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Full Length Research Paper

An analysis of physical planning perspective of the implications of traffic congestion in the central area of Osogbo

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ABSTRACT

This study analyzes the physical planning perspective of the implication of traffic congestion in the central area of Osogbo to investigate the socio-economic lifestyle of commuters and Identify the implication of traffic congestion within the study area. The study annexed both primary and secondary sources for data collection. The study adopts a 3% sampling study out of the total traffic count of 19745 respondents that ply the road; this therefore amounted to 364 respondents from the 7 selected junctions in the area. The results of the finding show that the population growth, lack of road infrastructure and parking facilities are physical planning perspectives on the implication of traffic congestion in the study area. The result also shows that the socio-economic status of respondents influences the condition of traffic congestion. The study concludes and makes recommendations such as the need for public enlightenment / regular education of road users in the study area on the need to use traffic control devices, the need to decongest activities in the central area of Osogbo to reduce the number of travel to the area, construction of proper and consistent bus terminals which are not too far apart within the city, enforcing the use of alternate routes to minimize the number of traffic within the city centre during the peak hour of the day. The study recommends the provision of a parking plaza strategically within the area to curb the problem of on-street parking.

Keywords: Central area, congestion, implication, physical planning and perceptive.

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INTRODUCTION

Traffic congestion can be described as the mutual obstruction of traffic by vehicles because of the interrelation between the volume of flows and the moving vehicle velocity in the case of the depletion of infrastructure capacity. It is likewise defined as the level of vehicle traffic that exceeds a road's capacity, leading to a reduction in moving vehicle velocity or entire obstruction of free movement (Ko´zlak and Wach, 2018). This traffic congestion causes delays in travelling time and increases the cost of travelling because congestion in traffic consumes more fuel (Olagunju, 2011).

The rapid urbanization and economic growth capacity in the urban regions bring about the need for large transport activities, and when these needs are met, traffic congestion happens at the same time (Agyapong and Ojo, 2018). Congestion has turned out to be an issue in some of the cities worldwide, and it is a difficult challenge to overcome. It interrupts sustainable social, economic, and environmental improvement and increases transport costs (Ye, 2012).

According to Aderamo (2012), physical planning and transportation planning are closely related. This is because the manner land uses are organized will have an effect on trip generation, travel patterns and traffic volumes which in turn will affect the transportation facilities which are provided for accessibility to different parts of the city.

Traffic congestion has turned out to be one of the problems in cities all over the world. (Aderamo, 2012). Which has led to negative economic impacts and

environmental pollution (Wang et al., 2014). Many of the African cities are not exempted from this challenge. Specifically, the central business districts (CBD) of many large and medium cities of the country are affected by this mobility problem, and the state capital of Osun State, Osogbo is also experiencing such a problem, especially in the CBD. Therefore, this study will focus on the physical planning implication of traffic congestion in the central area of Osogbo, Nigeria to provide information on measures that will offer beneficial information for urban planners, policymakers, and practitioners to plan suitable strategies for decreasing congestion that would assist to ensure a sustainable urban transport system.

LITERATURE APPRAISAL

The level of urbanization within the developing world shows that more people now stay in cities than before. Cities with a million people and above, in line with the United Nations forecasts elevation to over three hundred by the year 2000 in the developing world (Ogunbodede, 2009). This trend will continue due to the speedy population growth, resulting from the development of health services and the multifarious functions done by cities, which have been another main attractive force. The situation described above has its effect on traffic congestion in cities of the developing world. Thus, the activities, which take place in them, lead them to generators and attractors of traffic, which of course has implications on mobility (Ogunbodede, 2009).

Traffic congestion is a problem that emanates when a city's road network is not able to house the volume of traffic, which is due to speedy growth in motorization with less corresponding improvement in the road network, traffic control techniques and associated transport facilities. While traffic congestion has been controlled thoroughly in some developed countries, it has persisted in defying solutions within the developing world (Ogunbodede and Aribigbola, 2003). The study examines the socioeconomic characteristics of road users as well as the physical perspective of the implication of traffic congestion in the central area of Osogbo, Nigeria.

RESEARCH METHODOLOGY

Research location

Osogbo is the capital of Osun State. Osogbo city is the Headquarters of both Osogbo Local Government Area (located at Oke Baale Area of the city) and Olorunda Local Government Area (located at Igbonna area of the city). It's around 88 km through the road northeast of Ibadan. It is likewise 100 km by road south of Ilorin and 115 km northwest of Akure; Osogbo shares boundary with Ikirun, Ilesa, Ede, Egbedore and Iragbiji and is easily accessible from any part of the state due to its central nature. It is about 48 km from Ife, 32 km from Ilesa, 46 km from Iwo, 48 km from Ikire and 46 km from Ila Orangun; the city had a population of approximately 156,694 people in 2006 in line with the census; the postal code of the area is 230. It has a coordinate, longitude 7˚46N 4˚34E and latitude 7.767 ˚ N 4.567 ˚ E. The study area for the research work is the metropolitan of Akure with a focus on the central area of the city as shown in Figures 1, 2 and 3.

Research database

The research methodology adopts the use of the mixed methods approach. The primary data were collected from drivers and commuters of the central area and personnel from related government agencies in charge of controlling traffic were also interviewed to gather information related to traffic conditions in the study area. The secondary source of information includes journals, seminar papers, dissertations, published and unpublished books, population statistics related to infrastructure development, AutoCAD and ArcGIS Software, and maps sourced from the library, internet, archives and institutions. The study sampling frame was taken from vehicle operators within the selected area, car owners, commuters, traders as well and traffic warders that control the movement of vehicles at the selected traffic corridor. Twelve (12) traffic corridors were selected in the area because they generate more traffic within the central area of Osogbo.

The 12 traffic corridors are Oja-Oba (King's Market), Isale Osun, Olu-Ode, Okefia, Old Garage, Ajegunle, Olaiya, Alekunwodo, Jaleyemi, Igbona, Ayetoro. This study adopts 3% sampling for the study out of the total traffic count of 19745 respondents that ply the road; this therefore amounted to 364 respondents from the 7 selected junctions in the area. A 3% research sample size was used as a result of common attributes and peculiarity of the selected junction in relation to the course of the research. The study was also justified in line with the study of Joseph and Anderson (2012), in which he made use of 300 questionnaires to achieve the desired result on traffic congestion in major cities of Nigeria.

A multi-stage sampling procedure was used for the research. The first stage adopts purposive sampling techniques to identify the central area of the city (core) from transition and peripheral. The second stage involved the use of ballot sampling techniques to sample 7 traffic corridors out of the 12 within the central area of the city. Stage three adopts the use of convenient sampling techniques to sample 3% of the total respondents derived from the traffic population for the study which amounts to a total of 364 sampled respondents. The accidental sampling techniques were used at the fourth stage due to

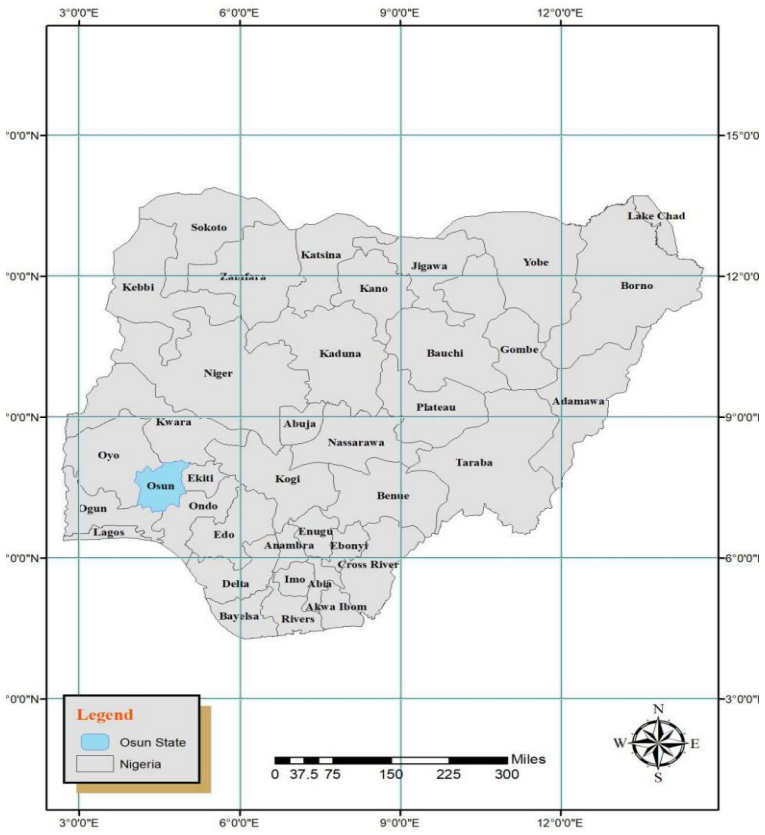

Figure 1. Map of Nigeria showing Osun State. **Source:** Osun State Ministry of Lands and Physical Planning, 2022.

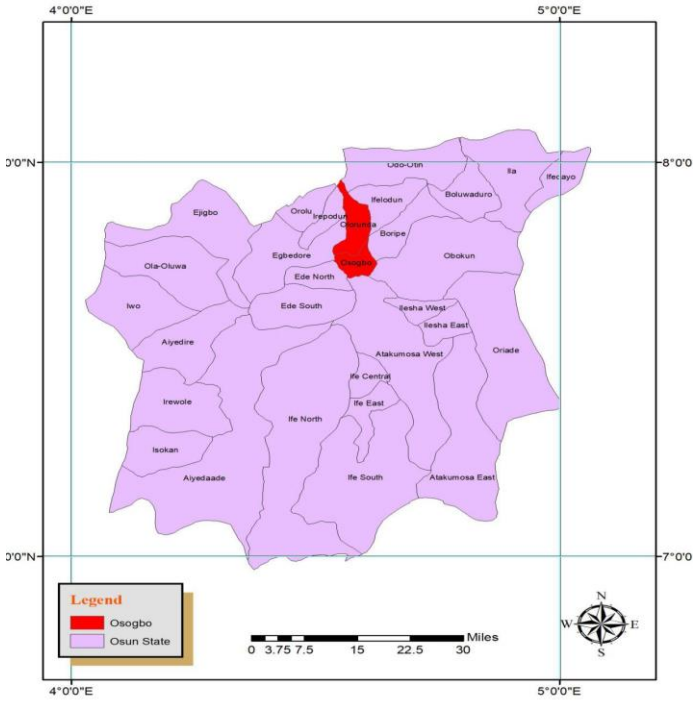

Figure 2. Map of Osun State showing Osogbo. **Source:** Osun State Ministry of Lands and Physical Planning, 2022.

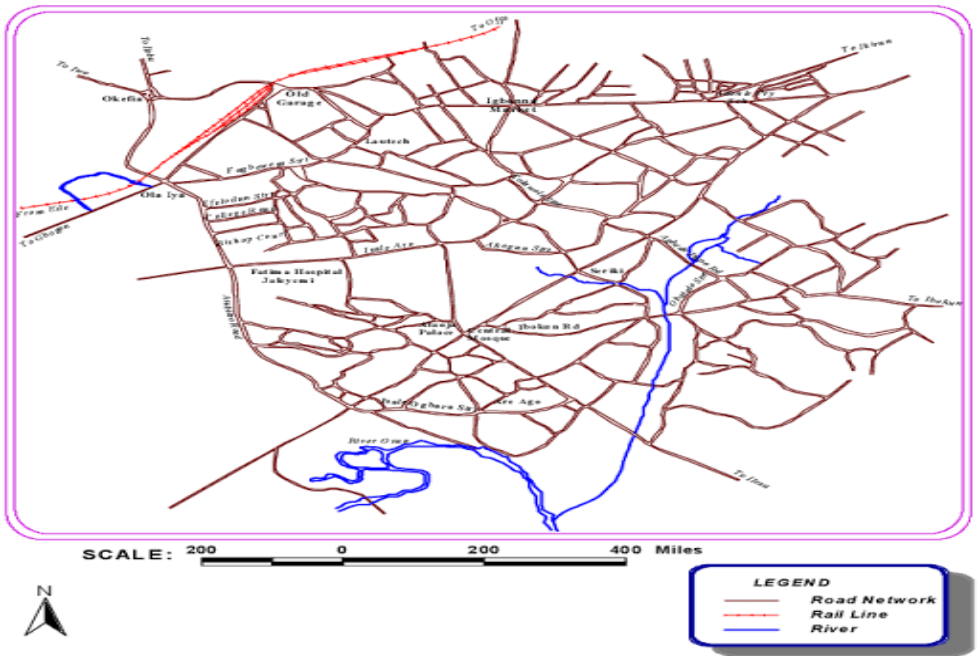

Figure 3. Map of Osun State showing Road Network. **Source:** Osun State Ministry of Lands and Physical Planning, 2022.

the nature of the study to sample any available commuter or vehicle operator until the total number was complete. Purposive sampling techniques were used for the last stage on some of the agencies regulating traffic such as the Federal Road Safety Commission (FRSC), National Union of Road Transport Workers (NURTW), and Traffic Warders among others.

The research instrument includes a structured questionnaire, interview guide, Google Earth Pro, AutoCAD, and Geographic Information System (GIS). Frequency tables and figures were computed for each variable based on the set objectives with the use of univariate analysis.

RESULT AND DISCUSSION

Socio-economic characteristics of respondents

The result of the findings shows that the majority of the respondents in the area are male 69% and female 31% (Table 1). This eludes that the majority of the respondents for the studies were either drivers or traders which constitute the major occupation of the respondents as presented in Figure 4. The finding also shows that more than half of the respondents in the area were married and are either Muslim or Christian with less than 10% of the respondents agreeing to be traditional worshipers. This larger percentage of married gives reliable information about the course of study.

From the findings presented in Figure 4, it was observed that 140 out of the total 364 respondents engage in commercial activities in the selected traffic corridor of Osogbo, 108 out of the total respondents were drivers, 44 were professionals, 36 were civil servants and 36 were artisans. This alluded that most of the respondents selected for the study engages in mobility movement in the area either as a trader, driver, civil servants or an artisan. The age group of the respondents denotes that most of the respondents for the study were mature enough to provide related responses to the course of study as a larger percentage 59.1% fall between the age group 31-51 years, 22% fall between the ages of over 51 years, 12.1% fall between the age of 18-30 years. It was also discovered that most of the respondents earn above Nigeria's minimum wage of 37% as shown in Figure 5, earning between 41,000-60,000 per month, which can lead to the increase in the number of car owners among Osogbo residents.

Analyzing the physical planning implication of traffic congestion in the study

There are several physical planning implications of traffic congestion in the central area of Osogbo, among them are population increase, urban sprawl, lack of overall physical plan and development control, inadequate road infrastructure and parking facilities, poor public transport and poor road network.

The finding un-measure population increase or population growth of Osogbo since it became the seat of

Table 1. Socio-economic characteristics of the respondents.

Sex of the Respondents	**Frequency**	**Percentages %**
Male	251	69
Female	113	31
Total	364	100
Religion of the Respondents		
Islamic	186	51.1
Christianity	144	39.5
Traditional	34	9.3
Total	364	100.0
Marital Status of the Respondents		
Married	206	56.9
Single	94	25.2
Divorced	15	4.1
Widow	49	13.7
Total	364	100.0
Age of the Respondents		
under 18 years	25	6.9
18-30 years	44	12.1
31-51years	215	59.1
Over 51 years	80	22.0
Total	364	100.0
Level of Education		
Primary	45	12.4
Secondary	81	22.3
Tertiary	152	41.8
No formal education	44	12.1
Post Graduate	42	11.5
Total	364	100.0

Source: Author's Field Survey, 2023.

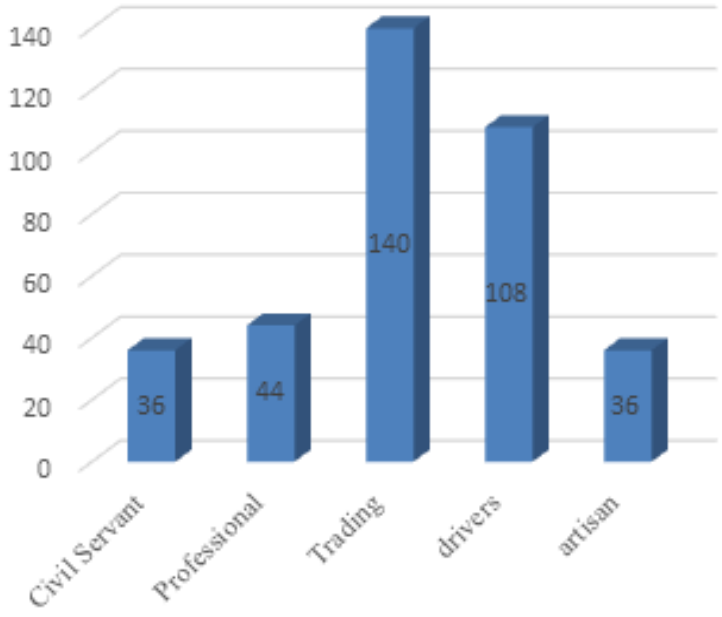

Figure 4. Occupation of the Respondents. **Source:** Author's Field Survey, 2023.

Figure 5. Income Level of the Respondents. **Source:** Author's Field Survey, 2023.

government for Osun state as being a major physical planning perspective to traffic congestion in the area. The city of Osogbo is growing at a very fast rate from 126,000 in 1953 to 772,000 in 2023 as shown in Table 2 and Figure 6. As a result of this, the city cannot provide adequate services and infrastructure including transportation infrastructure to cope with population growth and increase in the central area of Osogbo, contributing to traffic congestion. The increase in population will continue to exert pressure on road infrastructure and other social and economic services unless deliberate efforts are made to address traffic congestion in the city. This was also ranked 1st with a weighted mean of 4.16 which signifies that population growth in the study area is a crucial implication of physical planning to traffic congestion.

Another implication of physical planning to traffic congestion in the study area is urban inadequate road infrastructure and parking facilities in the area to accommodate the increase in population. Road infrastructure such as pedestrian walkways, bus terminals, and signage among others were not adequate in the study area therefore causing congestion in the area and this was ranked 2nd from the result of findings with a weighted means of 4.04, which implies that after an increase in population the second view of physical planning on traffic congestion in the central area of Osogbo is inadequate road infrastructure and parking facilities. Some of the road intersections in the central area such as (Oja-Oba, Gbona and Oke Fia) do not have either an overpass or underpass to facilitate a smooth flow of traffic. There is limited parking space, especially in the CBD, which forces some of the road users to park on roadsides thus reducing the road capacity by making the roads even much narrower. All these factors exacerbate the traffic congestion problems in the city. Finally, several motorists especially during morning and evening peak hours violate traffic regulations. The famous breakers of traffic regulations are the minibus (Korope) drivers and motorcyclists.

Table 2. Trend of population growth for Osogbo.

Year	Population	Growth rate
1953	126,000.	4.13%
1963	207,000	5.08%
1973	267,000	2.30%
1983	342,000	2.40%
1993	433,000	1.64%
2003	521,000	1.96%
2013	625,000	1.79%
2023	772,000	2.93%

Source: National Population Commission, 2023.

Urban sprawl is another physical planning perspective of traffic congestion in the central area of Osogbo. Urban sprawl refers to the rapid expansion of the geographic extent of cities and towns which are often characterized by low-density residential housing, single-use and increased reliance on the private automobile for transportation. The result of this urban sprawl on Osogbo traffic congestion is the use of motorized transport to travel long distances to workplaces and other parts of the city such as places from Ede, Ikirun, Ejigbo, Ilobu, Osunjela, Iragbiji and among other cities that people come daily to carry out their transaction. This is shown in Table 3 as the presence of many urban sprawl around Osogbo also constitute to traffic congestion in the area. Therefore, there is a need to make provisions for people in the neighborhood cities to reduce mobility to the centre of Osogbo.

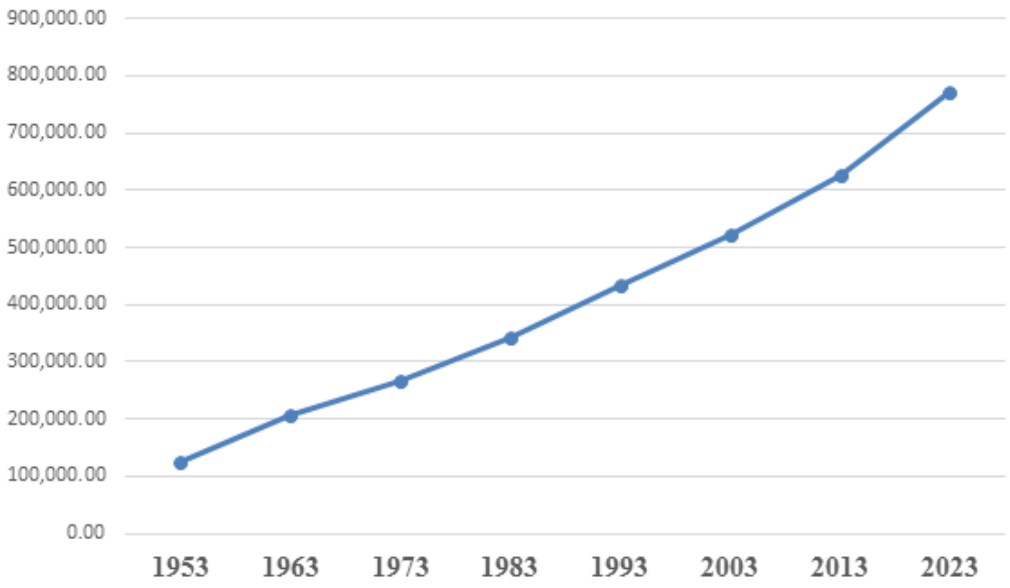

Figure 6. Trend of population growth for Osogbo. **Source:** National Population Commission, 2023.

Table 3. Physical planning implication of traffic congestion in the study area.

Physical planning implication of traffic congestion	Mean	Rank
Population increase	4.16	1st
Urban sprawl	3.80	3rd
Lack of overall physical plan and development control	3.76	4th
Inadequate road infrastructure and parking facilities	4.04	2nd
Poor public transport	3.74	5th
Poor road network	2.29	6th

Source: Author's Field Survey, 2023.

Public transport in the city of Osogbo is poor due to the low quality of services provided by the minibuses (known as Korope), tricycles and motorcycles. Public service is poor due to several factors including limited spatial coverage provided by minibuses, lack of fixed bus time schedules, overcrowding and at times not adhering to scheduled bus routes. Services provided by cyclists are poor because of rough riding leading to a high rate of accidents. In addition, poor public transport is contributed by the city being predominantly served by minibuses instead of regular buses, which are not comfortable to some of the commuters but the 'Korope' drivers who are only after their purses and not the comfort of the passengers. Poor public transport forces several Osogbo dwellers who can afford cars to opt to use private vehicles instead of public transport. This was also in line with the result of finding as poor public transport ranked 5th with a mean value of 3.74.

CONCLUSION AND POLICY RECOMMENDATION

Traffic congestion is a serious and growing problem in the central area of Osogbo and has led to several socio-economic and environmental impacts. The nature and dynamics of traffic congestion are more or less similar as in many other cities of the country. In the central area of Osogbo congestion is contributed by several factors including population increase, expansion of city boundaries, economic growth, an increase in the number of cars, poor road infrastructure, city physical structure, lack of updated master plan and poor development control, driver's attitude, passenger's attitude and on-street parking. Road rehabilitation, construction of overhead bridges and use of state enforcement at some markets are the main strategies applied by the Osun state government to control congestion. These strategies have not provided the desired results due to a number of reasons such as a rapid increase in population and cars, rapid growth of existing commercial activities along the central area of Osogbo and non-application of physical planning as a key tool for traffic congestion minimization.

So to enjoy a sustainable transport system there is a need for public enlightenment / regular education of road users in the study area on the need to use traffic control devices. There is also a need to decongest activities in

the central area of Osogbo to reduce the number of travel to the area, construct proper and consistent bus terminals which are not too far apart within the city, Enforce the use of alternate routes to minimize the number of traffic within the city centre during the peak hour of the day. It is recommended to provide a parking plaza strategically within the area to curb the problem of on-street parking.

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