

# **Spatial Variation in Residential Land Value Determinants in Lagos Nigeria**

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**Key words:** Land Use, City, Land Use Pattern, Infrastructural Facilities.

## **SUMMARY**

Cities are of enormous political, social, cultural and economic importance in various countries in which they are located. Land value is one of the major determinants of the morphology of these cities.

This paper attempt an examination of the spatial dimension of the factors that could affect land value by positing Lagos, Nigeria as a case study.

Seven hundred and fifty five household heads selected through stratified random sampling technique are interviewed using already prepared questionnaires. The information that is collected from the field are subjected to factor and principal component analysis. This is done to show the spatial variation that existed between factors of land values such as accessibility, rent, and transport improvement, quality of neighbourhoods, infrastructural facilities and government regulations.

The need for planners to consider the land value determinants in planning for optimum use of land are presented.

## **SOMMAIRE**

Les villes sont d'importance énorme, politique, social, culturel et économique dans les divers pays dans lequel elles sont localisées. La valeur de terre est une des déterminants majeurs du moephology de ces villes.

Cet article tente un examen du dimation spatial des facteurs qui pourraient affecter la valeur de terre en avançant Lagos, Nigéria comme une étude de cas.

Sept cent et cinquante cinq chefs de ménages choisies par la technique de selection random stratifié sont interviewée en utilisant des questionnaires déjà préparé. L'information recueillie des interviewes est analyse. Ceci est fait pour montrer la variation spatiale qui a existé entre les facteurs de valeurs de terre telles que l'access, le loyer, et l'amélioration de transport, la qualité de quartiers, les equipements de infrastructure et les règlements de gouvernement.

Le besoin pour les urbanistes de prendre en considérer les déterminants de valeur de terre dans la planification des villes pour l'usage optimum de terre urbaine sont présentés.

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## **1. INTRODUCTION**

Residential land use, among the various competing urban land uses, is the largest consumer of land in urban areas. Consequently, it is usually the focus of urban research. This has been confirmed through the works of many urban researcher like park Burgess and MeKenzie (1925) on American cities particularly in Chicago, Mabogunje (1968) on Lagos, Ayeni (1968) on Ikere-Ekiti and Jos respectively; Sada, (1975) on Lagos; Frishman (1977) On Kano; Olaore (1981) on Kaduna; Okpala (1981) on Enugu and Onisha. Other studies on the importance of residential land use in urban areas include those carried out by Onakerhoraye, (1984) on Benin; Omirin (1998) on Lagos; Okewole (1998) on Bodija; Egunjobi (1999) on Nigeria cities generally and Olayiwola (2000) on sustainable city development in Osun State, Nigeria.

Most of these studies show that urban areas are of enormous political, social, economic and cultural importance to the various countries in which they are located. The importance of cities in societal development is due to their unique role as centres of innovation, adoption and diffusion and growth points. Cities therefore propel the growth of societies and are able to attract to themselves large numbers of people from the hinterlands.

The centripetal nature of the cities creates intense pressure on the economic and spatial structure of urban systems such as on services and facilities like hospitals, educational institutions, housing, transport, telecommunication systems and energy supply. This is because the provisions of these facilities are expanding at rates slower than the rate of growth of the urban population thus creating a wide margin between demand and supply of urban infrastructural facilities and services

The market forces of demand and supply, especially of land and housing, are basic factors influencing variation in the values in urban areas. Abiodun (1985), elucidates this point further and argued that the rapid increase of urban population in Nigeria had brought with it many problems associated with the difficulties of providing basic infrastructures. The studies of Abiodun (1985) revealed that perhaps the most outstanding of all these problems is that of providing adequate facilities for the population. In support of this claim, Onibokun (1985) stressed the importance of the quality of residence. He stated that housing, as a unit of the health, efficiency, social behaviour, satisfaction and general welfare of any community. Housing Onibokun stressed, reflects the culture, social and economic values of a society, as it is the best and historical evidence in a country. It stimulates the growth of the national economy.

This assertion has been confirmed through the recent works of Egunjobi (1997) in which the studies demonstrate that the philosophical and practical attention developed in the area of urban studies is a clear indication of the importance of housing in the way it affects our life.

The way housing is structured in cities are capable of affecting and indeed do affect our lives both positively and negatively.

The growth of the economy generates physical development of which residential area is critical. This most often results in increase in values of land due to increase in demand. In a situation where there is scarcity of available land in the market. The aforementioned statements call for adequate research into residential land value in order to guide policy direction of government institutions and individuals.

## 2. THEORETICAL ISSUES

It is widely recognized that many theories have been formulated in the study of urban systems. These theories are both descriptive and quantitative in nature. Among the model that have helped to explain city morphology are the Burgess (1925) Concentric Zones Model; Hoyt's (1939) Sector Model; and Harris and Ullman's (1945) Multiple Nuclei Model. These three models are described as ecology models. Other models include the social Area Analysis and factorial Ecology. Some of the models are not so general but they deal with specific urban features. Wingo's (1961) and Alonso's (1964); land use model are micro economic models of urban land use while earlier works of Richardo and von. Thunen (1893); presented some notable theories on agricultural land use. Winch (1945); Zipf's (1949); and Chapin (1965); "Least Effort Principle" were formulated to explain urban mobility. Firey (1947), introduce the role of culturally rooted values and social behaviour in the determination of the city structure; while Kno's (1962); study on Topeka confirmed the spatial variation in land values in cities.

In the area of urban land values, the concept of accessibility has been adopted by scholars to structure the value of urban lands. These efforts had their origins in the early works of von thunen and Richardo, (Herbert, 1982). The principle of Bid Rent functions was established by Hurd (1903), and this has been confirmed by later works (Ratcliffe, 1949; Alonso 1964); among others. The summary of their findings confirmed that the nature of the city land uses is a process that changes with the economy. This has also been confirmed with recent literatures on urban land uses with particular reference to case studies of Nigeria urban centres as discussed below. Though many of the studies relating to urban residential areas carried out in many parts of the world were done under social cultural, economic and political situations different from the Nigeria situation. Therefore, their adoption to the Nigeria situation cannot provide a perfect explanation to Nigeria's urban problems. The outcome of such researches could only be used as guides to solving problems in developing countries generally and in Nigeria in particular. To solve problems of residential land use in Nigeria, there is the need for local researches to unravel the peculiarities of our own situation. In the Nigeria context, considerable amount of works have been done by scholars in various disciplines of explain the determinants, structures and effect of residential land use in Nigeria urban areas. For example mabogunje (1961, 1962); undertook the ecological analysis of Lagos and the growth of residential districts in Ibadan. In his discussion, he identified and classified the major residential districts in Lagos and Ibadan. He concluded that the growth of these cities were

due to growth by fission and spatial expansion Mabogunje's works also showed the relevance of the multiple Nuclei model as applicable to Lagos and Ibadan.

Sada (1968); examined the effect of political factors on the geography of Lagos. He noted that the emergence of Lagos as a livable city was as a result of the political decision which made it a capital city in 1914. He added that with the difference in jurisdictional area within the city and the associated varying levels of resources, the city has become a complex city. Sada concluded that the supply of different services is bound to make the city differentiated along many socially related lines. Also in 1972, Sada investigated the residential land uses in Lagos during which he explained the relevance of traditional models. He identified the major land use determinations and classified the residential land use in Lagos into high grade, government housing districts and commercial housing Ayeni's studies (1968); and (1979) were on Ikere-Ekiti and Lagos respectively. He researched into the trend in the development of built-up areas of Ikere – Ekiti and Lagos. He also attempted the residential location model of Lagos Metropolis during which he established the general framework that could be used for the planning of Lagos metropolis.

### **3. RESEARCH METHODOLOGY**

The data for this study were derived from primary and secondary sources. The primary data were obtained through questionnaire administration. The questionnaires were administered on 755 household heads selected from 47 residential neighbourhoods in metropolitan Lagos. The residential neighbourhoods used for the questionnaire administration were derived by classifying them into three categories. These were high medium and low-density residential neighbourhoods. From this stratification 15%, 50% and 50% samples of the stratified residential neighbourhoods were randomly selected. Table 1, shows the 47 selected residential neighbourhoods and the number of questionnaires administered in each identified category.

The respondents to the questionnaires administered were the household heads. The sampling frame was the house in the selected residential neighbourhoods. In each of the selected neighbourhoods, 2.5%, 5% and 10% samples of the houses were systematically picked from each of the high, medium and low density residential neighbourhoods respectively. One household head per house was engaged in interview and questionnaire administration.

The questionnaire administered was designed to collect data on the socio-economic characteristics of the respondents, Physical and infrastructural facilities in the neighbourhoods and the determinant of residential land values (degree of accessibility centrality, transport improvement, traffic flows land rent, price and land demand and supply).

Two main statistical techniques were used in the study namely, the correlation analysis and the multiple regression analytical techniques.

#### 4. THE CASE STUDY AREA

Metropolitan Lagos is located in the south -western (see fig 1, page 6) part of Nigeria. It is the largest metropolitan area in Nigeria (Ayeni 1968,1979). Framing the southern part of the study area in the west is the Lagos Harbour which stretches towards the east to form the Light House Creek, The Kuramo water and Lekki settlements combine to form the eastern boundary while the northern boundary are landmass of Ikorodu local government area and Alagbado towards Abeokuta in Ifako-Ijaiye and Alimosho Local Government Area which also has common boundary with Sango-Ota, a satellite town to Lagos from Ogun State. Badagry and Republic of Benin land mass defines the western boundary of the study area (see Fig. 2, page 7).

Lagos metropolis lies generally on low lands with about 17500 hectares of built up area. The approximate population of this area is more than 9 million people. The projected population by the year 2000 is 10 million. The projected

**Table 1:** Analysis of residential neighbourhoods categories and number of questionnaire administered

Types of residential Neighbourhoods Category	number of neighbourhoods category	number of neighbourhoods selected	number of questionnaire administer
High density Residential Neighbourhood	184	27	405
Medium density Residential Neighbourhood	20	10	200
Low density Residential neighbourhood	20	10	150
Total	224	47	755

Source: Authors, 2005.

average population density of the built-up area of Lagos metropolis is about 20,000 people per square kilometer in an emerging African Megacity.

Today Lagos exerts influential and central role in Nigeria out of proportion to its land area. The significance of this role is due partly to its historical and cultural background and partly to its former role as the seat of national government. It also owes its growth and development to European colonial influence.

In the colonial Lagos, there existed sharp contrast in the morphology and quality of housing between the Europeans, the educated African (Saras), the Brazilians and the indigenes. Each

social and racial group settled in different quarters. The contrast can be seen as they existed on Lagos Island. The Europeans lived along the marinas, the educated African mainly west of the Europeans, as in the Olowogbowo area, the Brazilian settled behind the Europeans. The Brazilian quarter was known as Portuguese Town or popo Aguda or popo Saro (Akinsemoyin, 1968) while on the mainland were many indigenous settlements.

The population growth rate of Lagos has serious implications on the trend of urban land use development and high demand for housing. However the rate of the housing supply has been slower than housing need. There is absence of practicable government policy that could solve the housing problems.

In metropolitan Lagos residential area densities vary widely from less than 100 person per hectare in Ikoyi to 2150 person on north Lagos Island (metropolitan) Lagos Master Plan, 1985). In Mushin a figure of 1200 can be recorded and about 6067 in Agege. When converted to persons per square kilometer, the densities result in 9800 persons per square kilometer, 215,000 on Lagos Island 120000 in Mushin and 60000 in Agege. On the overall average, the residential areas have more than 40000 persons per square kilometer. A circle of one kilometer radius would embrace 120,000 person (metropolitan Lagos master plan, 1985). Most of the residential communities are well related to the transport system in that higher type of roadways border the communities in one or more sides.

In terms of spatial distribution of residential districts, seven communities can be identified in Lagos Island Area with the population ranging from 13000 to 113000. These include those of Ikoyi, Victoria Island, Lekki and Obalende Areas. In the Lagos Mainland, eleven communities can be identified, with population ranging from 11,000 to 74000. In Ikeja area 10 communities that embrace some large industrial and institutional area can be identified. The population of these communities varies from 5000 to 200000. In Somolu area ten communities can be identified with population ranging from 10000 to 15000. Mushin is comprised of 14 communities ranging in population from 1200 to 179000. Ikorodu and its three adjacent Villages have a population estimated at 92000.

Industrial and storage uses presently occupy about 8.4 percent of the developed area representing a land area of 1444 hectares of land. 87.7 percent of the industrial and storage land is found in a total of eleven industrial estates. The distribution of commerce and industry through-out the built-up are appears relatively even.

## **Result**

### Variation in Land value Determinations in Lagos

The principal component technique was applied in the analysis of spatial variations and the relationships between factor influencing residential land value in the study area. The responses of respondents on the following land values determinants namely accessibility, rent, transport, improvement, quality, of neighbourhood infrastructural facilities and government regulation with particular reference to zoning were used as variable in the analysis. It is necessary to state that for the research a total of 95 variables were used for the analysis but for

the purpose of this paper the six variables which have been established in literature have been isolated as basis of analysis in this study. This is the reason for the moderate level of correlation observed in table 3 between the variables. The selected variables are listed in table 2.

The result obtained in the matrix of correlation shown in table 3 above shows that all the variables have high degree positive relationships with one another. The score on the relationship between accessibility and transport improvement shows the highest positive association with figure of 0.874. This means that improvement in transportation facilities especially road bring about improved accessibility in the study area. Also, the relationship between the following the following recorded very high degree of positive relationships transport and rent (.732); quality of environment and zoning regulation (.731) and accessibility and rent (.719). The implication of the above is that improvement in transportation and accessibility will be expected to bring about higher rents, while improved quality of environment is as a result of effective implementation of planning regulations especially zoning regulation also the correlation matrix revealed that there is high positive relationship between quality of basic facilities and quality of environment in which the correlation matrix figure of .694 has been obtained while the relationship between facilities and zoning recording .697. This means that the better the facilities provided the more improved is the quality of the environment, while application of zoning also enhances the effective provision of basic facilities. The lowest correlation interrelationship figure recorded was 0.509, which is for the relationship between facilities and accessibility. This is still within the range of high coefficient level of co-variation. This means that all the factor identified as basic to influencing residential land value have high level of co –variation relationships.

A further analysis of these variables was done through the application of principal component technique aimed at making each factor independent of each other.

Table 4 shows the result of the extraction process when the six variables (determinants of residential land values) were subjected to principal component analysis. The six factors have been reduced to two, which gives accounts of all the other factors. The first component is renamed infrastructural facilities and the second component renamed economic. It can be observed in table 4 above that the first factor has an Eigen value of 4.175, which is the relative magnitude, and proportion of variance accounted for by the first variable. Usually the first eigen value accounts for the highest variance in the data set. The first component also explains 59.638% of the variance of the data while the first two components account for 76.07% of the variance of the data.

Table 5 below revealed the component loading for each primary variable of each of the two components when they are subject to varimax rotation

The interpretation of the loading is the same as it was done in the correlation coefficients. A factor loading of 0.40 and more are considered to be high. This is also in agreement with Spence (1968) who considered 0.40 as a cut off level for high factor loading. Based on this, the first factor which accounts for 59.638% of the total variance loads highly on both

infrastructural facilities and economic factors, whereas the second factor which account for 16.441% of the total variance loads relatively low both on infrastructural facilities and economic factors with figures .249 and .146 respectively. The implication of these figures is that infrastructural facilities improvement and economic factor are highly related in factor 2. The implication of this is that where there is improvement in infrastructural facilities there is expected to be improvement in economic variables, usually in form of increase in rent and prices of residential land use properties. Thus it can be concluded that these factors or components can be used to describe the spatial variation of residential land use in metropolitan Lagos

### **Suggestion**

The focus of the suggestions of this paper is based on the major areas of the factors influencing residential land values in metropolitan Lagos. Therefore the suggestions are focused on how to improve the level of accessibility to and within residential land use areas, provision of technical infrastructure and how to enhance the ability of the resident of metropolitan Lagos to pay or purchase residential apartments.

### **Accessibility**

A general view of the land use plan of metropolitan Lagos shows that the city is predominantly a dormitory city with little observation noticeable of other land uses except that of institutional which records significant presence with uses such as education institution and barracks both of which significant residential areas are also located for the workers. This shows that more than the 51.9% coverage of residential land use recorded in the 1985 master plan will actually be for residential purposes. Major traffic movement in Lagos are that of North to south that is the Ikorodu, Abule-Egba, Alabgado to Ikeja, Apapa Lagos Island axis and east –west movement of Oworoshoki to Apapa –Ojo and Ijanikin movement. These routes are connected with three main expressways Major institution land use have remained major obstacle towards alleviating traffic movement in the city of Lagos. Accessibility through the major traffic system, which is road, can be improved if these major institutional land uses can allow their unused land area to be opened –up as arterial roads. These major institutional used are the Apapa KiriKiri Barracks, Maryland Barrack and Ojo Cantonment on one hand and the local and Murtala International Airports on the other. This will improve traffic flow and enhance property values along these new routes. It will also encourage unbuilt residential lands to commence housing construction on their sites, which are presently being shielded and made inaccessible from major employment areas of the city

To improve access to land there is also the need to put in place urban residential land use information system. This will assist the residents in Lagos to have comprehensive information about quality and quantity in terms of prices, types, number and actual location where residential apartments are available. Appreciable efforts are being made toward this by estate firms especially through advertisements in the print media. Government will have to intervene by dictating the pace of the market price especially through residential properties owned by government herself in various locations in metropolitan Lagos.

### **Technical Infrastructures**

This is critical in the area of constant electricity supply, steady pipe borne water supply, good road network, and telephone service. While the government has accepted the fact that she can no longer cope with the provision and maintenance of these facilities, the need to fully involve the private sector is inevitable so that the government can devote more attention to other pressing socio –cultural and political problems which seem to take centre stage in metropolitan Lagos.

It is the position of this paper that privatization of public infrastructural facilities in metropolitan Lagos will improve quality of life in residential areas since it will lead to efficiency of services and create more jobs. However for privatization to flourish in metropolitan Lagos there is the need to re-examine the capacity of government to handle the administrative and political roles that will be required. Government should establish the capacity not only to make initial assessments on how service should be supplied but also to administer the state role once they have been established.

### **Rent and Housing Finance**

The first major step toward rent control might not be through rent legislation as this has proved to be ineffective. It is a common knowledge that in the area of housing, the government always find it difficult to control what is not her own. Therefore there is the need for government to provide house at local government level in metropolitan Lagos on rental basis contrary to the present Lagos State and Federal government owner-occupier and site and service schemes which have provide not to be the solution of affordable accommodation for the people. Government should build rental apartments in all local government areas and than set the pace for the rent. In order to increase the stock of such house in the market, private housing developers and corporate bodies through the various labour union should encourage formation of housing co-operative societies.

The quality of the environment has great implication on the quality and value of the people and their neighbourhoods. It was discovered that specific environmental problem exist at very high level in metropolitan Lagos. This include flooding and noise being the most severe. Others are pollution (dust, odour, automobile emission, industrial waste and solid waste) there is need for greater attention towards ameliorating these problems. Flooding in metropolitan Lagos is mainly due to blocked drainage channels. Also this could be given to private bodies to maintain with the government especially at local level paying for such service this will be easier to monitor and appropriate punishment meted on erring contractors. This will be more efficient than the present structure where civil servants are expected to clean the drainage channels.

### **Quality of the Environment**

Noise pollution can best be tackled through appropriate legislation and public enlightenment on the adverse effects. Such social ills especially in neighbourhoods where part of apartments are converted into commercial premises such as hotels, beer palours, restaurants or where people just advertise their wares through the use of loud speaker within residential neighborhoods. The present efforts of government on domestic waste collection through the

private sector participation scheme should be sustained and improved upon especially in the light of the recent glaring deficiencies of the scheme. Also the present high rate of other uses especially of commercial into residential neighborhoods might be a situation, which have come to be part of the city land use planning phenomena. This paper recommends the need for independent research into this. Such findings might serve as an input into the future master plan of metropolitan Lagos.

### **Land Acquisition**

The present land acquisition by government and speculative tendencies of individuals which have resulted into land banking of very large tracks of land in both the built-up central and peripheral areas of Lagos require urgent attention. Most of these lands when sold in future are not usually used for residential, whereas they were initially demarcated for residential apartments. In the built-up areas as most plots are used for commercial purpose such as shopping complexes and petrol service stations. Also acquired government land are neither released into the market nor used for any scheme. Therefore there is a need for deliberate government policy to discourage such phenomena. This paper recommends the need for unbuilt lands in built-up neighbourhood to be subjected to heavy land taxation. Also there is the need to legislate on maximum land ceiling areas that could be left undeveloped in built-up areas. This will discourage speculation and most of the plots are likely to be use for the purpose(s) for which they were earmarked in the original scheme

### **Public Participation**

In the process of land use, planning the place of public participation should be given a pride of place. This should involve the establishment of effective communication link with the public at initiation of any land use relate policy or scheme. The objective of citizen participation should be tailored to inform and educate the public about the planning procedure in order to enable them understand the scope, limitations and to be able to select alternative useful policies that will be of general interest to the community

## **5. CONCLUSION**

This paper ha analysis the major factor influencing residential land values in metropolitan Lagos. The factor specifically analysis are accessibility, technical infrastructure rent, quality of neighbourhood, transport improvement and government regulations. This has been done with respect to the different residential neighbourhood during which reasons for the observed views were established. The use of principal component technique made it possible o reduce these factor into two factor can b accepted as the main determination of residential land values in the Lagos metropolis.

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Source Field Survey, 2002  
Fr = Frequency % = percentage

**TABLE 2: VARIABLES USED IN FACTOR ANALYSIS**

VAR 30	Accessibility as a factor influencing Residential land Value
VAR 32	Price/Rent as a factor influencing Residential Land Value
VAR 31	Transport Improvement as a factor influencing Residential Land Value
VAR 38	Quality of Improvement as a factor influencing Residential Land Value
VAR 39	Services/Facilities as a factor influencing Residential Land Value
VAR 48	Government Regulation (Zoning) as a factor influencing Residential Land Value

Source: Authors, 2005

Table shows the correlation matrix of the linear association between the variables.

**TABLE 3: MATRIX OF CORRELATIONS**

Variable	30	32	31	38	39	40
30	1.000					
32	.719	1.000	.732			
31	.874	.732	1.000			
38	.541	.572	.595	1.000		
39	.509	.594	.563	.695	1.000	
40	.541	.599	.557	.731	.697	1.000

**FIGURE 4 EXTRACTION OF INITIAL FACTOR (COMPONENTS)**

Factor number	Eigen Value	% of Variance	Cumulative % of Variance
1	4.175	59.638	59.638
2	1.151	16.441	76.079

**TABLE 5: COMPONENT LOADING FOR EACH PRIMARY VARIABLE**

Variable	Factor		
	1	2	
VAR 31	Infrastructural Facilities	.867	.249
VAR 32	Economic	.844	.146
Eigen value		4.175	1.151
% of Total Variance		59.638	16.441
Cumulative % of Total Variance		59.638	76.079

Note: Loading that are equal or greater than 0.40 are considered to be high

Source: Authors, 2005.