

The Challenges of Mobility within Osogbo, South Western Nigeria

Fasakin, J.O. & Ajala, D.O.
Department of Urban and Regional Planning
Federal University of Technology
Akure, Nigeria
E-Mail: oye2ajala@yahoo.com
Phone: 08033982949

ABSTRACT

The study identifies the barriers to urban traffic movement in Osogbo, Nigeria and examines the various impediments to traffic flow in the city. This is necessary because since 1991 when Osogbo became the state capital, people have been stuck in traffic persistently, contributing to the transport system in the city to be in a state of crisis. The survey method using questionnaire on 460 respondents was adopted in the study. The stratified, random and systematic sampling techniques were used in selection of eight routes from quarters covering areas of high vehicular populations in the city. The result revealed that on street parking contributed immensely to the problems of urban mobility in the city. The study therefore recommended that traffic management measures in the form of junction rehabilitation, introduction of mass-transit buses, encouraging the use of bicycles and providing pedestrian walk ways must be implemented in the city.

Keywords: Traffic management; On-street parking;

Aims Research Journal Reference Format:

Fasakin, J.O. & Ajala, D.O. (2017): The Challenges of Mobility within Osogbo, South Western Nigeria
Advances in Multidisciplinary & Scientific Research Journal. Vol. 3. No.1, Pp 101-110

1. INTRODUCTION

Cities and traffic have developed hand-in-hand since the earliest large human settlements. The same forces that draw inhabitants to congregate in large urban areas also lead to sometimes intolerable levels of traffic impedence on urban streets and thoroughfares. Despite the increasing level of urban mobility worldwide, access to places, activities and services has become increasingly difficult. Not only is it less convenient in terms of time, costs and comfort to access locations in cities, but the very process of moving around in cities generates a number of negative externalities. Accordingly, many of the world cities face an unprecedented accessibility crisis, and are characterized by unsustainable mobility systems.

The present road transportation and facilities in our urban areas are characterized by inadequacy in the number provided and capacity required, and poor state of their maintenance, which in turn gives rise to traffic congestion, over-loading of vehicles, surface wear-off of the roads and road traffic accidents (Wright, 1994; Ogunbodede, 2008; Ogwude, 2011; Basorun & Rotowa, 2012). In Osogbo, streets and major routes have no provision for pedestrian and bicycle lanes. The roads and streets are narrow and they are poorly maintained. The buses, cars, lorries, trucks, trailers, motor cycles as well as non-motorized vehicles compete for the narrow road space thereby decreasing facilities that would quicken the movement of persons, goods and services. The rising use of private cars has choked roads, impede traffic flow, endangering the safety of pedestrians and the health of residents in the city

Osogbo residents cannot meet all their needs and wants within the immediate environment; therefore, they move to other places in order to earn their living. They go to work to earn income, they go to shop or market to buy daily needs and they educate their wards who are transported to school on daily basis. Also they recreate themselves, visit friends, attend churches or mosques as well as partake in social functions (Ajala 2014). These are basic human wants that can only be satisfied by moving to those parts of the city where those activities or opportunities avail themselves. All these basic activities however lead to traffic congestion in the city. In recent times, road traffic impedence leading to congestion has been further compounded in the city due to rise in income, inadequate pre-timed traffic lights for traffic control, misuse and overuse of land, pedestrian traffic and poor road network planning and design. What is not understood is whether the route alignment of the road network in Osogbo is the causal factor. It is worthy to mention that for decades, transport network has been known to facilitate and dictate track of land use development.

Available records indicate a rising profile in the population of vehicles in the city as evidenced from data from motor licensing office. Moreover, the rising use of private cars have choked roads, impedes traffic flow endangering the safety of pedestrian and health of residents. The question of how to enhance mobility while at the same time reducing congestion, accidents and pollution is a common challenge to all major stakeholders transportation in the city. Therefore this study identifies factors that lead to accessibility crisis of urban mobility in the city and suggest solutions to the problem.

2. MATERIALS AND METHODS

2.1 The Study Area

2.1.1 Location and Geographic Setting

The study area is Osogbo Township. History had it that Olutimehin (a renowned hunter), Oba Larooye and many of his chiefs and subjects founded Osogbo in the 18th century (Falade, 2000). It is a typical indigenous Yoruba town and one of the largest towns in Nigeria. It is located between latitude 7^o 47' north of the equator and longitude 4^o33' east of the Greenwich Meridian. The present site of Osobo is the third settlement in succession, the other two sites being Ontoto and Ita Ontoto.

As a result of its central location, Osogbo is easily accessible from many towns within and outside the area. The city and its environs presently cover an area of about 30km². Osogbo as the capital of Osun state is about 220km to Lagos, the popular seaport in Nigeria, about 820km to Abuja, the Federal Capital Territory, and about 96km to Ibadan, the capital of Oyo state. Also the city is about 30km to Ile-Ife the cradle of Yoruba race, 32km to Ilesa, 5km to Ikirun, 5km to Ilobu and about 4km to Ede. These road systems complement the railway line which passes through the town. For many years, Osogbo was the northern terminus of what is now the Lagos – Kano Railway line. Locational advantages and infrastructural opportunities combine with the historical importance of the city to enhance its socioeconomic importance and also determine the nature and tempo of governmental patronage.

2.2 Data Collection

The research covers the city of Osogbo which was divided into three zones using quarters/compounds and land use densities as the yardstick for stratification. The research employed Simple Random Sampling Technique. This involves picking the wards and residential quarters/compounds/districts. Out of the total number of 26 wards in the 2 local governments that make up the city of Osogbo, 7 were chosen randomly (using the random table) representing 26.9 percent. To ensure a sample proportion of not less than 18 percent in the selected ward, 40 residential quarters were taken altogether. In the absence of disaggregated population figures for these quarters, the component buildings were regarded as the research population (Basorun, 2008). This means that the residential buildings were used as proxy population from where a respondent who was at least 18 years old (preferable household head) was picked for interview.

Table 1: Analysis of wards categories selected for questionnaire administration

Type of zone	No of zone	No of wards	No of wards selected
Low density	1	8	2
Medium density	2	11	3
High density	3	7	2
Total		26	7

Source: Field survey, 2014.

Table 2::Analysis of Number of household heads selected for Questionnaire administration

Zone	Ward	Number of buildings identified	Number of sampled buildings
1	1	285	56
	2	305	61
2	3	355	70
	4	340	68
	5	350	70
3	6	360	72
	7	305	61
Total		2300	460

Source: Adewuyi A (2006) & Field survey, 2014

The sample frame at this stage of the study is the individual buildings in the stratified zones and wards of the city. With the help of rating lists the houses are identified through house to house questioning and reconnaissance survey of the wards. In all the 7 selected wards by stratification 2300 structures were identified from where 20% sample was drawn. According to table 2, in zone 1, two wards were selected out of 8 wards. The wards have 285 and 305 habitable houses according to the rating lists fine tuned by the spatial delineation of the city. In zone 2, 3 wards were selected having 355, 340 and 350 habitable houses respectively. Also in zone 3, two wards were equally selected with habitable houses of 360 and 305 respectively. The systematic sampling was done by fine-tuning the numbering used for the valuation lists. One out of every five buildings was then selected for interview and questionnaire administration.

2.3 Observation studies

Observation studies were carried out to determine the dimensions of the situation, the causes of traffic problems, and the solutions so far adopted in the city. The approach was essentially observation and entails the following:

- (a) Identification of major land uses in the study area.
- (b) Identification of the dimensions of the problems and factors responsible for them.

4. DATA ANALYSIS AND DISCUSSIONS

Descriptive and bivariate statistics were used in analyzing the data.

Table 3 revealed that vehicle population had been on the increase, For example in 2010, a total number of 10,625 vehicles of all brands were registered in the city. In 2011 there was an increase of 6.2% and also upward increase of 10.1%, 12.1% and 9.3% for subsequent years respectively. However, these figures does not account for vehicles registered outside the city but found their ways into the capital (most especially from Lagos). The import of this is that the rising use of private cars has choked roads, impede traffic flow, endangering the safety of pedestrians and the health of residents in the city.

Table 4 reflects on the vehicle ownership status of respondents in the study area. The data indicated that 56.9% of the respondents have private vehicles to move around while 43.1% of respondents do not have private vehicles. The import of this is that more than half of the respondents are constantly on the roads using their vehicles leading to increased vehicular population on the roads. In terms of mode of transportation, the study revealed in table 5 that 56.9% of the respondents have private cars for their day-to-day movements while 16.5% perform their daily movement activities by taxis while 6.9% use motorcycles for their day-to-day movement. 1.3 % of the respondents ride on bicycles. The dominance of cars and taxis as the mode of transportation however revealed that fewer passengers would be moved at a time, hence there is tendency to be too many vehicles on the road carrying few passengers because the cars have low occupancy rate. Also the attitudes of motorcyclists with their numbers is becoming wearisome as the riders mostly untrained artisans are prone to accidents.

4.1 Absence of Traffic Lights at Intersections

The result of the effects of street trading indicated that 53.7% strongly agreed that congestion on the road occurs as a result of hawkers displaying their wares on the road, while (19%) agreed. They equally further explained that other factors such as bad roads ineffective traffic management cause congestion on the roads in the city. Also 7.4% of respondents are neutral. On the other hand, 10.2% disagree that street trading impede traffic flow while 9.7% strongly disagree. The survey result of condition of the roads as reflected in table 5 revealed that 36.5% of respondents strongly agreed that poor road condition impede the flow of traffic and also 13.5% relatively agreed while only 8.7% remain neutral on the question. On the contrary, 19.1% strongly disagree that this factor doesn't form the main obstacles to mobility. The result means that 50% agreed that poor road condition impede movement of vehicles hence, it is pretty difficult for two big vehicles moving in opposite direction to move freely on some of the roads. While in others the potholes are too numerous that vehicles speed on the road is drastically reduced. In effect the result from this analysis is a pointer to the fact that the government needs to rehabilitate more roads in order to enhance free flow of traffic in the city.

The road network in the city handles 100% of the state traffic and numerous passengers daily since there are no other forms of transport for intra-city movement. The intra-city traffic is complemented by traffic that entered the city from neighboring cities e.g Ikirun, Ile-ife, Ilesa, Ilobu, and those who leave their places of abode from Olorunda local government to and osogbo local government daily Osogbo as a city predated modern planning efforts, being in existence long before the introduction of vehicular mode of transport. This should explain the spontaneous nature of many streets and their poor alignment. What now constitutes road network in osogbo took its origin from a central point that is known as Oja-oba (King Place) from where other roads – Ilesa road, Ibokun road, farm settlement spread out. The construction of railways that reached Osogbo in 1906 added another CBD.

This new CBD forms another major focal point where another set of streets radiated to other areas like Ikirun, Ifon, Ilobu and the location of commercial centers and offices. It was observed that the poor layouts of alignments of many streets in the city create friction points at intersections. Many of the roads have pavements of less than 7 meter wide and their narrow widths are responsible for lack of pedestrian sidewalks and on street parking along them. Many streets also experience reduction in their carriage capacity during rainy season as a result of poor drainage system

On the effect of parking on traffic flow in the city, the study revealed that 55.2% strongly agreed that on street parking impede the flow of traffic in the study area while 19.5% only agreed. Only 3.5% of the respondents remained neutral. On the other hand 8.7% of respondents disagree that on street parking has a negative effect on traffic flow, while 12.1% of the respondents strongly disagree with this assertion. This on street or kerb parking lead to reduction in the carriageway capacity and the pedestrians are left competing with vehicles on the remaining travelled way.

From this analysis, it is inferred that 74.7% of the respondents give affirmation to the fact that on-street parking is one of the factors that greatly impede flow of traffic in the city. This is due to the fact that there are no organized parking lots either privately or by government in the study area, with the exception of some activity areas having some parking space, vehicles are parked on the roadside. This shows inadequacy of traffic management measures for the city.

Table 10 : Summary of Factors Impeding Traffic Observed on Selected Roads in Osogbo

Delay factors	Gbongan road	Sabo Rd	Station road	Adeleke/ Freeway	Igbona/ Ayetoro	Rasco	Iwo rd
Length	3.5km	3.2km	2.3km	1.3km	2.0km	0.9km	1.5km
No on feeders	29	18	14	6	12	4	12
Lane Width	9.83m	5.4m	5.6m	9.83m	6.15m	5.5m	9.80m
Pedestrian mall	NA	NA	NA		NA	NA	A
Cycle ways	NA	NA	NA	NA	NA	NA	NA
Rd mark	NA	NA	NA	NA	NA	NA	NA
No of lanes	4	2	2	4	2	2	4
Surface condition	P	P	P	P	P	P	P
Road signs	NA	NA	NA	NA	NA	NA	NA
Street trading	A	A	A	A	A	A	NA
On-street parking	A	A	A	A	A	A	A
Parking partly on street	A	A	A	A	A	A	A

Source: Field Survey, 2014

In dealing with the impediments to traffic flow in the city, the data in table 10 clearly indicates the factors observed to be responsible for traffic impedance and obstacles to mobility and increase in journey times in the city of Osogbo. Extant literatures (Ogunsanya, 2002) revealed that the major factors responsible for increased delays on most urban roads have been identified as the road width, number of feeder roads/ intersections and on street parking. With the exception of Adeleke freeway and Rasco roads all the roads have a substantial number of feeders/intersections in addition to experiencing heavy concentration of parkers in all categories. Equally important is the number of lorries on the roads which are narrow except Adeleke freeway, Iwo road and Gbongan roads that are wider and having dual carriageways, that can contain two moving vehicles on each lanes in addition to kerb side parking. Pedestrian facilities, cycle-ways and street trading are not accommodated and thus, their activities constitute serious threat to moving vehicles.

4/2 Management of traffic at Intersections in the Study Area

The nature of intersections in the city create conflict points. In understanding the pattern of traffic at intersections an evaluation of the intersections were carried out by employing a physical observation of land use characteristics that generate traffic at intersections and evaluating it against the backdrop of traffic flows, delays at intersections. The at-grade railway crossings cause hindrance to traffic flow each time a train crosses. In terms of geometry, the various types of T-type, Y-type, Cross type (+), and Rotary intersections exists in the study area (as reflected in table 8).

There are no lane markings on all the intersections as at the time of study. Hence, loose lane discipline as against strict lane discipline is prevalent in the city. However, traffic control is achieved with the aid of traffic wardens stationed at some strategic intersections.

Table 11: Characteristic of Selected Intersections in Osogbo.

Location	Nature of Intersection	How traffic is Managed	Land use Characteristics
Dugbe Area	Cross Intersection	Traffic Warden	Retailing shops, Banks Filling stations, Railway crossing
Olaiya Area	Cross Intersection	Traffic Warden	Filling station, Retail shops, Railway crossing
Igbona Area	Cross Intersection	Traffic Warden	Open Market, Filling station, hopping Complexes
Palace Area	Cross Intersection	Traffic Warden	Palace, Central Mosque, Filling Station
Gbaemu Area	Cross Intersection	No Control	Retail shops, Residential area
Jolayemi Area	Cross Intersection	No Control	Hospital, Retail shops Residential areas, hopping Complex
Isale Osun Area	Cross Intersection	No Control	Residential areas
Oke Fia Area	Cross Intersection	Traffic Warden	Shopping Complexes, Motor Park, Filling Stations
Baba sekere Area	Y junction	Traffic Warden	Institutional, Shopping Complexes, Residential areas
Kola Balogun Area	T. junction	No Control	Residential areas, Wholeale shops
Station Road/Fagbewesa	T. Junction	No Control	Market, Shopping Complexes Banks

Source: Field survey, 2014

Table 11 revealed that 8 of the selected Intersections in this study constituting 73.0% are cross intersections. These are Dugbe, Olaiya, Igbona, Palace, Gbaemu, Jolayemi, Isale Osun and Oke Fia Intersections respectively. In terms of land use characteristics of the selected intersections majority of them are located where institutional, commercial complexes, market retail shops that generate heavy traffic predominate. The intersecting arms also connect residential areas and other major activity centres in the study area.

These intersections serve as links to major routes which connect different types of areas and land use activities in the study area. Also common to all the intersections is the presence of roadside hawkers and traders, and the location of retail shops along the intersecting roads. These result in roadside obstructions and parking problems from customers who patronize them thereby impeding the free flow of vehicles. Associated with these problems are the problems of narrowness and poor or no channelization of the intersecting roads to separate the traffic stream thereby causing traffic conflicts. This was also reported by Aderamo, (2012).

4.3 Analysis of bivariate relationships

In an attempt to show the degree of relationship among the variables, Regression analysis of contribution of the independent variables to predicting traffic flow problems was carried out.

Multiple R	= 0.815
R Square	= 0.703
Adjusted (R2)	= 0.716
Standard Error	= 15.2758

Table 12: Analysis of variance

	Sum of squares	DF	Mean square	F=ratio
Regression	241034.12	5	48206.824	200.001
Residual	83128.43	587	141.616	

Sig. at P<0.05

The result above shows that a combination of independent variables; on-street parking, street trading, poor road condition, increase in vehicle population, inadequate pre-timed traffic lights at junctions, yielded a coefficient of multiple regression (R²) of 0.0703 accounting for 70.3% of the variance in road traffic flow thereby leading to obstruction and impedance of traffic in Osogbo. The table also shows that the analysis of variance for the multiple regression data F-ratio value of 200.001 is significant at 0.05.

4.4 Analysis of Contribution of each Independent Variable.

In an attempt to examine the relative contribution of each of the variables to traffic flow in the city of osogbo as analyzed above further analysis was carried out and a model specification was arrived at.

The model was specified as:

$$Y = a_0 + b_1x_1 + b_2x_2 + b_3x_3 + \dots + b_nx_n + U_i \dots \dots (i)$$

Where

A₀ = constant

x₁.....x_n = Explanatory variables

b₁.....b_n = Parameters to be estimated (i=1,2,3.....n)

U_i = Error term

Y = Dependent variable (Traffic flow)

X₁ = Street trading

X₂ = Increase in vehicle population

X₃ = On street parking.

X₄ = Poor road condition.

X₅ = Lack of traffic lights at junctions

Table 13: Variables in Equation

Variables	B	Seβ	Beta	T	Sig.T
Constant	52.7182	5.104	-	10.6713	0,05
X1	3.2510	0.263	0.257	12.545	0.01
X2	2.2390	0.250	0.233	8.896	0.02
X3	3.3121	0.232	0.378	13.991	0.05
X4	2.6290	0.201	0.215	13.477	0.01
X5	1.5530	0.242	0.314	5.374	0.01

Source: Data Analysis, 2014.

The summary output of multiple regression estimation is as shown as:

$$Y = 52.7182 + 3.2510X_1 + 2.2390X_2 + 3.312X_3 + 2.6290X_4 + 1.5530X_5 + U_i \dots \dots (ii)$$

The analysis in table 13 shows the relative contributions of each of the five explanatory variables. This indicates that each of the critical variables selected independently made significant contribution to prediction of obstacles to traffic flow in Osogbo, though in different degree. The most potent contributor happens to be on-street parking (β=3.3121) closely followed by street trading with (β =3.251), poor road condition with (β=2.6290), Increase in vehicle population (β =2.2390) and absence of traffic lights at junctions with (β=1.5330). This implies that on- street parking made the highest contribution to accessibility problems in osogbo, when all the independent variables are put together at 0.05 significant levels.

5. RECOMMENDATION

Based on the analysis above, the following policy options are recommended

- 1 Provision of on-street parking and off-street parking facilities.
- 2, Rehabilitation of intersections to accommodate merging and emerging traffic and provision of roundabout.
3. Provision of Pre- timed traffic lights at intersections
4. In the interim, regulate the activities of street traders at various markets and popular intersections and in the long run relocate them to planned markets.
- 5 Introduction of high occupancy vehicles and creation of bus stops.
- 6 Encourage the use of non- motorized vehicles (bicycles) and provision of pedestrian walkways along busy streets.

6. CONCLUSION

This study has attempted to identify factors contributing to obstacles to urban mobility in Osogbo. Parking along the street is established as the most serious road traffic challenge in Osogbo affecting movement amidst other identified problems. The paramount solution suggested for tackling these identified problem will facilitate smooth movement of people and goods. There is no doubt that a perfectly well planned road transport system in a city such as Osogbo, is essential in order to improve the quality of life of the people and enhance the functioning of trade, economy and many other essential services. It is therefore necessary to have a reformed transportation policy and an institutional frame work to effect control and management of traffic in the city.

Table 3.0 List of Registered Vehicles in Osogbo between 2003 and 2007

Year	Vehicles Newly Registered	Acumm Increase	% growth
2010	10,,625	10,625	-
2011	11,268	21,893	6.2
2012	12,420	34,313	10.1
2013	13,988	48,301	12.1
2014	15,320	63,621	9.3

Source: Internal Revenue Office, Osogbo.May, 2014

Table 4: Vehicle Ownership

Do you own a vehicle	Number	Percentage
I have a vehicle	262	56.9
I do not have a vehicle	198	43.1
Total	460	100

Source: Source; Computed from primary data, 2014

Table 5: Mode of transportation

Vehicle mode	Frequency	Percentage
Private Vehicle	262	56.9
Public vehicle(taxi)	76	16.5
Public vehicle(korope)	58	12.6
Motorcycle	32	6.9
Pick up	6	1.3
Station wagon	4	0.8
Bicycle	6	1.3
Trekking	16	3,5
Total	460	100

Source: Computed from primary data, 2014

Table 6: Effects of inadequate pre-timed traffic light at junctions

Inadequate traffic lights affect traffic flows at junctions	Frequency	Percentage
Strongly agree	167	36.4
Agree	58	12.6
Neutral	60	13.0
Disagree	80	17.4
Strongly Disagree	95	20.6
Total	460	100

Source: Computed from primary data, 2014

Table 7 Effects of Street Trading on traffic Flow

Street trading Impede traffic flow?	Frequency	Percentage
Strongly Agree	201	53.7
Agree	87	19
Neutral	34	7.4
Disagree	70	10.2
Strongly Disagree	68	9.7
Total	460	100

Source: Computed from primary data, 2014

Table 8: Effects of Poor roads condition, road links on Traffic Flow

Narrow road, potholes Impede traffic flow?	Frequency	Percentage
Strongly Agree	168	36.5
Agree	62	13.5
Neutral	40	8.7
Disagree	88	19.1
Strogly Disagree	102	22.2
Total	460	100

Source: Computed from primary data, 2014

Table: 9 :Effects of On- Street Parking on Traffic Flow

On street parking Impede traffic flow?	Frequency	Percentage
Strongly Agree	254	55.2
Agree	90	19.5
Neutral	16	3.5
Disagree	40	8.7
Strongly Disagree	60	12.1
Total	460	100

Source; Computed from primary data, 2013.

REFERENCES

1. Aderamo, A. J. (2012). Urban transportation problems and challenges in Nigeria: A planner's view. *Prime Research on Education*, 2(3), 198 – 203.
2. Ajala, D.O. (1995), Traffic Management in Agbowo Area of Ibadan, Problems and Prospect. An Unpublished thesis submitted to the Centre for Transport Studies Ogun State University, Ago Iwoye
3. Ajala D.O. (2014), Management Measures for Combating Traffic Impedance in Osogbo: An Evolving State Capital. An Unpublished PhD thesis submitted to the school of Environmental Technology, Department of Urban and Regional Planning Federal University of Technology Akure.
4. Ajala, D.O., Fasakin, J.O. (2016): Obstacles to Urban Mobility: Findings and Reflections on Osogbo, South Western Nigeria. Paper Presented at ISTEAMS Multidisciplinary Cross-Border Conference at the University of Professional Studies Accra Ghana between 21st - 23rd March 2016
5. Banister, D. (2002). *Transport planning*. United Kingdom: Taylor and Francis.
6. Basorun, J. O., & Rotowa, O.O. (2012). Regional assessment of public transport operations in Nigerian cities: The case of Lagos island. *International Journal of Developing Societies*, 1(2), 82 – 87.
7. Bruton, M. J. (1975). *Introduction to transportation planning*. London: Hutchinson.
8. Edwards, J. D. (1999). *Transportation planning handbook*. Washington D.C.: Institute of transportation planners.
9. Falade, S.A. (2000): *The Comprehensive History of Osogbo* pp10-12
10. Filani, M. O. & Osayinwese, I. Z. (1974). The organization of transport planning in Nigeria. *Nigerian Journal of Economic and Social Studies*, 16(3), 387-402.
11. Filani, M. O. (2000). Transport and the environment. *The Nigerian Geographical Journal*, 3 & 4, 15 – 28.
12. Gauthier, H. L. (1993). *Geography, transportation and regional development*. London: Macmillan.
13. Hutchinson, B. G. (2002). *Principle of urban transportation system planning*. New York, NY: Scripta Book Coy. Ltd.
14. Jackson, J. N. (2000). *Survey for town and country planning*. London: Hutchinson.
15. Meyer, M. D. & Miller, E. J. (2001). *Urban transportation planning*. New York, NY: McGraw-Hill Publishing Company.
16. Ogunbodede, E. F. (2008). Urban road transportation in Nigeria from 1960 to 2006; Problems, prospects and challenges. *Ethiopian Journal of Environmental Studies and Management*, 1(1), 7 – 18.
17. Ogwude, C. (2011). Managing transportation infrastructure in Nigerian cities. Paper Presented at the Nigerian Institute of Town Planner (NITP) and Town Planner Registration Council of Nigeria (TOPREC) Mandatory Continuing Professional Development Programme (MCPDP), 2011 edition, Ibadan, Nigeria.
18. Ratcliff, J. (1999). *An introduction to town and country planning*. London: Hutchinson.
19. Salter, R. J. (1997). *Highway traffic and design*. London: Macmillan press.
20. Town Planners Registration Council of Nigeria (TOPREC) Mandatory Continuing Professional Development Programme (MCPDP), 2011 edition, Ibadan, Nigeria.
21. Ratcliff, J. (1999). *An introduction to town and country planning*. London: Hutchinson.
22. Salter, R. J. (1997). *Highway traffic and design*. London: Macmillan press
23. Schiller, P. L., Bruun, E., & Kenworthy, J. R. (2010). *An introduction to sustainable transportation: Policy, planning and implementation*. United Kingdom: Earthscan.
24. Voight, O. N. (1986). *Transportation planning policy and analysis*. Oxford, Pergamon Press.
25. Wright, C. C. (1994). Conflicts, accidents, catastrophes and chaos. *Century Journal of the Royal Society of Medicine*, 87, 403 – 407.