



## ASSESSMENT OF TRAFFIC FLOW AND MANAGEMENT MEASURES AT SELECTED ROAD INTERSECTIONS IN ILORIN METROPOLIS

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### Abstract

**T**his study provides a pilot investigation into the assessment of traffic flow and management measures at selected road intersections in Ilorin metropolis. The study relies on both secondary and primary data for achievement of the aim of the study. A total number of 360 copies of questionnaires were administered using a purposive sampling technique. Three indices were developed for this study; these include Causes of Traffic bottleneck (CTBI), Effect of Traffic bottleneck (ETBI) and Effectiveness of Traffic Control Measures (ETCMI). The study established that Murtala/Amilegbe junction recorded the highest volume of traffic among the studied road intersections with 5829 vph and 5898 vph for morning and afternoon peaks respectively while motorcycles recorded highest average vehicle type (1701 vehicles) at the sampled junctions. The study observed that increase in population has the highest CTBI in the city with CTBI value of 4.06 and identified Lateness to work as the major effect posed

by traffic congestion across the study area with ETBI value of 4.31. The study also revealed that Availability of law enforce agents is effective (ETCMI= 4.54). The study recommended

### KEYWORDS:

Transportation,  
Intersection, Traffic  
Flow, congestion,  
Traffic Control  
Measure,  
accessibility.

Provision of CCTV at strategic locations and some problematic intersections in the City, encouragement of public/private partnership investment and operation of mass transit and provision of proper signalization i.e functional Electronically Control Traffic Device among others in the study area.

## **Introduction**

**T**he issue of rapid traffic and transportation problem remain one of the most significant problems in our urban centers across the globe particularly in developing countries (Adesina, 2002; Yahaya, Adekanye and Akinbami, 2018). Movement problems have become one of the major issues in Nigeria Urban centres; these urban centres have continued to experience traffic flow problems in various dimensions. Studies have established that Frequent traffic congestion, parking space difficulties, road accidents and air and noise pollution are some of the problems encountered on urban roads (Aderamo, 2000; Ogunsanya,, 2002 & Oyesikun, 2003); Notably among these problems is traffic congestion. While traffic congestion has been refer to occur when the supply of the urban transport networks can no longer meet the demand for them.

Today nearly all cities in both developed and developing countries suffer from traffic congestion. It manifests itself predominantly in recurrent queues, delays and time wastage which commuters experience along major networks especially during rush hours. A number of factors have been attributed to traffic congestion according to Yahayah et., al (2018), these factors range from incessant increase in population, increase in household incomes ( its resultant increase in the level of car usage coupled with poor land-use planning) to poor transport design and planning.

Traffic congestion is a major curse on urban movements. It is a plague that has become an integral part of normal life in almost all urban areas in the world. More seriously, traffic congestion causes unpredictability in journey times, thereby making urban commuters to plan for these problems by leaving home early just to avoid being late. The problem of traffic congestion in urban areas is worse at road intersections. Indeed, there is no other point on cities roads that can be greatly congested as road intersections (Aderamo, 2000).

Intersection is a point where two or more roads meet (O’Flaherty, 1997). In the same vein, Mchane et al., (1998) described intersection as points of conflicts and that serves as the major bottlenecks on urban routes and traffic networks in our cities. Road traffic congestion is noticeably when road is filled with cars, trucks, and buses. There is no doubt that congestion impacts the mobility of people and freight in most urban areas (yahayah et., al, 2018) and is deeply tied to history of high level of accessibility and mobility (Bello, 1993). Ogunsanya, (1994) described congestion as a situation where many vehicles struggle to use the same road at the same time along spatial and temporal dimensions.

Traffic delay problems are manifesting in many of the major urban centres in Nigeria (Atomode, 2012) and remain a menace to free flow of traffic in these cities. Road network constitutes an important element in urban development since it provides access to different land uses. Therefore, efficient transport network propel urban areas to function. No wonder, Author like Aderamo (2003) refer road network as a backbone of urban transportation. Road intersection plays a vital role in the road network development and has high level of influence on vehicle safety and movement's efficiency.

The issue of traffic delay (especially at road intersections) in Ilorin draws significant attention each day (Atomode, 2012). The intra-urban mobility (such as; journey to work, recreation centres, markets shops and schools) is characterized by discomfort, delays, waste of time, energy and resources. The problem according to Atomode (2012) is more pronounced during the peak periods of morning and evening. At these period (peak periods of morning and evening), vehicles stand still in long queues resulting in stress and reduction in the productive hours of commuters.

Traffic problems in Ilorin are further exacerbated by the concentration of most of the working places in the same area (usually at the city centres) so that traffic is essentially unidirectional during the morning and evening peak periods.

There have been comprehensive studies on traffic congestion in Nigeria's cities. Several of these studies focused on traffic congestion at road intersections (Adeshina, 2005; Atomode, (2012); Traffic Management problem (Olaogbebikan et al., 2013). There have been limited studies on traffic flow and management at road intersections particularly in Ilorin. It is this gap that this study tends to fill by analyzing traffic flow and management techniques at selected intersections in Ilorin with a view to enhancing free flow of vehicles in the study area. The study among other options examine the characteristics of road intersections and land use in the area, assess pattern of Traffic flow in the study area, analyses the causes and effect of traffic bottleneck in the study area, assess the existing traffic control measures in the study area and suggest possible strategies for improvement in the study area

### **The Study Area (Ilorin)**

#### **Geographical Location**

Ilorin is the gate-way between Northern and southern Nigeria. It is situated on the latitude 80301 North and longitude 40321 East. It lies on the plain of the South-

West plain of Nigeria. It is a transitional zone between the open savannah belt of which is an integral part to the North and forest area to the South. The city which lies along Lagos-Kaduna highway is about 134km away from Ibadan and 360km from Lagos. It is bounded in the North by Kogi state, in the East by Ekiti/Osun States and in the South by Oyo State (see figure 3.1). Ilorin is about 600km from Kaduna and about 500km from Abuja, the Federal Capital of Nigeria.

### **Transportation and Communication Network**

The inter-city and intra-city transportation for Ilorin could be identified as road, rail and air transport. Usually these modes of transport are supposed to complement each other for an efficient and effective co-ordination of the activities within the city. The first major development of a road network on Ilorin was subsequently by the Federal Government which constructed the present Lagos Road Abdul Azeez Atta road and Emir's Road. These roads are stretches of the Lagos - Ilorin - Kaduna trunk road that links the southern and northern parts of the country together.

Ilorin comprises of three major roads which are Emir's Road, Gambari/ Muritala Mohammed Road/Post Office Round About and Amilegbe Road/Ipata Market. Among the roads that forms the arterial within the study area are Emir's/Gambari junction, Edun/Opo Malu road, Muritala road/Emir's road. There is also a railway line transversing the town. The railway line serves as a link to both the North and the West. Most of the commercial activities of the town take place along the major roads of the study area. All the same, road transport dominates human movement in Ilorin and is characterized by para-transit modes such as mini-buses, taxi and motor cycles. By road, Ilorin is equidistant to all major population centers north and south of Nigeria.

Ilorin also has airport facilities. Although the Ilorin International Airport has been re-designated and equipped as International Cargo Airport, there are scheduled commercial flights to and from Ilorin by Overland and Capital Airlines with current destinations include Lagos, Abuja and Jos.

### **Research Methodology**

The study employed both primary and secondary data for this study. The primary data was achieved by distribution of 360 copies of questionnaires to respondents within and around the study area. The sample frame consists of two road corridors. The road corridors are Garilimi roundabout to Emir's road by Taiwo Isale junction and Kulende Estate Junction to A division roundabout. Forty two (42)

intersections were identified along the two selected traffic corridors. Seven major intersections were selected as sample size, these include Taiwo by Itaamodu, Moraba by Aminlegbe, post office roundabout, Amadubello way by Murtala, Taiwo isale by Emirs road, Sawmail/Airport and Kulende Estate Junction. Accidental sample technique was employed for the administration of 360 copies of questionnaires targeting the road users (The drivers, commuter and pedestrians). 350 copies of questionnaires were returned and analyzed. This was followed by Traffic counts conducted manually using simple hand tally to estimate the volume and composition of traffic volume at the sampled intersections. The counts were done on Monday, Wednesday and Friday, between the hours of 7:00 am-9:00 am and 3pm - 6pm for one week.

Three indices were developed for this study; these include Causes of Traffic bottleneck (CTBI), Effect of Traffic bottleneck (ETBI) and Effectiveness of Traffic Control Measures (ETCMI). The variable indicating CTBI and (ETBI) is measured in the ranking scale of Likert as Strongly Agreed (5), Agreed (4), Neutral (3), disagree (2) and Strongly disagreed (1). ETCMI is also measured in the ranking scale of Likert as highly effective (5), effective (4), Indifference (3), less effective (2) and not effective at all (1).

## Results and Discussion

**Table 1.1 Intersection Characteristics and Associated Land-uses**

S/N	INTERSECTION NAME	INTERSECTION TYPES	LAND-USE CHARACTERISTICS
1	Kulende estate junction	3-legged	Residential, Institutional, Market, Commercial Centres Event Halls
2	Murtala/Amilegbe	4-legged	Motor parks, Institutional, Offices, Market, Religions, Commercial centres, retailing shops, Residential .
3	Post office roundabout	4-legged	Institutional, Motor Parks, Commercial Banks, Religious, Retailing Shops, Residential.

<b>4</b>	Amodu Bello Way /Muritala	3-legged	Institutional Banks,Commercial Centres,Retailing Shops	Commercial
<b>5</b>	Emir’s Road/Taiwo Isale	3-legged	Institutional Banks,Commercial Centres,Retailing Shops	Commercial
<b>6</b>	Taiwo/Amodu	4-legged	Commercial centres, retailing shops, Institutional,Residential	
<b>7</b>	Sawmail Junction	3-legged	Institutional Banks,Commercial Centres,Retailing Shops,Sawmail,Residential.	Commercial

**Source: Author’s field survey, 2019**

Table 1.1 shows that four (4) of the intersections constituting 57.1% are 3-legged. These are Kulende Estate Junction,AmoduBello Way/Muritala ,Sawmail Junction and Emir’s Road/Taiwo Isale. The 4-legged intersections which constitute 42.9% are Murtala/Amilegbe , Taiwo/Ita Amodu, and Post office roundabout. In terms of land use characteristics of the studied junctions, majority of them are located where institutional, commercial, markets, retailing shops, and Residential are predominate. The intersecting arms also connect residential estates, public and private institutions and other major activity-centers in the city.

**Table1.2 Daily Average Volume of Traffic at the Studied Intersections**

S/N	Intersection	Morning Peak		Evening Peak	
		VPH	%	VPH	%
<b>1</b>	Kulende Estate Junction	3718	11.2	3806	11.5
<b>2</b>	Muritala/Amilegbe	5829	17.6	5898	17.8
<b>3</b>	Amadu Bello/Muritala	4023	12.2	4158	12.5
<b>4</b>	Emirs/Taiwo Isale	4420	13.4	4368	13.2
<b>5</b>	Taiwo/Amadu	5316	16.1	5362	16.2
<b>6</b>	Post Office Roundabout	5618	17.0	5678	17.1
<b>7</b>	Sawmail/Airport	4182	12.6	3910	11.8

	<b>Total</b>	<b>33106</b>	<b>100</b>	<b>33180</b>	<b>100</b>
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Source: Author’s field survey, 2019.

Table 1.2 shows that for morning and afternoon peaks, Murtala/Amilegbe junction recorded the highest volume of traffic among the studied roads. These are 5829 vph (17.6%) and 5898 vph (17.8%) of total volume for morning and afternoon peaks respectively. This is followed by Post Office Roundabout with 5618 vph (17.0%) and 5678 vph (17.1%) for morning and afternoon peaks respectively. Taiwo/Amadu ranks third recording 5316 vph (16.1%) and 5362 vph (16.2%) morning and afternoon peaks respectively while Emirs/Taiwo Isale junction ranks fourth recording 4,420 vph (13.4%) morning peak and 4368 vph (13.2%) afternoon peak. Sawmill/Airport ranks fifth having 4182 vph(12.6%) and 3910 (11.8%) morning and afternoon peaks respectively while Amadu Bello/Muritala ranks sixth with 4023vph (12.2) and 4158 (12.5%) morning and afternoon peaks respectively and the least is Kulende Estate Junction with 4718 vph (11.2%) and 3806 vph (11.5%) morning and afternoon peaks respectively.

**Table 1.3: Patterns of Traffic Composition in the study Area**

TRAFFIC COMPOSITION							
S/N	Intersection	A	B	C	D	E	F
1	Kulende Estate Junction	1580	1228	1413	556	242	101
2	Murtala/Amilegbe	2136	1324	1522	638	288	118
3	Post Office Roundabout	1926	1402	1614	612	314	132
4	Amodu Bello Way /Muritala	1534	1442	1530	644	229	124
5	Emir’s Road/Taiwo Isale	1638	1430	1522	641	305	84
6	Taiwo/Amodu	1548	1404	1420	420	230	98
7	Sawmail Junction	1542	1520	1340	522	380	76
<b>Total</b>		<b>11.904</b>	<b>9750</b>	<b>10361</b>	<b>4033</b>	<b>1988</b>	<b>733</b>
<b>Average</b>		<b>1701</b>	<b>1393</b>	<b>1480</b>	<b>576</b>	<b>284</b>	<b>105</b>
<b>Percentage</b>		<b>30.7</b>	<b>25.2</b>	<b>26.7</b>	<b>10.4</b>	<b>5.1</b>	<b>1.9</b>

Source: Author’s field survey, 2019

A = Motorcycle B = Private cars C = Taxis D = Buses E = Delivery vans F = Trucks/Trailers/Lorries/Tankers/Tipper

Table 1.3 shows the average peak-hour traffic composition at the sampled intersections. Among all the vehicle types recorded at the sampled junctions, motorcycles had the highest numbers of an average of 1701 vehicles (30.7%). The dominance of motorcycles among the types of vehicles recorded shows the emerging trend in the use of motorcycles for public transportation in the city. This mode is now becoming popular and it has helped a lot in reducing the transportation problem in the city. Taxis with an average of 1480 vehicles (26.7%) ranks second. In meeting the needs of the inhabitants in terms of public transportation taxis are a regular mode to use especially in Ilorin metropolis. Private cars ranked third with 1393 vehicles (25.2%). This shows that there are more private cars in the study area due to improved income and better purchasing power of the city dwellers. Buses which provide services for the transportation of goods and people came fourth with 516 vehicles (10.4%) while delivery vans which are used mainly for transporting goods in the city recorded an average number of 284 vehicles (5.1%). Trucks, trailers, Lorries, tankers and tippers are heavy goods vehicles and had a record of 107 (1.9%). They provide intra-city and inter-city services for the transportation of goods, materials for housing construction and petroleum products.

**. Table 1.4: Causes of Traffic Bottleneck in Ilorin Metropolis**

Causes of traffic congestion	Ratings					SW V	NR(f )	CTBI	D	D2
	5	4	3	2	1					
<b>Increase in population</b>	910	392	78	24	16	1420	350	4.06	0.49	0.02
<b>High volume of traffic</b>	430	616	258	0	4	1308	350	3.73	0.16	0.04
<b>Poor traffic management</b>	770	328	108	84	8	1298	350	3.71	0.14	0.05
<b>Poor transport</b>	630	432	186	32	12	1292	350	3.69	0.12	0.06

design and planning											
Disobedience of traffic rules/operators impatience	500	520	234	32	0	1286	350	3.67		0.1	0.07
Obstruct parking	550	432	192	64	12	1250	350	3.57		0	0.13
Narrowness of road	500	416	210	104	4	1234	350	3.53		-0.04	0.16
Increase in level of car usage	390	520	222	48	24	1204	350	3.44		-0.13	0.24
Street trading incidence	510	376	150	144	12	1192	350	3.41		-0.16	0.27
Increase in household income	330	416	360	48	12	1166	350	3.33		-0.24	0.36
Indiscriminate parking	380	320	294	108	10	1112	350	3.18		-0.39	0.57
Total								39.32	3.57		

Source: Author's field survey, 2019

The result documents in table 1.4 shows that increase in population has the highest index of 4.06, ranks second is High volume of traffic with an index of 3.73, followed by, poor traffic management with 3.71 index also is poor transport design and planning with an index of 3.69, next is disobedient of traffic rules/operators impatience with 3.67 index and obstruct parking with 3.57 index all with a positive deviation of 0.49,0.16,0.14,0.12,0.1,and 0 respectively from the mean, while narrowness of road with an index of 3.53, increase in level of car usage with 3.44 index , street trading incidence with an index 3.41, increase in household income with an index of 3.33 and indiscriminate parking with 3.18 index all with negative deviation of -0.04,-0.13,-0.16,-0.23 and - 0.39 respectively from the mean. Since

majority of the variables indicate positive deviation from the mean is a pointer to the fact that traffic in Ilorin is increasing on daily basis especially at road intersections in the metropolis; this is as a result of population increase, poor traffic management, poor transport design and planning, disobedient of traffic rules/operators impatience and obstruct parking among others. All these factors has led people to seek alternative routes to their destinations or moving out at certain hour of the day to avoid rush hours

**Table 1.5 Effects of road congestion in the Metropolis**

Effect of road traffic congestion	Ratings					SW V	NF(R )	ETC I	$\bar{X}$	d	D2
	5	4	3	2	1						
<b>Lateness to work</b>	1130	368	0	0	12	1510	350	4.31		0.81	0.66
<b>Tiredness</b>	410	592	228	40	4	1274	350	3.64		0.14	0.02
<b>Delay in catching up with appointment</b>	400	560	246	24	12	1242	350	3.55		0.05	0.002
<b>Psychological effect: emotional stress</b>	260	488	246	116	12	1122	350	3.21		-0.29	0.09
<b>Inability to meet health emergency</b>	320	328	342	112	6	1108	350	3.17		-0.33	0.11
<b>Economic activities paralyzed</b>	300	312	378	92	12	1094	350	3.13		-0.37	0.14
<b>Total</b>								<b>21.01</b>	<b>3.5</b>		

Source: Author's Field Survey, 2019.

The result documents in table 1.5 shows that Lateness to work has the highest index of 4.31 followed by Tiredness with an index of 3.64 and Delay in catching up with appointment with an index of 3.55 all of which has a positive deviation of 0.81, 0.14 and 0.05 respectively from the mean. This implies that they are effect is high. While Psychological effect: emotional stress with an index of 3.21, Inability to meet health emergency with an index of 3.17 and Economic activities paralyzed with an index of 3.13 all having negative deviation of -0.29,-0.33and -0.37 respectively from the mean. This indicates that they are effects are minimal.

**Table 1.6 Effectiveness of Traffic Control Measure in the Metropolis**

Effectiveness of traffic control measure	Ratings					SW V	NF(R )	ETC MI	$\bar{X}$	d	d2
	5	4	3	2	1						
Availability of law enforcement agent	1300	200	90	0	0	1590	350	4.54		2.06	4.25
Availability of Lane Marking	500	800	150	0	0	1450	350	4.14		1.66	2.76
Availability of Parking restriction	0	200	450	200	50	900	350	2.57		0.09	0.01
Availability of Zebra crossing	0	0	0	300	200	500	350	1.42		-1.05	1.10
Availability of Traffic light	0	0	0	160	270	430	350	1.22		-1.25	1.56
Total								13.89	2.78		

Source: Author’s Field Survey, 2019.

The result documents in table 1.28 shows that Availability of law enforcement agents has the highest Index of 4.54. This is followed by Availability of Lane

Marking with an index of 4.14, next to this is Availability of parking restriction with an index of 2.57 with all having a positive deviation of 2.06, 1.66 and 0.09 respectively from the mean. The study shows that “Availability of Zebra Crossing and Availability of Traffic Light has an index 1.42 and 1.22 respectively with negative deviation of -1.05 and -1.25 respectively from the mean. This indicates that they are less effective. Although the study revealed that law enforcement agent is effective in study area, this may be due to the fact it is the only visible traffic management measure adopted at the various road intersections in the study area. However, there are better management techniques as visible in other bigger cities and developed nations which can be adopted in the study area.

### **Conclusion**

Increase in population and rapid urbanization of Ilorin have resulted in increased usage of vehicles and transportation facilities, which in turn resulted in traffic congestion and related problems. Analysis of the collected data revealed that Murtala/Amilegbe junction recorded the highest volume of traffic. This is followed by Post Office Roundabout and Taiwo/Amadu junction. The study also established that increase in population, high volume of traffic, poor traffic management coupled with poor transport design and planning are the major causes of traffic bottlenecks in the study area. The study further revealed that Lateness to work, Tiredness, Delay in catching up with appointment, Psychological effect and emotional stress are the effect of traffic bottleneck in the area.

### **Recommendations**

The following recommendations will help to minimize the various traffic related problems confronting the various road users in Ilorin metropolis and consequently make Ilorin an ideal city in the nearest future.

#### **Provision of CCTV at strategic locations and some Problematic Intersections in the City**

The state Government should make provision for CCTV at some major intersections. This will capture and take records of traffic offenders for onward arrest by the relevant law enforcement agencies in the state. This will also create consciousness and awareness to the various road users.

#### **Provision of Mass Transit Services by the State and Local Government Authorities**

This will to a large extent reduce traffic issues within the metropolis because large volume of people can be convey at the same time and at minimal cost. This will no

doubt also reduce man hour cost of mobility, improve economic position of workers and also improve productivity of workers and other road users.

### **Encouragement of public/private partnership Investment and Operation of mass transit services**

There should be encouragement of some organized private sector in the provision of mass transit can be encouraged to register their mass transit with the government, this will reduce the burden on the government and it will also increase the number of mass transit in the study area.

### **Provision of Proper Signalization i.e Functional Electronically Control Traffic Device (Traffic Light)**

The provision of Functional Electronically control traffic Device as in other big cities of Nigeria like Abuja, Lagos and Porthacourt will to a large extent alleviate traffic issues in Ilorin metropolis

### **Park and ride should be encourage**

They should also provide park and ride in order to encourage those that are still using their private car so as to patronize the bus mass transit and as well reduce congestion in the study area. **Rail Rapid Transit (RRT) systems should be introduced.** Introduction of rail rapid system across the city will give room to a variety of transportation systems and it will reduce the burden on the mass transit system.

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### **Enforcement of Parking Restrictions**

There is need for the relevant law enforcement agencies such as Kwara State Traffic Law Enforcement Agencies (KWATMA), the Nigeria Police e.t.c. to be empowered by law to enforce parking regulations within the metropolis. Parking should only be allowed at the designated areas. All forms of on street parking should not be allowed as this will reduce the capacity of the roads.

### **Improvement in the Planning of Intersections**

There is need for improvement in the planning and re planning of some of the intersections like the post office roundabout (fly over) which was meant to ease

traffic problem in the area had little or no effect at all because such fly over is supposed to reach maraba area( Muritala/amilegbe). The recently completed **Diamond underpass** at Garialimi roundabout area is a welcome development this had greatly improved the traffic situations in the area. This is a good example of improvement in the planning of intersections.

### **References**

- Aderamo, A. J. (2003)**; changing structure of intra urban road network in Ilorin, Ilorin journal of business and social science, vol 8 no 1 and 2 faculty of business and social sciences, university of Ilorin, Ilorin.
- Aderamo, A.J. 2000.** Spatial Pattern of Intra-urban Trips in Ilorin, Nigeria, Geo-Studies forum (1 & 2)
- Adeshina, A. O. (2002):** road network pattern and land use development in Ilorin, kwara
- Adeshina, A. O. (2005)** parking problems in urban traditional markets: the case of Ilorin environmental watch journal of the institute of environmental studies federal polytechnic Bida.
- Atomode, T. I. (2012)** traffic congestion at road intersection in Ilorin Nigeria Mediterranean journal of social sciences volume no 2 department of geography university of Ilorin.
- Bello, S A (1993)** urban public transport in a growing city: the case of Ilorin, unpublished PhD thesis, department of geography unilorin of Ilorin, Nigeria.
- Mchsane, W.R., Roess, P.R., Prassas, E.D. (1998).** Traffic Engineering, Second Edition New Jersey: Prentice Hall.
- O’Flaherty, C.A. (2002).** Transport Planning and Traffic Engineering, London: Butterworth Heinemann.
- Ogunsanya, A. A. (2002)** maker and breaker of cities, the fifty nine inaugural lecture, university of Ilorin, Ilorin, Nigeria.
- Ogunsanya, A.A. (1984).** Traffic Congestion in an Urban Centre: The Case of Ilorin, Nigeria. The Nigerian Geographical Journal, 27: ( 1-2).
- Oyesiku, O. K. (2003)** sustainable transportation strategies for intermediate cities in Nigeria, journal of the Nigeria institute of town planers vol xvi state,the Nigeria journal of research and production, Enugu, Nigeria.

**Yahaya, M.I, Adekanye, E.S, Akinbami, B.S (2018):** Mobility challenges in cities of developing nation; Case of Ifo, Ogun State. Seminar presented Kwara State polytechnic, Ilorin International conference.