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EVALUATING THE CONTRIBUTION OF URBAN INFRASTRUCTURE ON PROPERTY VALUE IN MINNA, NIGER STATE, NIGERIA

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ABSTRACT
This research evaluates the contribution of urban infrastructure on property value in Minna. The primary data collected for this research included conditions of infrastructure parameters and annual rental values of properties in the different neighbourhoods in Minna. Methods of data analysis included, Analysis of Variance (ANOVA) to determine the infrastructure quality index at all neighbourhoods, correlation analysis to determine the relationship between average infrastructure quality and average property value at all neighbourhoods, and regression analysis to compare infrastructure quality and property value at all sampled locations. Assessment of property values by correlation analysis revealed that property values measured as average rent (avre) differ across all six neighbourhoods sampled. This is because the coefficient of determination (R^2) observed was 76%.This meant that variations in average infrastructure quality index (iqi) were responsible for about 76% of variations in property values. Regression analysis also provided evidence of a statistically significant relationship between property values and infrastructure quality, measured across all sampled locations with an R^2 value of 0.070. This meant only 7% of the variations in property values could be attributed to variations in infrastructure quality across the sampled neighbourhoods. These results meant that there is statistically significant relationship between neighbourhood infrastructure quality and property value in Minna. It was recommended that there is need for an urgent upgrade of the infrastructure in the neighbourhoods to become big agents of value creation for property investors as it is in most developing and developed economies.

Key Words: neighbourhood, infrastructure, property value, housing.

Introduction

The value of property in an urban area is strongly affected by location. Physical location refers to the position of property site relative to another. The term physical location is often used interchangeably with proximity and accessibility (Fanning, 1994). Location influences on the value of residential property may arise from a number of sources, such as accessibility to shopping centre, educational and leisure facilities, refuse disposal facilities, air quality, drainage system availability, security, noise pollution, water availability ,housing condition, accessibility or road condition, facilities and services, etc all of which are known as urban infrastructure.

Where urban infrastructure is adequately provided and well managed, productivity and profitable land uses are usually attracted towards such area. This competition for locations with good urban infrastructure usually results in an increase in land and housing values, either sales or rentals (Adebayo, 2006).

Since other factors such as the prevailing economic conditions, government's policies and legislation, including availability and state of urban infrastructure all affect the local property values, in this research, they were assumed constant while urban infrastructure was isolated and examined in relation to the determination of property value in Minna.

The study therefore, evaluates the contribution of urban infrastructure to residential property value in Minna. The following steps were taken to achieve this aim

- Identify and determine the state of urban infrastructure available in the study area.
- Derive an infrastructure quality index based on the state of the available urban infrastructure.
- Determine if there is any relationship between the infrastructure quality index and property value in Minna.

It is hoped that this research will benefit property investors and developers in their decision on choice of location and the government in the development of estate layouts that will promote urban environmental quality thereby enhancing property values in the area.

Hypothesis

H_0 – There is no statistically significant relationship between urban infrastructure and property value in Minna.

H_1 – There is statistically significant relationship between urban infrastructure and property value in Minna.

Concept of infrastructure

The term infrastructure has attracted a lot of definitions from different authors. Fox (1994) see infrastructure as those services derived from a set of public works traditionally provide by the public sector to enhance private sector production and allow for household consumption. Nubi (2002) sees infrastructure as the aggregate of all facilities that allow a city to function effectively. Adebayo (2006) sees it as a wide range of economic and social facilities crucial to creating an enabling environment for economic growth and enhanced quality of life. He listed them to include, housing, electricity, pipe-born water, drainage, waste disposal, roads, sewage, health, education telecommunications and institutional factors like police station, fire fighting stations, banks and post office. I totally agree that it is simply the engine needed to drive the city.

Residential Property Value Determinants.

There are factors that determine values of individual properties and those that affect property values collectively. Britton et al (1989) identified individual property value determinants ti include location, state of repair, accommodation details, services, properly interest and time. The factors that dictate the prevailing level of collective property values in a neighourhood at a particular point in time range from physical topography, configuration and features of the surroundings, socio-political factors; infrastructural facilities and services, government presence, class or status of occupation, economic to legal factors. This is in line with the assertion of (Brown and Moore, 1970) who recognize accessibility, physical characteristics of the neighbourhood, services and facilities, social environment, individual site and dwelling characteristics .They all often affect the values of properties collectively rather than in isolation, either to cause 'appreciation' or 'depreciation' in property values. Several factors can cause properly value to appreciate among which are infrastructural developments and positive changes in nearby properties. (These relate to physical planning and legislation. policies). On the other hand, depreciation may occur in property values due to infrastructural degradation and negative changes in neighbourhood properties.

Further consideration is to environmental attributes that consist of any natural or manmade features that are contained in or affect the neighbourhood and the neighbourhood's graphic location. The important environmental considerations include open space, nuisances, hazards emanating from nearby facilities such as shopping centres, factories, and schools; adequacy of public utilities such as street lights, sewers and electricity; general maintenance; street pattern, width, and maintenance.

Urban Infrastructure and Property Values

Briton et al, (1989) identified that one of the determinants of property values is infrastructural facilities, the presence of which leads to appreciation in property value. Its absence affects neighbourhood

properties adversely. According to Hammer et al (2000) provision of good and adequate infrastructure is central to property values. A residential user may be prepared to pay a high value for a property depending on his consideration for basic facilities such as accessibility, water and electricity (Harvey, 1993). Litchfiled (1974) also observed that areas with basic facilities such as access roads, good drainage, electricity, public water supply and telephone would attract high property values. This is in contrary to areas without any of these facilities. This research seek to evaluate the extent to which the above findings are true in Minna.

Accessibility which is a direct consequence of a good road network, in turn leads to high rental values of locations with greatest accessibility advantages. In a situation where all properties are accessible via motorable road network, such properties will enjoy high rental values conferred by virtue of accessibility, (Aibangbee, 1997). Provision of wholesome and portable water is a sine-qua-non-to every household. Keeble (1969) recognized this when he said water is indispensable to the household as it is necessary for drinking, cooking, bathing and doing other numerous domestic activities.

Research Context and Scope.

This research is focused on issues of urban infrastructure and residential property value. The study is focused on residential properties only and restricted to Minna township. The study examines the quality of neighbourhoods and the value they command. Since Minna the study area is basically a rental market, the study examined trends in rental values from 2003 to 2008 based on the availability of information. Baba and Jinadu (2000), zoned Minna town into twelve areas namely Bosso I, BossoII, GRA, F-Layout, Minna East central, Minna West central, Tunga I Tunga II, Minna South West peripheral, Minna North West peripheral, Maitumbi, and 123 Quarters/Oduoye Estate (table 1). The study covered only six of the twelve zones. Data on the trend in residential property value and neighbourhood quality in each of the zones were collected and analysed.

Table 1: Residential Zones Used for the Study

ZONES	DESCRIPTION
ZONE 1: Bosso I	High Density
ZONE 2: Bosso II	Medium Density
ZONE 3: GRA	Low Density
Zone 4: Minna East Central	High Density
Zone 5: Minna West Central	High Density
Zone 6: Tunga I	Medium Density
Zone 7:Tunga II	Medium Density
Zone 8: Minna South West Peripheral	High Density
Zone 9: Minna North West Peripheral	High Density
Zone 10: Maitunbi	High Density
Zone11:F-Layout	Medium Density
Zone 12: 123 Quarters	Medium Density

Adopted from Baba and Jinadu (2000).

Study Area

Niger state is located between latitude 9°37'North and longitude 6°33'East of the Greenwich Meridian (Max Lock Group Ltd, 1980). The state is one of the 36 states in Nigeria and was created on 3rd February, 1976 from the defunct North-Western state by the Late Head of State, General Murtala Ramat Mohammed. The state however, came into being on 1st

April, 1976. The state has a population of about 3,950,249 and covers a land area of about 76,000km^2 (population census 2006) or about nine percent of Nigeria's total land area, which makes the state the largest in the country. Minna the state capital is located between Latitude 8°20'N and Longitude 6^0 33'N. Minna town is almost a linear settlement with a major road running through it. There is also the East and West bye passes circumferencing Minna as a result of growth in recent time.

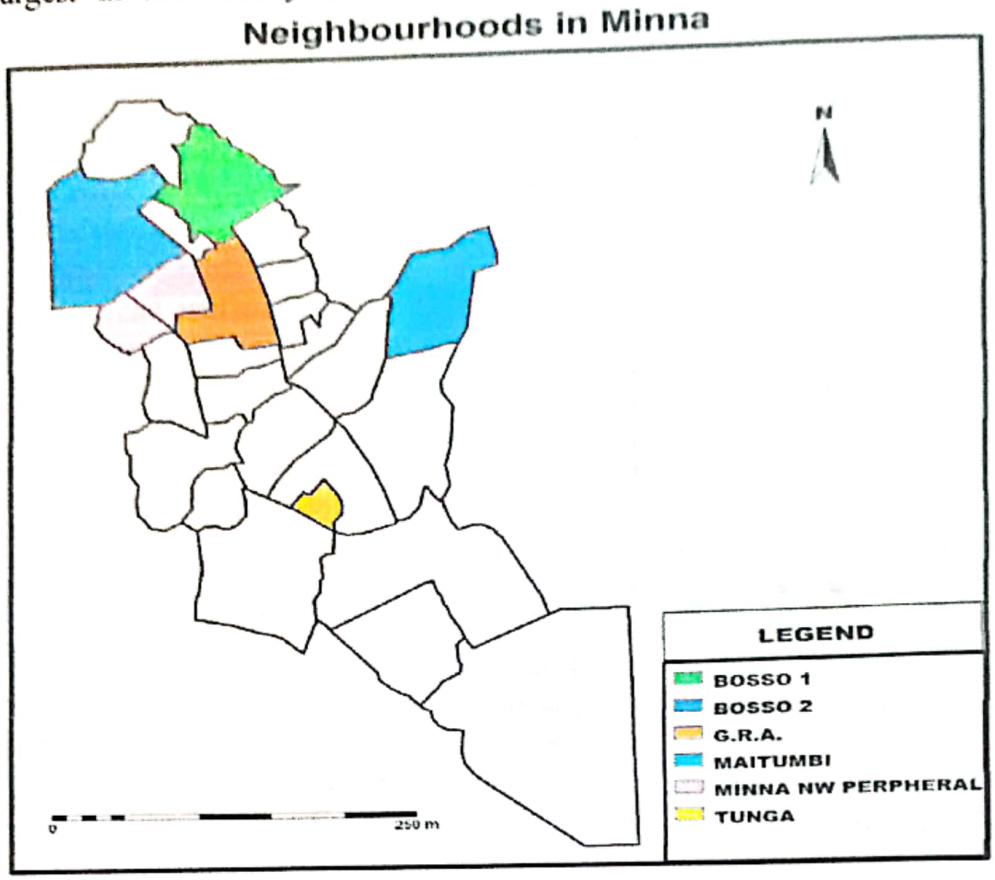

Figure 1: Neighbourhoods Selected for Study
Source: Ministry of Lands and Survey, Niger State, 2010.

Methodology

The data used in this study came from two sources. A structured set of questionnaires was used to gather information from primary sources – the residents of the selected neighbourhoods. The bulk of the data came from this source. Six neighbourhoods in Minna urban were selected based on the classification of Minna into neighbourhoods and densities by Baba and Jinadu 2000 on the ratio of 1:2:3 giving rise to one low density, two medium density and three high density neighbourhoods respectively. In deriving the infrastructure quality index (iqi), all the variables in the questionnaire were summed up to 22 in number and put on a 5 point likert scale with 1 representing very poor and 5 representing very good. A summation of all scores in a particular neighbourhood is made and divided by the total possible score of an ideal urban area (110) to get an infrastructure quality index number. This number can be checked from table 2 to know the quality rating of a neighbourhood in the urban area. Analysis of variance (ANOVA) was done to determine the infrastructure quality index at all neighbourhoods. To establish a relationship between infrastructure quality and property value, correlation and regression analysis was done. While Correlation analysis was used to determine the relationship between average infrastructure qualities and average property value at all neighbourhoods. Table 2 below shows all the zones in Minna with estimated housing population obtained from Power Holding Company of Nigeria (PHCN) Minna business district. There are a total of about sixty thousand one hundred (60100) houses legitimately

connected to the public power source. The sample size of 1.5% was drawn on the population resulting in 901 houses. This figure was divided among the twelve zones in equal ratio resulting in 75 houses per zone. Studying only six out of the twelve zones gave four hundred and fifty (450) houses. 450 questionnaires were administered on a systematic randomly selected resident within the six selected areas of Minna. Four hundred and twenty (420) questionnaires were returned. Data also came from secondary sources such as journals, government reports and gazettes that complement what was collected from the primary sources. Regression analysis was use to compare infrastructure quality and property value at all sampled locations.

Table 2. Zones with Estimated Housing Population in Minna

ZONES	DESCRIPTION	Housing Population
ZONE 1: Bosso I	High Density	4908
ZONE 2: Bosso II	Medium Density	2652
ZONE 3: GRA	Low Density	1134
Zone 4: Minna East Central	High Density	6719
Zone 5: Minna West Central	High Density	5953
Zone 6: Tunga I	Medium Density	3325
Zone 7:Tunga II	Medium Density	3998
Zone 8: Minna South West Peripheral	High Density	7801
Zone 9: Minna North West Peripheral	High Density	6508
Zone 10: Maitunbi	High Density	11269
Zone11:F-Layout	Medium Density	2808
Zone 12: 123 Quarters	Medium Density	3025
TOTAL		60100

Source : Author's analysis 2010. Housing population estimates was obtained from the business district of the Power Holding Company of Nigeria (PHCN) Minna.

Table 3. Neighbourhood Condition Rating.

Condition status	General description	Infrastructure Quality Iandex	Condition rating
Bad	The neighbourhood infrastructure has deteriorated badly with building and facilities having structural problems. The neighbourhood presents a generally poor outlook.	0.00 to 0.19	1
Poor	Conditions of neighbourhood infrastructure are poor, deteriorated road network, functional but often failing facilities, and blocked drains.	0.20 to 0.49	2
Fair	Conditions of neighbourhood infrastructure are average, services are functional but requires attention	0.50 to 0.74	3
Good	Conditions of neighbourhood infrastructure shows minor wear and tear requiring some upgrades but not major maintenance	0.75 to 0.95	4
Very good	Conditions of neighbourhood infrastructure can be described as perfect with no wear and tear	0.95 to 1.00	5

Source: Adapted from Guidelines for Strategic Asset Management (2000).

Table 7 Result of Correlation Analysis of Average Infrastructure Quality Index and Average Property Values at All Neighbourhoods

Variables		*Pearson Correlation (R)*	R^2_{value}	P_{value}
X	*Y*			
Infrastructure Quality index	*Average annual rent*	*0.871*	*0.76*	*0.024*

Source: Authors' analysis, 2010.

The findings agree with earlier research works on the link between environmental /housing quality and the cost of rented accommodation. In a similar study Cobb (1984), tries to explain varying rent rates in housing areas according to large numbers of housing area-related characteristics.

Infrastructure Quality and Property Value at all Sampled Neighbourhoods.
Regression analysis provided evidence of a statistically significant relationship between property values and infrastructure quality, measured across all sampled locations (table 8). This was because the value of the F-statistics was observed to be higher than the critical value of $F_{0.05}$ (21.977 compared to 3.84). However, some important features of this relationship were observed.

First the influence of infrastructure quality on property value was real but nonetheless very little, because the regression equation gave an R^2 value (coefficient of determination) of 0.070. This meant only 7% of the variations in property values could be attributed to variations in infrastructure quality across the sampled neighbourhoods. Thus the regression equation below yielded the following mathematical expression upon substitution with the study variables

property value = -86461.5 + 428,573.6(infrastructure quality index .....equation 1

Resolving equation 1 provided evidence that assuming infrastructure quality index of 50% (index of 0.50), the property value in the neighbourhood would average N127, 825.30 per annum. Therefore a tenant with all the necessary details about neighbourhoods can make projections and take informed decision.

It must be pointed out that the predictive power of the derived regression equation (equation 1) fell far below any acceptable level of accuracy. This was because of the very low R^2 value observed. It may not be used for any predictions.

The result presented and explained above are in agreement with the work of Potepan (1994) which shows that housing sales prices depend on the neighborhood amenities associated with the residential area and urban migration proceeds toward amenity rich areas despite the higher housing costs there. However, Basil and Michael (2004) opined that empirical analysis confirmed neighbourhood variables in general to have a strong positive impact on house values. This is in contrast with the weak association discovered within the study area of this research. This can however be attributed to the combination of all neighbourhoods under study with each of the areas either adding or subtracting from the overall result.

Table 8 Regression Analysis of Neighbourhood Quality and Property Value at All Sampled Locations

Variables		Type of Model		Observations			
X	Y		Regression Equation	R^2	F	$F_{0.05}$	P_{value}
iqindex	avre	linear	Avre = -86461.5 + 428573.6(iqindex)	.070	21.977	3.84	.000

Source: Authors' analysis, 2010.

Key
iqindex = Infrastructure Quality index avre = Average rent (property Value)

Summary of Findings, Conclusion and Recommendations

The findings of the research show a variation in quality based upon availability and state of urban infrastructure across the neighbourhood studied in Minna. (GRA was the best followed by Tunga, Bosso 2, Minna-North west peripheral, Bosso 1, and then Maitumbi representing the worst quality neighbourhood). It was also found that there is a direct relationship between neighbourhood infrastructure quality and property values. (GRA with the highest quality of infrastructure commanded the highest property value while Maitumbi commanded the lowest property value and the lowest infrastructure quality). There is need for an urgent upgrade of the urban infrastructure in our neighbourhoods and housing renovations to enhance the value of the properties which will ensure higher investment returns from the properties and human wellbeing.

REFERENCES

Adebayo, M.A (2006): The state of urban infrastructure and its effects on property values in Lagos, Nigeria. *Journal of Land Use and Development Studies* Vol. 2, No.1.

Aibangbee, S.S (1997): *Functions of Urban Infrastructure in National Development* Paper presented at the 27th Annual Conference of the Nigeria Institution of Estate Surveyors and Valuers, at Premier Hotel, Ibadan 1st – 6th April.

Baba J.M. and Jinadu A.M. (2000): Analysis of spatial variation in the occurrence of Housing Environment –Related Diseases in Minna Metropolis. Being a research submitted to the university Board of research, Federal University of Technology Minna.

Basil S. and Michael K. (2004): Measuring Environmental Effects on Property Values: Analysis of Spatially Variable Relationships. *Investment and Finance*, Vol.17 (1), Pp 11.

Britton, W, Davies K and Johnson, T (1988): *Modern Methods of Valuation* (8th ed.) London. The Estate Gazette.

Brown, L. A., and Moore, E. G. (1970): The Intra-Urban Migration Process: A Perspective. *Geografiska Annaler*, Vol. *52*(1), Pp13.

Chau, K.W. (1998): "The effects of improvement in public transportation capacity on residential price gradient in Hong Kong", *Journal of Property Valuation & Investment*, Vol. 16 No. 4, pp. 397- 410.

Cobb, S. (1984): The impact of site characteristics on housing cost estimates. *Journal of Urban Economics*, Vol.15, Pp 26-45.

Fanning, S. F. (1994): *Market analysis for Valuation appraisals*, Appraisal Institute. London.

Fox, W.F (1994): "Strategic Options for *Urban Infrastructure Management". Urban Management Programme* (UMP) Paper 17. The World Bank pp7.

Hammer L; Booth D. and Love H.E (2000) *Poverty and Transport*; A Report prepared for the World Bank in collaboration with DFID, Overseas Development Institute.

Harvey, J. (1993): Urban Land Economics 3rd ed. Macmillan Press Limited London

Herold, W.E., and Leonard, V.Z. (1991) "Tenure Choice, Housing Demand and Residential Location", *Journal of Real Estate Research*, Vol. 6, No.3,Pp. 341-356.

Keeble, L. (1969): *Principles and Practice of Town Planning*. State Gazette Limited

Litchfield, N (1974): *Economics of Planning Development*. London Estate Gazette Limited.

Max Lock Group(1980): "Minna Master Plan" Max Lock Group Ltd, Kaduna.

Nubi, T.O (2002): *'Procuring, Managing and Financing Urban Infrastructure: Towards Integrated Approach'* Paper presented at a National Workshop on Land

Management and Property Tax Reform in Nigeria. organized by Estate Management Department, University of Lagos, Akoka.

Potepan, M. (1994): Intermetropolitan migration and housing prices: Simultaneously determined. *Journal of Housing Economics*, Vol.3, Pp 77-91.

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