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Assessing Road Transport Infrastructure and Commuters' Travel Time in Lagos Metropolis

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Abstract

The increasing population in the Lagos metropolis has affected the commuting experience in recent years. This factor, coupled with the road transport infrastructure, has become increasingly worrisome and is currently receiving the interest of transport planners and policymakers. A growing volume of studies has examined the socio-demographic, socio-economic and perceptions of commuters on their commuting experience. However, the specific information on road transport infrastructure and the travel time of commuters in metropolitan Lagos is sparse. Hence, the assessment of road transport infrastructure and commuters' travel time in the metropolis. The study relied on primary data with the instrument of a questionnaire. Using the Krejcie and Morgan table (1970) to determine the sample size, with an approach for sample selection at a 95% confidence level with a 5% margin of error. In line with the table's recommendation, a population of 140 yields an estimated sample size of approximately 100 respondents. Frequency and percentage (%) were used to determine the socio-demography of respondents with variables like age, sex, marital status, e.t.c and multiple linear regression was used to determine the effect of Road transport infrastructure on commuters' travel time. Results revealed that the demographic composition points to a strong dependence on road transport, especially among economically active individuals, and that road transport infrastructure plays a significant role in determining how long commuters spend on the road within the study area. The paper concludes that road quality, traffic congestion, drainage condition, and traffic management all contribute meaningfully to variations in travel time among commuters and that a holistic approach is necessary to achieve reduced travel time, improved mobility, and enhanced urban transportation efficiency in Lagos metropolis.

Keywords: Commuter; Lagos Metropolis; Road Transport; Traffic; Travel Time.

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1. Introduction

World population doubled (100% increase) in 40 years, from 1959 (3 billion) to 1999 (6 billion), It is now estimated that it will increase by 50% in the subsequent 40 years, to reach 9 billion by 2037, and by 2057, the figure is predicted to increase to 10 billion persons [27]. Accordingly, urban areas will continue to witness rapid growth, which will impose further challenges for urban planners, specifically in transportation, as this is the backbone of urban expansion and development. Urban growth cannot be directly observed in urban areas as a single factor. In fact, a variety of factors drive urban growth, such as internal and international migration. At present, growth in the urban population worldwide is considered the factor directly responsible for the unprecedented rate of urban sprawl, mainly in cities in the global south. As the population of an urban centre increases, its need for infrastructure such as transportation, water, sewage, and facilities such as housing, commerce, health, schools, and recreation increases, most often resulting in the phenomenon known as urban sprawl. Due to the rapid rise in urbanisation levels in most countries across the world since 1950, the monitoring and analysis of urban expansion have become a popular topic in geoscience applications in various regions around the world. Lagos ranks among the top 10 most congested cities globally, with average travel speeds of 10-20 km/h Reference [26]. Also, 40 % of the roads are in poor condition, leading to increased maintenance costs and travel times. As far as Lagos is concerned, there is daily migration from different parts of the world and Nigeria, especially Lagos and other parts of Nigeria [1]. The state, which is the commercial nerve centre of Nigeria and the major urban agglomeration state in the country, accommodates virtually all tribes within the country, and it is often referred to as a heterogeneous city. Urban centres like Lagos offer greater opportunities in terms of education, employment, and research. One of the challenges that poses a threat to these greater opportunities in an urban setting like Lagos is the system of transportation in the state, which is a vital tool for the conveyance of people, goods, and services from one place to another, considering the ease of mobility. Road transportation infrastructures play an important role in the transportation system and, by extension, shape the economy of any nation (or region), because modern industries and commercial activities rely on proper, well-developed and efficient transport systems. stated that the demand for transportation has not been met with supply; rather, traffic congestion, pollution, and social inequalities are the reflection of the city's mobility. Importantly, the fact that transportation is a crucial factor for urban integration, since it gives access to economic activity, facilitates family life, enhances social networks, and helps to ease mobility. Posited that the efficiency of any urban area depends largely on the provision of efficient infrastructure and services. emphasised the importance of infrastructure in the local development process and argued that infrastructure development or the lack of it is often used as a policy tool to encourage or discourage growth. explained that good quality infrastructure has a significant influence on the progress of society, which includes, but is not limited to, ease of mobility as well as the general welfare of the citizens. Transport infrastructure refers to the framework that supports the system for the circulation of persons and goods. It consists of fixed installations and comprises of roads, highways, streets, roadways and bridges; crossing structures like sidewalks, bike paths; and all areas for vehicular use, namely: travel lanes, entrances and outlets and parking services; railways, airways, waterways, canals and pipelines; and terminals such as airports, railway stations, bus stopovers, warehouses, docking and transit facilities. The city's rapid urbanisation, population growth, and inadequate infrastructure development have resulted in congested roads and increased travel times [1]; an inadequate public transportation system; poor road maintenance and management [9];

insufficient traffic management and control; and limited accessibility for vulnerable populations (e.g., pedestrians and cyclists). In addition, the public transportation system is inadequate, with only 10 % of residents using the formal public transportation system. Safety concerns are also a problem in this regard, as the state records high rates of road accidents, with 1,456 fatalities in 2020 alone. All these have their consequences, ranging from economic losses, which are mainly due to wasted time and fuel consumption (Estimated at 3.5 trillion annually) Reference [1]; Environmental degradation from increased air pollution; Reduced quality of life and increased stress levels for residents due to unease of mobility; and Negative impacts on businesses and investment due to unreliable transportation.

Despite efforts to address these issues, the transport challenges persist. While some studies have focused on road infrastructures and the organisation of metropolitan areas, fewer studies have assessed road infrastructures in micropolitan areas, which feature a smaller urban core and lower population density, and have overlooked the importance of mobility ease, a subject that has been debated in recent times. Several studies, mostly from the Western world, have also showcased the importance of road infrastructures. For instance, there have been several studies that have been conducted in micropolitan and metropolitan areas in terms of road infrastructure, economic growth, sustainable and economic development [19; 11; 13], while some others associated road transport infrastructures with land use and investments [14; 15;16; 4; 22]. Generally, several strands of literature across the world have assessed road infrastructures from various perspectives [17; 12; 20; 21; 10; 2]. From these strands of literature, it is quite evident and obvious that the study of road transport infrastructure and commuters' travel time has not been well explored as it ought to be in Lagos metropolis. Hence, this study aims to assess the road transport infrastructure and commuters' travel time in the Lagos metropolis.

2. Conceptual Review

2.1. Road Transport Infrastructure

Road transport infrastructure comprises the physical and operational systems that facilitate vehicular movement within an urban space. These include road networks, lane capacity, pavement condition, drainage systems, terminals, and traffic management facilities. In rapidly urbanising cities, the adequacy and quality of these components determine the efficiency of movement, accessibility to opportunities, and overall urban productivity. In the case of Lagos, road transport remains the dominant mode of mobility for both passengers and goods. Yet, infrastructural development has struggled to keep pace with population growth and rising transport demand. [20] observed that road transport infrastructure in Lagos State is insufficient and largely in poor condition. Their findings indicate that deteriorating road quality constrains economic activities and negatively influences trip behavioral patterns. Poor infrastructure, therefore, not only affects physical mobility but also shapes how individuals organise their daily travel decisions. Beyond structural adequacy, infrastructure also influences broader urban outcomes. found that transportation infrastructure significantly affects city livability in Lagos Metropolis, emphasising that deficiencies in structural development undermine urban functionality. This supports the view that road systems are central to metropolitan performance and resident well-being. Environmental conditions further complicate infrastructure performance. demonstrated that environmental peculiarities, particularly high-water tables, substantially influence transportation infrastructure performance in Lagos. Their

study revealed that such environmental constraints increase commuting time, raise travel costs, and accelerate infrastructure deterioration. This suggests that road infrastructure performance in Lagos must be examined not only in terms of physical provision but also in terms of resilience to environmental stressors. This can also help commuters reduce their travel time.

2.2. Commuters' Travel Time

Travel time refers to the total duration required to move from origin to destination, including waiting time, in-vehicle time, and delays caused by congestion or operational inefficiencies. It is widely recognised as a key indicator of transport system effectiveness and commuter welfare. Although several studies in Lagos have examined transport-related outcomes, explicit attention to travel time as a primary outcome variable remains limited. For example, [23] assessed the impact of improved Bus Rapid Transit (BRT) operations on commuter satisfaction. While the introduction of dedicated lanes enhanced system expansion and operational performance, the study revealed persistent delays at major terminals due to poor schedule adherence. These operational inefficiencies directly affect commuters' time, even where infrastructure improvements exist. Similarly, commuting time was identified as one of the transportation performance indicators significantly affected by environmental peculiarities in Lagos. Flood-related disruptions and infrastructure vulnerability were shown to prolong travel duration and increase system inefficiencies. In their study of train commuters between Lagos and Ibadan, highlighted the importance of schedule reliability and accessibility. Using correlation and regression analysis, they found that accessibility and satisfaction significantly predicted commuting stress, while effective scheduling reduced stress levels. Although their primary focus was psychological stress, the findings underscore the importance of time reliability in shaping commuting experiences. These studies collectively suggest that travel time is both an operational and experiential dimension of urban mobility, influenced by infrastructure adequacy, environmental factors, and service efficiency.

2.3. Infrastructure–Travel Time Relationship

The relationship between road infrastructure and travel time is grounded in the idea that infrastructure capacity determines traffic flow conditions. Where road networks are poorly maintained, insufficient in capacity, or operationally inefficient, congestion intensifies and commuting duration increases. Empirical evidence from Lagos provides indirect support for this linkage. [20] showed that poor infrastructure impedes movement and disrupts trip patterns. [23] demonstrated that even where infrastructure improvements such as dedicated BRT lanes exist, operational inefficiencies can offset time-saving gains. further established that environmental constraints significantly influence commuting time through their effects on infrastructure performance. Despite these insights, most existing studies stop short of explicitly modelling commuters' travel time as a dependent variable influenced by specific road infrastructure components. This leaves a critical gap in understanding the measurable extent to which infrastructure quality shapes commuting duration in Lagos Metropolis.

3. Theoretical Review

3.1. Gravity Model of Spatial Interaction

The gravity model is the most common formulation of the spatial interaction method. It is named as such because it uses a similar formulation to Newton's law of gravity. Gravity-like representations have been applied in a wide variety of contexts, such as migration, commodity flows, traffic flows, commuting, and evaluating boundaries between market areas. Accordingly, the attraction between two objects is proportional to their mass and inversely proportional to their respective distance. The inter-urban movement of persons and goods is of great importance to transportation planning and regional development; as a consequence, the study of spatial interactions has long received attention among scholars in transportation, geography, planning, and engineering. Of particular interest are methods to estimate the flow of people or goods between origin and destination (OD) pairs, which are typically based on the concept of place attraction, tempered by the cost and/or effort of travelling or shipping over long distances [24] Specific approaches include the intervening opportunities [24] and radiation models, both of which associate trips with population or opportunities within the region between origin and destination. This applies to the Lagos metropolis and specifically the locations in the study area putting into consideration the trip distribution and the close interaction of vehicles and commuters, which enhances flow.

4. Empirical Review

Empirical research on transportation in Lagos has widely examined infrastructure adequacy, commuter satisfaction, environmental constraints, equity disparities, and urban livability, yet few studies explicitly model commuters' travel time as a primary outcome variable. [20] found that road transport infrastructure in Lagos State is inadequate and poorly maintained, with negative implications for mobility and economic activities, but they did not quantify its effect on commuting delays. [23] reported that while dedicated BRT lanes improved operational performance, terminal delays persisted due to poor schedule adherence; however, travel time was not treated as a dependent variable. showed that accessibility and service satisfaction significantly predict commuting stress, highlighting the role of time reliability, though their focus remained psychological rather than duration-based. Transportation Infrastructure influences livability in urban settings. demonstrated that environmental peculiarities increase commuting time and infrastructure deterioration. further addressed equity and mode choice without directly modelling travel duration. Collectively, the literature reveals a gap in quantitatively linking road infrastructure components to commuters' travel time.

5. Materials and Methods

5.1. Study Area

The Lagos metropolis is situated within latitudes 6°23′N and 6°41′N and longitudes 2°42′E and 3°42′E in Lagos State. The metropolis is bounded in the north and northeast by Ogun State and Ikorodu Local Government Area, respectively; in the e ast by Epe and Ibeju-Lekki Local Government Areas; in the west by Badagry LGA; and in the south by the Atlantic Ocean/Gulf of Guinea (Figure 1). The study area encompassed locations in metropolitan Lagos; each of the local governments in metropolitan Lagos has its own distinct urban dynamics and transport

infrastructure needs. The research focused on assessing the road transport infrastructure and commuters' travel time in Lagos Metropolis, specifically Agege and Amuwo - Odofin.

The population of metropolitan Lagos is huge, with over 15 million people, making it one of the fastest-growing cities in Africa, with the majority of residents and home ownership positively correlating with education level, having secondary or higher education. Metropolitan Lagos has a rich cultural heritage with influences from Brazilian, Portuguese and Indigenous cultures.

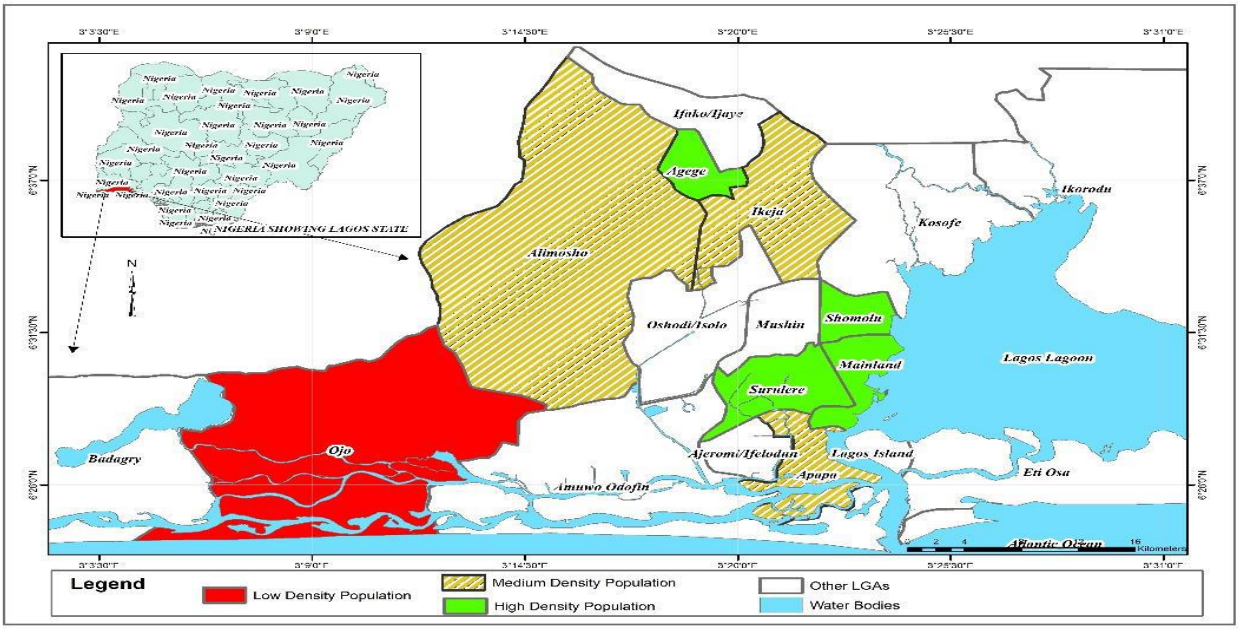

Figure 1: Map of Study Area

Source: Author's Work, 2024.

5.2. Data Collection

This study employed primary and secondary forms for data collection. The commuters and the transporters were the target population; this selection was predicated on the ground that commuters are regular users of the road and their familiarity with the road infrastructures cannot be ignored, while the transporters have extensive knowledge of the road network and traffic conditions. In doing this, a well-structured digital questionnaire was broken into sections, which entail questions like socio-demographic information, distance, and time taken to access road transport infrastructures, in relation to the objective that needs to be achieved in the study. The questionnaire had a partial difference in terms of content because it was for transporters or commuters, as the case may be.

5.3. Sample Frame and Size

The population for this study consists of commuters and transport operators within selected areas of Lagos metropolis, namely Agege and Amuwo-Odofin. In total, 140 individuals formed the target population for the

research. The determination of the sample size was guided by the Krejcie and Morgan Table, a widely accepted approach for sample selection at a 95% confidence level with a 5% margin of error. In line with the table's recommendation, a population of 140 yields an estimated sample size of approximately 100 respondents, which was used for the study. To achieve balanced representation across the study locations, a proportionate sampling method was applied. The total sample was allocated based on the relative share of each area in the population. Consequently, Agege, representing 66.3%, was assigned 66 respondents, while Amuwo-Odofin, with 33.7%, was assigned 34 respondents. This method of allocation helps to ensure that both locations are adequately represented, thereby improving the credibility and generalizability of the findings on road transport infrastructure and commuters' travel time within the Lagos metropolis.

5.4. Data Processing and Analysis

The questionnaires were subjected to checks for completeness, where data cleaning, validation, and quality checks were done. Descriptive statistics were used to do a summary of the information on the socio-demographics of respondents, especially the Age group, level of education, monthly income, marital status, and religion, as the case may be, for either transporters or commuters. The study also employs multiple linear regression analysis to examine the relationship between road transport infrastructure and commuters' travel time in the studied locations. This method is appropriate because it allows for the estimation of the individual and combined effects of explanatory variables on travel time. The econometric form of the model is stated as:

$$TT = \beta_0 + \beta_1 RQ + \beta_2 TC + \beta_3 DF + \beta_4 TM + \mu$$

Where:

TT: Travel Time

RQ: Road Quality

TC: Traffic Congestion

DF: Drainage and Flooding

TM: Traffic Management

β_0: Intercept

β_1-β_4: Coefficient of the independent variables

μ: Error term

6. Results and Discussion

Table 1: Demographic Information

Table 1*: Demographic Information of Respondents in the Study Area*

Route/Location	Frequency	(%)
Agege	66	66.3
Amuwo Odofin	34	33.7
Gender	Frequency	(%)
Female	54	53.50
Male	46	46.50
Age Grouo	Frequency	(%)
18.30	33	33.33
31-40	27	27.55
41-50	32	32.32
51-60	8	6.8
Occupation	Frequency	(%)
Self-employed	12	13.70
Worker	51	54.30
Student	34	29.8
Unemployed	3	2.2
Year of Commuting experience	Frequency	(%)
> 10 years	51	51.7
1-5 years	19	28.3
6-10 years	30	20

Source: Author's Computation through SPSS (26.0), (2026)

N=100 For Commuters and Transporters

The demographic profile of the commuters surveyed provides significant insights into the characteristics of those engaged and conversant with the selected locations for the study, especially in terms of how they ply the routes daily. The data reveal that out of the two selected locations for the study. Agege accounts for a larger share of respondents (66.3%), while Amuwo - Odofin makes up 33.7%. This pattern indicates that transport activities are more intense in Agege, which may be attributed to its high population density, active commercial environment, and key position within Lagos' transport network. Although Amuwo-Odofin records a smaller proportion, the level of participation there still highlights its importance as a functional transport corridor. Regarding gender

composition, the distribution is relatively even, with females representing 53.5% and males 46.5%. This balance suggests that both men and women depend significantly on public transportation, though women show a slightly higher level of usage, likely reflecting their engagement in diverse daily responsibilities such as employment, schooling, and household-related activities. The age structure reveals that most respondents fall within the active working population. Those aged 18–30 years account for 33.33%, followed by 41–50 years (32.32%) and 31–40 years (27.55%), while only 6.8% are within the 50–60 age bracket. This distribution implies that transport usage is largely concentrated among individuals in their prime productive years, with participation declining at older ages, possibly due to reduced economic activity or mobility constraints. Occupational data further show that employed individuals constitute the majority (54.3%), with students making up 29.8%, and self-employed respondents accounting for 13.7%. The unemployed group is minimal at 2.2%. This highlights the essential role of transportation in supporting economic activities and access to education, as most users depend on it for daily movement related to work and study. Examining commuting experience, more than half of the respondents (51.7%) have over 10 years of travel experience, indicating a high level of familiarity with the transport system. Meanwhile, 28.3% have between 1 and 5 years, and 20% have 6–10 years of experience. This suggests that a large proportion of respondents are well-acquainted with traffic patterns, road conditions, and transport challenges, thereby strengthening the credibility of the data collected. When both commuters and transporters are considered together, the results demonstrate a clear connection between transport demand and supply. The concentration of respondents within the working-age group (18–50 years) reflects the energy and effort required for both commuting and transport operations. In addition, the presence of self-employed individuals indicates the prominence of informal and semi-structured transport services, which are typical features of urban mobility in Lagos. Therefore, the demographic composition points to a strong dependence on road transport, especially among economically active individuals. This emphasises the urgent need for better transport policies, improved road infrastructure, and effective traffic management strategies to minimise travel time and enhance overall mobility within the study locations. The demographic findings provide important evidence regarding the nature of transportation demand within the selected study locations. The higher proportion of respondents from Agege confirms its status as one of the busiest transport corridors in Lagos State. Agege's concentration of commercial activities, educational institutions, and residential neighbourhoods generates substantial daily passenger movements, making it particularly vulnerable to traffic congestion and transport-related challenges. This finding aligns with the world's urban population's continued expansion, with urban growth placing enormous pressure on transportation systems, particularly in developing cities where infrastructure development has failed to keep pace with population growth [27]. Populated commercial centres experience greater travel demand due to increased economic and social interactions. [1, 26, 27]. The relatively balanced gender distribution suggests that transportation planning should not focus exclusively on one gender. The slightly higher proportion of female commuters reflects changing socio-economic realities in Nigeria, where women increasingly participate in employment, entrepreneurship, education, and other activities requiring regular mobility. Consequently, transport infrastructure and public transport services should incorporate gender-sensitive measures such as improved security, adequate lighting at bus stops, and safer passenger facilities. The concentration of respondents within the economically active age groups further supports existing transportation studies, which consistently report that mobility demand is highest among working-age populations. Individuals between 18 and 50 years undertake frequent daily trips associated with employment, education, business transactions, and social obligations.

Therefore, improvements in transport efficiency within these corridors would have significant economic benefits by reducing travel time, increasing productivity, and improving access to employment opportunities. The occupational profile equally reinforces the strong relationship between transportation and economic development. The dominance of workers and students indicates that efficient transport systems directly influence labour productivity, educational accessibility, and overall economic performance. Delays caused by traffic congestion, inadequate road infrastructure, or inefficient public transport services can reduce productivity, increase transportation costs, and negatively affect the quality of life of commuters. Furthermore, the high proportion of respondents with more than ten years of commuting experience strengthens the validity of the study findings. Long-term commuters possess extensive knowledge of recurring transport challenges, seasonal traffic variations, infrastructure deficiencies, and changes in transport operations over time. Their responses are therefore likely to provide accurate assessments of existing transportation conditions and realistic suggestions for improvement. Taken together, these demographic characteristics demonstrate that transportation remains a critical component of daily socio-economic activities within Agege and Amuwo - Odofin. The findings emphasise the need for sustained investments in road infrastructure, effective traffic management systems, improved public transport services, and integrated urban transport planning capable of meeting the mobility needs of Lagos' growing population. Such interventions would contribute significantly to reducing congestion, improving accessibility, enhancing commuter satisfaction, and promoting sustainable urban transportation development. According to [7] it is believed that in intra- and inter-city areas, there is value in saving time, especially for commuters with autonomous vehicles; and this corresponds with a similar belief in Belgium, where transport infrastructure is seen as a major contributor to the activity of the economy [17]. This shows that transport infrastructure catalyzes sustaining .

Table 2: Multiple Regression Results on the Effect of Road Transport Infrastructure on Commuters' Travel Time in Lagos Metropolis

	Unstandardized Coefficients		**Standardized Co-efficients**		
Model	**B**	**Std. Error**	**Beta**	**t**	**Sig**
Constant	2.460	0.545		4.514	0.000
RQ	-0.032	0.0074	-0.037	-4.329	0.003
TC	0.145	0.064	0.147	2.249	0.005
DF	0.078	0.012	0.085	6.684	0.006
TM	-0.070	0.0065	-0.083	-10.763	0.008

Source: Author's Computation through SPSS 26.0 (2026)

The regression analysis was carried out to examine the effect of road transport infrastructure on commuters' travel time in Lagos metropolis, using road quality (RQ), traffic congestion (TC), drainage condition (DF), and traffic management (TM) as explanatory variables. The constant term is 2.460 and is statistically significant ($t = 4.514$, $p = 0.000$). This implies that even when all explanatory variables are held constant, commuters still experience a baseline level of travel time. This reflects unavoidable delays in the transport system in the Lagos metropolis, which may be associated with high traffic demand, urban density, and overall mobility pressure. For the

explanatory variables, road quality (RQ) has a negative coefficient (-0.032) and is statistically significant (t = -4.329, p = 0.003). This indicates that improvements in road quality significantly reduce commuters' travel time, showing that better road infrastructure enhances traffic flow and reduces delays. Traffic congestion (TC) has a positive coefficient (0.145) and is statistically significant (t = 2.249, p = 0.005). This suggests that increased congestion leads to longer travel times, confirming that traffic congestion remains a major factor affecting commuting efficiency in the Lagos metropolis. The result for drainage condition (DF) shows a positive coefficient (0.078) and is statistically significant (t = 6.684, p = 0.006). This implies that poor drainage conditions, often resulting in flooding and road obstruction, significantly increase commuters' travel time by disrupting smooth movement along the road network. Similarly, traffic management (TM) has a negative coefficient (-0.070) and is statistically significant (t = -10.763, p = 0.008). This indicates that effective traffic management significantly reduces travel time, highlighting the importance of proper traffic control systems in improving mobility efficiency. Based on the standardised coefficients (Beta values), traffic management has the strongest influence on commuters' travel time, followed by drainage condition, traffic congestion, and road quality. This shows that operational control of traffic flow plays a more dominant role in determining travel time than the physical condition of roads. Therefore, the findings show that road transport infrastructure significantly influences commuters' travel time in the Lagos metropolis. Improvements in road quality, drainage systems, congestion control, and traffic management are therefore essential for reducing travel delays and enhancing mobility efficiency within the study area. The findings of this study on Assessing Road Transport Infrastructure and Commuters' Travel Time in Lagos Metropolis reveal that road transport infrastructure plays a significant role in determining how long commuters spend on the road within the study area, and this is in tandem with the fact that poorly planned public transport stops contribute to congestion, delays, and safety concerns. The regression results show that road quality, traffic congestion, drainage condition, and traffic management all have statistically significant effects on commuters' travel time, although their influence differs in magnitude. Firstly, road quality was found to have a negative and significant relationship with travel time. This implies that improved road conditions reduce commuting delays by enhancing smooth vehicular movement. This finding is consistent with gravity spatial interaction theory, which emphasises that good road surfaces reduce friction, vehicle breakdowns, and bottlenecks, thereby improving travel efficiency. Secondly, traffic congestion showed a positive and significant effect on travel time. This confirms that increased vehicle density on Lagos roads leads to longer commuting periods; this observation corroborates [6,20]. This outcome also aligns with the well-known urban transport challenge in Lagos, where high population growth and vehicle ownership often exceed road capacity, resulting in persistent congestion and delays. Thirdly, drainage conditions were also found to significantly influence travel time. Poor drainage systems, particularly during rainy periods, contribute to flooding and road obstruction, which slow down traffic movement. This finding highlights the indirect but important role of environmental and infrastructural support systems in shaping commuting efficiency, and it is in tandem with the findings of [3]. Lastly, traffic management exhibited a significant negative relationship with travel time, indicating that effective traffic control measures reduce commuting delays, confirming [2, 17]. This suggests that institutions responsible for traffic regulation, such as enforcement agencies and traffic coordination systems, play a crucial role in improving mobility outcomes in the Lagos metropolis.

7. Conclusion

The study concludes that road transport infrastructure significantly affects commuters' travel time in the Lagos metropolis. The empirical evidence shows that road quality, traffic congestion, drainage condition, and traffic management all contribute meaningfully to variations in travel time among commuters. Specifically, poor road conditions, high congestion levels, inadequate drainage systems, and weak traffic management practices all increase travel time, while improvements in these areas reduce commuting delays. The findings therefore suggest that both physical infrastructure and traffic control systems are essential in addressing travel inefficiencies in the study area. In conclusion, improving road infrastructure in isolation may not be sufficient unless it is complemented with effective traffic management and proper drainage systems. A holistic approach to transport planning is therefore necessary to achieve reduced travel time, improved mobility, and enhanced urban transportation efficiency in Lagos metropolis.

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