AN ASSESSMENT OF THE EFFECTIVENESSS OF TRAFFIC MANAGEMENT TECHNIQUES ON TRAFFIC FLOW AT IKOTUN CBD, LAGOS, NIGERIA

BY

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Abstract

This study undertook an assessment of the effectiveness of traffic management techniques on traffic flow at Ikotun CBD, Alimosho, Lagos state. The objectives of the research are to: evaluate the profile and the operational activities of the traffic agents in Ikotun CBD; identify the causes of perennial traffic gridlock and the traffic management techniques in use at Ikotun CBD and analyze the effectiveness of traffic management techniques on traffic flow at Ikotun CBD. The research adopted quantitative research techniques using field observations and the parameter measurement, including traffic count and flow analysis. During the fieldwork, the relationships between traffic congestion and the traffic management approaches adopted in the area were observed, measured and recorded. The findings from this study shows that the inadequate and inappropriate traffic management techniques such as the: absence of traffic light; bus stop laybys; pedestrian walkway; motor park and poor roundabout and intersection design, are the major problems affecting the free flow of traffic at Ikotun CBD, this is the more reason why commuters spent long time waiting at the bus stops before getting vehicles and vehicles too experiencing more delay before getting out of the Ikotun CBD. More so, the presence of the traffic control officers is not adequate in combating the challenges of traffic congestion in the area. The study therefore suggested among other solutions the provision of motor parks, laybys, junction and roundabout improvement, installation of functional traffic lights, and the increase in LASTMA personnel and control facilities.

1.0   Introduction

Transport is vital to the well-functioning of economic activities and a key to ensuring social well-being and cohesion of populations. Transport ensures everyday mobility of people and is crucial to the production and distribution of goods. Adequate infrastructure is a fundamental precondition for transport systems.Decision-makers in governments and international organizations face

difficult challenges, these include the existence of physical barriers or hindrances, such as insufficient or inadequate transport infrastructures, bottlenecks and missing links, as well as lack of funds to remove them. Solving these problems is not an easy task. It requires action on the part of the governments concerned, actions that are coordinated with other governments at national and international levels.

Thus, effective and efficient functioning of urban centres which depends on traffic management techniques and the provision of basic infrastructures is unavoidable, this implies that transport infrastructure has to be rationally developed to ensure that movement of people and goods takes place speedily, economically, safely, comfortably and in an environmentally-friendly manner (Sumaila, 2012). The importance of transport infrastructure to a nation cannot be overemphasized as efficient transport infrastructure facilities act as catalysts for development. However, in an urban setting such as Lagos which is the fastest growing city in Nigeria, the demand for transport and travel tends to increase sharply with the growing size of a city and town especially when the city center or major activity areas (such as Oshodi, Ikeja, Ikotun and others) increase correspondingly in terms of both area and employment. The need to deploy effective traffic management techniques and the critically review of what facilities are available for mobility becomes important especially to the private car owners and Mini-Bus operators that form a larger percentage of road users in the Central Business Districts (CBDs) of the State and whose daily activities constitute traffic congestion which resulted to delay in travel time if not properly managed (Olorunnimbe & Balogun, 2015).

More so, the rapid growth of population within the metropolis of Lagos is constantly increasing the challenges of accessing places with ease and that of free flow of traffic within the metropolis. This brings to mind the questions of how connected are the various sources and destination within the state and how efficient is the network of roads in the study area. Irrespective of where one' origin or destination is, we get entangle in the stream of the traffic web as we move round Lagos. Therefore, this study aimed to assess the effectiveness traffic management techniques on traffic flow at the Ikotun CBD, Alimosho area of Lagos State, with the intension of suggesting lasting measures to solving the problem, which pose traffic challenges to road users most especially during the morning and evening peak periods. This has been observed to be the result of too many commercial, institutional and religious services and functions that are been provided by the CBD. Ikotun CBD accommodates large number of commercial, institutional, industrial and residential activities. It inhabits the Alimosho local government headquarters and the headquarters of the Synagogue church of all nations alongside the largest market in the Alimosho LGA. These

activities have been observed to influence the increasing traffic flow into the area resulting to traffic congestion due to low level of road capacity, absence of parking space and the lack of off-street garage for the teaming population of vehicles providing transit services in the area.

Hence, the introduction of LASTMA to manage traffic on this roads, strict enforcement of traffic rules and regulations, introduction of various mass transit schemes like LAGBUS, BRT and others which are geared towards solving the traffic problems on Lagos roads have equally not remove the traffic challenges in the study area. Significantly, these problems could be noticed along the study area where the traffic management techniques deploy to the road network of the area has not been able to eliminate traffic problems and delays along Ikotun round about, Ikotun-Isheri road, Ikotu–Igando intersection, Ikotun-Ijegun intersection and Ikotun–Isolo road.

Therefore, this study having understood these challenges is seek at examining the effectiveness of traffic management techniques deployed in Ikotun CBD on traffic flow in the area, with the following objectives i. Evaluate the profile and the operational activities of the traffic agents in Ikotun CBD ii.Identify the causes of perennial traffic gridlock and the traffic management techniques in use at Ikotun CBD? iii Analyze the effectiveness of traffic management techniques on traffic flow at Ikotun CBD.
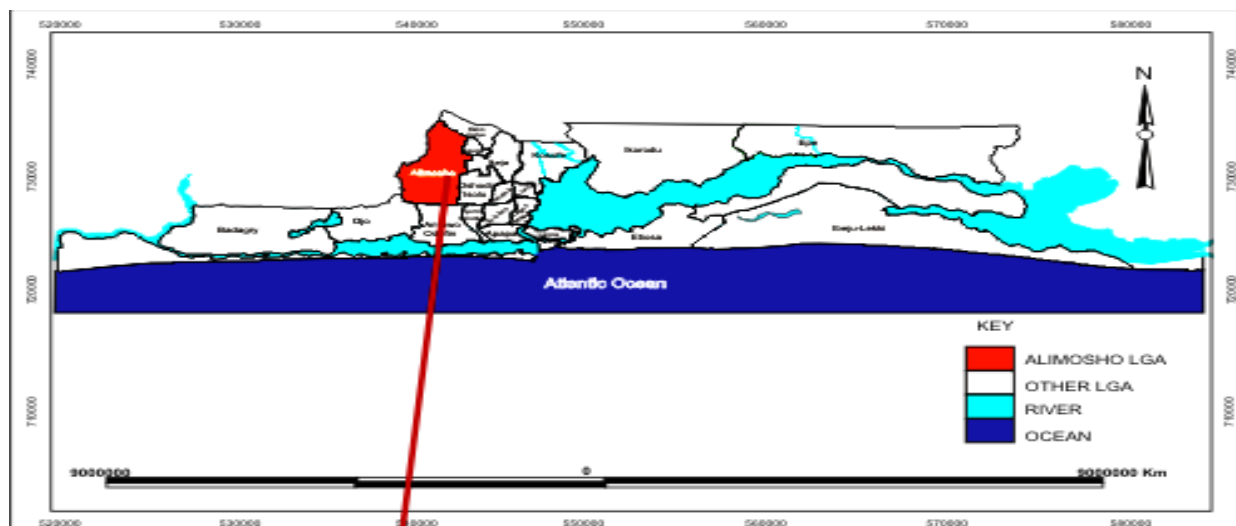
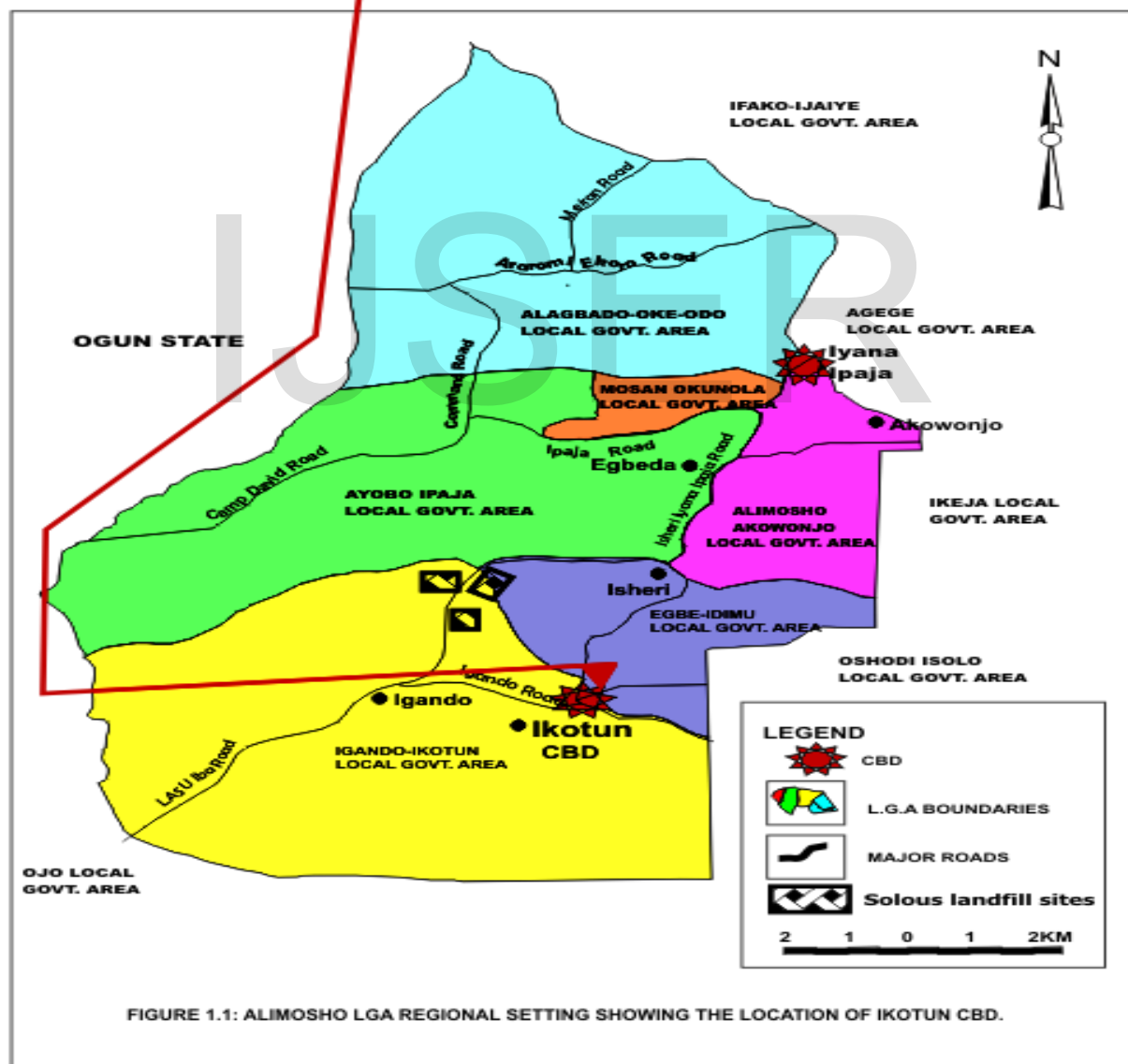FIGURE 1.0: MAP OF LAGOS STATE SHOWING ALIMOSHO L.G.A.

FIGURE 1.1: ALIMOSHO LGA REGIONAL SETTING SHOWING THE LOCATION OF IKOTUN CBD.

Figure 1.1: Regional setting of Alimosho LGA Showing the Location of Ikotun CBD
Source: GIS Laboratory, School of transport, LASU, Oj

2.0   Review of Literature

The significant role of transportation in the movement of people, goods and services from origin to destination which thus improved the socio-economic status and the general development of the nation cannot be overemphasized. Asiyanbola et al, (2012) Thus, traffic congestion condition on road networks occurs as a result of excessive use of road infrastructure beyond capacity, and it is characterized by slower speeds, longer trip hours and increased vehicular queuing. However Congestion can be perceived as unavoidable consequences of scarce transport facilities such as road space, parking area, road signals and effective traffic management. Rodrique et al, (2009) argued that urban congestion mainly concerns two domains of circulation, passengers and freight which share the same infrastructure.

Downie (2008), corroborating the above opined that traffic congestion occurs when the volume of vehicular traffic is greater than the available road capacity, a point commonly referred to as saturation. He describes a number of specific circumstances which cause or aggravate congestion. Most of such circumstances are concerned with reduction in the capacity of road at a given point or over a certain length, or increase in the number of vehicles required for the movement of people and goods. He further argues that economic surge in various economies has resulted in a massive increase in the number of vehicles that overwhelms transport infrastructure, thus causing congestion on roads in cities. This is in line with Rodrique et al. (2009) that congestion in urban areas is dominantly caused by commuting patterns and little by truck movement. They further attributed the causes of congestion to rise in population densities, road incidents and broken vehicles on the roads which restrict capacity of roads and impair smooth traffic flows.

Another contributing factor to congestion as suggested by Herman (2001), cited Downie (2008) is parking. He is of the view that road parking, which consumes large amount of space has become a land issue that greatly inflates the demand for urban land, causing congestion in cities, example is the Ikotun CBD. He added that high urban mobility rate also contributes to the congestion menace. The massive use of cars does not only have an impact on traffic congestion but also leads to decline in public transit efficiency, thereby creating commuting difficulties in cities.

Indeed the overdependence on cars has tremendously increased the demand for transport infrastructure so also is the surge in the use of para-transit 14-18 seater bus for urban transportation in developing countries of Africa and Asia. Unfortunately the supply of transport infrastructure has never been commensurate with the growth of mobility needs as can be

Observed at Ikotun CBD where there is absence of lay-by, garage and planned bus stop for commercial bus operation despite its major contribution to traffic generation and distribution in Alimosho LGA. Consequently, several vehicles spend most of the time in traffic as a result of traffic space limitation in major node areas in urban space (Yan and Crooks 2010).

Furthermore, Urban Roads (2004) Report that traffic congestion in Lagos is attributable to limited road capacity, parking space, dysfunctional road signals, drivers' behavior, vehicle breakdown on roads and too many cars within the city. Rodrique et al. (2009) outline some measures that could help deal with the congestion menace. They mention traffic signal synchronization, incident management, congestion pricing and the use of public transit as possible effective strategies available in dealing with congestion situation, although not without their associated challenges. According to Olaogbebikan, Ikpechukwu, Akinsulire and Enosko (2013), the reason for ineffectiveness of the traffic law enforcement agency in traffic management include corruption whereby some of them do extort money from the traffic offenders hence this encourage them more to flout traffic regulations. The traffic law enforcement agent's courage and boldness has been eroded so they could not courageously confront the traffic offenders and apprehend them. Another reason for ineffectiveness of traffic law enforcement agents is inadequate facilities needed to effect smooth traffic control some of the junctions in the study area were not provided with traffic light; at such junction traffic gridlocks are normally experienced coupled with the fact that there are few traffic warders to control traffic at such junction.

Olorunnimbe et. al. (2015) in their study noted that, the challenges of parking at Oshodi CBD revealed that the central business district is characterized by traffic congestion, on street parking and inadequate parking facility. This is basically due to lack of adequate planning for appropriate and efficient parking facilities for vehicles in the area. It was also found that majority of motorist use their vehicle for carrying goods (trucks and trailers constitute 36% of vehicle while buses and cars were also been used for goods carriage), implying that more parking spaces will be needed for such vehicles.

However, similar study by (Litman (2010); Asiyanbola (2012); Fan et.al. (2012); Adarmo (2013); Robert (2013) & Charles (2014)) concluded that parking of vehicles on the roads and on sidewalks along the road is highly pronounced in cities of developing world and this has continued to undermine the traffic regulation, which affects the overall efficiency of transport activities in many cities of emerging economy.

Considering the above, the need to improve parking and traffic congestion problem in Ikotun Central Business District in particular has been a major course of concern for scholars and transport management experts. In the year 2014, World Population Review adjudge Lagos as the second fastest growing city in

Africa with an estimated population of 21 million people, and it was predicted that by 2015, Lagos population would reach 25 million people, which will make it the third largest city in the world but with less infrastructure than the other large cities of the world. The metropolis undoubtedly one of the largest in Africa with car ownership ratio of 1.7:10.The region has an estimated figure of over 1,544,167 cars on its road (chijoke 2005), with an estimated annual increase of about 10.2 percent. (David, 2011).

Olayiwola et al (2014) in their own work claimed that the CBD is a downtown within a city centre enclave, where development is compact. The cost of land is considered relatively high, in comparison to suburban areas. The high cost of land with high rise structures, justifies the dense development pattern in the CBDs. This District is the commercial, office, retail, and cultural centre of the city and usually is the centre point for transportation (Rosenberg, 2013, cited in about.com, 2013).

Adaramo, (2012) in a similar study also, identified parking problem has one of the major problems and challenges of urban transport,he opined that parking demands far outweigh the available supply in most Nigerian cities and further stated that traffic congestion is propelled by too many people working in the CBD areas, coupled with narrow streets and shortage of off- street parking facilities.

3.0   Research Methods

The study utilized a combination of cluster, stratified and systematic sampling. The cluster sampling gives the location of the study parameters as concentrated in a predetermined location that is fixed by the GPS on the map of Alimosho LGA. However, the stratified sampling was used to administer the questionnaires and group the traffic management facility into group of similar function or classes based on capacity, nature of operation and condition of infrastructure.. All identified public and privately provided traffic management facility and devices were examined during the survey, a sample of 25 traffic personnel were taken at Ikotun CBD while the traffic management techniques/facilities during the morning and evening peak periods were be audited. Two major data sources were used for this study (primary and secondary). A total of thirty questionnaires were administered due to limited number of traffic agents in the study area. This was used to corroborate the field measurement traffic survey carried out in the study area. The result of the analysis pointed out the causes of the persistent traffic problem in Ikotun CBD area of Alimosho Local Government area of Lagos state.

Presentation of data were done through the use tables, graphs, charts, photographs and frequency display. The traffic flow model of analysis was used along with non-parametric statistics to determine traffic situation and congestion level. The effect on traffic were measured using the flow model, vehicle –volume

flow ratio, speed characteristics and queue length at the identified locations in the study area, using the models specified by the USA highway capacity manual 2010 and transport research board 2013. Sampling technique were used to assess the effect of the traffic management facilities on traffic flow in the study area. Also, online-GPS speedometer and speed radar software was used to measure the vehicular free flow speed and spot speed.

4.0   Results and Conclusion

Data gathered revealed that 18% of traffic agents within Ikotun CBD are police, 22% of them is NURTW officers, 50% are LASTMA, 10% are Local Government Traffic Unit officers. This means that LASTMA contribute most significantly to traffic management activities in Ikotun CBD. Furthermore, the sex distribution of the traffic agents reflected that 84 % are male while 16% are female. This shows that the male gender still dominates the traffic management operation in the study area. Therefore, one may deduce that the work of the traffic management is tedious and strenuous and is easier for men than the women.

Ihe survey as presented in table 4.1 shows that majority (64%) of the traffic officers are junior grade level (01-06) while 36% are senior officers of between grade level 07-13. This means that majority of the officers are likely to be more dedicated to their duties in order to get promoted. See table 4.1

Table 4.1: Grade Level of Traffic Officers.

LEVEL		PERCENTAGE	
01-06	Traffic assistance	20%	
	Constable	10%	
	Corporal	6%	
	Vehicle inspector	14%	
	Sergeant	4%	**64%**
	Traffic officer	10%	
07-13	Inspector	10%	
	ASP & SP	8%	
	Senior traffic officer	16%	**36%**
	Zonal head	2%	
	Total	100%	**100%**

Source: Fieldwork by the researcher 2020.

Considering the age group, Data gathered revealed that 12% of the traffic officers are in the age group 18-30yrs, 62% are in age group 31-40yrs, 22% are in the group 41-50yrs while 4% are in the range of 51-65yrs. This shows that the majority of the traffic officers are able young men who still have the required strength to work on the roads. Further analysis revealed that 80% of the officers are married while 20% are still single. This is an indication that 80% of the officers are likely to be more serious and maturely discharge their duties as prescribed. The survey also revealed that 14% of the traffic officers are secondary

school holder, 62% are first degree holder while 26% are postgraduate certificate holders. It can be concluded that majority of the officers are learned are most likely to perform better in their work because of their perceived level of education or literacy as shown in table 4.2.

Table 4.2: Educational Background and Length of Service

EDU. LEVEL	PERCENTAGE	YEARS OF EXPERIENCE	PERCENTAGE
Secondary	14%	1-5yrs	42%
First degree	62%	6-16yrs	38%
Post graduate	24%	16yrs & above	20%
Total	100.0	Total	100%

Source: Fieldwork by the researcher 2020.

In line with the above, table 4.2 also shows that 42% of the traffic officers have been in the service for 1-5 years, 38% have spent 6-16yrs in the serviced while 20% have spent 16 yrs and above in the traffic management service. This shows that majority of the officers have spent more than 6years in service and are likely to have gained adequate knowledge of traffic management which they can apply at work.

Considering, the resumption and closing time of the traffic officers on duties, table 4.3 revealed that 68% resumes and closes between 6am-2pm or 2pm-10pm. Also, 10% resumes and closes between 8am-4pm, while 22% resumes and closes between 5am-12pm or 12pm-8pm. This shows that the resumption and closing among the traffic agents in Ikotun CBD varies across the agencies.

Table 4.3: Resumption Time of Traffic Agents In Ikotun CBD

Resumption time	Percentage
6am-2pm or 2pm-10pm	68%
8am-4pm	10%
5am-12pm or 12pm-8pm	22%

Source: Fieldwork by the researcher 2020.

The survey also revealed that 100% of the traffic officers used manual method traffic control in Ikotun CBD. This shows that there are no traffic lights or other electronic traffic control devices at Ikotun CBD. The above method was believed to be effective by 56% of the traffic officers while 44% of them believed it is not effective. Table 4.4 shows that those who say it is not effective believed that if truly the method is effective, traffic congestion would have been reduced in the study area. They believed that other techniques such as: traffic channeling into motor parks, off-road bus stop, layby construction, installation of traffic signs and construction of overhead bridges would drastically reduce traffic congestion in the study area.

Table 4.4:

QUESTIONS	PERCENTAGE	
	YES	NO
Is the traffic control technique effective in your zone	56%	44%
Is it effective everyday	36%	64%
Total	100.0	100.0

Source: Fieldwork by the researcher 2020.

Furthermore, effectiveness of the methods was examined on daily bases and it was found that (as shown in table 4.4) only 36% of the traffic officers agreed that the method work every day. The remaining 64% indicated that manual technique do not work effectively at all time, meaning that it should be integrated along with other techniques. Yet, the days of the week in which the method is effective revealed that 54% of the officers said that the method is not effective during peak periods on Mondays to Fridays, while 46% said it not effective on Mondays and Saturdays only. This show that majority of the officers agreed that the method is not effective. See table 4.5.

Table 4.5: Days and Reasons for Non-Effectiveness of Traffic Control Techniques In Ikotun CBD

DAYS AND REASONS	PERCENTAGE
Monday-Friday(due to rush to work)	54%
Mondays and Saturdays only(due to rush to resume work and rush to go for weekend holiday)	46%
Total	100%

Source: Fieldwork by the researcher 2020.

Table 4.6: Suggestions for Reducing Traffic Congestion in Ikotun CBD

SUGGESTIONS	PERCENTAGE
Use both manual & electronic techniques	52%
Employ more traffic officers	32%
Road expansion & overhead bridge	16%
TOTAL	100%

Source: Field survey, 2020.

Considering the assessment of traffic management equipment and the level of cooperation received from sister agencies (Police, FRSC and LGAs officers) by LASTMA, the survey shows that the equipment in

use by traffic officers in Ikotun CBD is inadequate as asserted by 60% of them. However, 40% of the agents maintained that the equipment in-use is adequate (see Figure 4.1)
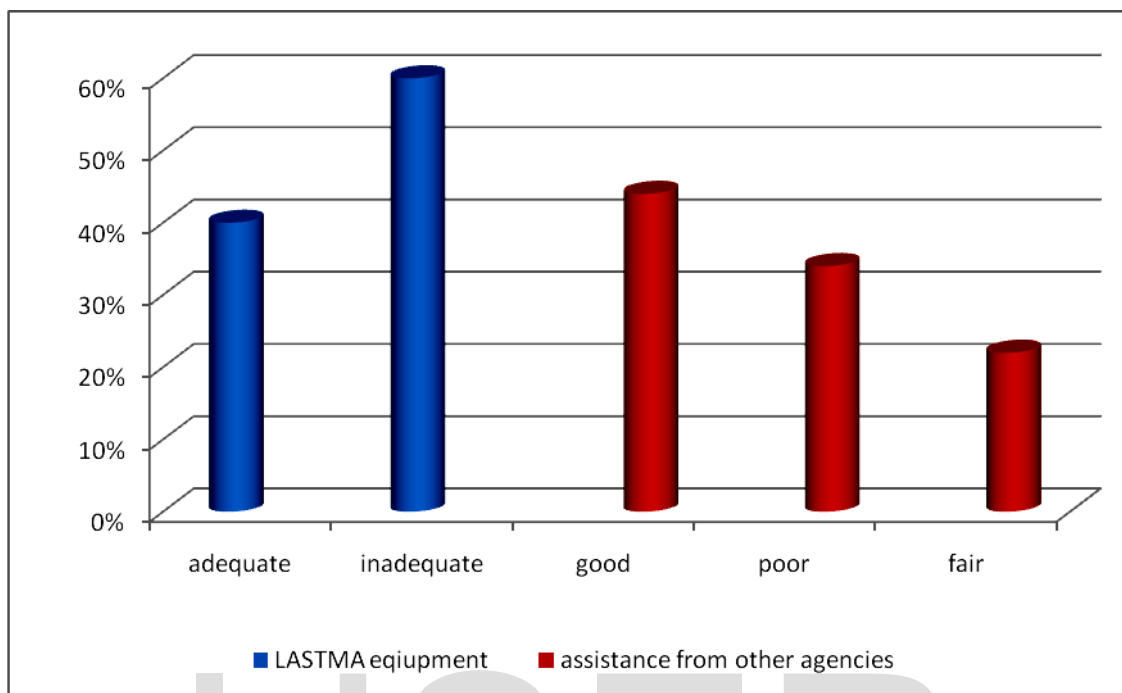
Figure 4.1: Lastma Equipment Rating and Assistance from Other Agencies
Source: Field survey, 2020.

Table 4.7: Classified Vehicular Free Flow Speed at Ikotun CBD, Lagos

IKOTUN ROUNDABOUT									
	s/n	Veh. Class	Monday	Tuesday	Wednesday	Thursday	Friday	Average speed
Alimosho LGA – North Gate – bound			SPOT/FREE FLOW SPEED (km/h)					
	1	Car	24	26	27	40	25	28.4
	2	HDV	20	21	22	30	20	22.6
	3	Tricycle	20	28	30	35	25	27.6
	4	Motor cycle	35	35	32	45	30	35.4
	5	Bus	20	20	24	35	24	26.6
	total							**28.01**
	s/n	Veh. Class	Monday	Tuesday	Wednesday	Thursday	Friday	
Ijegun junction b/4 roundabout South bound	SPOT/FREE FLOW SPEED (km/h)							
	1	Car	21	26	27	38	24	27.2
	2	HDV	17	21	22	28	19	21.4
	3	Tricycle	17	28	30	33	24	26.4
	4	Motor cycle	32	35	32	43	29	34.2
	5	Bus	17	20	24	33	23	25.4
	total							**26.9**

		s/n	Veh. Class	Monday	Tuesday	Wednesday	Thursday	Friday	
Synagogue Church Gate- East bound			SPOT/FREE FLOW SPEED (km/h)						
		1	Car	26	27	27	42	26	29.6
		2	HDV	22	22	22	32	21	23.8
		3	Tricycle	22	29	30	37	26	28.8
		4	Motor cycle	37	36	32	47	31	36.6
		5	Bus	22	21	24	37	25	27.8
		total							29.3

IJEGUN-IKOTUN JUNCTION

		s/n	Veh. Class	Monday	Tuesday	Wednesday	Thursday	Friday	Average speed
Pako bus stop before junction-W	Ijegun junction-		SPOT/FREE FLOW SPEED (km/h)						
		1	Car	20	21	20	30	25	23.2
		2	HDV	17	15	18	21	20	18.2
		3	Tricycle	20	19	20	25	25	21.8
		4	Motor cycle	25	23	24	35	30	27.6
		5	Bus	20	19	20	25	24	21.6
		Ave. total							22.7
		s/n	Veh. Class	Monday	Tuesday	Wednesday	Thursday	Friday	
Ijegun junction before roundabout-N	the		SPOT/FREE FLOW SPEED (km/h)						
		1	Car	17	19	19	27	22	21
		2	HDV	14	13	17	18	17	16
		3	Tricycle	217	17	19	22	22	19.6
		4	Motor cycle	22	21	23	32	27	25.4
		5	Bus	17	17	19	22	21	19.4
		Ave. total							20.5
		s/n	Veh. Class	Monday	Tuesday	Wednesday	Thursday	Friday	
Before Abaranje junction- South bound			SPOT/FREE FLOW SPEED (km/h)						
		1	Car	19	20	19	29	24	22.2
		2	HDV	16	14	17	20	19	17.2
		3	Tricycle	19	18	19	24	24	20.8
		4	Motor cycle	24	22	23	34	29	26.6
		5	Bus	19	18	19	24	23	20.6
		Ave. total							21.7

Source: Author's field survey, 2020.

DAYS	DIRECTION AND TIME DELAY	VEHICLE CLASS	AM PEAK (COUNT/1HR.)			AM TOTAL	PM PEAK (COUNT/1 HR)			PM TOTAL	DAILY PEAK TOTAL (INDIVIDUAL)	DAILY (INDIVIDUAL) AVERAGE	DAILY TOTAL (ALL CLASSES)
			NB	EB	SB		NB	EB	SB				
MONDAY	1. Isheri - Ikotun roundabout –NB (15 mins.)	Car	100	120	68	**288**	160	216	96	**472**	760	380	
		HDV	12	24	16	**52**	12	16	4	**32**	84	42	
	2. Egbe - Ikotun roundabout –EB (4 mins)	Tricycle	916	448	1464	**2828**	1644	464	96	**2204**	5032	2516	
	3. Ijegun - Ikotun roundabout –SB (10 mins.)	Motor cycle	8	36	20	**64**	32	140	60	**232**	296	148	
	Total delay = 29 minutes	Bus	180	208	100	**488**	316	340	128	**784**	1272	636	**7444**
TUESDAY	1. Isheri - Ikotun roundabout –NB (10 mins.)	Car	48	200	52	**300**	128	204	128	**460**	760	380	
		HDV	8	4	4	**16**	12	28	8	**48**	64	32	
	2. Egbe - Ikotun roundabout –EB (3 mins)	Tricycle	1176	200	1176	**2552**	2020	176	768	**2964**	5516	2758	
	3. Ijegun - Ikotun roundabout –SB (6 mins.)	Motor cycle	92	200	52	**344**	144	348	60	**552**	896	448	
	Total delay = 19 minutes	Bus	176	88	80	**344**	348	212	140	**700**	1044	522	**8280**
WEDNESDAY	1. Isheri - Ikotun roundabout –NB (12 mins.)	Car	40	128	88	**256**	88	364	88	**540**	796	398	
		HDV	8	12	24	**44**	16	24	4	**44**	88	44	
	2. Egbe - Ikotun roundabout –EB (5 mins)	Tricycle	784	332	1208	**2324**	1468	144	576	**2188**	4512	2256	
	3. Ijegun - Ikotun roundabout –SB (9 mins.)	Motor cycle	40	40	32	**112**	132	32	24	**188**	300	150	
	Total delay = 24 minutes	Bus	160	128	88	**376**	312	228	96	**636**	1012	506	**6708**
	1. Isheri - Ikotun roundabout –NB (6 mins.)	Car	140	364	60	**564**	208	344	136	**688**	1252	626	
		HDV	4	28	12	**44**	12	24	4	**40**	84	42	

THURSDAY	2. Egbe - Ikotun roundabout –EB (2 mins)	Tricycle	764	356	1268	**2388**	1500	356	732	**2588**	4976	2488	
	3. Ijegun - Ikotun roundabout –SB (5 mins.)	Motor cycle	24	96	8	**128**	64	132	68	**264**	392	196	
	Total delay = 13 minutes	Bus	56	228	40	**324**	176	240	140	**556**	880	440	**7584**
FRIDAY	1. Isheri - Ikotun roundabout –NB (13 mins.)	Car	60	340	72	**472**	64	164	164	**392**	864	432	
		HDV	0	20	4	**24**	176	8	8	**192**	216	108	
	2. Egbe - Ikotun roundabout –EB (4 mins)	Tricycle	334	432	980	**1746**	96	1100	1100	**2296**	4042	2021	
	3. Ijegun - Ikotun roundabout –SB (11 mins.)	Motor cycle	28	16	36	**80**	28	36	36	**100**	180	90	
	Total delay = 28 minutes	Bus	116	180	100	**396**	1408	116	116	**1640**	2036	1018	**7338**
WEEK TOTAL			**5274**	**4228**	**7052**	**16554**	**10564**	**5456**	**4780**	**20800**	37354	18677	**37,354**

NB: North Bound-NB, West Bound-WB, South Bound-SB, Heavy Duty Vehicle-HDV, Average-AVR, and Junction-Juctn.
Source: Authors' survey, 2020

Essentially, the condition of the road from the roundabout to Synagogue Church of all Nations is bad with pot holes while vehicles struggles to get free from the congestion along this section of the road.

Importantly, the use of traffic police and the more popular LASTMA officers as traffic management strategies have been successful in coordinating traffic at the Ikotun CBD. However, their operations have been very limited in efficiency due to the lack of adequate personnel, traffic light facility, off-street bus stop facility and road capacity. Also, the volume of traffic at the Ikotun CBD is higher than the road capacity during the morning and evening peak, this usually stretch the traffic control officers beyond their human capacity as fatigue will sure set in after about three to four hours. This means that the provision of traffic control light will help the traffic officers to perform longer than usual.

Furthermore, the details of the vehicular speed and classified traffic count by volume of vehicles within Ikotun CBD are presented in table 4.7 These tables showed that traffic mix in the study area is highly variable but at the same time uniformly repeated in proportions across the week. Although, the traffic volume in this area is very high especially at the peak periods (morning peak 8-9am & evening peak 5-6pm), however, the flow speed of vehicles within this area is grossly below 30 kilometres per hour. This means that traffic flow at the Ikotun CBD is very poor and indicating. Also, the time delay at the Ikotun-Ijegun junction is higher than that of Ikotun round about. Vehicles spend between 10minute and 41 minutes at the former while they spend between 13 minutes and 29 minutes at the later. The level of delay as measure on the field shows that Monday, Wednesday and Friday have the highest magnitude of delay while Thursday is fairly free (minimum delay of 13 mins. & 10 mins at Ikotun-Ijegun and Ikotun roundabout respectfully) due to the market environmental sanitation that usually last till 10am   given other category of workers (except market operators) chance to move without hindrances until after 10am .

Table 4.8: Speed and Journey Time Assessment within Ikotun CBD

Location	Min traffic delay	Max traffic delay	range	Radius of CBD influence	Max Spot/Free Flow Speed	Min Spot/ Free Flow Speed	Journey speed- min delay	Journey speed- max delay	Road/faci lity level of service
Ikotun-Ijegun Junction	10 min	41 min	31 min	500M outwards	22.7km/h	20.5km/h	3km/h	0.75km/h	Class F
Ikotun Roundabout	13 min	29 min	16 min	500M inclusive	29.3km/h	26.9km/h	2.3km/h	1.034km/h	Class F
Range of speed and journey time	3 min	12 min	15 min	-	6.6 km/h	6.4km	0.7km/h	0.284km/h	-

Source: Author's field survey, 2020

For further explanation, when the observed delay magnitude is converted to journey speed (using speed formula- i.e distance travel over time taken) relative to the minimum (10 mins. & 13 mins.) and maximum (41 mins and 29 mins.) travel delays, it will reflect a journey speed of 3km/h and 0.75km/h for Ikotun-Ijegun Junction; and 2.3km/h and 1.034km/h for Ikotun roundabout. This result as shown in table 4.8 is based on the maximum of 500 meters (measured from the Ikotun roundabout which the core of the CBD) length of spatial influence of the Ikotun CBD on traffic condition. This shows that the traffic management techniques put in place for managing traffic situation at Ikotun CBD is not effective and grossly in adequate for managing the high volume of traffic in this area. This situation is experienced both at the morning and evening peaks, although the volume of traffic is higher in the evening peak making it more difficult for commuters to navigate across the Ikotun CBD while returning back home.

4.1   Conclusion

In conclusion, the findings from this study has shown that road traffic congestion is a major problem to free flow of traffic at Ikotun CBD, this is the more reason why commuters spent long time waiting at the bus stops before getting vehicles and vehicles too experiencing more delay before getting out of the Ikotun CBD. More so, the presence of the traffic control officers is not adequate in combating the challenges of traffic congestion in the area. Rather, their increase in number is important for wider effectiveness and proper coordination and management of traffic in study area. the findings also reveals that the problems

of traffic congestion are mostly related to absence of parking and garage infrastructure and inadequate road network capacity which usually causes congestion along Ikotun CBD main roads. Similarly, suggested solutions refer mostly to provision of parks and garages, layby creation, law enforcement and junction/ roundabout rehabilitation. This is followed by installation of functional traffic lights, increase in traffic personnel as well as improving the facility of LASTMA. Nonetheless, it was also revealed that planned garages and bus stops are grossly absent. Except for the BRT/BFS planned garage facility, no other bus infrastructure is made available for the commercial buses in the study area. In other to achieve a sustainable traffic management system in Ikotun CBD area of Alimosho in Lagos state, the following recommendations must be implemented the traffic management techniques being used at Ikotun CBD is inadequate. There is the urgent need to deploy traffic management techniques such park and ride, vehicle layby, off-road bus stop, traffic light, pedestrian walkway, motor parks, motor cycle and tricycle restriction at the Ikotun CBD junction and roundabout. These are conspicuously absent in the area.

References

Adebajo A. E. (2015). An Assessment of the Challenges of Parking and Parking Infrastructure in IkotunCBD. An unpublished research project submitted to the School of Transport, Lagos State University, Ojo, pp. 20-37.

Aderamo A. J. and Salau K. A. (2013) Parking patterns and problems in developing countries: A case from Ilorin, Nigeria,Journal of Engineering Research, Vol. 1(2), pp. 40-48.

Asiyanbola R.A. and Akinpelu A.A. (2012), "The challenges of on-street parking in Nigerian Cities' transportation routes", International Journal of Development and Sustainability, Vol. 1 No. 2, pp. 476–489.

Balogun Y. T. Odumosu and R. Ojo (1999): Lagos State In Maps. Rex Charles and Connel Publications, Ibadan, Nigeria.

Bunnett R. B. and P. O. Okunrotifa (1990): General Geography IN Diagrams for West Africa. 4th Edition, Longman Group (FE) Ltd., Hong Kong.

Charles A.A (2014) Parking Management in Metropolitan Cities in West Africa, pp. 2-5

Daisa J. M. T. Kloster and R. Ledbetter (1998): *"Does Increased Connectivity Improve the Operation of Regional Street?"* <u>Metro Regional Design Study,</u> Portland Metro Regional Transportation Plan (RTP) 1998.

Falade J. B. and L. Oduwaye (1998): <u>Essentials of Landscape and Site Planning.</u> Omega Hi-Tech Information and Planning Systems Ltd. Lagos.

Fan J., Wang B., and Peng J., (2012) "Network Structure and Communication Design of Parking Lot based on Zig-BeeTechnique", International Forum on Strategic Technology (IFOST), pp. 1 – 5.

Litman, T. (2010). Parking Pricing Implementation Guidelines: How More Efficient Pricing Can Help Solve Parking Problems, Increase Revenue, And Achieve Other Planning Objectives. Victoria Transport Policy Institute (VTPI), Victoria.

Litman, T. (2010). Recommendations for Improving Transportation and Parking Credits, Victoria Transport Policy Institute (VTPI), Victoria.

Luthra A. (2002): *"Ludhiana Strives for an Efficient Transport System:"* <u>International Council for Local Environmental Incentives.</u>

Merlin P. (1992): Geographic des Transports, Que Sais-Je? Paris, Presses Univeersitaires de France.

Moore T. and P. Thornes (1994): *"The Transportation/Land Use Connection,"* Washington DC: <u>American Planning Association Report.</u> No. 448/449.

Ogden K. W. and S. Y. Taylor (1999): <u>*Traffic Engineering Management:*</u> Monash University. USA.

Olorunnimbe R.O., & Balogun I.I. 2015. Evaluation of the Impact of Inadequate Parking Infrastructure on Traffic Flow in Oshodi CBD, Lagos Metropolis. In *an International Journal of School of Transport ,Lagos State University, Ojo, Lagos 1 (1),23-34*

Robert E.M.,(2013) Parking Challenges Facing Urban Cities in Tanzania ,Journal of Economics and Sustainable Development, Vol.4,No.15.

Rodrigue J-P et al (2002): *'Transportation Geography on The Web':* Hofstra University, <u>Department of Economics & Geography.</u>

http://people.hofstra.edu/geotrans.

Berkeley Charleston-Dorchester Council of Governments (2001): "Transportation and Community, and System Preservation Pilot (TCSP) Program": A Quarterly Electronic Publication Volume 2, Issue 3 August 2001.

http://www.bcdcog.com/publications/newsletters/tesp/vol2_issue3.pdf.

United Nations (2001): "World Urbanization Prospects": The 2001 Revision. United Nations.

http://www.un.org/csa/population/unpop.htm.

World Bank Report (2003): "GUAPA – Guatemala Poverty Assessment: *Transport, Poverty and Isolation"*. World Bank.

http://www.worldbank.org/guatemalapoverty.

National Population Commission of Nigeria (2006): *"Nigerian National Census Data",* 2006.

WABP (2008): *Lagos Street Map.* Enlarged Edition, West African Book Publishers, Ilupeju, Lagos State.

Nokia OVI Map (2007): "Road Nekwork of Amuwo – Ajeroni LGAs".

http://www.ovimap.com.