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Research Article

Critical Analysis of Traffic Congestion in Ekwulobia, Aguata Local Government Area Anambra State

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Abstract

This study presents a critical analysis of traffic congestion in Ekwulobia, a rapidly urbanizing commercial hub in Anambra State, Nigeria. The research investigates the causes, impacts, and potential solutions to the growing problem of vehicular congestion within the town, with particular attention to high-traffic areas such as the Ekwulobia Roundabout, central Motor Park, and Eke Market. A mixed-method approach was adopted, combining manual traffic counts, field observations, and structured surveys targeting drivers, traders, commuters, and transport operators. The traffic count was conducted over a one-week period during both peak and off-peak hours to capture variations in vehicle volume and movement patterns. Linear regression analysis was employed to examine the relationship between key variables such as vehicle count, road width, market activity, and congestion levels. Findings indicate that the primary drivers of congestion include road infrastructure, parking availability, population growth, informal transport systems, and street trading. The socio-economic effects of congestion were found to be significant, including increased travel time, fuel consumption, environmental pollution, and reduced commercial productivity. The study also highlights each predicators such as road infrastructure (structural weakness at the core) emerging as the most critical determinant of congestion, with a strong negative beta coefficient (β = -0.351, $p < 0.001$), parking infrastructure (an overlooked but potent contributor), represent analysis that inadequate parking availability (β = -0.296, $p < 0.001$) plays a substantial role in traffic congestion, predicator like population growth (the latent pressure multiplier), shows a population growth (β = 0.222, $p < 0.001$) is another significant predictor, reflecting how rapid urbanization and densification strain the existing transport infrastructure. Informal transport systems (a vital but chaotic component): informal transport modes such as commercial motorcycles (okadas) and tricycles (keke napeps) contribute significantly to traffic congestion (β = 0.187, $p < 0.001$) this shows the role of informal transport operators and their impact on traffic flow and lastly, street trading (navigating the livelihoods-mobility nexus), street trading was found to be a statistically significant contributor to congestion (β = 0.195, $p < 0.001$) all these together explain approximately 60% of the variation in traffic congestion levels across the study area. Broader implications (the economic cost of inaction), residents overwhelmingly agree (mean likert score = 4.28) that traffic congestion adversely affects economic productivity. Based on the findings, the study suggests developing a multimodal transportation plan that supports walking, cycling, informal and formal public transit. Incorporate real-time traffic management technologies to improve flow and incident response. Establish a municipal mobility task force comprising local government agencies (ARTMA officials), transport unions, civil society, and urban planners to oversee coordination and implementation. The research underscores the urgency for integrated policy action and infrastructure investment to ensure mobility, safety, and economic vitality in Ekwulobia and similar mid-sized Nigerian towns.

Keywords: Traffic congestion, On-street trading, Traffic management, Peak hour, Traffic volume, Urbanization.

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Introduction and Background

Traffic congestion is a growing global urban challenge that affects cities across both developed and developing countries. Rapid urbanization, increased motorization, and spatial expansion of cities have contributed to higher travel demand, often exceeding the capacity of existing transport infrastructure (Litman, 2021). In metropolitan areas such as New York, London, and Tokyo, governments have introduced integrated traffic management systems, public transport upgrades, and smart mobility solutions to manage congestion. Despite these innovations, many cities still grapple with traffic delays, economic losses, environmental pollution, and reduced quality of life due to inefficient urban transport systems (World Bank, 2020).

In Africa, urban areas are experiencing unprecedented growth without commensurate infrastructure development and policy reform. Cities such as Nairobi, Lagos, Cairo, and Johannesburg suffer from acute traffic congestion exacerbated by inadequate road networks, poor public transportation, informal settlement patterns, and weak enforcement of traffic regulations (UN-Habitat, 2014). The proliferation of informal transport modes, such as minibuses and motorcycles, while offering flexibility, often results in disorderly traffic conditions. Many African countries face fiscal and institutional limitations that hinder the planning and implementation of effective urban mobility strategies (Aderamo, 2012).

Nigeria, as Africa's most populous nation, faces significant urban transportation problems. Rapid population growth, uncoordinated land use, and underinvestment in transport infrastructure have resulted in severe traffic congestion in major cities such as Lagos, Abuja, Port Harcourt, and Onitsha (Eze and Nwankwo, 2020). The reliance on road transport, coupled with the dominance of informal commercial transport operators, contributes to inefficiencies in movement and increased accident risks. Traffic congestion has negative socio-economic implications, including reduced productivity, increased fuel consumption, and environmental degradation. While several urban transport policies exist, implementation remains weak due to institutional fragmentation and inadequate funding (Oyesiku, 2002; Okpala, 1986).

In southeastern Nigeria, Anambra State has witnessed fast-paced urbanization, particularly in towns like Awka, Onitsha, Nnewi, and Ekwulobia. These towns serve as commercial and transportation nodes, drawing significant vehicular and pedestrian activity. However, traffic congestion remains a persistent challenge due to narrow roads, poor planning, unregulated roadside trading, and weak traffic management systems (Nwaka, 2005).

Ekwulobia, a rapidly urbanizing town in Aguata Local Government Area of Anambra State, southeastern Nigeria, has evolved into a critical commercial and administrative hub in the region. It serves as a major transportation node, linking several surrounding towns such as Oko, Uga, Igbo-Ukwu, Ezinifite, Agulu, and the state capital, Awka (Okpala, 1986; Nwaka, 2005). This strategic position, coupled with increasing urbanization, population growth, and economic activity, has contributed significantly to rising traffic congestion in the area.

The prominence of Ekwulobia as a regional interchange is underscored by the concentration of commercial establishments, motor parks, financial institutions, health facilities, educational centers, and religious institutions. These attractions generate a high volume of daily human and vehicular traffic. However, the rapid and often unplanned physical growth of the town has outpaced transportation infrastructure development (Aderamo, 2012). The current road system, originally

intended for a less populous and less motorized society, now experiences severe stress from vehicular overload.

Traffic congestion in Ekwulobia manifests in various forms including prolonged travel times, frequent bottlenecks at intersections, disorderly vehicle movements, and obstructions caused by roadside trading and illegal parking (Eze and Nwankwo, 2020). The narrowness of most internal roads, absence of service lanes, and lack of designated loading bays further exacerbate the problem (Oyesiku, 2002).

In addition, informal transport operators—commercial motorcyclists (okada), tricycles (keke napep), and minibuses—are prevalent and often operate without adherence to traffic laws. Their indiscriminate stopping and parking patterns contribute significantly to road congestion and increase the risk of road accidents (Adeleke et al., 2020).The absence of proper traffic control infrastructure such as signals, pedestrian crossings, roundabouts, and t raffic enforcement units contributes to vehicular and pedestrian conflicts. Furthermore, flooding during the rainy season, resulting from poor drainage infrastructure, often leads to road degradation and impassability in some sections, compounding traffic problems (Ukoje and Kanu, 2014).

Addressing the growing congestion crisis in Ekwulobia demands a holistic and integrated approach involving transport infrastructure upgrades, effective traffic management, enforcement of planning regulations, and the promotion of sustainable transportation practices (Litman, 2021). This study is justified by the urgent need to address persistent traffic congestion in Ekwulobia, a growing commercial and transport hub in Anambra State, Nigeria. The town's rapid development, rising vehicle use, and lack of adequate transport infrastructure have resulted in severe mobility challenges. The study is significant as it seeks to provide empirical insights into the causes and effects of traffic congestion, which will inform urban planning policies, guide local government interventions, and promote sustainable transportation solutions. It also contributes to academic research and supports national and global development goals aimed at creating more livable and efficient urban environments.

This study seeks to critically analyze traffic congestion in Ekwulobia, while proposing lasting solutions to traffic congestion in Ekwulobia.

2. Literature Review

2.1 Causes of Traffic Congestion

Poor Road Condition and Narrow Roads: Studies in various Nigerian towns, including Ilorin and Gwagwalada, have identified inadequate road infrastructure and narrow roads as significant contributors to traffic congestion. These conditions hinder smooth traffic flow and increase travel times (Faiyetole and Adewumi, 2024).

Indiscriminate Parking and Street Trading: In cities like Yenagoa and Lokoja, indiscriminate parking and street trading have been highlighted as major causes of traffic congestion. These activities obstruct roadways and reduce available space for vehicles (Olorunfemi, Okoko and Gbadamos, 2024).

High Vehicle Volume and Informal Transport Systems: The proliferation of informal transport systems, such as tricycles and motorcycles, has been noted in towns like Lokoja and Kogi State.

While providing affordable transportation options, these modes contribute to traffic congestion due to their high numbers and lack of regulation (Paul and McSharry, 2021).

2.2 Population Growth, Socio-Economic and Environmental Impacts

Reduced Productivity and Increased Costs: In Apo, Abuja, traffic congestion has been associated with increase population growth, decreased productivity, increased fuel consumption, and higher vehicle maintenance costs (Olayinka, 2020). These impacts affect both residents and businesses.

Increased Travel Time and Loss of Business Opportunities: In Gwagwalada, delays caused by traffic congestion have led to increased travel times and loss of business opportunities, particularly affecting civil servants and traders (Ojo and Akinlolu, 2022).

Environmental Pollution: Studies in the Federal Capital Territory (FCT) have shown that traffic congestion contributes to urban pollution, affecting air quality and public health (Abuh & John, 2023).

2.3 Informal Transport Systems and Roadside Activities

Impact of Informal Transport Operators: In Kogi State, informal transport operators have been identified as contributing to traffic congestion. Their operations often lack coordination and regulation, leading to traffic bottlenecks (Ali and Ngene, 2020).

Role of Street Trading: Street trading has been observed to obstruct roadways, reducing the effective width of roads and contributing to traffic congestion in towns like Yenagoa and Lokoja (Olorunfemi, Okoko & Gbadamos, 2024).

2.4 Effectiveness of Existing Parking Infrastructure and Traffic Management

Parking Space and Traffic Management Strategies: In Enugu, the introduction of more parking spaces, traffic management agencies and traffic lights has been found to improve traffic flow. However, challenges remain, necessitating the adoption of modern parking system and traffic management measures (Faiyetole and Adewumi, 2024).

Road Expansion and Mass Transit: In Gwagwalada, recommendations include road expansion and the promotion of mass transit to alleviate traffic congestion. These measures aim to increase road capacity and reduce the number of private vehicles on the road (Olayinka, 2020).

2.4 Proposed Solutions for Mitigation

Intelligent Traffic Systems: The adoption of intelligent traffic systems, such as smart traffic lights, has been suggested in Enugu to improve traffic flow and reduce congestion (Paul and McSharry, 2021).

Public Transportation Improvements: In Lagos, studies have shown that improvements in public transportation, including dynamic scheduling, can reduce waiting times and alleviate congestion (Olayinka, 2020).

Urban Planning and Land Use Integration: Integrating land use planning with transportation planning is recommended to create compact and mixed-use developments, reducing the need for long-distance travel and mitigating congestion (Abuh and John, 2023).

These studies provide valuable insights into the causes, impacts, and potential solutions to traffic congestion in smaller urban areas, offering a comparative perspective for addressing similar challenges in Ekwulobia.

2.5 Conceptual Framework for Traffic Congestion in Ekwulobia

2.5.1 Independent Variables (Causes of Traffic Congestion)

These factors represent the primary causes of traffic congestion in urban areas.

Road Infrastructure: Poor road networks and limited expansion of infrastructure contribute significantly to congestion. Inadequate road capacity combined with rapid urbanization leads to traffic bottlenecks (Faiyetole and Adewumi, 2024).

Urbanization and Population Growth: As population density increases, especially in developing economies, so does the demand for transportation, exacerbating congestion (Olayinka, 2020).

Indiscriminate Parking: Parking issues, such as illegal parking and insufficient designated parking spaces, reduce road capacity and create obstructions to smooth traffic flow (Ali and Ngene, 2020).

Street Trading: Informal trading along roadways blocks lanes and pedestrian walkways, contributing to congestion, particularly in commercial hubs (Olorunfemi et al., 2024).

Informal Transport Systems: Unregulated informal transportation systems, such as motorcycle taxis (okadas) and minibuses, can increase road use and cause traffic disruptions (Paul and McSharry, 2021).

2.5.2 Mediating Variables (Intervening Factors)

These variables moderate the relationship between the causes of congestion and the resulting impacts.

Traffic Management and Law Enforcement: The efficiency of traffic regulations and the enforcement of laws, such as illegal parking or proper lane discipline, affect the severity of congestion (Faiyetole and Adewumi, 2024).

Public Transport Availability: The availability of public transportation provides an alternative to private vehicles, reducing congestion (Olayinka, 2020). However, inadequate and unreliable services can worsen congestion (Ali and Ngene, 2020).

Government Policies and Urban Planning: Effective urban planning, zoning laws, and transportation infrastructure development are essential in preventing and mitigating congestion. Poor urban planning exacerbates the issues (Abuh and John, 2023).

2.5.3 Dependent Variables (Impacts of Traffic Congestion)

These are the negative consequences of traffic congestion in Ekwulobia.

Economic Losses: Traffic congestion leads to increased travel time and fuel consumption, reducing productivity and increasing the costs of goods and services (Olayinka, 2020; Ojo and Akinlolu, 2022).

Environmental Degradation: Prolonged congestion contributes to higher levels of air pollution and noise, negatively impacting public health and the environment (Abuh and John, 2023).

Health Impacts: Increased stress, respiratory diseases, and traffic accidents are common consequences of traffic congestion (Olayinka, 2020).

Decreased Mobility: Poor traffic flow reduces access to essential services, educational institutions, and economic opportunities, hindering social and economic mobility (Olorunfemi et al., 2024).

2.5.4 Proposed Solutions (Moderating and Mitigating Factors)

These strategies are proposed to mitigate the impacts of congestion.

Infrastructure Development: Expanding road networks, building multi-level parking structures, and improving urban infrastructure can alleviate traffic congestion (Faiyetole and Adewumi, 2024).
Introduction of Smart Traffic Management: Implementing intelligent traffic systems, such as real-time traffic monitoring, automated traffic control, and smart parking systems, can optimize traffic flow (Paul and McSharry, 2021).
Public Transportation Systems: Expanding reliable and efficient public transport options, such as buses or mass transit systems, can reduce the need for private car use (Olayinka, 2020).
Urban Planning and Zoning Regulations: Comprehensive urban planning that integrates transportation, residential, and commercial spaces, along with effective zoning regulations, is essential to reduce congestion (Abuh and John, 2023).

2.6 Hierarchy of Roads

Basically, there are four (4) hierarchies of roads in Ekwulobia. They are Arterial, Primary Collector, Secondary Collector and Access roads.

2.6.1 Road Network

Ekwulobia has good network of roads. The network would have made it possible for easy mobility to all the nooks and crannies of the town and would have enhanced easy intra transportation system. But the problem with most of these roads is that they are not in good condition. Being that most are earth road without drains, they are in pitiable state and have hampered the use of vehicle to get to some interior areas of the town especially during rainy season (Erere F. 2020).

Table 1: Ekwulobia General Road Condition

S/N	ROAD/ STREET NAME	ROW	CONDITION (REMARK)
1	Awka Road	25 Meters	Fair, poorly drained. Potholes at some portions
2	Orlu Road	25 Meters	Fair, Potholes at some portions
3	Nnewi Road	20 Meters	Fair, poorly drained with potholes at some points
4	Oko Road	20 Meters	Fair, Potholes at some intervals
5	Stadium Road	12 Meters	Good
6	Umuchiana Road	10 Meters	Bad, earth road with no drains. Full of potholes
7	George Okoli Jr. Road	10 Meters	Fair at entry from Awka road but terrible at exit into Nnewi road.
8	Paul Amaonye Street	8 Meters	Good
9	Jesco Factory Road	12 Meters	Tarred but very bad with ditches and potholes
10	Rev.Goddy Okonkwor Street	10 Meters	Earth road without drains. Retains water
11	Ezinifite Road	15 Meters	Very good.
12	General Hospital Road	12 Meters	Wide enough but with lots of potholes
13	St.Joseph – Eke Ofuu Road	8 Meters	Narrow street with street trading incidence.
14	Nkono Road	10Meters	Earth road. Not motorable
15	Eziagulu Road	10 Meters	Earth road and bad especially during rainy season.
16	Prison Road	12 Meters	Earth road with stagnant water, lacks drains

17	Aguata High School Road	12 Meters	Earth road and terribly bad. Lacks drains
18	St Mary's Hospital Road	8 Meters	Earth road and very bad with potholes
19	St Luke's Church Road	10 Meters	Earth road with potholes
20	Umuowelle Road	8 Meters	Earth road with lots of sand deposits
21	Umuezennafor School Road	8 Meters	Earth narrow street with incidence of street trading

Source: Researcher's Field Survey Compilation (2024).

2.6.2 Analysis and Planning Implications

The condition of roads in Ekwulobia affects mobility especially into the interior parts of the town thereby affecting social and economic growth of the town. Some businesses have complained of low patronage as customers find it difficult to get to them to buy their products. Some of them who sale perishable products have resorted to hawking them on the streets to avoid them get damaged. Physical development has not been spared either. This report cannot overemphasize the relation between transportation and land use. Poor intra-town transportation has affected land-use value and overall physical development of the interior. Development and other activities like commerce have concentrated only on the major roads while the interior parts of the town have suffered neglect.

The implication of this condition is lack of coordinated (planned) development, and development which is skewed in favour of major roads. Also conflict in the use of land has also been created especially along the major roads where various uses are jostling for the few available land. Land-use chaos is the resultant effect of the above scenario.

2.6.3 Road Analysis

The table 2 below shows the detailed road analysis.

Table 2: Road Analysis

ROAD TYPE	RIGHT OF WAY	ROAD DISTANCE (km)	
Arterial Road	30 meters	7.0 km	Existing
Primary Collector	20 meters	12.5 km	Improvement
Secondary Collector	15 meters	15.3 km	Improvement
TOTAL		**34.8 km**	

Source: Field Analysis of Road Improvement Plan, (2024).

It is noteworthy that the road analysis as much as possible followed existing roads with little modification (improvement) in areas of alignment and expansion. This is aimed at reducing to the barest minimum the extent of destruction.

3. Materials and Method

Ekwulobia is located between Longitude 07º 04' 00" and 07º 06' 00" East of Greenwich and Latitude 05º 59' 00" and 06º 02' 00" North of Equator. It is bordered on the East by Aguluezechukwu, on the South by Ezinifite and Nkpologwu. On the Western part of Ekwulobia lies Ikenga and Isuofia, while on the Northern part lies Nanka and Oko communities in Orumba North Local Government. Due to its location, Ekwulobia has attracted various projects development such as: Aguata L.G.A. Headquarters, Ekwulobia Township Stadium, National Prisons, District Police

Station, PHCN District Office, Aguata Diocesan Missionary Headquarters, Fire Service Station, Eke Market, Ekwulobia Commercial Park, etc. These projects also generate heavy traffic which constitutes traffic congestion.

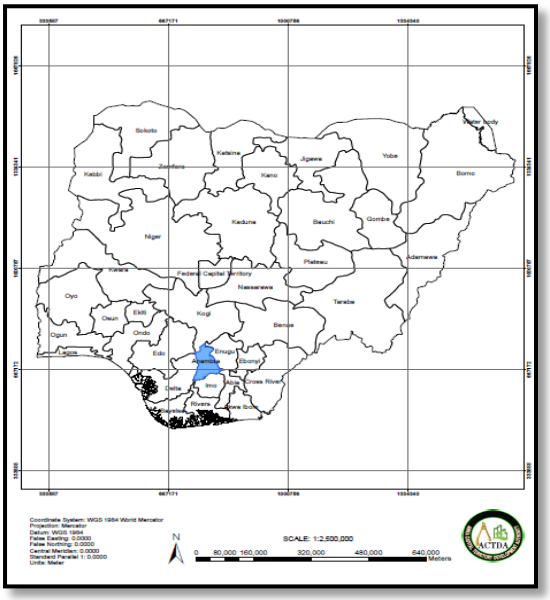


Figure 1: Anambra State in the Context of Nigeria.
Source*: Awka Capital Territory Devt. Authority, (2024).*

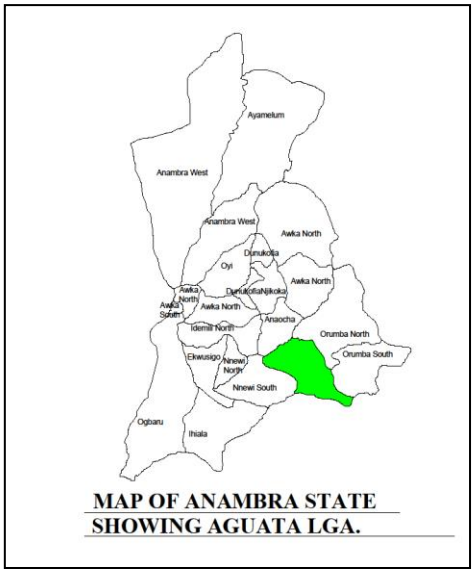


Figure 2: Map of Anambra State Showing Aguata L.G.A. *Source: Adapted from Nwabu, (2010).*

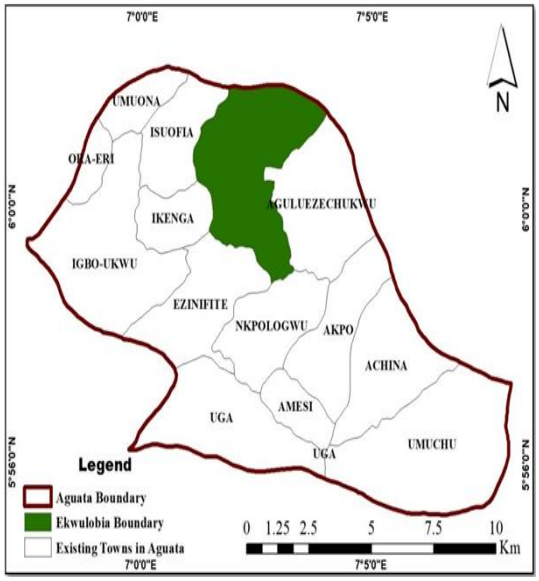


Figure 3: Ekwulobia in the Context of Aguata L.G.A.
Source: Adapted from Nwabu, (2024).

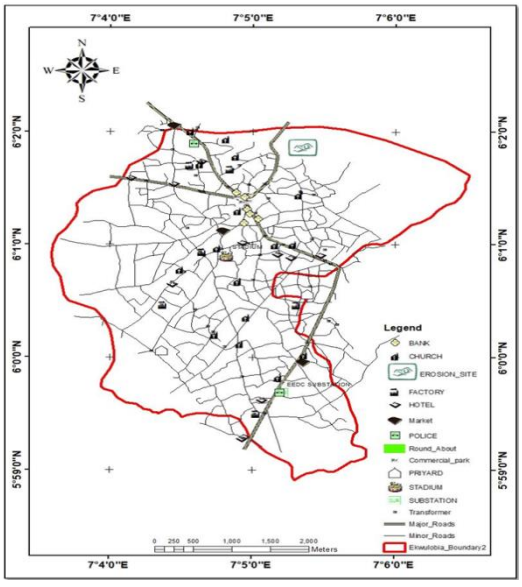


Figure 4: Base Map of Ekwulobia.

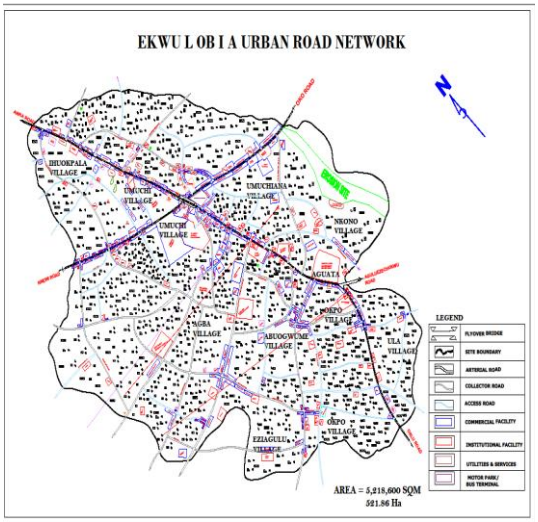


Figure 5: Existing Map of Ekwulobia Urban Road Network. Source: Field Survey (2024)

Ekwulobia which covers the land area of about 521.86 hectares is the fourth urban area in Anambra State after Awka, Onitsha and Nnewi, and is currently one of the largest towns in Aguata Local Government Area. Traditional, Ekwulobia is divided into two divisions namely; Ezi and Ifite. The Ezi division is made up of six (6) villages which are; Umuchiana, Umuchi, Okpo, Nkono, Abogwume and Ihuokpala, while Ifite division is made up of Agba, Ula and Eziagulu villages. Generally, Ekwulobia is made up of nine (9) villages viz: Umuchiana, Agba, Umuchi, Ula, Okpo, Eziagulu, Nkono, Abogwume and Ihuokpala. It is on record that Abogwume was the first among others to settle in Ekwulobia. This explains why Abagwume village till date holds the staff (*Ofor*) that unites Ekwulobia. Other villages that settled thereafter were Umuchiana, which is said to have migrated from Oko,Agba from Nnewi and Agbaja in Enugu State,Okpo from Ezinifite in Aguata L.G.A.,Eziagulu from Agulu-Ezechukwu town in Aguata L.G.A. and Nkono from Umuobom in Imo State. It is somewhat vague where Umuchi, Ula and Ihuokpala migrated from (Okoro 2023).

3.1 Population of Study

The 1991 and 2006 population census put Ekwulobia at 35,269 and 63,415 respectively, with average annual growth rate of 2.8% per annum (National Population Commission, 2006). From the 2006 population figure, the present population (2024) was projected using the standard population projection formula and the figure was estimated at 104,254. This population figure does not represent the population of resident vehicle owners.

Table 3: 1991, 2006 and 2024 Population of Ekwulobia.

Town	**1991 Figure**			**2006 Figure**			**Projected Population (2024)**
	Male	**Female**	**Total**	**Male**	**Female**	**Total**	**Total**
Ekwulobia	17,296	17,973	35,269	31,148	32,267	63,415	104,254

Source: National Population Commission, Awka (2006);

For the purpose of this study the 2006 population was projected to 2024 using Thomas Malthus Exponential model; $P2 = P1(1 + r)\hat{}n$ to be 104,254 persons approximately using a growth rate of 2.2%.

The study adopted the survey method through Oral interview, observation and Questionnaires survey to buttress the findings of the literature review. The required data for this study were collected from both primary and secondary sources. The primary data were obtained using questionnaires administered to residents in Ekwulobia. Secondary data were obtained from reputable planning books and online journals.

Two sets of questionnaire were prepared for this study. The questionnaires were administered on both the residents and road users, while another was administered on the Staff of Anambra State Road Traffic Management Agency (ARTMA). The questionnaires consists of questions on travel time, vehicular ownership, causes and solutions to traffic congestion, etc., while the other is specifically on the challenges faced by the ARTMA in the control and management of traffic in Ekwulobia. A total of three hundred and ninety-eight (398) questionnaires were printed for this study. Three hundred and seventy-eight (378) questionnaires were administered on the residents and road users, while twenty (20) questionnaires were administered on staff of ARTMA. Out of the three hundred and seventy-eight (378) questionnaire administered on the residents and road users, three hundred and seventy-six (376) were properly filled, one (1) was not filled, while one (1) was missing. On the questionnaires administered to the officers of ARTMA, (100%) all were properly filled and

The study employed TaroYamami formulae to calculate and determine the sample size for this study.

$$n = \frac{N}{1+N(e)\hat{}2} \qquad (1)$$

Where n = Sample size?

N (Population) = 104,254; I (Constant) and e (Margin for error) = 0.05 or 5%

Substituting the values, the sample size for the study is estimated at 398. The four major roads; Ekwulobia-Uga road, Ekwulobia-Oko road, Ekwulobia-Isuofia and Ekwulobia-Nanka road, in the study area were purposively selected based on their hierarchy and existing characteristics. The selected major roads serve as collector roads to the access roads in Ekwulobia. The nine villages represent nine clusters. Because of the difficulty in determining the existing population of the nine villages, the researcher therefore selected at random, forty-two (42) respondents from each cluster to ensure that field respondents have equal chance of being selected. Additional twenty respondents from Anambra Road Traffic Management Agency were also selected at random. Therefore, the totals of three hundred and ninety-six respondents were selected at random for this study which represents 99.5% of the sample size.

This study adopted purposive sampling in selecting key areas, individuals, or groups within Ekwulobia that are directly affected by or have relevant knowledge about traffic congestion. Traffic congestion is a localized issue, and it is essential to focus on those who have a direct experience with the problem. Participants involved in commercial activities (e.g., Staff of Anambra State Road

Traffic Management Agency (ARTMA), traders in Eke Market Ekwulobia or vehicle operators) will provide insight into the impact of congestion on business operations, health, and social life. Purposive sampling allows the researcher to gather data efficiently without the need for large-scale, random sampling, which may be time-consuming and costly in a geographically spread-out region. The present population of Ekwulobia represents the sample frame.

Linear regression analysis was applied in this research to offer a practical, interpretable, and robust method for identifying the key determinants of traffic congestion in Ekwulobia and for developing predictive models to support sustainable transport planning and policy-making. It aligns well with the quantitative nature of the study and provides valuable insights for evidence-based decision-making. Traffic congestion is influenced by multiple quantifiable factors such as population growth, vehicle volume, road width, parking availability, and market activity. Linear regression in this context helps quantify the strength and direction of the relationship between these independent variables (e.g., number of vehicles, road size) and the dependent variable (level of congestion), making it an ideal tool for analysis. The data for this study, such as traffic volume at different junctions, population density in specific wards, or average commute time, is often collected at a single point in time across multiple locations. Linear regression is well-suited for analyzing such cross-sectional datasets.

3.2 Traffic Count Procedure

To assess the extent of traffic congestion in Ekwulobia, a manual traffic count was conducted at selected key junctions and road segments within the town. These included the Ekwulobia Roundabout, the central motor park entrance, and the Eke Market access roads, which are known hotspots for vehicular delays and congestion. The traffic count focused on all types of vehicles including cars, buses, motorcycles (Okada), and tricycles (Keke), as well as commercial trucks where applicable. The count was carried out over a period of one week (Monday to Saturday) to capture variations in daily traffic flow and market activities.

Specific details of the traffic count include:

Count Times: Traffic was monitored during peak and off-peak hours.

- Morning Peak: 7:00 AM – 10:00 AM
- Midday (Off-peak): 12:00 PM – 2:00 PM
- Evening Peak: 4:00 PM – 7:00 PM

Duration: Each session lasted 3 hours in the morning and evening, and 2 hours at midday, making a total of 8 hours per day per location.

Method: Enumerators were positioned at strategic vantage points to record the number and type of vehicles passing or queuing at each location. Tally sheets and time-stamped logs were used to capture traffic flow per 15-minute interval.

Days Covered: Data collection was conducted on weekdays and a market day (Saturday) to account for variations due to market and commuting patterns.

Safety Measures: Enumerators were trained and equipped with reflective jackets and identification to ensure visibility and coordination during the exercise.

This structured approach ensured a comprehensive and representative dataset for analyzing traffic patterns and identifying congestion trends across different time periods and vehicle categories in Ekwulobia.

The study applied the use of manual traffic counting over automated methods which was guided by contextual, logistical, and practical considerations that align with the research environment in Ekwulobia. Considering the limited technological infrastructure, cost-effectiveness, flexibility and real-time observation, suitability for complex and mixed traffic conditions, local capacity and community involvement, short-term and targeted data collection, the manual counting method provided a reliable, adaptable, and context-appropriate means of collecting traffic data in Ekwulobia. When combined with structured schedules, trained enumerators, and standardized recording tools, the method ensured the accuracy and relevance of the data for analyzing congestion patterns in a complex, informal urban transport environment

4. Data Analysis and Findings

This section presents the results of the statistical analysis conducted on data collected from a sample of 376 respondents. Descriptive statistics provide a summary of respondent characteristics and traffic-related perceptions, while inferential statistics—specifically multiple linear regression—were used to identify key predictors of traffic congestion in the study area.

4.1 Descriptive Statistics

4.1.1 Sex of Respondents

Table 5 revealed that 43% of the respondents were male, while 57% were female. 55% of the staff respondents from ATMA are male, while 45% are female. From the combined responses of the respondents, 45% were male, while 55% female. The reason female respondents are more (55%) the male is that most household heads went for businesses as at the time the questionnaires were administered.

Table 5: Sex of Respondents

	Respondents		
Sex	**Residents and Road Users**	**ATMA Staff**	**Combined Total**
Male	162 (43%)	11 (55%)	173 (45%)
Female	214 (57%)	9 (45%)	223 (55%)
Total	**376 (100%)**	**20 (100%)**	**396 (100%)**

Source: Researcher's Field Survey and Analysis (2024).

4.1.2 Occupation

Table 6 shows that more than half of the respondents are self-employed (44%), having their businesses within the study area. Working class in the study area comprise of those employed in the public (18%) and private (12%) sectors. The table also reveals that 13% of the respondents are unemployed, while 13% are students/apprentice.

Table 6: Occupation of the Residents/Road Users

S/No.	Occupation	Frequency	Percent (%)
1	Student/apprentice	49	13
2	Public employed	68	18
3	Private employed	45	12
4	Self employed	165	44
5	Unemployed	49	13
Total		**376**	**(100%)**

Source: Researcher's Field Survey and Analysis (2024).

4.1.3 Age-Group, Marital Status and Educational Qualification of Respondents

Table 7 shows that most of the respondents (57%) are between the ages of 21 – 40 years, while the remaining respondents (43%) fall between the ages of 40 – 60 years. The table further revealed that 69% of the respondents are married, while 31% are single.

Table 7: Age, Marital Status and Qualification of Respondents

	Age	Respondents Residents and Road Users	ARTMA	Combined Total
A				
	21 - 40	92 (57%)	11 (85%)	103 (57%)
	41 – 60	70 (43%)	9 (15%)	79 (43%)
	Total	**376 (100%)**	**20 (100%)**	**396 (100%)**
	Marital Status	**Respondents Residents and Road Users**	**ATMA**	**Combined Total**
B	Single	52 (32%)	5 (25%)	57 (31%)
	Married	110 (68%)	15 (75%)	125 (69%)
	Total	**376 (100%)**	**20 (100%)**	**396 (100%)**
C	**Qualification**	**Respondents Residents and Road Users**	**ATMA**	**Combined Total**
	FSLC	79 (21 %)	0	79 (18.7%)
	WAEC/NECO	135 (36 %)	9 (45%)	144 (37%)
	NCE/OND	75 (20%)	3 (15%)	78 (19.3%)
	HND/B.Sc.	87 (23%)	8 (40%)	95 (25%)
	Total	**376 (100%)**	**20 (100%)**	**396 (100%)**

Source: Researcher's Field Survey and Analysis (2024).

About 37% of the respondents had either WAEC or NECO, while 25% had either HND or B.Sc. degree. The foregoing shows that the education background of the respondents to an extent guarantee the soundness of the information provided on the causes, effects and solution to the problem under study.

Table 8: Standard Travel Time for the Roads under Study

S/No	Roads Under Study	Length (km)	Standard Travel Time (at 50km/h)	Actual Travel Time
1	Ekwulobia-Oko Road	1.40	1 min, 41 sec. (0.028h)	**70 minutes** (1hr. 10mins.)
2	Ekwulobia-Isuofia Road	1.53	1 min, 50 sec. (0.031h)	**76mins. 30 secs** (1hr. 16mins. 30secs)
3	Ekwulobia-Nanka Road	1.56	1 min, 52 sec. (0.031h)	**78 minutes** (1hr 18mins.)
4	Ekwulobia-Uga Road	5.00	6 min. (0.1 h)	**250 minutes.** (4hrs. 17mins)

Source: Researcher's Field Survey and Analysis (2024).

Table 8 shows travel time of major roads in the study. It indicates time travel, actual distance and the disparities caused by traffic congestion from each point. This help give a clearer picture of situations on ground.

4.2 Traffic Situation in Ekwulobia

Table 9: Rating the Traffic Situation in Ekwulobia

Rank	Road Name	Rate the Traffic Situation in Ekwulobia			
		Very high	High	Low	Very Low
1st	Ekwulobia-Uga	170 (45%)	94 (25%)	56 (15%)	56 (15%)
2nd	Ekwulobia-Oko	142 (36%)	151 (38%)	103 (26%)	---
3rd	Ekwulobia-Isuofia	95 (25.3%)	139 (37%)	70 (18.5%)	72 (19.2%)
4th	Ekwulobia-Nanka	94 (25%)	124 (33%)	94 (25)	64 (17%)

Source: Researcher's Field Survey and Analysis (2024).

It is evident from Tables 9 that Ekwulobia-Uga Road ranks first as the road with the highest traffic volume. Ekwulobia-Oko (second), Ekwulobia-Isuofia (third) and Ekwulobia-Nanka (fourth).

Table 10: Summary of Traffic Counts of the Roads under Study

Roads	Tuesday (5/9/2024)					Total
	Car	Bus	Truck	Tricycle	Motorcycle	
Uga Road	1870	1723	505	1411	2509	**8018**
Oko Road	1322	1469	257	1040	1650	**5738**
Isuofia Road	448	1065	107	786	1413	**3819**
Nanka Road	622	921	180	633	852	**3208**
Roads	**Wednesday (6/9/2024)**					**Total**
	Car	**Bus**	**Truck**	**Tricycle**	**Motorcycle**	
Uga Road	1489	1415	443	1032	1862	**6241**
Oko Road	1145	1389	309	834	1675	**5352**
Isuofia Road	369	506	112	571	1727	**3285**
Nanka Road	499	745	218	391	623	**2476**

Source: Researcher's Field Survey and Analysis (2024).

From the summary of the traffic counts in Table 10, Ekwulobia-Uga Road is observed to be the busiest of all the roads especially on Mondays. This is because the major land use activities which generate and attract traffic streams are located along Ekwulobia – Uga Road.

4.2.1 Causes of Traffic Congestion

On the causes of traffic congestion, Poor road condition ranks first, Insufficient parking space (second), Informal transport (third), narrow road sections (fourth), Poor road design and connectivity (fifth), increase in car ownership (sixth), flooding/poor drainage (seventh), On-street trading (eighth), reckless driving (ninth) and vehicle breakdown (tenth). From the foregoing, on-street parking and trading are identified as the major causes of traffic congestion in Ekwulobia.

Table 11: Causes of Traffic Congestion

Rank	Causes of Traffic Congestion	Relationship			
		High	Undecided	Moderate	Low
1st	Poor road condition	209 (55.6%)	77 (20.4%)	90 (24%)	---
2nd	Insufficient parking space	196 (52%)	82 (22%)	98 (26%)	---
3rd	Informal transport	143 (38%)	79 (21%)	71 (19%)	82 (22%)
4th	Narrow road sections	143 (38%)	56 (15%)	101 (27%)	75 (20%)
5th	Poor road design and connectivity	135 (36%)	82 (22%)	94 (25%)	64 (17%)
6th	Increase in car ownership	128 (34%)	82 (22%)	105 (28%)	60 (16%)
7th	On-street trading	124 (33%)	78 (21%)	101 (27%)	72 (19%)
8th	Reckless driving	119 (32%)	90(24%)	94 (25%)	72 (19%)
9th	Vehicle breakdown	116 (31%)	90 (24%)	82 (22%)	87 (23%)
10th	Flooding/poor drainage	109 (29%)	79 (21%)	75 (20%)	112 (30%)

Source: Researcher's Field Survey and Analysis (2024).

Table 11 illustrate the causes of traffic congestion, Poor road condition has the highest percent most of the respondents (55.6%), followed by Insufficient parking space (52%), Informal transport (38), Narrow road sections (38%), Poor road design and connectivity (36%), Increase in car ownership (34%), On-street trading (33%), Reckless driving (32%), Vehicle breakdown (31%) while the remaining respondents (29%) has Flooding/poor drainage as causes of traffic congestion.

Table 12: The day Traffic Congestion is more prominent

Rank	Day	Frequency	Percent (%)
1st	Tuesday	185	49.4
2nd	Wednesday	72	19.2
3rd	Friday	61	16
4th	Thursday	58	15.4
Total		**376**	**100 %**

Source: Researcher's Field Survey and Analysis (2024).

Table 12 show the days that is predominantly affected by traffic congestion, and result from the table 12 shows that Tuesday experience more traffic congestion accounting for (49.4%) followed by Wednesday (19.2%), Friday (16%) while Thursday has less traffic congestion indicating (15.4%).

Table 13: Most frequent Time for Traffic Congestion

Rank	Time	Frequency	Percent (%)
1st	Morning Peak: 7:00 AM – 10:00 AM	158	42
2nd	Midday (Off-peak): 12:00 PM – 2:00 PM	128	34
3rd	Evening Peak: 4:00 PM – 7:00 PM	90	24
Total		**376**	**100 %**

Source: Researcher's Field Survey and Analysis (2024).

Tables 13 show that, traffic congestion occurs from Tuesday to Friday. It starts increasing from 7:00am to 10:00am and gets at its peak from 12:00am to 2:00am. It drops from 1:00pm to 3:00pm and increases again from 4:00pm to 7:00pm.

Table 14: How often do you get stuck in traffic jams

S/No.	Options	Frequency	Percent (%)
1	Once per week	68	18
2	2 – 4 times per week	57	15
3	Every Eke Market Day	151	40
4	Occasionally	102	27
Total		**376**	**100**

Source: Researcher's Field Survey and Analysis (2024).

Table 14 revealed that congestion occurs frequently in Ekwulobia during every Eke market day (40%) and festival period (Christmas, New Year and Easter) accounting for (27%). While the remaining traffic occurs once per week (18%) and 2-4 times per week (15%)

Table 15: How long do you get stuck?

S/No.	Options	Frequency	Percent (%)
1	20-30min	181	48
2	10-20min	120	32
3	less than 10 min	75	20
Total		**376**	**100**

Source: Researcher's Field Survey and Analysis (2024).

In tables 15 it is obvious that traffic congestion also occurs every Eke Market days with commuters spending average of 20–30 minutes on the gridlock.

4.2.2 Effects of Traffic Congestion

Table 16: Effects of Traffic Congestion

Rank	Effects of Traffic Congestion	Response				
		Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
1st	Pollution	116	93	84	83	--
2nd	Increase in travel time	107	104	83	82	--
3rd	Reduces business service delivery	101	99	57	75	22
4th	Increase in cost of travel	109	96	86	85	--
5th	Accident	107	120	95	--	--
6th	Reduces socio-economic productivity	97	94	95	90	--

Source: Researcher's Field Survey and Analysis (2024).

Table 16 shows the effects of traffic congestion, pollution ranks first, increase in travel time (second), reduction in service delivery (third), increase in cost of travel (fourth), and accident fifth and reduction in socio-economic productivity sixth.

4.2.3 Challenges faced by ARTMA in Controlling Traffic Congestion in Ekwulobia

Table 17: Responses on the challenges faced by ARTMA in controlling traffic in Ekwulobia

Rank	Options	Responses				
		Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
1st	Bribery and corruption	18	0	2	0	0
2nd	High level of illiteracy amongst road users	16	4	0	0	0
3rd	Narrow/bad roads	12	8	0	0	0
4th	Administrative bottleneck	14	0	4	0	2
5th	Over concentration of commercial activities	9	4	1	6	0
6th	Absence of road furniture	8	3	0	6	3
7th	Poor road condition	4	9	0	6	1
8th	Poor cooperation of other enforcement Agencies	6	0	3	3	8
9th	Inadequate/poor quality equipment	0	2	0	3	15
10th	Poor government funding	0	2	3	0	15

Source: Researcher's Field Survey and Analysis (2024).

On the challenges faced by the Anambra Road Traffic Management Agency (ARTMA), bribery and corruption as shown in table 17, is revealed as the major challenge faced by the ATMA in controlling traffic in Ekwulobia.

4.2.4 Solution to Traffic Congestion Problems in Ekwulobia

Table 18: Responses on the Solution to Traffic Congestion in Ekwulobia

Rank	**Question**	**Response** (Please tick ONE for each Question)				
		Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
1st	Street trading and street parking should be seriously discouraged	57	15	0	0	0
2nd	All the existing roads should be properly maintained	54	18	0	0	0
3rd	There is need for traffic wardens and Road Safety Officers to control and enforce traffic laws and regulations in Ekwulobia	48	24	0	0	0
4th	Government should create more bypasses	41	28	0	3	0
5th	Some commercial activities within the Central Business Area should be relocated at the fringes	40	29	0	3	0
6th	There is the urgent need to introduce grade separation at Ekwulobia Round About	35	20	0	17	0
7th	The four (4) major roads in Ekwulobia need to be dualized	30	37	0	5	0
8th	There is the urgent need to re-plan Ekwulobia	27	38	0	7	0
9th	Trucks and lorries should be restricted from moving into Ekwulobia during day time.	36	9	0	24	3
10th	Public transit system should replace private transportation	16	20	0	33	3
11th	Okada transportation should be banned in Ekwulobia	11	11	0	32	18

Source: Researcher's Field Survey and Analysis (2024).

On the solution to traffic congestion in Ekwulobia as shown in table 18, most respondents suggested the need to discourage street trading and street parking as the major solution to traffic congestion in Ekwulobia.

4.3 Descriptive Overview of Traffic-Related Variables

Research conducted in this study were based the following null hypotheses

H_{01}: There is no significant relationship between poor road infrastructure and traffic congestion in Ekwulobia.

H_{02}: Population growth has no significant impact on traffic congestion in Ekwulobia.

H_{03}: Parking availability is not significantly associated with the severity of traffic congestion.

H_{04}: Informal transportation systems do not significantly contribute to traffic congestion.

H_{05}: Street trading has no significant relationship with traffic congestion.

Table 19: Mean Responses on Key Indicators (Likert scale: 1 = Strongly Disagree to 5 = Strongly Agree)

S/N	Variable	Mean	Std. Deviation
1.	Road condition is poor	4.32	0.91
2.	Population growth worsens traffic	4.05	0.89
3.	Parking space is insufficient	4.24	0.94
4.	Informal transport is chaotic	3.98	0.88
5.	Street trading blocking roads	4.11	0.85
6.	Traffic congestion affects economic activities	4.28	0.86

Interpretation: Respondents generally agree that road conditions, insufficient parking, and population growth are major contributors to traffic congestion in Ekwulobia.

A multiple linear regression was conducted to assess the relationship between traffic congestion (dependent variable) and five independent variables: Road Infrastructure (RI), Population Growth (PG), Parking Availability (PA), Informal Transport Activity (ITA), and Street Trading (ST).

Regression Model Summary (N = 378)

Model	R	R^2	Adjusted R^2	Std. Error of Estimate
1	0.774	0.599	0.593	0.466

Interpretation: Approximately 59.9% of the variation in traffic congestion is explained by the five predictors.

ANOVA Table

Source SS	df	MS	F	p-value
Regression	89.35	5	17.87	82.04 <0.001
Residual	59.21	371	0.159	
Total	148.56	376		

Interpretation: The regression model is statistically significant, indicating a good fit for the data.

Coefficients Table

Variable	B	Std. Error	Beta	t	p-value
Constant	1.021	0.112		9.12	<0.001
Road Infrastructure	-0.351	0.056	0.328	-6.27	<0.001
Population Growth	0.222	0.053	0.209	4.19	<0.001
Parking Availability	-0.296	0.057	-0.285	-5.19	<0.001
Informal Transport	0.187	0.051	0.168	3.67	<0.001
Street Trading	0.195	0.049	0.189	3.98	<0.001

Interpretation: Road infrastructure ($p < 0.001$): A significant negative relationship. Poor road conditions contribute substantially to traffic congestion. Parking availability ($p < 0.001$): significant negative effect, confirming that inadequate parking worsens congestion. Population Growth, Informal transport, and street trading also show significant positive effects ($p < 0.001$), indicating they exacerbate congestion.

4.4 Discussion and Interpretation

This study sheds light on the multidimensional drivers of traffic congestion in Ekwulobia, a rapidly urbanizing town in southeastern Nigeria. Through empirical analysis, it identifies and validates five statistically significant predictors—road infrastructure, parking availability, population growth, informal transport systems, and street trading—that together explain approximately 60% of the variation in traffic congestion levels across the town. This robust R^2 value underscores the combined influence of physical infrastructure deficits, demographic pressures, informal economic activity, and planning limitations on urban mobility.

The findings not only diagnose the challenges but also offer a framework for evidence-based intervention. Each predictor is analyzed below in terms of its impact, planning implications, and corresponding policy prescriptions.

Road infrastructure (structural weakness at the core) shows road infrastructure emerged as the most critical determinant of congestion, with a strong negative beta coefficient ($\beta = -0.351$, $p < 0.001$). Observational data and respondent feedback reveal that Ekwulobia's roads are often narrow, poorly surfaced, riddled with potholes, and lack dedicated lanes for pedestrians and non-motorized users. In some areas, encroachments further reduce effective carriageway width.

Policy and infrastructure implications: A phased road rehabilitation strategy must be initiated, beginning with arterial roads that serve the highest traffic volumes. Road upgrades should include resurfacing with durable materials, proper drainage systems to prevent erosion, lane widening where feasible, and the creation of sidewalks and pedestrian bridges in high-footfall zones. A GIS-based road and traffic audit should be institutionalized to identify and continually monitor chokepoints and bottlenecks across the town's road network.

Urban planning strategy demonstrate implementation of a functional road hierarchy system is necessary—distinguishing between arterials, collectors, and local access roads—to promote traffic efficiency. Road designs should anticipate future vehicular volumes, incorporating resilience features such as service lanes and designated bus stops to prevent random stopping by public transport vehicles.

Parking infrastructure (an overlooked but potent contributor), represent analysis that inadequate parking availability ($\beta = -0.296$, $p < 0.001$) plays a substantial role in traffic congestion. Ekwulobia currently lacks sufficient formal parking spaces, especially around commercial centers like the central market and motor parks. Vehicles frequently park along carriageways, effectively reducing lane capacity and impeding traffic flow.

Policies Implications represent develop of off-street public parking lots in strategic locations, particularly near commercial zones and transit hubs. Amend local building codes to mandate the inclusion of sufficient off-road parking spaces in all new commercial, institutional, and mixed-use developments. Establish a structured parking fee system that discourages long-term on-street parking while generating revenue for maintenance and expansion.

Urban Design Considerations indicates an incorporate multi-level parking structure into town master plans, especially in high-density commercial districts. Enforce no-parking zones along narrow roads through signage, physical barriers (e.g., bollards), and regular patrols by parking enforcement officers.

Population growth (the latent pressure multiplier), shows a population growth ($\beta = 0.222$, $p < 0.001$) is another significant predictor, reflecting how rapid urbanization and densification strain the existing transport infrastructure. The town's population growth rate is outpacing the capacity of its roads, public transport systems, and public spaces, resulting in increased vehicle ownership and usage.

Policies implications here demonstrate integrate demographic projections into land use planning to ensure that infrastructure and services are scaled accordingly. Promote transit-oriented development (TOD) models that support mixed-use, high-density housing within walking distance of public transport corridors.

Regional Planning Perspective, link Ekwulobia's urban planning efforts with Anambra State's broader spatial development strategy, ensuring that investments in transport infrastructure and services reflect both local and regional population trends.

Informal transport systems (a vital but chaotic component): Informal transport modes such as commercial motorcycles (okadas) and tricycles (keke napeps) contribute significantly to traffic congestion ($\beta = 0.187$, $p < 0.001$). These operators often stop unpredictably, occupy road shoulders, and maneuver erratically, disrupting traffic flow and increasing accident risks.

Policy Implications, formalize informal transport through licensing schemes, route registration, and time-based operational permits. Create designated pick-up and drop-off points to reduce random stops on busy roads.

Transport innovation options, introduction of "BRT Lite" models by dedicating a lane or shoulder along major roads for high-capacity informal transport and being regulated by ARTMA officials. Offer incentives such as microloans or grants to help informal operators upgrade vehicles and comply with regulations.

Street trading (navigating the livelihoods-mobility nexus), street trading was found to be a statistically significant contributor to congestion ($\beta = 0.195$, $p < 0.001$). Traders occupy sidewalks, encroach on roads, and attract pedestrian and vehicular crowds, especially near markets and bus stops.

Policy and social planning implications, instead of criminalizing informal vending, urban authorities (ARTMA officials) should collaborate with trader associations to develop designated vending areas that are accessible yet do not obstruct traffic. Implement time-based vending policies, allowing trading during off-peak traffic hours. Develop modular roadside kiosks with clearly defined boundaries to maintain road space integrity.

Inclusive planning strategy, engage street traders, market unions, and local leaders in participatory planning processes to ensure buy-in and compliance with relocation or regulation efforts.

Broader implications (the economic cost of inaction), residents overwhelmingly agree (mean Likert score = 4.28) that traffic congestion adversely affects economic productivity. Reported consequences include extended commute times, increased vehicle maintenance and fuel costs, delays in goods delivery, and lost business opportunities.

5. Conclusion

The findings of this study present strong empirical support for rethinking urban mobility strategies in secondary towns such as Ekwulobia. Statement from broader implication in relation to planning response, needs an urgent cost-benefit analysis to quantify economic losses associated with traffic delays, and uses this data to prioritize investments in traffic management technologies and transport infrastructure. Justify expenditures on smart mobility systems—such as adaptive traffic signals, surveillance cameras, and real-time public transport tracking—using clear economic return metrics. Toward an Integrated Urban Mobility Framework, the study underscores the need for a comprehensive, multi-stakeholder urban mobility plan that aligns transportation policy with land use, economic development, and environmental sustainability goals. A piecemeal approach is no longer sufficient. Instead, a coordinated and holistic framework is essential—one that integrates physical infrastructure upgrades policy and regulatory reform, digital innovation, and socio-economic inclusion. The immediate priority for local planning authorities should be the rehabilitation and expansion of critical road infrastructure and the development of structured parking systems. Simultaneously, there is an urgent need to regulate and integrate informal transport operators and to reorganize street trading to balance livelihoods with urban mobility imperatives. A long-term vision for sustainable growth must be anchored in evidence-based planning, inter-agency coordination, and stakeholder engagement.

The study suggests that traffic congestion in Ekwulobia can be resolved through developing a multimodal transportation plan that supports walking, cycling, informal and formal public transit. Incorporate real-time traffic management technologies to improve flow and incident response. Establish a Municipal Mobility Task Force comprising local government agencies (ARTMA officials), transport unions, civil society, and urban planners to oversee coordination and implementation. Encourage community-based transport governance to enhance accountability, enforcement, and responsiveness

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