

WILLINGNESS TO PAY FOR INTANGIBLE ENVIRONMENTAL AMENITIES  
IN ANGUWAN ROGO-ANGUWAN RIMI, JOS, NIGERIA

ABDULAZEEZ ADAM MUHAMMAD

A dissertation submitted in partial fulfillment of the  
requirements for the award of the degree of  
Master of Science (Real Estate)

Faculty of Geoinformation and Real Estate  
Universiti Teknologi Malaysia

JUNE, 2016

## ACKNOWLEDGEMENT

I remain grateful to Almighty Allah for His guide, endless favor on me in this life and for seeing me through this programme.

I am deeply indebted to my supervisor Dr. HJ.IBRAHIM @ ATAN BIN SIPAN, who I will live to remember how he nurtured me throughout my stay in UTM as father, tutor, as well as role-model.

My appreciation goes to Dr. A.A. Aliyu for his support I say thank you. To my parents M. Adamu and Malama Khadija I appreciate everything. To my brothers Dr. Muhammad Muktar Adam, Dr. Abubakar Adam, M. Hassan thank you for your support. To my friends Arc. Yusuf, Abdunnasir, M.Muhammad Ishaq, Abdurrazaq, Umar D. Umar, Aliyu, Auwal Tela, Ja'afar, M. Yakubu police, M. Sulaiman Ibrahim thank you for your support. To my wife thank you for your understanding and support. Finally to all other friends, family and colleagues thank you for your prayers, support and help.

## ABSTRACT

Real estate is a package that extend beyond dwelling home but encompasses social, neighbourhood and environmental amenities and characteristics. The provision of basic amenities and services to accommodate the increasing population is among the major challenge of successive government in Nigeria. The property or rental values are influenced by residents' willingness to pay (WTP) for both neighbourhood and environmental amenities or characteristics. The aim of this dissertation is to evaluate the tenant willingness to pay for intangible environmental amenities in Anguwan Rogo-Anguwan Rimi Jos, Nigeria. A questionnaire survey was used with 389 household as total respondents, only 369 questionnaire were return and used for analysis. Among the 11 environmental variable, only 4 are found as amenities to be improved in the study area. Correlation analysis was used to find the relationship between monthly income and the willingness to pay for environmental variables. Among the 11 variables, only 3 seem to have significant relationship with the monthly income. This are electricity, household size and educational standard. The rental model was developed of willingness to pay environmental amenities using hedonic pricing concept, were the R value is 0.98 and the adjusted  $R^2$  value is 0.96 meaning that 96% of variance in WTP is predicted by all the 12 variables. The F value is 749.71 which is statistically significant. Out of the 12 independent variable, 7 variables are statistically significant. These includes improved drainage, air quality, water supply, waste dump site, accessibility, natural lightening as well as improved security with t value of 14.69, 7.43, 2.28, 23.61, 22.85, 26.94 and 9.72 respectively. It was recommended that the model can be used to evaluate tenant's willingness to pay for environmental amenities in Anguwan Rogo-Anguwan Rimi Jos, Nigeria.

## ABSTRAK

Harta tanah adalah satu pakej yang tidak hanya terhad pada penyediaan kediaman malah merangkumi sosial, kejranaan dan kemudahan alam sekitar dan ciri-cirinya. Penyediaan kemudahan dan perkhidmatan asas untuk menampung penduduk yang semakin bertambah adalah antara cabaran utama kerajaan Nigeria. Nilai harta atau sewa dipengaruhi oleh kesediaan penduduk untuk berbelanja bagi kejranaan dan kemudahan alam sekitar atau ciri-cirinya. Tujuan kajian ini adalah untuk menilai kesanggupan penyewa membayar untuk penggunaan kemudahan alam sekitar tidak ketara di Anguwan Rogo-Anguwan Rimi Jos, Nigeria. Tinjauan soal selidik telah digunakan dengan 389 isi rumah sebagai jumlah responden, hanya 369 soal selidik telah mengembalikannya dan digunakan untuk analisis. Antara 11 pembolehubah alam sekitar, hanya 4 pembolehubah yang perlu diperbaiki yang terdapat di kawasan kajian. Analisis korelasi digunakan untuk mencari hubungan antara pendapatan bulanan dan LPA bagi pembolehubah alam sekitar. Antara 11 pembolehubah, hanya 3 mempunyai hubungan yang signifikan dengan pendapatan bulanan. Pembolehubah itu adalah elektrik, saiz isi rumah dan standard pendidikan. Model sewa telah direka berdasarkan kesediaan untuk membayar kemudahan alam sekitar menggunakan konsep harga hedonik, nilai R adalah 0.98 dan nilai R<sup>2</sup> diselaraskan adalah 0.96 yang bermaksud bahawa 96% daripada varians dalam LPA diramalkan oleh semua 12 pembolehubah. Nilai F adalah 749,71 yang secara statistiknya adalah signifikan. Daripada 12 pembolehubah bebas, 7 pembolehubah secara statistiknya adalah signifikan. Ini termasuk saliran yang lebih baik, kualiti udara, bekalan air, tapak pembuangan sisa, kecapaian, pencahayaan semulajadi serta keselamatan yang lebih baik dengan nilai t pada 14.69, 7.43, 2.28, 23.61, 22.85, 26.94 dan 9.72 bagi setiap pembolehubah yang dinyatakan. Model ini disyorkan untuk digunakan bagi menilai kesanggupan penyewa membayar untuk penggunaan kemudahan alam sekitar di Anguwan Rogo-Anguwan Rimi Jos, Nigeria

## TABLE OF CONTENT

CHAPTER	TITLE	PAGE
	<b>DECLARATION</b>	<b>ii</b>
	<b>ABSTRACT</b>	<b>iv</b>
	<b>ABSTRAK</b>	<b>v</b>
	<b>TABLE OF CONTENT</b>	<b>vi</b>
	<b>LIST OF TABLES</b>	<b>x</b>
	<b>LIST OF FIGURES</b>	<b>xii</b>
	<b>LIST OF SYMBOLS</b>	<b>xiii</b>
	<b>LIST OF APPENDICES</b>	<b>xiv</b>
	<b>LIST OF ABBREVIATIONS</b>	<b>xv</b>
<b>1</b>	<b>INTRODUCTION</b>	<b>1</b>
	1.1 Background to the Study	1
	1.2 Statement of the Problem	4
	1.3 Research Questions	5
	1.4 Aim of the Study	5
	1.5 `Objective of the Study	6
	1.6 Scope of the Study	6
	1.7 Significance of the Study	7
	1.8 Methodology	7

1.9	Chapter Layout	9
1.10	Conclusions	10
<b>2</b>	<b>LITERATURE REVIEW</b>	<b>11</b>
2.1	Background to the Study	11
2.2	The Concept of Property	11
2.3	Real Estate Perspective	12
2.4	The Property Market	13
	2.4.1 The Residential Property Market	14
2.5	Factors Affecting Residential Property Price	15
2.6	Housing Attributes and Variables	17
	2.6.1 Physical Characteristics	17
	2.6.2 Neighbourhood Variables	18
	2.6.3 Environmental Amenity (Variable)	20
	2.6.3.1 Effects of Environmental Amenities on Property Values	22
2.7	Monthly Income	23
2.8	The Local Government	23
	2.8.1 Function of Local Government	24
	2.8.2 Source of Finance of the local government	24
2.9	Methodology for Valuing Environmental Amenities	24
	2.9.1 Stated Preference	25
	2.9.2 Revealed Preference or Hedonic Analysis	26
2.10	The Nature of Value: Definition of value	28
	2.10.1 Concepts of Value	30
	2.10.1.1 Open Market Concept of Value	30
	2.10.1.2 Cost Concept of Value	31
	2.10.1.3 Economic Concept of Value	31
	2.10.2 Type of Value	31
	2.10.3 Factors Affecting Residential Land Value	33

2.11	Willingness to Pay	33
<b>3</b>	<b>METHODOLOGY</b>	<b>35</b>
3.1	Introduction	35
3.2	Research Methodology	35
3.3	Population and Sample Size of the Study	38
3.3.1	Household	38
3.3.2	Sample Size	38
3.3.3	Method of Sampling	39
3.4	Method of data Collection	39
3.5	Method of Data Presentation and Analysis	40
3.6	Hedonic Pricing Method (HPM)	40
3.6.1	Hedonic Pricing Method Function (HPM)	42
3.6.2	The Choice of Hedonic Method	42
3.7	The Study Area	43
3.8	Selection of the Study Area	46
3.9	Conclusion	48
<b>4</b>	<b>DISCUSSION AND ANALYSES OF RESULT</b>	<b>49</b>
4.1	Introduction	49
4.2	The Hedonic Variable	50
4.3	Analysis result	52
4.4	State of Environmental Amenities	52
4.5	The Rental Model for Willingness to pay	62
4.5.1	Coefficient (B)	64
4.5.2	The Standardized coefficient (Beta)	64
4.5.3	Collinearity	65
4.6	The Model	65
4.7	Conclusion	65

<b>5</b>	<b>SUMMARY, CONCLUSION AND RECOMENDATION</b>	<b>67</b>
5.1	Introduction	67
5.2	Summary of the Research	67
5.3	Limitation of the Study	69
5.4	Recommendation	70
5.5	Further Research	71
5.6	Conclusion	71
		<b>72</b>
	<b>REFERENCES</b>	<b>72</b>
	<b>APPENDICES A-B</b>	<b>83-88</b>



## LIST OF TABLES

<b>TABLE NO.</b>	<b>TITLE</b>	<b>PAGE</b>
4.1:	Variable and their description	51
4.2:	Frequency of Condition of Amenities in the study area	52
4.3:	Showing the Amenities to be improved in the Study Area	53
4.4:	Monthly Income of the Respondent	53
4.5:	Monthly income showing the low high income division	54
4.6:	Descriptive Statistics on WTP for Environmental Amenities	55
4.7:	Monthly Income WTP for Drainage cross tabulation	55
4.8:	Monthly Income WTP for Electricity supply cross tabulation	56
4.9:	Monthly Income WTP for Air Quality/Ventilation cross tabulation	56
4.10:	Monthly Income WTP for Water Supply cross tabulation	57
4.11:	Monthly Income WTP for Waste Dump site cross tabulation	57
4.12:	Monthly Income WTP for Accessibility cross tabulation	58
4.13:	Monthly Income WTP for Natural Lightening cross tabulation	58
4.14:	Monthly Income WTP for improved Security cross tabulation	59
4.15:	Monthly Income WTP for Educational Qualification cross tabulation	59
4.16:	Monthly Income WTP for Household size cross tabulation	60
4.17:	Correlation between Monthly Income and Willingness to pay	61
4.18:	The Model Summary	62

4.19:	ANOVA	62
4.20:	Coefficients	63

**LIST OF FIGURES**

<b>FIGURE NO.</b>	<b>TITLE</b>	<b>PAGE</b>
3.1:	Research flowchart	37
3.2:	Map of Nigeria showing Jos North Local Government Area	45
3.3:	Map of Anguwa Rogo-Anguwan Rimi (Study Area)	47

**LIST OF SYMBOLS**

$WTP$	-	Willingness to pay
$R$	-	Rent
$X_n$	-	Attributes
$\epsilon$	-	Coefficient of $X$
$Y$	-	Income
$EQ$	-	Environmental quality
$SE$	-	A row vector of social economic characteristics
$C$	-	A vector of demander shifter
$n$	-	Sample size
$N$	-	Population
$e$	-	Level of precession of sampling error
$CV$	-	Capital value
$NI$	-	Income or annual rental value
$YP$	-	Years purchase or present value of one naira per annum

**LIST OF APPENDICES**

<b>APPENDIX</b>	<b>TITLE</b>	<b>PAGE</b>
A	The Research Questionnaire	83
B	Correlation Table	88

**LIST OF ABBREVIATIONS**

DRAINAGE	-	Amount willing to pay for improved drainage
ELECTRIC	-	Amount willing to pay for regular electricity
AIR	-	Amount willing to pay for improved air quality
WATER	-	Amount willing to pay for regular water supply
DUMPST	-	Amount willing to pay for improved dump site
ACCESS	-	Amount willing to pay for improved accessibility
NATRLIGHT	-	Amount willing to pay for improved natural lightening
SECURITY	-	Amount willing to pay for improved security
INCOME	-	Tenant monthly income
EDUC	-	Educational qualification
DIST	-	Distance from waste dump site
HOUSEHLSIZ	-	Household size

## **CHAPTER 1**

### **INTRODUCTION**

#### **1.1 Background to the Study**

Housing has been universally accepted for human habitation which is considered as the third next to food and clothing, it is more than just a home, it encompasses utilities, environmental amenities as well as services which enhance quality neighbourhood (Adedeji *et al.*, 2010; Nwosu, 2015). Possibly, provision of basic amenities and human services for its increasing population is among the major challenges of successive government in Nigeria in making her habitable (Olujimi, 2010; Nwosu, 2015).

The property value could be attributed to property as a package of goods and services (Bello and Bello, 2008). Real estate entails more than just a dwelling as it includes social and neighbourhood features as well as environmental attributes. Therefore, property rental value or transaction price is a function of willingness to pay (WTP) for environmental, locational features and attribute of the property in its location or neighbourhood. Hence, property is not just building but includes environmental features attributes.

According to Bello and Bello (2008) it is difficult to determine environmental influences on value. Especially in Nigeria, considering the wide range externalities (positive and negative) that affects property market as a result of externalities. Water pollution, unpleasant condition of environmental sanitation, spread of squatter settlements, lack of accessibility and improper waste disposal arrangement or system, etc. are negative externalities while positive externalities entails good access road, air quality, electricity supply, security, landscaping amongst others.

The influences of environment are therefore characterised and evidenced in pull and push effect of the neighborhood on the prospective buyer or occupant of the property (Bello and Bello, 2008). A push effect like the air and water pollution may have effect on property value on one hand and occupant's derivable satisfaction from the property occupied and environment on the other hand (Jackson, 2001). Hence, occupants' satisfaction in respect of their shelter and environment, is social, behavioural, cultural and environmental features, not by engineering elements alone (Onibokun, 1974; Bello and Bello, 2008)

Moreover, susceptible property(s) or vulnerable facility(s) is expected to be avoided by a would-be rational investor or occupant based "buyer". This is expedient because of difficulty to sell or lease, potential health risk, uncertainty and nuisance associated with environmental contamination and stigma (Patchin, 1994). Occupants may seek to approach or have properties which they hold positive attitudes in order to gain satisfaction, increase by professionals. The methodology for estimating values, benefit cost of changes in quality (Ferreira and Moro, 2010).

In line with Whitbread and Bird (1973), this research focuses on environmental attributes that improves community's welfare and positive changes in the part of authorities for the benefits of the property/house occupants. The efficiency and effectiveness of these depends on provision of infrastructural amenities or services (Nwosu, 2015; Babarinde, 1998). Availability of these amenities is pivotal to value of



property (Hammer *et al.*, 2000), which often leads to competition for such locations. This is because it enhances the value of property and vice versa

According to Lorenz *et al.* (2008), Hoch and Waddell (1993) and Berry and Bednarz (1979) property and rental values has to do with the overlapping effect of neighbourhood and environmental attributes. Adequacy of these infrastructural amenities increases economic and social value to land and landed property thereby attracting would-be occupant or buyer and enhances their WTP in the concern land and landed property (Nwosu, 2015). In Nigerian, the main issue is how will real estate market reflect these factors (environmental) as factors to determine WTP, using Anguwan Rogo-Anguwan Rimi a part of Jos metropolis. In this context, the objective is to find the amount housing occupants will be WTP for improvement as a resulted from provision of such environmental amenities.

In developed countries, several studies have been done in the past on environmental amenities and property values (Des Rosiers *et al.*, 2000; Diamond, 1980). Their findings cannot be directly applied in developing countries such as Nigeria, this is because of differential property market characteristics, culture difference, contextual setting among others. Few studies conducted in Nigeria focused on negative affect of environment on value of property (Arimah, 1996; Arimah and Adinnu, 1995; Bello and Bello, 2008; Akinjare *et al.*, 2011a; Bello and Ajayi, 2010). (Bello and Bello, 2008) looked at both the positive and negative influence. Therefore, there was no study which discusses only the positive effect of environmental amenities, hence it is identified as void. Therefore, this study attempt to fill the gap identified above through appraising the impact of intangible environmental amenities on rent payable in term of WTP by the tenants' desire environmental amenities. The study correlates between monthly income and the amount that tenant are WTP for improved environmental amenities as well as developed rental model for WTP for these improved amenities/services.

## 1.2 Statement of the Problem

It has been established that low income households have less ability to pay for services compared with their high income counter parts. This discovery as noted by (Islam) 2012, as a result of the fact that high income households have both the ability and willingness to pay premium price for those services in a sustainable manner.

As posited by Laliberté (2008) house prices depend on both tangible and intangible or less tangible household characteristics. Among these characteristics are those of the environment and the average income of household were found to be of significant role in determining house prices or rent. Anguwan Rogo - Anguwan Rimi was chosen partly because it is a place for majority of urban poor in Jos Metropolis, and partly because the housing supply is by private individual which may either be owner occupier or tenant.

The household has a choice as to range of prices to alternative accommodations, for tenants, he pays rent on periodic bases to the property owner. He would have expectation with related price change. For landlord, has no rent outlay to anyone for occupation but to himself. Therefore, he participate simultaneously as landlord and tenant.

The environmental amenities is an important value determinant in property (Akinjare *et al.*, 2011b). Property value tend to be high where adequate and good are provided and poor amenities in an area tend to experience low rate in rental value.

The environmental amenities have conflicting preferences and competition. Their presence entails high rent and absence leads to low rent deter investors and attract poor tenants (Nwosu, 2015).

Given the nature of Anguwan Rogo - Anguwan Rimi settlement (a district in Jos) characterized by poor access roads, poor ventilation, poor natural lighting, lack of adequate drainage, poor electricity supply, poor water supply, high crime rate, lack of waste dump site and the general unplanned situation of the neighborhood. This study focuses on evaluating the social- economic status of tenants in relation to their WTP house rental for positive change in their environmental or the neighborhood quality.

### **1.3 Research Questions**

- i. What are the various environmental amenities that need improvement in the study area?
- ii. What is the relationship between the tenants' monthly income and the amount they are willing to pay for improved environmental amenities?
- iii. What is the best rental model that can measure occupants' willingness to pay for the provision of improved environmental amenities in study area?

### **1.4 Aim of the Study**

The aim of the study is to evaluate tenant WTP for improved environmental amenities in residential property market with a view to providing stakeholders with necessary information for decision making.

## **1.5 Objective of the Study**

- i. To identify the various environmental amenities that needs to be improved in the study area.
- ii. To identify the relationship between the monthly income of the tenants and the amounts they are willing to pay for the provision of improved environmental amenities.
- iii. To develop Rental model that measures tenants (WTP) for improved environmental amenities in the neighbourhood.

## **1.6 Scope of the Study**

The research is restricted to evaluating the tenant WTP for improved environment amenities of residential property investment with reference to Anguwan Rogo - Anguwan Rimi neighbourhood of Jos metropolis. The study will focus its attention on those amenities that needed to be in place to improve environmental quality of residential property investment in the study area, taking into consideration the environmental and locational attributes which are refers to as the external attributes.

According to (Nwosu, 2015), the property value assessment is related to unique characteristics of the property which either gives satisfaction or dissatisfaction to occupants/tenants. These characteristics are either external or internal related to the property. This study only considers the external characteristics or factors (environmental and locational attributes).

## **1.7 Significance of the Study**

The purpose of this study is to provide a comprehensive data on the significance of tenant willingness to pay for improved environmental qualities of residential property investment in Jos metropolis. This project work will go a long way in creating awareness to the would-be investors/ investors on opportunities available for investment and effect of lack of those environment qualities/ services on the general performance of residential properties in the rental markets.

The study will be of great importance to governments in making housing policies and promulgation and/or amendment of planning and environmental laws as the study will reveal those environmental amenities that need to be improved.

This research will add to the general body of knowledge also will be an available source to other researchers in the future for their research works such as projects, thesis, paper and term paper which can be reference to in their project work.

The study will provide a guide for future planning proposal and also enlighten the general public on the performance of residential property qualities in Anguwan Rogo - Anguwan Rimi and similar area in other neighborhood of Jos metropolis.

## **1.8 Methodology**

For the purpose of this research, the methodology adopted includes the theoretical and empirical approach. Literatures on previous studies were visited on willingness to pay for environmental amenities using either the direct or indirect approach to measure the amount tenants or occupants are WTP for any change in

quality of the environmental. Primary data were sourced through questionnaire survey where respondents were to be randomly selected from the population in the study area and SPSS will be used to analyze the data whose results will be presented.

This research work is to be conducted in three stages; first stage is the theoretical part of the study which is followed by the empirical studies which involves the use of statistical tools. The identification of the research issue, review of related literature as well as aim and objectives were formulated. The essence is to launch a theoretical framework for this research. Then the empirical aspect which involves the use of Hedonic model to identify the significant environmental factors which will enhance the rental value of the property by extension influencing the tenant willingness to pay for improvement of such environmental services/amenities. The additional rent that the tenant are willing to pay shall be measured and a rental model will be developed.

The Hedonic equation is given the relation as presented in equation: 1. the attribute  $X_1$  to  $X_n$ ,  $\beta_1$  to  $\beta_n$  coefficient the attributes and  $\varepsilon$  the error:

$$R = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n + \varepsilon \quad (1)$$

The WTP is estimated using the equation: 2, where WTP is a function income, environmental quality economic and social characteristics and demander shifter.

$$WTP = f(Y, EQ, SE, C) \quad (2)$$

## 1.9 Chapter Layout

This thesis is made up of five chapters, the contexts were briefly discussed as follows;

The first chapter provides an overview of the research work which is set out to achieve the research objectives. It starts with the background of the study, statement of the problem, research question, aim and objectives, scope of the study, significance of the study, brief methodology as well as chapter layout.

The second chapter gives account of the theoretical framework of the research. It begins with the concept of property, the property market, housing attributes, the local government methodology for valuing environmental amenities as well as willingness to pay based on previous literatures.

The third chapter describes in detail the methodology adopted for the study, this includes brief description of the study area, the population, research design and methodology, sampling, sources and method of data collection and analysis.

The fourth chapter covers the empirical analysis which focuses on identifying the significant environmental amenities which influence the tenant's willingness to pay. Then the Hedonic rental model was developed to compute the additional amount that tenants are willing to pay (WTP) for the change in their environmental quality. This was done by the use of the hedonic model.

The fifth chapter is the concluding chapter of the thesis, it provides a summary of the research findings, the research conclusions as well as useful recommendations.

## **1.10 Conclusions**

This chapter provides an overview of the research work starting with the general background on the housing and housing attribute, a description of the research problem. The formulation of the research questions, aim and objectives as well as scope and significant of the study were defined. Also, a brief explanation of the methodology was provided. Finally, a sequence of the items in the chapter was presented.



## REFERENCES

- Abdul Hamid, M. I., Ibrahim, A. S., Suriatini, I. and (2012). *Geographic Information System and Spatail Analyses in Real Estate*. Johor Malaysia, Economy Express Printing and Graohics SDN. BHD.
- Adedeji, Y., Aluko, O. and Ogunsote, O. (Year) Published. Sustainable Landscaping and Green Housing in Tropical Climates. 2010. Adedeji, Y., Aluko, O, & Ogunsote, OO, A Case Study of Akure, Nigeria. Proceedings of the 1st International SET Conference, Federal University of Technology, Akure, October 25-27, 2010.204-214.
- Adenikinju, A. F. (2005). *Analysis of the Cost of Infrastructure Failures in a Developing Economy: The Case of the Electricity Sector in Nigeria*. African Economic Research Consortium.
- Ajibola, M., Awodiran, O. and Salu-Kosoko, O. (2013). Effects of Infrastructure on Property Values in Unity Estate, Lagos, Nigeria. *International Journal of Economy, Management and Social Sciences*, 2(5), 195-201.
- Akinbogun, S., Jones, C. and Dunse, N. (2014). The Property Market Maturity Framework and Its Application to a Developing Country: The Case of Nigeria. *Journal of Real Estate Literature*, 22(2), 217-232.
- Akinjare, O., Adelegan, V., Ajayi, A. and Oyewole, S. (2011a). Monetary Implication of Environmental Disamenities on Housing Investment in Lagos State: The Ojota Scenerio. *Mediterranean Journal of Social Sciences*, 2(2), 135-145.
- Akinjare, O. A., Ogunba, O. A., Ayedun, C. A. and Iroham, C. O. (2011b). Perception of Disamenity Hazards on Residential Housing Values in Lagos, Nigeria. *Far East Journal of Marketing and Management*, 1(1), 1-09.
- Al, A. E. (2015). Residential Segregatio and Existing Neighbourhood Pattern in Jos Metropolis, Nigeria. *Journal of Natural Science Research*, vol. 5.

- Amor, S., Anjorin, F. I., Aronson, J. K., Atadzhanov, M., Bedi, R., Behrens, R. H., Benatar, S. R. and Bodeker, G. C. (2009). Yusuf Ahmed Bm. *Manson's Tropical Diseases*.
- Anselin, L. and Lozano-Gracia, N. (2008). Errors in Variables and Spatial Effects in Hedonic House Price Models of Ambient Air Quality. *Empirical economics*, 34(1), 5-34.
- Arimah, B. C. (1996). Willingness to Pay for Improved Environmental Sanitation in a Nigerian City. *Journal of Environmental management*, 48(2), 127-138.
- Arimah, B. C. and Adinnu, F. I. (1995). Market Segmentation and the Impact of Landfills on Residential Property Values: Empirical Evidence from an African City. *Journal of Housing and the Built Environment*, 10(2), 157-171.
- Babalola, S. J., Umar, A. I. and Sulaiman, L. A. (2013). An Economic Analysis of Determinants of House Rents in the University Environment. *European Scientific Journal*, 9(19).
- Babarinde, J. (1998). Analysis of Industrial Relocation in Relation to Housing and Infrastructural Services in Metropolitan Lagos. *The Lagos Journal of Environmental studies*, 1(1), 97-108.
- Babawale, G., Koleoso, H. and Otegbulu, C. (2012). A Hedonic Model for Apartment Rentals in Ikeja Area of Lagos Metropolis. *Mediterranean Journal of Social Sciences*, 3(3), 109-120.
- Barlowe, R. (1978). *Land Resource Economics: The Economics of Real Estate*.
- Bateman, I. J., Jones, A. P., Lovett, A. A., Lake, I. and Day, B. (2002). Applying Geographical Information Systems (Gis) to Environmental and Resource Economics. *Environmental and Resource Economics*, 22(1-2), 219-269.
- Bello, M. and Bello, V. (2008). Willingness to Pay for Better Environmental Services: Evidence from the Nigerian Real Estate Market. *Journal of African Real Estate Research*, 1(1), 19-27.
- Bello, V. A. (2016). The Effect of Landscaping on Rental Values of Residential Property in Ijapo Housing Estate Akure, Nigeria. *African Journal of Geo-Science Research*, 4(1), 01-06.
- Bello, V. A. and Ajayi, C. A. (2010). Occupants' Satisfaction and Rent Paid for Residential Properties Close To. *Journal of Sustainable Development*, 3(1), 98.
- Berry, B. J. and Bednarz, R. S. (1979). The Disbenefits of Neighborhood and Environment to Urban Property. *The economics of neighborhood*, 219-246.

- Bhattacharjee, A., Castro, E. and Marques, J. (2012). Spatial Interactions in Hedonic Pricing Models: The Urban Housing Market of Aveiro, Portugal. *Spatial Economic Analysis*, 7(1), 133-167.
- Blackledge, M. (2009). *Introducing Property Valuation*. Routledge.
- Blomquist, G. C., Berger, M. C. and Hoehn, J. P. (1988). New Estimates of Quality of Life in Urban Areas. *The American Economic Review*, 89-107.
- Boyle, M. and Kiel, K. (2001). A Survey of House Price Hedonic Studies of the Impact of Environmental Externalities. *Journal of real estate literature*, 9(2), 117-144.
- Brown, R. J. (2005). *Private Real Estate Investment: Data Analysis and Decision Making*. Academic Press.
- Buck, A. J., Deutsch, J., Hakim, S., Spiegel, U. and Weinblatt, J. (1991). A Von Thünen Model of Crime, Casinos and Property Values in New Jersey. *Urban Studies*, 28(5), 673-686.
- Can, A. (1992). Specification and Estimation of Hedonic Housing Price Models. *Regional science and urban economics*, 22(3), 453-474.
- Carroll, T. M., Clauretje, T. M. and Jensen, J. (1996). Living Next to Godliness: Residential Property Values and Churches. *The Journal of Real Estate Finance and Economics*, 12(3), 319-330.
- Case, A. C. (1991). Spatial Patterns in Household Demand. *Econometrica: Journal of the Econometric Society*, 953-965.
- Chau, K. and Ng, F. (1998). The Effects of Improvement in Public Transportation Capacity on Residential Price Gradient in Hong Kong. *Journal of Property Valuation and Investment*, 16(4), 397-410.
- Cho, S.-H., Poudyal, N. C. and Roberts, R. K. (2008). Spatial Analysis of the Amenity Value of Green Open Space. *Ecological Economics*, 66(2), 403-416.
- Choumert, J., Stage, J. and Uwera, C. (2014). Access to Water as Determinant of Rental Values: A Housing Hedonic Analysis in Rwanda. *Journal of Housing Economics*, 26, 48-54.
- Clark, D. E. and Herrin, W. E. (1997). Historical Preservation Districts and Home Sale Prices: Evidence from the Sacramento Housing Market. *The Review of regional studies*, 27(1), 29.

- Clark, D. E. and Nieves, L. A. (1994). An Interregional Hedonic Analysis of Noxious Facility Impacts on Local Wages and Property Values. *Journal of Environmental Economics and Management*, 27(3), 235-253.
- Coffin, D. A. (1989). The Impact of Historic Districts on Residential Property Values. *Eastern Economic Journal*, 15(3), 221-228.
- Cohen, J. P. and Paul, C. M. (2007). The Impacts of Transportation Infrastructure on Property Values: A Higher-Order Spatial Econometrics Approach. *Journal of Regional Science*, 47(3), 457-478.
- Commission, N. P. (2006). Population Census of the Federal Republic of Nigeria. *Census Report. National Population Commission, Abuja.*
- D'amato, M. (2008). Rough Set Theory as Property Valuation Methodology: The Whole Story. *Mass Appraisal Methods: An International Perspective for Property Valuers*, 220-259.
- Daly, J., Gronow, S., Jenkins, D. and Plimmer, F. (2003). Consumer Behaviour in the Valuation of Residential Property: A Comparative Study in the UK, Ireland and Australia. *Property Management*, 21(5), 295-314.
- Des Rosiers, F., Thériault, M. and Villeneuve, P.-Y. (2000). Sorting out Access and Neighbourhood Factors in Hedonic Price Modelling. *Journal of Property Investment & Finance*, 18(3), 291-315.
- Diamond, D. B. (1980). Income and Residential Location: Muth Revisited. *Urban Studies*, 17(1), 1-12.
- Díaz, A. and Luengo-Prado, M. J. (2008). On the User Cost and Homeownership. *Review of Economic Dynamics*, 11(3), 584-613.
- Do, A. Q., Wilbur, R. W. and Short, J. L. (1994). An Empirical Examination of the Externalities of Neighborhood Churches on Housing Values. *The Journal of Real Estate Finance and Economics*, 9(2), 127-136.
- Drescher, K., Henderson, J. and Mcnamara, K. (Year) Published. Farmland Prices Determinants. American Agricultural Economics Association Annual Meeting, Chicago, IL, 2001.
- Dubin, R., Pace, K. and Thibodeau, T. (1999). Spatial Autoregression Techniques for Real Estate Data. *Journal of Real Estate Literature*, 7(1), 79-95.
- Dubin, R. A. and Goodman, A. C. (1982). Valuation of Education and Crime Neighborhood Characteristics through Hedonic Housing Prices. *Population and environment*, 5(3), 166-181.

- Dunse, N. and Jones, C. (2002). The Existence of Office Submarkets in Cities. *Journal of Property Research*, 19(2), 159-182.
- Fan, G.-Z., Ong, S. E. and Koh, H. C. (2006). Determinants of House Price: A Decision Tree Approach. *Urban Studies*, 43(12), 2301-2315.
- Farber, S. (1986). Market Segmentation and the Effects on Group Homes for the Handicapped on Residential Property Values. *Urban Studies*, 23(6), 519-525.
- Feige, A., Mcallister, P. and Wallbaum, H. (2013). Rental Price and Sustainability Ratings: Which Sustainability Criteria Are Really Paying Back? *Construction Management and Economics*, 31(4), 322-334.
- Ferreira, S. and Moro, M. (2010). On the Use of Subjective Well-Being Data for Environmental Valuation. *Environmental and Resource Economics*, 46(3), 249-273.
- Fierro, K. P., Fullerton Jr, T. M. and Donjuan-Callejo, K. E. (2009). Housing Attribute Preferences in a Northern Mexico Metropolitan Economy. *Atlantic Economic Journal*, 37(2), 159-172.
- Fox, W. and Edmiston, K. (2000). User Charge Financing of Urban Public Services in Africa. *Andrew Young School of Policy Studies*, 00-4.
- Fox, W. F. (1994). *Strategic Options for Urban Infrastructure Management*. World Bank Publications.
- Freeman Iii, A. M. (1981). *Hedonic Prices, Property Values and Measuring Environmental Benefits: A Survey of the Issues*. Springer.
- Fuzhan Nasiri, D., Famuyiwa, F. and Kayode Babawale, G. (2014). Hedonic Values of Physical Infrastructure in House Rentals. *Journal of Facilities Management*, 12(3), 211-230.
- Gallimore, P. (2002). The Components of Appraisal Accuracy. *Real Estate Valuation Theory*. (pp. 45-59). Springer.
- Gallimore, P., Fletcher, M. and Carter, M. (1996). Modelling the Influence of Location on Value. *Journal of Property Valuation and Investment*, 14(1), 6-19.
- Galster, G. and Williams, Y. (1994). Dwellings for the Severely Mentally Disabled and Neighborhood Property Values: The Details Matter. *Land Economics*, 466-477.
- Gardner, J. (2007). An Assessment of the Marginal Impact of Urban Amenities on Residential 24 Pricing. Metro.

- Garrod, G. and Willis, K. (1994). An Economic Estimate of the Effect of a Waterside Location on Property Values. *Environmental and Resource Economics*, 4(2), 209-217.
- Gatzlaff, D. H. and Smith, M. T. (1993). The Impact of the Miami Metrorail on the Value of Residences near Station Locations. *Land Economics*, 54-66.
- Geho, M. L. (2002). *Principles, Techniques and Methods of Valuation: A Technical Manual*. Univ. College of Lands and Architectural Studies, Department of Land Management and Valuation.
- Greenbaum, R. T. and Tita, G. E. (2004). The Impact of Violence Surges on Neighbourhood Business Activity. *Urban Studies*, 41(13), 2495-2514.
- Hendershott, P. H., Macgregor, B. D. and Tse, R. Y. (2002). Estimation of the Rental Adjustment Process. *Real Estate Economics*, 30(2), 165-183.
- Hoch, I. and Waddell, P. (1993). Apartment Rents: Another Challenge to the Monocentric Model. *Geographical Analysis*, 25(1), 20-34.
- Hoffmann, J. and Lorenz, A. (2006). Real Estate Price Indices for Germany: Past, Present and Future. *Present and Future (November 30, 2006)*.
- Hughes, W. T. and Sirmans, C. (1992). Traffic Externalities and Single-Family House Prices\*. *Journal of Regional Science*, 32(4), 487-500.
- Iman, A. H. M. (2006). *Basic Aspects of Property Market Research*. Penerbit UTM.
- International Association of Assessing Officers (1990). Property Appraisal and Assessment Administration. IAAO Chicago, IL.
- Isaac, D. (2003). *Property Finance*. Palgrave macmillan.
- Islam, S. Impact of Neighbourhood Characteristics on House Prices.
- Ismail, S. (2005). *Hedonic Modelling of Housing Markets Using Geographical Information System (Gis) and Spatial Statistic:: a Case Study of Glasgow, Scotland*. UNIVERSITY OF ABERDEEN (UNITED KINGDOM).
- Jackson, T. O. (2001). The Effects of Environmental Contamination on Real Estate: A Literature Review. *Journal of Real Estate Literature*, 9(2), 91-116.
- Janssen, C., Söderberg, B. and Zhou, J. (2001). Robust Estimation of Hedonic Models of Price and Income for Investment Property. *Journal of Property Investment & Finance*, 19(4), 342-360.

- Jiao, L. and Liu, Y. (2010). Geographic Field Model Based Hedonic Valuation of Urban Open Spaces in Wuhan, China. *Landscape and Urban Planning*, 98(1), 47-55.
- Jim, C. and Chen, W. Y. (2007). Consumption Preferences and Environmental Externalities: A Hedonic Analysis of the Housing Market in Guangzhou. *Geoforum*, 38(2), 414-431.
- Jimenez, E. (1994). Human and Physical Infrastructure: Public Investment and Pricing Policies in Developing Countries. The World Bank.
- Johnson, M. P. (2005). Spatial Decision Support for Assisted Housing Mobility Counseling. *Decision Support Systems*, 41(1), 296-312.
- Joshua Adegoke, O. (2014). Critical Factors Determining Rental Value of Residential Property in Ibadan Metropolis, Nigeria. *Property Management*, 32(3), 224-240.
- Keskin, B. (2008). Hedonic Analysis of Price in the Istanbul Housing Market. *International Journal of Strategic Property Management*, 12(2), 125-138.
- Kim, C. W., Phipps, T. T. and Anselin, L. (2003). Measuring the Benefits of Air Quality Improvement: A Spatial Hedonic Approach. *Journal of environmental economics and management*, 45(1), 24-39.
- Kim, K. and Park, J. (2005). Segmentation of the Housing Market and Its Determinants: Seoul and Its Neighbouring New Towns in Korea. *Australian Geographer*, 36(2), 221-232.
- Knight, J. R. and Sirmans, C. (1996). Depreciation, Maintenance, and Housing Prices. *Journal of Housing Economics*, 5(4), 369-389.
- Kostov, P. (2009). A Spatial Quantile Regression Hedonic Model of Agricultural Land Prices. *Spatial Economic Analysis*, 4(1), 53-72.
- Kothari, C. R. (2004). *Research Methodology: Methods and Techniques*. New Age International.
- Laliberté, N. (2008). *Conceptions of Community During Amenity-Based Development: The Case of Great Barrington, Ma*. The Pennsylvania State University.
- Lancaster, K. J. (1966). A New Approach to Consumer Theory. *The journal of political economy*, 132-157.
- Landry, C. and Hindsley, P. (2007). Willingness to Pay for Risk Reduction and Amenities: Applications of the Hedonic Price Method in the Coastal Zone.

*Management, Policy, Science, and Engineering of Nonstructural Erosion Control in the Chesapeake Bay.*

- Larsen, J. E. and Blair, J. P. (2010). Public Services Satisfaction and Single-Family House Prices in the USA. *International Journal of Housing Markets and Analysis*, 3(4), 278-289.
- Lawrence, D. M., Britton, W. and Rees, W. (1962). *Modern Methods of Valuation: Of Land Houses and Buildings*. Estate Gazette.
- Limsombunchai, V. (Year) Published. House Price Prediction: Hedonic Price Model Vs. Artificial Neural Network. New Zealand Agricultural and Resource Economics Society Conference, 2004. 25-26.
- Lorenz, D., D'amato, M., Des Rosiers, F., Elder, B., Van Genne, F., Hartenberger, U., Hill, S., Jones, K., Kauko, T. and Kimmet, P. (2008). Sustainable Property Investment & Management—Key Issues and Major Challenges. *Published by: Royal Institution of Chartered Surveyors, London.*
- Mapsofworld.Com. (2013). Nigeria Map. Available: <http://www.mapsofworld.com/nigeria/> [Accessed 27th April, 2016].
- Mcarthur, D. P., Osland, L. and Thorsen, I. (2012). Spatial Transferability of Hedonic House Price Functions. *Regional Studies*, 46(5), 597-610.
- Mcconnell, V. and Walls, M. A. (2005). *The Value of Open Space: Evidence from Studies of Nonmarket Benefits*. Resources for the Future Washington, DC.
- Mccormick, E. and Ilgen, D. (1985). Industrial and Organizational.
- Mieszkowski, P. and Saper, A. M. (1978). An Estimate of the Effects of Airport Noise on Property Values. *Journal of Urban Economics*, 5(4), 425-440.
- Milon, J. W., Gressel, J. and Mulkey, D. (1984). Hedonic Amenity Valuation and Functional Form Specification. *Land Economics*, 60(4), 378-387.
- Muhammad, M. S. and Ishiaku, B. (2013). An Assessment of the Prospects of Property Tax Administration in Nigeria: A Case Study of Bauchi State Board of Internal Revenue.
- Nigeria, F. R. O. (1999). *Constitution of the Federal Republic of Nigeria 1999*. Federal Government Press.
- Nwosu, A. (2015). Assessment of the Effect of Urban Infrastructure as a Tool for Enhancing the Values of Residential Property in Akure. *Ethiopian Journal of Environmental Studies and Management*, 8(2), 196-205.



- O'byrne, P. H., Nelson, J. P. and Seneca, J. J. (1985). Housing Values, Census Estimates, Disequilibrium, and the Environmental Cost of Airport Noise: A Case Study of Atlanta. *Journal of Environmental Economics and Management*, 12(2), 169-178.
- Odudu, C., Omirin, M., Nubi, T. and Fawehinmi, A. (2003). Significance of Infrastructure in Determining Land and Rental Values in an Urban Area-the Case of Lagos Metropolis. *Land Management and Property Tax Reform in Nigeria. Omirin M. M et al (ed) Department of Estate Management, University of Lagos, Akoka.*
- Ogedengbe, P. and Oyedele, J. (2006). Effect of Waste Management on Property Values in Ibadan, Nigeria. *Journal of land use and development studies*, 2(1).
- Okoko, E. (2004). Tenants' Willingness to Pay for Better Housing in Targeted Core Area Neighbourhoods in Akure, Nigeria. *Habitat International*, 28(3), 317-332.
- Olujimi, J. a. B. (2010). Analysis of the Relationships of Infrastructural Facilities in the Determination of Rental Values of Residential Properties in Akure, Nigeria. *Journal of Act and Social Sciences*, 10.
- Onibokun, A. G. (1974). Evaluating Consumers' Satisfaction with Housing: An Application of a Systems Approach. *Journal of the American Institute of Planners*, 40(3), 189-200.
- Otegbulu, A. (2010). *User Preference in Urban Infrastructure Provision Using the Contingent Valuation Model*. PhD thesis at Enugu state University of Science and Technology, Enugu, Nigeria.
- Owusu-Ansah, A. (2012). Examination of the Determinants of Housing Values in Urban Ghana and Implications for Policy Makers. *Journal of African Real Estate Research*, 2(1), 58-85.
- Pandit, R., Polyakov, M. and Sadler, R. (Year) Published. The Importance of Tree Cover and Neighbourhood Parks in Determining Urban Property Values. 56th AARES annual Conference, Freemantle, Western Australia, 2012.
- Patchin, P. J. (1994). Contaminated Properties and the Sales Comparison Approach. *Appraisal Journal*, 62(3), 402-409.
- Ridker, R. G. and Henning, J. A. (1967). The Determinants of Residential Property Values with Special Reference to Air Pollution. *The Review of Economics and Statistics*, 246-257.

- Rosen, S. (1974). Hedonic Prices and Implicit Markets: Product Differentiation in Pure Competition. *Journal of political economy*, 82(1), 34-55.
- Scarrett, D. (2008). *Property Valuation: The Five Methods*. Routledge.
- Selim, H. (2009). Determinants of House Prices in Turkey: Hedonic Regression Versus Artificial Neural Network. *Expert Systems with Applications*, 36(2), 2843-2852.
- Selim, S. (2011). Determinants of House Prices in Turkey: A Hedonic Regression Model. *Doğuş Üniversitesi Dergisi*, 9(1), 65-76.
- Sirmans, S., Macpherson, D. and Zietz, E. (2005). The Composition of Hedonic Pricing Models. *Journal of real estate literature*, 13(1), 1-44.
- Small, K. A. and Steimetz, S. S. (2012). Spatial Hedonics and the Willingness to Pay for Residential Amenities\*. *Journal of Regional Science*, 52(4), 635-647.
- Spahr, R. and Sunderman, M. (1999). Valuation of Property Surrounding a Resort Community. *Journal of Real Estate Research*, 17(2), 227-243.
- Sunding, D. L. and Swoboda, A. M. (2010). Hedonic Analysis with Locally Weighted Regression: An Application to the Shadow Cost of Housing Regulation in Southern California. *Regional Science and Urban Economics*, 40(6), 550-573.
- Thaler, R. (1978). A Note on the Value of Crime Control: Evidence from the Property Market. *Journal of Urban Economics*, 5(1), 137-145.
- Thayer, M., Albers, H. and Rahmatian, M. (1992). The Benefits of Reducing Exposure to Waste Disposal Sites: A Hedonic Housing Value Approach. *Journal of Real Estate Research*, 7(3), 265-282.
- Thibodeau, T. G. (1990). Estimating the Effect of High-Rise Office Buildings on Residential Property Values. *Land Economics*, 66(4), 402-408.
- Wang, K., Grissom, T. V., Webb, J. R. and Spellman, L. (1991). The Impact of Rental Properties on the Value of Single-Family Residences. *Journal of Urban Economics*, 30(2), 152-166.
- Weinberger, R. (2001). Light Rail Proximity: Benefit or Detriment in the Case of Santa Clara County, California? *Transportation Research Record: Journal of the Transportation Research Board*, (1747), 104-113.
- Wen, H.-Z., Jia, S.-H. and Guo, X.-Y. (2005). Hedonic Price Analysis of Urban Housing: An Empirical Research on Hangzhou, China. *Journal of Zhejiang University(Science)*, 6(8), 907-914.

- Whitbread, M. and Bird, H. (1973). Rent, Surplus and the Evaluation of Residential Environments. *Regional Studies*, 7(2).
- Whittington, D., Briscoe, J., Mu, X. and Barron, W. (1990). Estimating the Willingness to Pay for Water Services in Developing Countries: A Case Study of the Use of Contingent Valuation Surveys in Southern Haiti. *Economic development and cultural change*, 38(2), 293-311.
- Wieand, K. F. (1973). Air Pollution and Property Values: A Study of the St. Louis Area\*. *Journal of Regional Science*, 13(1), 91-95.
- Winson-Geideman, K. and Jourdan, D. (2011). Historic Façade Easements and Single-Family Home Value: A Case Study of Savannah, Georgia (USA). *International Journal of Housing Markets and Analysis*, 4(1), 6-17.