Effects of Population Pressure on Port Harcourt Neighbourhood Infrastructure and Facilitates

Ubani Princewill[1*], Bumaa Felix Neeka[2], Daibi-Oruene, Waaka Divine[3]

[1] *Department of Urban and Regional Planning, Kenule Beeson Saro - Wiwa Polytechnic Bori, Nigeria*
[2, 3] *Department of Architecture, Kenule Beeson Saro - Wiwa Polytechnic Bori, Nigeria*
**Corresponding Author*

Abstract: **-Alongside the framework that neighbourhoods in south-south cities (SSC), comprising Port Harcourt, has existed without the increase and upgrading of the necessary infrastructural facilities; and that the inherent difficulties of inadequate, obsolete and dilapidated infrastructures are threatened by the pace of escalated population pressure. This research suggests that this challenge and undeniably neighbourhood infrastructural shortages can be tackle through urban renewal programs, neighbourhood improvement plans, and development of new layout and satellite towns together with adequate infrastructures. They constitute the gadgets through which the much desired neighbourhood infrastructures could be achieved for maintainable neighbourhood development. However, the article concentrated on effects of population pressure on Port Harcourt Neighbourhood infrastructures and facilitates, while the sampling of 390 residents unfolded the escalated effect and consequences of uncontrolled population pressure together with the dissimilarities across the facets of neighbourhood infrastructures. The findings from the analysis revealed that effects of population pressure on neighbourhood infrastructures (R^2 = 0.978, effect at 0.01) explaining 97.8% (portable water, electricity, educational facilities, housing, transportation/pedestrian and waste disposal infrastructures). On determination of the population pressure dissimilarities, residential infrastructure claimed (25%), transportation infrastructure (20%), commercial (18%), industrial (15%), institutional (10%), agricultural (05%) and recreational facilities (07%).The research endorsed for a review of the initial neighbourhoods threshold population in Nigeria through the national population commission, to identify the number or figure of population in the increase and built more infrastructural facilities commensurate to the present population of the neighbourhoods under pressure and improve the existing condition of the same neighbourhoods through urban renewal projects or urban improvement plans.**

Keywords: **population, pressure, infrastructure, neighbourhood and Port Harcourt.**

I.INTRODUCTION

Infrastructure stands as the critical and uncomplicated inevitabilities for every neighbourhood. It serves as the life wire that enhances the functionality, efficiency and aesthetics of any settlement, as well as the manifestation of physical development upon which man survive after putting food in his table. The physical shortage or deficit of neighbourhood infrastructure can severely disturb the residents' life style, well-being and productivity. It rests as prominent need without which quality or standard neighbourhood might not be achieved. Neighbourhood infrastructure facilities are expected to be quantitative and qualitatively acceptable purposely to fulfil the unsophisticated demand of the escalated population (brainchild 2020).

The existing neighbourhood infrastructures have observed extraordinary population pressure in the past epochs. The side by side dilapidation, deterioration, and obsolete have generated, amongst others, tremendous difficulties to the delivery of sufficient infrastructure to meet the present plea of population increase. The rates of population pressure on neighbourhood infrastructure have manifestations of high occupancy ration, traffic congestion, hawking and display of goods on pedestrian walk, looting pollution and vandalization of infrastructure. From urban planning and architecture perspective, the necessary infrastructural facilities such as transportation, water project, housing, electricity, schools, reconstitute physical development as well as the spatial ordering of land use activities in all the sub-Sahara African (researchers brainchild 2020).

In Nigeria, the multifaceted effects of population pressure on infrastructural facilities in almost all the neighbourhoods portrayed substandard and other numerous characteristics that make neighbourhoods unfit for human habitation. A major reason Sabyasachi [14] (2017) employed 2001 and 2011 Census periods data to examine the applicable infrastructure features that led to the escalation of the urban populations sizes of large cities in India. While evaluating the position of first class towns in respect to accessibility of diverse infrastructure amenities and quality of public services in India were also inclusive. However, his findings demonstrated that the Borda area of India graded that metropolitans' areas such as Greater Mumbai, Chennai, Kolkata, Bangalore, and Thiruvananthapuram gained better provided infrastructure facilities for their urban residents more than the less important cities especially in the areas that has to do with population size. In furtherance, the study maintained that at the city glassy, holistic electricity connections, schools, colleges, and universities proved strong positive effect on urban population size. Finally, the analysis concluded that upgrading of infrastructure facilities could not significantly increase population agglomeration dignified in terms of size, density, and growth rate of urban population all over the big towns,

which could considerably advance the possible involvement of the towns and cities general monetary expansion in India through the enlightening the comfort of living and encouraging business enabling environment.

Peter (2010) applied population projections data to discover the meaning of infrastructure and the factors that affect investment choices. The study focused on population direction that administrators must put in place while making choices concerning infrastructural deal and how these ponder comparative to other deliberations. The central idea of research is nothing but population issues while the explanations anchored on districts with rising populations that requires arrangements to afford a primary system of water, sanitation and social services for shifts and threshold population, exclusively the increasing rate of personalities of operational stage.

John and Andrew (2012) stressed that assessing in serious 'hard' infrastructure to back abstemiously larger populations in well-known regional cities (respect to medium and high growth situations) is more possible to offer effectual and supportable conclusions for regional Victoria and the State. They maintained that advanced regional demographic ranks could confidently underwrite to a more effectual occupied settlement pattern in Victoria, identifying that numerous regional centres have established and well- functioning economies, with important capacity to expand further in a sustainable manner. According to the authors, the social and economic positive impacts are likely to flow from higher population levels in the regional cities and surrounding communities. That population growth in the regional cities is dependable with a variety of government strategies, together with long-term planning, marketing and fiscal creativities.

Craven, E. H. and Goulding, R. (2014) reported work on assessment of the possible urban transportation infrastructure plans such as metro, regional rail and tram, to provide a catalyst for the development and redevelopment of urban areas in European cities. Their findings reveal the achievements of a rail transit development in a low density city in Perth Australia. Their studies concluded that there are imperative lessons to be drawn from the European examples especially the Perth Southern railway in designing urban rail systems for making travel in detached urban areas like Melbourne.

Catherine (2001) found that the migration processes retort straight to infrastructure as a reason to move in circumstances where past incomes have become untenable but jobs are not available. For the facts that it is essential for procedure to deliver for population movement, that could have key allegations for public expenses, towards expansion delivery and for transformation and social justice.

Martin and David (2009) stressed that whenever global population increased, the economies of many regions shall also expand, the number and gauge of infrastructure will enlarged vividly. They maintained that certain infrastructure is used to move people and commodities from one location to another; as many infrastructures is employed to control natural processes or to citation natural resources. However their study concluded that understanding environmental dynamism demands considerate function of infrastructure in the environment. The authors forged ahead and review available catalogues on infrastructure and present environmental effects of dissimilar types of infrastructure. Apart from that, evaluate the contemporary condition of aging infrastructure and the future of environmental effect and advantages of infrastructure withdrawing. To end, look at strategies that have facilitated or subdued infrastructure retiring.

Asoka, Bunyasi, and Thuo, A (2013) adopted the cross-examination of 30 households, 20 businesses and 3 institutions in infrastructure development and service delivery. In respect to households, a simple random sampling technique was adopted while the issue of institutions and businesses employed purposive technique method. the aid of computer packages popularly called SPSS and Microsoft Excel programs analysed the data as the study generated outputs that were demonstrated on percentages and bar graphs. In furtherance, their study considered perspective impacts of population growth on infrastructure and service provision in Eastleigh neighbourhood. Centred on trends in population growth; impact of population growth on infrastructure and services and discover available initiatives and their effectiveness in guaranteeing sustainable infrastructure and effective services in the neighborhood.

while examining Transportation infrastructure as it relate public policy and private sector, Mehmet and Aldonat (2011) employed annual data for 1950-2004, comprising tangible and intangible effects of railway infrastructure. Their research focused on impact of railways as hard type of transportation infrastructure on economic growth and population density. Their study aimed at historical relationships between railway infrastructure and economic growth; and between railway infrastructure and population density in Turkey. Their findings proved that addition and causality tests dictated positive long run relationship between railway length and population density and between railway length and real GDP per capita. They maintained that railway length causes real GDP per capita to increase only in the long run but it causes population density to increase both in the long and the short run. However, their results settle the theoretical basis that improvements in transportation infrastructure connect to higher income and larger population in the researched region.

Marlon (1998) conducted a research on the possibility of negative outcome of spill overs from public infrastructure. His result shown that any time input factors are mobile, public infrastructure reserves in one location can draw production away from other locations. The study added that linear production-function framework occur, the effect must demonstrate a negative result spill over from public capital. Their research data acquired from California counties in 1969

via 1988, also maintained that negative spill over impacts are revealed to exist in the case of street-and-highway capital. Finally, he concluded that variations in the county's production are positively associated with changes in street-and-highway capital within the same county while the output vagaries are negatively associated with changes in street-and-highway wealth in other nations.

On the basis of frontier analysis, nmaculada , Ángel and José (2014)plan a practise to study the technical appearances and cost efficiency levels related to the provision of public infrastructure for elementary utilities. Their practice guessed a cost reducing attitude on the side of government officials especially when strategizing on the construction of local infrastructure, which is proposed by means of a bendable Trans log cost duties. The work maintained that important escriptions of measure economies, in connection with superior statistics of inhabitants and dwellings, coupled with economies of density, triggered by decreases in urban spreading. Regarding the determination of the optimal population densities for average cost minimization, their model demonstrated with the water cycle sector, water distribution, sewage collection and cleansing of wastewater and engaged data at the municipality level of the Spanish district of Castillay León. Though the outcome revealed feature cost savings in the form of lessening average costs, perceived important scale and density economies presently, and together with large inefficiency levels. Finally, the authors pointed that important strategy procedures favouring larger and denser urban sizes should be drawn, since the observed excess cost is the result of a general suboptimal urban dimension in terms of population compactness, and the negative consequences of detached settlement arrangements.

Calderón and Servén (2004) gave a practical investigation of the effect of infrastructure development on economic growth and income distribution via numerous panel data set surrounding more than 100 countries from 1960–2000.The study held and combined robust analysis, the results stressed that growth is positively pretentious by the standard of infrastructure properties whereas income dissimilarity reduces with advanced infrastructure measure and quality. The author maintained that diversity of condition assessments and proposes that the results obtained could not uphold the pivotal effect of the external component of infrastructure measure and quality on growing population and disparity. Further, the study integrated analysis proposes that infrastructure development could only be highly active to combat poverty. Finally, The work is a joint output of the Finance, Private Sector, and Infrastructure Department and the Office of the Chief Economist, Latin America and the Caribbean Region and part of a larger effort in the region to evaluate the impacts of infrastructure increase.

Harry and Dennis (1997) looked at the variability of regional models connected to infrastructure efficiency. Their research used spatial lags of certain independent variables, dependent variable and spatial connexion of the error terms, overall patterns of heteroscedasticity and of time series autocorrelation, and systems problems. Their findings powerfully advocate that regional infrastructure productivity involves four-dimensional spill overs connected to both noticeable variables and error terms. The works also submit that conforming quantity estimates are very sensitive to model stipulations.

Lucia, Antonio and Jose (2012) used spatial arithmetic practices and a micro-level data base to evaluate the impact of Madrid's metro line 12 expansion on business location patterns. The study was held at the municipality of Alcorcon, known as the new metro line from 2003. Objectively, the study reconnoitre the location decorations of different industrial sectors and investigated how new metro line has invigorated the appearance of a "Metrosur spatial economy". Their findings proved that the style of economic activity position is connected to urban accessibility and that agglomeration, with the support economies of scale which also frolicked an important role. Conclusively, outcome of this study offered from the analysis proved indicated advantageous to inform proficient transportation, urban, and regional economic planning.

Diana and Eustaquio (2001) researched the relationship between infrastructure growth and population growth in the Amazon through the application of293 rectangle data of cities that constituted amazon in the middle of 1975 to 1985. Vigorous, their analysis proved that strong and positive association between infrastructure and urban population could not designate course of connexion. On the analysis and modification form of the outmoded granger causality, the result concluded practically that the hypothesis which suggested that the rising city populaces brings about more infrastructure development, instead of vice versa.

In the alpine cities, Christian, Peter, Robert, Manfred and David (2013) concentrated on the growth of the urban environment and water system, the studies embraces space and time while in numerous examination cases, stochastically were obtained by a way of the virtual infrastructure cut of point approach grown over time. According to them, many situations for the growth of the urban environment and water system are mathematically appraised. They continued and stressed that intensification of rainfall strengths of lesser than 10% which was identified as critical for the performance of the combined sewer systems as created studied. That dangerous point in the time line of system performance can be notorious. They opined that the built-up water systems were controlled by trade gravity cause to the effect of climate change, population growth and growth. According to them, by the virtue that makes the urban water systems more adaptable to these challenges, calls for new water management strategies that must be developed. In order to extend their knowledge of these interactions at the city scale and to identify possible transition, strategies need to enhance the development of a potential planning tool called proposed.

II. METHODS AND PROCEDURE

The survey research strategy was used for this study. This method of design empowers the researchers to obtain data from residents and group of people through questionnaires, interviews, or environmental observational techniques for the purpose of analysis and subsequent interpretation. The population of the research comprised of residents of different income neighbourhoods in Port Harcourt metropolis Nigeria. A multistage sampling practice was employed and for fair allocation of figures, the stratified proportionate allocation formula was adopted using Jorgen's (2005) proportional allocation formula. However, stratified random sampling technique was employed to stratify the neighbourhoods after which only eight (8) neighbourhoods were selected for the work.Therefore,409 copies of questionnaires were distributed to the permanent residents in the eight (8) selected neighbourhoods of different densities while three hundred and ninety (390) representing 82% were reverted in Port Harcourt city local government. The examination/research shared 140 prints of questionnaire representing (40%) for the higher density, 130 copies representing (35%) was allocated for medium density whereas 120 (25%) duplicates was rationally allocated for low density of the sample size. The questionnaire distributed to the selected densities consisted of two section – A and section B. Section A sought to tap bio and demography data such as length of residency, religion and educational status. Section B contained (14) items, rated on the 4-point rating scale of **strongly Agreed = 4, Agree =3, Disagree =2, strongly Disagree =1,** with a minimum score of 15 and a maximum score of 63, with a range of 47, and a mid-point of 23.See table 1 below.

Table 1: Different Income Neighbourhoods sampled with populations density

S/N	Class	Neighbourhood	Projected population	Household population	Sample size	%
1	Low income	Diobu port harcourt	159,384	18,549	65	23%
2		Bundu waterside	94,209	14,602	55	11%
3		Ribisi waterline	23,805	3,403	20	6%
4	High income	Biraba (G R A)	14,143	4,038	80	17%
5		Government house	10,575	2,213	40	8%
6	Medium	Elekahia	30,878	5,813	55	20%
7		Ogbunabali	35,781	7,105	45	10%
8		Rumuogba	21,309	1,983	30	5%
	TOTAL		**390,084**	**57,706**	**390**	**100%**

Field survey 2020

Study Area: The study was held in Port Harcourt city local government, one of the most populated local governments suffering pressure in Nigeria. The local government shared boundary on the north by Obio/akpor and on the Eleme and Okirika local government. The good people of Port Harcourt city are mostly land owners while few of them are involved in government monthly paid job. There have been developed and obsolete infrastructural facilities in the place for a time immemorial. The inhabitants of the local government sensed that their infrastructural facilities would have accommodated the escalated population due to the presence of democratic government in the place. The research enclosed the four cardinal points of port Harcourt district as described in figure 2 which cuts across different neighbourhood like elekahia, ogbunabali, rumuogba and rebisi etc.

III. RESULT AND DISCUSSION

Effect of Population Pressure on Neighbourhood Infrastructure/facilities

The analysis of standardized coefficient (beta) regression revealed the effect of population pressure on urban infrastructural facilities in Port Harcourt metropolis. On extraordinary opinion of this research, the analysis demonstrated (R^2 = 0.978, effect at 0.01) explaining 97.8% effect of population pressure on urban infrastructure. Then Adjusted R2 = 0.976, indicates 97.6% confidence expectation

of population pressure effect on urban neighbourhood infrastructure (portable water facility/, electricity, educational facility, housing infrastructure and transportation/pedestrian infrastructure).

Population Pressure on Electricity:

The analysis proved that population pressure has effect on urban neighbourhood power supply in Port Harcourt urban [β =1.042; t = 7.642; ρ = 0. 000 (< 0.01 population effect). This suggests that as the neighbourhood population increases, the infrastructure remains stagnant. The ecumenical consequence stressed that neighbourhood electricity transformers built on the capacity of supplying power to only 15,000 residents or household, now accommodate 45,000 household, this drops quality power supply or electricity system and subjected the neighbourhood to enormous low frequency electricity which hinders mass productions, causes dismissal and unemployment of residents by district industries that could not generate adequate power for industrial productions as a result of population pressure on electricity supply. The pressure elicits the erection of buildings near high voltage above power transmission lines and responsible for higher demand of additional energy and increasing mega wart in currently required in Port Harcourt and beyond. This demonstration predicts that 25%increases in neighbourhood population are prone to 1.062 (2%) increases of quality electricity consumption and proved pressure on available power supply.

Water Facility/Infrastructure:

The analysis on the effect of population pressure on neighbourhood quality and quantity portable water supply had a correlation coefficient of [β =1.031; t = 2.978; ρ = 0. 000 (< 0.01 significant effect)] in Port Harcourt neighbourhood. This proposes that population pressure have denied Port Harcourt residents access to safe, potable and adequate water supply crucial to human health . In furtherance, the research illustrated that both eminence and quantity of water supply are currently inadequate in the neighbourhoods while the natural water bodies that would have serve as an alternative in absence and shortage of built quality water infrastructure were polluted by human pressure through the means of open defecation and discharge of solid, liquid and gaseous waste. These challenges subjected the residents of Port Harcourt neighbourhood into consumption or taking of water that never pass the necessary test of quality drinking water. It also indicates that increase in only1.041 (2%) of government added and provided quality water in the neighbourhood, attract 5,000 residents that compete to fetch and consume the drop of quality water available in the neighbourhood caused by population pressure.

Institutional Facility/Infrastructure:

The analysis interpreted that population pressure has strong effect on neighbourhood educational facilities or infrastructure and gave a correlation coefficient of [β = 0.111; t = 2.926; ρ = 0. 006 (< 0.01 significant effect)]. This succumbs that overpopulation poses high stress on educational facilities such as buildings, classrooms, laboratories, and equipment- education infrastructure of which most neighbourhood schools operate on shifting manners as against educational standard in Nigeria. These entire population problems make quality educational systems substandard, increase school dropout, increase facility obsolete and unhealthy learning environment in the neighbourhood. It indicates that common one per (0.151) increase of the neighbourhood educational facilities is available to 25% increases of the neighbourhood population using it for academic purposes.

Housing Infrastructure:

The understanding on the attachment of population pressure and infrastructure retained the measurement of [β = 0.132; t = 2.298; ρ = 0. 028 (< 0.05 significant level)] in Port Harcourt neighbourhood. The indication is that 1% increase in housing infrastructure is prone to more than (25%) increase of the residents' population that competing for it on daily basis. In furtherance, population pressure in Port Harcourt urban has made shelter the highest and serious challenge currently confronting the entire residents. Therefore, the region is characterised by high occupancy ratio, substandard neighbourhoods and poor-quality housing units, slum, squatters' settlement, sky priced houses, uncompleted residential houses, kiosk and caravans residential houses and development of residential houses on swampy, water logged and marsh zones. However, the high birth rate and high rate of rural-urban influx are behind the population pressure that causes flooding disasters, collapsing of buildings, and other social problems associated with Port Harcourt neighbourhoods and beyond.

Transportation/Pedestrian Infrastructure:

The analysis on the effect of population pressure recorded the measurement of [β = 0.121; t = 2.978; ρ = 0. 005 (< 0.01 significant effect)]. This suggests that 3 kilometres constructed or rehabilitated neighbourhood road attracts more than 15,000 vehicles per hours while pedestrian walks are subjected to display of commercial goods as well as mini Markets together with wide spread of hawkers and baggers. Population pressure remains the originator of on street parking, designation of parks and loading of goods and services along the high ways and streets, destruction and disobedient of roads signs etc. Furthermore, the analysis suggests that 1.121 (2%) increases and pavement of any of any neighbourhood road, attracts more than 5,000 vehicle populations, road side mechanics and on street parking and hawkers etc.

Waste Disposal Facilities/Infrastructure:

The effect of population pressure on waste disposal facilities measured [β = 0.125; t = 2.976; ρ = 0. 005 (< 0.01 significant effect)]. The implication is that population pressure over burden planned waste disposal infrastructure or facilities in

port Harcourt urban, thereby encouraging improper disposal and littering of waste in streets and neighbourhood environment. On the long run, portrays negative consequences on human health, deface and reduced environmental aesthetics and promote the pollution of land, air, water, soil etc. known to be the last destination of all residential, commercial, agriculture, industrial and institutional generated waste in port Harcourt and beyond sub-Saharan Africa. Finally, It indicates that (2%) in waste disposal facilities accommodate more than 15,000 households in Port Harcourt. See table 3 and 4 below

Table 3: urban neighbourhood infrastructural facilities and population pressure effect.

R^2 = 0.978 F – cal = 354.357	
Adjusted R^2 = 0.976	P = 0.000
Standard error = 4500.34356 significant = 0.01	α

Source: SPSS Scrutiny 2020

Table 4: urban population and infrastructural variables

Facilities	Std coefficient (β)	T	P	α Sign	Comment
Electricity (X1)	1.062	7.642	.000	>0.01	Significant effect
Water (X2)	1.041	2.978	.005	>0.01	Significant effect
Education (X3)	1.151	2.978	.006	>0.006	Significant effect
Housing (X4)	1.132	2.926	.0028	>0.0028	Significant effect
Transport (X5)	1.121	2.298	.005	>0.05	Significant effect
Waste (X6)	1.143	2 .754	.000	>0.001	Significant effect

Source: SPSS Scrutiny 2020

Dissimilarity of Population pressure on Port Harcourt Neighbourhood infrastructures

The percentage calculation or analysis conducted in respect to population pressure effect on neighbourhood infrastructural facilities, proved strong variations in various and currently developed district or layout excluding the Port Harcourt government house. Therefore, the analysis available in table 4, reiterated that the respondents or residents of various district of Port Harcourt urban, pointed out that the effect of population pressure on infrastructural facilities continue to be rampant in Port Harcourt urban but absent in neighbouring rural communities where rural-urban exodus gave access to existence of fallow lands purposely used for agrarian practices without contest or competition. In furtherance, the investigation stressed that all the infrastructural facilities in Port Harcourt metropolis are presently prone to population pressure. Consequently, residential neighbourhood recorded (25%) mathematical percentage value and marked the highest infrastructure or facilities under population pressure neighbourhoods. Others are transportation infrastructure (20%), commercial (18%), and industrial (15%).Also measured are institution (10%), agriculture (05%) and recreational facilities (07%).This implies that in Port Harcourt architecture, urban planning and physical development, all the infrastructural facilities that enhance functional, effective and aesthetics environment are under population pressure but housing and transportation facilities experience the highest and escalated population pressure. The reason is that users of other neighbourhood infrastructural facilities contend and consider housing and transportation paramount for the sustainability of residents and urban development. See table 4 below.

Table 4: dissimilarity of population pressure within the neighbourhood infrastructure

S/N	Infrastructure/facilities	Population pressure (%)	Environmental observation/ comment	Metro-rank
1	Commercial	18%	Severe population pressure	3
2	Industrial	15%	Severe population pressure	4
3	Agriculture	05%	Under population pressure	7
4	Residential	25%	Severe population pressure	1
5	Institutional	10%	Severe population pressure	5
6	Recreational	07%	Under population pressure	6
7	Transportation	20%	Severe population pressure	2
	TOTAL	**100%**		

Authors field work 2020

IV. CONCLUSION

The growth and pressure of population on neighbourhood infrastructure facilities stood as a critical challenge for social, economic, environmental and urban liveability across the populated nations of the world including Nigeria. Vehemently, the article pursued effect of population pressure on Port Harcourt neighbourhood Nigeria. The analysis held by the research observed that infrastructural facilities (electricity, housing, institutional, transportation, water and waste disposal facilities) accessible in Port Harcourt urban are under population pressure and population pressure on these infrastructures varies in seven different facility facets namely: residential neighbourhood facilities, transportation infrastructure, commercial, industrial, institution, agriculture, and recreational facilities which explained 100% statistically.

V. RECOMMENDATION

1. The research endorsed for a review of the initial neighbourhood threshold population in Port Harcourt Nigeria through the national population commission, to identify the number or figure of population in the increase and built more infrastructural facilities commensurate to the present population of the neighbourhoods under pressure and improve the existing conditions or qualities of the same neighbourhoods through urban renewal projects or urban improvement plans.
2. The paper suggested for planning and development of new commercial, industrial, institutional, residential and other neighbourhood layout within Port Harcourt urban to decongest all the existing neighbourhoods from all sought of population pressure affecting all the facets of infrastructures built to accommodate initial population without future prediction.
3. The study further proposed the upgrading of all the local government areas in river state to satellite township standard with the necessary infrastructural facilities and quality security architecture. so that majority of local government staff and officials residing in urban neighbourhoods the administrative headquarters of the state can relocate to their locality of primary assignment and enjoy the presence of infrastructures.

REFERENCE

[1]. Asoka, G. W., Bunyasi, M. M., &Thuo, A. D. M. (2013). Effects of Population Growth on Urban Infrastructure and Services: A Case of Eastleigh Neighborhood Nairobi, Kenya. http://hdl.handle.net/123456789/2047.

[2]. Christian Urich, Peter M. Bach, Robert Sitzenfrei, Manfred Kleidorfer, David T.(2013) Modelling cities and water infrastructure dynamic Proceedings of the Institution of Civil Engineers - Engineering Sustainability 166 (5) 301-308.

[3]. Catherine Cross (2001) ‘’Why Does South Africa Need a Spatial Policy? Population Migration, Infrastructure and Development’’ Journal of Contemporary African Studies, 19(1) 1-18.

[4]. Craven, J. E. H., and R. Goulding (2014) Population growth and infrastructure development in Melbourne, The Sustainable City IX, (1) 509, 1-12.

[5]. Diana Weinhold, Eustaquio J. Reis. (2001)’’ Model Evaluation and Causality Testing in Short Panels: The Case of Infrastructure Provision and Population Growth in the Brazilian Amazon’’ journal of regional science 41 (4) 639-657.

[6]. Harry, H. K., Dennis, P. R. (1997) Infrastructure Productivity Estimation and Its Underlying Econometric Specifications: A Sensitivity Analysis, Regional Science, 76 (1) 115-131.

[7]. John noronha and Andrew Rossiter(2012)’’Implications of Population Growth on Infrastructure and Resources in Regional Cities’’ 2012 final Report Prepared for Regional Cities Victoria, 1 -118.

[8]. Jorgen, L.(2005)’’Proportional Allocation via www.Zerorisk’’

[9]. Lucia, M.D., Antonio, P., and Jose, M. V. (2012)Transportation infrastructure impacts on firm location: the effect of a new metro line in the suburbs of Madrid, Journal of Transport Geography 22,236-250.

[10]. Martin, W. D., and David, G. H.(2009)’’ Home Annual Review of Environment and Resources’’ 34, 349-373.

[11]. Marlon, G. B.(1998) Spillovers and the Locational Effects of Public Infrastructure 38 (3) 381-40.

[12]. Mehmet, Y. K.,andAldonat, B. (2011) Infrastructure, Economic Growth and Population Density in Turkey International Journal of Economic Sciences and Applied Research 3, 39-57.

[13]. Nmaculada, C. Á., Ángel, M. P., and José L. Z.(2014) Cost Efficiency, Urban Patterns and Population Density When Providing Public Infrastructure: A Stochastic Frontier Approach, European Planning Studies, 22 (6) 1235-1258.

[14]. Peter Heller (2010) ‘’People and Places: Can They Align to Bring Growth to Africa’’ Centre for global development essay’’

[15]. Sabyasachi, T.,(2017)’’ Relationship Between Infrastructure and Population Agglomeration in Urban India: An Empirical Assessment ‘’ Asian Development Bank Institute working paper series No. 731, 1-29.

[16]. The Effects of Infrastructure Development on Growth and Income Distribution. Policy research working paper. https://doi.org/10.1596/1813-9450-3400.