



RESEARCH PAPER

Analysis of Passenger Flow Between Lapai Town and Surrounding Settlements in Lapai Local Government and its Environs in Niger State, Nigeria

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ABSTRACT

The research was carried out to evaluate passenger flow between Lapai town and surrounding settlements. Six motor parks are identified namely; Soje, Namiye, Suleja, Bida, Lokoja and Agaie. The flow of passengers to other settlements; their characteristics and purpose of flow from was obtained from a census of 1,958 passengers from the parks of which were relevant to the study. Correlation coefficient statistical technique was used to determine the relationship between the flow of passengers and the distance to other settlements was determined using Google earth. From the analysis of data, it was observed that female 33.7% about 660 passengers travelled from Lapai town and males (66.3%) about 1,298 male passengers mostly in the age bracket of between the active ages (18-40years). The settlement with the highest interaction with Lapai town is Minna with 635 passengers representing 32.4% of the total flow census and Kontagora is the least people travel to from LAPAI town with 2 passengers forming only 0.1% of the total flow population. the major purposes of flow are commercial with 752 passengers representing 38.4%, social with 493 passengers representing 25.2%, residential or home trips with 345 passengers about 17.6%, educational with 200 passengers representing 10.2% and breaking points or intermediary locations with 168 passengers representing 8.6% of the total flow census respectively.

Keywords: passenger, motor parks, settlement, interaction, flow census

INTRODUCTION

Passenger is any person that is being conveyed from one point to another by any of the different modes of transportation such as road, rail, water and air. Hence a passenger is anybody on motion that is being driven by the driver. Flow is a motion, it can be said to be the movement from one position to another. Hence, passenger flow can be defined as the movement or transportation of people or passengers from one place to another at a particular time from a particular location. Transportation is the movement of people, goods and services from one geographical area to another for commercial, administration, industrial, educational, occasional purposes or for the purpose of relocating to an area permanently or temporarily. It is also concerned with the movement of information as well as constraints and spatial attributes of an object movement between places.

Transportation is a process that involves the movement of commuters, goods and services

from a given point of origin to a specific destination (Okoko, 2006). The methods of transportation in Nigeria can be classified into four major modes which are: road, rail, water, and air. The contribution of the transport sector to the economy of Nigeria if considered by the GDP tends to stagnate or decline at about 3% of GDP (Ogunsanya, 2003). It is a very important factor in considering the economic growth and development of a nation. The transport sector contributed about 2.4 % to real GDP in 2004; with road transport alone accounting for nearly 86 % of the transport sector output (World Bank, 2007). Transport development is a growth generating mechanism in respect to the process of socio-economic development; it facilitates the development of growth poles and centre and

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should be a key element in the development process of any nation (Oyesiku, 2002). It is believed that the investment in transportation development will lead to increase in production and hence the developing countries with the zeal to develop places and provide effective transportation systems. Among the various modes of transport, the road is the most popular and widely used all over the world. The previous Nigerian National Development Plans reveal that road alone accounts for more than 85 percent of the total Nigerian transport assets (Federal Ministry of Transport, 1993). Public and private agencies operating inter-urban passenger transport services have been confronted with the increasing demand and forecasting procedures, which pose a great problem in making inter-city and regional transport service decisions (Oyesiku, 1995).

For better understanding of the movement of goods and people, the different modes of transportation road, rail, air and water transportations are considered and their links and relationships to the urban infrastructure. Also the various types of movements, which are inter rural, inter urban, rural-urban and urban rural movements are also considered. Nigeria is faced with transportation problems such as, bad roads, excessive unprofessional built up bounds

in some settlements, high accident rate, pollution, traffic congestion, and lack of direct flow pattern from the origin to the destination without breaking point. Some of these problems are also associated with the urban areas. The major factors responsible for the difficult access to the rural areas is the relationship between size of settlements, distance from origin and the passengers flow to a given settlement. In the transportation sector, due to the desire to minimize cost and maximize efficiency, transportation flows are scheduled through intermediary locations. This paper focus on inter rural and rural-urban movement of passengers between Lapai local government area and surrounding settlements of Niger State.

Geographical Location of The Study Area

Lapai is a local government area in Niger state bounded by the Federal Capital Territory, Abuja. It is located between latitudes 9° 03' and 9° 05' and longitudes 6° 34'E and 6° 57'E. It is about 18km west of old Lapai near the tributary or river Gurara along Suleija road which is also about 56 km east of Minna, Niger state. It covers a total land area of 3051km² with a population of 110127 (2006 Census). Lapai is located in the tropical climate which is characterized by two distinct seasons in a year, the wet and the dry seasons.

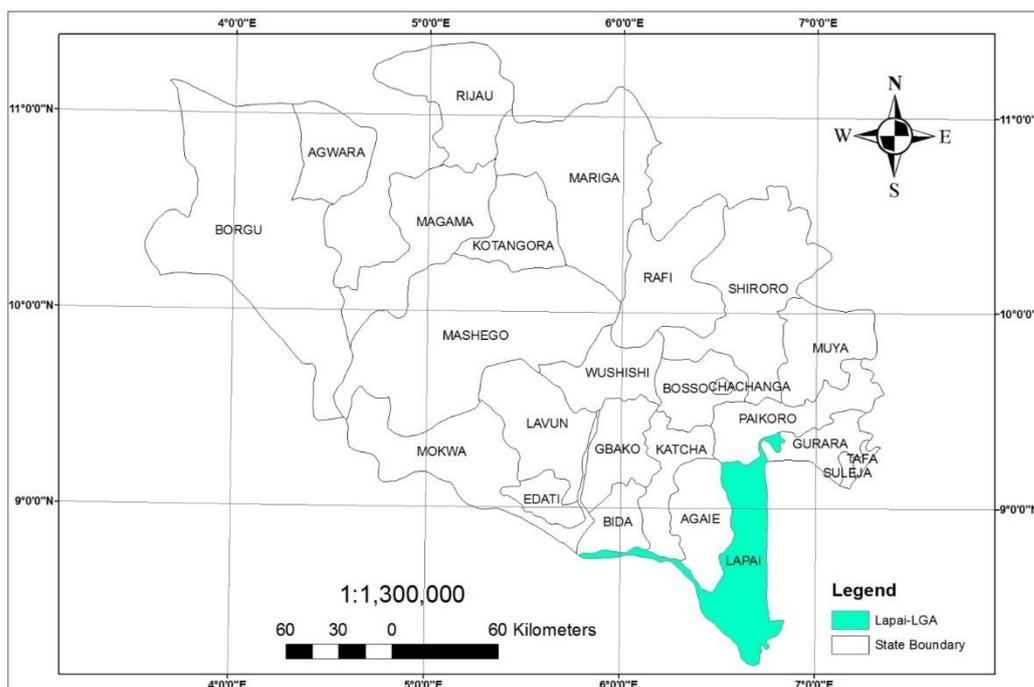


Fig. 2: Niger state map showing study location (SOURCE: NASRDA, 2014)

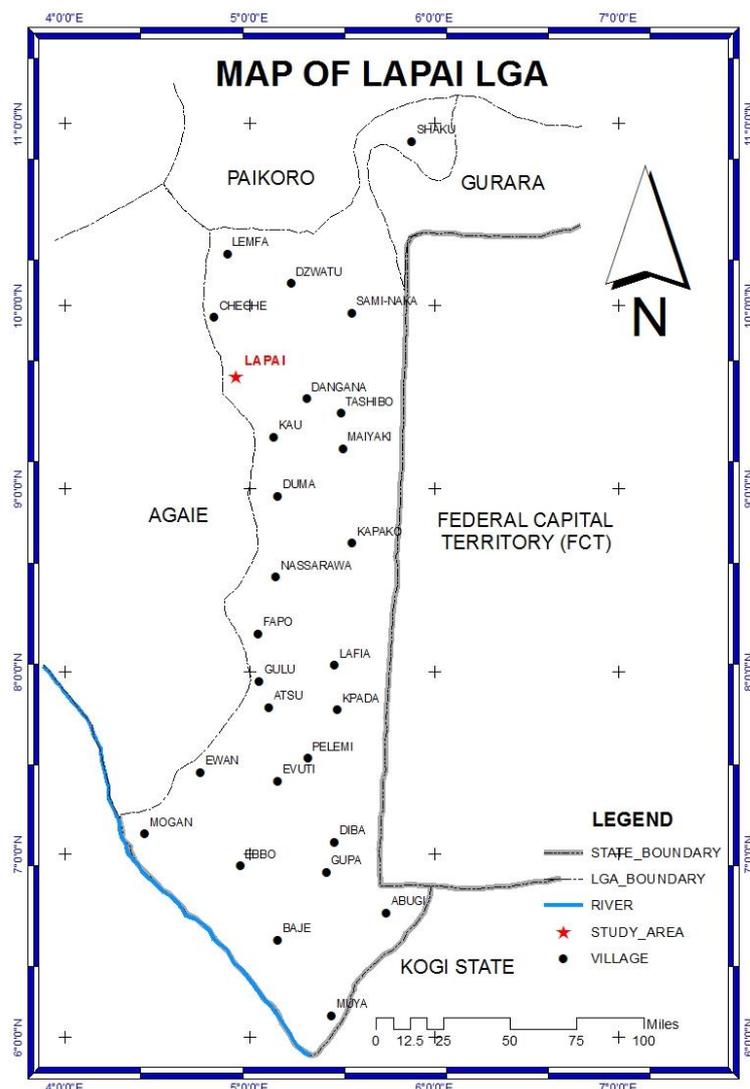


Fig. 3 STUDY AREA:LAPAI
(Source: NASRDA, 2014)

Transportation and Development

The contribution of the transport sector to the economy of Nigeria if considered by the GDP tends to stagnate or decline at about 3% of GDP (Ogunsanya, 2003). Nigeria’s transport system consists of some 195,000 km of roads; this network comprises a combination of Federal, State and Local Government roads. The Federal trunk roads are the principal vectors of the system and have a total length of 32,100 km (16%) of which the majority is paved. State roads account for 30,900 km (16%) while the Local Government road system comprises approximately 132,000 km (68%). Out of the 195,000km roads, about 60,000 km are paved, 3,775 km of railways, 3 international and 78 domestic airports as well as 13 sea and river ports. Roads are the country’s dominant mode of

transport carrying more than 90% of cargo and passenger traffic (RAMP, 2007). Rural roads constitute the major percentage of Nigerian road system. Transport development is a growth generating infrastructure in relation to the process of socio economic development; it facilitates the development of growth poles and centres and should be a fore-runner in the developmental process of any nation (Oyesiku, 2002; Peters,2002; Akintola, 2007)

Transport is a determining factor of nations and socio-economic development. As the key of economic development, transport infrastructure and facilities make up a basis for monitor trade and the movement of goods and person. Long perceived as a tool for accessing national and regional trade in a radically changing global environment, transport infrastructure remains a

pillar of development with a view to accelerating growth and reducing poverty (Okoko, 2006; Matalon, 1992; Musa, 2010). As an essential service in urban centers, transport enables people, firms and organizations to carry out their activities at sites selected for the purposes in separate location in the cities. Transportation is a key factor to understanding and serves as a link between the social and political occurrences in relation to the development of an economy. One of the major functions of the spatial structures of any human settlement is to facilities the movement of people and goods within a particular settlement (Mabogunje, 2008).

(Vibeke, 2009) also observed that changes in the transport sector may induce changes in other sectors, which in turn may affect sustainable development. Also Geerlings et al, (2005), ascertained that “the issue of transport is a derived effect of the fulfilling of all sorts of needs, varying from economic needs to social needs”. CST, (2003) observed that sustainable transport system forms a basic foundation that facilitates movement of goods and services in the present generation and capable of taking care of incoming generations. And hence, it should be efficient, affordable, safe, available, and should support economic development of the people. Also, alterations in the transport sector may impact changes in other sectors, which may affect sustainable development (Vibeke, 2009). Since the past decade, there have been increase in the demand for intercity passenger travel which has been due to increasing personal income, improved transport infrastructure and availability of vehicles for long distance travels in the market (Oyesiku, 1995).

The importance of public transport stemmed from the fact that it provides mobility for those who cannot afford to buy a car and helps in creating and maintaining livable communities by relieving high way congestion and assuring long-term sustainability in terms of resources consumption (Paul, 2001). Problems pervading urban transport sector in most developing countries range from inadequate and poor quality of infrastructures mismatch between demand and supply. These problems are triggered by interrelated trends such as urban population growth, rapid unplanned urbanization and rapid uncoordinated growth of cities (Aderamo, 2011). Today, experiences

shows a need for a greater variety of public transport modes, but buses are choice of majority of the communities and are the only means of mobility that can be afforded by poor in the developing countries (Armstrong-Wright, 1999). The bus system is the transportation system that uses buses that may have a range of passenger’s capacities and performance characteristics, which may operate on fixed routes with fixed schedules or may be flexibly routed.

METHODOLOGY

The following methods were adopted in carrying out the study

- i. Census was conducted based on passenger flow from the six various motor parks in Lapai to other settlements identifying certain characteristics
- ii. Questionnaires were administered at the motor parks in the study area which helps identifying the purpose of flow.
- iii. Volume of flow and distance of destination from Lapai settlement was correlated using statistical technique which is used to determine the relationship between distance of destination and passenger flow from Lapai settlement.
- iv. A traffic flow map showing relationship between Lapai and surrounding settlements was prepared.

Method of Data Analysis

The correlation coefficient method was used in analyzing these data, the relationship and the difference between various data sources (primary and secondary) were put into consideration. It was a yardstick in analyzing passenger flow between Lapai and its environs and measuring the flow pattern between these settlements. The method was used in analyzing the volume of the population with distance of the destination.

The formula used for obtaining percentage is:

$$\% = \frac{\text{Number of travellers}}{\text{Total number of travellers}} \times 100$$

RESULTS AND DISCUSSION

Identifying the Passengers Characteristics

Table 1 distribution of passengers by age

Age Range	Frequency	Percentage
18-30	797	40.7
31-40	732	37.4
50 and above	429	21.9
Total	1958	100

Age is a determinant of flow characteristics, as observed from Table 1 above, 40.7% of the total sample representing 797 passengers were between the ages of 18 to 30 years, 37.4% of the total sample representing 732 passengers were between the ages of 31 and 40 years and 21.9% of the total sample representing 429 passengers were between the ages range of 50 and above.

Table 2: distribution of passengers by sex

Sex	Passenger flow	Percentage
Male	1298	66.3
Female	660	33.7
Total	1958	100

Sex is a major determinant of flow characteristics, as observed from Table 2 above majority of the flow between Lapai town and other settlements was observed by male passengers and there was 660 female passengers represented by 33.7% of the total sample.

Identifying The Volume Of Passengers Flow Between Lapai Town And Surrounding Settlements

Table 5: Distribution of passengers flow by settlements interaction with Lapai town

Settlements	Number Of Towns	Flow Frequency	Percentage
Within Lapai Local Government	7	250	12.8
Surrounding Lapai Local Government	12	674	34.4
Other Settlements	13	1034	52.8
Total	32	1958	100

From Table 5 above, Lapai town interact with settlements both within and outside Lapai local government and Niger state as a whole. Lapai town interacted with 7 settlements within Lapai local government with 250 passengers representing 12.8% of the total sample; it interacts with 12 settlements surrounding Lapai

Table 3: Distribution of passengers by occupation

Occupation	Frequency	Percentage
Farming	764	39
Trading	685	35
Civil servants	333	17
Students	176	9
Total	1958	100

From Table 3 above, 764 passengers representing 39% of the total sample were engaged in farming, 685 passengers representing 35% of the total sample were engaged in trading, 333 passengers representing 17% of the total sample were civil servants and 176 passengers representing 9% of the total sample were students.

Table 4: distribution of passengers by car ownership

Ownership of car	Frequency	Percentage
Yes	145	7.4
No	1813	92.6
Total	1958	100

From Table 4.4 above, 145 of the passengers representing 7.4% of the total sample owned a private vehicle while the 1813 other passengers representing 92.6% of the total sample were not sole owners of vehicle(s).

local government with 674 passengers representing 34.4% of the total sample. Other settlements outside the context of the research which Lapai interact with are 13 with 1034 passengers representing 52.8% of the total sample of which is the highest.

Table 6 Distribution of passengers flow by interaction within Lapai local government

Settlements	Distance (in km)	Passengers	Percentage
Saminaka	23.8	18	7.2
Ebbo	72.3	50	20
Duma	140	22	8.8
Evuti	57.9	65	26
Gulu	45.2	45	18
Abugi	96.1	26	10.4
Muye	85.6	24	9.6
Total		250	100

Table 6 shows the interaction between Lapai town and settlements located within Lapai local government. Saminaka which is the closest to Lapai town with a distance of 23.8km has a flow of 18 passengers representing 7.2% of the total flow within, while the farthest which is Duma with a distance of 140km from Lapai town has a flow of 22 passengers representing 8.8% of the total flow within. Other settlement that interact with Lapai town from within Lapai local government, their distance and flow percentage from Lapai town are Ebbo has a distance of 72.3km and a flow of 50 passenger representing 20% of flow within, Evuti has a distance of 57.9km and a flow of 65 passengers representing a 26% of the flow, Gulu has a distance of 45.2km and a flow of 45 passengers representing 18% of the total flow within, Abugi has a distance of 96.1km and a flow of 26 passengers representing 10.4% of the total flow within and Muye has a distance of 85.6km and a flow of 24 passengers representing 9.6% of the total flow within.

Table 7 distribution of passengers flow by interaction with settlements surrounding Lapai local government.

Settlements	Distance (in km)	Passengers	Percentage
Paiko	47.7	125	18.5
Agaie	28.9	34	5
Gawu	40.4	90	13.4
Izom	64.1	55	8.2
Takumpara	28.7	178	26.4
Lokoja	185	10	1.5
Bakajeba	22.2	40	5.9
Sokun	92	34	5
Lambata	59.6	79	11.7
Egba	93.9	17	2.5
Katakpa	73.4	8	1.2
Kandi	53	4	0.6
Total		674	100

Table 7 above depicts the interaction between settlements surrounding Lapai local government and Lapai town. The closest settlement among those with interaction surrounding Lapai town is Bakajebba with a distance of 22.2km has a flow of 40 passengers representing 5.9% of the total flow in surrounding settlements, the farthest which is Lokoja with a distance of 185km has a flow of 10 passengers representing 1.5%. The settlement with the highest flow of 178 passengers representing 26.4% from those surrounding Lapai town is Takumpara with a distance of 28.7km. Other settlements surrounding Lapai settlement that interact with Lapai town such as Paiko has a distance of 47.7km with a flow interaction of 125 passengers representing 18.5%, Agaie has a distance of 28.9km with a flow of 34 passengers representing 5.0%, Gawu has a distance of 40.4km with a flow of 90 passengers representing 13.4% , Izom has a distance of 64.1km with a flow of 55 passengers representing 8%, Sokun has a distance of 92km with a flow of 34 passengers representing 5.0%, Lambata has a distance of 59.6km with a flow of 79 passengers representing 11.7%, Egba has a distance of 93.9km with a flow of 17 passengers representing 2.5%, Katakpa with a distance of 73.4km has a flow of 8 passengers representing 1.2% and Kandi with a distance of 53km has a flow of 4 passengers representing 0.6% of the total flow surrounding Lapai settlement respectively.

Table 8: distribution of passengers flow by interaction with other settlements

Settlements	Distance (in km)	Passengers	Percentage
Minna	71.5	635	61.4
Suleja	87.9	190	18.4
Ilorin	314	18	1.7
Kontagora	311	2	0.2
Mokwa	196	8	0.8
Kuta	127	12	1.2
Gwada	108	17	1.6
Kaduna	358	3	0.3
Dere	367	23	2.2
Tafa	125	50	4.8
Yelwa	407	25	2.4
Benin	432	29	2.8
Bida	64.6	22	2.1
Total		1034	100

Table 8 shows the interaction between Lapai local government and other settlements within and outside Niger state. From the table the farthest settlement that interacted with Lapai local government is Benin City with a distance of 432km from Lapai town and passenger flow of 29 representing 2.8%, the closest settlement that interacted with Lapai town is Bida with a distance of 64.6km and passenger flow of 22 representing 2.1% of the flow. The highest interaction with Lapai town was with Minna from a distance of 71.5km having a passenger flow of 635 passengers representing 61.4% of total flow between settlements within and outside Niger state that interacted with Lapai town. Other settlement not surrounding Lapai settlement that interacted with Lapai town are Suleja with a distance of 87.9km has a flow of 190 passengers representing 18.4% of the flow, Ilorin with a distance of 314km has a flow of 18 passengers representing 1.7%, Kontagora with a distance of 311km has a flow of 2 passengers representing 0.2% of the flow, Mokwa with a distance of 196km has a flow of 8 passengers representing 0.8%, Kuta with a distance of 127km has a flow of 12 passengers representing 1.2%, Gwada with a distance of 108km has a flow of 17 passengers representing 1.6%, Kaduna with a distance of 358km has a flow of 3 passengers representing 0.3%, Dere with a distance of 367km has a flow of 23 passengers

representing 2.2%, Tafa with a distance of 125km has a flow of 50 passengers representing 4.8% and Yelwa with a distance of 407km has a flow of 25 passengers representing 2.4%.

Identifying Factors Responsible For Volume Of Flow

Table 9 distribution of passengers by purpose of flow

Factors	Frequency	Percentage
Social	493	25.2
Commercial	752	38.4
Intermediary routes	168	8.6
Home trip		
(Residential)	345	17.6
Educational	200	10.2
Total	1958	100

Table 9 shows the different purposes that causes flow between Lapai settlements and other settlements, 493 passengers representing 25.2% travel to other settlements from Lapai town for social purposes, 38.4% representing 752 passengers flow between Lapai town to other settlements for commercial, 345 passengers representing 17.6% of the total flow move from Lapai town to other settlements for home trip, 200 passengers representing 10.2% of the total flow to other settlements from Lapai town for educational and 168 passengers representing 8.6% move to other settlements as breaking point to get another vehicle moving to their destinations, these settlements act as Intermediary routes.

Conclusion

Transportation is of great significance to every settlement no matter how big or small and the availability of accurate data aids in better improvement and alterations that may be needed. The availability of accurate data on flow characteristics, and facilities involved in interaction is of great significance but the importance to keep the data updated is neglected.

Lapai settlement is not an exception; there are no accurate data available concerning public transportation, and flow interaction between Lapai settlements and other settlements. This study focused on the passenger flow interactions between Lapai town and other surrounding

settlements, the highest interaction is Minna which is outside Lapai local government. The major reasons for passenger flow between these settlements are due to educational, commercial, social, intermediary locations and residential purposes.

Recommendation

- i. Based on the findings and information gathered on this study, it is obvious that movement of people using public transportation from one settlement to another is evident in every environment. These have made it possible to perform social, commercial, educational, religious and residential functions with ease of access.
- ii. This study recommends that government should participate more in public transportation sector in order to provide more means of public transportation and help regulate transportation cost for transportation to be less costly.
- iii. Schedules of transportation should be drawn to provide passengers with information on movement time and destinations this will help reduce the time wastage of passengers.
- iv. Policies should be established and regulated by the government on prices of transportation to certain locations, numbers of passengers in a vehicle, age range of drivers, speed limit for the passengers to enjoy a safe and satisfactory movement.
- v. Roads should be repaired and ensured to be well secured for comfort of passengers by assigning security personnel on threatening roads.
- vi. Roads should be well linked for easier and faster access to locations.

REFERENCES

- Aderamo, J. (2011) *Traffic congestion at road intersections in Nigeria. Australian Journal of Basic and Applied Science*, 5 (9): 1439-1448.
- Akintola, S.R. (2007) *Coping with infrastructural deprivation through*

collective action among rural people in Nigeria. Nomadic Journal of African Studies, 16 (1). 30- 46

Armstrong-Wright, (1999) *Public transport in third world cities*, London, Geerlings, H.J.

Centre for Sustainable Transport. 2003, Sustainable Transportation Performance Indicators. CTS, www.cstctd.org

Federal Republic of Nigeria (2007) *Report on Rural Access and Mobility Project (RAMP)* Cross River State Ministry of Works Civil Engineering Department Calabar, Cross River State, Nigeria

Geerlings, H., Van Ast, J and Ongkittikul, S.(2005)*Towards a More Fundamental Transport Policy: An Inventory of Trends That Influence the Transport Patterns in Western Europe and Their Implication for Policy Making*. Journal of the Eastern Asia Society for Transportation Studies, No.6, pp.4050-4065.

Mabogunje, A. L (2008) *The Challenges of mobility within Nigeria's Emerging Megacities*. Keynote address at the National Conference on public Transportation Organized by the Lagos Metropolitan Area Authority (LAMATA) on integrated transport system in Nigeria Emerging Megacities: Issues, Challenges and option held at Ikeja on May 6-8, 2008.

Matalon, B. (1992). *Mobility With Regards to Social Groups and Attitudes*. Transport and Roads Research Laboratory Reports, 689; pp.133-151.

Musa, J. J (2010) *Nigeria's rural economic development strategy: Community Driven Development Approach*. AU J.T. 13(4): 233-

Ogunsanya, A.(2003)*Maker and Breakers of Cities*. 59th Inaugural Lecture", University of Ilorin, Nigeria. June 27th.

Okoko, E. (2006) *Quantitative techniques in urban analysis*, Ibadan, Kraft Book Limited. International Journal of Open Scientific Research IJOSR Vol.1, No. 5, 80-89

Oyesiku, K. (1995). *An Analysis of the Demand for Inter-city Trip Generation Attributes of a Developing State in Nigeria*. *Journal of Transport*, 1(1): 17-27

Oyesiku O. and Odufuwa B. (2002). *Gender Perspectives in Travel Behaviour of Motorcycle Passengers in Nigerian Intermediate Cities*. In Xavier Godard and Innocent Fatonzoun (eds.) *Urban Mobility for All*, Lisse: A.A. Balkema, The Netherlands pp. 13-19

Paul, J. (2001) *Transport network development in developing countries*. Sydney, McDonald Printing Press.

Peters, D. (2002). *Gender and Transport in Less Developed Countries. Background paper for the Expert Workshop on Gender Perspectives for Earth Summit 2002: Energy, Transport, Information for Decision-Making*, Berlin, 10-12 January.

Vibeke, N. (2009) *Indicators for Sustainable Urban Transport*. Road and Transport Research. Research for Climate and Environment, No. 2; pp.16.

World Bank (2007) *Turkey-Transport Sector Expenditure Review: Synthesis Report*. Washington
DC.<https://openknowledge.worldbank.org/handle/10986/12307/LicenseCCBY3.0unported>
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