sustainable housing supply in Nigeria through the use of indigenous and composite building materials. *Civil and Environmental Research.3,79-84. https://core.ac.uk/download/pdf/234677536.pdf*

United States Environmental Protection Agency (2024). Green Building. *https://www.epa.gov*

Zhang, Y., Kang, J., and Jin, H. (2018). A review of green building development in China from the perspective of energy saving. *Energies*, 11(2), 334doi:10.339.