

Assessment of Barriers and Strategies to Sustainable Property Management in Jos, Plateau State

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Received: 30/09/2024

Revised: 25/10/2024

Accepted: 18/11/2024

The global emphasis on ensuring sustainability across all industries will inevitably have an impact on the real estate sector. This study examines the state of sustainable property management practices in Nigeria, with a focus on the strategies and challenges encountered by property managers in Jos, Plateau State. This study looks at the methods and challenges of sustainable property management in Jos, Nigeria, by distributing a structured questionnaire to 20 estate surveying and valuation companies. Of the responses, 19 were helpful. Purposive sampling is used in this study, which focuses on registered companies in the Jos branch of the Nigerian Institution of Estate Surveyors and Valuers. Binary Logistic and descriptive statistics were employed in the data analysis to gauge the perceived importance of the variables affecting sustainable practices. The findings indicate that technological expertise (mean value 4.05) and economic stability (mean ranking 4.26) were two major barriers to sustainable property management in the study area. Important sustainability strategies like increasing waste recycling and reducing water waste are highlighted in the study. The logistic model explains about 50% of the cases of no barriers on sustainable property management practices, 72.7% for its significance effect, and it correctly classifies 63.2% of the included cases. Major barriers to sustainable property management (SPM) were found by the binary logistic regression to be sustainable building design, financial constraint and lack of awareness. Promoting sustainable management in the real estate industry requires addressing these issues with focused interventions, like financing and training.

Keywords: Economic Stability, Logistic Regression, Property Management Practices, Real Estate, Sustainability

<https://dx.doi.org/10.4314/etsj.v15i2.18>

Introduction

Global concern over climate change has increased dramatically in recent years. The built environment must be more sustainable in order to mitigate the impact of human activities on the planet's resources and climate change. Due to the consequences of climate change and the challenges it presents, sustainable property management has gained popularity recently, particularly in industrialized nations (Alohan & Oyetunji, 2021). Ensuring sustainability across all industries has become a global concern (Agboola *et al.*, 2023). The real estate industry now has to key and deal with sustainability (Zhang *et al.*, 2011). Real estate accounts for about 40% of global carbon dioxide emissions, with building activities accounting for 70% and construction for the remaining 30% (Lu *et al.*, 2020).

Serving as the representative of the owner is an important part of managing property, regardless of whether it be residential or commercial. It entails tasks including rent collection, property upkeep, tenant relations, and ensuring that all legal requirements are met. Property managers are also responsible for marketing, leasing, and presenting financial information (Power, 2021). Modern building technology and the advent of smart buildings have increased the complexity and competitiveness of the real estate market, making the application of sustainable management techniques necessary to ensure the best possible returns (Power,

2021). According to Chikwuado and Uchenna (2020), sustainable property management in the context of real estate management and value encompasses more than only directing, controlling, and coordinating. The emergence of sustainable management requires today's property managers to reconsider, innovate, and employ technicalities to increase the value of properties even more without compromising the environment. Energy use, water use, indoor quality of air, material use (including waste reduction), land use, and training for both builders and end users are some of the sustainability needs for contemporary property management (Coraglia *et al.*, 2024).

One of the many obstacles to sustainable property management in Jos is the scarcity of environmentally friendly supplies and equipment. lack of knowledge regarding the advantages and application of sustainable techniques. Furthermore, the implementation of green strategies is hampered by a lack of regulatory support, and investment may be discouraged by high initial costs. The transition to sustainability is made more difficult by cultural beliefs and conventional construction techniques. Even though these difficulties are acknowledged, empirical research on sustainable property management, particularly in Jos, is severely lacking. The distinct socioeconomic and environmental circumstances have not been specifically addressed in any of the previous research that have been conducted in

the study region. There is an urgent need for remedies to protect our way of life for coming generations. Since no two assets are alike, property is regarded as unique. Without knowledge of the obstacles to sustainability, it is impossible to evaluate a property's degree of sustainability. However, the study intends to examine the obstacles and strategies to sustainable property management practices in Jos, Plateau State.

Literature Review

Concept of sustainability and sustainable property management

The objective of establishing a compassionate, equitable, and nurturing global community that acknowledges the intrinsic value of human dignity for everyone has prompted researchers globally to concentrate on sustainability studies (Phillips, 2024). Otali and Ujene (2020) asserted that sustainability is "that which can be sustained; in ecology, the extent to which the earth's resources may be utilized without adverse effects." Sustainable development is defined as that which "meets the needs of today's generation without compromising the ability of future generations to meet their own needs (WCED, 1987).

These criteria underscore the necessity of diligently protecting the earth's natural resource base to guarantee societal social, economic, and environmental welfare. During these discussions, it is asserted that property managers are strategically positioned to address tenant demands and alter views of sustainability in both public and private environments within the buildings they manage.

Wiegelmann and Falcão (2024) stated that property management refers to a field which includes the utilization of skills to properly care for the property in order to maximize the owner's investment and produce the maximum return. A key emphasis of sustainable property management is maximizing the effectiveness and effectiveness of resources such as water and energy. Sustainable property management entails overseeing real estate that is economically viable and environmentally friendly, positively impacting both the ecosystem and the quality of life for residents (Philokyrou & Michael, 2021). However, property owners engage property managers to supervise and administer their properties (Wiegelmann & Falcão, 2024).

The three dimensions of sustainable development, preservation of the natural environment/ecosystem, safeguarding of fundamental natural resources, protection of human health is utilised by Fatourehchi and Zarghami (2020) to categorize sustainable structures and their management. In addition, according to the Royal Institute of Chartered Surveyors (2009), sustainable property management seeks to reduce the costs associated with a building's life cycle by

examining every aspect of the development, including the extraction of raw materials, production, usage, repair, maintenance, the disposal and recycling. Developing a culture of environmentally friendly procedures in property management demands taking risks and trying to innovate, which can cut expenses, raise output, and promote customer satisfaction.

From a broader viewpoint, Kauko (2018) stated that there has seemingly been a movement in the real estate sector's perception from green features to entire sustainability, which includes property management. Because sustainability criteria assist the property occupier, they are seen as fundamental components of modern management approaches. According to Trinkūnas *et al.* (2018), the development of property management strategies needs consideration of different national characteristics, including but not limited to economic, social, demographic, political, technical, environmental and psychological issues. Regarding the positive effects of sustainability for the real estate and property management businesses, Kats and Capital (2003) claimed that eco-friendly aspects can dramatically cut energy, water, and waste expenditures, as well as emissions and environmental expenses. There are various benefits of sustainability in the real estate business as shown by several studies, including Ding (2005) and Lai and Lorne (2019). These studies also affirm that sustainability helps real estate enterprises' internal and external stakeholders, notably owners, investors, and employees, in addition to environmental protection. This bundle of advantages decreases input costs and maximizes earnings while representing economic, social, and environmental benefits. help boost property management's sustainable returns.

Barriers and strategies to sustainable property management

The continuously growing nature of property management indicates that there are likely to be impediments capable of impeding the complete incorporation of sustainable management practices into the sustainability agenda among companies. The amount of dedication to sustainable property management practice may also be seen from the point of view of government attention to the notion of sustainability generally. At the governmental level and originating from many UN resolutions, many countries, particularly wealthy ones, notably the UK, have established laws and regulations aimed at giving legislative legitimacy to issues of sustainability. Researchers have underlined the clear role the property management profession can play in furthering the sustainability agenda by virtue of its potential influence on sustainability goals in enterprises (Luetz *et al.*, 2019). Guribie *et al.* (2022) emphasised that notwithstanding the development of green

buildings, there are hurdles to both the building and management of sustainable buildings.

Table 1: Barriers and Strategies to Sustainable Property Management

Barriers	Strategies
Economic Stability	Reduce water wastage
Technological knowhow	Waste recycling
Government policy on sustainability	Energy efficiency and conservation
Sustainable Building Design	Use of renewable resources
Incorporating sustainability in the management plan	Enhancing Tenants safety
Financial Constraint	Eco-friendly material used by tenants
Lack of Awareness	Incorporating sustainability clause in tenancy agreement
	Waste management
	Consideration of the environment in property operation

Source: (Debrah *et al.*, 2022; Ikediashi *et al.*, 2012; Elmualim *et al.*, 2010; Amaral *et al.*, 2020; Sodiq *et al.*, 2019)

Study Area

The Local Government Areas (LGA) of Jos South and Jos North are included in the study. Before 1991, these Local Governments were controlled by a single Local Government Council; however, to promote effective administration, they were split into Jos North and Jos South Local Governments, respectively (Aliyu *et al.*, 2015; Mallo & Anigbogu, 2009). 429,300 people are living in the Jos North Local Government Area and 306,716 people live in Jos South (National Population Commission, 2006). The Jos North and South Local Government Areas are both referred to as "Jos" throughout this study. The majority of the properties in the study area are of residential and commercial types. Urban sustainability is vitally needed in Jos due to the city's rapidly growing population. To guarantee adequate, effective and efficient coverage, the research is restricted to the Jos metropolis. Further, it is restricted to Jos estate surveying and valuation firms, confining it to on estate surveying and valuation firms in Jos provides data from trained professionals, anchoring findings in acknowledged best practices for sustainable property management.

Research Methodology

The data were acquired using a standardized questionnaire to gather the essential data from twenty estate surveying and valuation firms. There were 20 registered Estate Surveying and Valuation Firm (Nigerian Institution of Estate Surveyors and Valuers, NIESV Directory, 2024). Purposeful sampling strategy was adopted. When working with a tiny population, the optimum sampling strategy is frequently purposive sampling (also known as judgmental sampling). With a tiny population size, the total number of people may be limited, making random sampling problematic or impossible (Baltes & Ralph, 2022). The population is tiny, the total population was chosen as the sample size. Nineteen of the twenty survey questionnaires that were distributed and returned from the respondents.

Descriptive statistics and Binary logistics were applied to present the findings of the analysis of the collected data. Binary logistic regression was employed to determine the effects of barriers to sustainable property management. The method is specifically designed for scenarios where the dependent variable is binary, making it ideal for assessing whether certain barriers to sustainable property management are present or absent. According to Mcdonald (2014), logistic regression is used to analyse data that have one nominal variable with two values (e.g. male/female, dead/alive, true/false) and one measurement variable. The independent variables were the barriers to sustainable property management which were lack of awareness, economic technological know-how, Government Policy on sustainability, Sustainable Building Design, incorporating sustainability in management plan and financial constraint.

Results and Discussion

Demographic information of respondents

The demographic data of the respondents presented on Table 2, provides valuable insights into the composition of the firm. In terms of position, a notable 26.3% are pupil surveyors, indicating a strong presence of early-career professionals, while branch managers represent 21.1%, reflecting a significant leadership layer. Regarding firm establishment, 26.3% of respondents have worked in firms established for over 20 years, suggesting a blend of experience and stability within the industry.

Experience in property management shows that 31.6% of respondents have over 21 years of experience, highlighting a wealth of expertise among the team. The professional qualifications reveal that 57.9% of respondents hold ANIVS status, which emphasizes a high level of professional certification. Overall, the data illustrates a diverse mix of experience and roles, contributing to a well-rounded workforce equipped to handle various challenges in property management.

Table 2: Demographic Information of respondents

	Information	Frequency (n)	Percent (%)
Position in firm	Principal/managing partner	2	10.5
	Associate partner	3	15.8
	Branch manager	4	21.1
	Head of department	2	10.5
	Pupil surveyor	5	26.3
	Graduate/probationer	3	15.8
	Total	19	100
Year of firm establishment	1-5years	2	10.5
	6-10years	3	15.8
	11-15years	4	21.1
	16-20years	2	10.5
	Above20years	8	26.3
	Total	19	100
Experience in Property management	0-5years	2	10.5
	6-10years	5	26.3
	11-15years	4	21.1
	16-20years	2	10.5
	21yearsandabove	6	31.6
	Total	19	100
Professional qualification	Probationer/graduate	8	42.1
	ANIVS	11	57.9
	Total	19	100

Barriers to sustainable property management

Table 3 reveals respondents' views on key factors influencing property management, with economic stability rated highest at a mean of 4.26, underscoring its importance in investment decisions. Technological know-how follows closely at 4.05, indicating a strong reliance on advanced tools. Government policy on sustainability and sustainable building design also score well, at 3.95 and 3.84 respectively, highlighting their

roles in promoting eco-friendly practices. Incorporating sustainability into management plans is seen as moderately important (3.68), while financial constraints (3.58) and lack of awareness (3.50) suggest challenges and opportunities for improvement. Overall, the findings attested to the findings of Lai and Lorne (2019); Debrah *et al.* (2022) and Dawidowicz *et al.* (2020) that there is need greater focus on sustainability within the property management sector.

Table 3: Barriers to Sustainable Property Management

Statement	Mean	Std. Dev.	Ranking
Economic Stability	4.26	1.24	1 st
Technological knowhow	4.05	0.911	2 nd
Government policy on sustainability	3.95	1.026	3 rd
Sustainable Building Design	3.84	0.898	4 th
Incorporating sustainability in the management plan	3.68	1.108	5 th
Financial Constraint	3.58	1.058	6 th
Lack of Awareness	3.50	1.05	7 th

Strategies for sustainable property management

Table 4 indicates the average ranking of techniques for sustainable property management in the study area. Reducing waste water came in first, followed by recycling waste, energy efficiency and conservation, using renewable resources, tenant safety,

environmentally friendly supplies used by tenants, incorporating a sustainability clause in the tenancy agreement, managing waste and considering the environment when operating the property, in that order. The findings are in line with the findings of Amaral *et al.* (2020) and Sodiq *et al.* (2019).

Table 4: Strategies for Sustainable Property Management

Statement	Mean	Std. Dev	Rank
Reduce water wastage	4.21	0.976	1 st
Waste recycling	4.16	0.958	2 nd
Energy efficiency and conservation	4	1.106	3 rd
Use of renewable resources	3.89	1.049	4 th
Enhancing Tenants safety	3.74	1.195	5 th
Eco-friendly material used by tenants	3.47	1.124	6 th
Incorporating sustainability clause in tenancy agreement	3.37	0.895	7 th
Waste management	2.95	1.311	8 th
Consideration of the environment in property operation	2.95	1.311	9 th

Binary regression model for barriers on sustainable property management practice

Table 5 presents the results of the logistic regression with the constant only included before any coefficients (i.e. those relating to economic stability, technological know-how, government policy on sustainability, sustainable building design, incorporating sustainability in management plan. Financial constraint, lack of

awareness) are entered into the equation. Logistic regression compares this model with a model including all the predictors to determine whether the latter model is more appropriate. The table suggests that if we knew nothing about our variables and guessed that there are barriers to sustainable property management, we would be correct 57.9% of the time.

Table 5: Classification Table

Observed Y	Predicted Y [0(Low effect)]	Predicted Y [1(High effect)]	Percentage correct
0	0	8	0.0
1	0	11	100.0
Overall Percentage			57.9

The cut value is 0.500

Table 6 illustrates the variables in the equation, which is the constant term at the moment. It can be realized that the intercept-only model has $\ln(\text{odds}) = 0.318$. If we exponentiate both sides of this expression we find that our predicted odds $[\text{Exp}(B)] = 1.375$. That is, the predicted odds of barriers to sustainable property management practice are 1.375. Since 11 of the sampled

persons suggest there is barriers to property management practice and 8 have suggest less effect on sustainable management practice, our observed odds are $11/8 = 1.375$. Wald statistic is computed and since it is 0.470, the null hypothesis is accepted, indicating that the constant does not make a significant contribution to the model.

Table 6: Variable in the Equation

Observed Y	B	S.E	Wald	df	sig.	Exp(B)
Constant.318	.465	.470	1		.493	1.375

The variables not in the equation table tell us whether each independent variable improves the model in Table 7. The answer is yes for variables X1 (Economic Stability) X7 (Lack of Awareness), as both are

significant and if included would add to the predictive power of the model. The other barriers seem to be not important at this step, the overall significance P-value of 0.820 shows that the logistic model is of high value.

Table 7: Variable Not in the Equation

Variables	Score	df	sig.
X1	.966	1	.002
X2	.146	1	.702
X3	.939	1	.006
X4	.723	1	.126
X5	1.210	1	.271
X6	.571	1	.321
X7	.979	1	.001
Overall Statistics	3.645	7	.820

Table 8 presents the model chi square value of 4.765, with 7 degrees of freedom, and a probability value of p

= 0.689. Thus, the indication is that the model has a poor fit, with the model containing only the constant, while the predictors do have a significant effect.

Table 8: Omnibus Tests of Model coefficients

Step 1	Chi-square	df	sig.
Step	4.765	7	0.689
Block	4.765	7	0.689
Model	4.765	7	0.689

Although there is no close analogous statistic in logistic regression to the coefficient of determination R^2 , the Model Summary in Table 9 provides some approximations. In our case its value (Nagelkerke's R^2)

is 0.298, and that of (Cox & Snell R^2) is 0.222, indicating a medium relationship between the predictors and the prediction. Under Model Summary the value of the -2 Log Likelihood statistic is 21.099.

Table 9: Model Summary

Step 1	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	21.099	.222	0.298

Estimation terminated at iteration number 20 because maximum iterations have been reached. Final solution cannot be found

Table 10 illustrates Hosmer-Lemeshow (H-L) test. The statistic under consideration has a Chi-square value of

6.571 and significance of 0.584 which means that it is statistically significant and therefore leading to the fact that the model is quite a good fit.

Table 10: Hosmer and Lemeshow Test

Step 1	Chi-square	df	sig.
1	6.571	8	0.584

Considering Table 11, it can be realized that it is a classification table, including the constant term and the rest of the predictors. It reveals that 50.0% were correctly classified for the low effect of barriers to sustainable property management practice while 72.7%

for high effect of barrier to sustainable property management practice. And overall, 63.2% of the cases were correctly classified. This is a considerable improvement on the 57.9% correct classification with the constant model, indicating that the model with predictors is a significantly better one

Table 11: Classification Table

Observed Y	Predicted Y [0 (Low Effect)]	Predicted Y [1 (High effect)]	Percentage correct
0	4	4	50.0
1	3	8	72.7
Overall Percentage			63.2

The cut value is 0.500

Table 12 is about the variables that are included in the logistic regression equation. This is illustrated in the following equation:

$$\text{Ln(odds)} = -1.456 + 0.333(\text{ES}) - 0.545(\text{TK}) - 0.307(\text{GPS}) + 0.001(\text{SBD}) + 0.932(\text{ISMP}) + 20.827(\text{FC}) + 20.84(\text{LA})$$

Wald statistic states that the barriers such as sustainable building design, financial constraint and lack of

awareness are the statistically significant factors, while other factors are not.

Table 12: Variables in the Equation

Step	B	S.E.	Wald	Df	Sig.	Exp(B)	95% C.I.for EXP(B)	
							Lower	Upper
X1	0.333	1.098	0.762	1	0.092	1.395	0.162	12.003
X2	-0.545	1.341	0.684	1	0.165	0.58	0.042	8.025
X3	-0.307	1.317	0.815	1	0.054	0.735	0.056	9.718
X4	0.001	1.248	0.999	1	0	1.001	0.087	11.544
X5	0.932	1.099	0.397	1	0.719	2.539	0.294	21.895
X6	20.827	23141.684	0.999	1	0	1.11E+09	0	.
X7	20.845	23141.684	0.999	1	0	0	0	.
Constant	-1.456	4.802	0.762	1	0.092	0.233		

Finally, the case-wise list of Table 13 produces a list of cases that did not fit the model well (outliers). If there are large number of cases, this may reveal the need for further explanatory variables to be added to the model. But fortunately, only three case (No. 11, 15 and 19) falls into this category and therefore the model is reasonably sound (this are the only three persons that did not fit into

the general pattern). We do not expect to obtain a perfect match between observation and prediction across a large number of cases. Excessive outliers should be retained as they can affect results significantly. The standardized residuals for outliers (ZResid) should be inspected and removed if they are > 2.58 (outliers at the .01 level). And in table 13 it is 1.151 is the maximum.

Table 13: Casewise List^b

Case	Selected Status	Observed Y	Predicted	Predicted	Resid	ZResid
11	S	0	.411	0	.411	-.835
15	S	1**	.430	0	.570	1.151
19	S	0**	.598	1	-.598	-1.219

a. S = Selected, U = Unselected cases, and ** = Misclassified cases.

b. Cases with studentized residuals greater than 2.000 are listed.

Conclusion

In conclusion, the study underscores the essential aspects influencing property management, with technological know-how and financial constraint are the two most paramount barriers. This interaction of obstacles emphasizes the need for focused interventions, such more financing and specialized training courses, to support sustainable management in the real estate industry. A more sustainable approach to property management and the accomplishment of more general environmental objectives depends on addressing these issues. The examination of barriers to sustainable property management emphasizes the necessity of better comprehension and technological integration, especially among seasoned professionals. There is agreement on effective sustainable practices, as seen by the high ranking of strategies like recycling trash and reducing water waste. All things considered; this study emphasizes how critical it is for the property

management industry to make a conscious effort to become more sustainable. A binary logistic regression analysis was conducted to predict barrier of sustainable property management practice. All factors considered were not statistically significant but are considered as important factors for sustainable property management practices.

Based on the outcomes of this study, it is advised that property management organizations focus raising knowledge and training regarding sustainable practices among their staff. Investing in technical improvements is vital, as it can greatly aid in overcoming barriers to sustainable property management. Additionally, incorporating sustainability terms in rental agreements is also recommended to ensure that renters are aware of their obligations in sustaining eco-friendly standards. Regular assessments of water waste and recycling activities should be performed to measure success and identify areas for improvement. Collaboration with

industry professionals and organizations can further strengthen the implementation of innovative sustainable methods. Finally, continuing education initiatives on sustainability should be implemented to nurture a culture of environmental responsibility within the sector.

Limitation of the Study: this study limited to the Jos metropolitan area and does not reflect the specific issues in other regions of Nigeria. Additionally, its reliance on quantitative analysis overlooks the qualitative intricacies of respondents' experiences. Future research can take a mixed-methods approach for a more thorough knowledge of sustainable property management.

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