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RESEARCH ARTICLE

An Assessment of The Adequacy of Public Infrastructure in Enugu Urban

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ABSTRACT

This study aimed at assessing the adequacy of public infrastructure in Enugu Urban, Enugu State, Nigeria. Study objectives were to identify and determine the adequacy of public infrastructure in the area and the challenges affecting its provision. Survey research design was employed to reach all respondents. Using purposive, stratified and simple random sampling techniques, a total number of 400 respondents were selected in three areas of Enugu Urban that is, Trans-Ekulu (Enugu East LGA), Ogui-Enugu (Enugu North LGA) and Awkunanaw (Enugu South LGA). Primary (questionnaires, oral interview and personal observation) and secondary (web pages, journals, magazines and government gazettes) data sources constituted data collection instruments for the study. Data were presented and analyzed using tables, percentages, means and the hypothesis was tested using Chi-Square test. The study revealed that roads, hospitals/clinics, pipe-borne water system, electric line and transformers, telecommunication, schools, open spaces and parks etc are the most prominent public infrastructure in the city. Challenges to public infrastructure provision as revealed from the study included corruption, financial constraints, lack of citizen involvement, unforeseen technical challenges, lack of visionary leaders, lack of coordination between central and regional levels, political interference among others. Result from the hypothesis show that challenges affecting public infrastructure provision in Enugu Urban are highly significant as the p value (.001) was less than the significance level (α) of 0.05. The study therefore recommended that the government through its appropriate agencies should embark on construction, expansion and rehabilitation of new and old infrastructure and facilities in Enugu Urban. This will help to augment the already dilapidating and over-burdened infrastructure within Enugu Urban.

Keywords: *Public Infrastructure; Enugu Urban; Financial Constraints; Political Interference; Community Facilities*

Introduction

Infrastructure is vital to the creation of sustainable cities (Sydney, 2023). It is also the basic physical and organizational structures needed for the operation and function of a society like industries, buildings, roads, bridges, health services, governance among others (Oyedele, 2019; Sulivan & Sheffin, 2023). Viewed functionally, infrastructure facilitates the production of goods and services and also the distribution of finished products to end-users. Infrastructure globally enhances national economic prosperity and there also exist a link between infrastructure planning, investment, competitiveness and productivity (Royal Town Planning Institute, 2018). The provision/governance of infrastructure which entails the planning, financing, contracting and building of the public physical infrastructure essential for economic and social activities is facing a somewhat paradoxical situation (Wegrich, Hammerschmid & Kostka, 2021). The question is therefore put forward: "who takes the blame for the infrastructural deficit facing cities of the world? "What are the challenges facing its planning and provision? "What roles do the public, organizations, professionals and governments play in infrastructural planning and provision and what can be done to improve infrastructural planning which culminates into effective and efficient provision?

In the advanced countries of the world like North America and Europe, infrastructure is no longer about just building roads and maintaining pipes in the ground. Infrastructure is now synonymous with quality of life for citizens and a city's ability to remain economically competitive (Community Trends Report, 2018; Wong & Webb, 2024). In the United Kingdom, through the 2011 and 2013 National Infrastructure Plans (NIP) (HM Treasury and UK Infrastructure, 2011; 2013), the UK coalition government identified over 500 projects worth approximately £250 billion to be delivered through public and private funds. This huge infrastructure deficit has been attributed to the lack of spatial expression of government policies and planning especially infrastructure planning (Wong, 2021). In Malaysia, infrastructure development received considerable boost pre and post-independence (Naidu, 2020). However, from the early 1990s due to resource constraints faced by public sector, the government has encouraged and facilitated private sector participation. In spite of recorded success, the formulation of medium-term plans, rigorous project evaluation, improved monitoring has been highlighted as areas that need further improvement to meet infrastructure needs.

Down south of the Sahara, governments have emphasized investment in urban infrastructure as a key strategic objective in economic growth and social development (Swilling, 2025). According to the Herti-OECD expert survey (2023) on country performance in infrastructure planning and management, countries in the continent had low ratings both for infrastructure planning and management. This is also evident as the continent showed a backward movement in terms of infrastructure provision especially technology-based (Elu, 2022). In South Africa, the government created at national level a mega-fund (Municipal Infrastructure Grant (MIG), charged with facilitating the investment of over R15 billion in municipal infrastructure over a three-year period starting in 2004/2005. As pointed out by Swilling (2025), the absence of a national sustainability development strategy in South Africa presents as the main reason why infrastructure planning has not been taken seriously and entrenched in infrastructure development. In Nigeria, the military era for the most part of the economic boom only succeeded in widening the gap in infrastructure demand and provision (Oyedele, 2019). Infrastructure and facilities in the country are decided on the spur of the moment without any conviction that their future expansion and sustainability are guaranteed (Udoudo & Udoidem, 2021).

In Enugu Urban, following a continuous increase in population and urbanization over the past few decades, infrastructure provision has been largely meager, inadequate and worrisome. Investments or government spending on infrastructure have often falling short of what would be beneficial in the medium and long term. Also, infrastructure delivery has become characterized by the 'iron law' (Flyvberg, Bruzelius and Rosengatter, 2018) of cost overruns and delays especially in Enugu North (the abandoned presidential hotel and the new secretariat building). From the foregoing, there is evidence of a disconnect between infrastructure provision and planning and demand for a more joint-up approach that proactively addresses the infrastructure needs of new development and the deficits of existing settlements in Enugu Urban. Without this, the study area will continue to struggle to reduce the productivity gap that exists relative to its developed counterparts, to adapt to environmental risks, to deliver the quality and quantity of infrastructure needed to make society functional and effective and to create healthy, sustainable urban environment. This study therefore was carried out in order to assess the adequacy of public

infrastructure in Enugu urban, Enugu State, Nigeria with a view to suggesting measures to increasing public infrastructure t meet the demands of the area. The study objectives focused on identifying the various public infrastructure in Enugu Urban and its adequacy in meeting demands, challenges facing its provision and viable recommendations.

Research Hypothesis

To arrive at veritable findings and conclusion, the under listed hypothesis was formulated. It would be tested at 0.05 significance level. Where the p-value is greater than the level of significance, the null hypothesis would be accepted and vice-versa.

The challenges of infrastructure provision are not statistically significant in Enugu urban.

Review of Related Literature

Conceptual Review

Public Infrastructure

Public' infrastructure is an investment where the government has the primary role in, and responsibility for, deciding on whether and how the infrastructure is provided in the interests of the broader community and on the source of the revenue streams to pay for the infrastructure over its life (Poole, Toohey and Harris, 2020. Public infrastructure may include roads, lighthouses, bridges and public monuments; piers, school, trains, water, sewerage, and electricity (Finkle, 2021). Thus, public infrastructure extends beyond infrastructure that is owned or directly funded by the public sector. For example, this definition would capture infrastructure assets and services owned and operated by the private sector, but where the government has created the overarching policy and regulatory framework, or possibly retains a contingent liability for the infrastructure assets and continued service provision.

Theoretical Underpinning

The diffusion theory by Edari (1976) which explains the technological imbalance and the need to adopt western technologies was adopted for the study. Edari (1976) utilizes diffusion theory to explain the process of less privilege societies' development. Diffusion is a process by which a third world country adopts capital, technology, and social structure from western industrialized countries. He argued that the developing countries would develop to the extent that: (a) Western industrialized countries provide capital programmes. (b) They adopt modern methods of agricultural and industrial production and (c) They adopt those values, attitudes and behaviour patterns that are exhibited by western industrialized nations. The people-centered approach to development views an individual not as a subject- 'but an actor who defines the goals, controls the resources, and directs processes affecting his/her life (Korten, 1984).

The key elements in this approach are provision of infrastructure through: (a) empowerment of people, (b) development of an administrative process, which responds to the needs of the people, (c) human growth and wellbeing, (d) equality, (e) self-reliance, (f) participation and (g) Sustainability. White (1987) argued that sustainability is a measure of lasting quality in development programme. An infrastructural development programme can be sustained by creating a felt need among beneficiaries about the efficacy of the programme, developing institutions which continually adapt, providing (or self-generating) resources and building support among political elite and community groups. This will ensure that public infrastructure serve to its life spans in Enugu Urban.

Infrastructure Planning and Development in Enugu State and Enugu Urban

The foundation for the sharp variation in the hierarchy and level of urban infrastructure provided in many Nigerian Cities was laid during the colonial period (Efobi and Anierobi, 2024). At that time, cities that served as administrative headquarters for the whites were given special attention and classification and Enugu Urban the coal city was one of them. Enugu Urban; the study area benefited so much from the colonial masters with regards to the provision of urban infrastructure and facilities because it served as an administrative headquarter for the Southern provinces. Available data show for instance, that it was at that time that the outline for the present transportation network in the city was put in place.

Trends in infrastructure planning and development in Enugu Urban will be discussed under 3 sub headings as follows: Community Infrastructure, Transportation infrastructure and Facilities and Public Utilities.

a. Community Facilities

These refer to those infrastructures and facilities which are provided for the benefit of an entire community. Some examples of community facilities that will be discussed here are educational and health Institutions.

Health Institutions

Enugu Urban has a comprehensive Health care delivery system. Data used for drawing up the Enugu Master Plan shows that in 1977 there were 59 medical facilities available in the city and 90% of them were privately owned. At that time, Enugu Urban had an average of 11,732 people per hospital and 143 people per hospital bed. By 1993, the number of health institutions in Enugu Urban had tremendously increased to about 137 (Enugu State Ministry of Health, 2020). This shows that the health institutions are increasing as the city grows. As a result of frequent strike actions by public health workers in the country, the numbers of privately-owned hospitals are now on the increase. Most doctors and other medical personnel established their own medical institutions. Private medical facilities can be seen scattered all over the city. However, the three most popularly used public Hospitals are the University of Nigeria Teaching Hospital, Park lane Hospital and Orthopedic Hospitals which are located some distance away from the majority of the urban population; for example, Parklane hospital is located at GRA, and UNTH near the Central Business District. This makes it difficult for people living in other parts of the city like Achara layout, Idaw River, Awkunanaw, Independence layout, Maryland, Thinkers' Corner to make effective use of them. People therefore tend to patronize the private clinics which are scattered all over the city. Efforts by the governments at improving public health care delivery over the years have also increased the number of health facilities to in the City to about a current total of 171 and these are at various levels of functionality.

Educational Institutions

The existing 6-3-3-4 educational system of the Federal Government of Nigeria is operational in Enugu Urban as is the case in other Cities in the country; namely the Primary school, Secondary school and the tertiary institutions. In 1977, there were 61 primary schools in Enugu Urban and by July 1985, the number had increased to 103. Presently there are over 175 primary schools in Enugu Urban due to government interventions and private school operators in the City. As at 1985, there were 22 Secondary schools in the city. At the moment, the number is about 118. This means that the number of these schools have been increasing with increase in the number of people that live in the city. Also, there were previously four tertiary institutions in Enugu Urban which include University of Nigeria Enugu Urban Campus, Enugu Urban State University of Science and Technology, Institute of Management and Technology (IMT) and the recent addition of Our Savior's Institute of Science and Technology (OSISATECH). Today, there are about 24 in all (Enugu State Ministry of Education, 2020).

b. Transportation Infrastructure and Facilities

Road Transportation System

The road network in Enugu Urban follows a grid pattern with a north-east to south-west orientation which links Enugu Urban with Abakaliki to the east and Onitsha to the South. Within the City, a continuous Agbani road coming from Port-Harcourt passing through Coal camp, Okpara Avenue and Abakaliki roads and leading to Onitsha and Makurdi roads could be classified as the major arterial of the City. A system of minor arterials can also be identified showing the structure of the City. Such roads are Ziks Avenue, Kenyatta and Ogui roads. The collector roads and streets which complement the major road network include Independence layout road, Nise and Bishop Anyogu Streets. The remaining road systems are the streets of local character. Out of the total road network within the city, 97.5km (68%) are of local character, 20 km (14%) are collector roads while 26.4 km (18%) form the arterial road system consisting of 17.5 km and 9 km for minor and major arterial roads respectively.

One can easily say that the road network in the city is just fair when compared with some cities in the country. Though about 56% of the road networks are unpaved, all the major and minor arterial roads have an asphalt pavement. As for the rest, about 30% of collector roads and 77% of the total local streets are unpaved (Enugu State Ministry of Works and Transportation, 2020). The paved roads have width varying from 4.3 to 7.3m and have lateritic base course with black top consisting mainly of prime coat while most local roads have no surface dressing at all, (Enugu State Ministry of Works and Transportation, 2020).

The two major means of urban transportation system in Enugu Urban are the public and private buses/cars. In Enugu Urban, the volume of traffic is usually very low before 6.30 am but between 7.30 am to 8.30 am, traffic is usually very heavy as people leave for their various places of work while children leave for their schools. At such periods, road users experience delays due to traffic jams on the roads. From about 9.00 a.m. to 12 noon, traffic comes down to a normal average flow and rises again at about 1.00 pm-4.00 pm. The increase is as a result of school children and civil servants returning to their homes after the day's business. Traffic at such times is heavier on roads like Agbani and Abakpa Nike roads, Ziks Avenue, Ogui and Obiagu roads. Traffic congestions on some of the roads in the study area are mostly due to some dangerous intersections which are common features in the older sections of the city like Uwani, Coal Camp, Asata and Achara layout.

Rail Transportation

Infrastructure and facilities provided in Enugu Urban, several years ago for rail transport are mostly lying idle as they are rarely put into use. Though the Nigerian Railway Corporation has made some efforts to revitalize some of their trains, rail transportation facilities is yet to amount to anything in Enugu Urban. It is like the proverbial Siberia. Many people know it exists but no one ever goes there.

c. Public Utilities

Water Supply

Enugu Urban has been enjoying good portable drinking water supply though not properly spread out, especially since 1983 by the Enugu State Water Corporation. Pipe borne water is supplied to Enugu Urban through the Enugu Water Scheme situated at Ajalli. There are other sources of water supply to Enugu Urban. According to the Enugu Master Plan, water supply to Enugu Urban from the 1920's was drawn from escarpment springs of the Ekulu River. This perennial clean water is collected and pumped directly to the city's 4.5 million liters reservoir at Enugu-Onitsha Road. Enugu Urban operated two water treatment plants; the one at Iva Valley was constructed in 1956 while the Ekulu water works was constructed in 1962. Enugu Urban also receives water from the 9th Mile Corner. This consists of borehole supply scheme connected to Enugu Urban on Mission Avenue. This benefits mainly the Coal Camp area of the study area. There are about two major storage reservoirs, two at Mission Avenue, one at Independence layout, one at WTC, Queen's School, University of Nigeria Enugu Urban Campus, UNTH, Parliament Building, the Enugu Urban Airport, and the tank at Park lane.

A survey carried out in twenty layouts in Enugu Urban on the availability of water supply revealed that apart from Aria road and Mary-Land Layout, other layouts have water supply in their houses. It was also observed that the regularity of water varies. For example, GRA and Thinkers Corner have 100% supply of water.

Electricity

Electric power is one of the stimulants of development in any city, and so Enugu Urban is connected to the National grid of the Enugu Electricity Distribution Company (EEDC), i.e. availability of adequate electricity supply in Enugu Urban has been attracting other development-oriented projects that need it for their operation in the city.

Majority of the layouts in Enugu Urban have adequate electric supply. However, none of the layouts have up to 100% supplies. Some layouts have supply ranging from 70% to 96%. In general, about 82.4% of houses in the study area have electricity supply. Electric light is supplied to Enugu Urban through a 66.6 kva high tension network.

Telecommunication Facilities

Telecommunication facilities are also enjoyed in most parts of the city. However, before the privatization of the Nigerian Telecommunications Limited (NITEL), this facility was grossly inadequate due to high service charges, coupled with poor spread of available facilities. They were thus beyond the reach of a greater percentage of the population. Today, the emergence of GSM in 2001 has improved the situation drastically as individuals own and use mobile phones. Telecommunication masts are mounted at various locations.

Solid Waste Management Facilities

Initially, Enugu local government councils were responsible for solid waste collection and disposal in the city. Thereafter, the then Anambra State Sanitation Authority (ASESA) was established to take over this function. Later, with the creation of Enugu State the job was taken over by the Enugu State Environmental Sanitation Authority (ESESA) to ensure the general cleanliness of the city. Currently, the Enugu State Waste Management Authority (ESWAMA) is mandated to ensure neater, healthier and more efficient disposal of waste in the city using dumpsters, compactors and other modern facilities that needs to be improved upon to ensure adequacy and even spread, (ESWAMA, 2012).

Recreational Facilities

Open space development was integrated into the over-all plan of Enugu in the 1950s. This was during the colonial era when more emphasis was on school play grounds, golf and tennis courts. These served as the earliest recreational facilities in Enugu Urban. However, by 1973, government enacted an edict establishing the Open Space Development Commission (East Central State edict 11, 1973). Due to some problems beyond Governments control, the commission did not take off until 1975.

The then Anambra State Government established its own Open Space Development Commission after the splitting of the former State into Imo and Anambra. When Enugu State was carved out of the old Anambra State, ESESA took over the responsibility for the maintenance of open spaces and today, it is under the care of the State Ministry of Environment. Many open spaces were mapped out both on state and privately owned land. There is one standard stadium in Enugu Urban situated along Ogui road. There is also a golf course situated at GRA as well as three recreational clubs namely: Enugu Recreational Club, the Railway Club and Enugu Sports Club.

Drainage Facilities

The city was not planned to have a comprehensive drainage system. Many streets in Enugu Urban are paved and many have drains on both sides, so the city could be said to have fairly good drainage facilities. However, the major problem here is that of lack of maintenance. The available drains are usually filled with mud and refuse during the rainy seasons. Some of the drains retain standing pools of water rather than channeling them away.

Sewerage

In Enugu Urban like in many urban centers in Nigeria, four means of human waste disposal have been identified. They include water closets, pit latrines, bucket system and bush method. As far back as 1974, government made it mandatory that only WC toilets should be provided in every new house. Much later in 1988, an edict was passed requiring the whole urban structures in the state to convert their toilet system to the water closet type. As of today, a high percentage of the inhabitants of Enugu Urban use water closets. However, pit and VIP toilets can still be identified in some areas. The slum areas of the city use the bush method since some of the houses do not even have toilet facilities at all. Of all these systems, the use of bucket system is almost completely eradicated.

Public Library Facilities

Three main Libraries serve the urban population of Enugu Urban; namely: the Enugu State Library, the British council library (Private but open to the Public) and the National Library. There are also libraries in the various tertiary institutions but their use is restricted to their school not the public, hence, there is much room for improvement to ensure adequacy and spread.

Postal Services Facilities

Enugu Urban is fully equipped with postal services. In fact, there are two general post offices in the city. The first is located within the Nigerian Railway's premises along Ogui road. The second is located at the State Secretariat along Okpara Avenue. There are also postal agencies doting most of the layouts in Enugu Urban. In recent times, postal services are generally avoided by the members of the public.

Empirical Review

Udoudo & Udoidem (2021) conducted a study on urban infrastructure provision in Nigeria. The study revealed that the Nigerian government has been guilty of neglecting or under-funding infrastructure development due to either poor budgeting, wrong estimation of acquisition, maintenance cost or sheer mismanagement of funds allocated for such projects. The paper recommends that funding for urban infrastructure provision and maintenance should be embodied in the national budget while monitoring of the executed project should be performed by the statutory government agencies.

Nunbogu (2024) studied sustainable infrastructure planning for road infrastructure in the United Kingdom and the Netherlands. Following content analysis of the two cases through literature review, results show that the Dutch case of road infrastructure integration is rated in their spatial planning system. The British type occurs in a process of negotiation between local districts and developers and in the form of planning obligation. The study also revealed that issues of comparative planning cultures influence the extent of integration in the two countries.

Efobi & Anierobi (2024) assessed the magnitude of urban infrastructure and facilities provision and maintenance in Enugu. The study revealed that while efforts have been made over the years towards providing and enhancing the functionality of urban infrastructure and facilities in the city, the existing infrastructure and facilities were adjudged not only so meager but also worrisome due to poor state of maintenance. The study therefore recommended for an articulated action by the government for improved maintenance while also calling for public participation and partnership towards infrastructure maintenance in the study area.

Wegrich, Hammerschmid & Kostka (2021) in their study highlighted some of these challenges. They include political constraints, unforeseen technical challenges, prevalence of minority interest over national interest, lack of coordination between central and regional levels, lack of adequate involvement of civil society/citizens and NGOs in infrastructure planning and development.

Going further, Oyedele (2019) investigated the challenges of infrastructure development in democratic governance in Nigeria. He highlighted finance, technology for development, maintenance and design, lack of visionary leaders,

corruption and international requirements for projects to be sustainably developed. The study further recommends that any serious government can overcome them through incessant research and development of a viable long-term infrastructure plan (s).

A discovery of the availability and condition of public infrastructure in Enugu Urban whilst the massive population surge coupled with poor maintenance culture in most third world countries, this study becomes pertinent in its conduct. This will heighten allocation of funds, provision and maintenance of existing public infrastructure in the study area.

Materials and Methods

Study Area

Enugu Urban in Enugu state of Nigeria is the study area (see Figure 3.1). It is located between longitudes 07^0 20^0 E and 07^0 35^0 E and between latitudes 06^0 30^0 N and 06^0 40^0 N of the Greenwich Meridian (see Figure 1). It has an elevation of roughly 664 feet (202 meters) and a surface area of about 80 square meters (200 km square). Nkanu East Local Government Area borders it on the east, Udi Local Government Area borders it on the west, Enugu East Local Government Area borders it on the north, and Nkanu West Local Government Area borders it on the south (Ugwuoke, 2020). Enugu North Local Government Area, Enugu East Local Government Area, and Enugu South Local Government Area are the three local government areas that make up Enugu Urban.

It is connected by road, air, and train to other important cities in Nigeria. The railway line was constructed to carry coal from the interior city to the port of Port Harcourt, which was constructed specifically for this purpose and is located 151 miles (243 kilometers) south of the area formerly known as Enugu Coal Camp. The city has continued to be significant as an administrative, educational, and cultural center for Igboland (Amalu and Ajake, 2019).

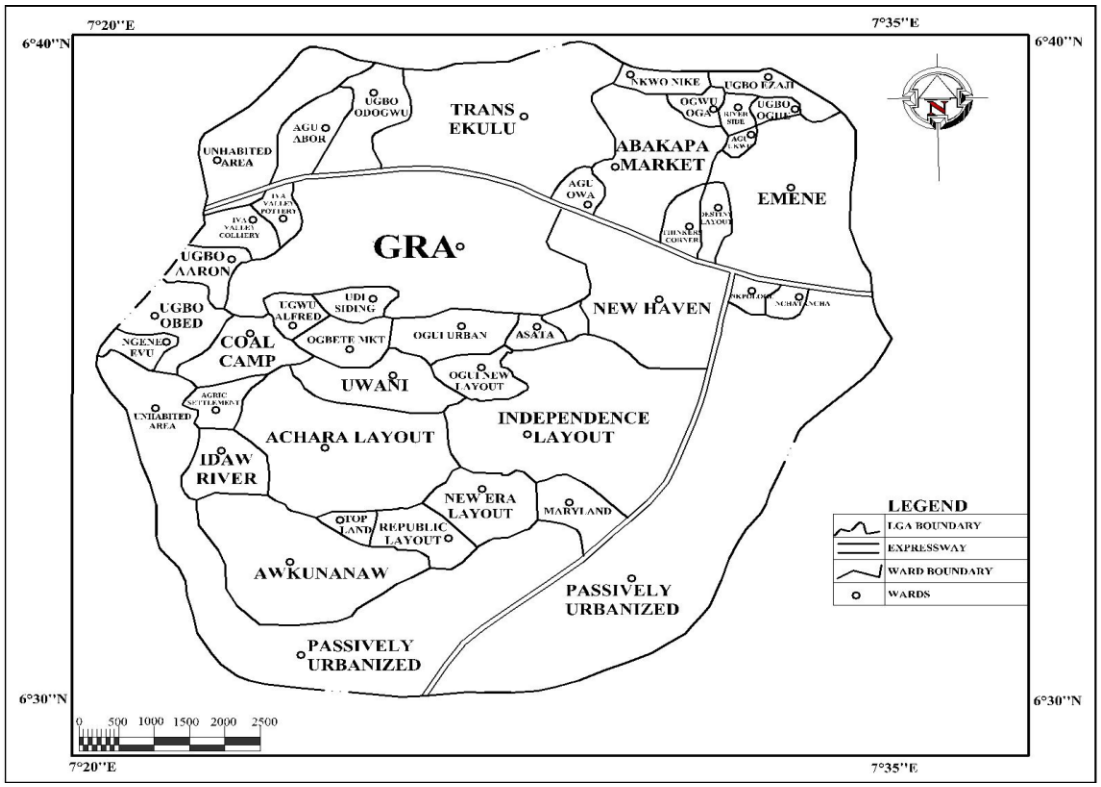

Figure 1: Map of Enugu Urban
Source: Google Map (2025)

Methods

The study adopted the survey research design to facilitate reach to all respondents. Survey research is a quantitative and qualitative research method that measures variables of interest using self-reports from participants and adequate sampling technique (Madubuko, 2019). The chosen method will go a long way in elucidating vital information from respondents and professionals on the adequacy of public infrastructure coupled with its challenges in Enugu Urban and how these challenges can be overcome. The study employed both primary and secondary data sources for its data collection. Primary data sources include questionnaire, personal observation and oral interview. Secondary data sources included web pages, journals, newspapers and government gazettes. Taro Yameni (1976) was employed for the sample size determination where 400 samples constituted the respondents for the study. Purposive and simple random sampling techniques were employed for the study. Census, stratified and simple random sampling techniques were adopted for the study. Census sampling technique entails that all neighbourhoods present in the Urban area were available for selection. Stratified sampling entails that the Urban area was stratified according to densities, that is, low, medium and high-density areas. For the study, high density areas include: Abakpa, Iva valley, Asata, Camp, Ogbete, Ogui New layout Achara layout, Ogui, Uwani. Medium densities include the following areas: Awkunanaw, Idaw River, New era, New Haven, Trans-Ekulu, secretariat quarter and Udi Siding. The Low-density areas include: Aria, City Layout, G.R.A, Independence Layout, Republic, Maryland, River side, and Thinkers Corner. Using simple random sampling technique, one area was drawn from the three strata or areas from the three local government areas. The three (3) selected areas for the study are Trans-Ekulu, Ogui Enugu and Awkunanaw. Descriptive like frequencies, percentages, means, and charts along with inferential statistics (Chi-square) were adopted in analyzing the study objectives and the hypothesis of the study respectively.

Results

Objective I: Identifying the availability of various public infrastructure in Enugu Urban and its adequacy in meeting demands

Figure 1 identifies the available public infrastructure in Enugu Urban. For this objective, the respondents were allowed to choose multiple responses. This is to adequately determine which public infrastructure were available in the study area. From the analysis, 65% of respondents indicated the presence of roads in their locality; 66% indicated for hospitals/clinics; 4% indicated pipe-borne water, 79% indicated for electric line and transformers; 85% indicated telecommunication; 15% indicated dumpsters and drainages; 30% indicated schools; 4% indicated open spaces and parks; 13% indicated public/private libraries, 12% indicated bridges/culverts; 9% indicated postal services; 51% indicated markets; 4% indicated stadia/courts; while 13% indicated street lights. From the result, it shows that public infrastructure provision is inadequate and in short supply in Enugu Urban in meeting the required demand considering the over 1.6 million people living in the Urban area (722, 665 persons according to NPC, 2006 population figure projected to 2026 at 5% population growth rate for urban areas). However, telecommunications and electric line and transformer were in high supply in the study area. The result therefore implies that the government should intensify its efforts in public infrastructure provision in Enugu Urban in other to make the city livable, enjoyable and conducive for its residents.

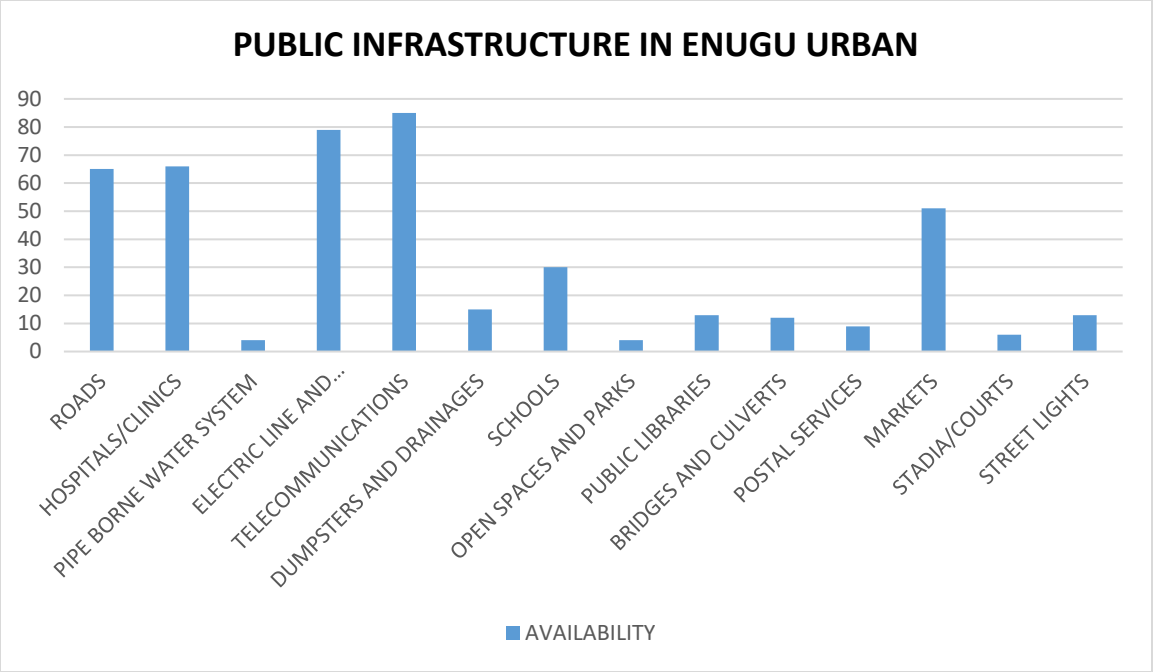

Figure 1: Availability of public infrastructure in Enugu Urban
Source: Field Survey, 2026

Objective Two: Challenges affecting public infrastructure provision in Enugu Urban

Table 1 revealed that all identified challenges affecting public infrastructure provision in Enugu Urban were significant as they all recorded mean scores above 1.49. These challenges included corruption (m=2.9), financial constraints (m=2.9), lack of citizen involvement (m=2.9), unforeseen technical challenges (m=2.8), lack of visionary leaders (m=2.8), lack of coordination between central and regional levels (m=2.7), prevalence of minority interest over national interest (m=2.7), political interference (m=2.6), technology for development (m=2.6), international requirements for sustainability (m=2.5), design and maintenance (m=2.4) and lack of adequate manpower (m=2.3). The result therefore implies that without overcoming these numerous challenges, infrastructure provision and sustenance would only be a mirage. This will also leave Enugu Urban residents in perpetual sufferings and neglect of the good life supposed of an urban area.

Table 1: Response on challenges of public infrastructure provision in Enugu Urban

S/N	*Challenges*	*3*	*2*	*1*	*Mean X*	*Rmk*
1	Political interference	27	10	3	2.6	Sig
2	Unforeseen technical challenges	31	8	1	2.8	Sig
3	Prevalence of minority interest over national interest	30	7	3	2.7	Sig
4	Lack of coordination between central and regional levels	28	10	2	2.7	Sig
5	Lack of citizen involvement	36	4	-	2.9	Sig
6	Financial constraints	35	4	1	2.9	Sig
7	Technology for development	28	9	3	2.6	Sig
8	Design and maintenance	27	3	10	2.4	Sig
9	Lack of visionary leaders	31	8	1	2.8	Sig
10	Lack of adequate manpower	22	8	10	2.3	Sig
11	Corruption	35	5	-	2.9	Sig
12	International requirements for sustainability	28	5	7	2.5	Sig

Source: Field Survey, 2026

Testing of Hypotheses

The null and alternative hypothesis is stated thus:

H_{01}: The challenges of public infrastructure provision are not statistically significant in Enugu Urban.

In order to test the above hypothesis, the values from Table 1 on 'Response on challenges of public infrastructure provision in Enugu Urban' was inputted into the computer with the software (Statistical Package for Social Sciences) and the Chi-Square result in Table 2 were obtained. Chi-Square output obtained using a significant level of 0.05 at a df of 24 are presented below:

Table 2: Chi-Square Results from the test Hypothesis

Chi-Square Tests

				Monte Carlo Sig. (2-sided)			Monte Carlo Sig. (1-sided)		
					95% Confidence Interval		95% Confidence Interval		
	Value	df	Asymp. Sig. (2-sided)	Sig.	Lower Bound	Upper Bound	Lower Bound	Upper Bound	Sig.
Pearson Chi-Square	57.733[a]	22	.000	.000[b]	.000	.000			
Likelihood Ratio	57.614	22	.000	.000[b]	.000	.000			
Fisher's Exact Test	49.939			.000[b]	.000	.000			
Linear-by-Linear Association	2.133[c]	1	.144	.148[b]	.141	.155	.069	.080	.075[b]
N of Valid Cases	480								

Source: SPSS, 2026

Chi-Square Value = 57.733

p Value = .001

Level of significance (α) = 0.05

Decision Rule:

Reject Ho, if p value is less than level of significance and accept Ho if otherwise.

Conclusion:

p value = .001

Level of significance = 0.05

Therefore, Ho is rejected because p value (.001) is < (less than) level of significance which is 0.05.

Implication:

The implication of this result is that the null hypothesis (Ho) was not accepted, which states that challenges facing public infrastructure provision are not significant in Enugu urban, Enugu State, Nigeria and H_1 is accepted which states that Challenges facing public infrastructure provision are significant in Enugu urban, Enugu State, Nigeria. Therefore, it is concluded that challenges facing public infrastructure provision are significant in Enugu urban, Enugu State, Nigeria.

Discussions

The discussion of findings was organized according to the result of the research objective tested.

On the availability and adequacy of public infrastructure in the study area, analysis as obtained from figure 1 revealed that roads, hospitals/clinics, pipe-borne water system, electric line and transformers, telecommunication, dumpsters and drainages, schools, open spaces and parks, public/private libraries and bridges/culverts were being provided in varying degrees in the study area. From the analysis also, results indicated that provision of public infrastructure were inadequate and in short supply in the study area. This result corroborates with the findings of Herti-OECD Expert Survey (2016) and Efobi and Anierobi (2014) who opined that infrastructure provision in most developing countries are inadequate and in short supply.

Analysis as presented in table 1 revealed that all identified challenges affecting public infrastructure provision in Enugu Urban were significant as they all recorded mean scores above 1.49. Notable among these challenges are corruption (m=2.9), financial constraints (m=2.9), lack of citizen involvement (m=2.9), unforeseen technical challenges (m=2.8), lack of visionary leaders (m=2.8), lack of coordination between central and regional levels (m=2.7), prevalence of minority interest over national interest (m=2.7), political interference (m=2.6), technology for development (m=2.6) among others. This finding was in tandem with the findings of Wegrich et al (2016) and Oyedele (2017) who observed that political interference, unforeseen technical challenges, prevalence of minority interest over national interest, lack of adequate involvement of civil society/citizens, financial constraints, maintenance and design, lack of visionary leaders were major challenges facing infrastructure planning in cities of the world most especially down south of the Sahara.

On the result of the hypothesis testing, results from Chi-Square presented in table 2 showed that the identified challenges of public infrastructure provision in Enugu Urban were significant. This implies that the amelioration of these challenges is one vital way to enhance public infrastructure, its condition and provision in the study area. The result therefore aligns with the earlier finding of this study.

Implications: Research and Practice

Infrastructure is one of the vital operations that result in the livability criteria in most cities of the world. Its provision and adequacy equate to livable cities free from overdependence and exhibiting modernity. The current study reveals the widening gap as it relates to infrastructure provision in developing countries as points to the fact that governments rise up to the occasion of championing concerted efforts towards adequate and modern public infrastructure that make life worthwhile and enjoyable.

Similarly, the study filled a gap in literature by assessing the availability and adequacy of public infrastructure with emphasis on Enugu Urban which had not previously been conducted. This masterpiece adds to the existing body of literature focused on development and infrastructure provision. The study will also be relevant in the conduct of further studies.

Conclusion and Recommendations

Infrastructures are crucial for economic growth, productivity and ensure that societies are functional. Planning for infrastructure provision ensures that infrastructure projects are initiated and delivered on time schedule, at estimated cost, stated standards and meets the economic, environmental and social needs of the populace. The challenge facing infrastructure planning are numerous affecting most especially the developing nations. The demand for public infrastructure surpasses the supply and finance that will stimulate rapid provision is also scarce as evident from the current study. It is therefore imperative that the above measures are implemented to curb these challenges thereby ensuring that urban environment have the necessary infrastructures and facilities that stimulate economic growth and productivity. The study recommends the following:

1. The government should establish adequate legal, institutional and administrative frameworks that encourage increased individual and public-private partnerships in infrastructure and facilities provision. This will go a long way in alleviating the heavy burden from the shoulders of the government so as to focus more on governance.
2. The government through its appropriate agencies should embark on construction, expansion and rehabilitation of new and old public infrastructure in Enugu Urban. This will help to augment the already dilapidating and over-burdened public infrastructure within Enugu Urban.
3. The government through its agencies and advice from town planners and other stakeholders in the built environment should embark on the construction of modern and green public infrastructure that meets international requirements for sustainability. This will help to ensure sustainability of public infrastructure in Enugu Urban and Enugu State in general.

Future Research

Future researches will consider the implications in terms of social, economic and physical consequences of the inadequate provision of public infrastructure as regards the current study location. Also, more sophisticated statistical tools like PCA can be employed to adequately weigh the challenges affecting public infrastructure in the study area. This will streamline the challenges whilst availing governments the choice of prioritizing how these challenges can be ameliorated.

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