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RESEARCH ARTICLE

An Evaluation of Road Transportation Problems and Prospects in Enugu Urban, Enugu State, Nigeria

Madubuko, Moses Chinatu[1*], Prof. Iyi, Edmund Amuezuoke[2] & Agwu, Jacob Parkins[3]

[12]Department of Urban and Regional Planning, Enugu State University of Science and Technology (ESUT), Nigeria

[3]Department of Geography, Alex Ekwueme Federal University, Ndufu Alike Ikwo (AEFUNAI), Nigeria

Corresponding Author

ABSTRACT

This study aimed at evaluating the road transportation problems and prospects in Enugu Urban, Enugu State, Nigeria. Specific objectives pursued include evaluating the condition of the existing transport infrastructure and facilities in the study area; ascertaining the causes and characteristics of vehicular traffic composition of selected roads in Enugu Urban and evaluating the traffic problems associated with road transportation in the study area. Evaluative survey design was adopted where 280 respondents were selected for the study. Collected data were analyzed using percentages, frequencies, mean and t-test which was employed in testing the hypothesis. Data collected were on the condition, causes and effects of road transportation in Enugu Urban. The study revealed that transportation infrastructure and facilities like road pavement and buses, cabs and taxis were in fair condition while bus sheds, traffic lights and parks/bus stops were in poor condition. The study also revealed that the causes of traffic congestion included bad roads/pot holes, breakdown of vehicles; traffic among others. The study also revealed that delays in travel time, pollution (noise and air); deaths from road accidents; fuel wastage/increase maintenance; among others constituted the road transportation problems prevalent in Enugu Urban. The study therefore recommended that the government should formulate policies that encourage public transportation policy (reduction in transport fares, adherence to vehicle carrying capacity, and provision of more coal city buses). This will go a long way in reducing the volume of vehicles plying roads in Enugu Urban.

Keywords: *Road Transportation; Traffic Congestions; Enugu Urban*

Introduction

Transportation is the movement of people, goods and services from a point of origin to the destination (Aderamo, 2022). Transportation is indispensable to modern economic development especially in a developing country like Nigeria. It plays a vital role in shaping the economy of any nation (or region) because modern industries and commercial activities rely on proper, well developed and efficient transport system. It was pointed out that transportation is a crucial vector for urban insertion since it gives access to economic activity; facilitate family life and helps in spinning social networks.

Transport is a central dimension of the national and global production systems that are reshaping the world, making it a topic of universal interest and importance. People move from one place to the other, regularly or occasionally. Goods collected, extracted and manufactured, must be distributed from place to place prior to consumption. People who need services, which are generally provided at a limited number of places, must travel in order to access such services. Transport therefore fulfils a very important function in a society and is one of the most pervasive factors in any economy.

Transport plays a crucial role in urban growth by linking and providing access for people to essential services such as education, markets, employment, recreation, health care and other key services that induce growth of towns, cities and metropolis (Bailey et al., 2020). Enhanced mobility for the poor and vulnerable groups especially in cities of the developing world is one of the most important preconditions for achieving Sustainable Development Goals (SDGs). Those cities with transport modes in an integrated system are more likely to evolve and prosper as centres for trade, commerce, industry, education, tourism and services. The rate of growth of urban centres has called for the need for movement of people, goods, services and information. In order to sustain the growth of urban centres, efficient transportation system is required. However, the rate of growth of urban centres is related to the rate of movement of people, goods and services, using different means of transportation.

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Transport developments may lead to changes in the pattern of land use in an urban centre around the transport corridors, with more transport intensive uses; including consumer activities locating closer to transport interchanges. Commercial, retail and residential development may be affected. These impacts can be important at a local level but basically affect the geographical pattern of activity rather than the overall level of activity. The effects are therefore, local rather than national or even regional (Planning, Economic and Development Consultants, 2024).

There are different conventional transport modes: roads, rail, air, water and pipelines. These modes of transport are all important in one way or the other. For instance, rail is prominent in the transportation of goods, but its relative advantage is limited to long distance bulk movement. Air transport is more efficient in the movement of passengers and high valued goods over long distance. In the case of water transport, its advantage lies in the capacity to carry bulk cargo over long distances at cheaper rates than other forms of transport modes. Roads transport on the other hand, serves other modes of transport as it provides door-to-door services. Roads are an integrated system that is made up of nodes and routes. The nodes are towns which associated themselves to the roads, while the routes are the different types of roads. Roads are defined as an economic penetrating route which is required to open ways for investment in new activities such as agriculture and commerce. Road can also be defined as those which are clearly necessary ingredients of nearly every aspect of economic and social development. It links the most remote locations and has been found to be more useful in gathering goods to collection points for distribution and marketing in rural and urban centres. Ajiboye and Afolayan (2021), noted that road transport is the most common and complex network. It covers a wide range, physically convenient, highly flexible and usually the most operationally suitable and readily available means of movement of goods and passenger traffic over short, medium and long distances. This is why attention is often placed on road transport development.

In Enugu, road transportation is the sole process of moving people, goods and services from one place to another within the Enugu state boundary. Therefore, the transportation road network condition is important. Since it plays an important role on the social, commercial and economical integrity of the state, adequate importance should be accorded to it. For that reason, Enugu road network should be analysed to improve the easy flow of traffic. Enugu transportation network has a series of issues namely; road blockages, improper maintenance of road, road side structures that hinder traffic flow, etc. By analysing these problems, it would be possible to find a solution.

Statement of the Research Problem

A good number of private companies, retail stores, commercial banks and so on aggregate in Enugu Urban to take advantage of opportunities afforded by locations near the seat of governance, thus attracting complimentary services. This led to high concentration of vehicular and pedestrian movements especially along the access roads. This has ensured that movement of vehicles, goods and people become slow and troublesome.

The relationship between road transport and development has been the focus of many studies. For example, Dakyes and Ogbuli (2021) investigated the impact of road transport development on socio-economic development in Gwagwalada Area Council, Abuja, Nigeria. The study concluded that improvement in transportation, especially road development, would no doubt enhance the socio-economic activities of the study area, thereby improving the well-being of the people in the area.

Furthermore, Precious (2022) analysed the effects of road transport development on spatial integration in Kaduna State. The study used different policy regimes to show road development over four time periods in the state and how it reflected on the movement of the people in the state. The study has also revealed that the huge investment on road development has actually translated into improved accessibility and connectivity, decrease in travel time and travel cost below inflation rates. Ajiboye and Afolayan (2021) examined the impact of transport development on agricultural production in a developing country which focuses on kolanut production in Nigeria. The study revealed that improved transportation would have positive impact on farmers‟ productivity, income, employment and reduce poverty level in the rural areas.

Umar (2023) examined the effects of road transport development on food-grain marketing and distribution in Katsina State. The study highlighted the important role that road development plays in integrating, developing and sustaining any economy. The study specifically focused on the relationship between transport planning and the agricultural sector of the economy as essential to any development strategy. Muktar (2022) in a similar study on the impact of transportation on economic growth, reiterated that road transport is an important determinant of the success of a nation’s effort in diversifying its production base, expanding trade and linking together resources and

markets into an integrated economy. It is also necessary for connecting villages with towns and market centres and in bringing together remote and developed regions closer to one another.

Road transportation is one of Enugu Urban biggest issue. There is lack of good road and an abysmal maintenance of road conditions. There is a large amount of commercial activities happening along major roads which then causes traffic congestions which in turn hinders beneficial economic activities. Some roads also don't meet the recommended size and are too small for all incoming and outgoing traffic. This has resulted in traffic gridlocks, accidents, loss of productive time, frustrations and daunting health related challenges both for transporters and commuters.

This can be seen in highly populated areas in Enugu such as Emene, New Heaven, Nike and Agbani Road. Other places have roads with the recommended size but access are hindered by road blocks caused by security official that have no reason to be in a road that isn't a police check point, presence of political structures such as the INEC office at independence layout and unrestricted parking in a no parking zone. Specific objectives considered in this study included to evaluate the condition of the existing transport infrastructure and facilities in the study area; ascertain the causes and characteristics of vehicular traffic composition of selected roads in Enugu Urban and evaluate the traffic problems associated with road transportation in the study area.

Literature Review

The Concept of Road Transport Network

Smith (2024) identified three elements in a network called by various names. These are nodes, vertices or points, the edge, linkage or route. These nodes, vertices or points refer to the settlements while the edge, linkage or route refers to the roads. In the course of making the nodes and linkages easily identifiable, a network is transformed into a topological graph which is a representation of the geometry of a network showing the relationship between nodes and linkages without considering the scale of the map and morphology of the actual route.

In order to make the analysis successful, map analysis is normally done on road network using topological abstractions that actually represent series of vertices (nodes) and set of edges (links). Furthermore, various indices have been developed describing the extent to which a network approaches maximum connectivity, which requires the existence of a direct link between each node (Kansky). These indices are all based upon the relationship between the number of edges and vertices in a network which is regarded as a topological graph.

Empirical Review

Different researchers and authors have lent their voice on traffic problems on urban road networks. On the causes of intra-urban traffic problems in urban transport systems, Aderamo (2022), examined traffic congestion problems and their causes at selected road intersections, in Ilorin, Nigeria. Traffic volume and delay were estimated and the causes of delay were identified. The result revealed that space and time variations exist in traffic flow and delays at the intersections. Traffic wardens and parking problems were found to be the greatest cause of delays. The study recommended that the road intersections be signalized and vehicle parking be strictly prohibited to reduce congestion and delays.

Ukpata & Etika, (2024), investigated traffic congestion which has become a common sight in most urban centres of Nigeria. A survey was conducted during the Annual National Conference of the Nigerian Society of Engineers (NSE) which held in December 2011 at the Calabar Tinapa Business and Leisure Resort. Three hundred (300) copies of questionnaires were distributed among participants and 196 returns were made and these were analyzed. The results showed that poor driving habits, poor road network, inadequate road capacity, and lack of parking facilities constitute the greatest causes of traffic congestion in Nigeria. Also, Lagos, Port Harcourt and Abuja were identified as cities most affected by traffic congestion.

Popoola, Abiola and Adeniji (2024) investigated the causes, effects and remedies of traffic congestion in Mowe/Ibafo section of the Lagos-Ibadan expressway. The result from the study showed the causes of traffic congestion as inadequate road capacity, poor road pavement, poor traffic management, poor drainage system poor driving habit, poor parking habit, poor design junctions/round-about, presence of heavy trucks, lack of pedestrian facilities, lack of road furniture, lack of parking facilities and others. Effects of road congestion from the study were waste of time, delay movement, stress, accident, and inability to forecast travel of time, fuel consumption, road rage, relocation,

night driving, and environmental pollution. To drastically reduce these negative effects the following were proposed; there must be provision for adequate parking space, construction of proper drainage, enlarging the width of the road, rehabilitate all roads needing attention, public enlightenment, traffic education, hack down all illegal buildings/shops built on the right of way (ROW), creating a separate/alternative root for trucks and heavy vehicles, provision of pedestrian facilities, In-depth training of transport/traffic personnel, ban all form of road trading/hawking, and reduce the number of bus-stop are necessary.

Fadairo (2020) investigated traffic congestion in Akure, along Federal University of Technology Akure Road / Oja-Oba Road. The data collected from both primary and secondary sources were analyzed and these include using of camera to capture traffic-congested zones; information on traffic-congested junctions; the roads and the land use areas; and traffic census for some selected road junctions in the study area. The results showed that poor driving habits, weather condition, absence of traffic light and/warden, work zones, road side parking, special events, lack of public mass transit, reluctance to use parking facilities and bus stops constitute the greatest causes of traffic congestion in the study area. The recommendations were that both Federal and State governments should initiate plans for the introduction of other forms of urban transportation such as metros and trains which support mass movement of people as done in major cities globally.

Bashiru & Waziri (2021) studied the problems of intra-urban traffic in Lagos Nigeria and found that 57% of commuters and motorists spend between 30 to 60 minutes on the road due to traffic congestion. Their results also showed that the worst traffic congestion occurs on Mondays. They listed traffic congestion in Lagos to include, presence of pot holes/bad road, trading activities, on-street parking, loading and discharging of passengers, illegal bus stops, flooding/poor drainage, vehicle breakdown, narrow road sections, religious activities, high volume of traffic, lack of parking space and lack of traffic light at some road intersections.

Yusuf, et al. (2022), studied attitudinal factors of road users and increase commuting time in Zaria, Kaduna state. The data were collected from Zaria city-Danmagaji –Tudun Wada axis and Sabon-Gari, Kwangila-Samaru axis. The findings revealed that about 97 % of commuters attributed increased commuting time to the attitude of drivers among which are impatience and waiting for passengers, another 87% attributed it to passenger attitude. The study also showed that Zaria city-axis recorded longer commuting time than Samaru-axis. About 93% of respondents believed that commuting time is extended by 10-15 minutes, depending on the vehicles. The study revealed that delays in commuting time can be reduced through attitudinal change and sustained policy intervention.

Thwala et al, (2024), examined the effects and causes of traffic congestion in Ibadan city, Nigeria. The study was carried out in three neighborhoods (Agbowo, Bodija and Agodi Gate) in Ibadan North Local Government Area. Survey approach through questionnaire was used for data collection. Fifty (50) respondents were sampled in each of the three neighborhoods making a total of 150. Descriptive statistics such as means, simple percentages and graphics were employed in analyzing the data collected. Results show that 51.3% of the respondents spend between 21 minutes and above on congestion daily while 20.7% spend between 5-15 minutes and1.3% less 5 minutes. It was equally observed that residents in the city spend almost twice the time they would use on their trip from home to office due to traffic congestion. On the temporal and spatial pattern of traffic congestion in the three neighborhoods, the results revealed that Agbowo (65.3%) recorded the highest traffic congestion in the evening and morning period followed by Bodija (48 %) and Agodi Gate (31. 4%). On ranking of some major routes in the study area on traffic congestion by respondents, Agodi –Iwo Road route ranked highest with a mean value of 1.45 followed by University of Ibadan (U.I)–Bodija-Agodi Gate route with mean value of 1.27 and Sango-Iwo Road 1.03. The authors recommended the banning of street trading and provision of functional mass transit buses.

From the review, it is evident that numerous literatures have captured traffic problems in cities around the globe. However, empirical literature focusing on the conditions as well as the causes and effects of road transportation with emphasis on Enugu Urban remain elusive and where they exist are outdated. This therefore becomes the bane of this study as it will help to fill this gap in literature and also serve as a good reference material for further studies on the topic under consideration.

Materials and Methods

The Study Area

Enugu metropolis lies approximately between latitude $6^0$21' N and $6^0$30'N and between longitude $7^0$26' E and $7^0$37'E of the Greenwich Meridan (Figure 1). The total area coverage is approximately 72.8 square kilometers with an estimated population from the 2006 census data from the National population commission put at 722,665 persons with 348,902 males and 373763 females. Enugu Metropolis comprises three council areas Enugu North, Enugu East and Enugu South Local Government Areas. It is bounded in the East by Nkanu LGA, in the West by Udi LGA, in the North by Igbo-Etiti and Isiuzor and in the South by Nkanu West LGA.

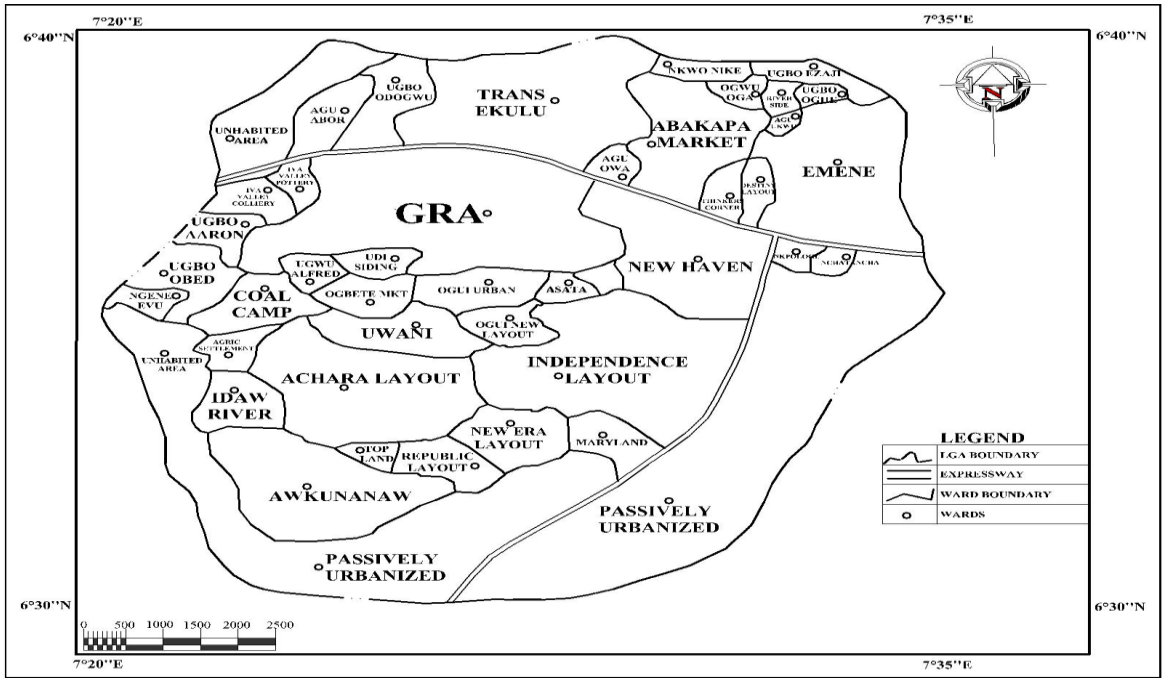


Figure 1: Map of Enugu Urban
Source: Google Map (2025)

In terms of geology, the town lies in the eastern Nigeria sedimentary basin, underlain by Enugu shales, lower coal measure (Mamu formation) and false bedded sandstone (Ajalli formation) (Egboka, 2020).

Its topographical features are classified into two; the escarpment zone, the plains and lowlands of Cross River Basin. Average maximum temperature is usually a little above 27˚C all over the year although it sometimes exhibits peaks of up to 36˚C in March, which is usually the hottest month of any year. Average annual rainfall is about 1800mm but over 70% of the amounts fall in four months, between June and September. The metropolis sources its water supply mainly from Ekulu and Asata rivers boreholes including Ngwo as well as shallow wells around Abakpa-Nike, Emene, New Haven and parts of Independence Layout where the geological formation permits.

Methods

The survey research design was adopted for the study. Primary and secondary data were obtained for the study. Primary data were obtained through the use of questionnaire, manual count and personal observation. The manual traffic count where the number of vehicles seen during traffic congestion was conducted along Ogbete/Holy ghost axis on the 1st of March, 2025. Secondary data were obtained from journals, web pages and textbooks. From the study area, 280 respondents were selected for the study. Collected data were analyzed using descriptives like percentages, frequencies, mean, pie and bar charts.

Findings and Discussions

Condition of the Existing Road Transport Infrastructure and Facilities in Enugu Urban

Data generated from item 1 in the questionnaire was presented in this sub-section. Table 1 revealed the condition of existing transport infrastructure and facilities in Enugu Urban. The result showed that road pavement and buses/cabs/taxis were in fair condition while bus shed, traffic light and parks/bus stops were in poor condition. The result further revealed the daunting transport challenge in Enugu Urban. From the personal observation carried out, it was also discovered that most of the transport infrastructure and facilities needed urgent repairs, rehabilitation, expansion and reconstruction. This result is in tandem with the findings of Bashiru and Waziri (2021) who opined that most transpiration infrastructure and facilities in major cities of Nigeria were in poor condition needing urgent repairs, expansion and reconstruction.

Table 1: Response on the condition of existing transport infrastructure and facilities in Enugu Urban

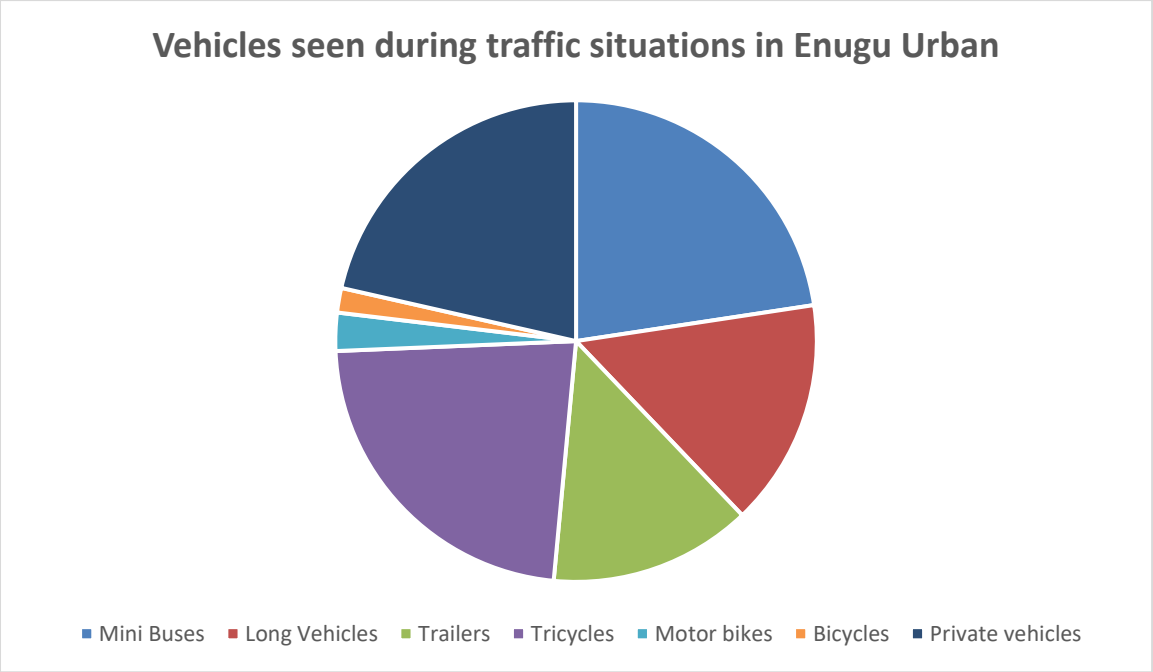
S/N	*Infrastructure*	*Good 3*	*Fair 2*	*Poor 1*	*Non-existent*	*Mean X*	*Remark*
1	Road pavement	58	160	62	-	1.7	Fair
2	Bus shed	30	52	186	12	1.4	Poor
3	Traffic light	39	29	192	20	1.4	Poor
4	Buses, cabs	6	95	179	-	1.8	Fair
5	Parks, bus stops	9	52	184	35	1.2	Poor

Source: Field Study, 2025

Causes and Characteristics of Vehicular Traffic Composition of selected Roads in Enugu Urban

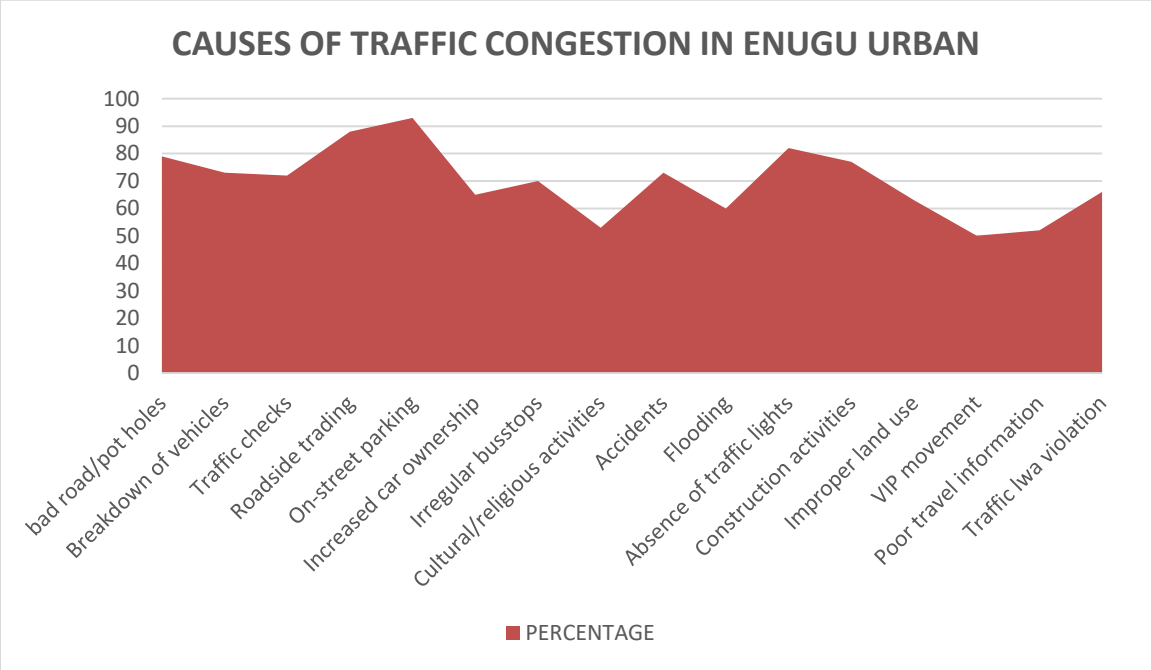
Vehicular Composition in Enugu Urban with special emphasis on Holy Ghost/Ogbete Route

Figure 1 reveals the vehicular composition during traffic situations in Enugu Urban. From the figure, tricycles were more along the axis during traffic congestion (277). This is followed by mini buses (274); private vehicles (260); long vehicles (185); trailers (165); motor bikes (31) and bicycles (20). From the result, it can be deduced that the breakdown of trailers and long vehicles due to lack of maintenance and poor road condition would result in serious traffic congestion on such route. This result echoes the findings of Echendu, Okeke and Nnaemeka-Okeke (2020) who averred that mini buses and tricycles were the major travel modes used by commuters and residents in Enugu Urban.



Source: Field Study, 2025

Figure 2 showed the causes of traffic in Enugu Urban. From Figure 2, it was revealed that all identified causes were responsible for traffic in the study area. The result showed that 79% of respondents indicated bad road/pot holes; 73% indicated breakdown of vehicles; 72% indicated traffic checks/wardens; 88% indicated roadside trading/hawking; 93% indicated on0street parking; 65% indicated increased car ownership; 70% indicated irregular bus stops; 53% indicated cultural/religious activities; 73% indicated accidents; 60% indicated flooding; 80% indicated absence of traffic lights; 77% indicated construction activities; 63% indicated improper land use; 50% indicated VIP movements; 52% indicated poor travel information and 66% indicated traffic law violation. The result therefore implies that causes of traffic in Enugu Urban are multi-faceted and therefore requires holistic approach in its remedy. The result is in conformity with the findings of Ukpata and Etika (2024), Bashiru and Waziri (2021) and Osoba (2020) who stated that bad roads/pot holes, on-street trading/hawking, religious activities, absence of street lights, flooding were among the major causes of road traffic in major cities of Nigeria.



Source: Field Study, 2025

Road Transport Problems Prevalent in Enugu Urban

Table 2 showed the intra-urban traffic problems prevalent in Enugu Urban. From the result, all identified problems were significant in the study area as they all recorded mean scores above 1.5. These traffic problems include delays in travel time (m=2.8); pollution (noise and air) (m=2.7); deaths from road accidents (m=2.7); fuel wastage/increase maintenance (m=2.6); dilapidation of road, bus shed, street lights (m=2.6); parking problems (m=2.6); loss of productive time (m=2.6); unwanted urban sprawl (m=2.5); headaches, swollen eyes etc (m=2.5); high cost of fares (m=2.5), road accidents (m=2.5); reduction in road width (m=2.5); delays related to scarcity of buses, cabs, taxis (m=2.5); traffic congestion (m=2.5); rise in heat levels (m=2.3); anger and frustration (m=2.4) and reduced accessibility to commercial centres (m=2.3). This result is in tandem with the findings of Osoba (2020) who averred that despite the contributory role of transportation to urban growth; it also brings some negative effects with it. The result also corroborates with the findings of Echendu et al (2020) who opined that most commuters underwent stress during trips in most cities of Nigeria with special emphasis on Enugu Metropolis.

Table 4: Response on road transport problems prevalent in Enugu Urban

S/N	*Situations*	*Sig 3*	*Mod. Sig 2*	*Not Sig 1*	*Mean X*	*Rank*
1	Traffic congestion	182	85	13	2.5	4
2	Delays in travel time	186	71	23	2.8	1
3	Delays related to scarcity of buses, cabs, taxis	176	95	9	2.5	4
4	Rise in heat levels	184	73	23	2.3	6
5	Pollution (Noise and Air)	209	57	14	2.7	2
6	Reduction in road width	196	69	15	2.5	4
7	Road accidents	193	68	19	2.5	4
8	Dilapidation of roads, bus shed, street lights	179	82	19	2.6	3
9	Deaths from road accidents	182	58	40	2.7	2
10	High cost of fares	204	42	34	2.5	4
11	Fuel wastage/increase maintenance	196	65	19	2.7	2
12	Headaches, swollen eyes	197	68	15	2.5	4
13	Anger/frustration	202	62	16	2.4	5
14	Reduced accessibility to commercial centres	201	61	18	2.3	6
15	Parking problems	210	52	18	2.6	3
16	Loss of productive time	197	69	14	2.6	3
17	Unwanted urban sprawl	208	50	22	2.5	4

Source: Field Study, 2025

Conclusion

The study allows the following conclusions to be drawn: The results of the computation of gamma, beta, and alpha indices indicated that there is a significant increase in road connectivity in Enugu urban. In this study, it has been possible to successfully capture the changing pattern of urban growth. Although, road network development has correlation to urban growth in Enugu, it may not be the sole determinant of the urban growth because other factors like: migration, personal increase in income, the desire to own personal home and loan scheme from banks are also contributors. Finally, it was also discovered that road transport development brought about improvement in commercial activities coupled with increase in profit. Access to major roads provides relative advantages consequent upon which commercial users locate to enjoy the advantages. Good road projects clearly contributed to poverty reduction by improving the living conditions of people and by augmenting the opportunities available for trade and employment.

Recommendations

From the above findings, the study makes the following recommendations:

1. The government should formulate policies that encourage public transportation policy (reduction in transport fares, adherence to vehicle carrying capacity, provision of more coal city buses etc). This will go a long way in reducing the volume of vehicles plying roads in Enugu Urban.
2. The government through its agency (Ministry of Transport (MOT) in collaboration with Federal Road Safety Corps (FRSC) should ensure effective and efficient intermodal coordination. This will help to remove traffic bottlenecks and reduce traffic congestion at major nodal points in Enugu Urban. This will also ensure easy accessibility to major areas within Enugu Urban.
3. The government through its agencies, FRSC with advice from Town Planners should educate and enlighten the general public on the need to use non-motorized transport and embrace telecommunications channels in disseminating information. This will help to reduce the volume of vehicles plying the road and the need to travel thereby ensuring efficient movement of people and goods from one place to the other within and around Enugu Urban.
4. The government through its agencies, FRSC, Ministry of Works with advice from Town Planners should embark on prompt maintenance, reconstruction and construction of old and new transport infrastructure and facilities in Enugu Urban. This will go a long way in ensuring easy flow of traffic within and around the metropolis.
5. The government through its agencies with advice from Town Planners should formulate policies banning the use of unworthy road vehicles, under age driving, high carbon emitting vehicles, over-speeding, on-

street trading/hawking/parking and strict adherence to traffic rules, regulations and codes. This will help in ameliorating the causes and intra-urban traffic problems being experienced in Enugu Urban and major cities in Nigeria.

6. Town Planners should ensure strict adherence to planning rules, standards and regulations like setbacks, adequate development control implementations, discourage the collection of bribes and wavers. This will help curb unwanted urban sprawl, encroachments etc as they have being identified as major road bottlenecks in Enugu Urban.

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