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Assessment Of Socioeconomic Characteristics Of Public Transport Users In Osogbo, Osun State, Nigeria

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Abstract*: The socioeconomic characteristics of public transport users in Osogbo, Osun State, Nigeria were examined as well as the public transport use patterns in order to explain the influence of socioeconomic factors on transport choice. The research hypothesized that the choice of public transport is influenced by age, gender, income, education and employment status. Adopting a survey-based approach, 400 respondents were chosen from residential, commercial, industrial, institutional and recreational areas using stratified random sampling. The R programming language was used to analyze socioeconomic factors, travel patterns and mode of transportation data collected. The majority of the respondents were between the ages of 26 and 35, earned between 20,000 and 100,000 naira monthly and spent 200 – 500 naira per trip. The users' gender distribution was roughly equal and majority had achieved tertiary education. Affordability was a key factor in the decision to use public transportation, particularly buses, for work trips. The study concluded that improving public transport accessibility and affordability is the answer to urban mobility. Recommendations are to improve bus availability and harmonize transport modes for efficient service delivery.*

Keywords— *Socioeconomic Characteristics, Public Transport, Use Patterns, Transport Choice, Urban Mobility*

1 INTRODUCTION

Osogbo, the capital of Osun State, Nigeria, is a rapidly expanding city that faces issues like inadequate transportation systems, a growing population, and bad transportation infrastructure. The daily mobility of the populace and the overall operation of the city are significantly impacted by these problems.

The primary public transportation means in Osogbo include tricycles (Keke Napeps), motorbikes (Okadas), and minibuses (Korope). A number of issues, such as limited infrastructure, affordability, and safety concerns, confronts these transportation means. Potholes, absence of walkways, and lack of road signs mark the road network in Osogbo. These deficiencies undermine reliability and prolong travel time, with the additional lack of lanes specifically for public transport [1]. Commercial motorcycle passengers and pedestrians are the most vulnerable groups to transit crimes and crashes, whereas private vehicle owners are considered the safest group of travelers, reflecting disparities in safety perceptions and realities [2]. Public transport fares, despite being lower than private options, impose financial burdens on low-income households, leading to longer travel times and increased expenses, often forcing reliance on informal and unsafe transportation methods [3].

In spite of these compelling concerns, few comprehensive data exist on the socioeconomic profiles of the users of Osogbo public transport. Current research tends to concentrate on wider regional or nationwide trends, with little attention to the distinctive dynamics and concerns of smaller city settings. This scarcity of information compromises the formulation of context-specific interventions and the design of effective policies for improving the public transportation of the city.

This study hypothesizes that socioeconomic characteristics like income, age, gender, education, and level of employment have a strong influence on the pattern and choice of use of public transportation in Osogbo. By examining these relationships, the research seeks to uncover valuable information reflecting user behavior and to make practical suggestions to policymakers.

2 LITERATURE REVIEW

Socioeconomic determinants like income, education, occupation, and levels of living influence access to amenities, opportunities, and health [4]. Public transport in Osogbo, Nigeria, is the most frequent mode of transportation for a range of individuals, ranging from low earners and students to professionals and informal sector workers. However, Osogbo city's transport industry is faced with inadequate funding, infrastructure, and lack of coordination [5].

2.1 Socioeconomic Factors Influencing Public Transport Use

Income is a significant determinant of public transport usage in Osogbo. Studies show that individuals with lower income levels are more likely to depend on public transport due to limited access to private vehicles [6]. Public transport also caters to specific occupational groups, particularly informal sector workers, who rely on these systems to access workplaces and markets [7]. In contrast, professionals and formal sector employees may have access to private vehicles or employer-provided transport, reducing their reliance on public transport [8].

Educational attainment influences travel behavior, as students and individuals with lower education levels often

depend on public transport due to limited access to private vehicles. Olawole and Olapoju found that on-campus trips are dominated by walking, while commercial buses are the primary mode for off-campus trips [8]. Similarly, younger demographics, particularly students, are frequent public transport users, while senior citizens and people with disabilities rely on public transport due to mobility challenges [9].

2.2 Urban Transportation Challenges in Osogbo

Congestion during peak hours leads to delays, increased fuel consumption, and economic losses [10]. The inadequacy of public transport makes mobility even more difficult, with minibuses ("Korope") and motorbikes ("Okada") serving as the primary means of transport. Studies emphasize investments in public transport infrastructure and modernizing the fleet as a way of resolving the issues [5, 11]. Adedotun advocates for strategic investments in road maintenance and expansion projects to improve connectivity and enhance road safety [12].

3 METHODOLOGY

On-site survey was utilized to gather quantitative data from the respondents at chosen sites in Osogbo. On-site survey is favorable due to its ability to gather real-time contextual data, which would increase the validity of the study. This method guaranteed greater response rates and provided an opportunity for instant feedback and clarification while gathering data. Although it was resource demanding, the method yielded detailed, high-quality data that was indicative of the participant's behaviors and experiences.

3.1 Description of the Study Area

Osogbo, the capital city of Osun State, Nigeria, is a vibrant urban center with an estimated population of over 599,000 residents. It also serves as the administrative center for the Olorunda Local Government Area in the Igbonna area and the Osogbo Local Government Area in the Oke Baale area of the city. Osogbo lies at the center of Osun State—108 km northwest of Akure, 88 km northeast of Ibadan, and 108 km south of Ilorin. Not merely does its strategic position stabilize it, but it also promotes ease of access to an exceedingly vast choice of amenities.

Following Nigeria's overall population trend, the town itself is a multicultural weave of different ethnic tribes, socioeconomic groups, and cultural classes, all of which combine to produce its truly vibrant nature. The urban identity is reflected in residential communities, schools, governmental institutions, and business centers. Situated in the heart of the area, Osogbo has traditional urban traits and above all, is serviced primarily by public transportation in its daily activities.

Minibuses, commonly known locally as "Korope," and motor bikes known as "Okadas" form a prominent part of the transportation sector in Osogbo. These minibuses have developed far-reaching routes covering the town and surrounding towns and rural communities. The high demand for transportation calls for studying their socioeconomic traits in strategy development to ease transportation issues and promote sustainable practices.

The chosen study area is important because it represents one of the rapidly changing urban contexts and the attendant transportation needs typical of Nigerian urban centers. Focusing in particular on Osogbo, this study maps out the determinants of the use of public transportation, and in doing so, presents policy implications drawn from empirical data designed to improve urban transit systems.

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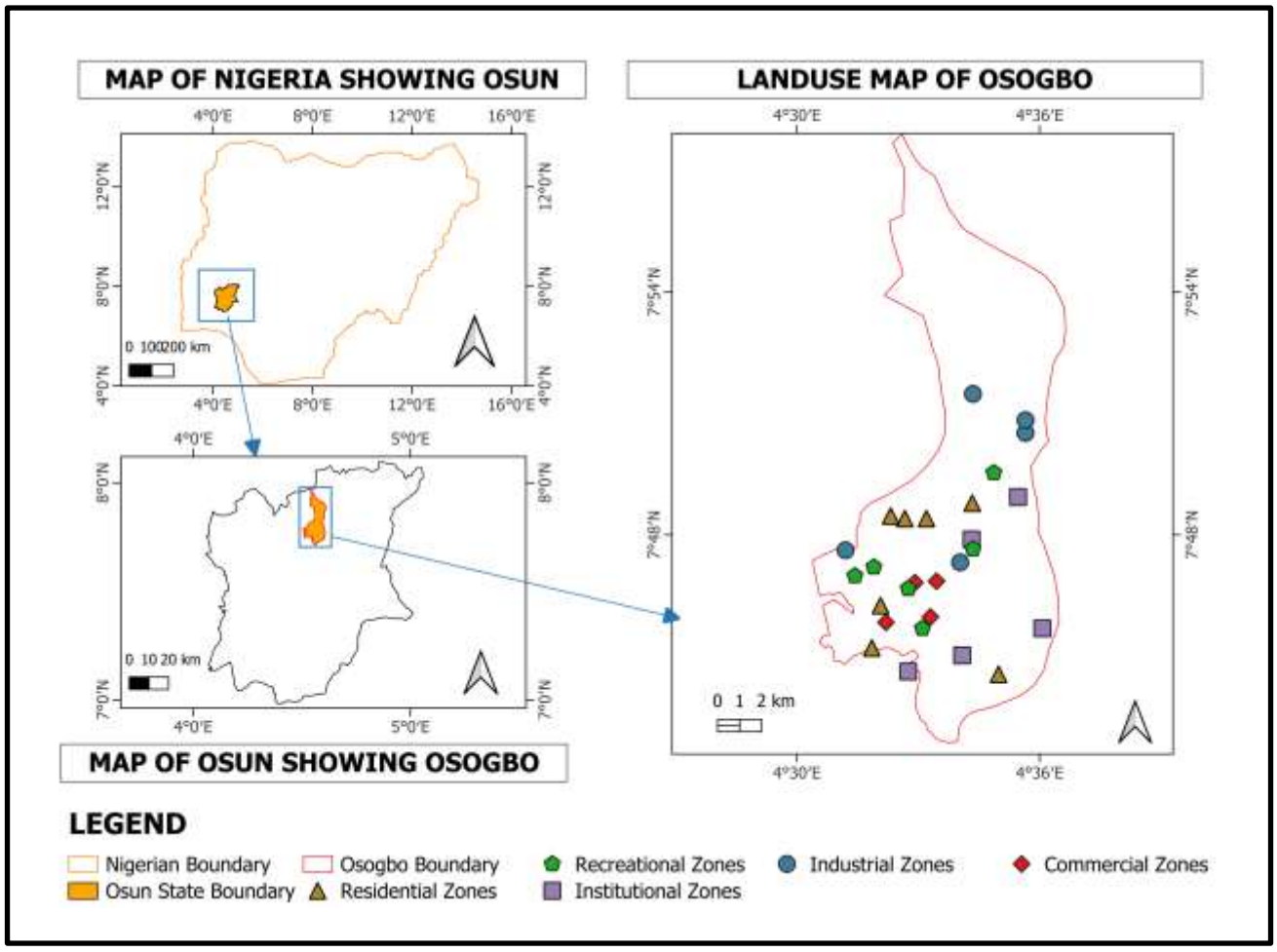

Fig 1. Map of the Study Area. (Source: QGIS, 2024).

3.2 Sampling Technique

The annual population growth rate was originally computed using the following formula in order to estimate Osogbo's population in 2024:

$$\text{Growth Rate, } r = [(\frac{P_{final}}{P_{initial}})^{1/t} - 1] \times 100\% \quad (1)$$

Where:

P_{final} is the final population size

$P_{initial}$ is the initial population size

t is the number of years between the two population sizes

Using the data from 1991 and 2006:

$P_{initial}$ = 156,694

P_{final} = 288,455

t = 2006 - 1991 = 15 years

Substituting these values:

$$\text{Growth rate, } r = [(\frac{288,455}{156,694})^{1/15} - 1] \times 100\%$$

r = 4.15%

Considering the data from 2006 to 2024, the present population of Osogbo can be estimated from Eq. (1):

$P_{initial}$ = 288,455

P_{final} = To be calculated

t = 2024 - 2006 = 18 years

r = 4.15%

$$4.15 = [(\frac{P_{final}}{288,455})^{1/18} - 1] \times 100\%$$

P_{final} = 599,715

Thus, the estimated population of Osogbo in 2024 is approximately 599,715 residents

Determining the sample size by Slovin's formula:

Slovin's formula is expressed as:

$$n = \frac{N}{1+Ne^2} \quad (2)$$

where:

n is the sample size

N is the total population size

e is the margin of error

Given the population of Osogbo, estimated at approximately 599,715 and a desired margin of error of 5% (0.05), the sample size was calculated from Eq. (2):

$$n = \frac{599715}{1 + 599715(0.05)^2}$$

$n \approx 400$

3.3 Data sampling method

Stratified random sampling was employed in assessing public transport users in Osogbo Metropolis. This was employed so that the sample will be representative of the differing characteristics of the population in the different land use types in the city. Stratified random sampling entails that the population be separated into distinct subgroups, or strata, based on predefined criteria and that each strata is adequately represented in the final sample.

The study of the available literature identified some key land use types in Osogbo, which varied from residential to commercial, industrial, institutional, and recreational areas. While trying to capture the varying transport needs and use patterns within these types, the sampling was conducted with 400 questionnaires evenly split across these land use types. 80 questionnaires were particularly administered in each identified land use type to obtain a balanced and equitable database.

Apart from increasing the data's validity, the research conducted surveys in a number of different neighborhoods within every land use zone. This was because it presented a workable and realistic method of portraying each zone by making sure that the covered neighborhoods were representative of the broader land use type. By so doing, the study managed to make sure that different socioeconomic groups from various locations in Osogbo, i.e., high- and low-density areas, were included in the data.

3.4 Statistical Software

The statistical analyses in this study were conducted using R programming, an open-source statistical software renowned for its capacity to handle large datasets and generate reliable outputs.

R was used to perform descriptive statistical analyses, summarizing the socioeconomic characteristics and travel behavior of public transport users in Osogbo. Key statistical measures, such as frequencies, percentages were calculated. The processes for generating results in R are;

- Importing Data: The raw dataset was imported into R using the read_excel() function.
- Data Cleaning: The dplyr and tidyr packages were employed for filtering, grouping, and transforming the dataset.
- Descriptive Statistics: The summary () function and specialized packages like psych provided detailed statistical summaries.
- Visualization: The table() package was used to create comprehensive frequency tables, ensuring clarity and accuracy.
- Output Generation: The analyzed data was exported as tables using flextable package for easy integration into the Word document.

4 RESULTS

Four hundred (400) questionnaires were administered evenly across the five land-use zones in Osogbo: residential, commercial, industrial, institutional, and recreational zones, with 80 questionnaires distributed in each zone. The analysis focuses on the socioeconomic characteristics of respondents and their transport behavior. The results are illustrated using tables for easy interpretation.

4.1 Age Distribution

Table 1 presents the age distribution of respondents within the five zones. The figures reflect that the 26–35 age group is the majority age group within the majority of zones, particularly residential zones (31.25%) and industrial zones (27.5%), which indicates that the bus system has the majority users being adults employed. Also, respondents within the 18–25 age group are an important segment within the zones used recreationally (18.75%), showing higher mobility within the younger groups.

The prevalence of the 26–35 age group emphasizes the role that the use of public transport plays to enable work-related endeavors within urban areas where private vehicle use is limited.

Table 1: Age distribution of respondents

Age (Years)	Residential zone		Commercial zone		Industrial zone		Institutional zone		Recreational zone	
	Frequency	*Percentage (%)*	*Frequency*	*Percentage (%)*	*Frequency*	*Percentage (%)*	*Frequency*	*Percentage (%)*	*Frequency*	*Percentage (%)*
<18	7	8.75	7	8.75			11	13.75		
18-25	7	8.75	13	16.25	5	6.25	9	11.25	15	18.75
26-35	25	31.25	20	25	22	27.5	19	23.75	18	22.5
36-45	20	25	20	25	25	31.25	17	21.25	24	30
46-55	12	15	15	18.75	19	23.75	12	15	14	17.5
56-65	7	8.75	2	2.5	8	10	9	11.25	7	8.75
>65	2	2.5	3	3.75	1	1.25	3	3.75	2	2.5

4.2 Gender Distribution

Table 2 summarizes the gender distribution of respondents. The results reveal that females predominate in the commercial (58.75%) and institutional zones (55%), whereas males dominate in the industrial zone (57.5%). The higher percentage of females in commercial zones aligns with findings from previous studies indicating the prevalence of women in informal trade and related occupations.

Table 2: Gender distribution of respondents

Gender	Residential zone		Commercial zone		Industrial zone		Institutional zone		Recreational zone	
	Frequency	*Percentage (%)*	*Frequency*	*Percentage (%)*	*Frequency*	*Percentage (%)*	*Frequency*	*Percentage (%)*	*Frequency*	*Percentage (%)*
Female	39	48.75	47	58.75	34	42.5	44	55	42	52.5
Male	41	51.25	33	41.25	46	57.5	36	45	38	47.5

4.3 Income Levels

Table 3 displays the monthly income levels of respondents across the zones. A notable proportion of respondents in the industrial zone (43.75%) reported earning over ₦200,000 monthly, whereas lower-income earners (<₦20,000) were more prominent in institutional zones (30%). The predominance of higher-income earners in the industrial zone suggests its role as a hub for formal employment, contrasting with institutional zones where lower-income groups predominate due to their association with students and academic staff.

Table 3: Income levels of respondents

Monthly income (₦)	Residential zone		Commercial zone		Industrial zone		Institutional zone		Recreational zone	
	Frequency	*Percentage (%)*	*Frequency*	*Percentage (%)*	*Frequency*	*Percentage (%)*	*Frequency*	*Percentage (%)*	*Frequency*	*Percentage (%)*
<20,000	10	12.5	4	5			24	30	6	7.5
20,001-50,000	14	17.5	33	41.25	1	1.25	30	37.5	13	16.25
50,001-100,000	14	17.5	31	38.75	4	5	4	5	27	33.75
100,001 - 150,000	20	25	2	2.5	4	5	8	10	8	10
150,001 - 200,000	16	20	2	2.5	12	15	9	11.25	12	15

>200,000	6	7.5	8	10	35	43.75	5	6.25	14	17.5

4.4 Employment Status

Table 4 reveals that full-time employment is highest in the industrial zone (77.5%), reflecting the prevalence of factory and office workers. Self-employment is prominent in residential (31.25%) and recreational zones (31.25%), indicating entrepreneurial activity.

Table 4: Employment status of respondents

Employment status	Residential zone		Commercial zone		Industrial zone		Institutional zone		Recreational zone	
	Frequency	*Percentage (%)*	*Frequency*	*Percentage (%)*	*Frequency*	*Percentage (%)*	*Frequency*	*Percentage (%)*	*Frequency*	*Percentage (%)*
Employed full-time	31	38.75	33	41.25	62	77.5	28	35	38	47.5
Employed part-time	4	5	6	7.5	5	6.25	6	7.5	2	2.5
Retired	5	6.25	2	2.5	1	1.25	2	2.5	2	2.5
Self-employed	25	31.25	26	32.5	8	10	25	31.25	25	31.25
Student	10	12.5	13	16.25	4	5	17	21.25	13	16.25
Unemployed	5	6.25					2	2.5		

4.5 Educational Attainment

Table 5 indicates the educational qualifications of the respondents. The majority of respondents from each region are highly educated, the highest percentage being from the residential region (65%). The industrial region has the highest proportion of respondents with postgraduate qualifications (20%), an illustration of the influence that education has on employment and travel.

Table 5: Educational attainment of respondents

Educational attainment	Residential zone		Commercial zone		Industrial zone		Institutional zone		Recreational zone	
	Frequency	*Percentage (%)*	*Frequency*	*Percentage (%)*	*Frequency*	*Percentage (%)*	*Frequency*	*Percentage (%)*	*Frequency*	*Percentage (%)*
Postgraduate	7	8.75	7	8.75	16	20	5	6.25	10	12.5
Tertiary	52	65	45	56.25	44	55	34	42.5	49	61.25
Secondary	10	12.5	21	26.25	10	12.5	24	30	15	18.75
Primary	6	7.5	2	2.5	6	7.5	10	12.5	4	5
No formal education	5	6.25	5	6.25	4	5	7	8.75	2	2.5

Most of the individuals questioned are educated. This indicates that Osogbo is a city and that education assists a great deal in securing official employment and means of transport.

4.6 Preferred Mode of Transport

Buses were the dominant choice across all zones, with over 50% of respondents preferring them in residential, commercial, industrial, and recreational zones as revealed in Table 6. Motorcycles were a secondary preference, especially in recreational zones (43.75%).

Table 6: Respondents most preferred mode of transport

Mode of transport	Residential zone		Commercial zone		Industrial zone		Institutional zone		Recreational zone	
	Frequency	*Percentage (%)*	*Frequency*	*Percentage (%)*	*Frequency*	*Percentage (%)*	*Frequency*	*Percentage (%)*	*Frequency*	*Percentage (%)*
Bus	43	53.75	41	51.25	43	53.75	39	48.75	43	53.75
Motorcycle	29	36.25	13	16.25	12	15	15	18.75	35	43.75
Tricycle	8	10	26	32.5	25	31.25	26	32.5	2	2.5

The inclination to use buses signifies the affordability and convenience of using them, while the use of motorcycles and tricycles signifies the flexibility to travel along narrow roads and densely populated zones.

4.7 Frequency of Public Transport Use

Table 7 outlines the frequency of public transport usage. Daily usage is predominant across all zones, with the highest rates observed in the commercial zone (61.25%) and residential zone (56.25%). Weekly and rare usage were more common in recreational zones, reflecting their less frequent travel needs.

Table 7: Frequency of public transport use

Frequency of use	Residential zone		Commercial zone		Industrial zone		Institutional zone		Recreational zone	
	Frequency	*Percentage (%)*	*Frequency*	*Percentage (%)*	*Frequency*	*Percentage (%)*	*Frequency*	*Percentage (%)*	*Frequency*	*Percentage (%)*
Daily	45	56.25	49	61.25	43	53.75	41	51.2	44	55
Weekly	30	37.5	22	27.5	18	22.5	27	33.75	12	15
Rarely	5	6.25	9	11.25	19	23.75	12	15	24	30

The high daily usage of public transport underscores its critical role in the daily lives of residents, particularly for work and school trips.

4.8 Trip Purpose

Table 8 summarizes the primary trip purposes of respondents. Work-related trips dominate across all zones, with the highest proportion observed in the commercial zone (88.75%). Recreational trips are more significant in recreational zones (13.75%). The dominance of work-related trips highlights the economic reliance on public transport, while recreational trips suggest a need for greater integration of leisure activities into transport planning.

Table 8: Trip purpose of respondents

Trip purpose	Residential zone		Commercial zone		Industrial zone		Institutional zone		Recreational zone	
	Frequency	*Percentage (%)*	*Frequency*	*Percentage (%)*	*Frequency*	*Percentage (%)*	*Frequency*	*Percentage (%)*	*Frequency*	*Percentage (%)*
Work	47	58.75	71	88.75	61	76.25	63	78.75	62	77.5
School	23	28.75	1	1.25	1	1.25	4	5	2	2.5
Shopping	7	8,75	1	1.25			5	6.25	5	6.25

Social/Recreational	3	3.75	5	6.25	16	20	8	10	11	13.75
Medical			2	2.5	2	2.5				

4.9 Spending Per Trip

Table 9 illustrates the spending behavior per trip by respondents. Most respondents across the zones showed spending behavior within the range ₦200 to ₦500 per trip, the highest proportion being that of the recreational zone at 66.25%. The highest spending was seen more often in the industrial (48.75%) and institutional zones (47.5%).

Table 9: Respondents spending per trip

Spending per trip (₦)	Residential zone		Commercial zone		Industrial zone		Institutional zone		Recreational zone	
	Frequency	*Percentage (%)*	*Frequency*	*Percentage (%)*	*Frequency*	*Percentage (%)*	*Frequency*	*Percentage (%)*	*Frequency*	*Percentage (%)*
100-200	4	5	6	7.5	5	6.25	10	12.5	7	8.75
200-500	35	43.75	38	47.5	36	45	32	40	53	66.25
>500	41	51.25	36	45	39	48.75	38	47.5	20	25

The findings indicate that public transportation in Osogbo serves diverse socioeconomic groups, with significant variations across land-use zones. The predominance of working-age adults and the reliance on buses highlight the economic and social role of public transport in supporting daily activities.

The analysis of travel motivations based on the socioeconomic classes underlines the need to ensure efficient and financially viable means of travel, particularly within industrial and institutional zones that are occupied by commercial businesses and learning institutions. The prevalence of motorcycles and tricycles in recreational spaces signifies their application in connecting less accessible locations, although they are traditionally typified by safety hazards.

Nevertheless, the findings also reveal such concerns as poor households' low affordability and gendered variations in the use of transport, which demand targeted interventions.

5 Conclusion

The findings reflected that the majority of users were aged 26–35 years, which signifies the reliance of the working class on public transport. The gender split was close to equal with slight variations by zones, reflecting occupational as well as societal roles. Most participants were of tertiary education level, signifying the important function of public transport in supporting economic, as well as educational, activity.

Income groups displayed a wide difference in public transport usage, with lower income groups predominantly concentrated in institutional areas and higher income groups in industrial zones. The predominance of buses as the primary vehicle says a lot about their affordability and accessibility. However, motorcycles and tricycles, though secondary means, dominated the zones that lacked accessibility, showing that there is a need for greater connectivity.

The costs per trip ranged mostly from ₦200 to ₦500, thus making them an important source of financial burden to economically poor groups. Use of public transport on a daily basis for work and school trips indicates its central role in urban commuting. The study concludes that investing in public transport infrastructure development, affordability, and safety is critical to improving urban mobility in Osogbo.

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