SPATIAL PATTERN OF HOUSING QUALITY IN ABUJA, NIGERIA

Saliman Dauda

Department of Urban and Regional Planning, Baze University, Abuja, Nigeria

ABSTRACT: *The study attempted evaluation of Spatial Pattern of Housing Quality of Abuja, Nigeria. The identified 62 political wards were stratified into their various Area Councils namely, Abuja Municipal Area Council (AMAC), Bwari Area Council, Gwagwalada Area Council, KwaliArea Council, Kuje Area Council and Abaji Area Council. Using systematic random sampling, 3593, 1002,641,290,341 and 202 houses were selected in AMAC, Bwari Area Council, Gwagwalada Area Council, Kwali Area Council, Kuje Area Council and Abaji Area Council respectively to give a total of 6069 houses. Socioeconomic characteristics of the households revealed that the youth constituted 14.2% of the respondents, while 79.99% of the respondents were also found to be in the age bracket of 31-60 years. Analysis of Variance (ANOVA) confirmed, that there were significant differences in the age distribution of the residents (F = 4.11, p = 0.005). Analysis of spatial pattern of housing quality using Factor Analysis revealed that housing location quality attributes factor, recorded highest influence on the spatial pattern of housing quality in Area Councils, such as AMAC, Bwari Area Council and Gwagwalada Area Council. The study concluded that a general hierarchical trend in spatial pattern of housing quality had been figured out in Abuja, where housing quality was observed to decrease with increase in distance from the Central Business District(CBD).*

KEYWORDS: housing quality, urban spatial structure, central business district, Abuja,

INTRODUCTION

Scholars had long established that good quality housing is a key element for ensuring a healthy environment and, that cramped and crowded conditions give rise to poor hygiene by providing places for vermin to breed and transmit diseases through fleas, ticks and other vectors. Furthermore, poor household hygiene leads to food and water contamination within the home. Research had also indicated that poor indoor air quality leads to respiratory problems and inadequate lighting leads to eyesight problems; while Stress is higher for individuals living in poor housing conditions. These constitutes background for studies carried out on housing quality that satisfies maximum health standards and good living standard as well as affordability of households (Aribigbola, 2000). According to Morris et al ;(1997) housing quality constitute a norm, a culturally derived criteria that household uses to judge their houses and that of others. Housing quality is also found to be congruent with household status (Ponice et al;(1997). Individual holds housing quality as a product of subjective judgment which arises from the overall perception, towards what is seen as the significant element at a particular point in time. (Anantharaman (1983), Olayiwola et al., (2006) and Jiboye (2010). Thus, beauty, convenience, health and accessibility constitutes attributes of housing quality using variables such as aesthetics, ornamentation, sanitation, drainage, age of building, access to basic housing facilities, burglary, spatial adequacy, noise level within neighborhood, sewage and waste disposal, air pollution and ease of movement. While good environmental condition is also a factor that could promote the health, convenience, aesthetic, environmental and well-being of the occupants of a house.

Studies in the developed world have analyzed numerous indicators of housing quality in which beauty, convenience, health and accessibility was introduced into attributes of housing. However there is dearth of studies that focus on the housing quality of urban dwellers in the developing countries, especially in Nigeria. Even though housing is implied in a number of few discuss, most emphasis is on affordability.

However, in Nigeria housing quality is a strong determinants of housing choice due to the need for houses to have good finishes, different roofing types, full decoration, ensuite rooms as well as good physical conditions, these have strong influence on residents' choice of Homes. (Saliman, 2015). Consequently studies are required to determine the pattern of distribution of these qualities in the developing city such as Nigeria, studies that strictly address the pattern of housing quality are scarce in Nigeria.

Abuja is Nigeria's New Federal Capital Territory and arguably, the fastest growing city in Africa, as it houses residents from over 250 ethnic Nationalities. As such, it can conveniently be taken to reflect what obtains in other cities in Africa. To this end, this study sought to examine the spatial pattern of housing quality in Abuja, Nigeria with specific emphasis on spatial and economic factors; by examine the extent to which location, cost and availability of infrastructure as influence it.

LITERATURE REVIEW

Some of the notable studies on housing quality include that carried out by Ponice et al; (1997). The study, identified valued characteristics that a house should possess, this includes features such as good housing materials, good bathrooms space, electrical services, appliances and air – conditioning. Thus, the study did not analyze issues of location and cost, the gap this study is trying to fill. In the same vein, Godwin(1998) in his studies considered aesthetics, ornamentation, sanitation, drainage, age of building, access to basic housing facilities, burglary, spatial adequacy, noise level within neighbourhood, sewage and waste disposal, air pollution, and ease of movement. The study identified beauty, convenience, health and accessibility as the main attributes of housing quality. Thus, the study failed to examine the influence of location on the availability of the identified housing quality. Also, study by Ibem (2012) explored the residents' perception of selected household heads in newly constructed public housing estates, and staff members of four key public housing agencies in urban areas of Ogun State, Nigeria.

The findings suggested that Housing delivery strategies, organizational capacity of housing providers, age, income, education and tenure status of residents were the key factors influencing residents' perception of housing quality in the study area. Hence, the study did not examine the location of housing with respect to provided quality attributes. Study by Emankhu, et al; (2015) examined housing quality in the peripheral area of Lafia town. The study evaluated the influence of socio-economic factors on housing quality of the peripheral area of Lafia, and revealed that peripheral area have serious adverse effects on people's health, their built environment and housing quality. Therefore, the study failed to explore the influence of the spatial make-up of Lafia as a State Capital on the housing quality attributes of the Inhabitants of Peripheral Areas. This study took care of these loose ends. Studies carried out on Osogbo by scholars like Akinola, (1998), Olayiwola etal;(2006) and Jiboye(2010) revealed that the provisions of qualitative housing involves consideration of all ancillary services, environmental amenities and social infrastructures like water, electricity, road, drainage, sewage and water

treatment facilities, personal safety and security. The lack of Master Plan for the study area; an evolving state capital, made it difficult for the research work to have Spatial Implications. This study is conducted in the context of Abuja Six Area Councils that are several kilometres from one another, thus given the study an unavoidable spatial considerations. Study by Hammer et al., (2001) unfolded that qualitative housing involves the provision of infrastructural services which could bring about sustainable growth and development through improved environmental condition and livelihood. The study did not examine issues of cost as it affects the quality of housing provided in the study area. Furthermore, Malcolm (2007) and Imrie(2004)s' studies, explored disabled people's interactions with the physical quality of housing. The study concluded that most of the dwellings in the UK were not designed to respond to the needs of people with different types of impairment. Thus, the paper focused only on physical quality of housing and people with disability. Roderick (1995) and Shrivastava et. al ;(2014) examined housing quality and customer satisfaction with reference to delivering methods. The paper concluded that housing quality should be considered in terms of economic and ecological dimension. In the same vein, Anofojie et al; (2014) assessed housing quality in selected public residential estate in Amuwo Odofin Lagos.

The study suggested that a large proportion of infrastructure in the study area is in deplorable condition, therefore recommended urban renewal for the area. Thus, the study area of concentration was in the provision of infrastructure. Thus study proffer a more holistic approach to the study of housing quality. Further known studies on housing quality was that conducted by Fahrlander et al; (2008) on the perceived environmental housing quality and wellbeing of Movers. The study concluded that an improvement in the perceived environmental housing quality led to increase in wellbeing of Movers. Thus, the study examined only the environmental quality of housing. This study in addition discussed housing quality on the basis of spatial, location, structural and environmental quality of housing. Etenko(2008) evaluated housing quality as a system ,the study discussed dwelling quality in terms of a system which covers the performance of components and the functional efficiency of the buildings over a period of time. Thus, the paper lack spatial consideration, the gap this study examined. In the same vein, Jennifer etal(2010) examined the role of housing type and housing quality in urban children with Asthmas. The study discovered differential in the risk of Asthmas as a result of variation in the housing types and quality. Shaughnessy etal;(2010) attempted developing data collection and response system that makes it possible to assess the finish housing stock from the point of view of quality ,health and safety. The data collected could not be suited to developing countries like Nigeria, hence the need for this study. Streimikiene(2015) examined the quality of life and housing, the study observed that increase in the quality of life is the main aim of sustainable development and that housing dimension is one of the major issues affecting the quality of life.

The paper define the trends of housing indicators in Lithuania and compare them with the same indicators in old EU member states and neighbouring countries develop policy recommendations Adeoye (2016) worked on the problems that aided the degradation of basic housing infrastructures, prevalence of substandard housing, overcrowding as well as incidences of disease and epidemics in Akure. The study divided the City into density zones- high, medium and low, and attributed the incidence of substandard and overcrowded housing in the City to tenants' internal abuse of conversion of every available space to room to increase occupancy rate. Thus, the study did not focus on the spatial distribution of housing quality, as in the case of this research work. On the other hand, Funmilayo (2012) examines the causes and characteristics of informal settlements in the assessment of housing quality. The research

identified problems that have aided informal settlements as included urbanization, poverty, growth of informal sector, non-affordability of land and housing shortage. This study examines the quality of housing in formal settlements of Abuja. Thus, most of the available studies especially in the developing countries lack spatial dimension in housing quality, hence this study.

Study area

Abuja is located between latitudes 8^025^1 and 9^025^1 north of the equator and longitudes 6^045^1 and 7^045^1 east of Greenwich. The detail boundaries of Abuja was defined in the Federal Capital Territory Decree No 6. as starting from the village called Izom on 7^0E longitude and 9^015^1 latitude, project a straight line westwards to a point just north of Lehu on the Kemai River; then along $6^047½$ E southwards passing close to the villages called Semasua, Zui and Bassa down to a place a little west of Ebagia in Kwara State, afterwards project a line along parallel 8^027 ½^{1}N latitude to Ahinza village 7^06^1E, then a straight line passes to Bugu village on 8^030^1N latitude and 7^020^1E longitude, furthermore draw a line northwards joining the villages of Odu, Karshi and Karu, also from Karu the line should proceed along the boundary between the North-West and Benue-Plateau States as far as Karu, the line should proceed along the boundary between North-Central and North-Western States up to a point just north of Bwari village , the line goes straight to Zuba village and then straight to Izom.

The Abuja Master Plan was designed by the International Planning Association (IPA), United State of America (USA). The City was divided into two Sectors of Residential Districts to accommodate population of between 100,000 and 250,000 people. The Federal Capital City was conceived to have a four phased development plan and to accommodate a total population of 1.60 million people by the year 2000, (FCTA, 2001).The Master Plan budgeted indicated less than half of Abuja land mass for residential land-use. This projection was grossly inadequate for an evolving national capital of a highly populated country like Nigeria. This was the beginning of housing quality problems in Abuja.

RESEARCH METHODS

The Sample population for the study was made up of households in the identified 62 political wards in Abuja. First, the identified 62 political wards were stratified into their various Area Councils. Available records showed that there are 179674, 50109, 32071, 14504,17092 and 10142 houses in Abuja Municipal Area Council, Bwari Area Council, Gwagwalada Area Council, Kwali Area Council, Kuje Area Council and Abaji Area Council respectively. In the second stage, 2% sample (as postulated by Scheaffer et al.,2011 and Sivo et al., 2006) of the houses in each of the identified Area Council were selected by systematic random sampling technique to give 3593,1002,641,290,341 and 202 houses in Abuja Municipal Area Council, Bwari Area Council, Gwagwalada Area Council, Kwali Area Council, Kuje Area Council and Abaji Area Council respectively. On the whole a total of 6069 buildings were selected and questionnaires were administered on the household heads of the selected buildings. However, where the household head were not available, the next available male or female members of the household were sampled. Furthermore, where there were more than one household in a building, only one household were selected.

ANALYSIS AND RESULTS

The socio- economic characteristics of respondents discussed includes issues such as age, Income, Marital status, education status, housing typology and housing quality attributes. Thus, the youth constituted 14.2% of the respondents. Furthermore, most of the respondents were also found to be in the age bracket of 31-60 years (79.99%). This implied that most of the residents in Abuja are in their productive years (Saliman, 2015). Furthermore, adult constituted the lowest proportion (5.8%) of the residents. This is probably due to the high cost of living. (Saliman, 2015). Analysis of variance (ANOVA) confirmed that there were significant differences in the age distribution of the residents (F = 4.11, p = 0.005). Results of analysis of resident's income indicates that 49.1% of the respondents in the study area were low and middle income earners. A breakdown indicated that, 13.3% and 35.8% were in low and middle income levels respectively. While 50.9% were high income earners.

Most of the respondents in Abuja are married. This is because 62.6% of the respondents claimed this status. It was also revealed that 21.4% of the respondents are single. While 6.8%, 4.8% and 4.4% of the respondents claimed they are divorcee, widowed or single parents respectively (see Table 4.4).

In disaggregated manner, it could be seen in Table 4.4 that most respondents claimed they are married in all the selected wards.Thus,69.9%,50.09%,65.36%, 70.3%,66.86 % and 50.75 of respondents in AMAC, Bwari Area Council, Gwagwalada Area Council, Kwali Areal Council, Kuje Area Council and Abaji Area Council respectively, were married.Findings on the educational status of residents indicated that 10.0% of the respondents had no formal education; while 10.1% had at least primary education. The percentage of those that were educated to secondary and Grade II levels were 7.1% and 5.1% respectively. It was also observed that 51.9% of respondents in Abuja Municipal Area Council (AMAC) were educated to university level. In the same vein, 40.2% of Gwagwalada residents also had university education. Further enquiry indicates that 39.5% of Abuja residents were educated to university level.

On the whole, NCE, OND/HND and university degree holders represented 2.8%, 14.5% and 39.5% respectively. The Chi-square test computed revealed that there existed significant variation in educational status of residents in the different Area Councils surveyed. The results of chi-square value of 167.06 significant at 0.05 confirmed this. The research also revealed that residents with high educational status were mostly found in places such as in AMAC, Bwari Area Council and Gwagwalada Area Council respectively. This was attributed to the availability of pipe-borne water.(Saliman,2015)

In Kuje, the predominant (58.7%) housing type was the traditional housing. The presence of this quality of housing was due to large population of original inhabitants Gbagyi indigene in the area council. The next predominant housing type in Kuje area council was self-contained and one bedroom flat apartment (19.2%), this was occupied by mostly non-indigenous residents. They were mostly civil servants and Abuja Airport workers probably due to the proximity of the Area council to Abuja International Airport.

Further analysis revealed that predominant house type in Bwari Area Council was self – contained row-housing. This accounted for 27.3% of the housing type in the area council. In Gwagwalada Area Council, the predominant housing type was also self-contained row housing.

This was deemed to be as a result of the Area Council being a University Town and home to paramilitary officers whose families do not reside in Abuja (Saliman, 2015).

Analysis of the socio-economic characteristics of respondents in Abaji Area Council revealed that 53.8% of residents lived in traditional houses while 33.9% lived in self-contained and one bedroom flats. This drift was ascribed to the location of the Ward as the farthest (114km) to the central business district of Abuja and therefore most of the inhabitants had developed a lifestyle independent of the Central Business District of Abuja.

An investigation into the resident's housing quality attributes revealed that 23.4% of houses in AMAC are connected with good road network, water supply and electricity, while 24.3% are in good physical conditions but lack infrastructure. In the same vein 18.9% of houses in Bwari Area Council were connected with good road network,water supply and electricity, while 22.1% were in good physical conditions. However, 27.1% of the houses were crowded,lacking water closet and day light obstructions. Results of survey conducted on Gwagwalada houses indicated an interesting scenario;30.3% of the houses were crowded, with room lacking closet and day light obstruction while 25.1% of the houses were aged. This is attributable to the location of the University of Abuja in the Area Council, hence the need to accommodate large students' population at relatively lower cost, regardless of the quality of the housing. In like manner, 75.2% of surveyed houses in Kuje Area Council were crowded, lacking water closet, experiencing day light obstruction and aged. In addition, 88.0% of surveyed houses in Abaji were aged, while 6.4% were connected with good road network, water supply, electricity lighting, good landscape, good toilet, good finishing, fire safety and escape stairs.

Table 1: Age group of respondents

Age group in years	No of respondents	%
Youth (18-30)	861	14.19
Young adult (31-60)	4855	79.99
Adult (above 60 years)	353	5.82
Total	**6069**	**100.0**

Source: Authors' Field Survey, 2019

Table 2: Resident's distribution into income group

Income level per month	No of respondents	%
Low < (N25,000)	3611	59.50
Middle (N25,000-60,000)	1760	28.99
High (N70,000 – N274,000)	698	11.50

Source: Authors' Field Survey, 2019

Table3: The Distribution of Respondent into different Educational Status by Ward

	Educational Status							
	No formal Education	Primary six	Secondary	Grade II	NCE	ND/HND	University degree	Total
Ward	Feq. %	Freq. %	Freq. %	Freq. %	Freq. %	Freq. %	Freq. %	Freq. %
AMAC	155 (3.3)	197 (5.4)	287 (7.9)	165 (4.6)	382 (10.6)	539 (15.0)	1868 (51.9)	3593 32.99
BwariAreaCouncil	25 (2.5)	20 (2.0)	25 (2.5)	66 (6.6)	208 (20.8)	279 (27.9)	379 (37.8)	1002 7.90
GwagwaladaArea Council	33 (5.1)	23 (3.6)	33 (5.1)	42 (6.6)	126 (19.7)	126 (19.7)	258 (40.2)	641 12.09
Kwali Area Council	59 (20.6)	43 (14.7)	21 (7.4)	13 (4.4)	47 (16.2)	47 (16.2)	60 (20.7)	290 15.88
Kuje Area Council	20 (5.8)	16 (4.8)	10 (2.9)	39 (11.5)	118 (34.6)	43 (12.5)	95 (27.9)	341 23.0
Abaji Area Council	95 (47.0)	71 (35.1)	17 (8.4)	2 (0.9)	12 (5.9)	3 (1.5)	2 (0.9)	202 7.6
Total	**387 (10.0)**	**370 (10.1)**	**393 (7.1)**	**327 (5.1)**	**893 (2.8)**	**1037 (14.5)**	**2662(39.5)**	**6069 (100)**

Source: Authors' Field Survey, 2019

Table 4: Resident's housing typology

Ward	Traditional		Self-contained row housing		One bedroom flat row housing		Two/three bedroom flat		Block of flat		Duplex		Total	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
AMAC	62	1.7	363	10.1	723	20.1	1673	46.5	75	2.1	697	19.4	3593	32.99
BwariAreaCouncil	170	16.9	274	27.3	137	13.7	239	23.9	30	3.0	152	15.2	1002	7.90
Gwagwalada Area Council	121	19.0	210	32.8	150	23.4	94	14.6	14	2.2	52	8.1	641	12.09
Kwali Area Council	90	30.9	132	45.6	60	20.6	8	2.9	0	0	0	0	290	15.88
Kuje Area Council	200	58.7	65	19.2	60	17.3	7	1.9	3	1.0	6	1.9	341	23.0
Abaji Area Council	110	53.8	37	18.5	31	15.4	15	7.7	3	1.5	6	3.1	202	7.6
Total	**753**	**12.4**	**1081**	**17.8**	**1161**	**19.1**	**2036**	**33.5**	**125**	**2.1**	**913**	**15.0**	**6069**	**100.0**

Source: Authors' Field Survey, 2019

Table 5 : Marital Status of respondents by Ward

Wards	Marital status												
	Single		Married		Divorced		Widowed		Single parents		Total	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
AMAC	535	(14.9)	2513	(69.9)	284	(7.9)	111	(3.1)	1 50	(4.2)	3593	32.9
Bwari Area Council	303	(30.4)	502	(50.09)	71	(7.1)	55	(5.5)	71	(7.1)	1002	7.90
Gwagwalada Area Council	158	(24.)	419	(65.36)	27	(4.2)	23	(3.6)	14	(2.2)	641	12.09
Kwali Areaa Council	43	(14.8)	204	(70.3)	17	(5.8)	13	(4.5)	13	(4.5)	290	15.88
Kuje Area Council	68	(19.9)	228	(66.86)	16	(4.6)	19	(5.6)	10	(2.9)	341	23.00
Abaji Area Council	50	(24.7)	103	(50.9)	19	(9.4)	21	(10.4)	9	(4.5)	202	7.60
Total	**1157**	**(19.06)**	**3969**	**(65.39)**	**434**	**(7.15)**	**242**	**(3.94)**	**267**	**(4.39)**	**6069**	**100.0**

Source: Authors' Field Survey, 2019

Wards	Availability of infrastructure(road network, water supply, electric lighting)		Fully decorated luxurious, good landscaping, large rooms,good toilet conditions and infrastructure		Good finishing, Firesafety, Dua Egress, Stairs, Escape Stair and infrastructure		Crowded persons/sleeping space,Rooms lacking closet, daylight obstruction, rooms lacking windows		Houses with good physical condition, no infrastructre		Aged buildings		Total	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
AMAC	840	(23.4)	729	(20.3)	672	(18.7)	341	(9.5)	873	(24.3)	138	(3.8)	3593	32.99
BwariAreaCouncil	189	(18.9)	126	(12.6)	59	(5.9)	272	(27.1)	221	(22.1)	135	13.5)	1002	7.90
GwagwaladaArea Council	55	(8.6)	27	(4.2)	80	(12.5)	194	(30.3)	124	(19.3)	161	(25.1)	641	12.09
Kwali Area Council	8	(2.7)	2	(0.6)	6	(2.1)	70	(24.3)	64	(21.9)	140	(48.4)	290	15.88
Kuje Area Council	18	(5.2)	5	(1.4)	6	(1.7)	144	(42.2)	56	(16.4)	112	(33.0)	341	23.00
Abaji Area Council	2	(0.8)	1	(0.4)	1	(0.3)	11	(5.4)	10	(4.9)	177	(88.00)	202	7.60
Total	**1112**	**(18.3)**	**890**	**(14.7)**	**824**	**(13.6)**	**1032**	**(17.0)**	**1348**	**(22.2)**	**863**	**(14.2)**	**6069**	**100.0**

Source: Authors' Field Survey, 2014

Table 6: Residents' housing quality attributes in Abuja

Variables in the study area were subjected to factor analysis using the principal components method to evaluate the spatial pattern of housing quality in the study area. Thus, Factor analysis using the principal component methods was employed to collapse all the identified housing quality variables in each of the six area Councils by examining the largest values that linked the factors to the measured variables. That is to say that the goal of the use of factor analysis is to represent relationships among sets of variables parsimoniously yet keeping factors meaningful. Thus, a small number of factors (R) were determined based on the interrelated identified variables. . The variables from which the factors were derived are listed in Table 7.

Table 7:   Variables used for Factor Analysis

Va	**House near CBD and Infrastructure(road network, water supply, electric lighting)**
Vb	**Fully decorated luxurious, good landscaping,**
Vc	**Good finishing,**
Vd	**Crowded persons/sleeping space,**
Ve	**Houses with good physical condition,**
Vf	**Aged buildings**
Vg	**Houses lacking infrastructure**
Vh	**Houses with daylight obstruction and rooms lacking windows**
Vi	**Houses with large rooms, good toilet conditions and good infrastructure**
Vj	**Houses with Fire safety equipment , Dua Egress, and Escape Stairs**

First, Correlation matrix is conducted for the identified variables, thus, variables that did not correlate (R< 0.5) or that correlates too highly(R<0.8) were eliminated.

Table 8: Correlation Matrix for Factor Analysis

	Va	Vb	Vc	vd	ve	vf	Vg	vh	vi	vj
Va	1.0000									
Vb	0.6108*	1.0000								
	0.0000									
Vc	0.5003	0.6100	1.0000							
	0.0400	0.0500								
Vd	0.6838	0.5236	0.5066	1.0000						
	0.0017	0.0361	0.0308							
Ve	0.4848	0.5739	0.5574	0.6611	1.0000					
	0.0016	0.0031	0.0375	0.0400						
Vf	0.6472	0.4360	0.4663	0.6978	0.5565	1.0000				
	0.0400	0.0501	0.0400	0.0300	0.0500					
Vg	0.5173	0.5955	0.6914	0.6311	0.5330	0.5129	1.0000			
	0.0466	0.0570	0.05217	0.0500	0.0300	0.0400				
Vh	0.6014	0.5660*	0.5376	0.5141	-0.5667	0.5083	0.5564	1.0000		
	0.0500	0.0000	0.0000	0.0532	0.0001	0.0200	0.0500			
Vi	0.5367	0.5159	0.4613	0.5295	0.5233	0.5724	0.6726	0.5090	1.0000	
	0.0300	0.0500	0.0000	0.0280	0.0301	0.0400	0.0400	0.0300		
Vj	0.6244	0.6446	0.6405	0.2702*	0.5294	0.5088	0.5369	0.5251	0.5145	1.0000
	0.0500	0.0400	0.0000	0.0000	0.0400	0.0200	0.0300	0.0300	0.0200	

Source: Computer Output, 2019

*Significant at 0.05

The results reveal interesting relationships. For instance, fully decorated luxurious, good landscaping houses (vc) (0.6108*, 0.0000) indicate significant positive association with House near CBD and infrastructure (road network, water supply, electric lighting) (va). This implies that, houses that are well built and luxurious were provided with road network, water supply and electricity. Similarly, a negative but significant association was observed between Houses with daylight obstruction / rooms lacking windows (vh) (-0.5667, 0.0000) and Houses with good physical condition (ve). This implies that houses that experience daylight obstructions as well rooms without windows were found to lack good physical conditions in the study area. Furthermore, significant positive relationship were also recorded between Houses with daylight obstruction and rooms lacking windows (vh) (0.5083, 0.0200) and Aged buildings (vf). The inference from this is that most houses with day light obstruction and room lacking windows were aged.

Thus, the interrelationships between quality scores for location, structural and neighborhood attributes allowed for the initial identification of some subgroup which were used as composite indicators of the spatial pattern of housing quality. Table 9 indicates the results of the second stage of the factor analysis which was the extraction process. The principal objectives of this stage was to make initial decisions on the number of factors underlying a set of measured variables using the principal components analysis. Thus, linear combinations of the observed variables were formed. The first extracted factor was the combination that accounted for the largest amount of variance (first principal component); the second extracted factor accounted for the next largest amount of (second principal component) variance and uncorrelated with the first, while the successive components explained progressively smaller portions of the total sampled variance. However, all the factors were made to be independent of each other (orthogonal). In other words, it could be inferred from the table that each factor accounted for a smaller proportion of the variance than the previous one. Besides, the first component explained 46.3% of the variance of the data, while the first three components accounted for 77.1% of the variation in the data.

Consequently, the three components were retained, based on the criterion that the three factor components had at least 5% of the variance (Spence, 1968, Olayiwola 1990, Ostnorene et al.,(2012).

Table 9: Extraction of Initial Factors (Components)

Factor number	Eigen value	% of variance	Cumulative % of variance
1	5.554554	46.3	46.3
2	2.46821	20.6	66.9
3	1.22362	10.2	77.1

Source: Computer output, 2019

Also, considered in the determination of factors to represent the data was the Eigen values. Accordingly, since each variable was expected to have a variance of 1; factors with a variance less than 1 were no better than a single variable and were therefore not retained.

Consequently, all the factors with Eigen values greater than 1 were retained.Furthermore, factor matrix (unrotated component) was then introduced to assess the factor loadings for each variable on the unrotated factors. Thus, each score represents the correlation between the variables and the unrotated factor. This relationships helped to formulate interpretations of the factors looking for common thread among the variables that have large loadings for a particular factor. This is indicated in the Table 10, where it was revealed that not all variables in the matrix loads significantly only on one factor.

Table 10: Unrotated Factor Matrix

Variable		Factor 1	Factor 2	Factor 3
Va	**House near CBD and Infrastructure**	0.5878	-0.7064	-0.1131
Vb	**Fully decorated luxurious, good landscaping**	-0.7860	-0.6371	0.5434
Vc	**Good finishing,**	-0.7696	-0.5798	0.4243
Vd	**Crowded persons/sleeping space,**	-0.4173	0.6415	0.5329
Ve	**Houses with good physical condition,**	0.2088	-0.5633	0.5178
Vf	**Aged buildings**	0.3088	0.5333	-0.1405
Vg	**Houses lacking infrastructure**	0.1132	-0.5211	0.5636
Vh	**Houses with daylight obstruction and rooms lacking windows**	0.1274	0.5418	-0.3230
Vi	**Large rooms, good toilet conditions and good infrastructure**	0.3065	0.5671	-0.4205
Vj	**Houses with Fire safety equipment , Dua Egress, and Escape Stairs**	-0.8730	0.6532	-0.1375

Source: Computer Output, 2019

Thus, variables on housing location quality attributes loaded on factor1, variables on housing structural quality attributes loaded on factor 2, while variables on housing neighbourhood quality attributes loaded on factor 3. In the final analysis, Table 11 shows the spatial pattern of housing quality when the factor scores of the housing quality attributes were plotted for each of the Area Councils in Abuja.

Table 4.21: Area Councils Factor Scores on the housing (1) Locational quality ;(2)Structural quality and (3) Neighbourhood quality attributes

No	Name of wards	Scores		
		1	2	3
1.	AMAC	*1.72	1.53	0.51
2.	Bwari Area Council	1.52	-0.03	*1.61
3.	Gwagwalada Area Council	1.3	0.46	1.70
4.	Kwali Area Council	0.45	0.12	*1.03
5.	Kuje Area Council	1.2	0.14	1.4
6.	Abaji Central	0.01	0.02	1.23

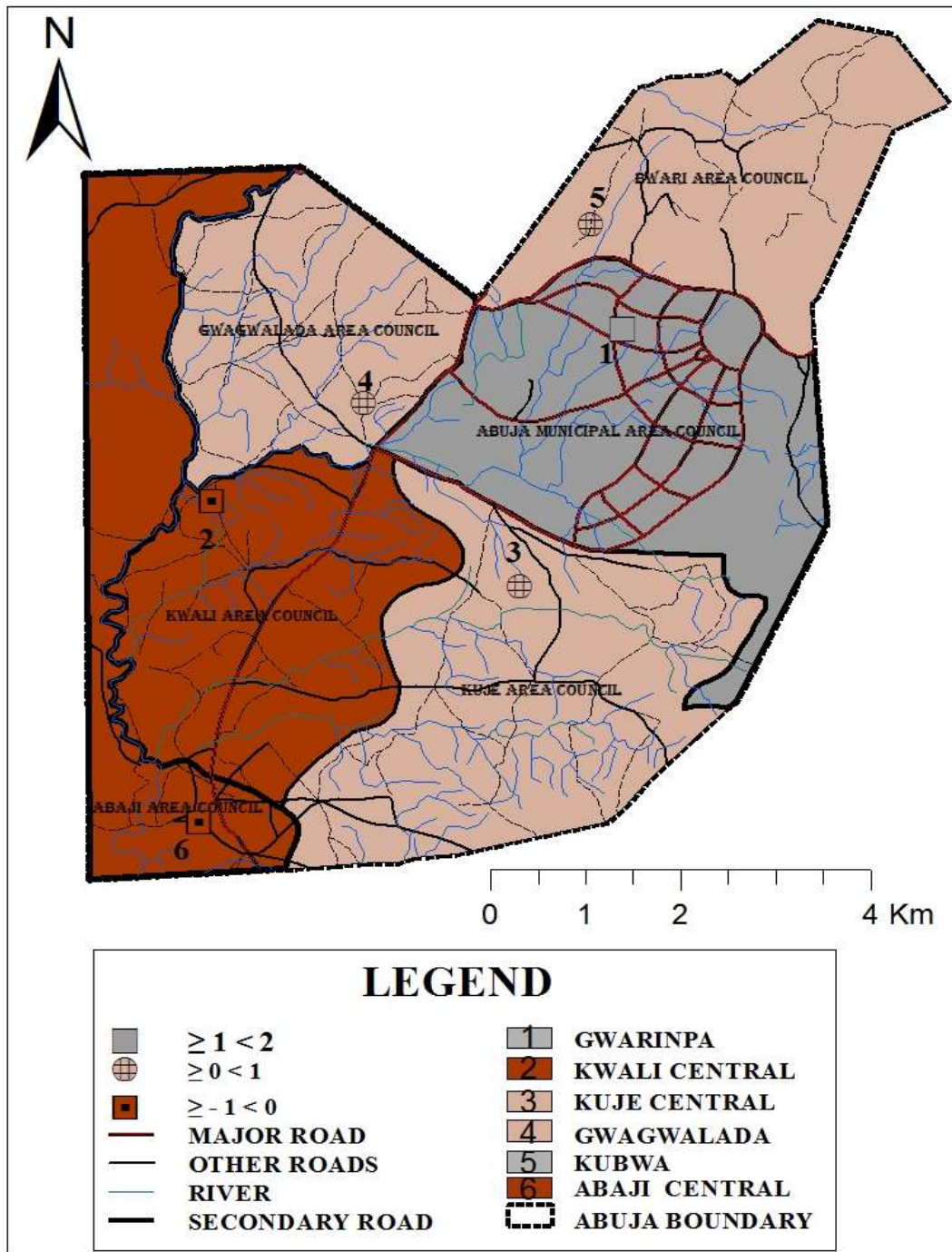Sources: Source: Computer Output, 2019

Rotation Method

Thus, factor 1(housing Location quality attributes factor scores) recorded highest attribute factor scores and dominant influence on the spatial pattern of housing quality in Area Councils such as Abuja Municipal Area Council (Gwarinpa), Bwari Area Council (Kubwa) and Gwagwalada Area Council. The least housing location quality attribute factor was observed in other Abaji and Kwali, as shown in figure 1. In the same vein, high housing structural quality attributes factor scores , was observed in AMAC (see figure 2), while the influence of housing neighbourhood quality attributes factor scores was high in Abaji,Kwali, Kuje and Gwagwalada Area Councils. (See figure 3).
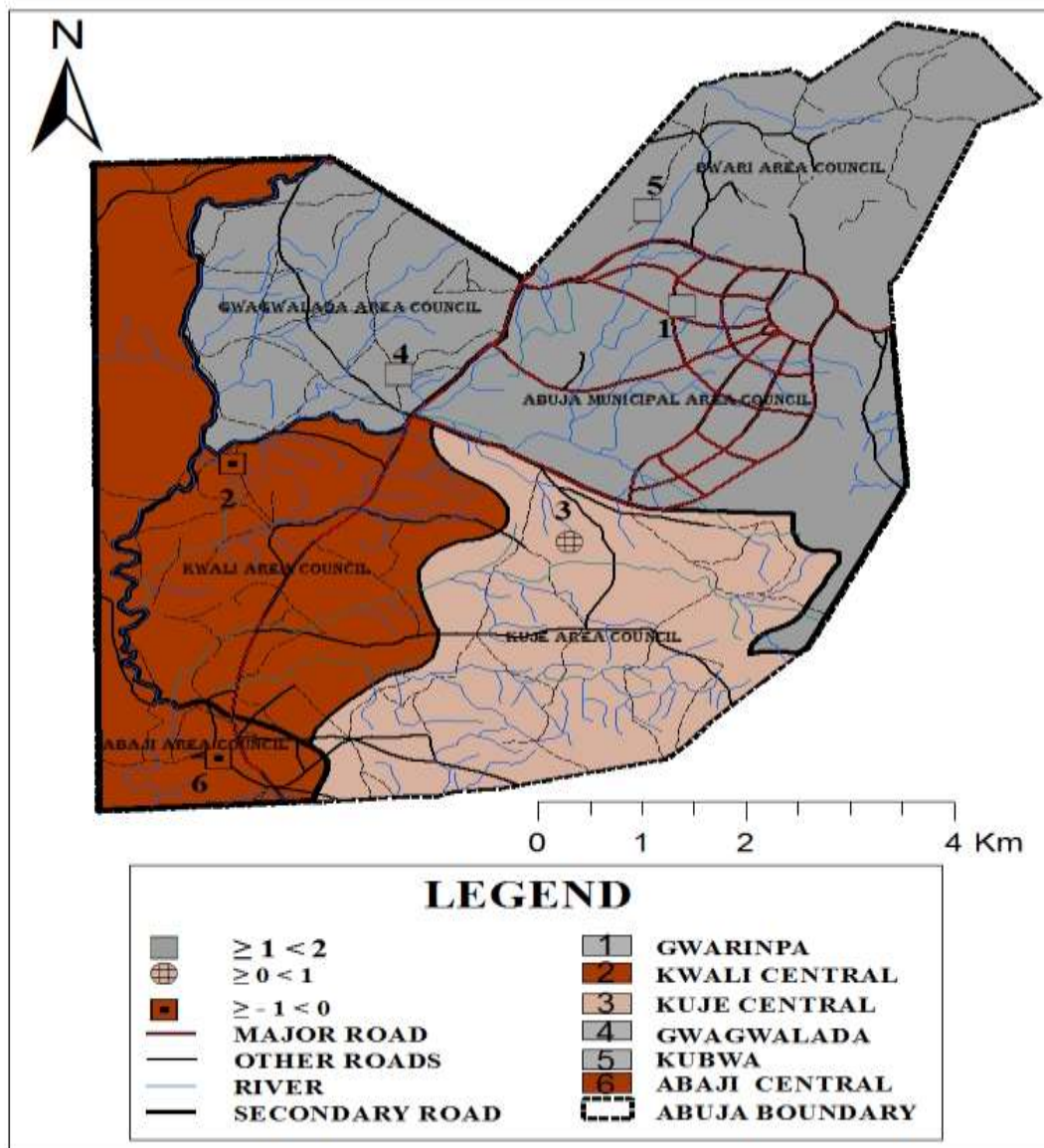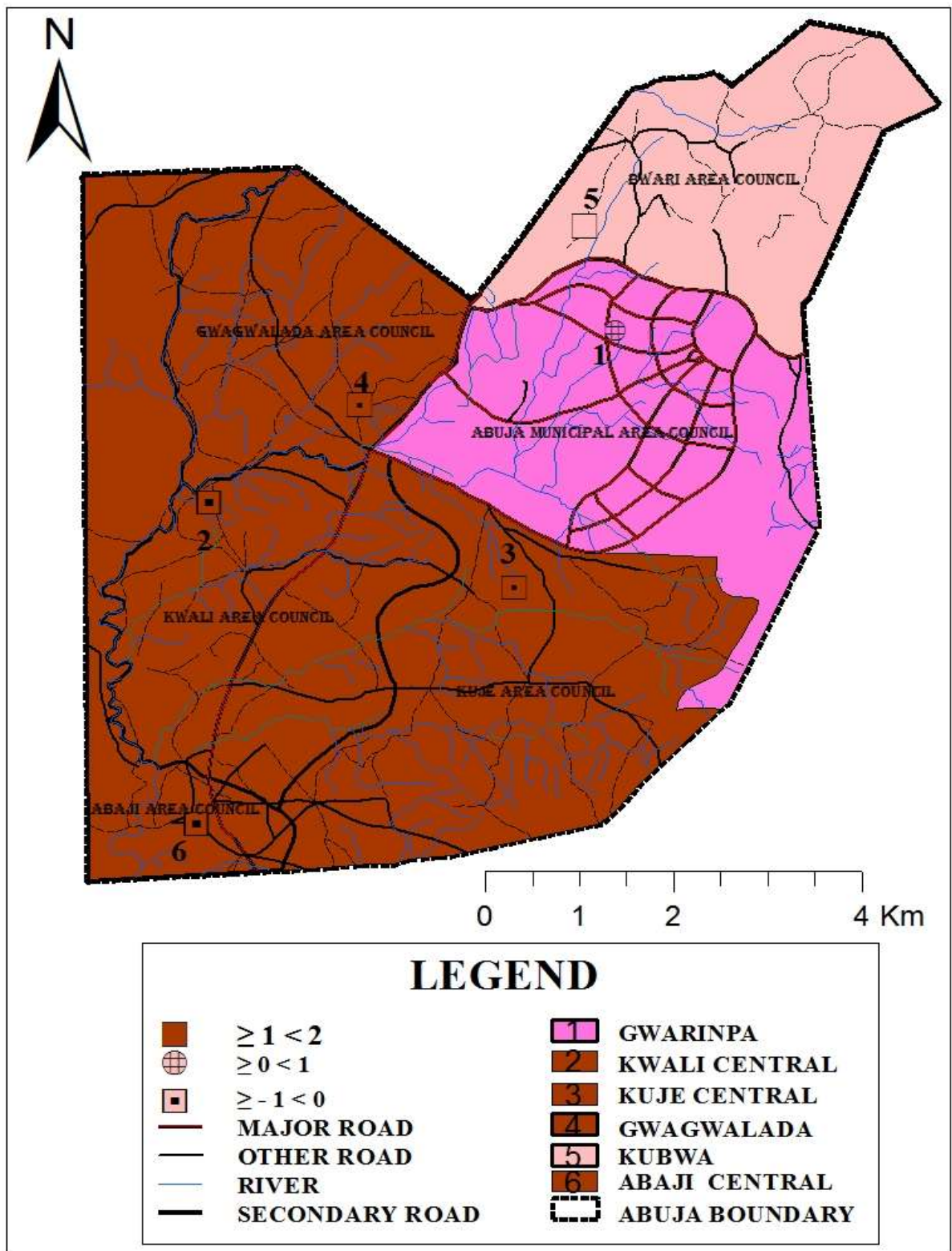

Source: Computer Output, 2019

Figure 1; factor 1(Housing locational quality attributes scores

Source: Computer Output,2019
Figure 2: Factor 2(Housing structural quality attributes scores)

Source: Computer Output, 2019

Figure 3: Factor 3 (Housing neighbourhood quality attributes scores)

CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS

The underpinning for this study was the realization that quality housing serves as a measure of quality of life, thus its availability in the Nation's New Capital City, Abuja would help provide order, haven, identity, warmth, connectedness to the households and defines the level of development of the country at large. Evaluation of Spatial pattern of housing quality in Abuja revealed a general hierarchical trend in the resident's home, where housing quality was observed to decrease with increase in distance from CBD. Altogether, the study revealed that housing quality in Abuja decreases with increase in distance from the central business district. Thus, AMAC in the City Center as well as Bwari Area Council and Kuje Area Council about 29km and 38km respectively from the central business district had relatively good quality houses at high cost and were mostly occupied by high income earners. In the same vein, Gwagwalada, Kwali and Abaji Area Councils; about 55km, 66km and 114km respectively from the central business district had lowest quality houses at relatively lower cost. Thus, the study discovered that, generally most Abuja work force lived in low quality housing and far from their places of work which affects their productivity and that of the Nation at large.

The findings of this study has several implications. Most previous studies in the available extant literature did not take into consideration spatial pattern of the study area as well as cost, as it affects housing quality in a developing and productivity of the residents. Therefore, this study has come up with some important findings that are capable of enhancing the understanding of the importance of Spatial Pattern of Housing Quality and probably serve as a guide for policy makers towards the development of a Nation.

References

Adeoye. D.O (2016); Challenges of Urban Housing Quality:Insights and Experience of Akure. Nigeria.Urban Planning and Architecture Design for Sustainable Development. UPADSD 14-16

Akinola SR (1998). "The Pattern of Housing Quality in Osogbo, Osun State". Ife J. Environ. Design Manag. Pp.109-120.

Anantharajan T (1983). Evaluation of Residential Development through User's Rating and Ranking of Environmental Attributes. Proceedings of the IAHS Congress on Housing NW 7–12 Miami Florida Ural ED. (ed.) pp.73-84.

Anantharajan, R. N. (1983): A Holistic Model for Total Quality Service. *International Journal of Service Industry Management*. Vol. 12 No. 4. pp. 378-412.

Anofojie.A.E, Adeleye.O.A and Kadiri.M.A(2014): Housing quality Assessment in selected Public Residential Estates in Amuwo-Odofin Local Government Area, Lagos .Nigeria. International Journal of Research in Earth and Environmental Sciences.Vol.2 No. 6

Aribigbola, A. (2000): Conceptual Issue in Housing Provision in Nigeria. In Akinbanjo O. B, And Olotuah, A. (ed). *Effective Housing in the 21ˢᵗ Century Nigeria Environmental Forum FUTA. Nigeria.*

Ebong MO (1983). The Perception of Residential Quality: A case study of Calabar, Nigeria. Third World Planning Review, 5(3):273-284.

Emankhu.S E. and Yakubu .U.A (2015): Housing quality in Peripheral area of Lafia Town. International Journal of Geography and Regional Planning Research. Vol.1.No.3 pp.9-17

Etenko V.(2008): Evaluating housing quality: a System Approach. Building Research and Practice.Vol.2 issue 1

Fahrlander.C.B, Grize.L, Schindler.C and Kahlmeier.S (2008): Perceived environmental housing quality and wellbeing of Movers.BMJ Journals.Vol.55.issue 10

Federal Capital Territory Administration (FCTA ,2001): *The Making of a Dream Capital. Department of Planning,* Research and Statistics, Abuja.

Funmilayo L.A(2012): Housing Quality in Informal Settlements and Urban Upgrading in Ibadan ,Nigeria. International knowledge Sharing Platform.Developing Countries Studies .Vol.2.No.10

Godwin, J. (1998): The House in Nigeria. An exploration In Amole, B. (Ed. Habitat Studies in Nigeria. *Some Qualitative Dimensions*" Shaneson of Publishers Nigeria pp, 1-10.

Hammer, L. Booth, D. and Lovell, E. (2001): *Poverty and Transport.* A Report prepared for the World Bank in collaboration with DFID. Over Seas Development Institute.

Imrie.R.(2004): Housing quality, disability and domesticit. Housing Studies. Vol.19 pp.685-690

Jennifer.N, Olivia.F.R,Jeanette.A.S and Luz.C(2010): The Role of Housing Type and Housing Quality in Urban Children with Asthma. Journal of Urban Health . Vol.87(2) pp.211-224

Jiboye A (2009). The Significance of Households" Characteristics on Housing Quality in Nigeria, J. Geogr. Plann. Sci. (2):1-10.

Jiboye, A. B. (2010): Evaluating the Pattern of Residential Quality In Nigeria: The Case Of Osogbo Township. FACTA UNIVERSITATIS Series: *Architecture and Civil Engeinering.* Vol. 8 No. 3 pp307 – 316.

Lanrewaju A.F(2012): Urbanization,housing quality ad environmental degeneration in Nigeria.Journal of Geography and Regional Planning.Vol.5(16),pp.422-429

Malcolm H.(2007): Defining housing quality and environment: disability , standard and social factors. Housing Studies.Vol.19 issue 5

Morris, E and Winter, M. (1997): *Housing, Family and Society.* 2nd edition) St. Paul. Mini Department of Design Housing and Apparel, University of Minnesota, John Wiley and Sons. New-York.

Okoko E (2001). Residential Crowding and Privacy in High-Density Neighborhoods in Akure, Nigeria. Ife Social Sci. Rev. 19(1):133-144

Olayiwola L. M (1990): *A study of the adequacy of infrastructural facilities in rural areas of Oranmiyan Local Government.* An Unpublished Ph.D. Thesis. Department of Urban and Regional Planning, Obafemi Awolowo University, Ile-Ife. Osun State, Nigeria.

Olayiwola LM, Adeleye A, Jiboye AD (2006). "Effect of Socio-cultural factors on Housing quality in Osogbo, Nigeria". International Symposium on Construction in Developing Economies: New issues and challenges. Santiago, Chile. January, 18-29.

Olayiwola, L. M. (2003): *The Future of Public Housing in Nigeria*. A Lecture series Department of Urban and Regional Planning, Obafemi Awolowo University, Ile-Ife.

Olotuah AO (2005). Urbanization, Urban Poverty, and Housing Inadequacy; Proceedings of Africa Union of Architects Congress, 2328 May, Abuja, Nigeria pp.185-199.

Osborne J. W and Fitzpatrick D. C. (2012): Replication Analysis in Exploratory Factor Analysis: What it is and why it makes your analysis better. *A peer-reviewed electronic Journal*. Vol. 17 no. 15 pp 22-29.

Ponice, L. B, Hadjiyanni, T. And Yust, B. L, (1997): Exploring Housing Quality Measures in a Rural Area of the Philippines. *Housing and Society.* Vol. 24 No1, pp. 59 – 74.

Roderick J.L(1995): Housing quality: An Agenda for Research. Urban Studies. Retrieved from http://doi.org

Saliman, D (2015): Determinants of Housing Choice in Abuja. An Unpublished Ph.D. Thesis. Department of Urban and Regional Planning, Obafemi Awolowo University, Ile-Ife. Osun State, Nigeria.

Scheaffer. R.L., Mendelhall. W. and Ott. R. L (2011*): Elementary Survey Sampling* 5th Ed. Belmont, C.A. Duxbury Press.

Shaughnessy.U.H,Nevalainen.A,Villan.J,   Paanala.A.   and   Turunen.M(2010): Evaluating housing quality, health and safety using an internet based data collection and response System: A cross –section study .Journal of Environmental Health.Article69

Shrivastava .A.B,Garg.Y and Dhagat. N(2014): Housing quality and customer satisfaction with reference to delivery methods. Global Institute for Research and Education.Vol.3(1)pp.1-4

Sivo S.A, Saunders C, Chang. Q. and Jiang . J. (2006): How Low Should You go? Low Response Rates and Validity of Influence in Questionnaire Research. *Journal of the Association for Information Systems*.Vol. 7 No 6 pp 351-441.

Spence, N. A. (1968): A Multifactor Chi form Regionalization of British Countries. *Regional Studies.* Volume 2 pp. 87-104.

Streimikiene .D(2015):Quality of Life and Housing. International Journal of Information and Educational Technology.Vol.5 No2.