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Vehicular Traffic Congestion in Selected Satellite Towns in the Federal Capital Territory (FCT) Abuja, Nigeria

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ABSTRACT
Purpose This paper investigated the level and causes of traffic congestion in FCT Abuja, as it affects commuters from satellite towns as they commute daily to the city centre. This is because previous studies did not consider traffic congestion situation in the satellite towns of the city.**:**
Design/Methodology/Approach: To achieve this aim, six traffic congested roads linking satellite towns and AMAC were sampled for this study.. The primary data for this work were obtained through administration of 655 copies of questionnaire to respondents across the study area. Data on vehicular traffic counts along the 6 sampled roads linking satellite towns and AMAC for 7days, were collected from FRSC Abuja Command. Descriptive statistics and graph theoretic indices were used to analyze the level, causes of traffic congestion and road network connectivity.
Findings: The study revealed the level of vehicular traffic congestion which varied from 5.3% above the designated road capacity in Kugbo to 96.1% in Nyanya. The major causes of traffic congestion were found to be the size of available road capacity, dismal condition of roads, market activity along the side of roads, poor road network connectivity and roadside parking of vehicles
Practical Implications: The results may be used to develop strategic transport land use planning, aimed at improving road connectivity and capacity to reducing vehicular traffic congestion inherent in satellite towns, as well as enhancing road transport efficiency between city centre and its adjoining peripheral highly populated satellite towns.
Originality/Value: Vehicular traffic congestion is an alarming problem in satellite towns in emerging big cities. This study makes contribution to planning and policy making of transport land use in satellite towns in relation to city centres to improve traffic flows between them.
Keywords: Abuja, Vehicular, Traffic, Congestion, Satellite, Towns, Causes

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I. INTRODUCTION

The agglomeration of the economic prospective and inhabitants in the city areas leads to the occurrence of very large transport needs in a spatially limited area, and when these needs are met at the same time, the congestion occurs. This applies to congestion in respect of both the road network and the vehicles. Congestion is a situation in which demand for road space exceeds supply (OECD and ECMT, Joint Transport Research Centre (2007). Vehicular traffic congestion occurs when urban road networks are no longer capable of accommodating the volume of vehicular traffic that use them thus leading to delays in journey time (Knowles, 1993).There are two types of such delays; fixed delay and operational delay. Fixed delays occur mainly at road intersections and such are usually unavoidable (Ogunsanya, 1985). Operational delays are those caused by vehicle's inefficiencies, parking problems, accidents and maneuvering of vehicles on the road. Vehicular traffic congestions are characteristic features of most urban centres of Nigeria including Abuja. Rodrique *et al*, (2009) states that congestion can be perceived as unavoidable consequences of scarce transport facilities such as road space, parking area, road signals and effective traffic management. They argue that urban congestion mainly concerns two domains of circulation, passengers and freight which share the same infrastructure. Thus, traffic congestion condition on road networks occurs as a result of excessive use of road infrastructure beyond capacity, and it is characterised by slower speeds, longer trip hours and increased vehicular queuing. Significant disproportions between the transport needs and the possibilities of their meeting at the desired level of quality can be seen also in satellite towns in Abuja.

Abuja today has become a big sprawling city with population significantly exceeding projected forecast. The bulk of this large human population residing mainly in the satellite towns commute daily to Abuja city thereby worsening transportation challenges in the city (Ughojor, 2016). Over the years, FCT had witnessed rising transport demand and road traffic which have led to increasing congestion and delays (go-slow) occasioned by greater access to cars (as purchasing power of the middle-income classes has risen), access to credit, population growth and large supply of used cars; as well as poor quality of driving especially by those who drive commercial vehicles or transit vehicles. Traffic congestion in FCT affects both car and public transport users and produces losses in terms of economic efficiency and other negative social effects like road accidents.

The creation of the FCT as Nigeria's capital was as a result of the former capital Lagos being over populated, congested and has little land area left for further development. The FCT was also chosen because of its central location and its available land area. Over the years the FCT now experiences traffic congestion in certain locations due to various factors.

The need for this study was to assess vehicular road traffic congestion in selected points in FCT Abuja. It was driven by the congestion problems experienced in most satellite towns within the FCT. For instance, Traffic congestion in Abuja is now so heightened that most times it takes an upward of two hours instead 10—15minutes before to move from the City Centre to densely populated satellite towns like Kubwa, Apo and Nyanya, especially during rush hours like in the mornings when residents are going to work, and at close of work(Kwen, 2020). According to Ughojor (2016) Abuja municipal area council which is the seat of power has a well-developed and maintained road network as compared to other area councils such as Bwari, Gwagwalada, Kuje, Kwali and Abaji. These area councils comprise of satellite towns in which majority of workers in the FCT resides in because of the affordable housing in these locations. Majority of FCT workers cannot afford the very expensive accommodation in the city center. As a result, about 70% of FCT workers reside in satellite towns within the FCT such as Kubwa, Dutse, Bwari, Nyanya and towns in neighboring states such as Mararaba, Masaka, Suleja and Madala both in Nasarawa and Niger states. The workers commute daily from these satellite towns to the city centre for work, schooling and business. The network of roads connecting the satellite towns with Abuja city centre cannot accommodate the increasing number of road users leading to amassive vehicular traffic congestion along these routes as they commute daily to the city center for work, studies or businesses.

The major problem along these routes is the vehicular road traffic congestion which seems to hinder people from getting to their work places on time and making accessibility of some areas difficult especially moving from satellite towns to the city center and back, and also makes transportation generally difficult. This should not be so and as a result, these problems should not be overlooked especially as the FCT is Nigeria's capital city. The city requires easy flow of traffic and accessibility of the entire Federal Capital Territory not just the city center but also the satellite towns around it. This is in line with SDG GOAL 11.2 "To make cities and human settlements inclusive, safe, resilient and sustainable by 2030, by providing access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons"(United Nations, 2015: 18).With present vehicular traffic congestion being experienced by commuters from satellite towns on daily basis, people will find it difficult to get to their work places on time. Emergency transportation would be difficult and access to certain areas within the satellite towns may be extremely difficult or impossible. This should not be so for urban centre like Abuja which is supposed to have a good road network to enhance accessibility of the area, promote easy flow of traffic and reduce time spent on transportation, in a bid to meet the transportation demands of the urban population. The unanswered question is; how can we accommodate the growing movement of people and goods without causing serious and undesirable congestion on the road network systems linking satellite towns and Abuja Municipal Area Council (AMAC). This of course is what this study seeks to answer. Thus, this study aims at examining the problems of vehicular road traffic congestion along the roads within the Federal Capital Territory that link satellite towns and Abuja Municipal Area Council (AMAC) and ways to ameliorate the poor situation. To achieve the above aim, the specific objectives were to: (1) assess road network connectivity and the major modes of transport used in the study area; (2) examine the patterns of vehicular traffic flows the roads and (3) identify causes of vehicular traffic congestion along the roads linking satellite towns with AMAC.

II. MATERIALS AND METHODS

Study area

The FCT is located in the geographical heart land of the country between latitude 8^0 25' North of the equator and longitude 6^0 45' and 7^0 45**'** East of Greenwich meridian as shown in Figure 1. It is bordered to the South-East by Nasarawa State, to the North-east by Kaduna state and to the West by Niger state. The population of the FCT has been increasing rapidly over the years since 1987 when population was 125,000 which increased to 378,671 in 1991 and 1,405,201 in 2006. The Federal Capital Territory covers an area of 8,000 square

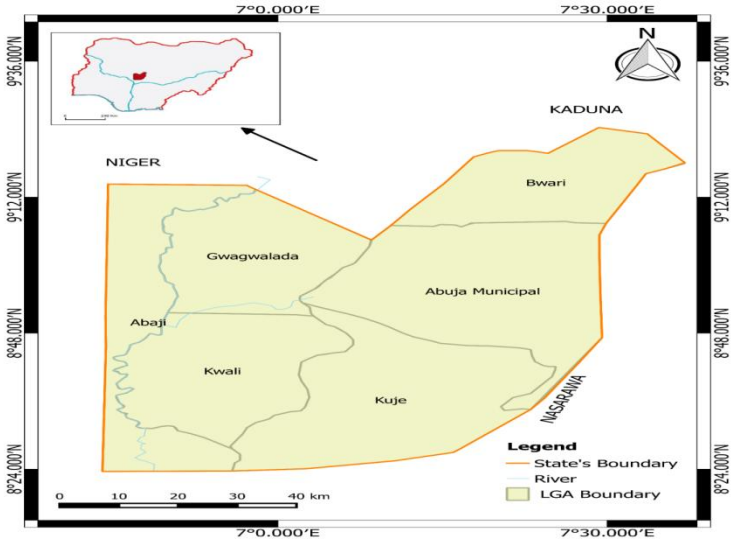
kilometers. It is more than twice the extent of Lagos state which is (3,535 km2), Imo state (5,430 km2) and Abia state (6,420 km2) lying close to the Centre of the country the territory is situated wholly within the region generally known as the "middle belt" (Dawan, 2000).

III. RESEARCH METHODOLOGY

Sampled Vehicular Traffic Congestion Points in the FCT Abuja

There are traffic congestion points along many roads in the area councils within the FCT Abuja experiencing various degrees of traffic congestion on different axis and on major junctions along the expressways that link satellite towns. In the case of this study, six (6) traffic congestion points/roads were sampled from three (3) major expressways that cut across three area councils within the FCT Abuja.

Fig. 1: Federal Capital Territory (FCT) Showing the Six (6) Area Councils



These area councils were chosen because of their high populations and mixed land uses as compared to the other area councils. Two sample points/roads linking satellite towns with each of the three major expressways were chosen and studied given a total of six sampled points/roads (See Table 1).

Table 1: Sampled Traffic Congestion Points/roads in FCT Abuja

Expressway Route	Surveyed Sampled Roads/Points	Northings	Eastings
Abuja-Gwagwalada-Lokoja Expressway	Giri/road	09^0 00.45N	007^0 09.27E
	Zuba/road	09^0 05.43N	007^0 13.27E
Abuja-Kubwa-Kaduna Expressway	Kubwa first gate/road	09^0 08.42N	007^0 18.85E
	Kubwa second gate/road	09^0 08.50N	007^0 19.39E
Abuja-Nyanya-Keffi Expressway	Nyanya/road	09^0.01.35N	007^0 34.22E
	Kugbo/road	09^0 01.67N	007^0 34.99E

Source: Fieldwork 2019

IV. METHODS OF DATA COLLECTION

Primary and secondary sources of data were used to collect relevant data needed to achieve our aim and desired objectives. The primary data were obtained through field observations, structural interviews, administration of copies of questionnaire and photograph. Structures questionnaire was used to extract information from drivers, commuters and residents of areas about causes of vehicular traffic congestion on the sampled roads.and supplemented with the use of interview method. Respondents were stratified and randomly surveyed as presented in Table 2:

Secondary data were collected from FCTA, FRSC, published and unpublished materials. Vehicular traffic counts data for 7days (Sunday to Saturday) were collected from FRSC Abuja command. Vehicular

Traffic count was conducted on the 6 sampled roads linking satellite towns and AMAC for 7days-- Sunday to Saturday from 7am to 7pm at these congestion points along the roads linking the following satellite towns −Nyanya, Kugbo, Kubwa 1st gate, Kubwa 2nd gate, Zuba and Giri. Measurements were also carried out to obtain the physical width of the sampled roads used in this study.

Table 2: Distribution of the Sampled Target Population

Expressway	Congested point on the road linking the satellite towns and Expressway	No. of respondents surveyed along the roads linking the satellite towns and the Expressway				
		Private drivers	Commercial drivers	assengers	Residents	Total Respondents interviewed
Abuja – Gwagwala-lokoja Dual carriage expressway	Giri	28	30	27	28	113
	Zuba	25	25	25	26	101
Abuja-Kuwa−Kaduna Dual carriage expressway	Kubwa 1st Gate	27	26	26	25	104
	Kubwa 2nd Gate	24	27	25	26	102
Nyanya- keffi Dual carriage expressway	Nyanya	30	31	31	23	115
	Kugbo	29	30	31	30	120

Data Analysis

Graph theoretic indices were used to analyze the level of connectivity of road network in the study area using these graph theoretic indices:

Cyclomatic Number (μ) = $e - v + p$……Equ. 1

Beta index: Therefore (β) = e/v ……..…...Equ. 2

where "e" is the number of edges or links; "v" is the number of vertices or nodes and "p" is the number of sub-graphs. Cyclomatic number is the measure of the number of circuits in the transportation or the number of links in the system excess to the number required to tie the vertices together in a minimal way. The beta index expresses the number of edges present in a network in relation to the number of vertices to be connected. It therefore indicates the number of links leading in and out of each node. The higher the value of the beta index the greater the connectivity of the network. Descriptive and multiple regression analyses were also employed in the analysis of data collected from the conduct of interviews and field measurements. Regression analysis and ANOVA were used to determine the contribution of the factors responsible for the observed level of congestion in the study area.

V. RESULTS AND DISCUSSION

Road Network in the FCT

The FCT Abuja has three major expressways which link it to the northern, southern, eastern and western parts of Nigeria. The Abuja-Kubwa-Kaduna expressway also known as Murtala Mohammed expressway is a four lane road and covers a stretch of 39km. It links the FCT to Niger, Kaduna and Kano states. Secondly, is the Abuja-Gwagwalada-Lokoja Expressway which is a dual carriage way and it links the FCT to the southern part of Nigeria such as Southeast, Southsouth and Southwest it links these places through Lokoja in Kogi state. Thirdly, is the Abuja-Nyanya-Keffi expressway. This is also a dual carriage way and it links the FCT to Nasarawa and Benue states and also to Eastern Nigeria through Enugu state, and to Northern Nigeria through Plateau state. Apart from these major expressways there are also roads linking one area council to the other and some minor roads within the area councils. The increasing population of the FCT has continued to put pressure on the existing roads within the territory and this has given rise to traffic congestion as a major transportation problem. Figure 2 shows map of the FCT showing the road network and our sampled traffic congestion points.

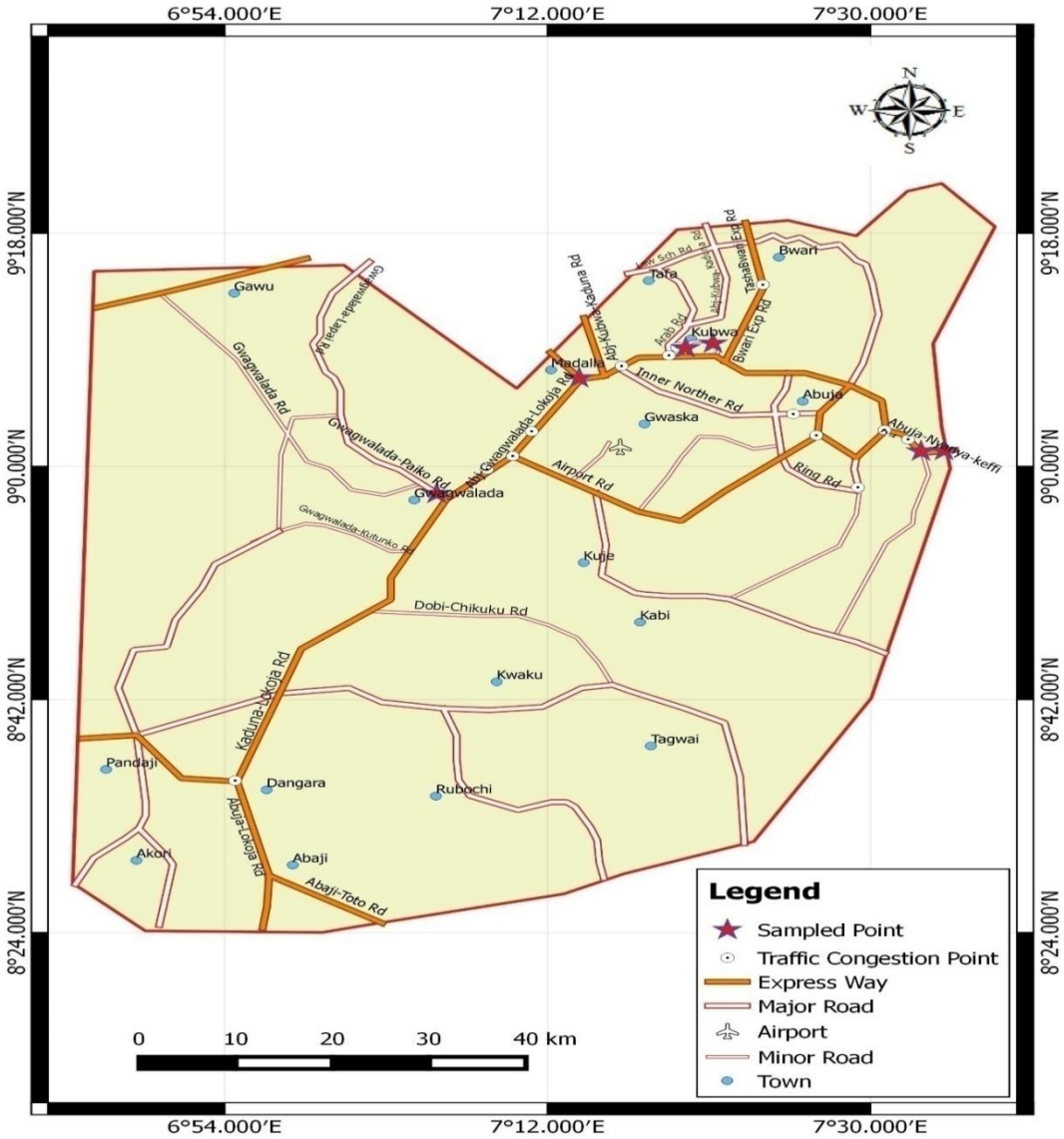


Fig 2: Map of the FCT Showing the Road Network and Sampled Traffic Congestion Points

Road Network Analysis

The road network consists of systems of interconnected paved carriages which are designed to carry buses, cars and goods vehicle; the road network generally forms the most basic level of transport infrastructure within urban areas, and link with all other areas, both within and beyond the boundaries of the urban area (SECURIPEDIA, 2013).

Fig. shows a topological map of the FCT road network from which the connectivity indices was derived and used for our road network analysis using Graph theoretic indices.

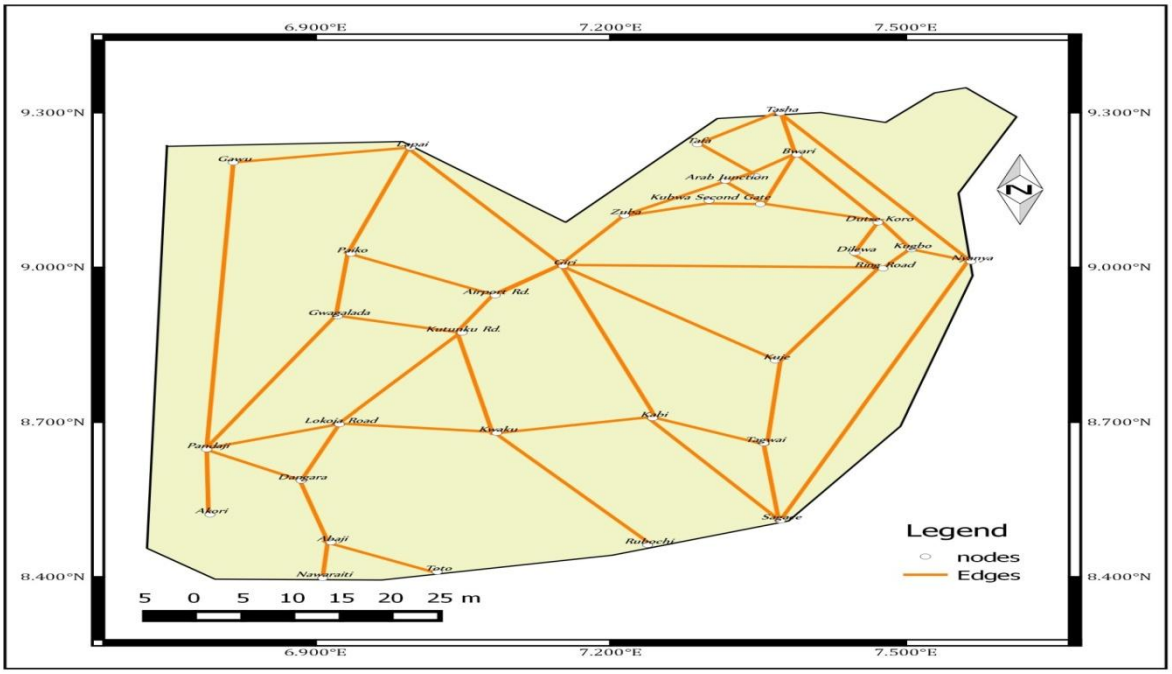


Table 1: The values of graph theoretical indices of road connectivity in the study area

Names and symbols of indices	Values of indices
Cyclomatic number(μ)	18
Beta index(β)	1.57

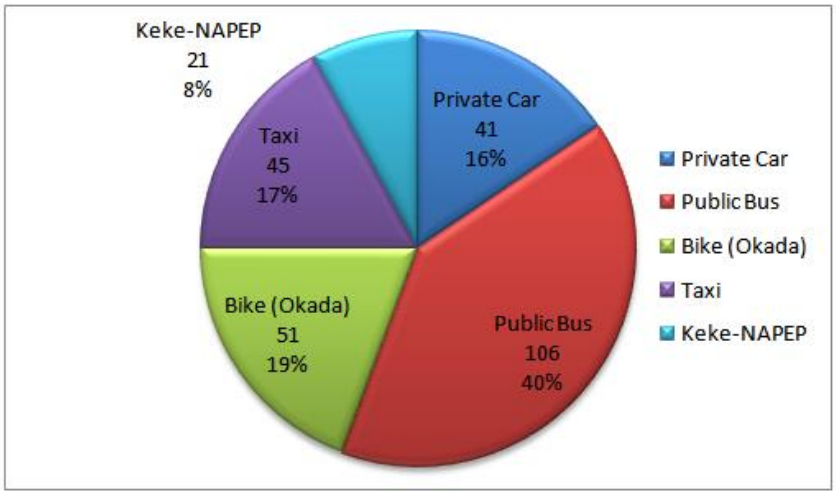
Source: Fieldwork 2020

The cyclomatic number of the road network in the FCT is 18(i.e. eighteen fundamental circuits linking some major centres in the FCT)(See Table 1) and since the number is considerably lower than the maximum number of circuits (i.e. 2v-5) possible which is 55 it means that the connectivity of roads in the FCT is very low. The beta index is relatively low with an index of 1.57 showing that the number of links leading in and out of FCT is relatively low.

1. Major modes of Transportation in the FGT

Figure 4 shows the preferred means of transport in FCT Abuja, keke -NAPEP accounted for 8%, private car 16%, taxi 17% bike 19%, public bus 40%. It is deduced from our analysis that public bus which accounted for 40% is the most preferred mode of transportation in FCT Abuja as shown in Fig. 4.

Fig 4: Major Means of Transportation in satellite towns of the FCT Abuja



2. The Levels of Vehicular Traffic Congestion Points on The Sampled Roads in the FCT Abuja

2.1. Abuja-Gwagwalada-Lokoja Expressway

The Abuja-Gwagwalada-Lokoja Expressway is a major road in the FCT. This expressway also stretches through the Gwagwalada area council. Sampled points along this expressway are Zuba and Giri axis See Table 3). A daily vehicular traffic count on Giri road recorded 4941(7am-7pm) while the design capacity is 4000 daily vehicular traffic movements. This means that the actual vehicular traffic movement is 23.5% above the designed capacity (See column 7 of Table 3). On Zuba road, the daily actual vehicular traffic count was found to be 46.2% over the designed capacity.

Table 3: Congested Points/Areas of the Sampled Roads Linking Satellite Towns in the city of Abuja

Expressway	Congested Points/Areas	**Type of Road**	**No. of Vehicles Counted per day from 7am-7pm**	**No. of Vehicles based on designed capacity per day (specialists consult Department of Transport FCTA**	**The difference between the actual No. of Vehicles counted per day and the projected No. of vehicles per day based on designed capacity**	**The percentage increase of het actual vehicles counted over expected designed capacity (%)**
Abuja-Gwagwalada-Lokoja Expressway	Giri Road	A single carriageway	4941	4000	941	23.5
	Zuba Road	A single carriageway	5849	4000	1849	46.2
Abuja-Kuwa−Kaduna Dual carriage expressway	Kubwa First Gate Road	A single carriageway	6241	4000	2241	56.0
	Kubwa Second Gate Road	A single carriageway	7112	4000	3112	77.8
Nyanya-keffi Dual carriage expressway	Nyanya Road	A single carriageway	7843	4000	3843	96.1
	Kugbo Road	A single carriageway	4211	4000	211	5.3

Source:Fieldwork2020

2.2. Abuja-Kubwa-Kaduna Expressway

The Abuja-Kubwa-Kaduna expressway also known as Murtala Mohammed expressway, covers a stretch of about 39km. Vehicular traffic congestion problems are experienced on the feeder roads linking satellite towns to this expressway. Traffic congestion points on feeder roads along this route includes; Dei-dei junction, Arab road junction, Kubwa first gate, Kubwa second gate, Federal housing junction and Dutse junction, but Kubwa first gate and Kubwa second gate axis were samples chosen for this study(See Table 3). The actual vehicular traffic counts are 56.0% and 77.8% percents over the designed capacities of the roads respectively. Cars are constantly trapped in vehicular congestion traffic at Kubwa second gate axis along Abuja-Kubwa-Kaduna expressway can be seen in Plate 1.

Plate 1: Cars Trapped in Traffic in Kubwa Second Gate Axis along Abuja-Kubwa-Expressway

2.3. Abuja-Nyanya-Keffi Expressway

The Abuja-Nyanya-Keffi expressway is another major route in the FCT, linking it to Nasarawa state. This route is found along Abuja municipal area council (AMAC) and some parts of Nasarawa state. The satellite towns found on this route as well as traffic congestion points includes; Nyanya, Kugbo, Jikwoyi, Kurudu and Karu, Mararaba, new Nyanya and Masaka in the outskirts of Abuja. Nyanya and Kugbo are the samples chosen for this study. Nyanya road is highly congested with 96.1% above designed capacity of 400 vehicles per day. Kugbo road is least congested with 5.3% above the designed capacity(See Table 3).

3. Pattern of Traffic Flow along Sampled Roads/Points in FCT Abuja

The traffic flow pattern in the FCT is not different from the flow pattern of other areas within the country that experiences traffic congestion. Traffic flow along traffic congestion points in the FCT are heaviest in the mornings and evenings. In the morning most trips occur between 7am to 11am and in the evenings its between 4pm and 7pm. At these hours the roads and its infrastructures are highly congested. During the afternoon there is a free flow of traffic along these routes because of the decreased number of road users.

The volume of traffic is usually very high for the weekdays especially from Mondays to Wednesdays, this is because a large percentage of road users in the FCT are civil servants or work in private firms, most of them do not exempt themselves from work especially on Mondays through Wednesday. On Thursday the traffic is still high but not as the traffic experienced on Mondays. But the volume of traffic gradually reduces as we approach the weekend, this is because most civil servants and those who work in private firms do not usually go to work during the weekends which starts from Friday. Also on Saturdays and Sundays, the volume of traffic also reduces because fewer trips are generated and made on weekends which are basically visitation to relatives and places of interest. .

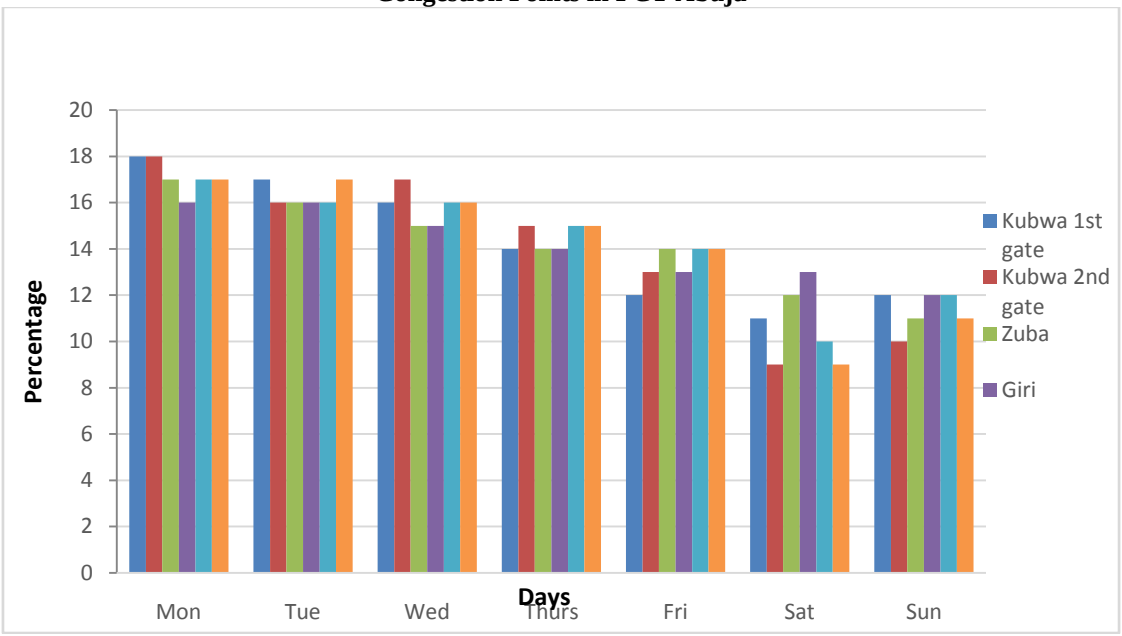
3.1. Nature and Pattern of A.M (Morning) Peak Flow

The nature and pattern of A.M peak flow shows a period in the day, where the volume of traffic builds up as early as 7am it gets to a point where the accessibility of these routes is greatly reduced, it shows a high density of vehicular traffic on the road with very low speed. Vehicular movement during the A.M. peak period is quite difficult even for a commuter/driver to reverse. In most of our sampled points the A.M peak usually occurs at 7am-10am but in some points such as the Kubwa second gate it extends to about 11am. The atmosphere is also very dense and is polluted by exhaust fumes from vehicles caught on the road at the A.M peak, there are deafening noises from cars, motor cycles and big vehicles. The resultant effect is the worsening traffic congestion being experienced at this period. The inability of the road network along these points to accommodate the large population of commuters from the satellite towns which harbors the largest population to move within the FCT without losing productive man hours, coming from these satellite towns in the morning. The pattern of daily A.M peak on our sampled points for 7 days' traffic count is shown in the Fig.4.

3.2. Nature and Pattern of P.M (Evening) Peak Flow

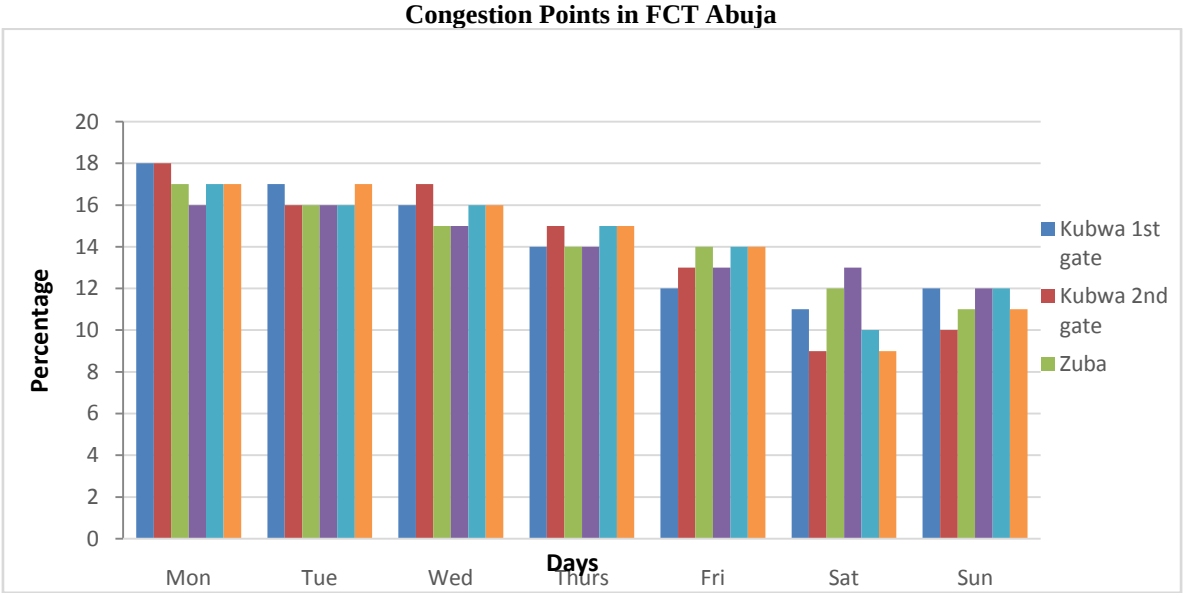
The nature and pattern of the P.M (evening) peak period is not very different from the A.M peak. The road at this period is highly congested with tired looking commuters. Usually, the traffic on these points is congested with different modes of transport, which comprises of motorcycles, private cars, taxis, tricycles, minibuses and high capacity buses. It is at this P.M peak period that pedestrians operate most because the roads are so congested that even motorcycles struggle their way out of the traffic. So most commuters prefer to walk the distance until they are out of the congestion. This P.M peak starts

Fig 4: Column Chart Showing Percentage of Daily A.M Peak on Sampled Satellite Town Traffic Congestion Points in FCT Abuja



building up by 4pm to about 7pm and sometimes 8pm we observed from our field work that the P.M peak is densest as compared to the A.M peak. The pattern of daily P.M peak on our sampled points for 7 days' traffic count is shown in the Fig 5.

Fig. 5: Column Chart Showing Percentage of Daily P.M Peak on Sampled Satellite Town Traffic Congestion Points in FCT Abuja



4. Causes of Vehicular Traffic Congestion on Roads Linking Satellite Towns Abuja Municipal Area Council (AMAC)

The Identified factors responsible for vehicular traffic congestion at various points along the roads linking satellite towns with Abuja city centre are presented on Table 4. They are the size of the road capacity, dismal road conditions, market activities at the roadsides, poor road network connectivity, roadside parking of vehicles, inadequate modes of public transport, military checkpoints, mixed land use and increasing number of road. Generally Afrom the Table 4 above, size of the road capacity is the highest contributor to vehicle traffic congestion along satellite roads in Abuja with 17.1% contribution. This is because the demand for road space is now higher than the available satellite town road spaces thereby resulting to vehicular traffic congestion. Roadside parking of vehicles is the second major contributor and contributes 14.4% to the causes of vehicular traffic congestion leading to reduction in vehicular speed thereby causing vehicular bunching. Dismal conditions of roads linking satellite towns and Abuja city centre contributes 14.4% causes of vehicular traffic congestion on the roads. For instance, in Zuba bad condition of road affects general transport activities (Isa et al., 2015). Roadside market activity contributes 12.04% to the causes of vehicular traffic congestion in the study area. This is because traders occupy available roadside spaces thereby reducing road spaces where vehicles are supposed to park or even pass. Poor road connectivity, contributes 11.90% to the observed traffic congestion, while military checkpoints due to rate of insecurity in Nigeria, increasing road users, inadequate mode of public transport and mixed land use contribute 10.84%, 8.58%, 6.33% and 5.57% respectively to the causes of vehicular traffic congestion in the study area.

Table 4: Causes of Traffic Congestion along major road linking satellite towns in Abuja

The raod linking satellite towns in Abuja	Number of Respondents	Size of the road capacity	Dismal condition of roads	Mixed land- use	Market activities at the roadside	Poor raod network connectivity	Inadequate mode of public transport	Military check-point	Roadside parking of vehicle	Increasing road users
Giri Road	113	21(18.6%)	13(11.5%)	17(15%)	10(8.8%)	18(15.9%)	4(3.5%)	8(7.1%)	12(10.6%)	10(8.8%)
Zuba	101	18(17.8%)	14((13.9%)	5(5.0%)	11(10.9%)	19(18.8%)	5(5.0%)	7(6.9%)	13(12.8%)	9(8.9%)
Kubwa First Gate Road	104	18(17.3%)	11(10.6%)	6(5.8%)	11(10.6%)	9(8.7%)	8(7.4%)	15(14.9%)	17(16.3%)	9(8.7%)
Kubwa Second Gate Road	102	20(19.6%)	10(9.8%)	7(6.9%)	11(10.8%)	9(8.8%)	65.9%)	1716.6%)	16(15.6%)	6(5.9%)
Nyanya Road	115	16(13.9%)	19(16.5%)	4(3.5%)	20(17.4%)	14(12.1%)	10(8.7%)	11(9.6%)	18(15.7%)	3(2.6%)
Kugbo Road	120	19(15.8%)	21(17.5%)	7(5.8%)	16(13.3%)	9(7.5%)	8(6.7%)	13(10.9%)	18(15%	9(7.5%)
Total	655	112	88	46	79	78	41	71	94	46
	%	17.1	13.4	7.0	12.1	11.9	6.3	10.8	14.4	7.0

VI. CONCLUSION AND RECOMMENDATIONS

The Federal Capital Territory Administration FCTA, has done massive rehabilitation of roads within the FCT, especially in the city centre and the major expressways, traffic congestion still persists especially in the satellite towns. Concisely, this research work has made various attempts to examine the problem of vehicular road traffic congestion in the FCT especially as regards the trip generation from satellite towns to the city centre. It identified the various major modes of transportation used in the FCT. It has also identified the levels of traffic congestions as well as the causes of traffic congestion on the FCT roads linking satellite towns. These consequences of traffic congestion are probably one of the most urgent problems facing the study area. On the basis of the findings, these recommendations were made to address the problems and causes of vehicular traffic congestions on the roads linking satellite towns with Abuja city centre as follows:

1. The predominance of road as the only means of transportation within the territory is not ideal for Nigeria's capital as the increasing population all rely on the available road network to convey them to places of interest. The Abuja light rail operating only between Ibu rail station and international airport rail station should be expanded to link satellite towns of Kuje, Gini, Nyanya, Kugbo, Zuba amomg others. The use of rail transport will help in reducing the pressure on road transport as commuters will instead of using their private cars or public bus will prefer using trains if it is faster and affordable.

2. There should be a decentralization of government ministries, agencies and parastatals, which are all concentrated in the City Centre. As the federal capital territory, government agencies should be spread across the six (6) area councils, this will help in decongesting the City Centre, as on a daily basis thousands of commuters are all headed to a single point which is in the City Centre and in the evening they return from that

single point to their destinations. These lead to the AM and PM traffic congestion peaks being experienced in the satellite towns.

3. The presence of a number of military checkpoints especially in Nyanya and Kugbo axis, is a major cause of traffic congestion in the FCT, these roads are blocked with drums and bags of sand, and a stop and search is done to every vehicle plying these routes, these road blockages should be removed to allow a free flow of traffic along these routes. The security agencies should install other security measures such as the installation of bomb detectors instead of blocking the roads and creating unnecessary bottlenecks.

4. The management of Abuja urban mass transit limited, who are the managers of the high capacity buses should be overhauled and an effective management be put in place who can manage the buses and prevent its frequent breakdown. Also the number of these buses should be increased to be able to cater for the increasing population. It was gathered from our field work that most FCT road users prefer using their private cars since the ban on commercial mini buses because the high capacity buses are not enough along our sampled points.

5. A major cause of traffic congestion along the Zuba axis is the bad state of the road. It's a single road and it is filled with potholes with craters filled with water during the rainy season. This area is a major commercial area with the presence of the Zuba international spare parts market. The FCT Administration should as a matter of urgency repair the bad road in this axis, to an international standard which is able to carry the heavy vehicles that ply this route.

6. As part of measures to reduce the traffic congestion experienced on feeder roads long the satellite towns, the roads into these areas should be rehabilitated from a single road to a dual carriage way. This is because these areas have continued to witness an increase in population and level of car ownership and these roads can no longer accommodate the amount of vehicle going in and coming out of these areas such as the Kubwa first gate and Kubwa second gate roads should be made a dual carriage way.

7. Pedestrian walk ways should be provided to control the interference of pedestrians with vehicular traffic flows. Our study area is mainly a residential and commercial area. Zebra crossing should be provided in areas with markets, schools and social centres.

8. The government should ensure that developers create parking spaces in the construction of Plazas, markets, churches, mosques, schools etc. This will go a long way in preventing roadside parking which causes traffic congestion. Roadside trading should also be discouraged because it reduces the width of motor-able roads and vehicles will struggle to move in such a condition thereby causing bottlenecks. Taskforce should be put in place to address the roadside trading and parking carried out in our study area.

9. Transport infrastructure and transport facilities are most vital component of effective and efficient transport system in the world over, which evidently is inadequate in the study area. During our field study it was observed that most road signs and signals that are supposed to guide motorists and pedestrians are absent or inadequate in some areas. In areas where traffic lights are installed, some have become faulty and gives wrong signals to motorists thereby causing confusion. Traffic control and Traffic engineering measures should be put in place in our study area.

Implementations of the recommendation made, will go a long way to help ameliorate the problem of vehicular road traffic congestion in the FCT as stated in this research work, congestion will be reduced at least to the minimum if not averted for future reoccurrence. Apart from the recommendations above, the residents and road users of the FCT and especially our sampled points have to be educated and enlightened with strict regulations and a penalty for failure to comply with such regulation. If these measures are put in place the FCT will be a modern and a sanitized City to work and live in.

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