

Effects of Infrastructural Facilities on the Rental Values of Residential Property

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Abstract: Problem statement: Real estate developers were consistently faced with the issue of making decisions on the types of property to invest their hard earned income or highly competitive secured mortgage funds, which were attached with high lending rates. One of the different sectors that are begging for such investment is residential property development. **Approach:** This study evaluated the effects of available infrastructure in residential property on its rental values in Akure, Ondo state, Nigeria. Two different sets of questionnaires were designed and administered for the collection of primary data used in the study. The first set of questionnaires was for the tenants of residential property while the second set of questionnaires was administered on the practicing estate surveyors based in Akure. The questions in the questionnaires amongst others probed into the types of available infrastructure in the rented apartment, rent paid, income of household-heads and family size. Primary data collected were subjected to multiple regression analysis and the determination of the effects of each of the available infrastructure (water, electricity, access road, kitchen, toilet, refuse disposal facility, wall fence, installed burglary proof, drainage channel, daywatch-security and nightwatch-security services) on the rental value was achieved. **Results:** The study revealed that infrastructural facilities contributed 30.50% in the determination of rental values of residential buildings in Akure; of which the provision of wall-fence round the building and the installation of burglary proof in all the windows played the most important infrastructure. **Conclusion:** Property developers that want to invest in residential buildings development should endeavour to provide these two infrastructure amongst others with a view to earn attractive rental values on their residential property in Akure in particular and towns and cities in developing countries.

Key words: Rental value, infrastructure, tenants, zones. Naira (N) (Nigeria currency in which N125.00 naira is equivalent to one America dollar at the time of the study)

INTRODUCTION

Real estate development requires huge capital investment, which is not easy to come by particularly in most developing countries^[1]. The concern of most investors in property development therefore, is how to maximize the returns on their investment and recoup back their money within a shortest possible period. In Nigeria for instance, recent years have witnessed increasing rates of inflation accompanied by high and volatile interest rates. Asaju and Bello^[3], were of the opinion that some factors have affected the entire economy. Moreover, one of the most drastic effects of this is on housing as shown by wide swings in construction activity and in the turnover of the existing stock as well as by growing feeling that housing is out of the reach of an increasing large number of

households The effects of which can be traced to the shortcomings of the mortgage instruments^[5] and the institutional arrangement that surround it which in an inflationary environment have had a serious destabilizing impact on both the demand and supply^[6]. As a result, real estate developers are consistently faced with the issue of making decisions on the type of property to invest their income or highly competitive secured mortgage funds, which are attached with high lending rates.

Disappointedly, a walk along major streets in most Nigerian cities reveals that significant numbers of shopping malls and shops in residential apartments on which such money were invested are tagged with signposts of “to-let” for months without prospective tenants making enquires Many factors are responsible for this non-patronage/non-occupation. These range

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from poor location factor(s), non-availability of supporting infrastructure (like inadequate parking spaces, poor access) to the effects of the down turn in the economy among others. The implication of this is that substantial amount of money secured with high interest rates are being tied down without generating the desired income.

However, the reverse is the situation concerning residential property in most Nigerian cities^[10] Residential Property or accommodation transcends ordinary shelter and thus comprises of the facilities and other aspects of the social environment, which links man with his remote and immediate neighborhood. Hardly would one find residential property being vacant for couple of weeks without prospective tenants making effective demand. The increasing demand for residential property in our urban centers would continue to attract the investment interests of real estate developers. This is because of the increase in rent, which is usually attached to the property^[9].

Different scholars have variously stressed the relevance of infrastructure in all spheres of life McNeil^[8] was of the opinion that infrastructure services have taken on a new urgency in part because they have a direct bearing on economic growth. She stresses further that studies have shown that adequate infrastructure reduces the cost of production, which in turn affects profitability, level of output and employment; particularly in small-scale businesses.

In holding the importance of infrastructure in a high esteem, McNeil^[8] quiescently concludes that when infrastructure works, productivity and labor increase; when it does not work, economic renewal can be postponed or even halted. Unfortunately, the level of availability of infrastructure in most developing countries is drastically low which calls for concern particularly on the part of the government at all levels. Mabogunje^[7], decries the unavailability of such services as water and sanitation, which are measure of welfare. Thus, concluding that people are poor because they do not have access to basic necessary services.

It is generally believed that provision of infrastructure in residential property would continue to attract prospective tenants. In the course of this investigation therefore, it becomes pertinent to provide answers to the following questions; what are the various types of residential property in Akure? What are the existing infrastructural facilities in the residential property? What are the conditions of these infrastructural facilities? How has the available infrastructure influenced the rental value of the residential property? How can the quality of the infrastructural facilities in the residential property be

improved upon and maintained in a sustainable manner with a view to attract high rental value? These are the questions, which this study intends to provide answers.

MATERIALS AND METHODS

The study area is Akure which, is located on latitude 7°15' North and longitude 5°14' East of Greenwich Meridian. It occupies about 35 km² of land Akure is about 700 km Southwest of Abuja, the federal capital of Nigeria. Akure was originally the headquarters of Ondo province until 3rd February, 1976 when its status changed to the Capital of Ondo State, Nigeria. This led to a phenomena change in the political, social, economic and administrative roles as well as the population of the town. In the 1991 national population census exercise, the population of Akure was 239,124 persons. However, the projected population figure for 2008 was 459,716 persons. The increasing population had not been adequately housed because of the shortage in the supply of housing units to cope with the housing needs^[11]. This has been responsible for the shortage of residential accommodation, which correspondingly led to skyrocketing of rent for the available residential property most of which are devoid of necessary infrastructural facilities.

In this study, the research methodology was designed to obtain data on the effects of infrastructural facilities on the rental values of residential property in Akure metropolis. As a necessary prelude to the assessment of the effects of infrastructural facilities on rental value of residential property, a reconnaissance survey purposely designed to familiarize the researchers with the available types of housing property development in Akure was undertaken. This was followed by series of other field surveys conducted by the researchers ably assisted by field assistants. Data were collected on the distribution of residential property, the types and the conditions of infrastructural facilities provided and rents paid by tenants among others. The data were later processed to give the overall assessment of the rental values of residential property as well as formed the basis for making recommendations that would improve the level of infrastructure provision in residential property in Akure in particular and Nigeria in general; with a view to enhance the returns on capital invested by the property developers Data collected in the pursuit of this study were from two main sources. These are (1) primary sources and (2) secondary sources.

The primary data were sought from the field surveys conducted through the administration of two different

sets of questionnaires. The first set of questionnaire was designed for the tenants of rented residential property. The questions in the questionnaire among others probed into the location of the residential property, available infrastructure and conditions of the infrastructure, rent paid, income status and the household size of the tenants and the readiness of the tenants to pay increased rent whenever there is improvement in the level of infrastructural provision.

Akure our study area has residential quarters aggregated into natural areas. The general unifying attributes include the age of buildings, location attributes, available infrastructural facilities and their management. In administering the questionnaire for the tenants in the residential property in Akure, the city was divided into (4) zones, which, was similar to the classification of Akinbamiyo^[2] These are the core area, the transition area, the peripheral area and the public housing districts (Fig. 1).

Core area: This area is predominantly made up of old structures, whose construction predating the colonial period in Nigeria (i.e., pre-1914). The core area covers Eruoba, Odo Ikoyi, Igann, Odo Ijoka, Immagun, Isolo, Erekefa, Erekesan and Oritagun quarters among others. Most of the residential property in the core area are generally old, poorly ventilated, dilapidated, squalid and deficient in infrastructural facilities like potable pipe-borne water, drainage, electricity, sewage and refuse disposal system^[11].

Transitional area: This is an extensive post-colonial development, spreading to all directions from the boundary of the city core^[2]. The zone is characterised by a strong mix of land uses such as commercial, administrative and residential. Unlike the core area, most of the residential property enjoy fair accessibility. However, the sanitary condition in the area is nothing to write home about. This area essentially covers Oke Arata, Oke Padi, Oke Aro, Aiyedun, National Electricity Power Authority (NEPA) area and Oke Isinkan among others.

Peripheral areas: These areas are post-1976 development (i.e., after the creation of Ondo State). They are located at the outskirts and the residential property in the areas are mostly of modern design and structurally sound. Most of residential property were built on approved private residential layouts. The areas include Aule road, Gaga area, Ijoka road, Ologede area, Jegele and Igoba among others. The extension of infrastructural facilities to most of these areas is on community-based and individual efforts.

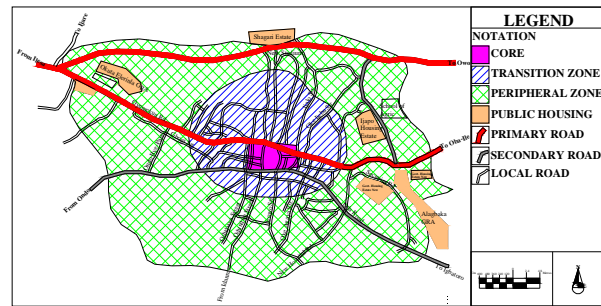


Fig. 1: Akure: Showing the zones and major roads
Source: Ministry of works and housing, Akure, 2008

Government residential estate: These are housing districts developed by public initiative and noted for their strict compliance with the development control ethics^[2]. The areas enjoy better infrastructural facilities such as pipe-borne water supply, electricity, drainage system, access road and refuse disposal system. The districts include Alagbaka, Ijapo, Ala, Okuta Elerinla, Shagari and Ilesha Road Housing Estates. In the administration of questionnaire on tenants in the zone, the Alagbaka and Ala Housing Estates were ignored because the estates are government-developed estates, where all the tenants have access to the same type and quality of facilities. The reason for this is that the tenants do not have the option of negotiating their rents even when there is an improvement in the facilities provided. They are civil servants and their rents are deducted from their salaries at source. The remaining estates are Shagari housing estate, Ijapo housing estate, Okuta Elerinla housing estate and Ilesha Road housing estates. They are government estates in which the residential property were developed by private individuals but the estates enjoy a reasonable measure of infrastructural facilities provided under the site and service programme.

In each of the 4 zones, 55 questionnaires were distributed to randomly selected tenants. Only 50 questionnaires were retrieved in a useable form in each of the first three zones i.e., core, transitional and peripheral zones while 40 questionnaires were retrieved from the selected government residential estate making 190 questionnaires. The survey-assistants asked the questions from the respondents and filled in the answers in the presence of the respondents particularly in the first three zones; whereas, in the 4th zone (i.e., government residential areas) survey-assistants were made to drop questionnaires for the respondents to complete because of their absence at home during the working period. This was responsible for the low recovery rate of questionnaires in the zone.

The second set of questionnaire was designed for the practicing Estate Surveyors in Akure. The questionnaire contained questions that sought their views on the rental values of residential property in Akure in general and the likely influence the provision of essential basic infrastructure might have on the values of the residential property. For the administration of questionnaires on the practicing Estate Surveyors, 10 copies of the questionnaire were dropped with the State Chairman of the Ondo State Chapter of the Institution of Estate Surveyors and Valuers, who distributed to practicing Estate Surveyors during their September 2008 monthly meeting in Akure. A follow-up at their different offices yielded the retrieval of only 9 copies in a useable form. Secondary data used in the study among others include the population figures for Akure and its base-map. Data collected were subjected to both descriptive and multiple regression analysis.

The analysis of the data collected from the tenants was done using multiple regression model to determine the interrelationships between each of the isolated infrastructure (i.e., water, electricity, waste disposal facility, access road and security enhancing facilities) which are the independent variables; and the rental value of the residential property (dependent variable). The model is not only capable of handling the problem of interactions amongst the independent variables but also it enables us to know the contributions or the importance of each variable to the explanation of variation in the dependent variable (rental value). It also allows for the prediction of value of the dependent variable.

According to Bryman *et al.*^[4], the equation of multiple regression y (dependent variable) on $X_1, X_2, X_3, X_4, \dots, X_n$ (independent variables) is given as:

$$Y = a + b_1x_1 + b_2x_2 + b_3x_3 + \dots + b_nx_n + e$$

Where:

X_1, X_2, \dots, X_n = The independent variables

b_1, b_2, \dots, b_n = Multiple regression coefficients for the independent variables (the slope of the regression line relative to x-axis)

“a” = An error term which points to the fact that a proportion of the variance in the dependent variable

Y = Unexplained by the regression equation

However, the application of the model to our case study shows that:

$$Y = a + b_1ELEC + b_2WAT + b_3ACC + b_4BUG + b_5RDF + b_6TO + b_7KT + b_8DC + b_9WAF + b_{10}DAW + b_{11}NIW \quad (1)$$

Where:

Y = The annual rental value

ELEC = Electricity

WAT = Water

ACC = Access road

BUG = Burglary proof

RDF = Refuse Disposal Facility

TO = Toilet

KT = Kitchen

DC = Drainage Channel

WAF = Wall Fence

DAW = Daywatch-security services

NIW = Nightwatch-security services

RESULTS AND DISCUSSION

Types of residential property in Akure: Residential property market in Akure covers a wide range of property, which can be grouped into 4 types for convenience of discussion. These are “face-to-face”, semi-detached flat, detached flat; and duplex. The “Face-to-Face” Residential property as the name implies is the residential building in which it is designed on room basis arranged on two opposite rolls, separated with a long passage. Tenants share the facilities such as toilet, kitchen and bathroom. It can be in form of a bungalow or a storey building.

The semi-detached flats are 2 flats combined on the same plot. It could be in bungalow or a storey building. The Detached flat is a single flat inclusively built on a site and usually a bungalow building. It promotes privacy of occupants or tenants.

The Duplex residential property is essentially depicted in its design; where the sitting room and the kitchen are located in the ground floor while the bedrooms and the conveniences (such as bathroom, toilet and private sitting room are in the first floor. The high-income group essentially occupies this type of building.

Table 1 shows that 47.4% of the sampled residential property are “Face-to-Face” type. This type of residential property is very prominent in the core and the transitional zones of the town; where 60 and 74% of the residential property correspondingly existed.

Table 1: Types of residential property by zones (% in Parenthesis)

Types	Zones				
	Core	Transitional	Peripheral	Public housing	Total
Face-to-face	30 (60.0)	37 (74.0)	20 (40.0)	3 (7.5)	90 (21.1)
Semi-detached flat	18 (36.0)	9 (18.0)	14 (28.0)	20 (50.0)	61 (32.1)
Detached flat	2 (24.0)	4 (8.0)	14 (28.0)	11 (27.5)	31 (16.3)
Duplex	0 (0.0)	0 (0.0)	2 (4.0)	6 (15.0)	8 (4.2)
Total	50 (26.3)	50 (26.3)	50 (26.3)	40 (21.1)	190 (100)

However, 32.1% of the entire residential property are semi-detached Flat. For instance, 50% of the residential property in the public Housing Zone is made up of Semi-Detached Flats. The table also indicates that there is no single Duplex in both core and transitional zones of Akure while 15% of the residential property in the Public Housing zone is duplex.

Infrastructural facilities available in the residential property in Akure: The infrastructural facilities available in the residential property include electricity, water supply, access road, burglary proof, refuse disposal facility, toilet kitchen, drainage channel, wall-fence, watchday-security services and watchnight-security services. The levels of provision of these facilities vary from building to building and from one zone to the other.

About 97% of the residential property in Akure are connected with electricity; while the entire residential property in the Public Housing zone are connected with electricity. All the sampled tenants in these residential property complained of epileptic supply of the electricity. The issue of water supply is not based on the public water supply or connection to the public water supply because this is not functioning in Akure but on the provision of functional water supply either through hand-dug well or boreholes. In this respect, 78.4% of the residential property are provided with water from either hand-dug well or borehole. It is necessary to note that none of the zones has less than 72% of its residential property provided with water. The location of the hand-dug well within the house compound influences the level of safety of such water; particularly in the core area where most of the hand-dug well are located within the septic field.

Every residential property is required to be provided with unhindered access road with a view to ensure safe movement of goods and services. Overall, 76.3% of the residential property are accessible by motorable road. However, the residential property in the core zone are mostly affected by inaccessibility, where only 56% were only accessible. This is followed by the peripheral zone, where 66% of the residential property are accessible. In the remaining 2 zones (i.e., the transition and the Public Housing zones) not less than 90% of the residential property are accessible by motorable roads.

The installation of burglary proof in residential property serves as means of ensuring security of property in such building. Over 70% of the residential buildings in the core, transitional and public housing zones are installed with burglary proof in their windows respectively. However, only 48% of the residential buildings in the peripheral zone are installed with burglary proof.

Table 2: Infrastructural facilities available in residential property by zones in Akure (% in parenthesis)

Infrastructural facilities	Zones				Total
	Core	Transition	Peripheral	Public housing	
Electricity	49 (98.0)	49 (98.0)	47 (94.0)	40 (100.0)	185 (97.4)
Water supply	40 (80.0)	38 (76.0)	42 (84.0)	29 (72.5)	149 (78.4)
Access road	28 (56.0)	45 (90.0)	33 (66.0)	39 (97.5)	145 (76.3)
Burglary proof	36 (72.0)	41 (82.0)	24 (48.0)	39 (97.5)	140 (73.7)
Refuse disposal facilities	28 (56.0)	16 (32.0)	17 (34.0)	18 (45.0)	79 (41.6)
Toilet	49 (98.0)	48 (96.0)	41 (82.0)	40 (100.0)	178 (93.7)
Kitchen	37 (74.0)	45 (90.0)	48 (96.0)	40 (100.0)	170 (89.5)
Drainage channel	26 (52.0)	20 (40.0)	33 (66.0)	35 (87.5)	114 (60.0)
Fenced round	26 (52.0)	18 (36.0)	22 (44.0)	30 (75.0)	96 (50.5)
Watching day service	2 (4.0)	3 (6.0)	9 (18.0)	10 (25.0)	24 (12.6)
Watching night services	25 (50.0)	10 (20.0)	20 (40.0)	35 (87.5)	90 (47.4)

Refuse disposal facility in residential property in Akure is generally poor and only 41.6% of the residential property enjoyed refuse disposal services. About 56% of the residential property in the core zone enjoyed refuse disposal services. This is connected with the special attention given to the core area of Akure by the Waste Management Board because of the intensive commercial activities in the zone.

Toilet facility is one of the basic facilities in any functional residential property. Overall, 93.7% of the sampled residential property in Akure are provided with toilet facility. It is necessary to note that all the residential property in the Public Housing zone are provided with toilet and kitchen facilities as indicated in Table 2. Although, 74% of the residential property in the core are provided with kitchen facility but this is much to be desired. Even when the kitchens are provided, some of the tenants carried out their cooking in unhygienic environment.

The drainages in the residential areas in Akure need much to be desired. Overall, just 60% of the residential property could boast of functional drainage. The provision of wall-fence round the residential property is to guide against unwanted interruption and ensure security and safety of property in the residential buildings. Only 50.5% of the residential buildings are provided with wall-fence, while 52, 36, 44 and 70% of residential property in the core, transition, peripheral and public housing zones are correspondingly provided with wall-fence.

The provision of watching-day security services in the residential property are not popular in Akure, with only 12.6% provided with these services. However, Table 2 shows that 25% of the residential property in the public housing zone are provided with daywatch-security services and in other zones (core, transition and peripheral zones), 40, 6 and 18% of residential property enjoyed daywatch-security services correspondingly. Nightwatch-security services are provided in 47.4% of

the residential property in Akure but over 87% of the residential property in the public housing zone are provided with nightwatch-security services. It is hope, that when residential property is provided with these infrastructure, such property would enjoy high patronage and consequently attract high rental value.

Level of satisfaction of tenants with the infrastructural facilities provided in their rented-residential property: The level of satisfaction of the tenants with the available infrastructure in the residential property in Akure is assessed under three categorization viz-satisfied, not satisfied and the last category is indifferent. The indifference is a situation where respondent is unable to make up his/her mind as to the indicated categories.

Table 3 shows that 96.3% of the tenants were not satisfied with the electricity supply into their buildings. This is connected with the frustrating condition of electricity supply in the country in general and in Akure in particular. Only 2.6% of the tenants could confirm being satisfied. This is followed by water supply, for which 89.5% of the tenants were not satisfied with the water supply in their houses. About 63% of the tenants were not satisfied with the refuse disposal services and the condition of the drainages abutting their rented residential property. However, 44.8, 43.2 and 39.4% of tenants were correspondingly satisfied with the nightwatch-security services, burglary proof installed and kitchen provided in their residential property.

In spite of the low level of satisfaction expressed by the tenants of residential property in Akure concerning the available infrastructure in the residential buildings they occupied, yet 37.4% of the tenants have been living in their present residential buildings for over 5 years ago. In addition, 26.3% of the tenants had been living in their residential buildings between 3 and 5 years ago. In the core zone, 30% of the tenants in the zone have being living in their houses for over 5 years while 34% of the tenants have been living in the same residential buildings between 3 and 5 years. In the transitional zone, 64% of the tenants lived in their present buildings for over 5 years.

Rental values of residential property in Akure: Despite the low level of satisfaction on the infrastructural facilities available in their rented apartments, the annual rent paid by the tenants range from ₦6, 000.00 to over ₦72, 000.00 per annum. Table 4 reveals that 4.7% of the tenants paid less than ₦6, 000.00 per annum for their rented residential apartment. It is necessary to stress that this is only peculiar to the core area alone (Table 4).

Table 3: Level of satisfaction of tenants with the infrastructural facilities in the residential

Infrastructure	Levels of satisfaction			Total
	Satisfied	Not satisfied	Indifferent	
Electricity	5 (2.6)	183 (96.3)	2 (1.1)	190 (100)
Water Supply	12 (6.3)	170 (89.5)	8 (4.2)	190 (100)
Access Road	60 (31.6)	125 (65.8)	5 (2.6)	190 (100)
Burglary Proof	82 (43.2)	100 (52.6)	8 (4.2)	190 (100)
Refuse Disposal	41 (21.6)	120 (63.2)	29 (15.2)	190 (100)
Toilet	80 (42.1)	102 (53.7)	8 (4.2)	190 (100)
Kitchen	75 (39.4)	110 (57.90)	5 (2.6)	190 (100)
Drainage channel	56 (29.4)	120 (63.2)	14 (7.4)	190 (100)
Fenced	75 (39.4)	110 (57.9)	5 (2.6)	190 (100)
Watching day services	20 (10.5)	80 (42.1)	90 (47.4)	190 (100)
Watching night services	85 (44.8)	100 (52.6)	5 (2.6)	190 (100)

Table 4: Annual rent paid by tenants in residential property by zones in Akure (% in parenthesis)

Annual rent	Zones				Total
	Core	Transitional	Peripheral housing	Public	
Under N6,000.00	9 (18.0)	0 (0.0)	0 (0.0)	0 (0.0)	9 (4.7)
N6,000-N12,000.00	4 (8.0)	17 (34.0)	4 (8.0)	0 (0.0)	25 (13.1)
N13,000-N36,000.00	16 (32.0)	23 (46.0)	13 (26.0)	0 (0.0)	52 (27.4)
N37- N48,000.00	5 (10.0)	2 (4.0)	10 (20.0)	3 (7.5)	20 (10.5)
N49,000-N60,000.00	7 (14.0)	8 (16.0)	8 (16.0)	6 (15.0)	29 (15.3)
N61,000-N72,000.00	7 (14.0)	0 (0.0)	14 (28.0)	16 (40.0)	37 (19.5)
Over N72,000	2 (4.0)	0 (0.0)	1 (2.0)	15 (37.5)	18 (9.5)
Total	50 (26.3)	50 (26.3)	50 (26.3)	40 (21.1)	190 (100.0)

Table 5: Zone with the highest rental value in Akure

Zone	No.	Percent of total
Public housing	8.0	88.80
Peripheral	1.0	11.20
Transitional	0.0	0.00
Core	0.0	0.00
Total	9.0	100.00

In the public housing zone, none of the residential property is rented out less than ₦37,000.00 per annum. In the transitional zone, none of the residential property is rented out for more than ₦60, 000.00 per annum. However, 40% and 37.5% of the residential property in the Public housing were rented out between ₦61,000 and ₦72,000.00 and over ₦72,000.00 per annum correspondingly. The improved quality of infrastructural facilities provided and the hygienic environment could have been responsible for the high rent.

Paradoxically, in spite the low level of infrastructural facilities provided in the core area, 4% of the residential property in the zone were rented for over ₦72,000 per annum. The competitiveness over land, which the commercial land use posed to residential land use in the core area, was responsible for this high rental value for the residential property.

Besides the information gathered on the rental values of residential property from the tenants in Akure, efforts were made to gather information on the rental values of the residential property from practicing Estate

Table 6: A zero-order matrix of Pearson's correlation coefficient key rental value variables

	Annual rent	Elect	Water	Access	Burgl	Refdis	Toilet	Kitchen	Drain	Fence	Daywatch	Nightwatch
Annual rent	1.00	0.073	0.151*	0.060	0.389**	0.212**	0.159*	0.122	0.160*	0.523**	0.250	0.287**
Elect		1.000	0.139	0.092	0.014	0.107	0.287**	0.330**	0.040	0.044	0.045	0.019
Water			1.000	0.181*	0.123	0.313**	0.048	0.034	0.024	0.069	0.103	0.173*
Access				1.000	0.209**	0.223**	0.147*	0.116	0.143*	0.097	0.102	0.067
Burg					1.000	0.224**	0.224**	0.094	0.057	0.333**	0.185*	0.224**
Refdis						1.000	0.197**	0.163*	0.157*	0.194**	0.248**	0.332**
Toilet							1.000	0.448**	0.006	0.245**	0.035	0.171*
Kitchen								1.000	0.153*	0.205**	0.016	0.150*
Drainage									1.000	0.190**	0.192**	0.167*
Wall fence										1.000	0.315**	0.409**
Daywatch											1.000	0.355**
Nightwatch												1.000

Note: Correlation is significant at 0.05 level; **: Correlation is significant at 0.01 level

Surveyors and Valuers based in Akure. The basis for this is premised on their rich professional background and in-depth knowledge of the property market of Akure and its environ. Table 5 reveals that over 80% of the Estate Surveyors and Valuers confirmed that the residential property in the Public housing zone attract the highest rental value. The reasons for this among others include the high level of infrastructural provision, the aesthetic quality of the housing environment and the structural quality of the buildings.

In spite of the 4% of the tenants in the core zone indicating that the rent of the residential property which they rented was over ₦72,000.00 per annum; none of the practicing Estate Surveyors and Valuers indicated that the residential property in the zone attracted highest rental value. However, they all confirmed that land in the zone attracted very high rental value particularly for the purpose of commercial uses or activities but not essentially for residential purposes.

Analysis of the relationship of the infrastructure variables: This section examines the relationships among the infrastructural variables Table 6 is the zero-order Pearson product movement Correlation Matrix of the 12 key variables. The annual rent of the residential property has significant relationships with 8 of the variables. The annual rent is related to water, Burglary proof, refuse disposal facility, toilet, drainage, wall-fence Daywatch-security services and Nightwatch-security services.

The annual rent has 0.151 correlation coefficient with water supply at 0.05 level. This is an indication that an increase in annual rent would attract an improvement in water supply to the residential property. This is perfectly required to be true because tenants often based their demand for improved water supply either in the provision of new hand-dug well or reactivation of the existing hand-dug well based on the increase in rent.

However, other infrastructural variables which annual rent maintains significant relationships with at 0.05 level are toilet with 0.159 and drainage channel with 0.160 correlation coefficient. Like water supply,

both toilet and drainage channel maintain weak relationships. Toilet facility is a necessity in any functional residential building. Often times, when increased in rent is anchored on the provision of toilet, the quality of toilet provided is much to be desired. Rather than providing a water closet toilet, pit toilets are often provided, which are poorly maintained.

The issue of drainage channel tells much on the environmental quality of the housing environment. Majority of the residential property in the core zone are located in degraded environment coupled with blocked drainages while in the Public housing zone, the aesthetics quality of few of the housing environment is high and with well-maintained drainages thus, the residential property in the zone attract high rental value.

At 0.01 level, (5) of the infrastructural facilities (variables) maintain significant relationships with the annual rental value. These are installed burglary proof with 0.389 correlation coefficient, refuse disposal facility with 0.212 correlation coefficient; wall-fence with 0.523 correlation coefficient, Daywatch-security services with 0.250 and Nightwatch-security services with 0.287 correlation coefficient (Table 6). Tenants do not toil with the issue of security. This is because of increased cases of burglary in most Nigerian urban centers. Often times, tenants jointly arranged for security services to keep watch of their rented apartments at daytime and nighttime particularly at the peripheral and public housing zones; that appear to be isolated and solitary during the daytime.

Of all the security related variables, construction of wall-fence round residential property maintains the strongest relationship with rental value.

It has a correlation coefficient of 0.523. This is followed by the installation of burglary proof in residential building with 0.389 correlation coefficient. Tenants prefer localities where they can enjoy both daywatch and nightwatch-security services, even if it will amount to paying additional money to their rent. Often times, on community basis, tenants engage security services for both day and night. This is mostly common in the peripheral and public housing zones in Akure.

Table 7: Regression results (estimates) between annual rent and infrastructural facility variables

Code	Variables	Regression coefficient	Beta coefficient	Absolute t-value	Sig.
	Constant	1.851		2.363	0.019
ELEC	Electricity	0.384	0.031	0.464	0.643
WAT	Water	0.299	0.080	1.211	0.228
ACC	Access Rd	-0.299	-0.067	-1.033	0.303
BUG	Burglary proof	0.795	0.234	3.447	0.001*
RDF	Refuse disposal	0.134	0.043	0.611	0.542
TO	Toilet	-4.229E-02	-0.007	-0.099	0.921
KT	Kitchen	-5.882E-02	-0.009	-0.124	0.902
DC	Drainage channel	0.194	0.063	0.969	0.334
WAF	Wall-fence	1.229	0.400	5.505	0.000*
DAW	Daywatch security	0.164	0.034	0.489	0.625
NIW	Nightwatch security	4.834-02	0.014	0.191	0.848
	R = 0.576				
	R ² = 0.332				
	R ² adjusted = 0.291				
	FO.05 = 8.047				
	N = 189				

Overall, electricity, access road and kitchen have no significant relationships with rental value of residential property in Akure. One may wonder why these infrastructural facilities do not maintain significant relationships with rental value. This is not unconnected with the poor situation of electricity supply in Nigeria in general and in Akure in particular. In Akure, some areas are without functional electricity transformer, which makes the tenants to live in perpetual darkness. Majority of the tenants depend on the use of generating plants for their electricity supply. Many of the tenants do not consider the condition of the access roads linking their rented apartment as too major; particularly in the core zone where most of the residential property are poorly accessible or only accessible by footpaths.

It is necessary to conclude that the security related infrastructural facilities and services contributed significantly to the rental values of residential property in Akure. These are the installation of burglary proof, provision of wall-fence and availability of day and night security services as well as the provision of refuse disposal facility. However, other infrastructural facilities that contribute to the rental values of residential property are provision of potable water supply, toilet facility and good drainage channels.

The regression of Electricity (ELEC), Water (WAT), Access road (ACC) Burglary Proof (BUG), Refuse Disposal Facilities (RDF), Toilet (TO), Kitchen (KT), Drainage Channel (DC), Wall fence (WAF), Daywatch Security services (DAW) and Nightwatch-security services (NIW) on rental value (Y) is considered.

Thus:

$$Y = a + b_1ELEC + b_2WAT + b_3ACC + b_4BUG + b_5RDF + b_6TO + b_7KT + b_8DC + b_9WAF + b_{10}DAW + b_{11}NIW \quad (2)$$

The empirical result presented in Table 7 reveals that wall-fence and burglary proof are significant determinants of rental values paid by tenants of residential property in Akure. In the consideration of the entire variables fitted into the model, R² (0.332) shows that about 33.2% of the variation in rental value are jointly accounted for by the variables. The standard coefficients (Beta) give a picture of the relative importance or influence of the independent variables on the rental value of residential property in Akure. The higher the magnitude of Beta, the more the influence of the variable:

$$\begin{aligned} \text{Rental value (Y)} = & 1.851 + 1.229(WAF) + 0.795(BUG) + 0.299(WAT) \\ & + 0.194(DC) + 0.134(RDF) + 0.164(DAW) + 0.384(ELEC) \quad (3) \\ & + 4.834e-02(NIW) + -0.220(ACC) + -4.229E-02(TO) \\ & + -5.882e-02(KT) \end{aligned}$$

The empirical results of the multiple regression model are presented in Table 7. It shows that wall-fence is the most determining variable of rental value. This is followed by installation of burglary proof in the building. Next to this in order of influence are water, functional drainage channel, availability of refuse disposal facility, daywatch-security services, nightwatch-security services, access road, toilet facility and kitchen respectively:

$$Y = 2.340 + 1.325(\text{wall fence}) + 0.815(\text{Burglary proof}) \quad (4)$$

Y = Annual rental value

From the empirical result of the stepwise regression presented in Table 8, only two of the (11) infrastructural facilities are very crucial for the determination of rental values by tenants of residential property in Akure.

Table 8: Step-wise regression results (estimates) relationship between the rental values of residential property and infrastructural facilities

Variable code	Regression coefficient	Beta coefficient	Absolute t-value	Sig
Constant	2.340		12.930	0
Wall-Fence (WAF)	1.325	0.432	6.7110	0
Burglary proof (BUG)	0.815	0.240	3.7250	0
R = 0.559				
R ² = 0.313				
R ² adjusted = 0.305				
F0.05 = 42.512				
N = 189				

The most crucial is wall-fence with a regression coefficient of 1.325 and the second most important is burglary proof with 0.815 regression coefficient. The infrastructure put together contributed 30.5% in the determination of rental values. These two infrastructure are security and safety inclined. It can be concluded that tenants valued the safety and security of their lives and property in those residential buildings very much that tenants are ready to offer an increased rent for apartments where these two infrastructure are available. On a general note, these two infrastructure are mostly available in the residential property in the Public housing zone. Our findings earlier confirmed that residential property in the zone attracted the highest rental values.

CONCLUSION

The study has investigated into the effects of infrastructural facilities on the rental value of residential property in Akure. It has concluded that improved quality of infrastructural facilities contributed to the increase in the rental values of residential property. In order to enjoy this opportunity, tenants in residential property in Akure cherish security-enhancing infrastructure. Property developers in Akure should endeavour to provide the security-enhancing infrastructure which, include wall-fence and burglary proof.

Over 60% of the tenants were not satisfied with the entire infrastructure in exemption of burglary proof, wall fence and toilet facility. There is need for property developers to provide and improve on the quality of the infrastructure. The available toilet facility provided in residential property in the core zone is much to be desired. Majority of them are not sanitarily safe for tenant’s usage. In order to ensure a sanitary environment safe for human habitation, the Sanitary Health Inspectors of Akure South Local Government Council should be alive to their responsibilities

particularly in the core zone of Akure and the entire Akure city in general by carrying out regular surveillance of the residential environment.

The blockage of access roads to most residential property in Akure is mostly because of the non-compliance with approved building plans of residential property during construction of the buildings on site. Therefore, the Building Plan Approving Authority among others should effectively enforce the development control provisions of the planning laws and building regulations to guide against blockage of access roads to residential property.

Residential property in the Public housing zone attracted the highest rental value. Therefore, residential property developers should focus their residential property development efforts in this zone, in order to make higher returns on their investment. In view of this, the state government should establish more “Site and Service Residential Schemes” in Akure and make them more attractive to property developers to participate in the physical development of the schemes. Most of the access roads to the residential property virtually in all the zones are in poor condition. The tenants should organize themselves under the aegis of “Landlords-Tenants’ Association” by rendering community services in the maintenance of the roads. This should be extended to the provision of daywatch and nightwatch-security services in their residential areas.

The state of infrastructural facilities in the study area is disappointingly appalling. Ondo State and Akure South Local government council should jointly give priority attention to the maintenance of existing infrastructure and provision of new ones in the new areas of Akure in particular and other settlements in general. However, governments at these two levels cannot handle successfully the maintenance and provision of infrastructure alone. Therefore, the people under the Public-Private Partnership programme should be involved.

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