DISTRIBUTION PATTERNS OF FEDERAL AND STATE ROAD NETWORK IN IMO STATE (2000 – 2014)

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The important nature of road transportation to economic, social and political development of Imo State has brought about the need for this study. Also, the fact that lack of logical distribution of road network coupled with the poor conditions and maintenance is a major setback in the socio-political and economic development in Imo State over the years. This study was aimed at establishing the relationship between the size of roads and demographic variables of the Geographical/Local Government areas of Imo State with a view to offering advice to policy makers in the government to be aware of physical aspect of road network planning like geographical area, population and population density in the allocation of Federal and State roads. Data were collected from the secondary source. The use of regression analysis was employed to determine the relationship between the variables for which data were collected. The results of the analyses revealed that there is partly strong and significant relationship and mostly weak and not significant/significant relationship between Federal/State roads and the geographical area, population and population density with R^2 value of 42.13% on the average. On the overall, the relationships between the total length of road and two of the parameters tested (population and population density) were also weak. It was concluded that the government was not giving total attention to population and population density during policy formulation. It was therefore recommended that the government of Imo State should take cognisance of these factors during policy formulation. Other States of the Federation having similar problem were suggested to be studied in future researches. Further studies were also suggested to be carried out on the development and distribution of feeder roads in Imo State.

Keywords: *Distribution Pattern, Geographical Area, Population, Population Density, Road Network.*

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INTRODUCTION

The important nature of road transportation to economic, social and political development of Imo State has brought about the need for this study. Also, the fact that lack of logical distribution of road network coupled with the poor conditions and maintenance is a major setback in the socio-political and economic development in Imo State over the years.

Since BC 8000 until recent times population growth rate was 0.1%. Now it is over 2%. Two thousand years ago the population of the world was 250million. It took until 1800AD to reach I billion, an additional million was added after 130 years, 30 years and 17 years, to clock 4 billion in 1977, population for the year 2000 will be 6.5 billion estimated (World Bank, 1995).

As population grows, so the strain on the road transportation resources of the world increases. Puts the figure of persons living in area without adequate and good transport network at 60 million, no solution has been found to provide the people with adequate road. The population of the urban centres of the world's developing countries deserve special mention – world urban population increased from 737 million (29.2% total population) in 1950 to 2603 million (45.2% of the total population) in 1995, by the year 2025, 61.2% of the total population will live in the cities. This translates to 518.7 million people: 86% of global population growth will occurred in the urban areas of developing countries (Clark, 1989). By the 2000 in Nigeria, 18 cities in the country will have a population of over a million; Lagos State has a high population compared to its geographical area. It can also be noted that since independence in 1960, there has not been any systematic motor road development policy in Nigeria. The general scene is the intermittent release of packets of uncoordinated road contracts to reinvigorate the motor road system in Nigeria may be beyond the scope of the government. Foreign assistance is needed in the way of advice, planning and execution (NPE).

The main drawback to construction development in Nigeria from 1960 to 1999 is principally due to the lack of political, social and economic stability. The military which preoccupied the government of the country for decades was not equipped to provide populist planning which is a condition precedent to the development of a vibrant and internationally assisted development (Mogbo, 1998).

In order to address the identified problems from this study, the study was set out to establish the relationship between the size of roads and demographic variables of the Geographical/Local Government areas of Imo State with a view to offering advice to policy makers in the government to be aware of physical aspect of road network planning like geographical area, population and population density in the allocation of Federal and State roads. In order to achieve this aim, the following objectives were set out for the study.

i) To establish the relationship between total length of roads and geographical area.

ii) To determine the relationship between total length of roads and population.

iii) To examine the relationship between total length of roads and population density.

Historical Background of Nigerian Road Transportation

Roads can be described as strips of land that has been cleared and usually further improved for the movement of people and goods. Roads tend to have two fundamental purposes of mobility and accessibility. Transportation plays a major role in the political, social and economic development of a country. At every stage of national and regional development planning transportation is considered. The need to provide rapid economic growth makes transportation all important. It is based on this context that Munby (1968) said that there is no escape from transportation. Transportation in one form or another is a basic and essential part of the daily rhythm of life throughout the world Ratclife (1981) says it plays a document role in determining, the scale, nature and form of our towns and cities. Its efficiency contributes largely to the level of productivity, economic growth and standard of living.

When transportation is considered in terms of national development, it would be discovered that the nature of transportation and the crucial role it plays in the social and economic development of any nation makes it a pre-requisite to the development of all sectors of the national economy. (Carapetis *et al.*, 1993). The need for road transportation networks in a state extends to all aspects of political, economic and social development of a state and the nation as a whole. The presence good transportation network is essential, because an effective, efficient and extensive road transport system serves as a channel for the collection and exchange of goods and services, movement of people and information dissemination.

Ratclife (1981) reported that there is no escape from the transport needs because everybody is concerned and to an extent, everybody is affected in one-way or the other. Transportation plays a major role in determining the scale, nature and form of towns and cities. Nne-Ngene (1998) explained that transportation is the most important feature of human society because the history of civilization is the history of transportation. For long time, transportation of people and goods has been carried out by use of land, waterways as well as railway.

In Nigeria today road transportation has become an important and most vibrant sector of the national economy accounting for the daily movement of close to a million people. This thereby makes transportation play a major role in the development of a nation and its cities. Road transportation is one of the oldest means used in Nigeria. In Imo State, road transportation is most popular and the most widely used mode of transportation. There is however the need through planning and distribution of road networks. It is against this background that the study is carried out to find out if the distribution of the road network in the State is based on quantifiable and related factors such as, population, geographical area and population density across the various Local Government Areas in the State.

Road transportation is regarded by experts as a catalyst for engineering and rejuvenating economic, socio-political and strategic developments of any nation. The economic

development of any nation can rightly be assured in terms of the level and sophistication of its road transportation system apart from modes of transportation. The importance and relevance of good road network cannot be underestimated. Thus when roads are bad apparently, economic and business activities becomes stalled and paralyzed (Nwoji, 1995).

The necessity of national development becomes apparent when the cynical role of transport in socio-economic development of any nation is considered. Kuhn (1995) reported that the national and individual welfare of a society is intimately and linked to the availability of road transportation system. In general the growth of towns and the opening up of rural areas is directly linked to the effectiveness of the transport system available. The accessibility of a town by road transport encourages investment and movement of people to and fro.

Transportation and Economic Development

Transportation plays a crucial role in the political, economic and social development of a country. Munby (1989), that there is no escape from transport. New strategies of economic planning require the modification and renewal of inherited transport system. The economic development of any country depends to a large extent on its transport system. A well planned adequately maintained, efficiently managed and properly operated transport system is a prerequisite to the development of all sectors of national economy. Also our national and individual welfare is intimately linked to the availability of welfare transport. The various modes of transport each have very distinctive physical and economic characteristics, which helps to accelerate development in any area.

Transportation Network Planning

Planning according to Thomson (1983) is not an occasioned task, it is a continuing activity, calling for regular data collection, monitoring of programs and predictions, updating and modification of plans and implementation. The first two components are organizational adequate planning capacity and means of implementation of the plans. Also there must be two plans, a long range directional plan and a short range design plan.

Transport network planning comes in various stages and various processes are involves. Planning of road networks have been largely confined to the process of evaluating costs and benefits of individuals' routes or groups of routes as a means of putting together a program of work. The need to establish a co-ordinated approach for national resource allocation at the national state and local levels in road planning is only recognized by a few countries and states. The economic importance and relevance of good network of roads in any nation cannot be underestimated. A glance at the conditions of the roads depicts the level of socio-economic and political development so far attained. Thus, when road are adequate, economic and basic activities becomes stalled and paralyzed. Transportation plays a major role in opening towns and villages. Transportation importance is strikingly clear in the contrast between a village that has already access to markets and one that is without an all whether road connection or perhaps any road whatever. In the latter case there is no

knowledge of the outside world no scientific method of agriculture, no cash coming into the village, no health service which is not the case of the former (Oluyemi and Eniola, 1978).

As far as 1967, a United Nations study regarded transport as the formative power of economic growth. This at a given stage of development, a country requires a certain level of transportation facilities in order to maximize its resource potentialities. Any unsatisfied demand for transport, if allowed to persist, may in the long run have serious adverse effect on the country's economy. The indispensable nature of transportation and its importance makes experts regard it as a catalyst for engineering and rejuvenating economic, socio-political and strategic development of a nation. The economic development of any nation can rightly be assured in terms of its level and sophistication of its road transport system. Without transportation it would be apparent that there would be a dislocation in the nation's economic transactions (Nwoji, 1995). Economic growth will enhance level transport cost for industry through reduced times; improve access to ports and manufacturing facilitated and higher productivity through increase vehicle and dimensioned units. The tourism industry is enhanced by the improved access and travel condition through the provision of adequate road network (Mc. Quillen, 1996).

Factors That Affect the Routine Transportation Networks

The transportation makes it possible for a community to survive for its supplies the population with food and other necessities of life, it moves needed materials to factory, farms and workshops and it delivers the products of the community to buyers elsewhere in the country (Owen, 1978). The major factors that contribute to the efficiency and effectiveness of transportation distribution are population factors, geographical area factors and population density factors.

The Population Factor

The population factor plays a very important role in many government policies and actions such as revenue allocations among states, in the distribution of infrastructure facilities, in the subdivision of the country into administrative units and so on. People have come to realize the decisive role of the population factor plays in the development plans of government and they have become highly sensitive to anything relating to population, such as census and the collection of vital statistics. The population factor constitutes a vital component of the resource base and development potential of any country.

The most relevant element of the population in their regard is its of growth, spatial distribution, population concentration centres, shift in population (rural urban drift) and causes. Olayemi (1977) explained that the population factor, especially the degree of urbanization in the different parts of the country influences the demand for the distribution of road transport networks. Hoyle (1988) stated that roads and railways like new crops, schools, hospitals etc are some of the main tools of development for raising people standard of living and they have a bearing on many aspects of life. Population which constitutes a

vital component of the resource base and the development potential of any country should be important not only as an indication of the level of development efforts in a given country or state particularly Nigeria.

The Geographical Area Factor

Geographical area (size) is a fundamental element in the political geography of states. Other things being equal the larger a state is in area, the greater the chances of its supporting a large population and a diversified natural resource base the two most important elements in the political and economic development of any state (Dikshit, 1983). The geographical area factor is an important factor to be considered for the efficiency of public services. The inequalities of public welfare provision which form principal subject of this research study exists partly as a result of the agencies of resource use. Geographical criteria of efficiency include catchment areas and population size. A hierarchy of public goods can be envisaged according to the scale of area over which services can be efficiently provided (Curtis, 1989).

The Population Density Factor

Onokhoraye (1984) defines population density as an expression of the ration between population and a given unit of size. Mathematically, population density is expressed as the number of objects or people in a certain population within a certain area, divided by the numerical value of the area. Thus population density of Imo State would be expressed as:

$$\text{Population density} = \frac{\text{Number of people in Imo State}}{\text{Total landmass of Imo State}}$$

Population density is a useful tool in the measurement of the density of the population in a given area. Unfortunately it ignores that fact that some parts of the given area may not be inhabited, the regulation density is thus stated in absolute terms. Even with this shortcoming, measures of population density still offer an invaluable tool for comparing different areas in relative terms. To overcome this shortcoming, population densities are expressed in a variety of ways. These includes as a ratio of the population to the available mass, total area under cultivation.

In line with the findings of review of literature and research gap identified from the study's background, the study makes use of geographical area, population and population density in relation with the length of road networks in Imo State. This was done to address the identified problem of the study.

RESEARCH METHOD

The study adopted the quantitative research approach. Data collection was from the secondary source. Archival data were collected from the records compiled by Federal and State Ministries in Imo State. That is, the study used relevant data collected from the Imo State Ministry of Works and Housing, Federal Ministry of Works and Housing Imo State.

Imo State Ministry of Urban Planning, and Imo State National Population Commission. Data collected covered the total length of road network comprising of Federal (Trunk A) and State (Trunk B) roads in the 21 Local Government areas of Imo State within period of fifteen years (2000-2014). Data for the study was collected on the length of road network, population, population density and geographical area.

The use of simple liner regression analysis was adopted to determine the relationship between the parameters. This was further confirmed by the degree of correlation between the variables (that is the R value). The one-way ANOVA using Duncan's test of significance to determine the degree of association between the sectional districts was also employed. In all analyses carried out, measures of goodness of fit using the co-efficient of determination (R-sq) were established. Linear regressions and transformations were used to prove or disprove the formulated hypothesis for the purpose of achieving the aim of this study. The analyses carried out from the study were done to test the following null hypotheses which were formulated for the study:

i) There is no significant relationship between total length of roads and geographical area.

ii) There is no significant relationship between total length of roads and population.

iii) There is no significant relationship between total length of roads and population density.

FINDINGS AND DISCUSSION OF RESULTS

The study carried out nine regression analyses in order to determine the relationship between the research variables for which data was collected. The results of these analyses were used to achieve the objectives and also test the hypotheses formulated for the study.

Analysis 1: Relationship between Federal Road (Km) and Geographical Area

From the first analysis, the regression equation shows positive linear relationship. The coefficient of determination R-sq, suggest a weak significant relationship between the variables tested of 32.10%. This shows that although there exists a positive relationship between the variables but the strength of the relationship is weak.

Hence it confirms that geographical area is not a strong factor used in determining the Federal roads network distribution in Imo State. The test for the overall significance of the relationship reveals an F-calculated value of 8.99 which is greater than F tabulated value of 4.38. Thus the relationship is statistically significant. The null hypothesis is there rejected. Table 1 gives a summary of this result.

Table 1: Relationship between Length of Federal Road and Geographical Area

NO	X AXIS	Y AXIS	MODEL	REGRESSION EQUATION	R^2 %	F TAB	F CAL	STRENGTH	REMARK
1	Geo Area	Fed. Road	Linear	Fed Road = 10.6+0.551 G/AREA	32.10	4.38	8.99	Weak	Significant
			Logarithm	Y = -78.17+19.59 lnx	41.67	4.38	13.57	Weak	Significant
			Quadratic	Fed Road = 7.75 + 0.198 G/Area –0.000 156 G/Area^2	48.64	3.55	8.52	Fairly Strong	Significant
			Cubic	Fed Road = - 13.404+0.26 30 G/Area – 0.000325 G/Area + 1.1479E-07	49.08	3.20	5.46	Fairly strong	Significant

Analysis 2: Relationship between State Road (Km) and Geographical Area

From the second analysis, the regression equation shows a positive linear relationship. The coefficient of determination R-sq is 72.50% suggesting that the relationship is strong and also there exists a significant relationship between the variables tested. This implies that approximately 73% of variation in State roads network is attributable to variation in geographical area sizes of the Local Government Areas. The test for overall significance of the relationship reveals an F-calculated value of 50.0 which is greater than F-tabulated value of 4.38. The null hypothesis was therefore rejected. The result of this analysis is summarised in Table 2.

Table 2: Relationship between Length of State Road and Geographical Area

NO	X AXIS	Y AXIS	MODEL	REGRESSION EQUATION	R^2 %	F TAB	F CAL	STRENGTH	REMARK
2	Geo Area	State Road	Linear	Total Road = 0.66 + 0.140 G/AREA	70.50	4.38	50.00	Strong	Significant
			Logarithm	Y = 180.49 + 41.04 INX	63.96	4.38	33.72	Strong	Significant
			Quadratic	State Roads = 10.0 + 0.127 G/Area + 1.42 E-05 G/Area^2	72.51	3.55	23.74	Strong	Significant
			Cubic	State Roads = - 11.92 + 0.274 G/Area – 0.0004 G/Area Q + 2.624 E-07 G/Area Cubic	73.31	3.20	15.56	Strong	Significant

Analysis 3: Relationship between Combination of Federal & State Road (Km) and Geographical Area

From the result of the third analysis, the regression equation shows a positive linear relationship. The coefficient of determination is R-sq of 70.40% showing that the relationship is very strong and suggests a significant relationship between the variables tested. This shows that approximately 70% of variation in total road network is attributable

to variation in geographical area sizes of the Local Government Areas. The test for the overall significance shows an F-calculated value of 45.29 which is greater than F-tabulated value of 4.38. Thus the relationship is statistically significant and the null hypothesis is therefore rejected. Table 3 gives a summary of this result.

Table 3: Relationship between Length of Federal & State Roads and Geographical Area

NO	X AXIS	Y AXIS	MODEL	REGRESSION EQUATION	R^2 %	F TAB	F CAL	STRENGTH	REMARK
3	Geo Area	Total Road	Linear	Total Road = 9.93+0.195 G/AREA	70.40	4.38	45.29	Strong	Significant
			Logarithm	Y = -258.67 + 60.63 lnx	69.87	4.38	44.06	Strong	Significant
			Quadratic	Total Road = 6.74 + 0.325 G/Area –0.000	72.83	3.55	24.13	Strong	Significant
			Cubic	Total Roads = - 25.33+0.538 G/Area – 0.0007 G/Area SQ + 3.771E-07 G/AREA CUBIC	73.66	3.20	15.84	Strong	Significant

Analysis 4: Relationship between Federal Roads Network (Km) and Population

From the fourth analysis, the regression equation shows a positive linear relationship. The coefficient or R-sq of 50.60% shows that the relationship is relatively strong between the variables tested. This shows that approximately 51% of variation in Federal roads network is attributable to variation in the population sizes of the Local Government Areas. The test for overall significance of the relationship reveals an F-calculated value of 19.44 which is greater than F-table value of 4.38, which shows that there is a significant relationship. The null hypothesis is therefore rejected. A summary of the result is given in Table 4.

Table 4: Relationship between Length of Federal Roads and Population

NO	X AXIS	Y AXIS	MODEL	REGRESSION EQUATION	R^2 %	F TAB	F CAL	STRENGTH	REMARK
4	POP	Fed Road	Linear	Fed Road = 15.9+0.0000314 POP	50.60	4.38	19.44	Strong	Significant
			Logarithm	Y = -512 + 46.22 lnx	44.98	4.38	15.53	Fairly strong	Significant
			Quadratic	Fed Road = 10.73 + 0.0029 POP + 2.09e-10 POP^2	50.69	3.55	9.25	Strong	Significant
			Cubic	Fed Roads = - 1.43+4.99E-05 POP + 1.75 E – 09 POP^2 – 3.1E – 15 POP^3	50.72	3.20	5.83	Strong	Significant

Analysis 5: Relationship between State Roads Network (Km) and Population

From the fifth analysis, the regression equation shows a positive linear equation. The coefficient of determination R-sq was 25.60% showing that the relationship is relatively weak between the variable tested. It was also revealed that there is a significant relationship between the variables tested. The test for overall significance of the relationship reveals an F calculated value of 6.54 which is greater than F tabulated value of 4.38. The null hypothesis was therefore rejected. Table 5 gives a summary of the result.

Table 5: Relationship between Length of State Roads and Population

NO	X AXIS	Y AXIS	MODEL	REGRESSION EQUATION	R^2 %	F TAB	F CAL	STRENGTH	REMARK
5	POP	State Road	Linear	State Road = -14.0+0.0000410 POP	25.60	4.38	6.54	Weak	Significant
			Logarithm	Y = -167.36 + 56.07 lnx	23.14	4.38	5.72	Weak	Significant
			Quadratic	State Road = -7.012 + 0.00313 POP + 2.816E-10 POP^2	25.67	3.55	3.10	Weak	Significant
			Cubic	State Road = -91.14+0.023 POP - 1.36E – 08 $POPSQ^2$ + 2.80E - 14 POP^3 CUBIC	26.37	3.20	2.03	Weak	Significant

Analysis 6: Relationship between Combination of Federal & State Road Network (Km) and Population

From the result of the sixth analysis, there exists a positive linear relationship from the regression equation. The coefficient of determination R-sq is 43.00% which is relatively weak between the variables tested. Also there exists a significant relationship between the variables tested. The test for the overall significance of the relationship reveals F calculated value of 14.31 which is greater than the F tabulated value. The relationship was therefore statistically significant and the null hypothesis was rejected. Table 6 summarises the result.

Table 6: Relationship between Length of Federal & State Roads and Population

NO	X AXIS	Y AXIS	MODEL	REGRESSION EQUATION	R^2 %	F TAB	F CAL	STRENGTH	REMARK
6	POP	State Road	Linear	Total Road = -29.9+0.000752 POP	43.00	4.38	14.13	Weak	Significant
			Logarithm	Y = -1330.28 + 102.29. lnx	42.08	4.38	13.80	Weak	Significant
			Quadratic	Total Road = -17.746 + 0.00058 POP + 4.90E-10 POP^2	43.07	3.55	6.81	Weak	Significant
			Cubic	Total Road = -0.0023 POP – 1.186E – 08 POP^2 + 2.477E - 14 POP^3	43.35	3.20	4.33	Weak	Significant

Analysis 7: Relationship between Federal Roads Network (Km) and Population Density

From the seventh analysis, the regression equation shows a negative linear relationship. The coefficient of determination R-sq is 15.90. suggesting a weak relationship between the variables tested. This implies that there exists a negative relationship between the variables tested. The test for the overall significance of the relationship reveals a non significant relationship between the variables. This is because the F- calculated value of 3.59 observed was less than the F-tabulated value of 4.38. The null hypothesis was therefore accepted. Table 7 gives a summary of this result.

Table 7: Relationship between Length of Federal Roads and Population Density

NO	X AXIS	Y AXIS	MODEL	REGRESSION EQUATION	R^2 %	F TAB	F CAL	STRENGTH	REMARK
7	POP DENT	FED Road	Linear	FED Road = -42.2-0.0256 P.DENSITY	15.90	4.38	3.59	Weak	Not Significant
			Logarithm	Y = -114.65 – 14.12 lnx	16.32	4.38	3.70	Weak	Not Significant
			Quadratic	Fed Road = 51.47 – 0.0548 P.DENSITY + 1.85E -05 P.DENSITY	18.14	3.55	1.99	Weak	Not Significant
			Cubic	Fed Road = 43.34 – 0.002P. DENSITY – 6.23E – 05 + 3.29E – 08 DENSITY CUBIC	18.79	3.20	1.32	Weak	Not Significant

Analysis 8: Relationship between State Roads Network (Km) and Population Density

From the result of Analysis 8, the regression equation shows a negative relationship. The coefficient of determination of 34.90% suggests a weak relationship between the variables tested. This shows that there exists a negative relationship between variables tested. The test for overall significance of the relationship reveals an F- calculated value of 10.19 which is greater than F- tabulated value of 4.38, showing that there is a significant relationship. The null hypothesis was therefore rejected. This result is summarised in Table 8.

Table 8: Relationship between Length of State Roads and Population Density

NO	X AXIS	Y AXIS	MODEL	REGRESSION EQUATION	R^2 %	F TAB	F CAL	STRENGTH	REMARK
8	POP DENT	State Road	Linear	State Road = 79.1 -0.0641 P. DENSITY	34.90	4.38	10.19	Weak	Significant
			Logarithm	Y = -290.61 - 40.8 lnx	45.97	4.38	16.16	Weak	Significant
			Quadratic	State Road = 109.67 - 0.110 POP DENSITY + 6.104 POP DENSITY^2	43.54	3.55	6.94	Weak	Significant
			Cubic	State Road = 122.78 – 0.25P. DENSITY + 0.0079 P.DENSITY^2 – 5.313E – 08P. DENSITY	44.29	3.20	4.50	Weak	Significant

Analysis 9: Relationship between Combination of Federal & State Road Network (Km) and Population Density

From the ninth analysis, the regression equation shows a negative linear relationship. The coefficient of determination R-sq of 34.20% suggests a weak relationship between the variables tested. This shows that there exists a negative relationship between the variables tested. The test for overall significance of the relationship reveals an F- calculated value of 9.88 which is greater than F- tabulated value of 4.38, showing a significant relationship. This led to the rejection of the null hypothesis. Table 9 gives a summary of the result of the ninth analysis.

Table 9: Relationship between Length of Federal & State Roads and Population Density

NO	X AXIS	Y AXIS	MODEL	REGRESSION EQUATION	R^2 %	F TAB	F CAL	STRENGTH	REMARK
	POP DENT.	Total Road	Linear	Total Road = -121-0.0897 P.DENSITY	34.20	4.38	9.88	Weak	Significant
			Logarithm	Y = 405.26 – 54.21 lnx	42.08	4.38	13.80	Weak	Significant
			Quadratic	Total Road = 161.15-0.215 POP DENSITY + 7.75E -05 P. DENSITY^2	41.52	3.55	6.39	Weak	Significant
			Cubic	Total Road = 166.12 – 0.248P. DENSITY + 0.00013P. DENSITY SQ – 2.019E-08P DENSITY CUBIC	41.57	3.20	4.03	Weak	Significant

CONCLUSION

The study revealed a significant relationship between length of roads and all the demographic parameters except for the relationship between the length of Federal roads and population density which was not significant. Only Geographical Area shows a strong relationship with the length of Federal and State roads. It can therefore be concluded that Geographical Area is a very important factor to be considered in the construction of roads and road network design in Imo State.

In addition, it was revealed that out of the nine analyses carried out, eight (8) turned out to be statistically significant, thereby rejecting the null hypothesis, but with low R^2 values in most of the analyses. The highest R^2 value is 72.5%. Based on this result, it can be seen that the Federal and State Governments give little attention to population and population density during road network distribution, but needs to increase the attention given to these factors. This will ensure logical distribution and enhance economic and socio-political development of the State.

Other States of the Federation having similar problem should also be studied in future researches. Further studies are also suggested to be carried out on the development and distribution of feeder roads in Imo State.

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