Determinants of Land Value in the University of Port Harcourt Host Communities, Nigeria

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Abstract: **- Rapid growth in suburbanization and the rapid expansion of urban population in contemporary times, especially in the global south have brought a lot of dynamic changes to urban areas and land values This study therefore focused on the determinants of land value in the University of Port Harcourt host communities.The study was purely a survey research and computation of raw data from field investigation was done. Purposive sampling techniques was used to select three host communities of the University of Port Harcourt while data analysis and testing of the validity of the research hypothesis was done through the aid of Bi-variate and multivariate analytical techniques. The student "T" test was used to test if there is significant relationship between the dependent and independent variables. The result of analysis shows that there is a strong positive relationship between land value and factors affecting land values, which are accessibility, land use, terrain and distance from nearest Central Business District (CBD). The researchers conclude that these variables contribute to land value in the study area and therefore recommends the need for government to embark on a well-thought-out sub urbanization scheme aimed at dispersing the over-crowded population of the city which will reduce rural-urban mass movement and lower the demand placed on urban land.**

Keywords: **Land, Value, Host, Communities, Analysis, Comparatives, suburbanization**

I. INTRODUCTION

Land is the solid part of the earth surface and the basic natural resource of any nation or state on which human and economic activities take place. It is humanity's most valuable resource without which man could never have existed and on which his continued existence and progress depend (Fabiyi, 2006). Land is said to be the primary and permanent material for human existence. Land from time immemorial has been treated as a measure of wealth, status and power all over the world. As a result of this land has also been the source of many bloody conflicts and disputes not only between nations, kings, but also between common people as this was the major source of their livelihood. It has also been the cause of family rifts, turning brothers into enemies. Hence land is used to meet a multiplicity and variety of human needs and to serve numerous diverse purposes. According to Lastarria-Cornhiel and Frais (2009), land represents an important cultural resource, a productive factor and capital asset supporting the basic needs of humanity. Its livelihood asset and the basic building blocks support women in pursing self-sufficiency. As a highly valued resource it does not only determine condition but also the position of men and women within a particular class and society.

Similarly, Oyeshola, (1995) identifies the importance of land as dominant resource where economic activity of farming, fodder and the ingredients of much income earning strive. It is a resource that dignifies, brings food production, peace, security and justice and, promotes a culture of respectful use of natural resources and ensuring that the future generations can meet their needs. Land is fundamental to economic activity and development of any community. It provides the most common source of wealth, social status and a powerful economic activity especially to the women. (Fabiyi, 2006).

However, the rapid growth in urbanization and the rapid expansion of urban population have brought a lot of dynamic changes to the cities and land values. Adegoke et al (2017) maintained that this has brought in a number of problems perhaps the most important of which is that of providing adequate housing facilities for the population. Housing is one of the three basic needs of mankind as noted by Wizor (2014) and it is indeed the most important for the survival of man after the provision of food (Olayiwola, Adeleye and Ogunshakin, 2005; Babalola, Umar and Sulaiman, 2013).

A critical review of related literature to date has revealed a listing of several factors affecting the value of land. Cheshire and Sheppard, (1995) identified income, interest rates, demographic structure, housing stock, location, level of income, population, transport, policy and neighbourhood characteristics. Meen and Andrew (1998) mentioned nine factors; income, real interest rates, nominal interest rates, general level of prices, household wealth, demographic variables, tax structure, financial liberalization and housing stock while McCluskey, Deddis, Lamont and Borst (2000) listed only location as a factor. Han, Yu, Malone-Lee and Basuki (2002) identified land area, parks, proximity to CBD and schools. In the study of Case and Shiller (2003), the only factor that they identified was number of employment while Wong, Hui and Seabrooke (2003) only identified interest rate. Kauko (2003) listed location, shopping centres, highway, parks, metro and neighborhood characteristics. Turner (2004) identified population growth, level of development in the node, property use, the size and condition of improvements on the site and the demand and supply in the property class within the local real estate market as the general and specific drivers of residential property values.

The study carried out by Olayiwola et al (2003), examined the relationship that exists between various land value determinants in metropolitan Lagos. Ogbuefi and Egbenta (2002) on the other hand studied the relationship between transport services and property/land values in Enugu, Nigeria. Also, Olaore (1991) investigated land values in Kaduna while Olayiwolaet al. (2005) examined the relationship that exists between various land value determinants in metropolitan Lagos, Nigeria. Using factor analysis and principal component techniques, it showed that a high level of co-variation existed between factors of land value such as accessibility, rent, transport improvement, quality of neighborhood, infrastructural facilities and government regulations.

Urban land markets play a critical role in shaping urban development outcomes. They determine the location, density, form and price of residential, commercial and industrial development (Serra et al, 2004). On the demand side, population growth, income, and level of economic activity determine how much land is demanded to support development. The supply on the other hand is determined by topography and physical conditions, patterns of land ownership, availability of infrastructure: roads, water, electricity, and government policy (Kabba and Li, 2009). A major characteristics of land markets in Nigeria and many other countries of the global south is that they operate almost totally outside the realm of public authorities. Thus, access to land in many of these countries is either through official or unofficial channels. In the official system, land is usually leased or allocated, rather than sold. Market transactions are in conformity with existing laws, planning regulations, building codes and standards. In the unofficial system, access to land is by several channels including purchase (Kironde, 2000). Sivam(2002) critically observed that the informal market is growing and becoming more diverse and increasingly commercialized. This is because the official means of access to land has not been able to adequately address land issue

Land therefore is becoming a scarce resource due to immense demographic pressure. Though humans have been modifying land to obtain food and other essentials for thousands of years, but the current rate, extent and intensities of land use are far greater than ever in history (Zubair, 2006).Rapid urban developments have brought dynamic changes to large cities in the global south. Spatial distribution and locational characteristics of land development have changed dramatically and so also are land values. Land values have significant implications for the growth of an economy. Analyzing and explaining absolute land values are likely to shed light on the determinants of land price. The concept of urban land value is as old as the cities themselves and the importance of this concept grew over time since the introduction of land as a commodity in the market. (Arokoyu and Obafemi, 2002).

In the study of urban land values, the concept of accessibility has been adopted by scholars overtime to explain the determinants of the values of urban land. These efforts had their origins in the early works of Von Thunen and Ricardo (1893). The principle of bid rent theory was established by Hurd (1903), and this has been confirmed by later works of Ratcliffe (1949), Alonso (1964), and Asabere, et al (1982). The theory as explained by Adegoke et al (2017) refers to how price of land changes as the distance from the CBD increases. This means that land values decay away from the CBD. But these postulations in contemporary times seems to be contradictory given what have been observed about the suburbanization of both the high and middle income groups to metropolitan fringes, which is facilitated by improved transportation technology (Uju and Iyanda, 2012; Wizor, 2014)

Based on this observation, recent urban studies have not only shown that land values do not decay away from the CBD but they are also largely determined by non-location factors. According to Uju and Iyanda (2012), these non-location factors includes but not limited to plot size, time of land purchase, age of neighbourhood, income, zoning policy and neigbhourhood quality which most times are neglected. More so, land prices reflect not only the uses of land, but the potential uses as well. In a competitive market, the price of land will equal the discounted sum of expected net returns obtained by allocating the land to its most profitable use. That use surely may change over time. If, for example, agricultural production is currently the most profitable use, but development for some other purpose is expected to yield even greater net returns in the future, then the current land price should reflect the returns to both uses in a simple additive form: the sum of the discounted stream of rents from agriculture up until the time of conversion plus the discounted stream of expected rents from development from that time onward. 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. The value of access is capitalized into the land value and access is measured through market participants' willingness to pay. Essentially, this view suggests that accessibility measures may be inferred from land prices (Udo and Egbenta, 2007).

The last few years have seen a surge in land values as commodity prices have risen to record levels. This is to be expected as a net present value analysis of land prices would capitalize the expected future returns by an expected discount rate to arrive at a land value. Since most farmers and land investors expect commodity prices to remain above loan values for the foreseeable future. The price of residential land is a function of the supply and demand for the land. Quality of the environment is also another factor that affects the values of land. Land value does not only depend on the physical characteristics of a building but also the environment that surrounds the building. The cost of land has very strong influence on the quality and type of development that can be

sustained on such land. Residential areas are no exception (Adeyemo & Arokoyu, 2002).

II. MATERIALS AND METHODS

The method of data collection was mainly based on the primary and secondary data collection. The study was purely a survey research and computation of raw data through field investigation. Statistical tool that was employed in analyzing the data and testing of the validity of the research hypothesis is the Bi-variate and multivariate analytical techniques. The student "T" test was used to test if there is significant relationship between the dependent and independent variables.

The analysis seeks to establish the relationship between two variables in order to determine the degree of Co-variation. This was done using the Pearson's Product Moment Correlation.

The Pearson's Product Moment Correlation (r) is given as

$$r = \frac{n\sum xy - \sum x \cdot \sum y}{\sqrt{\left[n\sum x^2 - (\sum x)^2\right]\left[n\sum y^2 - (\sum y^2)\right]}}$$

Where n = number of sample size

x = dependent variable (land value)

y = independent variable (accessibility, land use, terrain and distance from nearest (CBD)

The university of Port Harcourt host communities comprises of six (6) periurban towns namely:

1. Choba 2. Aluu 3.Alakahia
4. Ozuoba 5.Rumualogu 6.Rumuekini

Purposive sampling techniques was used to sample three (3) of the six host communities for this study. The sampled host communities are:

1. Choba
2. Aluu
3. Alakahia

The study area lies between longitude 4° 48 and 5° 00 N and latitude 6° 55 and 7° 10 E (See Fig.1). It covers an estimated area of 239. 6km2 as calculated from the topographic Maps. The sub-aerial Port Harcourt of which Choba, Alakahia and Aluu communities is an integral part covers an area of 75,000km^2.

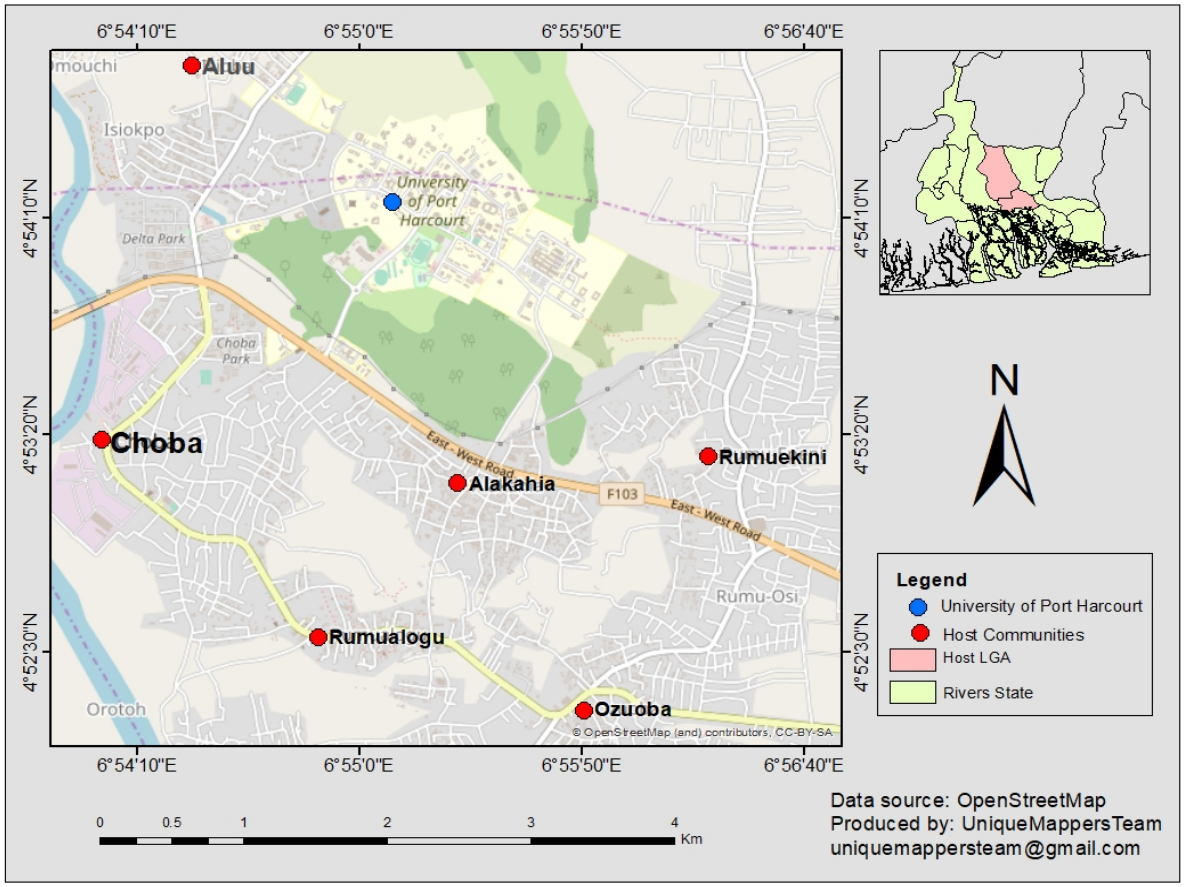

Figure 1 University of Port Harcourt Host Communities

The acute accumulation of cretaceous and tertiary sediments of over 70 million years is at least 12km thick in its central parts and extends to over 40km in its off shore limits, (Oyegun, 1991). It is noted that the Imo/Otamiri Basin in the North East and the new Calabar in the North West bound the area. The Bonny River, which drains the region, takes its sources from the flat lands on the eastern axis of the Niger Delta. The upper Bonny River includes the Okpoka, Amadi and Elechi tributaries. It is into these tributaries that all the streams seen around Port Harcourt such as Woji and Diobu empty (Umeuduji and Aiseuebeogun 1999).Olanmiran and Summer (1989) classify the region into the coastal climate zone. The mean daily minimum and maximum temperature for Choba, Alakahia and Aluu in Port Harcourt according to Department of Meteorological Services, Lagos ranges between 22.2°C, 22 8°C, 22.3°C and 22.6°C from 1996, 1997, 1999, 2000, respectively. Also, climate system particularly rainfall in Nigeria are primarily as a result of the interplay between two major pressure and wind systems. It is the dynamically generated sub-tropical high-pressure cells centered over Azores Archipelago, off the West coast of North Africa and ST. Helena Islands, off the coast of Namibia.

The three University of Port Harcourthost communities in Port Harcourt metropolis is endowed with abundant sunshine by virtue of its geographical location near the equator, hence the sun is vertically overhead throughout the years. Daylight hours are longer because of the long duration of solar radiation at the surface which is substantially reduced mainly due to cloudiness consequent upon its coastal location. This moderating influence induces slight diurnal, monthly and annual variations in temperature over the region. Other influences aside cloud cover include the harmattanand vegetation. The mean annual temperature is high but has a spatial sequence of slight increase with latitude. For instance, Choba, Alakahia and Aluu in Port Harcourt region record a mean annual temperature of 28°C (Oyegun and Adeyemo, 1999).

Like many emerging towns in Nigeria metropolitan fringes, the three University of Port Harcourt host communities have recorded rapid growth in population and aerial spread. Urban development is denser on the corridors determined by geographic thresholds and major transportation connections. The location of the University of Port Harcourt has led to population increase and corresponding suburban growth spreads to the three host communities and the periphery as in the other metropolitan cities. Most of this growth however, is unplanned and unregulated. The Choba and Alakahia axis of the study area is completely built up while the Aluu axis is developing rapidly with gigantic peri urban growth towards the Greater Port Harcourt.

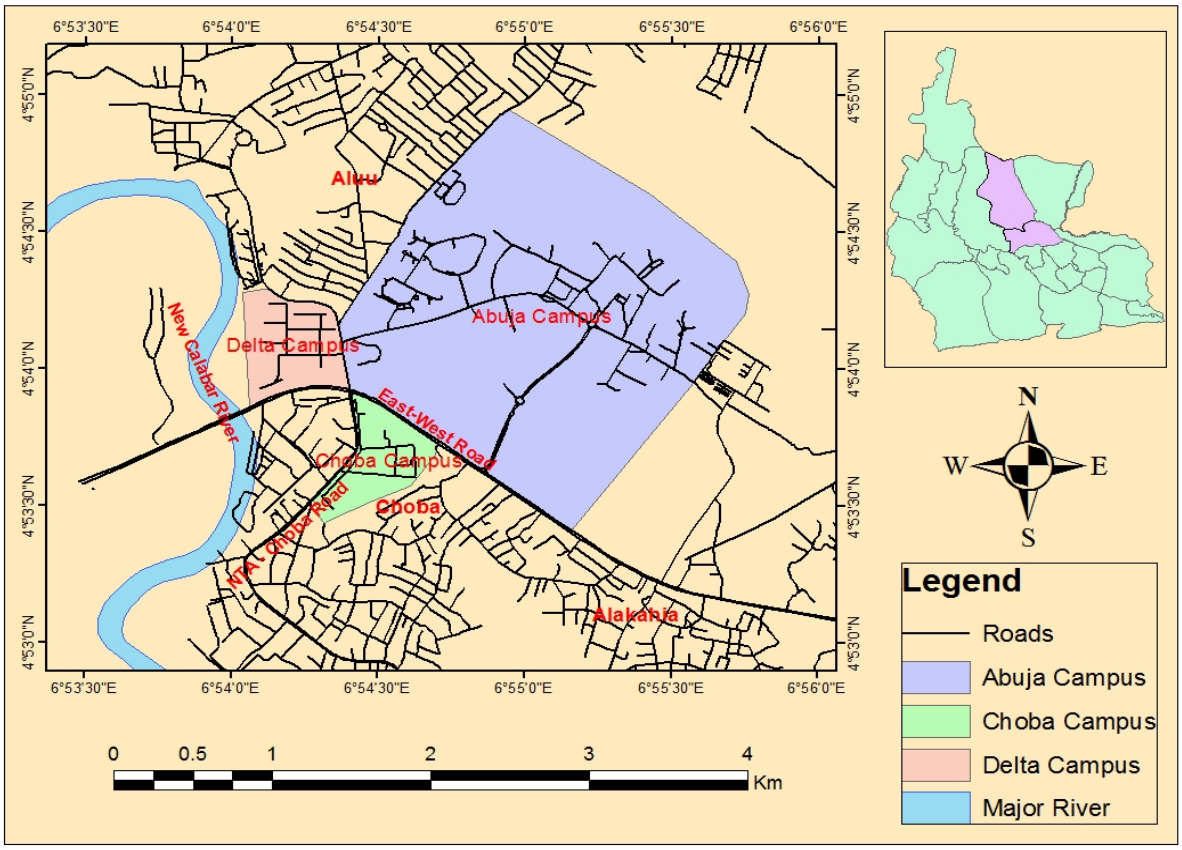

Figure 2: Selected University of Port Harcourt Host Communities

III. RESULTS AND DISCUSSIONS

Land value is a reflection of competition for site between different landuses operating under the forces of demand and supply. Assuming there are two plots of land in an area but one of the plots have higher market price than the other, then the differences may be due to difference in the locational characteristics. Since different sites have different site characteristics, these differences will also lead to difference in the level of patronage.

Table 1 below shows the price of land per plot in the three selected University of Port Harcourt host communities.

Table 1 Price of Land Per Plot in the three Selected Host Communities

Host Communities	Size of Plot	Amount in Million Naira
Alakahia	930 sq/m (100 by 100 ft)	3.5
Omuoko (Aluu)	930 sq/m (100 by 100 ft)	1.0
Omuokiri (Aluu)	930 sq/m (100 by 100 ft)	1.5
Omuike (Aluu)	930 sq/m (100 by 100 ft)	1.0
Omuigwe (Aluu)	930 sq/m (100 by 100 ft)	0.8
Omuchiolu (Aluu)	930 sq/m (100 by 100 ft)	1.0
Rumuchakara (Choba)	930 sq/m (100 by 100 ft)	3.0
Rumuokocha (Choba	930 sq/m (100 by 100 ft)	2.5
Owhipa (Choba)	930 sq/m (100 by 100 ft)	2.0
Ndidor (Choba)	930 sq/m (100 by 100 ft)	2.0

Source: Survey data, 2019

A keen look at table 1 above reveals a hierarchical zonation of land values in the different communities in the study area. The area with the highest land value of 3.5 million naira is Alakahia, followed by Choba communities — Rumuchakara with 3.2 million per plot, Rumuokocha(2.5 million naira), Owhipa and Ndidor(2 million naira) per plot respectively.

It is observed that Alakahia and Choba communities are the zones of peak land values, dominated by commercial land uses and falls within the host communities closest to the University of Port Harcourt first two campuses (Choba Park and Delta Park) which is often described as the central business district (CBD) in this context with high level of accessibility and power supply. Also, these communities are also dominated by high class residential buildings (houses) for students and staff of the University. The next zone is Aluu communities which has land valueranging from 1.5 million naira to 800,000 naira per plot.

The reason for the observed variations in land value in the study area may be due to difference in their locational characteristics. The extent to which the observed trend in land value is explained by their locational characteristics is the preview of subsequent sections of this study.

A comparative look at the variation in land value in different communities in the study area will shed more light on different location attributes of each zones bringing about the observed variation in land values.Generally, every land use, be it residential, commercial or industrial seems to locate where the forces of demand and supply are in equilibrium. This is reflected in the ability to offer the highest price for the location in question such that land is put to its highest and best use.

A critical look at table 1 above, suggests that land values are not equitably distributed among the university of Port Harcourt host communities. Land values are not the same between high low and medium density residential areas, and between commercial areas.Alakahia and Choba communities whose land values are high tends to have high residential and commercial density. This is as a result of the accessibility and complementarity advantage.

In Port Harcourt metropolis, the use to which land is put is a reflection of the existing land features and values leading to a high competition between and amongst different land uses in an area. Overtime, this competitive allocation process in land market results in overall adjustment such that each site (land) is occupied by the activity which can pay the highest rent.

Testing of Hypothesis

To unravel the relationship between our dependent and independent variables Bi-variate analysis was used. The result of this analysis seeks to determine the relationship between two variables. The table 2 below shows raw data from the field survey.

Table 2 Relationship between Dependent Variables and Independent Variables

	Dependent Variable	Independent Variables			
Communities	**Land Values in Million**	**Accessibility (x_1)**	**Land Use (x_2)**	**Terrain (x_3)**	**Distance from nearest CBD (x_4)**
Alakahia	3.5	6	5	3	9
Omuoko	1.0	5	4	2	7
Omuokiri	1.5	5	4	2	5
Omuike	1.0	3	3	1	4
Omuigwe	0.8	2	2		
Omuchiolu	1.0	4	4	1	4
Rumuchakara	3.0	6	5	3	7
Rumuokocha	5	5	4	2	6
Owhipa	2.0	3	3	2	5
Ndidor	2.0	4	2	2	4

Bi-Variate Analysis

Let x represent dependent variable (land value) and y represent independent variable (Accessibility xi) where sample size is 10 (n = 10). As shown in the table below.

Table 3 Analysis of Accessibility

x	Y	x^2	y^2	XY
3.5	6	12.25	36	21
1.0	5	1	25	5
1.5	5	2.25	25	7.5
1.0	3	1	9	3
0.8	2	0.64	4	1.6
1.0	4	1	16	4
3.0	6	9	36	18
2.5	5	6.25	25	12.5
2.0	3	4	9	6
2.0	4	4	16	8
18.3	**43**	**41.39**	**201**	**86.6**

The Pearson's Product Moment Correlation (r) is given as

$$r = \frac{n\Sigma xy - \Sigma x \,.\, \Sigma y}{\sqrt{[n\Sigma x^2 (\Sigma x)^2][n\Sigma y^2 - (\Sigma y^2)\ ]}}$$

To test for significance at 95% significant level, the student T-test was used which is given as:

$$t = \frac{\sqrt{n-2}}{\sqrt{1-r^2}}$$

While degree of freedom = d/f = n-2

n= number of sample size

Therefore, the Pearson Product Moment Correlation(r)

$$r = \frac{10x86.6 - 18.3\ x\ 43}{\sqrt{[10\ x\ 41.39 - 334.89][10\ x201 - 1849]}}$$

$$= \frac{866 - 786.9}{\sqrt{[413.9 - 334.89][2010 - 1849]}}$$

$$= \frac{79.1}{\sqrt{79.01\ x\ 161}} = \frac{79.1}{\sqrt{1272061}}$$

$$= \frac{79.1}{112.78}$$

$$r = 0.7013$$

the student "t" test

$$t = \frac{\sqrt{n-2}}{\sqrt{1-r^2}}$$

$$= \frac{0.7013\sqrt{10-2}}{\sqrt{1-(0.7013)^2}} = \frac{0.7013\ x\ 2.8}{\sqrt{1-0.49}}$$

$$= \frac{1.96}{\sqrt{0.509}} = \frac{1.96}{0.713}$$

$$= 2.74$$

Degree of freedom d/f = n - 2 = 8

t = calculated = 2. 74 while t = critical = 2. 05

Since our calculated value which is t_{cal} = 2. 74 at the 0.05 probability level and 8 degree of freedom, is greater than the critical value, t_{crit} = 2.05. Therefore, we reject our null hypothesis H_o and accept our alternate hypothesis H_1 which states that there is significant relationship between accessibility and land values in the study area.

Let x represent dependent variable (land values) and y represent independent variable (land use) x^2). As shown below

Table 4 Analysis of land use

X	Y	X^2	Y^2	XY
3.5	5	12.25	25	17.5
1.0	4	1	16	4
1.5	4	2.15	16	6
1.0	3	1	9	3
0.8	2	0.64	4	1.6
1.0	4	1	16	4
3.0	5	9	25	15
2.5	4	6.25	16	10
2.0	3	4	9	6
2.0	2	4	4	4
18.3	**36**	**41.39**	140	**71.1**

The Pearson's Product Moment Correlation (r) is given as

$$r = \frac{n\Sigma xy - \Sigma x \,.\, \Sigma y}{\sqrt{[n\Sigma x^2 (\Sigma x)^2][n\Sigma y^2 - (\Sigma y^2)\ ]}}$$

To test for significance at 95% significant level, the student T-test was used which is given as:

$$t = \frac{\sqrt{n-2}}{\sqrt{1-r^2}}$$

$$= \frac{10\ x\ 71.1 - 18.3x36}{\sqrt{[10\ x\ 41.39 - 33\ .89][10\ x140 - 1296]}}$$

$$= \frac{711 - 658.8}{\sqrt{[413.9 - 334.89][1400 - 1296]}}$$

$$= \frac{79.1}{\sqrt{79.01\ x\ 161}} = \frac{79.1}{\sqrt{1272061}}$$

$$= \frac{52.2}{\sqrt{79.01x1}} = \frac{52.2}{\sqrt{8217.04}} = \frac{52.2}{90.64}$$

$$r = 0.7013$$

the student "t" test

$$t = \frac{\sqrt{n-2}}{\sqrt{1-r^2}}$$

$$= \frac{0.575\sqrt{10-2}}{\sqrt{1-(0.575)^2}} = \frac{0.575\ x\ 2.82}{\sqrt{1-0.3306}}$$

$$= \frac{1.698}{\sqrt{0.6694}} = \frac{1.698}{0.818} = 2.08$$

Degree of freedom d/f = n - 2 = 8

t = 10-2 = 8

Therefore, the conclusion is the alternate hypothesis (H_1) that there is statistically significant relationship between land use (X_2) and land value.

Table 5 Analysis of Terrain

x	Y	X^2	Y^2	XY
3.5	3	12.25	9	10.5
1.0	2	1	4	2
1.5	2	2.25	4	3
1.0	1	1	1	1
0.8	1	0.64	1	0.8
1.0	1	1	1	1
3.0	3	9	9	9
2.5	2	6.25	4	5
2.0	2	4	4	4
2.0	2	4	4	4
18.3	**19**	**41.39**	**41**	40.3

As shown in the table above, let x represent dependent variable (land value) and y represent independent variable (terrain X_3).

The Pearson's Product Moment Correlation (r) is given as

$$r = \frac{n\Sigma xy - \Sigma x \,.\, \Sigma y}{\sqrt{[n\Sigma x^2 (\Sigma x)^2][n\Sigma y^2 - (\Sigma y^2)\ ]}}$$

To test for significance at 95% significant level, the student T-test was used which is given as:

$$t = \frac{\sqrt{n-2}}{\sqrt{1-r^2}}$$

$$= \frac{10\ x\ 40.3 - 18.3x19}{\sqrt{[10\ x\ 41.39 - 334.89][10\ x141 - 361]}}$$

$$= \frac{403 - 3\ \ .7}{\sqrt{[79.01[49]}} = \frac{52.3}{\sqrt{3871.49}}$$

$$= \frac{55.3}{62.22} = 0.889$$

the student "t" test

$$t = \frac{\sqrt{n-2}}{\sqrt{1-r^2}}$$

$$= \frac{0.889\sqrt{10-2}}{\sqrt{1-(0.889)^2}} = \frac{0.889\sqrt{8}}{\sqrt{1-0.790}}$$

$$= \frac{0.889\ x\ 2.83}{\sqrt{0.21}} = \frac{2.515}{0.458} = 5.49$$

Degree of freedom d/f = n – 2. Therefore t = 10-2= **8**

Therefore, we accept the alternate hypothesis (Hi) that there is statistically significant relationship between Terrain (x^3) and land values.

Let x represent dependent variable (land value) and y represent independent variable (distance from nearest CBD, X^4). As shown below.

Table 6 Analysis of Distance from Nearest CBD

X	Y	X^2	Y^2	Xy
3.5	9	12.25	81	31.5
1.0	7	1	49	7
1.5	5	25	25	7.5
1.0	4	1	16	4
0.8	3	0.64	9	2.4
1.0	4	1	16	4
3.0	7	9	49	21
2.5	6	6.25	36	15
2.0	5	4	25	10
2.0	4	4	16	8
18.3	**54**	**41.39**	**322**	110.4

The Pearson's Product Moment Correlation (r) is given as

$$r = \frac{n\Sigma xy - \Sigma\ \ .\ \Sigma y}{\sqrt{[n\Sigma x^2 (\Sigma x)^2][n\Sigma y^2 - (\Sigma y^2)\ \ ]}}$$

To test for significance at 95% significant level, the student T-test was used which is given as:

$$t = \frac{\sqrt{n-2}}{\sqrt{1-r^2}}$$

$$= \frac{10\ x\ 110 - 18.3\ x\ 54}{\sqrt{[10\ x\ 41.39 - 33\ \ .89][10\ x\ 322 - 2916]}}$$

$$= \frac{1104 - 988.2}{\sqrt{[413.9 - 334.89][\ 3220 - 291\ \ ]}}$$

$$= \frac{115.8}{\sqrt{[79.0][304]}}$$

$$= \frac{115.8}{154.98} = 0.747$$

the student "t" test

$$t = \frac{\sqrt{n-2}}{\sqrt{1-r^2}}$$

$$= \frac{0.747\sqrt{10-2}}{\sqrt{1-(0.747)^2}} = \frac{0.747\sqrt{8}}{\sqrt{1-0.558}}$$

$$= \frac{0.747\ x\ 2.83}{\sqrt{0.442}} = \frac{2.114}{0.6648} = t$$

$$= 3.17$$

Degree of freedom d/f = n - 2

t = 10-2 = 8

We reject the null hypothesis (Ho) since our t — calculated value which is 3.17 at 0.05 probability level of 8 degree of freedom is greater than t critical value of 2.05.

Therefore, we accept the alternate hypothesis (H_1) that there is statistically significant relationship between distance from nearest CBD (X_4) and land value.

The result of the bi-variate analysis discussed above shows that land value is related in one way or the other with the independent variables.

However, there is need for multivariate analysis to establish the joint explanation which the independent variables of this study provide for land value.

Multivariate Analysis

Y = a + blx' + b2 x 2 ± b3 x 3 + b4 x 4

Y= dependent variable land va1ue

X^3 - x^4 = independent variables (locational characteristics

b^1 –b^4 = the coefficient of the respective independent variable.

a = constant representing that part of the value of y not explained by the independent variable. To test for significance at 95% significant level, the student "t" - test was used which is given

as:

$$t = \frac{\sqrt{n-2}}{\sqrt{1-r^2}}$$

Where r = regression confidence

n= sample size

t = student t- test.

$$y = 0 + 0.7013 + 0.5759 + 0.0889 + 0.747$$

$$= 2.9132$$

$$\text{The student's' test} = t = \frac{r\sqrt{n-2}}{\sqrt{1-r^2}}$$

$$= \frac{2.9132\sqrt{10-28}}{\sqrt{1-(2.9132)^2}}$$

$$= \frac{2.9132\ x\ 2.83}{\sqrt{1-8.487}}$$

$$= \frac{8.24}{\sqrt{0.487}}$$

$$= \frac{2.24}{2.73}$$

$$= 3.01$$

Decision: We reject the null hypothesis (Ho) since our calculated value which is t_{cal}=3.01 at the 0.05 probability level of 8 degree of freedom is greater than the t - critical value of 2.05.

Therefore, the conclusion becomes the alternate hypothesis (Hi) which states that there is a statistically significant relationship between independent variables of accessibility, land use, terrain, Distance from nearest CBD, and that of dependent variable (land value)

Discussion of Result

The result of the two analysis shows that there exists a relationship between land values and the level of accessibility, land use, nature of terrain and distance from nearest CBD.The result of bi-variate analysis showed that land value is related to accessibility, land use, terrain and distance from nearest CBD.The independent variable of terrain had the highest percentage of 5.49 statistically significance level of relationship with land value while distance from nearest CBD, accessibility and land use had the percentage of 3.17, 2. 74 and 2.08 respectively.This shows that the nature of terrain has the greatest statistically significant level of relationship with land value followed by distance from nearest CBD, accessibility and land use.

The result of multi-variate analysis also shows that generally, there is a statistical relationship between the dependent variable (land value) and accessibility, distance from nearest CBD, land use and terrain; hence the calculated "t" value (2.74, 2.08, 5.49 and 3.17) are all greater than the critical "t" value against 8 degree of freedom.

The relationship which exists between land value and accessibility, land use, terrain and distance from nearest CBD as shown in the study agree with the works of Hurd (1964) and Olayiwola et al (2005). They all agree that land value relates to the independent variables.In the words of Alonso, (1964) urban land use pattern are determined by land values, which in turn are related to transport cost. He concluded by saying that "as various potential user bid for land, the land lord sale or rent to the highest bidder for land such that the pattern of land use and values become mutually determined.

While acknowledging that various other attributes of a location may influence the value of a given plot of land, the key systematic determinants of rent level is postulated to be accessibility. These activities which derive greatest benefit from accessibility locations are able to outbid those which derive less benefit.

IV. CONCLUSION AND RECOMMENDATIONS

From this survey, it is clear that the value of land is related to their respective qualities, be it location or the quality of the properties; hence, giving rise to differences in land values.Port Harcourt metropolis has been experiencing rapid urbanization and high influx of people into the city leading to high demand for land by both corporate establishments and individuals. This scenario has created land scarcity at the metropolitan fringes; therebyincreasing the value of available land.

The result of this survey showed that land values in university of Port Harcourt host communities is significantly correlated with accessibility, land use, nature of terrain and distance from nearest CBD. More value is place on land at the city center, but decreases towards the urban fringes describing the relationship which exist between accessibility, distance from nearest CBD and that of land value. The relationship which exist between land value and terrain indicate that most land are equally capable or complementary to each other; hence having competitive bidding leading to high land value. As regards to terrain, the survey shows that the value of land is dependent on the land quality;areas with dry flat land attract higher bidding compared to marshy undulating land on the same location which ultimately influences the value of land.

The implications of high land value in the development of University of Port Harcourt host communities are enormous with its attendant social, economic and health consequences. For instance, as more lands are offered for sale due to its increased demand and value, the future planned expansion of the city of Port Harcourt is jeopardized. This is because as individual land lords driven by high cost of land, outrightly sale-off their land, less space is left for the futureplanned expansion need of the study area.

Considering the fact that Port Harcourt is the biggest city in the Niger delta region of Nigeria and its strategic location as centre for oil and gas industries, sea ports terminals, presence of state and federal Universities amongst others, the metropolis will continue to attract more people. Deliberate actions are therefore needed by government to embark on a well-thought-out sub urbanization scheme aimed at dispersing the over-crowded population of the city. This will reduce rural-urban mass movement and lower the demand place on urban land.

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