

Analysis of Access to Social Infrastructure in Rural Imo State, Nigeria

Ikenna Osumborogwu^{1*}

¹*Department of Geography and Environmental Management, Imo State University, PMB 2000,
Owerri, Nigeria.*

Author's contribution

The sole author designed, analyzed and interpreted and prepared the manuscript.

Article Information

DOI: 10.9734/JGEESI/2016/27675

Editor(s):

(1) Umberta Tinivella, Istituto Nazionale di Oceanografia e di Geofisica Sperimentale , Borgo Grotta Gigante 42C, 34010
Trieste, Italy.

Reviewers:

(1) Eva Haslauer, University of Salzburg, Austria.
(2) Jephias Mapuva, Bindura University, Zimbabwe.

Complete Peer review History: <http://www.sciencedomain.org/review-history/15754>

Short Research Article

Received 13th June 2016
Accepted 5th August 2016
Published 11th August 2016

ABSTRACT

Yearly, the federal and various state governments allocate stated amounts of money in their annual budget to capital projects. Most of these projects involve renovation or development of new infrastructural facilities. Availability of infrastructure in contrast to accessibility is often addressed in academic discourse, but one pertinent question remains, what is the use of an available social infrastructure if it cannot be accessed? This paper aims at analysing access to social infrastructure in contrast to availability in rural areas of Imo State, Nigeria. Questionnaire survey method and oral interviews were used to collect data on identified indices of accessibility to social infrastructure, income/affordability. Three variables of social infrastructure were used in this study; health care facilities, schools and leisure centres. Linear regression model of data analysis was used to analyse the relationship between access to social infrastructure and income level of respondents. The result shows a strong positive relationship between income and access to social infrastructure. This indicates that an increase in income brings about a commensurate increase in accessibility to social infrastructure.

Keywords: Social infrastructure; availability; affordability; accessibility; rural Imo State.

*Corresponding author: E-mail: osumborogwu.ikenna@gmail.com, i.e.osumborogwu@imsu.edu.ng;

1. INTRODUCTION

Infrastructure generally refers to those basic and primary services and systems required in the process of development whose availability and accessibility bring positive effects in the lives of citizens. Different authors define infrastructure to fit properly with the aim of the research involved. For this work, infrastructure is defined as the stock of capital that supports transportation, communications and basic services such as water and power supplies [1]. In Nigeria, the rural areas show obvious signs of neglect in the provision of infrastructure, and this could be as a result of remoteness or low population density [1] or sheer negligence on the part of government. This attitude is often implicated in the rural-urban migration syndrome witnessed in Nigeria today. This scenario poses a serious challenge as the agglomeration of people to towns and cities has been witnessed and the rate of urban population growth has exceeded overall population growth in Nigeria [2,3]. The provision and regular maintenance of infrastructural facilities is not the exclusive reserve of the government in Nigeria. However, it has been observed by researchers that while it is possible that private individuals could own infrastructure, they are licensed by public authorities [4].

Different authors have classified infrastructure into groups, such as, physical and social, [5], economic and social, [6] as well as technical and social infrastructure, [4]. This study focuses on accessibility to social infrastructure which refers to the social environment, [5]. They can be defined as a variety of built structures and public utilities that are considered necessary for the physical well-being, health, comfort and overall development of the population, [7], which include schools, libraries, universities, clinics, hospitals, courts, museums, theatres, playgrounds, parks, fountains and statues [6]. Some authors [1] refer to social infrastructure as quality of life infrastructure, thereby emphasising the importance of this subsector of infrastructure to the wellbeing of the masses.

A look at our society reveals that accessibility to infrastructure is not within the reach of many. A lot of specialist hospitals exist but only a small proportion of the society has access to them. Recreational facilities exist in some cities, but the rural areas are almost left out in the provision of this social infrastructure. In the cities where they exist, some urban dwellers do not visit such places. With the instances enumerated so far, it

could be said that a number of factors are responsible for the inaccessibility to these facilities. It is likely that the level of income of people which in turns determines affordability of goods and services play a role in their ability to access available social infrastructure. It is true that infrastructural facilities are provided for the good of all, and it is established also that citizens should access these infrastructural facilities where they are available, but the issues are as follows; 1) Is this ideal condition of accessibility achieved in reality? 2) Does everyone living in an area where infrastructural facilities are available have access to them? 3) Could it be possible that income level of individuals determines their abilities to access social infrastructure?

1.1 Aim and Objectives

The aim of this study is to analyse access to social infrastructure in the rural areas of Imo State, Nigeria. The following objectives are adopted to achieve this: a) identifying available social infrastructure in the study area, b) ascertaining the conditions of assessing these facilities and c) establishing the relationship between accessibility to social infrastructure and level of income of respondents.

1.2 Hypothesis

It is hypothesised that there is no relationship between personal income, and access to social infrastructure in the study area.

The rest of this paper is organised as follows: section two presents a review of literature, section three, deals with the methodology, section four discusses the findings of this work and conclusions are drawn in section five.

2. LITERATURE REVIEW

From work completed in Mawson Lakes and Caroline Springs Victoria, both in Australia, [5] found that physical and social infrastructure can facilitate or impede the development of community and social capital by the way it enables people to come together. This is true for adequate infrastructure improves capability and offers opportunity to develop social ties and become a part of multiple social networks. On the other hand, when the infrastructure is not adequate, this opportunity is discouraged thereby hindering social networking.

The role of telecommunications (a subsector of social infrastructure) has been studied within the

contexts of rural development and poverty reduction in Bangladesh [8]. The author found that the services emanating from Village Pay Phones (VPP) are likely to deliver (even) more benefits to the poor than to the non-poor.

2.1 Infrastructure and Economic Performance/Growth

The relationship between infrastructure provision/availability and the economic development of a region as well as poverty reduction has been identified by scholars [7,9,10]. The relationship between five infrastructural subsectors namely telecoms, water, road, electricity, sanitation and growth in terms of GDP per capita was studied in 16 countries in East Asia [11]. They found that infrastructure subsectors across the board have a positive and significant impact on growth in East Asia, and are shown to be statistically significant engines of growth. The authors thus concluded that greater stocks of infrastructure were associated with higher growth, proxied by GDP per capita for the period 1985 to 2004. In contrast to this study, [12] used both a growth accounting framework and cross-country regressions to study whether infrastructure investment has contributed to East Asia's economic growth. They found that the adopted methods failed to identify a significant connection between infrastructure, productivity and growth. The authors concluded that results from studies using aggregate data lack robustness, and different techniques (production function, growth regressions, growth accounting) produce very different results, even when looking at similar set of countries.

Commenting on the relationship between public infrastructure and growth [13] suggested that public infrastructure can affect economic growth by indirectly improving productivity of workers, in addition to the direct effect on the productivity of labour used as input in the production function. Secondly, they could facilitate adjustment costs connected with private capital formation and its mobility to relatively more profitable activities. Finally, the authors suggested that public infrastructure could improve health and education output, as well as consolidate its effects on growth. Another research by [14] on interstate highway construction (a public infrastructure) and development at county level in the United States found that certain industries grow as a result of reduced transportation costs,

whereas others shrink as economic activity relocates. Furthermore, the authors concluded that interstate highway construction increased the level of economic activity in the counties they pass directly through, but draw activity away from adjacent counties.

Ogun [3] adopted the structural vector autoregressive (SVAR) technique in an effort to study the relationship between infrastructure investment and poverty reduction in Nigeria. The author found that government fiscal policy that focuses on improvement of social infrastructure will go a long way in reducing the poverty level in the country. Further analysis by the author indicated that investment in social infrastructure has greater potential to reduce poverty than investment in physical infrastructure in Nigeria.

Research conducted by [15] concluded that investment in rural infrastructure can lead to higher farm and nonfarm productivity, employment and income opportunities, and increased availability of wage goods, thereby reducing poverty by raising mean income and consumption. The authors went further to suggest that roads appear to have strong indirect and direct effects on poverty reduction. They are of the view that these effects are even clearer when roads are combined with complementary investments, such as schooling.

Research on the relationship between infrastructure and regional economic development in rural China, [16] found that rural infrastructure and education play significant roles in explaining the difference between rural nonfarm productivity and agricultural productivity. They suggested that since rural nonfarm economy is a key determinant of rural income, greater investment in rural infrastructure is crucial for an increase in overall income of the rural population. The authors also were of the opinion that lower productivity in the western region of the study area was explained by its lower level of rural infrastructure and education.

Narayanamoorthy and Hanjra [17] adopted descriptive and regression analyses to study the relationship between rural infrastructure development and agricultural output for 256 Indian districts, drawn from 13 states at three time points: 1970-71, 1980-81 and 1990-91. They established strong linkages between rural infrastructure development and value of agricultural output among the districts studied.

Snieska and Simkunaite [6] studied the impact of three subsectors of infrastructure (transport, communications and sanitation) on development in the Baltic States: Lithuania, Latvia and Estonia over the period 1995-2007. Their results showed that in Lithuania, the only positive impact on GDP per capita was from transportation sub-sector. The relationship between telecom and sanitation subsectors and GDP per capita was negative. The situation was different in Latvia and Estonia where transportation and telecommunication sectors had strong correlation with growth while sanitation sector had negative trend line in both countries. The authors thus concluded that statistical measurement of relationship between infrastructure and economic growth determinants in the Baltic States proved that several variables were not enough to evaluate the impact of infrastructure on development. They advocated further research in the creation of a model for the evaluation of infrastructure impact on the development trends of countries.

From the literature review so far, one finds that the relationship between infrastructure availability and the economic productivity of the populace abound. However, there is limited published research as regards accessibility to infrastructure in contrast to availability, furthermore, adequate attention has not been paid to the determinant factors of infrastructural accessibility in published literature. It is important to address these issues considering the fact that certain infrastructure could be available, yet, inaccessible to some people due to one factor or another. This paper attempts to contribute to knowledge in the study of social infrastructure by addressing this existing gap in the published literature.

3. METHODS AND DATA

In an attempt to understand the relationship between income and access to social infrastructure, questionnaire and oral interviews were adopted for this study. These constituted the primary sources of data while published work served as secondary data. A total of 100 copies of the questionnaire were administered to household heads in the study area. The reason for singling out this set of individuals was because of the role they play in the provision of needs of family members, thus, children were

excluded in the distribution of questionnaire. The household heads comprised both men and women. Of the 100 identified respondents, 81 correctly filled and returned their questionnaire, thus representing 81 percent of the sampled population. Collation of data was done using tally system. Three variables of social infrastructure were used in this study, they include health care facilities (hospitals, pharmacies, dispensaries, traditional medicine and others), schools (representing educational facilities) and leisure centres. The relationship between these identified subsectors of social infrastructure and income was tested using Linear Regression Model of data analysis as represented in Equation 1.

$$Y = mx + c \tag{1}$$

Where m = coefficient of variable
 x = independent variable
 c = constant
 y = dependent variable

4. RESULTS AND DISCUSSION

A total of five government owned primary schools, two health centres, five private hospitals and many leisure destinations were identified in the study area. The number of private primary and secondary schools could not be ascertained as almost all churches within the area of interest have their primary schools, some proprietors also run primary schools in their homes. Whether these establishments are all government approved could not be ascertained. In Equation 1, the income level of respondents is given as the dependent variable, Y, while the independent variables are represented as X. The regression model lumped access to health facilities, educational facilities and leisure centres as the independent variables. The outcome of the analysis is shown in Tables 1(a) and 1(b).

Table 1a. Social infrastructural variables used for this study

Model	Variables entered
	Leisure centres
	Educational facilities
	Health care facilities

Table 1b. Model summary

Model	R	R square	Adjusted R square	Std. error of the estimate
	.929	.863	.856	6636.23091

With the overall coefficient, r , as .929, it indicates that personal income has a very high positive relationship with the three independent variables. This means that increase in personal income motivates a person's access to social infrastructure. The coefficient of determination, r^2 is .863. The implication is that personal income explains 86.3 percent of the variance in a person's accessibility to social infrastructure in their environment. This leaves a residual of 13.7 percent. The inference is that other variables not included have 13.7 percent influence on personal income. In conclusion, the model can be defined as;

$$Y = 0.929x - 0.05 \quad (2)$$

The scree plot of the line of best fit of the regression model is shown in Fig. 1. It should be recalled that it was hypothesised that there is no relationship between personal income, and access to social infrastructure. Using the student "t" – test to test the hypothesis, it is found that the t – statistic is 22.310 and the critical value at 95 percent confidence limit at 79 degree of freedom is 1.658. Since the critical value is less than the t – statistic, the null hypothesis is rejected. It is therefore affirmed that there is a relationship between personal income, and access to social infrastructure. This indicates that an increase in income brings about a commensurate increase in accessibility to social infrastructure. On the other hand, a decline in the income level results in a drop in accessibility to social infrastructure, thus, access to social infrastructure is dependent on the income level of individuals.

This is so because adequate income assures that the affordability of required social infrastructure is guaranteed. This explains why a certain ratio of the society is not able to patronise some specialist hospitals, send their children and wards to model schools as well as shy away from visiting some luxury parks and recreation centres available in the country. Table 2 contains the individual relationship between the independent variables and the dependent variable. Table 2 illustrates that access to health care (Beta

coefficient .493) and educational facilities (Beta coefficient .204) have higher positive correlation with income than access to leisure facilities (Beta coefficient .119). This indicates that people rather spend their income on their health and the educational upbringing of their wards than they do in leisure activities. The explanation, with respect to leisure, is that an individual opts for leisure after they have provided for education and health. It is therefore concluded that in terms of the behaviour of people in the study area, they order their priorities. This explains why leisure has the lowest coefficient of .119 which symbolises weak positive relationship.

The ensuing model emanating from the statistics in Table 2 is defined by;

$$Y = .493x_1 + .204x_2 + .119x_3 - 9836.717 \quad (3)$$

Where x_1 = Health care facilities
 x_2 = Educational facilities
 x_3 = Leisure centres

Normal P-P Plot of Regression Standardized Residual

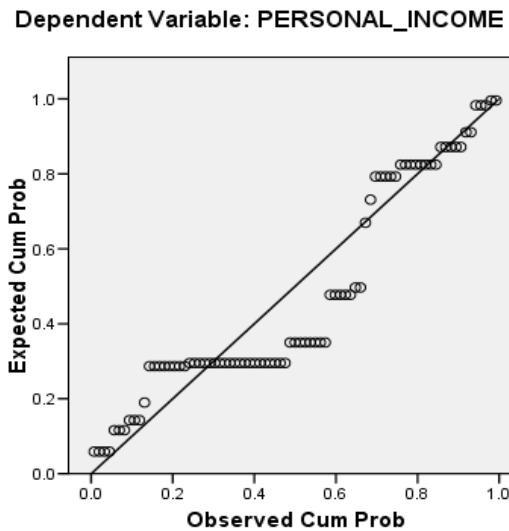


Fig. 1. Line of best fit of regression model

Table 2. Beta coefficients of the independent variables

Variables entered	Beta coefficients		
	Unstandardized coefficients (b)		Standardized coefficients (β)
	B	Std. error	Beta
(Constant)	-9836.717	3232.774	
Health care services	782.163	171.240	.493
Educational facilities	546.758	248.995	.204
Leisure	209.719	159.965	.119

5. CONCLUSIONS

This study set out to identify the relationship between access to three social infrastructural facilities; educational, health care and leisure centres and the income level of respondents. The Linear Regression Model of data analysis was adopted for this study and Section 4 illustrates there is a strong relationship between these identified variables and income. This is similar to the results of [11] who suggested that countries with higher income levels have better rates of access to infrastructural services. The analysis shows that access to social infrastructure is highly dependent on an individual's income. The symbolic model (see Equation 3) is indicative that positive relationship exists between income and health care, income and educational facilities and income and leisure.

ACKNOWLEDGEMENTS

The author is grateful to respondents who agreed to have oral interviews to support the responses provided in the questionnaire, as well as field assistants who supported in the distribution of the questionnaire.

COMPETING INTERESTS

Author has declared that no competing interests exist.

REFERENCES

1. Blandford D, Boisvert RN, Davidova S. Infrastructure and rural development: US and EU perspectives infrastruktur und entwicklung des ländlichen raums: Perspektiven aus den USA und der EU Infrastructures et développement rural: Perspectives aux États-Unis et dans l'Union européenne. *Euro Choices*. 2008;7(1):52-59.
2. DFID 'What is pro-poor growth and why do we need to know?' Pro-poor growth briefing note 1. London: DFID; 2004.
3. Ogun TP. Infrastructure and poverty reduction: Implications for urban development in Nigeria. In *Urban Forum*; Springer Netherlands. 2010; 21(3):249-266.
4. Bigotte JF, Antunes AP. Social infrastructure planning: A location model and solution methods. *Computer-Aided Civil and Infrastructure Engineering*. 2007;22(8):570-583.
5. Williams P, Pocock B. Building 'community' for different stages of life: Physical and social infrastructure in master planned communities. *Community, Work & Family*. 2010;13(1):71-87.
6. Snieska V, Simkunaite I. Socio-economic impact of infrastructure investments. *Inzinerine Ekonomika-Engineering Economics*. 2009;3:16-25.
7. Uduku NO. Promoting community based approaches to social infrastructure provision in urban areas in Nigeria. *Environment and Urbanization*. 1994; 6(2):57-78.
8. Bayes A. Infrastructure and rural development: Insights from a Grameen Bank village phone initiative in Bangladesh. *Agricultural Economics*. 2001;25(2-3):261-272.
9. Gunatilaka R. Rural infrastructure programmes for poverty reduction policy: Issues from the Sri Lankan experience. Regional consultation for WDR2001 for South Asia, on poverty reduction and social progress: New trends and emerging lessons, at Rajendrapur, Bangladesh; 1999.
10. Satish P. Rural infrastructure and growth: An overview. *Indian Journal of Agricultural Economics*. 2007;62(1):32.
11. Seethepalli K, Bramati MC, Veredas D. How relevant is infrastructure to growth in East Asia? *World Bank Policy Research Working Paper Series*; 2008.
12. Straub S, Vellutini C, Warlters M. Infrastructure and economic growth in East Asia. *World Bank Policy Research Working Paper Series*; 2008.
13. Agénor PR, Moreno-Dodson B. Public infrastructure and growth: New channels and policy implications; 2006. Available at SSRN 2005043
14. Chandra A, Thompson E. Does public infrastructure affect economic activity? Evidence from the rural interstate highway system. *Regional Science and Urban Economics*. 2000;30(4):457-490.
15. Ali I, Pernia EM. Infrastructure and poverty reduction-what is the connection?; 2003.

16. Shenggen FAN, Zhang X. Infrastructure and regional economic development in rural China. *China Economic Review*. 2004;15(2):203-214.
17. Narayanamoorthy A, Hanjra MA. Rural infrastructure and agricultural output linkages: A study of 256 Indian districts. *Indian Journal of Agricultural Economics*. 2006;61(3):444.

© 2016 Osumgborogwu; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Peer-review history:
The peer review history for this paper can be accessed here:
<http://sciencedomain.org/review-history/15754>