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Oba Peter Tomonidie S

Department of Estate Management and Valuation, Kenule Saro-Wiwa Polytechnic Bori, Nigeria

Nkpite Bari-ene Samuel Department of Estate Management, Rivers State University Port Harcourt, Nigeria

Assessing the mechanisms of saakpenwa-bori-kono road infrastructure influencing residential property values in bori, rivers state, Nigeria

Oba Peter Tomonidie S and Nkpite Bari-ene Samuel

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Abstract

This study is aimed at examining the mechanisms of road infrastructure influencing residential property values in Bori Urban of Rivers State, Nigeria. The purpose is to identify the features of road infrastructure influencing residential properties rental/capital values. Structured questionnaires were administered on some purposely selected 125 landlords and tenants living in residential properties along newly dualalized Saakpenwa-Bori-Kono road under study and out of the selected 125 landlords and tenants, 95 respondents duly completed and returned their questionnaires representing 76% response rate, all of which were found useful for the study. And the data collected were analysed using descriptive statistics. The findings showed that the features of road infrastructure influencing the choice of location for a residential property include facilitation of accessibility, reduce traffic from road widening, free flow of water, good drainage, provision of street light, provision of pedestrian walkway and provision of cover drainage. Furthermore, findings revealed that more than half of the respondents with mean score >3.00 identified the mechanisms of road infrastructure influencing residential property values to include increases rental values, stimulates aggregate demand & supply and attracts additional flow of income, provides accessibility to the property, marketability & viability of the property and reduce time and resources spent on property, provides amenities that enhances quality of life, provides mobility to investors and provides free flow of information. The study therefore suggests that the relative increase in rental values may be attributed to features of road infrastructure; as an affirmative response that road infrastructure increases rental/capital values respondents. It was therefore recommended among other things that governments at all levels should take the matters of road construction, maintenance and rehabilitation as a matter of priority because these processes enhance property values and indirectly increase revenue accruable from property as tax to government coffers.

Keywords: Features, mechanism, residential properties, property values, road infrastructure

Introduction

Road infrastructural development refers to the bringing into existence of the basic pathways and routes for humans and vehicular movement which must be in place for a particular activity or pursuit. However, no nation can boast of significant development or an enhanced economy without providing the road infrastructure for the citizens' well-being. Road infrastructure is indispensable in residential property investment and its complexity in socio-economic relations to the production of property values which is central to the continuity of human's investment in land. In Nigeria, values of properties vary for different suburbs due to their environmental attributes. For people who live in urban areas or cities, road infrastructure decisions may be influenced by the balancing of desires and the environments (Kuye, 2018) ^[6]. Therefore, road infrastructure is discussed as a key influence in explaining residential property value dynamics.

The adequacy of road infrastructure helps to determine the level of success that a country achieves in terms of coping with population growth, reducing poverty, or improving environmental conditions (World Bank, 1994) [18]. One veritable parameter of assessment and indicator of status of any spatial, especially urban system is the state of road infrastructure. The efficiency of any form of human activity system including an urban area largely depends on the provision of efficient accessibility of pathways and routes (Makata and Olabejo, 2019). Oni (2007) [8, 12] opines that property and land values tend to increase in areas with expanding transportation networks, and increase less rapidly in areas without such improvements. Rapid and continued rise in housing and land prices are expected in cities with transportation improvements and rapid economic and population growth.

Corresponding Author:
Oba Peter Tomonidie S
Department of Estate
Management and Valuation,
Kenule Saro-Wiwa
Polytechnic Bori, Nigeria

Road is any nation greatest investment where every citizen is a shareholder (Readopt Series II 2007). However, the burden of road construction, road caring or management is seen as the sole responsibility of the government.

Importantly, Bori Town being the headquarters of Khana Local Government Area has witness the construction and dualization Saakpenwa, Bori and Kono road and the subsequent commissioning of Saakpenwa and Bori section of the road, and was chosen for the study to evaluate the mechanism of established road infrastructure as a locational amenity influencing on residential property values. Bori as an urban zone requires physical development (road infrastructure) which is essential to the wellbeing and development of any societies evidence with residential properties investment as asset that provide links to livelihood, health, safety and security, social and economic stability. In Bori before the road dualization; residential properties were the extremely vulnerable asset due to urban transport systems as one of the most visible influence on property values. Likewise, after the road completion and commissioning; the most visible influence of residential property values was the urban transport systems which are life wire of investors in terms of acceptable locations meeting the needs and choice of specific investors.

It appears that there are wide range differences in the levels of rent passing on residential properties before the construction and after the commissioning of Saakpenwa-Bori road in a particular areas and between different locations. Before construction, Saakpenwa- Bori road was deteriorated into deplorable situations. Pot-holes existed on the road thus causing traffic problems. Drainages were badly destroyed and run-off water from drains devastated roads. The whole environment was defaced by these situations thus affecting rental value of residential properties within the layout. Within a relatively short period, after the road was completed and commissioned, basic roads infrastructure such as the road, drainages and streetlights were provided in the road. The environment which hitherto was a death-trap improved tremendously. It is against this background that this study was conceived to fill the gap in knowledge, despite many studies carried out returning either positive or negative effect. In an attempt to improve our understanding where little or no information exist in the particular case study; this study will attempt to assess the mechanisms of roads infrastructure influencing residential property values in Bori, which the results will be provided in this research.

Aim and Objectives of the Study

The aim of this study is to assess the mechanisms of road infrastructure that influence on residential property values in Bori Rivers State, Nigeria. To achieve this, the following objectives shall be used to:

- i. Assess the features of road infrastructure influencing residential property values in Bori.
- ii. Identify the mechanisms of road infrastructure influencing residential property values in Bori.

Literature review

Road Infrastructure

Road infrastructure, apart from being a major pointer of environmental quality; is a critical agent for the socioeconomic development of an urban area (Onyejiaka and Okpala, 2020). It plays an important and indispensable role in the economic, social and environmental aspects of life of an urban setting. According to United Nations (2002) [17], the quality and coverage of infrastructural services have a major impact on living standards and economic growth, yet it is estimated that two billion of the world's poor people lack access to adequate sanitation, two billion lack access to electricity, one billion lack access to clean water. Nubi (2003) [19] describes road infrastructure as the aggregate of all facilities on the pathway that allows a city to function effectively.

Onyejiaka and Okpala (2020) defines road infrastructure as those landmarks or track derived from a set of public works traditionally set up by the public sector to enhance the private sector production and allow for household consumption. It is the facilities with high fixed costs, long economic lives, strong links to economic development and a tradition of public sector involvement. The services provided forms the underpinnings of the nation's defense, a strong economy, and health and safety of its populace. They include highways, street roads and bridges; airports and airways; public transit and transport services; water supply, waste water treatment and water resources; solid waste and hazardous waste services; recreational facilities and security services.

Oni (2007) [12] opines that property and land values tend to increase in areas with expanding transportation networks, and increase less rapidly in areas without such improvements. Rapid and continued rise in housing and land prices are expected in cities with transportation improvements and rapid economic and population growth. Road is any nation greatest investment where every citizen is a shareholder (Readop Series II, 2007). However, the burden of road construction, road caring or management is seen as the sole responsibility of the government.

Alimi, Ayedun and Oni (2014) [5] observes that property's location and value are strongly interrelated with the urban transport systems influencing the property features. Accessibility is a key aspect of location: physical accessibility of a residential property is determined by the time and cost of travel the tenants considered valuable as compare to other location's properties. The valuable consideration of such location also depends on the presence, efficiency and effectiveness of transport modes. Investment in new transport infrastructure will alter location's relative accessibility, inducing both localised and more general changes in land values. Substantial value changes will trigger property investment and development decisions, resulting in the intensification or change in land use (Said and Shah, 2006). Therefore, property market acts as the conduit through which the economic and social impact of changes in accessibility is transmitted to the environment.

Road Infrastructure and Property Value

Onyejiaka and Okpala (2020) in their study discovered that negative externalities linked to water supply/quality problems in a given neighbourhood adversely affected property values within the study location. Des Rosiers *et al.* adopted the hedonic pricing model in quantifying the economic influence of this externality in property values within their study area. Findings indicated that water-related health hazards exert a detrimental and measurable impact on higher property values. A study in Nigeria on land value determinants in medium density residential neighbourhoods of metropolitan Lagos, Oduwaye (2004) [10] found that

access roads, good drainage, electricity, public water supply and telephone are essential and where facilities are adequately available, land values will be high. He observed that road network is one of the factors that influence property values and establish that improvement in transportation facilities especially roads brought about improved accessibility. Using the Spearman's correlation analysis, a correlation coefficient of 0.177 for transport improvement was observed at 0.01 level of significance. The study only showed the relationship between growth in transport development and improvements in accessibility. However, the study did not empirically determine degrees and levels of accessibility and connectivity of each nodal point within the studied network. In addition, it also did not consider the effects of demand, supply and location on residential property values.

Odudu (2003) compared different neighbourhoods in Lagos and noticed that property values tend to peak in those areas that enjoyed one form of infrastructure or the other. Land uses out-compete less productive uses through better rent offers. Competition for locations with good urban infrastructure usually results in an increase in land and housing values, either sales or rentals (Adebayo, 2006) [2]. Adebayo (2006) [2] also suggests that 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. A few other empirical studies also reveal this correlation.

Residential Property Investment in Bori

Investment in real property market is undertaken by various individuals or groups, each having its own peculiar requirement in terms of property and returns. Residential property which is the focus of this study is a multidimensional good differentiated into a bundle of attributes that vary in both quantity and quality (Kuye, 2018) [6]. It is often difficult to identify the appropriate variables that explain residential sale and rental values because each piece of property is unique. One approach that has been used by researchers to model residential property value evaluates properties according to their neighbourhood characteristics (Tse and Love, 2000) [15]. Other research explained it on the basis of residential housing unit's physical characteristics which includes number of bedroom, number of toilet/bathrooms, age of the building and area of the building (Udechukwu, 2013) [16]. In whichever way the analysis is viewed, the residential property investment in Bori has turned in a sterling performance over the years. Rental values of residential properties have shown an upward growth pattern. This may be because Bori is a local government headquarters and the present of civil servant and students of Ken Saro-Wiwa Polytechnic starts experiencing the influx of people from all spheres of life in search of government jobs and student's accommodations. Investors have diverted their funds into real property development because of the security of returns and the profitability of the market. In addition, because of the high competition in the residential property market, there has been expansion and improvement in the quality of residential properties provided by the investors to meet demand.

Influence of Roads Infrastructure on Residential Property Values

However, availability or otherwise of roads infrastructure in Nigerian cities determines the choice of rented apartment (Tse and Love, 2000) ^[15]. Similarly, inadequacy and non-availability of these infrastructures could necessitate changing of residences by people living in a particular area. This is known as residential mobility (Udechukwu, 2013) ^[16]. The provision and maintenance of these infrastructures in any residential property neighbourhood requires substantial sum of money, which constitute part of an investment in property development (Kuye, 2018) ^[6]. This investment in turn generates return in form of rental values. Therefore, the concern of this study is to analyse the mechanism of the following roads infrastructure; access road, pathway, walkway, street lighting, water, traffic light, refuse disposal facility, drainage channel, security services on the rental values of residential properties.

Aderamo (2003) [1] opines that road network constitutes an important element in urban development as roads provide accessibility to the different land uses in the urban area. Thus, the proper functioning of an urban area depends on an efficient transportation network. General accessibility largely depends on transport facilities. Oni (2007) [12] listed transportation modes to include human porterage, railways, ropeways and cableways, pipelines, inland waterways, sea, air and road. Ladan (2007) [7] describes road transportation as a form of land transport which involves the movement of people and goods by motor cars, trucks, buses, motorcycles and bicycles. Furthermore, they refer to road transportation as the most popular means of transport.

Hence the significance of road infrastructure in the proper functioning of an urban area cannot be dismissed. Apart from being a major pointer of environmental quality, road infrastructure is a critical socio-economic development of any urban area (Makata and Olabejo, 2019) [8]. It places an important and indispensable role in the economic, social and environmental aspect of life of an urban setting. It has a pronounced impact on the quality of life. It is a back bone of any economy. Real estate industry needs it to effectively and efficiently drive their production processes. It is evident that a myriad of factors such as the prevailing economic conditions, government legislation and policies, availability and state of roads infrastructural provision come into play to influence residential landed property (values).

The influence of roads infrastructure and residential property values has been the focus of many studies. Many studies (Singh, 2005; Olayiwola, Adeleye and Oduwaye, 2006) [10] emphasized the effects of the factors on values of properties generally with little consideration given to the mechanisms of road infrastructure and its influence on values of residential properties. Some of the earlier studies returned positive effect between road infrastructure and residential property values while others showed negative effect. Possible influence of roads infrastructure and residential property values have therefore prompted the interest of the researcher in this direction.

Research methodology

Bori town is the traditional headquarters of Ogoni kingdom which consist of four independent but interrelated local Government councils, notably; the Eleme, Tai, Gokana and Khana local Government Council Area. Bori, is an ancient community transcending from the capital of the old Bori Division to the Head-Quarters of the present Khana local Government Area. Bori is measuring 20 square miles (50 km2) with a population of 11,693 in the 2006 National Population census figure of the National Population

Commission. It is bounded to the North by Tai and Gokana local Government council to the south by Nwiiyaakara to the East by Kaani and Kor while, it is bounded to the west by Zaakpon and Boue community. Bori serves as a commercial centre for the Ogoni, Andoni, Opobo Annang and other ethnic nationalities of the Niger Delta. Bori is the host of the Ken Saro Wiwa Polytechnic Bori, Zonal General Hospital, Area Command of the Nigeria Police, State High and Magistrate Courts, as well as famous Biarabi Memorial Grammar School. With the presence of these institutions has led to increasing rate of residential and commercial property investment: there is a standard road net-work which connect people across all parts of Bori. The study was conducted in Bori resulting from increased demand for residential accommodation due to road infrastructural improvement. The research design for this study is the field survey research design method. The field survey design approached was employed for this study because it is amenable to situations where facts or data must be collected from respondents within the industry and data collected from a sample of the target population was used to predict certain characteristics of the population. The population of this study consists of property owners and tenants who are property developers in Bori, Rivers State Nigeria. In the course of this study, 125 owners and tenants including residential properties whose values were affected was identified including both property owners and tenants in Bori Urban were selected using snow-balling during researcher's pilot survey. The sample size for this study was

125 respondents utilizing structured questionnaire to collect primary data. A total of 125 copies of structured questionnaire were administered to the respondents and 95 copies of the questionnaires were adequately filled and returned presenting 76% response rate, which is presumed to be adequate for this study. The descriptive statistical tool such as percentage techniques, frequency tables, mean scores and relative importance index (RII) were used to analyse the data collected.

Data presentation and Analysis Features of Road Infrastructure on the Selection of Residential Properties

Table 1 indicates the attributes of road infrastructure in which it influences respondents' choice of selecting residential property in that location of the study area. From the Table, 11.5% explains it in term of accessibility, 12.8% each explain it in terms of reduction of traffic and covered drainage, 7.7% each consider the selection in terms of free flow of water and road smooth surface, 14.1% each select base on good drainage and of provision of street light, 9% select base on provision of pedestrian walkway, 10.2% are of the opinion that consider the selection in terms of road widening. It implies that the features of road infrastructure influencing the choice of location for a residential property include facilitation of accessibility, reduce traffic from road widening, free flow of water, good drainage, provision of street light, provision of pedestrian walkway and provision of cover drainage.

Table 1: Features of Road Infrastructure on Residential Property Values

Features of Road infrastructure	Frequency	Percentage (%)
Accessibility	9	11.5
Reduce Traffic	10	12.8
Free flow of water	6	7.7
Good Drainage	11	14.1
Road Widening	8	10.2
Provision of Street light	11	14.1
Provision of Pedestrian walkway	7	9.0
Road smooth surface	6	7.7
Provision of cover drainage	10	12.8
Total	78	100.0

Source: Author's Field Survey, 2022

Mechanisms of Road Infrastructure Influencing on Residential Property Values

This section presents data on the influence of road infrastructure on residential property values Table 2 shows that increases rental values, stimulates aggregate demand & supply and attracts additional flow of income have weighted sums of 3.57, 3.42 and 3.35 respectively; while provides accessibility to the property, marketability & viability of the property and reduce time and resources spent on property have weighted sums of 3.32, 3.26 and 3.15 respectively, and provides amenities that enhances quality of life, provides

mobility to investors and provides free flow of information have weighted sums of 3.13, 3.03 and 3.00 respectively. From the Table 2 it is deduced; majority of the respondents with mean score of >3.00 agreed that influence of road infrastructure on residential property values include increases rental values, stimulates aggregate demand & supply and attracts additional flow of income, provides accessibility to the property, marketability & viability of the property and reduce time and resources spent on property, provides amenities that enhances quality of life, provides mobility to investors and provides free flow of information.

Table 2: Influence of Road Infrastructure on Residential Property Values

Influence of Road Infrastructure	Weigh: N=78					\(\sigma_{\sigma_{\sigma}}\)	$\Sigma \mathbf{f} \mathbf{x} / \Sigma \mathbf{f}$	RII	Rank
	5	4	3	2	1	$\sum fx$	<u></u>	KII	Kalik
Increases rental values	21	18	15	13	13	279	3.57	0.71	1 st
Stimulates aggregate demand & supply	18	17	15	14	13	267	3.42	0.68	2 nd
Attracts additional flow of income	22	19	13	15	10	265	3.35	0.67	3 rd
Provides Accessibility to the property	19	20	16	12	12	259	3.32	0.66	4 th
Marketability & viability of the property	17	21	17	14	10	258	3.26	0.65	5 th

Provides amenities that enhances quality of life	19	15	18	13	14	249	3.15	0.63	6 th
Reduce time and resources spent on property	19	16	16	14	12	247	3.13	0.62	7^{th}
Provides Mobility to investors	15	16	16	16	15	234	3.00	0.60	8 th
Provides free flow of information	16	16	15	16	16	237	3.03	0.60	8 th
Mean						255	3.27	0.65	

Source: Author's Field Investigation, 2022.

Discussion of Findings

Features of Road Infrastructure on the Selection of Residential Properties

As found in table 1, the findings showed that It implies that the features of road infrastructure influencing the choice of location for a residential property include facilitation of accessibility, reduce traffic from road widening, free flow of water, good drainage, provision of street light, provision of pedestrian walkway and provision of cover drainage. The deduction from this breakdown is that majority of the respondents living in the study areas agreed that road infrastructure leads to an increase in rental/capital values. Accessibility is a major factor that determines how much people are willing to pay for a particular location. With the road infrastructure, the location is easily accessible (with lower net economic cost of movements in terms of distance, time and convenience) has a greater comparative advantage and the greater is the demand for property at that location.

Influence of Road Infrastructure on Residential Property Values

From the results in Table 2, more than half of the respondents with mean score >3.00 identified influence of road infrastructure on residential property values to include increases rental values, stimulates aggregate demand & supply and attracts additional flow of income, provides accessibility to the property, marketability & viability of the property and reduce time and resources spent on property, provides amenities that enhances quality of life, provides mobility to investors and provides free flow of information. Road infrastructure is an important factor contributing to the enhancement of rental/capital values. The study indicated this when respondents agreed that road infrastructure increases rental/capital values respondents as an affirmative response.

This study has established that the increase in rent was as a result of improvement in road. But it may be also as a result of increases property values, willingness to pay and accept rents, less capital outlay requires to manage the property. It has also been established in other studies that inflation, increase in population, fashion and taste, type of society, standard of living, migration, etc. It is also possible that the roads under study are already existing and many of the tenants were displaced during land acquisition roads and latent values has set into the properties; hence, the effect of their improvement on rental values was significant. This will lead to households responding to differential public service levels by migrating between communities to meet their needs. To consolidate urban structure and the cost of providing urban infrastructure, existing road infrastructure is more effectively utilised in the built-up urban areas.

New transport infrastructure influenced property values with the found anticipation that construction of Saakpenwa-Bori-Kono road; it acted to increase rental values of residential properties. This was possibly because of expectations of disruption during the building of the system, and on completion of the road, the positive impact has appeared. Moreover, this study has also shown that the features of road infrastructure was the major mechanism influencing on property values. Further evidence on the influence of road infrastructural attributes is provided by street light and pedestrian walkway, drainage and green verge, kerb/pavement and drainage cover signage/symbol, road median and road flat surface and roundabout services such as sewerage and drains, roads, and public transport, as well as linking the residence to social infrastructure such as health care facilities, education facilities and other community services. They demonstrate that the presences of these social infrastructure facilities are important factors in determining property values. However, the most striking feature of the results of this research are highly valued as a part of the environmental quality. The deduction from this analysis is that majority of the respondents living in the study areas agreed that road infrastructure do lead to an increase in rental/capital values. In this case, accessibility to transport is an important determinant of property values, based on class of residential properties in Bori.

Conclusion and Recommendations

This study has examined the mechanism of roads infrastructure on residential property values along Bori-Saakpenwa Road, Rivers State of Nigeria. The features and influence of road infrastructure and other attributes to changes in rental and capital values of residential properties were examined. The study has emphasized on the importance of facilitation of accessibility, reduce traffic from road widening, free flow of water, good drainage, provision of street light, provision of pedestrian walkway and provision of cover drainage, including increased rental values, aggregate demand & supply, additional flow of income, provided accessibility to the property, marketability & viability of the property and reduced time and resources spent on property, amenities that enhances quality of life, mobility to investors and free flow of information; as the impact that road infrastructure has on residential properties value generally. The results emphasise the importance of physical attributes as principal determinants of residential property values. In addition, the result also shows that the presence of road infrastructure, particularly road infrastructural features is an important attribute in determining rental values. This suggests that different attributes are valued differently when combined with other attributes. It may be concluded that a variety of the mechanisms of road infrastructure are also fundamental to determining the residential property values.

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