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Trend in the Pattern of Vehicular Traffic Flow in Ado-Ekiti, South-West Nigeria

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Transport which is the conveyance of people, goods and services from one geographical location to another is very key and important in the socio-economic development of any city, region or nation. This work on the trend in the pattern of vehicular traffic flow in Ado-Ekiti, South West Nigeria is a comparative study with the objective of determining the differences in passenger Car Unit (PCU) values among cordon stations along major roads in the Study Area. Data for the study was collected from both the primary and the secondary sources. From the secondary source, data was collected from the result of a study on the pattern of vehicular traffic flow in the Ado-Ekiti conducted in 2004 and published in 2006. Another survey on the pattern of vehicular traffic flow in the Study Area was conducted in 2014 using the same method. A comparative analysis of the two studies was done using Tables and simple percentages, findings from the analysis showed that: the value of the Passenger Car Unit (PCU) for all stations increased four times or by not less than 400 per cent. Urbanization and increase in the use of motorcycles as a means of public transportation were adjudged to be the reasons for the sharp increase. The study recommends expansion of existing urban roads to accommodate increasing projected human population and a reduction in the use of motorcycles as a means of public transportation for improved mobility of people, goods and services in the Study Area.

Keywords: Trend, Pattern, Vehicular Traffic Flow, Passenger Car Unit.

INTRODUCTION

There is hardly any aspect of a nation's development that transport is not an essential ingredient, since there is the need to collect, assemble move or transfer and distribute people and things. Transport is so key, paramount and important in the life of any nation, region or city because it is central to the realization of the broad development objectives of the average man's social and economic desires (Adefolalu 1981, Olayemi, 1980). Leinbanch (1983) observed that a non-existent or inefficient transport system perpetuates subsistence lifestyle and limits the space of transformation and integration of the society.

In the same vein, Lugard (1922) asserted that the material development of Africa can be summed in one word "transport". In the life of any urban center, demand for transport is inevitable since the bulk of the economic activities of any nation is concentrated in the cities. In more complex societies, people shop for recreational reasons and attend to personal business needs as part of their job. Freight is moved within the industrial process, from mine to factory or from field to processing plant, to shops or warehouses, and to the final consumers. People also demand for transport because of the need to move between residence and place of work or education and the need to shop for food and other necessities. Thus, anything which affects the numbers and location of houses, jobs, shops, factories or storage facilities immediately affects traffic.

Finalni (1982; 2005) and Ogunleye (2013) rightly observed that the socio-economic development of any society depends to a large extent on the nature and structure of the transportation networks of the society, since it provides the arteries through which the economic life stream of society flows (the people, information raw material and finished products), which help to build and maintain the society.

The fact that most cities in developing countries continue to attract people on a daily basis has further contributed to more pressure on the pattern of vehicular traffic flow in them. Aderamo (2012) opined that the increasing urbanization and overall population growth in cities have contributed to sudden Jump in travel demand. According to Gwillian (2011), African cities are experiencing rapid population growth (typically

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between 3 and 5 percent) per year over the past decade and the growth had been driven by economic conditions in rural areas rather than by burgeoning wealth in cities, with the people fleeing rural areas to escape failing crops, natural disasters, poverty and conflicts.

The challenge posed by rapid growth is accentuated by the absence of policies on land use and economic developments. Gakenheimer (1999) asserted that the use of the word "crisis" to describe transport problems in European and American cities seems a misnomer. He opined that the term was more appropriate for cities of the developing world given the environmental pollution, noise, traffic fatalities and injuries, congestion and mobility problems that are inherent in them. So also Ambe (1997) opined that some of the most serious problems facing development planners and policy makers in Cameroon reside in the transport sector. He attributed the worrisome traffic congestion always experienced in Daula and Younde (the two largest cities) to the colonial urban transport that was designed to serve colonial economic and administrative objectives and continually propagated by successive government in the country.

Urban mobility problems in the major cities or Nigeria do not make news, various studies have highlighted these, as well as the dimension of the problems and identified possible solutions (Adedimula 1981, Adeyemo 1998, Oyesiku 1996, Ogunleye and Ibitoye 2005, Ogunleye and Ibitoye, 2006) what is probably news is the continuing inability of the various solutions to effect significant improvement in the case of intra-city movements in urban centres. The pattern of vehicular traffic flow using vehicular traffic survey is always embarked upon to determine degree of fluctuations in the flow of traffic in any area or city. Apart from this, vehicular traffic volume survey is always undertaken to establish the relative importance of one route to another, the distribution of traffic on the road system within a study area, establish the fluctuations or variations in traffic flow pattern within a study area and to determine the trend in the use of the roads in any settlement.

This study which is on the trend in the pattern of vehicular traffic flow in Ado-Ekiti, South-West Nigeria, is basically a comparative study between the findings of an earlier work on the pattern of vehicular traffic flow in Ado-Ekiti conducted in 2004 and published in year 2006 (Ogunleye and Ibitoye, 2006) and a similar study conducted in 2014. The need for this study became necessary having studied and noticed an upsurge in the population of the city and the continuous expansion of the city. The aim of this paper therefore, is to establish the variations and the degree of increase in the volume of vehicular traffic flow along major roads in the city (if any)

However, the specific objectives of this paper are to determine between 2004-2014, differences in Passenger Car Unit (PCU) values in each cordon stations along the major roads in the study area, to determine the differences in Passenger Car Unit (PCU) values along the major routes for the week, to determine the differences in Passenger Car Unit (PCU) values between 2004 and 2014 for the week in the study Area, establish the probable reasons for the differences and to recommend options for improved mobility along the major roads in the study area.

THE STUDY AREA

Ado-Ekiti, an ancient city in Nigeria is located between latitudes $7^0 34^1$ and $7^0 41^1$ north of the Equator and Longitudes $5^0 11^1$ and $5^0 6^1$ east of the Greenwich Meridian, the history of Ado-Ekiti dates back to a period before the advent of Ewi dynasty in 1310 AD. It grew to a town of repute about 700 years ago when the 'Oba Ado' otherwise called the 'Elewi' joined the princely adventure instituted by several children of Oduduwa (from Ile-Ife) to found their own territories (Ebisemiju, 1993). It became the headquarters of the Ekiti Divisional Council in 1916 and rose to the status of a state capital on October 1, 1996. It has a total population of 157,519 people going by the 1991 population census, and 308,656 people, according to the 2006 Housing and population census. With the upsurge in urbanization trend in the region, the estimated population of the city could be put around 600,000 people.

Geologically, Ado-Ekiti lies entirely within the pre-Cambrian Basement Complex rock group, which underlies much of Nigeria. It falls within Koppen's 'A' climatic belt that is tropical wet climate. The city is strategically located in Ekiti land at the convergence of major roads forming a radial pattern. These roads are Ado-Ekiti – Akure road passing through Ijan-Ekiti and Aramoko Ekiiti, Ado-Ekiti-Ikare road passing through Ijan-Ekiti, Ilumoba, Aisegba Ekiti, Ado-Ekiti, Ilawe road and Ado-Ekiti-Ifaki road. Educationally, Ado-Ekiti is in the forefront. It has about 14 public secondary schools among which are, Christ's School, Mary Immaculate, Ado Grammar School, four notable tertiary institutions are located in the city to give qualitative education to the people; they are the Ekiti State University, Ado-Ekiti, Afe Babalola University, the Federal Polytechnic and the State School of Nursing.

Economically, Ado-Ekiti is undergoing tremendous transformation. No wonder that commercial banks such as the Guaranty Trust Bank, Union Bank, First Bank, Diamond Bank, United Bank for Africa (UBA) etc. located in the city, further boost commercial activities. Hotels and Rest Houses such as After '7' Guest House, Anisulowo Hotels, Spotless Hotels, Fem Guest House, De Link Motel, Owena Motel, Fabian Hotel, Olujoda Hotels prosperous Hotel pathfinder Hotel etc. located strategically in the city, offers recreation and Tourism opportunities to people. As a result of economic, social and political transformation that is taking place in Ado-Ekiti in recent times, the city continues to witness physical expansion in terms of buildings, transportation network (roads) duplication of market places, social activities, religious activities and economic activities. The transportation system of the city is operating at a below average level.

METHOD

Data for the study was collected from both the primary and the secondary sources. Vehicular traffic volume count/survey was embarked upon in order to identify the degree of fluctuation in the flow of traffic within Ado-Ekiti, the study area. Information about the number and types of vehicles passing through specific cordon stations per unit time was also determined. Six unique conspicuous and important locations along the major roads under consideration namely:

(1) Christ School gate – (Opopogbooro – Iworoko road)
(2) State Security Service (SSS) office – (Iyin road)
(3) Sky Bank at old garage
(4) Ile Abiye junction – (Ilawe road)
(5) Igirigiri Junction – (Federal Polytechnic - Ijan road)
(6) PHCN gate – (Ajilosun – Ikere – Akure road) were identified and selected as cordon stations for the purpose of actual traffic count/survey

As a result of lack of mechanical/computerized counting methods that can easily distinguish between/among the

vehicles plying a cordon station at a time, the survey was conducted manually with two enumerators on each cordon station counting the number of vehicles moving in opposition directions. Their observations and counting were made and recorded in appropriate forms without stopping vehicles.

Vehicular traffic volume survey were conducted from Monday to Sunday covering three hours in the morning (7.00am to 10am) and (2.00pm to 5.00pm) being morning and afternoon peak periods.

Since this study is a comparative one, secondary data was collected from an earlier study on the pattern of vehicular traffic flow in Ado-Ekiti (Ogunleye and Ibitoye 2006). This study (of 2004 was conducted using the same modality for data collected in 2014.

The Data collected were processed and computed using the urban standard for Passenger Car Unit (PCU). Tables and simple percentages were used to present data.

RESULTS AND DISCUSSIONS

From the data presented on table I, a major vehicular traffic pattern was established. Table I shows the daily fluctuations in traffic flow in Passenger Car Unit (PCU) for the study area (per 6 hour survey period in 2004 and 2014). From the table, it is clear that cordon station 1 i.e. the Christ School gate along Opopogbooro – Iworoko road, the PCU value for the year 2004 was 4633.84 while the value for 2014 was 18417.25 on Monday and the total PCU value for all stations on Monday in 2004 was 23304.35 and 103587.25 in 2014. Likewise, on Sunday for cordon station 1 the pcu value for 2004 was 2787.87 and 10196.25 for 2014. The total pcu value for all the stations for the whole week was 156760.73 and that of 2014 was 605771.75 (see table I for the pcu values for other cordon stations per day and per week for both 2004 and 2014).

From table 1 also, another table was generated to show the differences in pcu values between 2004 and 2014 for all cordon stations.

From table II, it is clear that a sharp increase in the Passenger Car Unit (PCU) values between 2004 and 2014 had occurred. For instance on Monday, in cordon station 1 along Fajuyi – Opopogbooro – Iworoko road an increase of 13783.41 (18417.25 – 4633.84) had occurred. This represents a sharp increase, by 297.45%. The simple meaning of his is that the number of vehicles of all categories along this road had increased by (297.45%) within a period of ten (!0) years.

Table II also shows that an increase of 80282.90 pcu value representing 344.50% was recorded for all stations in the city cordon station 1 on Monday.

On Tuesday a total of 78667.45 representing 321.04% increase was recorded. The implication of this is that there was an astronomical increase of vehicles of all types by 321.84% on the major street of Ado-Ekiti on Tuesday between 2004 and 2014.

On Wednesday the increase for all stations was 66889.25 in pcu value representing 272.56%.

Likewise, on Thursday, an increase of 65886.98 pcu representing of 258.89%. It was 64943.84 pcu representing 271.09% on Friday, 53342.34 representing 262.26% on Saturday, and 38998.26 representing 265.93% on Sunday.

On the difference in the Passenger Car Unit (PCU) values along the major routes in the study area, looking at table II, it is clear that a significant increase had also occurred. Specifically at cordon station 1 along Fajuyi – Opopogbooro – Iworoko road, a total of 72295.58 pcu representing 247.66% was recorded for the entire week. At cordon station 2 along Fajuyi – Iyin road, a total increase of 66301.31 representing 347.10% was recorded. At cordon station 4 along Ijibgbo – Ilawe road a total increase of 74804.26 representing 267.06% was recorded. Also Ajilosun – Ikere road an increase of 99752.83 pcu representing 302.60% was recorded for the entire week.

Finally, for the vehicular traffic survey conducted in both 2004 and 2014, for the entire study area, an increase of 449011.02 pcu representing 286.43% was recorded. From the analysis above, it is clear that the number of vehicles on the major roads of Ado-Ekiti had increased by almost four times between year 2004 and 2014. The reason for this astronomical and geometric increase may not be unconnected with the rate of urbanization in the city. The continuous influx of people from all over the country to the city of Ado is one of the probable factor of increase in the pcu value of vehicular traffic in the city. In the last ten years also, there had been a considerable increase in the number of federal government agencies in the state. Specifically the state branch of the Central Bank of Nigeria (CBN) was established during this period, the Corporate Affairs Commission and other Federal Agencies too numerous to mention had been established in the state.

Another relevant factor that could account for the increase in vehicular traffic on the roads in Ado-Ekiti is the establishment of new educational institutions, Nursery and Primary, Secondary and Tertiary). It is on record that Deeper Life High School, Seed of Grace International School and Tinuola Maximum College among others were established during the period under consideration. Afe Babalola University (ABUAD) and The Federal University Oye (FUOYE) are renowned institutions established in the state in recent times. It is on record that almost ninety per cent (90%) of the entire workforce of the federal university of Oye Staff members reside in Ado-Ekiti. They prefer to commute on a daily basis between Ado and Oye Ekiti.

Another strong probable factor of increase in vehicular traffic on the roads of Ado-Ekiti is the increase in business activities in the city. Various Banks are establishing their branches in the city, others that have existed before are opening more branches of their Bank. Specifically, First Bank, Guaranty Trust Bank and Wema Bank have opened up new branches of their Banks in the city of Ado-Ekiti. Related to this is the number of Hotels and Restaurants springing up in the city. Hotels such as Midas Hotel prosperous Hotel and Yemraf Hotel among others, are the prominent hotels that have been established in the city recently.

A major factor of increase in PCU values in vehicular traffic in the study area is the increasing use of motorcycles as a means of transportation in the city. There is no restriction on motorcycle as a means of public transportation in the city. There is no restriction of motorcycle movement along the major roads of the city, hence, motorcycle had become a major means of public transportation in the city.

Findings from the fieldwork exercise conducted during vehicular traffic survey for this work (in 2014) revealed that motorcycles contributed a very high percentage to the value of Passenger Car Unit (PCU) recorded in almost all the cordon stations selected for the survey. This has grossly influenced the value of the p.c.u. Ordinarily, a city with the status of Ado-Ekiti should not have PCU values as high as recorded, but for the use of motorcycles as a means of public transportation, the result became unnecessarily high.

Table I. Daily fluctuations in Traffic Flow in p.c.u for the Study Area (per 6 Hours) survey period, in 2004 and 2014

	STATIONS							
DAYS	**PERIODS**	**1**	**2**	**3**	**4**	**5**	**6**	**TOTAL**
MONDAY	2004	4633.84	3055.93	4504.73	4188.50	2610.88	4310.47	23304.35
	2014	18417.25	12763.50	19849.25	16876.50	10614.25	25066.50	103587.25
TUESDAY	2004	4316.87	3129.77	5229.16	4399.79	2700.73	4727.98	24504.30
	2014	17726.00	11899.50	18888.50	17406.00	11303.00	25948.75	103171.75
WEDNESDAY	2004	4363.18	3000.19	5102.54	4242.56	2678.70	5154.08	24541.25
	2014	16069.00	11327.00	16210.00	16157.00	12445.00	19222.50	91430.50
THURSDAY	2004	4578.29	2953.69	5098.25	5141.28	2703.16	4975.60	25450.27
	2014	13863.50	12312.25	15971.00	16959.75	9985.25	22245.50	91337.25
FRIDAY	2004	4776.73	2975.09	4410.69	4129.39	2551.09	5113.42	23956.41
	2014	13005.25	13869.75	18350.75	14540.50	10020.25	19113.75	88900.25
SATURDAY	2004	3734.89	2267.70	3876.69	3564.37	2120.05	4775.46	20339.16
	2014	12210.00	13082.00	16265.75	12203.75	7960.00	11960.00	73681.50
SUNDAY	2004	2787.87	1719.07	1986.67	2344.60	1918.87	3907.91	14664.99
	2014	10196.25	10148.75	10380.00	8671.25	5106.25	9160.75	53663.25
TOTAL	2004	29191.67	19101.44	30208.73	28010.49	17283.48	32964.92	156760.73
	2014	101487.25	85402.75	115915.25	102814.75	67434.00	132717.75	605771.75

Source: Fieldwork 2004 and 2014

Table II. Differences In Pcu Values between 2004 and 2014 (Per Day and Per Week)

	STATIONS						
DAYS	**1**	**2**	**3**	**4**	**5**	**6**	**TOTAL**
MONDAY	13783.41	9707.57	15344.52	12688.00	8003.37	20756.03	80282.90
TUESDAY	13409.13	8769.73	13659.34	13006.21	8602.27	21220.77	78667.45
WEDNESDAY	11705.82	8326.81	11107.46	11914.44	9766.30	14066.42	66889.25
THURSDAY	9285.21	9358.56	10872.75	11818.47	7282.09	17269.90	65886.98
FRIDAY	8228.52	10894.66	13940.06	10411.11	7468.35	14000.33	64943.84
SATURDAY	8475.11	10814.30	12389.06	8639.38	5839.95	7184.54	53342.34
SUNDAY	7408.38	8429.68	8393.33	6326.65	3187.38	5252.84	38998.26
TOTAL	72295.58	66301.31	85706.52	74804.26	50150.52	99752.83	449011.02

Source: Fieldwork 2004 and 2014

RECOMMENDATIONS AND POLICY IMPLICATIONS

For effective and sustainable road transport system in Ado-Ekiti, the following recommendations are inevitable.

(1) Coordination of land use and transportation planning in Ado-Ekiti to promote and enhance urban mobility

(2) The construction and improvement of more township roads to reduce pressure on the existing major roads is highly recommended.

(3) Expansion of urban roads to accommodate increasing and projected human population is also recommended. This is necessary because the various educational institutions, Federal and State, Commercial, industrial and recreational facilities will further increase the demand for transport in the city.

(4) Ring roads should be constructed in the city of Ado-Ekiti. Construction of ring roads will help to decongest the city centre since traffic having no business in the city centre would have been directed naturally to the ring roads.

(5) There should also be the provision of comfortable, dependable fast co-ordinated, efficient and safe, public transport system. This could be done in the way of urban mass transit

(6) The use of motorcycles as a means of public transportation should be regulated in the city. Designated major roads should be identified and exempted from the routes where motorcycles should be used for public transportation.

(7) Urgent completion of the dualisation of Ado-Iworoko road so as to adequately cater for the volume of vehicular traffic moving towards the Ekiti State University Campus daily.

(8) Improved traffic management is highly recommended in the city.

(9) There is the urgent need to work on the economy of the country and that of Ekiti State in particular with the aim of providing an environment that could promote employment opportunities for our teaming youths. If this is done, some of the graduates of Tertiary Institutions that are forced to take up motorcycle riding for public transportation will find better options for survival and drop their motorcycles. This will drastically reduce the number of motorcycles on the roads.

(10) Some growth pole centres should be identified in Ekiti State and such centre should be made to undergo rapid transformation by the establishment of government offices both State and Federal. Industries and other commercial activities should also be developed in such centres. This will certainly help to reduce pressure on Ado-Ekiti and reduce the problem of vehicular and human mobility in the city.

CONCLUDING REMARKS

Cities all over the world are centres of industrial, commercial, educational, political, recreational and social activities. Therefore, an investment in transportation in the urban centres is an investment in the functionality of such settlements in the present and in the future. A robust, well planned and well implemented transport planning and policy have the potential of effecting the required and expected change in the transport system thereby enhancing the general well-being of its masses.

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