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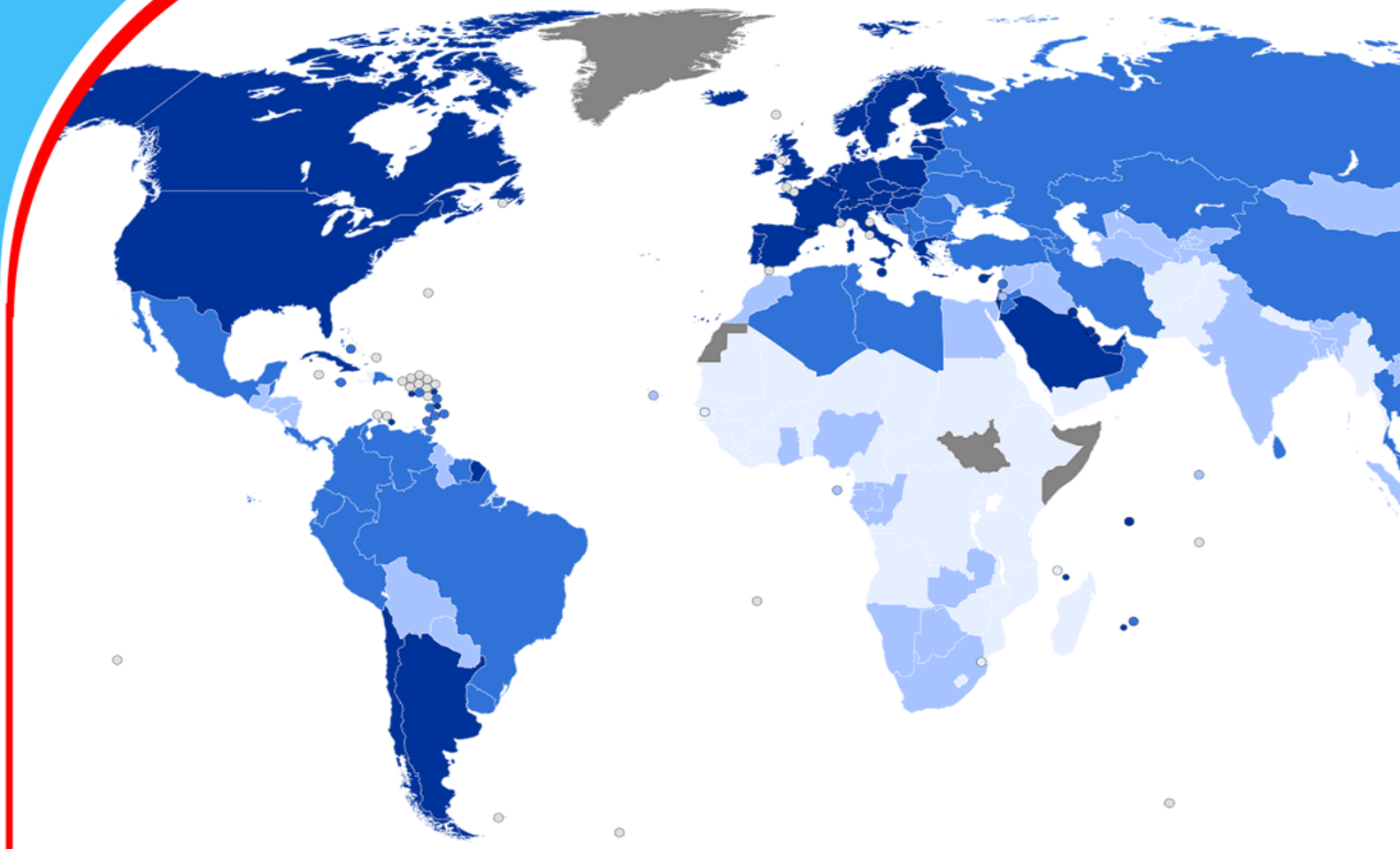

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Abstract

Purpose: Traffic congestion is one of the major problems in urban areas arising from increased influx of people and vehicle ownership. The deficiency in alternatives mode and route of movement such as monorail and cable car often hinder free traffic flow along major intersections. The study aimed at assessing the traffic congestion in Calabar South LGA, Cross River State, Nigeria. The study area is experiencing an upsurge in traffic congestion as a major residential area where large proportion of people live and move to work in Calabar Municipality.

Methodology: Field survey using questionnaire, traffic count and oral interview was adopted to elicit information from the respondents in four sampled locations that constituted 10% of the major interconnections in Calabar south. The questionnaire elicited information on the perspectives of people on factors responsible for traffic congestion, numbers of trips per day, purpose for the trips, average time spent on traffic among others. Moreover, traffic volume count was carried out manually twelfth hour weekly expressed as passenger car unit per hour (PCU/h).

Findings: The result obtained indicated that narrow road was identified as one of the major causes of traffic congestion as indicated by 33.5% of the respondents followed by increased population (29.5%). Moreover people make at least 3 trips per day indicated by 57.5% of respondents and which is mainly to work and business (38.5%) followed by School run (26.05%). Large proportion of the respondents (58.0%) spend at least 21-30 minutes on traffic especial at the intersections at peak period.

Recommendation: Delay constitute the highest effect on road users. Traffic volume ranges from 1045 to 2608 vehicles per hour. Thus, traffic congestion is a serious problem in Calabar South, hence it is recommended that Government to increase the number of access roads by constructing other in access roads to distribute traffic.

Keywords: *Traffic Congestion, Perspective, Traffic volume, vehicle per hour, Automobile*

INTRODUCTION

Provision of Infrastructures such as good road network, electricity, water resources etc. is a factor that determines the efficiency of town and city management which are essential for national development (National Emergency Economic Development Strategy (NEEDS, 2004). Good road network is specifically important for the flow of goods and services as well as human movement. Therefore, availability of this social amenities such as tarred roads in the metropolis becomes man's epitome achievements (Ogunbode, 2007) to ensure ease of movements as well as safety and human well-being.

Transportation serve as functional catalyst for the general development and growth of cities, thereby increasing trade and commerce within the urban centres. The socio-economic development is stimulated and more infrastructures is provided to keep pace with the current development. Moreover, with appropriate policies and legal framework in place infrastructural development is often understood to mean progress. The integrated developmental strategy involves development of other sundry facilities. However, where there is shortage of the infrastructure, the capacity of the available ones to accommodate the demand especially as human population increases result in various problems.

Traffic congestion is one of such problems and is a condition on road networks that occurs as use increases and is associated with slower speeds, longer trip times and increased vehicular queuing. When traffic demand is greater than interaction between vehicles it slows the speed of the traffic stream, this results in some congestion. It is also note that, traffic congestion occurs when urban transport networks are no longer capable of accommodating of movement that uses them. This condition is caused by rapid growth in the number of vehicles and with less than corresponding improvement in road network (Ogunbode, 2007; Odeleye, 2008). However, a number of specific circumstances leads to congestion such as reckless driving, lack of awareness on road signs, unworthy vehicles and poor road maintenance. Most of them reduce the capacity of a road at a given point or over certain length or increase the number of vehicles required for a given volume of the people and goods.

Road traffic congestion is a situation when urban road network could no longer accommodate the volume of traffic on it, resulting in impedance vehicles impose on each other, due to the speed flow relationship in conditions where the use of a transport system approaches its capacity. (Goodwin, 1997; Ogunsanya, 2002). Traffic congestion is recurring, and is attributed to sheer weight of traffic, most of which attributed to traffic accidents (U.S Federal Highway Administration (FHA, 2008). From research conducted so far it is difficult to fully predict under which condition a 'traffic jam' may suddenly occur. It has been discovered that (such as accidents or even single car breaking heavily in a previously smooth flow) may cause ripple effects which then spread out and create a sustained traffic jam when, otherwise normal flow would have continued for some time longer (Helbing, 2001).

Traffic congestion is an observable fact associated with cities and towns both in the developed and developing world. The reason is that as prime movers of economic development (Sankaran, 2005) observed that about 8% of Gross Domestic Product (GDP) growth in developing countries is expected to accrue from cities. Our social and economic wellbeing are critically dependent on the road haulage system (Mokinnon, 2007). A recent study carried out by the Portland Business Alliance, Port of Portland and Metro found that traffic will cost the local economy 6,500 jobs and

$844 million a year by 2025, including the lost worker productivity, higher transportation cost and lost business earning.

The delays in time and cost lost by vehicle due to traffic friction that are like to be caused by other vehicles inefficiencies or ineffectiveness as in the case of breakdowns, accidents, parking and maneuvering problems (Adenle, 1986 cited in (Somuyiwa, 2008). Congestion arises out of the conjunction of two factors; first is that every process has a finite capacity. The second is that every process has a holistic character. That is, there some degree of randomness in both the demand placed on a process to service those demands. When network becomes congested, the queue length become very large in a short time, resulting in buffer overflow and cell loss. Congestion control is therefore necessary to ensure that user get quality of service (QoS) Active Traffic Management (ATM, 2005). Moreover, traffic congestion makes living in urban centers a nightmare. Traffic congested cities experience both air and noise pollution. Emissions from vehicles such as nitrous oxide (NO_2) and carbon monoxide (CO) pose health risk to urban residents and the environment. As traffic increase, so does the occurrence of traffic accidents. It is estimated that over one million people die annually from traffic accidents.

The issue of traffic congestion is becoming increasingly obvious in CalabarSouth as the population and economic activities in increasing. Like many other cities in Nigeria, the city of Calabar is experiencing ongoing vehicular traffic congestion even after the ban on motorcycle in the metropolis in November, 2009. Sequel to this, car and other vehicle ownership rates have been on the increase as never before. Overtime, a state of automobile dependence has ensued as there is no other alternative to urban mobility making the automobile the only means of mobility. Although rising automobile mobility in Calabar can be seen as a positive result of rising incomes and standard of living, this surge in the total number of vehicles also give rise to congestion at peak traffic hours on major through fares. Therefore, the studies to assess the traffic conditions in Calabar is important to determine the impact on various human activities.

THEORETICAL UNDERPINNING

Although a global phenomenon, 90 `% of the growth in urban population occurs in the developing countries which place intense pressure on urban infrastructures, particularly transportation (Rodrigue, 2009). Oduela (1981) in Aderamo (2002) observed that a major cause of traffic problem in Nigeria is that the city structure predates the advent of the automobile. The structural pattern of roads, especially in the traditional areas of the city and the unplanned growth and haphazard land use distribution impose serious constraints on movement and the facilities provided.

Rao and Rao (2012) categories causes of congestion into two namely: (a) micro-level factors (e.g. relate to traffic on the road) and macro-level factors that relate to overall demand for road use. Congestion is "triggered" at the "micro" level by factors that contribute to the incidence of congestion and its severity. The micro level factors are, example, many people and freight want to move at the same time, too many vehicles for limited road space. Many trips may be delayed by events that are irregular, but frequent. Accidents, vehicle breakdowns, poorly timed traffic signals, special events like mass social gatherings, political rallies, bad weather conditions etc. which present factors that cause a variety of traffic congestion problems.

The essence for trip generation rest on the locational structure and its complementary activities which are variedly located in space. Therefore, the complementary of urban land uses is the basic factor in the generation of urban trips (Waugh, 1995). Land use activities therefore have impact on transport thus the importance of spatial interaction model in the study of relationship of phenomenon in space (Ogunbodede, 2006).

Travel time variability has several components, including differences in travel time, from day-to-day, over the course of the days and even from vehicle-to-vehicle (Noland & Polak, 2002). It is noted that this activities is independent of congestion effects. According to (Noland, 2002) congestion system may exhibit very stable day-to-day travel times at travelers anticipate advance. As mentioned above variability introduces uncertainty for travelers such that they do not exactly know when they will arrive, a destination. Therefore, it is universally recognized that for road travel, incident (or non-recurrent delay) is the major source of travel variability which occurs as a result of a pot-holes on the road while is unknown how the probability of an incident (including the likely severity and duration of the accident) is effected by recurrent congestion, reduced capacity during peak travel times will result in greater travel delay and potentially can result in greater variability at peak times.

The uncertainty in trip journey times is clearly an added cost to a traveler making a given journey longer than necessary. Hence, this terms can be interpreted as added travel time from extra delay on the road due to congestion or traffic jam. The behavioural reactions to uncertain travel times are significantly more complex. This is why Graver (1998) attributed it to variability of travel time. His contribution was to embody the concept of travel time variability within a model of utility maximization with the result that travelers view it as lack of time by departing earlier than they would with no travel time variability (Knight, 2004). Economist Anthony Downs argues that rush hour traffic congestion is inevitable because of the benefits of having a relatively standard work day. In a capitalist economy like Nigeria for instance goods can be allocated either by pricing (ability to pay) or by queuing (first-come-first serve); congestion is of latter. Instead of the traditional solution of making the ‘pipe’ large enough to accommodate the total demand for peak-hour vehicle travel either by widening roadways or increasing ‘flow pressure’ via automated highway systems. Downs advocate greater use of road pricing to reduce congestion a demand-side solution, effectively rationing demand, in turn this cause generated revenue into public transportation projects.

Mobility is a crucial to functionality of cities as it effects their socio-economic activities. It is also a fact that the economic development of a nation is closely linked to its transport system. Hindrance to effective mobility is road traffic congestion, which the World Bank (1999) stated that it constitutes about 54.5% of all noticeable urban transport externalities. This is as a result of the ever increasing urbanization, human activities and resultant heavy dependence on road transportation that warrants increase in the number of vehicles, of different categories on the road. The demand for transport especially in cities of developing countries has been on the increase following the rapid socio-economic growth and development of these countries. For instance, the rate of motor vehicle ownership and use is growing faster than population in many places, with the vehicle ownership growing rates rising to 15 to 20 percent per year (Odeleye, 2008). Traffic management has been quite poor in many developing countries, despite the growth in transport demand and supply. The resultant traffic congestion has become impediment to our livability.

Olagunju (2011) simply described road traffic congestion as a disproportion between the inflow and outflow of vehicles into and out of a particular space. This is also in line with Ogunsanya (2002) conceptualization of road traffic congestion as a situation when urban road network could no longer accommodate the volume of traffic on it. Sanders (2015) revealed that the cost of congestion in the United State of America included 87,606 crashed in work zones, 1,200 deaths, 37,476 injuries, 482 million hours lost in driver delays and $6.5 billion lost time. Sanders also identified the accident costs to include property and medical but that the users delays cost are often the largest cost. The user delay from increased accidents and user delay from reduced lanes are enormous. Also identified as part of congestion costs are increased fuel consumption and reduced air quality.

Aderamo (2012), states that Nigeria is one of the countries in the developing world with rapid urbanization and fast growing cities. A study of the changing morphology of many Nigerian cities gives an insight into the evolution of urban transport problems. In Nigeria, many urban transport scholars have carried out studies as urban transport problems all aimed at proffering solutions. These include Adedamila (1977), Adenle (1977), Ogunsanya (1981, 1983, 1993 and 2002). Many of these scholars have identified congestion as the most serious transport problem in Nigeria as evidenced in most urban centers most especially Lagos, Ibadan, Port Harcourt, Enugu, and lately Calabar.

METHODOLOGY

Study Area

Calabar South is part of Calabar metropolis-the capital of Cross River State in the Niger Delta region of Nigeria. Calabar South lies between latitudes 4.57^0N and 4.95^0N and longitudes 8.19^0E and 8.19^0E, occupying an area of 264 square kilometers on a peninsular formed by the Calabar River estuary and the Atlantic ocean. It is bordered in the North by Calabar Municipality, to the East by Great Qua River, to the South by the Gulf of Guinea and West by Calabar River and Cross River. Calabar has a semi-equatorial climate (Monsoonal) with annual rainfall range from 2500m to 3000mm with relative humidity of about 84%. It has a mean temperature range of 25^0c w and 30^0c. Calabar being the tourism hub of the country is a fast growing city in terms of volume of socio-economic activities.

Survey design was adopted for this study which basically includes questionnaire, site observations and oral interviews as primary source of data. Secondary source of data on the other hand were obtained from extant literature, maps and other documents. Information included in the questionnaire are factors responsible for congestion from the commuters experience, number of trips per day, purpose for the trips, average time spent on traffic and effect of congestion.Traffic volume count at four different sampled intersections was also carried out manually using field assistant. The extent of variation of traffic flow was ascertained by carrying out twelve-hour (6:00-18:00) weekday counts. The period of peak flows are assessed. Traffic volume counts are performed at the intersections and expressed as passenger car unit per hour (PCU/h).

Interviews were also conducted in the course of data collection, thus, enabling the researcher to have face-to-face interaction with some commuters and drivers who plied the route where this study was conducted. Sampledlocations considered for the study constituted 10% of the major intersections randomly selected in the area. These include Mayne Avenue by Atamunu, Mount

Zion by Uwanse, EkpoAbasi by Yellow Duke and Watt Market Roundabout. The sample size of 400 respondents were determined using Yaro Yamane's formula for finite population as expressed below:

$$n = \frac{N}{1 + N\,(e)^2}$$

Where; n = the sample size

N = the finite population

e = level of significance (limit of tolerable error = 0.05)

1 = unit (a constant)

Simple Random Sampling Technique was adopted in questionnaire administration while the stratified sampling technique was equally adopted to distribute the questionnaire to the sampled communities of the study area. Out of the 400 questionnaire distributed, 400 copies were received from the respondents. The analysis is based on this return rate.

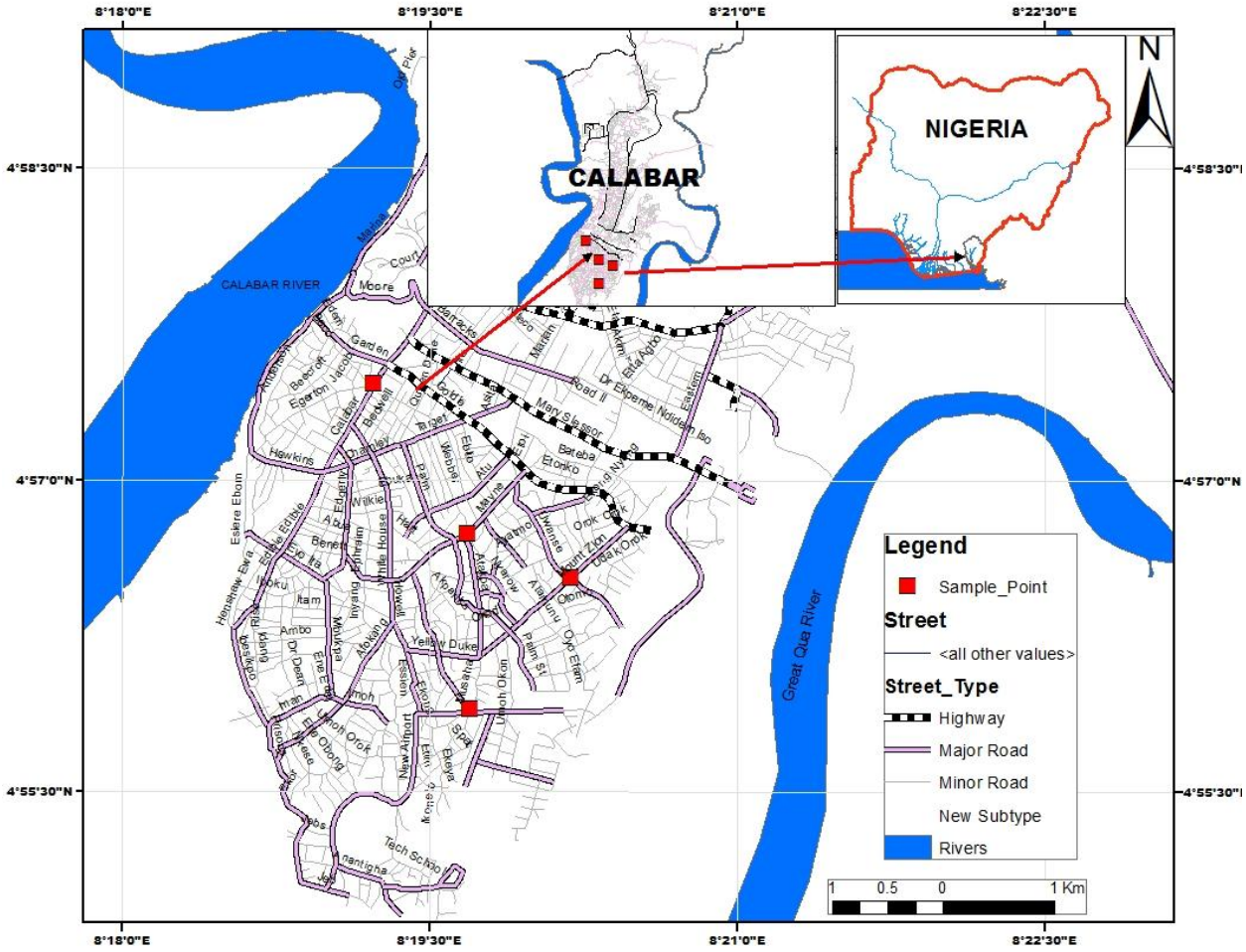

Figure 1: The study area

RESULT

The highest means of transportation in the study area is motor cars as shown by 34.0% of the respondents. This is followed by Tricycle with 26.0 % response and Bus with 25.255 response.

Table 1: Means of transportation in the study area

Option	Frequency	Percentage
Trekking	42	10.5
Bicycles	2	0.5
Tricycle	104	26
Motor cycle	9	2.25
Motor cars	136	34
Bus	101	25.25
Lorries/Tipper	6	1.5
Total	**400**	**100**

Source: Researcher's field survey, 2017.

Occupation of Respondents

Data from table 2 is occupation status of respondents. From the table, 25.8% of the respondents are civil servants, the second groups are civil servant, constituting 21.8% and Public servant as the third group (20.5%).

Table 2: Occupation of respondents

Occupation	Frequency	Percent
Driver	74	18.5
Civil Servant	103	25.8
Public servant	82	20.5
Trader/other Business	87	21.8
Students	54	13.5
Total	**400**	**100.0**

Source: Researcher Fieldwork (August, 2017)

Education of Respondents

On level, the largest segment have secondary education shown by (53.05%) while the second largest segment have no based formal education (table 3)

Table 3: Education of respondents

Education	Frequency	Percent
None	96	24.0
Primary	18	4.5
Secondary	122	53.0
Tertiary	74	18.5
Total	**400**	**100.0**

Source: Researcher Fieldwork (February, 2017)

Income Level

On income level, 34.5% of the respondents earned between ₦3100 to ₦50,000 monthly the second groups earn between ₦21,000-₦30,000 while others earn between ₦11,000-₦20,000 and ₦5,000-10,000 respectively (Table 4).

Table 4: Income level

Income	Frequency	Percent
5-10,000	64	16.0
11,000-20,000	64	16.0
21,000-30,000	134	33.5
31,000-50,000	138	34.5
Total	**400**	**100.0**

Source: Researcher Fieldwork (February, 2017)

Factors of Traffic Congestion in the Metropolis

The factors responsible for congestion in the study area were analyzed. One of the causes of traffic congest is narrow road within the area as shown by 33.5% of respondents. The second factor is increase population as shown by 29.5%. The increase rural-urban migration has result in the increase population. The third factor in the increase in car ownership shown by 25.5%, which indiscipline by road users account for 11.5% of the traffic congestion (Table 5).

Table 5: Causes of traffic congestion

Causes	Frequency	Percent
Increased Population	118	29.5
Increase in car Ownership	102	25.5
Narrow Road	134	33.5
Indiscipline	46	11.5
Total	**400**	**100.0**

Source: Researcher Fieldwork (February, 2017)

Average Time Spent on Traffic

To identify the average time spent on traffic, the number of trips per day made by individuals was used as an indicator. The data on Table 6 shows that most people-made at least 3 trips per day as shown by 57.5% of respondents. Also 26.0% of the respondents make at least 4 trips per day. The come graph shows the trends of the trips (Figure 2).

Table 6a: Number of trips a day

		Localities			
No Of Trips A Day		**Ekpo Abasi**	**Mayne Avenue**	**Mount Zion**	**Total**
2	Count	14	14	12	40
	% within No of Trips a day	35.0%	35.0%	30.0%	100.0%
	% of Total	3.5%	3.5%	3.0%	10.0%
3	Count	68	78	84	230
	% within No of Trips a day	29.6%	33.9%	36.5%	100.0%
	% of Total	17.0%	19.5%	21.0%	57.5%
4	Count	42	22	40	104
	% within No of Trips a day	40.4%	21.2%	38.5%	100.0%
	% of Total	10.5%	5.5%	10.0%	26.0%
Above 4	Count	6	16	4	26
	% within No of Trips a day	23.1%	61.5%	15.4%	100.0%
	% of Total	1.5%	4.0%	1.0%	6.5%
Total	Count	130	130	140	400
	% within No of Trips a day	32.5%	32.5%	35.0%	100.0%
	% of Total	32.5%	32.5%	35.0%	100.0%

Source: Researcher Fieldwork (February, 2017)

Table 6b: Average time in traffic congestion

	Frequency	**Percent**
Less than 10 minutes	232	58.0
10-20 minutes	78	19.5
21-30 minutes	52	13.0
31-40 minutes	38	9.5
Total	**400**	**100.0**

Source: Researcher Field Report (February, 2017)

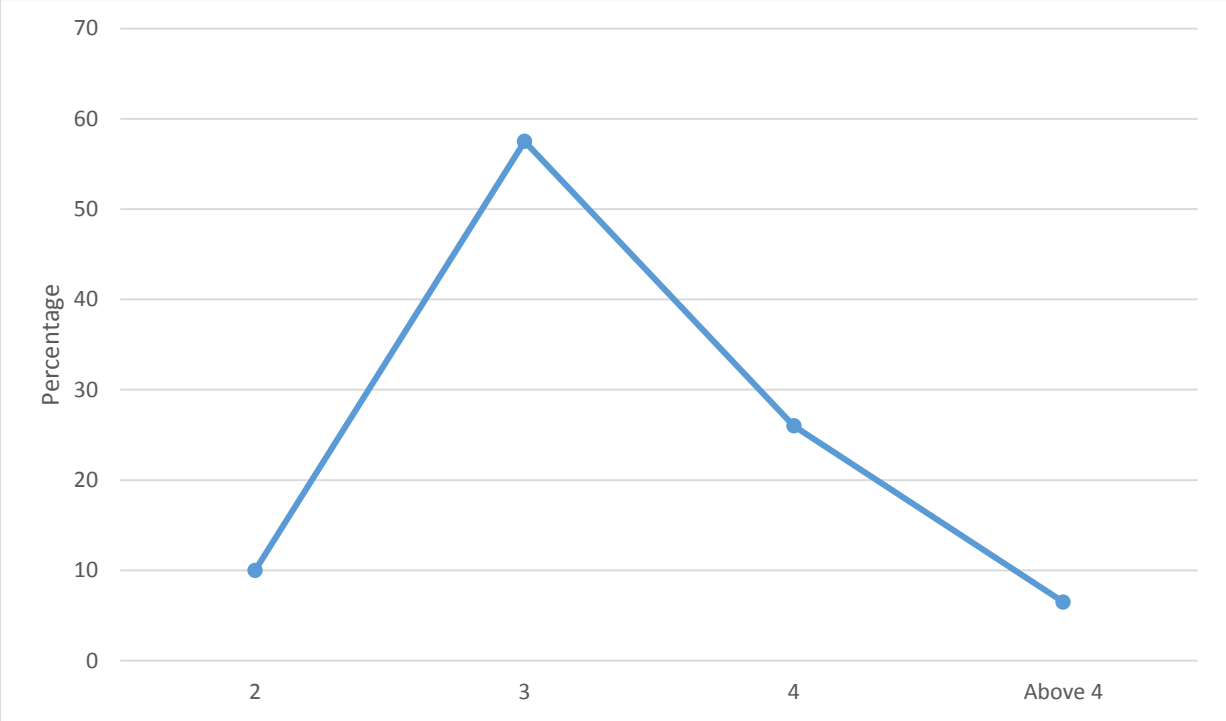

Figure 2: Number of trips made by residence

Source: Researcher Fieldwork (February, 2017)

Purpose of the Trip by Respondents

From table 7, the trips are made due to some reasons. The trip to work constitute the highest reason with 38.5%. This is followed by the trip for recreation the next is trip to school called school run (26.05%). While trip to shopping the least (5.5%). Figure 3 shows the average time spent on traffic congestion. From the figure, 58.0% of the people responded that they spent less than 10 minute on traffic especial at the intersections. The second group spend 10-20 minutes which constitute 19.5% while only 9.5% responded that they spend 31-40 minutes on traffic.

Table 7: Purpose of the trip

	Frequency	Percent
Work/business	154	38.5
School	104	26.0
Recreation	120	30.0
Shopping	22	5.5
Total	400	100.0

Source: Researcher Fieldwork (February, 2017)

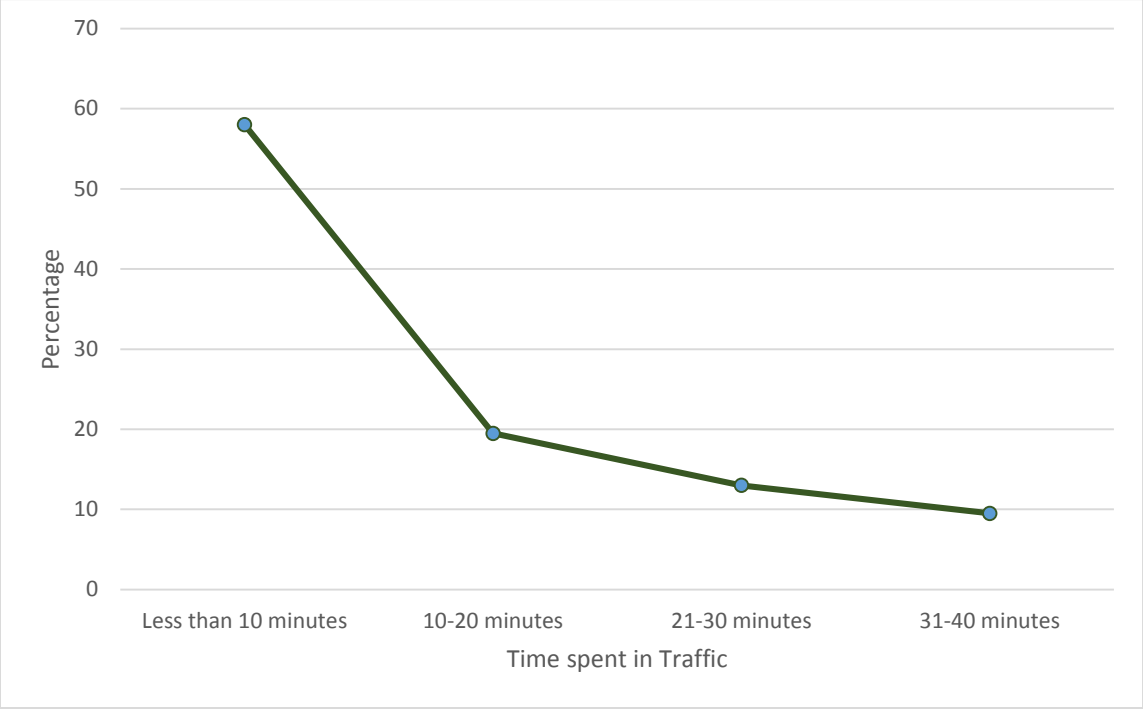

Figure 3: Average time spent on traffic congestion

Source: Researcher Fieldwork (February, 2017)

Consequences of Automobile Congestion on Socioeconomic Activities in Calabar South

The analysis shows that there are socio-economic effects of congestion. The response show that 72.5% of the respondents support that there are socio-economic consequences, whereas 21.5% of the people do not see any socio-economic effect (Table 8)

Table 8: Socio-economic effect

	Frequency	**Percent**
Yes	290	72.5
No	96	21.5
Don't Know	24	6.0
Total	**400**	**100.0**

Source: Researcher Fieldwork (February, 2017)

Effect of Congestion

The data on Table 9 indicate that one of the prevalent effect is the Delay in the traffic and cost for fueling. The more time spent, the more fuel used in the journey as shown by 44.55 respondents on Table 9. The next effects is the reduction in marginal labour productivity, while the third effect is the stress (frustration in meeting up with business plans and office work). Travel time also increase as a result of traffic congestion shown by 7.0% response.

Table 9: Effect of congestion

Effect of Congestion	Frequency	Percent
Delay/high cost for fueling	178	44.5
Reduction in marginal Labour Productivity	164	41.0
Increase in time of travel	14	3.5
Stress/frustration	44	11.0
Total	**400**	**100.0**

Source: Researcher fieldwork (February, 2017)

Other Impact of Congestion

On Table 10 other impacts of congestion include, Heat Island, the burning of fuel causing heat to be released blockage of street that impacted movement as shown by 28.5% response is another problem. The third is Noise pollution shown by 26.0% response. Congested areas are characterized by noise of vehicles.

Table 10: Other impact of congestion

Impact of Congestion	Frequency	Percent
Noise Pollution	104	26.0
Air Pollution	34	8.5
Blockage of street	118	29.5
Heat	144	36.0
Total	**400**	**100.0**

Source: Researcher Fieldwork (February, 2017)

Spatial Distribution of Traffic Congestion

The distribution of traffic volume among the road and intersections in the study area shows that Calabar road has the highest volume of 2608 and constitute 36.3% of the volume in the sampled locations. The least is Mayne Avenue of 1045 vehicles per hour (Table 11).

Table 11: Traffic volume

Sample Area	Volume	Percent
EkpoAbasi	1480	20.6
Mount Zion	2045	28.5
Calabar Road	2608	36.3
Mayne-Avenue	1045	14.6
Total	**7178**	**100.0**

Source: Researcher Fieldwork (February, 2017)

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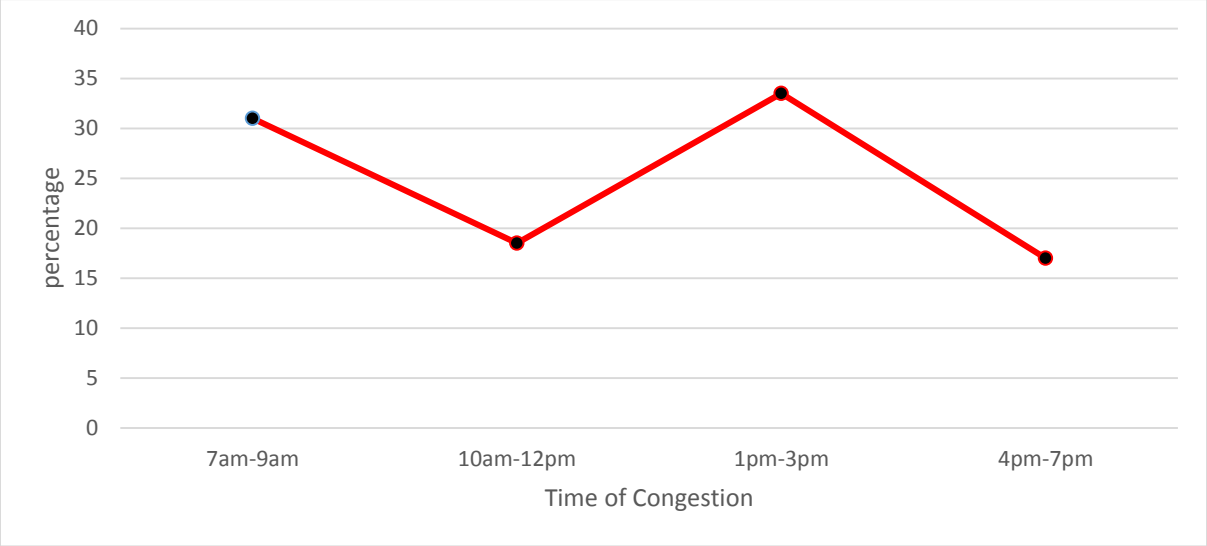

Figure 4: Time of congestion in the study area

Source: Researcher Fieldwork (February, 2017)

Time of the Day

Figure 4 shows the trends of the congestion periods. The morning and afternoon hours are the peak periods of traffic congestions that is 7.00am to 9.00am in the morning and 1:0pm to 3:00pm in the afternoon, probably this is the hours for trip to school and work and other business and also close of schools and offices. EkpoAbasi and Mount Zion have their highest congestion by 1:00 to 3:00pm while Mayne Avenue is in the morning and 4:00pm to 7:00pm (Figure 5) (Table 12).

Table 12: Time of the Day

		Localities			
		Ekpo Abasi	**Mayne Avenue**	**Mount Zion**	**Total**
7am-9am	Count	20	23	19	62
	% within Time of the Day	32.3%	37.1%	30.6%	100.0%
	% of Total	10.0%	11.5%	9.5%	31.0%
10am-12pm	Count	12	12	13	37
	% within Time of the Day	32.4%	32.4%	35.1%	100.0%
	% of Total	6.0%	6.0%	6.5%	18.5%
1pm-3pm	Count	25	12	30	67
	% within Time of the Day	37.3%	17.9%	44.8%	100.0%
	% of Total	12.5%	6.0%	15.0%	33.5%
4pm-7pm	Count	8	18	8	34
	% within Time of the Day	23.5%	52.9%	23.5%	100.0%
	% of Total	4.0%	9.0%	4.0%	17.0%

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Total	Count	65	65	70	200
	% within Time of the Day	32.5%	32.5%	35.0%	100.0%
	% of Total	32.5%	32.5%	35.0%	100.0%

Source: Researcher Fieldwork (February, 2017)

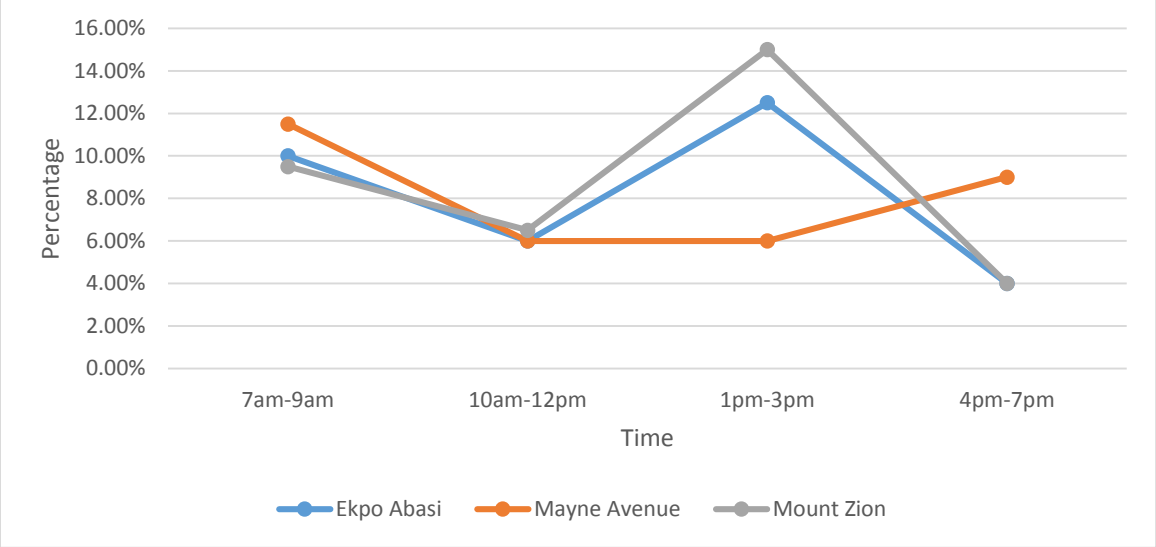

Figure 5: Time of congestion at different sampled area

Source: Researcher Fieldwork (February, 2017)

Test of Hypothesis

Table 13: Descriptive statistics

	Mean	Std. deviation	n
Average Time in Traffic Congestion	1.7400	1.01368	200
No of Trips a day	2.2900	.73389	200

Source: Researcher Fieldwork (February, 2017)

Table 14: Correlations

Correlations		Average Time in Traffic Congestion	No of Trip a day
Average Time in Traffic Congestion	Pearson Correlation	1	.298**
	Sig. (2-tailed)		.000
	N	200	200
No of Trips a day	Pearson Correlation	.298**	1
	Sig. (2-tailed)	.000	
	N	200	200

**. Correlation is significant at the 0.01 level (2-tailed).

Source: Researcher Fieldwork (February, 2017)

DECISION

Since the relationship is significant at 0.05 confidence level, the null hypothesis is rejected while the alternate is uphold, hence there is no significant relationship between average time spent on traffic and socio-economic effects.

DISCUSSION

There are various factors that contribute traffic congestion in Calabar. This range from narrow roads within the area, population to increase in car ownership and indiscipline, some people disobey traffic roles, others do double parking making the road narrow. Theses finding corroborates that of Popoola, Abiota and Adeniji (2013), that the traffic congestions on highways in Nigeria are caused by poor road, pavement, narrowness of roads, poor traffic management and poor driving and parking habit that result in indiscipline used and this study.

The congestion has caused wastage of time in one trip, some road users reduce their number of trips in the area. However, a large proportion male at least 3 trips per day. This has been pointed by Ogunsanya (2002) in cities like Lagos, Ibadan, Port Harcourt, Benin and Abuja. Trips to work, school, market, recreation centre and shopping are major reasons for trips within the city. The congestion in different intersection results in different socio-economic loss, such as in man-hour in office and business and the fuel burnt in the traffic. The study by Alawale, Adebambo&Boye (2015) on the correlates of road traffic congestion and workers' performance on Lagos metropolis shown positive relationship of time loss in congestion and effectiveness of workers and hence negate productivity of workers. The test of hypothesis on time spent on traffic and socio-economic loss in terms of time and resource corroborate with the findings of Olawale et al (2015).

In addition, traffic congestion varies with locations and road intersections. On the spatial analysis of traffic count, it was discovered congestion differs in different locations. Ogunbode (2010) also support this ascertain in his study of traffic congestion in Akure using GIS approach, shows variation road traffic especially where such road traffic especially where such road network cannot accommodate the volume of traffic. In the test of hypothesis on variation in traffic congestion differences were observed in different time of time of the day.

CONCLUSION

Thus, traffic congestion have significant effect on socio-economic activities of people. This then necessitate the need for planning to ensure efficiency of free traffic flow in the metropolis to reduce losses of man-hour, energy, resources and negative impact on human health.

RECOMMENDATIONS

Following the findings of this study, it is concluded that government to increase the number of access roads by constructing other in access roads to distribute traffic, traffic laws should be enforced with penalties for disobedience and government should construct flyovers to reduce traffic at intersections.

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