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23rd INAUGURAL LECTURE SERIES

ECONOMICS OF NIGERIA'S HEAMORRHAGIC ROADS: PROBABLE CURE IN SIGHT

By

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All my former students
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1.0 Introduction

My gratitude goes to Almighty God, the Creator of heaven and earth, the "I am that I am", the "Lion of the tribe of Judah", the "Author and Finisher of our faith". He is the beginning and the end of all things. I thank Him for making today a reality. I worship and stand before You as I begin the presentation of the 23rd Inaugural Lecture of the University of Abuja. This lecture is the 6th from the Faculty of Social Science and the 3rd in the Department of Economics. The two earlier presentations from Economics were made in the areas of Fiscal Federalism delivered by Professor Oyinlola Olaniyi and in Development (Entrepreneurial) Economics presented by Professor Serah O. Anyanwu. I will be delving into an area that is just evolving to the Economic science but commonly discussed in the fields of Civil Engineering and Geography, Transportation.

1.1 Preamble and the Choice of My Topic

The account of the Gospel according to Saint Mark 5:25 – 34 of the Holy Scripture states: gives a vivid description of the biography of a piteous case of a woman that existed in history at a particular time. She found herself in a state of hopelessness and despair. The best way to describe her was through the illness (Haemorrhage) or otherwise called constant issue of blood she suffered for over twelve years which has made her miserable, frustrated and rejected.

She had spent all she had on medication to no avail. The physicians had constantly kept her in hope that they could cure her: and has made her to spend all she had acquired in her life they eventually gave up on her case as incurable.

In the Jewish tradition people that suffer this form of ailment are stigmatised and discriminated against in the society. Even the husband, the children and relations deserted and discriminated against her for over 12 years. Within this period, she has been drained financially and had spent everything she had yet the problem grew worse. Her strong faith in Jesus Christ to heal propelled her to touch his cloth; she got result not minding the crowd.

Like the woman, the Federal Republic of Nigeria (since political independence in 1960, about 57 years ago) has suffered from the ailment of bad governance, corruption and insecurity which has put our transportation sector in a state of despair and at best described as death traps. The sickness in the road transportation sector like the haemorrhage the woman suffered from look incurable even with the many policies the government has tried to put in place. With each regime coming like physician and messiah with promises to heal our economy and especially our road transportation sector. They came in different shape and form; they came like military in uniform with marshal songs and sometimes like civilian in democratic slogans such as 'One Nation, One Destiny', 'Politic without Bitterness', 'Power to the People', 'Nasara', 'Victory', and 'Change' and they have not been able to heal our bleeding road transportation sector neither have they been able to heal our dear beloved Nation even with our great faith on our politicians.

However, unlike the case of the poor woman with an issue of blood in the scripture, the Nigerian bloody road traffic situation is more complex and critical that she suffers from haemorrhage with some symptoms of diabetes mellitus. She suffers from higher than normal level of glucose with a kind of sugar in her blood. The glucose in the blood stream is supposed to becomes a potential source of energy that will propel the growth of the economy.

Similarly, just as petrol in the tank of the car needs to be pumped into the car engine to be of any effect, the body requires some assistance to get glucose from the blood stream to the muscles and other tissues of the body. In the body, that assistance comes from a hormone called insulin. Without insulin, glucose cannot get into the cells to be used as fuel. Instead, it accumulates in the blood to high levels and is excreted or spilled into the urine through the kidneys once the renal threshold (Usually 10mmol/L) is exceeded. When blood glucose level is persistently elevated above normal glucose intolerance is said to be present, diabetes mellitus is eminence (Bakari, 2014).

As you are aware, diabetes pushes one's sugar level up, and since the body may not be able to bring it all back in, it will get rid of the extra by making more urine. The mouth will dry and skin itching as a result of losing fluid and dehydration. This complication has deferred medical prescriptions and diagnosis by both Consultant Haematologists and Physician Endocrinologists and epidemiologists.

The physician had further discovered more serious type 1 diabetes with the claim of the risk of some cancers. The high risk was seen for cancers of stomach, liver, pancreas, ovary, kidney and obesity. It was further discovered that in type 1 diabetes, the body cannot produce the hormone insulin, which helps regulate blood sugar levels. People with type 1 diabetes must be treated with insulin to survive (Anumah 2015). In a recent study by an epidemiologist in the University of Edinburgh, UK, suggest that insulin treatment for Type 1 diabetes does not itself increase risk of cancer (New York Times News Service).

This health situation of Nigeria is, paradoxical, sugary (with abundance of resources) yet poor and beggarly (indebted to Internal and International Financial Institutions) to manage and administer the Nigerian Economy. The sugar (Petroleum Resources) in the body of our economy is diseased (diabetes with some cancerous elements) and seriously emaciating all the sectors of Nigeria. For instance, Nigeria is not just Africa's largest oil producer but also highest importer of refined oil products. It is African largest economy with the highest incidence of poverty and unemployment. While Nigeria has the highest number of private jet owners on the continent of Africa, Nigeria has the largest number of poor people in Africa and one of the largest in the world. Statistics revealed that of the estimated 170 million people in Nigeria, 122 million people live in desperate poverty, signifying that about 72 percent of Nigerians are desperately poor using the acceptable extreme poverty line of $1.25 per day.

In spite of all the human and mineral resources at our disposal the economy is experiencing unproductive growth with high unemployment, high inflationary rates, due to low economic output, erratic power supply, poor infrastructure and unrealistic

and lack of continuity in policies. The situation is so bad such that the transportation sector and Nigeria as a whole must seek for remediating attention from economists (the World wisest creature of earth) owing to the fact that medical science, politics and political parties, legal and judiciary, social, military and their artilleries, mystical and metaphysical fields have all failed.

Nigeria, a nation with abundant resources but is highly characterised by bad bleeding and bloody roads. The resources at our disposal have become curse rather than blessing. Thus the present ailment has left the health of the Nigerian roads worse off. Given this situation, I have travailed for several years trying to profound solutions to the problems on our bleeding roads. Hence the topic for our discussion and deliberation today: "**ECONOMICS OF NIGERIA'S HEAMORRHAGIC ROADS: PROBABLE CURE IN SIGHT".**

1.2 Conceptual Issues

1.2.1 Economics and Stages of Her Development

Many unimpressive description of the discipline of Economics was done by Philosophers, Historicity of ancient Oikonomos, ancient Theologians, and Greek Oikonomoi. Oikonomos is a compound word which simply means steward. Oikos stands for household while nomos means rule or law. Economics literally means the application of household rules or law to everyday living. Nnaji (2015), opined that the discipline of Economics originated from hekonomi and oikonosis i.e mystery or spiritual religious cults, and argued further that economics is Christianity because economics got its name from an ancient Greek church, oikonomos (spiritual leaders). The integration of the church between 1517-1700 during Protestantism gives rise to the modern economics spare headed by Adam Smith (1723 – 1790).

Economics as a discipline was originally introduced as a science concerned with the collection of revenue for the government and were equally required to point out the best possible way of spending the revenue collected. With the revolution in the late eighteenth century commerce and trade grew and the role of the state was specified and the field of political economy emerged. Wealth was identified as the source and means to satisfy our various wants, so wealth was emphasised. Adam Smith, generally known as the father of Economics defined Economics as 'science of wealth'.

The concept of Economics has been changing during different stages of developing Economics as a subject. Stages of Developing Economics as a subject have developed in the following stages as depicted in figure 1.

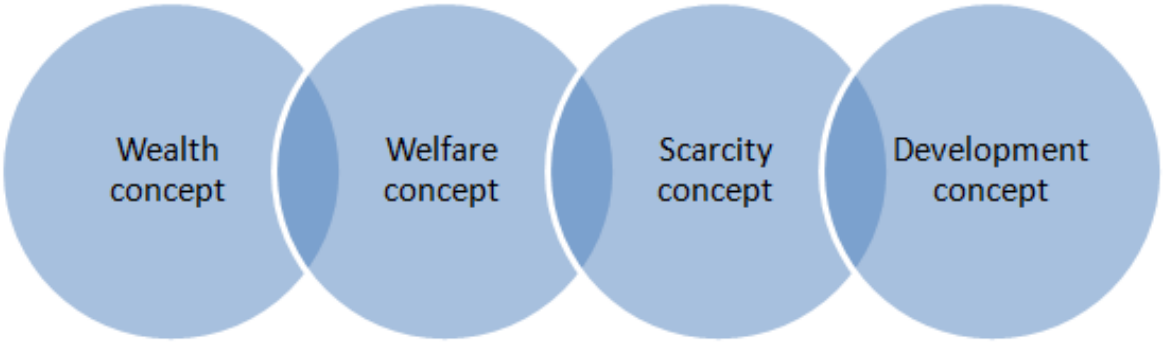

Fig. 1: Stages of Developing Economics

1.2.2 Wealth Concept

During the late eighteenth and the early part of nineteenth century, classical economists, such as Adam Smith, J.B. Say and Walkar defined Economics as the science of wealth. Adam Smith systematised the concept in the form the book which was entitled as "An enquiry into the nature and cause of the wealth of nations.'' These economists stated that Economics is related to and concerned with wealth. Excessive emphasis on wealth enabled the businessmen and industrialists to amass wealth by any means, whether by fair or foul. Social reformers like Thomas, Carlyle, John Ruskin, Charles Dickens and William Morris reacted sharply to the wealth concept of Economics. They branded Economics as a dismal science, gospel of Mammon and science of bread and butter. Wealth concept of Economics was bitterly criticised, because it assumed wealth as an end of human activities. If it is accepted in life, there will be no place for love, affection, romance, retreat, exhibition, unionism, agitation, sympathy and patriotism. Absence of these values will make our real life unworthy.

1.2.3 The Welfare Concept

The welfare concept opined that Economics does not concern itself with wealth but it is concerned with human welfare. Wealth is a means of satisfying human wants, not as an end of human activities. Alfred Marshall was the pioneer of welfare thought. According to him, ''Political Economy or Economics is the study of mankind in the ordinary business of life. Thus it is on the one side a study of wealth and on the other, and more important side a part of the study of man.''

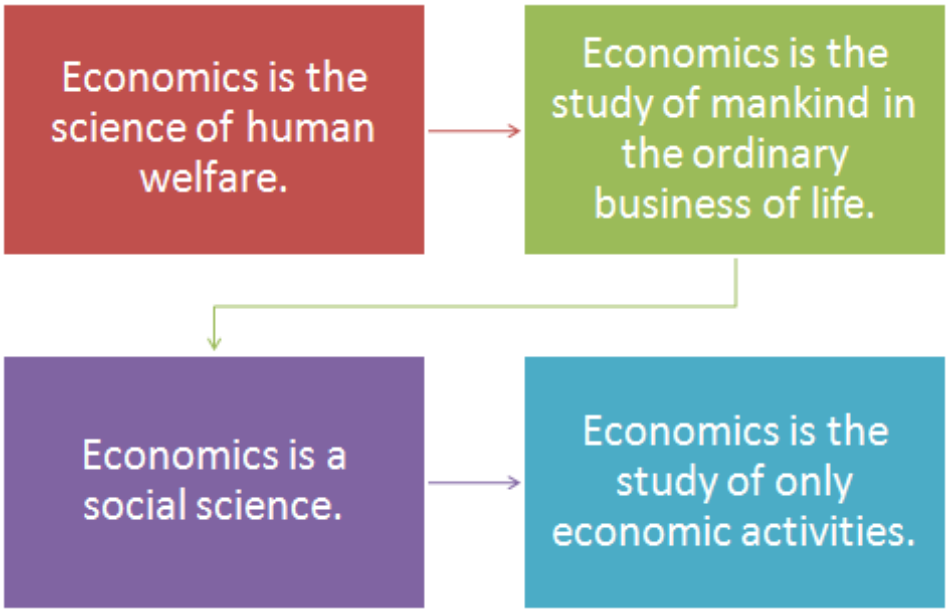

Fig. 2: Important Features of the Welfare Concept

The concept of welfare was also greatly criticised and the concept of Scarcity evolved. The apologist pioneers of scarcity observed that it was an injustice to the science of economics if it is restricted to ordinary business and human welfare only.

1.2.4 The Concept Scarcity

The Concept Scarcity propounded by Lionel Robbins sees, ''Economics is the science, which studies human behaviours as a relationship between ends and scarce means which have alternative uses.'' The concept clearly identified the following important features: Economics as a positive science, relates to the study of human behaviour, the wants of men are unlimited, resources are limited in supply/scarce and available resources can be put to alternative uses.

According to this approach certain universal truth are regarded as the basis of economic problems. Every individual and economy has unlimited wants and scarce means to satisfy these wants. Inability to satisfy unlimited wants with limited resources creates the problems of choice making i.e., fixing priority of wants to be satisfied. As resources can be put to alternative uses, we will have to take decision as to which specific want should be satisfied with particular means. In this way, choice making or decision making is the means of tackling all these economic problems.

1.2.5 The Development Concept

While the concept of scarcity concept explains the presence of economic problems the development concept is concerned with the positive aspect of the subject. Modern economists feel that economist should also suggest how the scarce means should be further increased to satisfy more wants and attain good living standard. The concept propounded by Professor Samuelson, who presented the growth-oriented definition of Economics. According to him, ''Economics is the study of how man and society choose, with or without the use of money to employ scarce productive resources, which could have alternative uses, to produce various commodities over time and distribute them for consumption now and in the future among various people and groups of society. The important features of this concept may be summarised as under:

(i) Problem of choice making arises due to unlimited wants and scarce resources. And every human must have to decide which wants are to be satisfied and which of them are to be deferred. Wants have tendency to increase in the modern dynamic economic system, so the available resources needs to be judiciously used. Best possible efforts should also be made to increase the resources, so that increasing wants can be satisfied.

(ii) Economics is not only concerned with the identification of economic problems but also suggest ways and means to solving the problems of unemployment, production, inflation, construction, rehabilitation and maintenance.

(iii) Economics also suggests how the resources of the economy should be distributed among various individuals and groups.

(iv) Economics should also point out the plus and minus points of different economic systems.

2.1 Transportation

The word transportation was coined from classical Latin words; 'Transportare': Trans means across and portare is to carry. i.e simply to carry across. Transportation collectively, meets the demand for the movement of people (from where they are to where they would prefer or intend to be) and commodities (to where their relative values are greatest) but the nature of these demands defers widely. The product of transportation is the timely delivery of goods and people to where they should be (Siyan, 2006). Transportation demand is usually derived from

some other functions. For instance, a company producing clothing materials sees transportation as a means of moving its cotton to textile industry, ans the product to wholesale warehouse, to the retail store and finally to the consumers.

The importance of transportation cannot be over emphasis. According to Oyesiku (2002), transportation historically played significant role in the growth of civilization. He gave an example of Egypt, where development in water transportation served as the foundation for the development of the country. River Nile held Egypt together; it was the mean of transporting Egyptians goods and a method for Egyptians soldiers to move to defend their country.

Akpoghomeh (2012) opined that transportation also create a social structure in the sense that people who travel within bounds of a particular transportation network share ideas and experiences that further enriched society.

Economically, transportation between two places helps to determine the market and economic values of goods and services. Transportation helps to create time utility by ensuring that people and commodities are at the proper location at the right time. Transportation is an essential part of human activities, and in many ways form the basis of all socio-economic interactions. Indeed, no two locations will interact effectively without a viable means of movement. Transportation has made it possible to link producer and consumer together, and has made farm produce to reach the market and raw materials to get to the industries. Thus a good and effective transportation system is essential to support economic growth, development and in fact serves as corner stone to civilization. Transportation is central to social, economic; political, and psychological development of the state and individuals.

It is universally recognized that transportation is crucial for sustainable economic growth and modernization of a nation as it affects directly virtually all other sector in the economy. The Agricultural sector can only produce in large quantity if there is assurance of transport for trade both domestic and foreign.

This is applicable to other sectors, hence the need for this sector to be efficient. Adequacy of this vital infrastructure is an important determinant of the success of a nation's effort in diversifying its production base, expanding trade and linking together resources and markets into an integrated economy. It is also necessary for connecting villages with towns, market centres and in bringing together remote and

developing regions closer to one another. Transport, therefore, forms a key input for production processes and adequate provision of transport infrastructure and services helps in increasing productivity and lowering production costs.

The provision of transportation infrastructure and services helps in reducing poverty. It needs no emphasis that various public actions aimed at reducing poverty cannot be successful without adequate transportation infrastructure and services. It is difficult to visualize meeting the targets of universal education and healthcare for all without first providing adequate transport facilities.

Transportation becomes the back bone of any economy in the world, as such an anatomy of aspects relating to inefficiencies and lack of good transportation network in Nigeria is responsible for low rate of economic growth (GDP) is crucial. Attached to this is the poor government policy on transportation (Lack of regulation of fees charged by private transportation, inadequate fuel, lack of spare parts and above all the prevalence of bad roads and lack of security have succeeded in trimming down the transportation system in Nigeria which has a negative effect on the economic growth.

The relationship between the level and pattern of transportation system and the welfare of the population of an area is an important factor affecting economic development. It must therefore be taken into account at various levels of policy formulation. No wonder, Lugard (1922) summed up the material for developing Africa in one word "Transportation." At every stage of development, any area requires a certain level of transportation infrastructure in other to maximize its potentials.

Its role in economic development on any nation is undeniably great. Without transportation the present global, regional and national transformation and integration would be impossible to attain.
Cox (1972) identified three important characteristics of transportation. Firstly, the distance biased movement whose intensity is an inverse function of distance. His study showed that there is an inverse relationship between location and intensity of flow. He concluded that short distance movements tend to be relatively more intense than long distance movements. Secondly, is the direction-biased movement. He

noted a correlation between direction and movement. He described direction-biased movement as that in which case all movements or the most intense movements are restricted to a few of all possible directions. Thirdly, in addition to distance and direction-biased movements, movement tend to flow along channels. According to him if such channels do not exist there would be no movement. Harvey (1985) on the other hand suggested factors such as, cognitive capacity, time constraints, exogenous imposed schedules, physical needs, cumulative experience, authority and the desire or need to articulate activities among individuals in a social unit responsible for travel demand.

Siyan (2006) in modelling spatial interaction identified three other factors that could influence movement. These are the attractiveness of particular destination, the costs of movement and vocational structure of the movement opportunities. Ullman (1957) provided a comprehensive model of spatial interaction to explain the essence of movement from one place to another. He posited that three necessary conditions which must be present for interaction to take place between two points. The conditions are: complementarities, transferability and intervening opportunities. Wheeler and Muller (1986) and Siyan (2015) opined that an area is complementary to the other if the first area has in abundance of the commodities demanded by the second area.

The factors that could give rise to the demand for these commodities were explained in terms of variation in human and natural resources and regional variation in the size of enterprise. Abler (1977) observed that the transferability of commodities from one point to the other could be measured in the real time and money costs. However, movement may not take place if the distances between the points are too large despite the complementarities and absence of intervening opportunities.
Moavenzadeh (1983) in his study identified some reasons that are responsible for movement: propensity to travel, geographical locations, characteristics of individual travellers, the kinds of transportation servicing different passengers, the level of service provided, the cost to the users and the operational cost of the system. Ortuzar (1990) identified the level of infrastructure together with a set of rules for their operation as the most important requirements that are responsible for transportation.

Transportation statistics in Nigeria are grouped into five basic categories, namely, road, rail, pipelines, water, and air transportation. Of all the modes of transportation in Nigeria, road transport is the dominant means of transportation that accounts for more than 90 percent of sub-sector's contribution to the Gross Domestic Product (GDP).

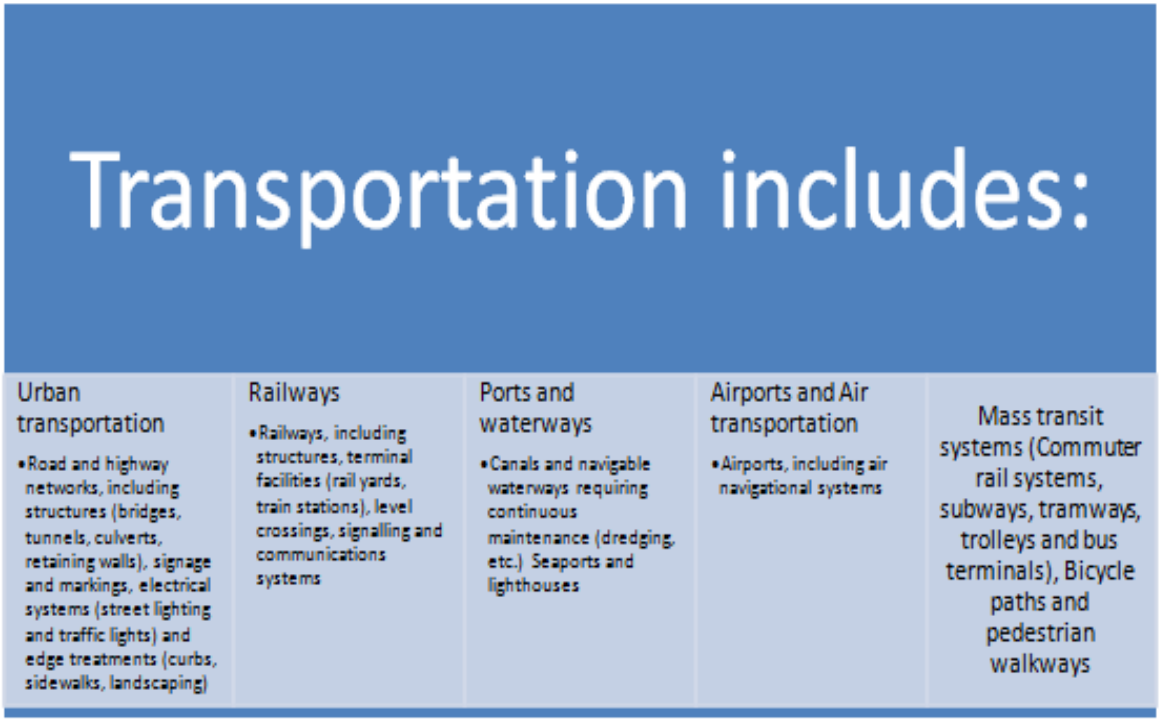

Fig. 3: Modes of Transportation

2.1.1 Road Traffic

The whole idea of developing modern road in Nigeria was conceived during the colonial period. The widths of the existing footpath were too narrow that hardly could two people or animals walk side by side. Lugard (1926) cited in Morenikeji (1998) avers that road was an ancillary to railways and was constructed as feeders to them in order to compete for freight. Walker (1959) stated that while railway development in Nigeria started in 1898, modern road development did not start until the early 1920. Bolaji (1985) in his study supported Lugards claim that road traffic as the most ubiquitous mode of transportation and one that is made use of by the greatest proportion of the populace, were designed to serve as feeders to the railways which today constitute a sick and epileptic baby of Nigeria's transportation system.

There were periods in history when only a single transportation mode was available. Walk horses, donkey, steam locomotive or street cars and there were no rooms for selection or choice. But after centuries of research and technological development and breakthroughs, we find numerous ranges of options in our societies today.

Walking is originally the first and basic transportation mode. We are all pedestrians; any trip by any means include a bit of small distance covered on foot at the beginning and end of every journey. We still walk from place to place even with the introduction of technological and mechanical means. Because of constraint of resources people still cover long distances on foot expending human energy.

The earliest mode of road passenger traffic in Nigeria as stated by Walker (1959) was the Mummy Wagon (lorry), which serve as passenger and freight carriers. He observed that the Nigerian stage carriage was remarkable, neither for the excellence of its appointments nor the consideration given to the convenience of the passengers. There has been progressive development from the use of Lorries to buses and cars since the 1970s.

Nigeria has the largest road network in West Africa and the second largest south of the Sahara, with roughly 204, 000 km^2 of surfaced total road network, out of which 35, 000 Km^2 are federal roads, 34, 000 Km^2 are state roads and 129 Km^2 are local government roads (FRSC, 2016). However these roads are poorly maintained and are often cited as a cause for the country's high rate of traffic fatalities. In 2004 Nigeria's Federal Roads Maintenance Agency (FERMA) began to patch the 32,000-kilometre federal roads network. Poor funding posed serious challenges to road maintenance in Nigeria. Some paved roads have lost their asphalt surface and are in very poor condition or have reverted to being gravel roads. Some of the road system is barely usable, especially in high rainfall areas of the south.

2.1.2 Nigeria: Road, People and Economy

Road transportation is regarded as the most popular and important mode of movement in Nigeria. Ogunsanya (1977) observed that the present structure of the road system in Nigeria has been formed since the 19th century through footpath constructed by hunters, traders and

itinerant merchants. The introduction of the automobile in the 20th century led to a rapid development of roads by the British colonial government. The rich interior was opened up and roads were built initially to complement the rail and later to compete with it.

This progression has been brought about first by the establishment of vehicle assembly plants such as, Steyr in Bauchi, Peugeot Automobile of Nigeria (PAN) in Kaduna, Leventis Motors (Mutsubishi) in Lagos, Fiat in Kano, Anambra Motor Company (ANAMCO) Mecedis Benz, in Enugu, Ley Land in Ibadan and Federated Motor Industry (Bedford) and Volkswagon in Lagos. Most of these plants are out of operation except for PAN and ANAMCO that are presently operating at epileptic rate. Similarly, between the 1959s and the early 1980s, many companies were importing new cars e.g. SCOA, Leventis, CFAO, J. Allen, and many others.

The Government of the Federal Republic of Nigeria is comprised of a three-tier structure. The highway systems are categorized as trunk A, B and C and based on this, the ownership and administration of public roads in Nigeria is in three tiers as follows: Federal Roads, State Roads and Local Government Roads.
Nigeria has a network of Federal, State and Local Government roads

Table 1: Classification of Nigerian Roads

TYPE	PAVED ROAD (KM)	UNPAVED ROAD (KM)	TOTAL (KM)
FEDERAL	23,000 (16, 0%)	5,600 (3.9%)	28,600 (19.9%)
STATE	10,430 (7.2%)	20,070 (13.9%)	30,500 (21.1%)
LOCAL GOVERNMENT	870 (0.6%)	84,130 (58.4%)	85,000 (59.0%)
TOTAL	34,300 (23.8%)	109,800 (76.2%)	144,100 (100%)

Compiled from Olugbekan (1994) and Kadiri (1998)

The Federal government has been responsible for the construction and maintenance of Trunk A roads. Pre 1968 regional capitals the federal government took over a few stretches of trunk B roads in some states, including a few township roads in Kaduna, Ibadan, Enugu and Benin.

Table 2: Distribution of Nigeria's Road Network (in Kilometres)

	Federal Road	**State Road**	**Local Govt. Road**	**Total**
Paved main roads	26,500	10,400	-	36,900
Unpaved main road	5,600	20,100	-	25,700
Urban roads	-	-	21,900	21,900
Main rural roads	-	-	72,800	72,800
Village access road	-	-	35,900	35,900
Total	32,100	30,500	130,600	193,200
% of total	**17**	**16**	**67**	**100**

Source: **Road vision 2000 steering Committee Information Brochure, P.4. Transportation in Nigeria 2020**

Table 2 shows that most roads presently require rehabilitation instead of routine maintenance so that the existing roads can be brought to a serviceable condition. More importantly, rural access roads throughout the country are in very deplorable condition because such roads belong to the local governments, which are financially handicapped. The little money that comes to this tier of government is regrettably not applied to the development of their areas.

The rural roads were marginally neglected despite their importance for transportation of raw material to the manufacturing sector of the economy and to individual markets. Not until 1986 when the directorate

of Food, Road and Rural Infrastructure (DIFFRI) was set up that the responsibility of resurfacing road infrastructure was intensified. There is simply no continuity in government policies. All the policies initiated dies with the government that initiated them.

There is incessant road blockages and reckless extortion of drivers by security and traffic agencies (Armed Police, Nigerian Army, Road Safety, Vehicle Inspection Officers, Custom Officers and of recent Nigerian Civil Defence Corps) in the name of check points and illegal stands for extortions. From sampled studies, averaging 1.5 million vehicles made up of tankers, commercial and private buses and cars loses an average of ₦50 per vehicle reaping a whopping sum of ₦75 million (unknown and unaccounted payment) going into personal coffers. This will amount to ₦2.25 Billion per month and ₦27 billion per annum. This amount would have been used to build reasonable length of roads and bridges. The studies recommended that the agencies responsible for curbing corruption should look into this direction and further challenged their actions by asking these agencies to account for these robberies on our high ways. Advanced technologies could be implored for such checks leading to a transparent regime of other penalties to motorists without wasting time.

The collapse of the rail system and the high cost of air travels have put a lot of pressure on the nation's road transportation system. Statistics from the Federal Road Safety Commission (FRSC) disclosed that as at 2014, Nigeria had about seven million (7, 000, 000) registered vehicles plying the roads. This, with the growing population of about one hundred and seventy million (170, 000, 000) people in Nigeria, asserts serious pressure on its roads. This population showed a road population ratio of eight hundred and sixty (860) people per square kilometres; this depicts serious pressure on the roads that have not been maintained or rehabilitated for decades. This pressure accounts for high rate of accident crashes and death in Nigeria.

Nigeria has the largest road network in West Africa and the second largest in South of Sahara, with roughly 108 Km of surface roads. However, they are poorly maintained and are often cited as a major cause for the country's high rate of traffic fatalities. Siyan (2002) discovered that a major problem facing the road sector in Nigeria is the constant deterioration of road conditions because of heavy trucks

carrying overweight loads. This problem arose because the roads were constructed for much lighter traffic vehicles. The engineering standards of the roads were also quite low in many places leading to the early appearance of portholes on them. Heavy rain and erosion compound the poor state of the roads in most parts of the country.

Overall, the poor state of roads in Nigeria impacts negatively on cost of production, and represents a major trigger of cost-push inflation. Huge sums of money have been sunk into road development in Nigeria. By 2011, of the one hundred and ninety four (194,000) Kilometres of roads, only about thirty five thousand (35,000) Kilometres are officially paved, but out of the 35,000 Kilometres network paved only four thousand five hundred (4,500) Kilometres are fairly motorable. Extensive road repairs and very few new construction activities are being implemented as the governments spend their portions of enhanced government revenue allocations. By 2014, 6,525.28 kilometres national road network enjoy fair motorability. This is reflected in the six geo-political zones of Nigeria. However, this has not been sustained.

Table 3: Road Construction in Nigeria (2011 – 2014)

S/No	Zone	No. of projects	Length (Km)
1	North Central	29	1, 201. 81
2	North East	26	1, 219.65
3	North West	20	1, 040.22
4	South East	45	1, 251.40
5	South South	33	739.57
6	South West	31	1, 072.63
	Total	184	6, 525.28

Source FERMA, 2015

The fundamental road transportation problem in Nigeria is that drivers don't pay anything close to the full cost of driving. No clear price for road use has been fixed because road, all along, has been considered as a social service. About one hundred percent of road and bridge costs in Nigeria are borne by general property taxpayers. Indeed, if all the externalities associated with excessive driving were calculated from accident rooms to air pollution, the sum would be staggering and would compel us to reconsider our daily travel habits.

Above all, the deterioration of our roads and the consequent loss of goods and passengers have mainly been caused by inadequate funding, corruption, poor maintenance, repair, construction and management. Maintenance of roads has been mainly financed by general tax revenue. Statistics shows that maintenance allocation to the transportation sector has been declining. Apart from inadequate funding, the institutional framework and management structure within which roads have been managed, repaired and maintained is weak.

A major problem facing the Nigerian road is rapid deterioration of road conditions due to heavy trucks carrying overweight loads on roads not designed to carry such loads. Another problem is that most of the roads were constructed far below the quality of engineering standards required. Furthermore, heavy rains and erosion tend to compound the problems of the Nigerian roads for the motorists. Also declining government revenue has resulted to inadequate funds for maintaining and constructing highways in Nigeria. This is because budgetary allocations to the transportation sector as a whole has been declining since 1986.

Inadequate coordination between the Nigerian roads and other transportation modes has been another major problem. The result is that other transportation situation has been deplorable because maintenance costs have risen sharply and the frequencies of travelling have increased. Also the rates of accidents causing loss of lives and damages to roads have increased. In fact, now the major roads in Nigeria are in a great state of disrepair.

2.1.3 Nigeria: Land, People and Road

Every society depends on the availability of social and economic infrastructures to attain meaningful growth and development. These public services are poorly developed and managed in Nigeria and have rather become bottleneck to growth. This is practically true of road and rail Transportation, electricity and tertiary education in Nigeria. The collapsed railway system is a major factor in the rapid deterioration of the roads and highways. The situation is exacerbated by the abandonment of the regulatory framework on axle loads and passenger traffic.

Nigeria's publicly owned transportation infrastructure is a major constraint to economic development. The government of Nigeria has invested huge sum of money with no corresponding result to show forth.

Over the years under consideration, the Federal Government of Nigeria's allocation to transportation sector of the country has been experiencing an undulating trend as could be seen in table 4.

Table 4: Budgetary allocation to the Transportation sector: 1981 - 2013

Year	Total Budget	Transportation Sector
1981	11.4	0.03
1982	11.9	0.04
1983	9.6	0.03
1984	9.9	0.04
1985	13.0	0.05
1986	16.2	0.1
1987	22.0	0.2
1988	27.7	0.2
1989	41.0	0.3
1990	60.3	0.3
1991	66.6	0.2
1992	92.8	0.6
1993	191.2	2.0
1994	160.9	0.4
1995	248.8	1.1
1996	337.2	2.1
1997	428.2	1.6
1998	487.1	1.9
1999	947.7	11.1
2000	701.1	3.0
2001	1,018.0	33.9
2002	1,018.2	29.4
2003	1,226.0	22.7
2004	1,426.2	8.1
2005	1,822.1	8.0
2006	1,938.0	9.8
2007	2,450.9	32.2
2008	3,240.8	67.4
2009	3,453.0	90.0
2010	4,194.6	42.4

2011	4,712.1	13.1
2012	4,605.4	23.2
2013	5,185.3	18.5

Source: NBC 2013

Not until 1993 did the upward trend became very significant and that continued to 2013 as could be seen in figure 4.

The recurring experience of poor performance of public sector programmes on account of poor funding recently gave rise to a paradigm shift in the approach to transportation development. The menu of funding options that have been canvassed in the recent years include:

(i) Full treasury funding
(ii) Partial treasury funding
(iii) Public Private Partnership (PPP) and
(iv) Full Privatisation.

Full treasury funding is expected to apply in the case of projects that the government is expected to implement under Public Service Obligation (PSO).

On the other hand partial treasury funding would apply where government only funds the capital programme while the operation after completion is funded through the application of user charges to meet the running and maintenance costs, for example, the tolls collected after the completion of a highway project.

The Public Private Partnership (PPP) approach would apply in a situation of direct funding by the private investor who may build the project, operate the same after completion, and later transfer to government after the stipulated period (BOT) or operate the project for an indefinite period after completion. The private sector will require an adequate financial rate of return while the public sector funding body will consider the social benefits to be derived from the investment.

The fourth funding option is the situation where government no longer feels obliged to participate in the construction or the running of the project or programme and totally divests its investment to the private sector.

For the road sub-sector, road maintenance and rehabilitation are expected to be undertaken as public service obligation except in the circumstances of major highways where tolls may be collected as user

charges as currently obtains in several countries of the world such as Malaysia and the USA.
The same arrangement could apply to new road construction in Nigeria. Like in other developed countries, a Road Development Fund could be established to fund the development and maintenance of major highways that are not included in the PPP arrangement. In this regard contribution to the fund are made from the annual vehicle registration fees, fuel surcharge, revenue from road concessions, annual grants on account of government public service obligations and special government allocations. Some of the major highways and new roads may be given out as outright concessions i.e. Public Private Partnership.
Despite this huge investment on maintenance, rehabilitation, reconstruction, and expansion, the poor state of road transportation remains perennial to the government development efforts. This may likely be due to high scale embezzlement, mismanagement, corruption and government insincerity to initiating appropriate legislation for the transportation sector.

Siyan (2016) demonstrated that there is a definite correlation between corruption, poor maintenance and road traffic crashes in Nigeria. The corruption is at both micro and macro significance. To corroborate this finding a Report of WHO (2014) showed that Nigeria ranked second highest in road accident among the 193 countries surveyed. The report further revealed that Nigeria is the most dangerous country in Africa with 33.7 per 100, 000 annually due to road crashes. This implied that one in every four accidents that result in deaths in Africa occurred in Nigeria.

2.1.4 Transportation Economics and the Economics of Transportation

Transportation Economics is a branch of economics founded in 1959 by American Economist John R. Meyer. According to him, "it deals with the allocation and distribution of resources within the transportation sector." It has its strong link with Civil Engineering and Geography. It differs from other branches of economics in its assumption of space less, and instantaneous economy, which does not hold in the field of economics. Here passengers and freight (people and goods) flow over networks at certain speeds and time.

The pattern of trade that helps to drive transportation is complex because of the dynamic global environment and changes in economic

indices. Transportation touches the lives of the citizenry and the economy as a whole. It affects the economic welfare, safety, access to places and people and the quality of the environment of the people. People are frustrated when transportation system is not functioning well. However, it provides opportunities when the transportation system is performing well.

It is the task of the transportation economist to calculate the different alternative methods of transporting goods or passengers, what the costs and the benefits are, how long it takes to transport goods and services from one point to the other, so that the alternatives can be arranged according to the rate of return on capital. Much more researches are necessary into the motives which make people decide whether to travel and, if they decide to travel, what type of transportation mode they would or should use. This applies particularly to the longer trips made for business, pleasure or holiday. In urban transportation there is not much of a choice. People must travel to work, shops, houses of worships, visit friends and recreational places, often in the peak hours, while in many instances there is not an acceptable alternative to the road transportation especially in Nigeria where rail transportation has become comatose, and air is beyond the reach of the majority. Comprehensive transportation planning which aims at providing sufficient road and parking facilities are not only necessary but sufficient for economic development.

The ingredient for increase or decrease in passengers travel is an economical transportation system. The rising costs of automobile and air travel occurring as a result of escalating or decreasing faire, fuel, labour, maintenance and equipment costs might lead to a change in lifestyles. People might decide to stay closer to their homes for vacation instead of travelling long distance or decide to postpone or not travel at all. Areas with tourist attractions have also brought people all over the globe as an economic base. It's also the source of supply chains in contiguous locations for the firms to move their goods. The combination of low labour costs in some locations and relatively low transportation costs in the past have made some distant sources of supply more attractive and this assisted in the location of some companies.

The movement of certain goods between two designated points is determined by weight. The demand for transportation is associated and

measured in weight-distance (ton-Kilometre) units for freight and passenger-distance (passenger-Kilometre) for people. Both of these measurements are two-dimensional, which can present some challenges for intermodal comparisons. This shows the heterogeneous nature of transportation demand unit. The same unit of demand could have different costs for producing it and different users' requirements.
Transportation demand can also be examine from aggregation perspective. Aggregate demand for transportation is the sum of the individual demands for passengers and freight. It can also be assessed from sum of the demand for transportation via different modes.

2.1.5 The Demand for Transportation

Transportation is very important such that it affects every individual directly or indirectly. The place we go to, the goods we consume and our entertainment are impacted by transportation. The growth or otherwise of the Nigerian economy is attributable in part to the transportation system of the economy. The demand for transportation is derived. The demand from a given location depends on the existence of demand to consume that product in the distant location. Goods are not transported except there are needs for them. Transportation plays an important role in helping to bridge the supply and demand gap inherent in production approach between the geo-political zones of the economy. As geo-political zones specialize in the production of particular goods and services they have comparative advantage while they rely on other zones for the good and services they need or desire. Transportation is relied upon to move these goods and services to different locations in an efficient manner. The same is applicable to the global economies on a global scale. Countries recognise their international interdependencies. The developed economies supply many Less Developed Countries (LDCs) with a variety of manufactured products and services, while the LDCs like Nigeria provide the developed world with crude and raw materials. Thus transportation plays a key role in this national and global dependency by providing the ability to match demand and supply requirements on national and international basis. Countries ability to trade among themselves to efficiently move goods and services is a key element of national and global development.

In a similar vein, people move from area where they are currently situated to areas where they desire to be on daily, weekly, monthly,

yearly or permanent basis. Within the demand-supply context, the origin of a passenger may be in the area of oversupply and the destination may be an area of undersupply. Transportation also helps to provide a bridge between demand and supply for individuals to move from their current places of abode to new locations. The same is applicable to freight; people depend on transportation for mobility of their goods.

Transportation costs can also affect the demand for the product. Variation in transportation costs can cause a shift in demand among the modes. It can also affect both freight and passengers over a specific traffic lane were several carries and passengers the competing for the traffic. The impact of transportation costs on the demand for a product at a given location usually focuses on what we call the landed cost of the product. Thus the landed cost of the product is made up of the cost of the product at the source, the cost to transport the product to its destination, plus any ancillary expenses such as loading costs. If the landed cost of the product is lower than that of other sources, there will usually be a demand for the product and also for the transportation of that product from its origin (Coyle, Langley, Gibson, Novack, & Bardi 2009).

Transit Time could also be responsible for shift in demand. The longer the transit time, the higher the inventory levels required and the higher the carrying costs. Similarly, transit time impact the inventory costs in the overall supply chain. Reliability, accessibility, capability and security are major factors that will influence transit time on supply chain.
Location of economic activities will also to a large extent influence demand for transportation. The quality of transportation services, such as time required to traverse the spatial gap between the source of supply and the location of the plant, the warehouse, and the markets will affect inventory cost, stock out costs, and other costs.

2.1.6 The Supply Chain

Supply chain is the third phase in the development of the physical distribution concept, which focused on finished goods after products are produced or the passenger must have arrived at his/her destination. Supply chain management is simply the pipeline or conduit for the efficient and effective flow of products/passengers and material

services, information and cash from the suppliers' through the various immediate organisations out to the final consumers/destination. The supply chains are often non-linear and have the following participants: Suppliers, Distributors, Manufacturers, Wholesalers, Retailers and final Consumers. Transportation is the glue that holds the supply chains together to allow for efficient and effective operations of organizations and the system at large. The flow between and within the chain is directly dependent upon efficient transportation system. In fact, a timely delivery, reliable, and damage free manner transport system is critical to the outcome.

Information is equally important for the success of supply chain management. It is the flow back from the market place and the retailer through the wholesale. Distance between them is bridged by transportation.

The physical distribution management was on the system costs and analysing trade-off scenarios to arrive at the lowest physical distribution system cost. The system relationships that exist among transportation, inventory levels, warehousing, exterior packaging, distance and customer service cost centres were analysed and evaluated.

Many supply chains are characterised by outsourcing production to low labour cost area and countries which might give rise to low transportation rates and trade between the two areas. The importance of transportation in supply chains framework cannot be over emphasised, the customers are expected to have the best product delivered to them at the right place and in the right quantity, right condition at the right cost and transportation plays a vital role in all these.

Supply chain can use practical economic to benefit their firms through ways: Pricing, Sourcing, Making and Moving.
In my inquiries over the years, I discover that more assessment methodologies seem necessary for transportation policy strategies and until very recently available research on Transportation Economics is very limited.

3.1 The Issue of Blood on Our Roads

3.1.1 Causes of Road Traffic Accidents in Nigeria

Causes of traffic accident are categorised majorly into three:

(i) Human factor
(ii) Technical or mechanical factor
(iii) Environmental factor

According to Akpoghomeh (2012), out of the three categories, the human factors are said to be responsible for over 70 percent of all traffic crashes because the drivers' operational ability is very critical to the cause and prevention of traffic accidents. Oyeyemi (2016), based on statistic from FRSC opined that over the periods 2013, 2014 and 2015 the drivers (human) accounted for 82% of road crashes. Human factors include visual acuteness, driver fatigue, poor knowledge of road signs and regulations, illiteracy, health problems, excessive speeding, drug abuse, and over-confidence while at the steering wheel.

Among the mechanical factors that led to fatal car accidents are poor vehicle maintenance, tyre blowouts, poor lights, un-roadworthy vehicles, and broken-down vehicles on the road without adequate warning, rainfall, Harmattan winds, sun reflection, heavy wind, pot holes, and un-tarred roads. These factors have independently and/or collectively contributed to the high rate of fatal road accidents in Nigeria.

Eke (2001) presented a review of etiological factors to determine the incidence of road traffic accidents and advocated preventive measures. According to him the factors include man, the road and the vehicle. Alcohol and drugs intoxication account for a large proportion of road traffic accident worldwide.

In the developing world, roads are poorly built and are poorly maintained. As a result, roads have become death traps.

Vehicles are poorly maintained due to poverty, ignorance and corruption among law enforcement agents. Africa Road Safety Review (2001) observed that of the road fatalities in Sub-Saharan Africa between 68 and 82 thousand lives are estimated to have been lost in road crashes in the year 2000. The use of official road crash casualty statistics underestimates the true extent of the burden, especially that of injuries of which only a fraction is believed to be reported by the police. The average African continental growth in road deaths over the period 1985/86 to 2012/2013 (excluding the two dominant countries of Nigeria

and South Africa) was found to be over 40 per cent, indicating the continued increase in road deaths over time. In comparison, road fatalities in Western Europe and North America fell over the same time period by about 20 percent.

Assum (1998) in his appraisal of Road Safety Initiatives in five African Countries (Benin, Cote d'Ivoire, Kenya, Tanzania and Zimbabwe) observed that they shared the same main problems including funding and technical skill shortages, which hindered implementation. He concluded with a call for an Africa Road Safety initiative built on quality road maintenance initiative leading to road funds and private sector participation in road maintenance and rehabilitation programs.
Faced with the problem of roads being built to different standards, many countries have revised their Geometrical Design Standards in recent years. Safety was given much consideration in the geometric design for the Ethiopian Road Authority. A highway designer must strive to eliminate hazardous condition, or dangerous unexpected situations for the driver to face. In a safe design, the designer should think in terms of a driver-using road in less than ideal circumstances. Consider a wet pavement, night time use, where the driver is using the road for the first time and perhaps he has had a few drinks. If this combination of elements results in an unsafe environment for the driver, it can be considered that the design is insufficient. (Ethiopian Road Authority, 1999).

Another strong reason of automobile crashes is the importation of fairly used vehicles into the country. Most of these vehicles come in illegally and are very old in terms of year of manufacture and usage. The unrestrained influx of this type of vehicle into the country informed the fiscal policy embarked on by the federal government of Nigeria. The Federal Executive Council took the decision to review the age limit placed on vehicles coming into the country from five to eight years in January 2002. This decision has led to a noticeable rise in the prices of used cars. In the meantime, importers of such cars have devised a strategy of cutting off the seat belt making it difficult to know the year of manufacture of such vehicles.

Table 5: Causes of Road Traffic Crashes In 2014

STATE	SPV	UPD	TBT	LOC	MDV	WOV	BFL	OVL	DOT	WOT	DGD	BRD	RTV	OBS	SOS	DOV	DAD	ROV	PWR	FTQ	SLV	OTHERS	TOTAL
Abia	27	0	8	13	2	1	4	0	0	2	9	1	4	1	0	0	0	4	0	1	7	0	84
Adamawa	65	0	12	58	3	3	0	0	10	5	50	1	25	9	0	0	2	0	0	0	6	0	249
Akwa Ibom	31	0	5	12	2	1	3	1	1	2	8	2	7	2	0	0	2	2	0	0	3	0	84
Anambra	115	2	11	63	3	12	28	2	10	1	29	2	17	5	0	0	5	0	5	0	2	0	312
Bauchi	114	0	41	108	2	20	7	5	18	14	27	4	38	6	9	2	1	0	0	6	34	0	456
Bayelsa	4	1	1	61	0	0	3	0	7	1	5	0	3	0	0	0	0	0	3	0	3	0	92
Benue	143	2	15	24	0	15	5	14	5	6	53	2	0	5	2	1	0	9	1	2	17	0	321
Borno	5	0	0	12	1	0	0	0	0	0	2	0	3	1	0	0	0	0	0	0	0	0	24
Cross River	81	2	15	30	6	5	4	5	8	10	51	15	3	0	0	0	1	0	0	2	10	1	249
Delta	152	1	56	64	6	7	4	1	4	0	64	1	11	3	1	0	3	0	0	0	9	0	387
Ebonyi	93	1	18	30	20	0	10	3	18	7	39	4	19	5	4	0	12	0	0	0	3	0	286
Edo	137	0	19	74	6	15	36	0	8	3	21	1	17	12	1	0	2	1	1	0	4	4	362
Ekiti	36	0	3	18	1	5	10	1	0	1	7	5	2	2	0	0	2	1	0	0	2	0	96
Enugu	111	1	13	41	1	19	31	2	9	4	31	1	14	0	1	0	4	1	0	0	0	0	284
FCT	578	3	126	426	22	52	61	6	7	3	118	1	115	29	4	0	13	4	5	9	91	44	1717
Gombe	35	0	18	46	4	7	22	0	7	3	34	0	4	0	1	0	1	0	0	0	19	0	201
Imo	64	0	15	24	26	8	5	0	11	4	37	0	17	3	0	0	3	0	0	0	69	0	286
Jigawa	32	0	8	14	3	0	0	1	6	0	9	1	6	13	0	0	0	1	0	0	2	0	96
Kaduna	196	3	71	135	10	5	6	7	13	7	60	7	9	17	1	0	6	1	2	0	50	0	606
Kano	122	0	48	128	6	18	8	1	4	14	34	2	8	0	0	1	1	1	0	0	77	0	473
Katsina	57	3	17	48	0	1	3	18	6	0	18	1	4	1	0	0	0	2	0	0	14	0	193
Kebbi	69	0	7	9	1	8	0	4	1	6	10	1	6	4	0	1	1	6	0	4	13	20	171
Kogi	30	0	20	47	7	46	10	0	7	3	8	1	2	1	0	0	0	2	0	5	21	6	216
Kwara	4	0	15	35	8	11	5	1	1	5	27	7	9	3	2	0	4	0	1	0	50	0	188
Lagos	78	0	15	43	9	10	44	4	10	5	43	1	14	8	0	3	2	1	2	1	15	7	315
Nasarawa	198	4	74	183	22	79	16	13	17	18	180	9	42	9	5	1	11	7	2	17	283	0	1190
Niger	192	3	36	107	11	38	9	1	13	8	79	4	22	12	4	1	6	6	0	0	9	85	646
Ogun	112	2	23	72	8	7	15	7	11	0	27	2	11	1	0	0	0	5	0	0	6	1	310
Ondo	152	0	10	87	7	0	23	2	36	0	63	11	14	5	7	2	5	0	1	0	6	0	431
Osun	140	0	63	93	9	24	3	0	2	0	19	8	13	1	1	1	1	2	1	1	30	0	412
Oyo	122	1	29	63	4	37	13	8	21	2	21	2	16	4	0	3	0	2	2	6	12	0	368
Plateau	47	0	12	89	2	24	22	0	2	5	23	1	1	7	1	1	2	2	0	0	7	0	248
Rivers	48	0	16	30	3	4	0	0	10	0	9	0	7	0	1	0	0	0	0	0	0	0	128
Sokoto	42	2	3	66	2	0	6	3	5	0	1	0	12	0	1	0	0	0	0	0	7	5	155
Taraba	15	0	7	28	2	0	0	0	0	0	29	0	0	3	0	0	0	0	0	0	2	2	88
Yobe	8	0	7	8	6	4	0	0	3	1	19	0	7	8	2	0	0	1	0	0	1	0	75
Zamfara	41	1	16	56	1	3	2	4	18	7	60	3	11	1	0	0	3	2	2	7	21	0	259
TOTAL	3496	32	873	2445	226	489	418	114	309	147	1324	101	513	181	48	17	93	63	28	61	905	175	12058

Source: FRSC 2014

Summary description of some causes of traffic crashes on Nigeria's Roads:

- Over 70% of the total movements of the registered vehicles in the country and about 80% of the freight movements take place on the road. The over-dependence on road transportation and huge pressure on the already bad condition of the roads worsens the condition of roads and often causes many fatal road accidents.
- Speed limit: Over speeding, reckless driving and speeding violation could result to accident. Excessive speed is a major contributory factor to accident on our roads. Government functionaries' especially political public office holders, including the President, Vice President, Governors, Ministers, Commissioners, Chairmen of Local Government Areas and their convoys, have been identified as protagonists in fatal road accidents in Nigeria. They are involved in indiscriminate use of sirens, coupled with excessive speeding, and disobedient to traffic rules, traffic officers, recklessness and careless driving on highways. A renowned Nigerian University don, Comrade Professor Festus Iyayi (of blessed memories) was killed in an accident that involved the convoy of the former Governor of Kogi State, Captain Idris Wada, who back on 28th December, 2012 was involved in another fatal accident along the Lokoja–Ajaokuta Road, which killed his ADC, ASP Idris Mohammed. Similarly, the convoy of Comrade Adam Oshiomole, former governor of Edo State was involved in a gruesome auto accident, leading to the death of three reporters, while returning from a party function in April 2012 where some members of the People's Democratic Party (PDP) were being received into the defunct Action Congress of Nigeria (ACN). In the same year, three political aides of Governor Al-Makura of Nasarawa State were killed in a multiple auto crash involving the governor's convoy along the Gadabuke–Keffi Road in the state. Governor Abdul Aziz Yari was involved in a fatal car accident in 2012 that claimed the life of a police officer attached to his team. In Katsina in 2011, the ADC to the then State Governor Ibrahim Shema and four others died in a road accident that involved the governor's convoy, just 48 hours after two people died when their vehicle had an accident while travelling in the convoy of the former Niger State Governor Babangida Aliyu for a campaign rally. The list is not exhausted.

- Petrol tankers, trucks, trailers and articulated vehicles have significantly contributed to fatal road accidents in Nigeria. Trucks and trailers transport agricultural goods and industrial equipment and petrol through the tankers to various locations by road. According to statistics from the National Bureau for Statistics (2010), over 60% of the Nigerian population are engaged in agriculture. Transporting the products in trucks via roads plagued with potholes and congestion has caused several fatal road accidents. In 2011, the FRSC reported that Nigeria has an average of approximately 5,000 tankers involved in wet cargo haulage, moving about 150 million litres of fuel, and 2,500 "trailers" in dry cargo plying Nigeria's roads daily. Other works have shown that a total of 4,017 tanker/trailer crashes were recorded on Nigerian roads, with a yearly average of 1,148 crashes, monthly average of 96 crashes, and a total of 4,076 persons killed in such crashes involving tankers and trailers.
- Commercial cities like Lagos, Onitsha, Kano, Portharcourt, Abuja and Ibadan frequently experience fatal road accident owing to the number of inhabitants and socioeconomic activities like street trading. Drivers and hawkers scramble for space and drivers manoeuvre around other road users for space which often lead fatal road accidents.
- Tyres burst or blowouts due to non-observance of: (pressure, load required, and date) codes have caused fatal accidents on our roads.
- Negligence of weight regulation and dimension.
- Overloaded vehicles should be prohibited on the road until the weights are reduced to within the legal limit.
- Loading and unloading on the road should be prohibited because it is a source obstruction to other road users. Vehicle must not be left in a position where it will cause obstruction to others.
- Arbitrary Parking outside the designated area of parking is often dangerous and should be prohibited because it could lead to accident obstruction to others.
- Abandoned stationary motor vehicles or any part removed from a vehicle in the open air or on any other land of the highway.

- Failure to use seat belts: Seat belt for drivers and front seat passengers of motor vehicles are usually not in compliance. This

should be extended to travellers at the rear of motor vehicles. Seat belts are fitted to all vehicles and must be put to use.

- Drunk driving (through the use of alcohol and drugs). Drivers who take excess alcohol and banned drugs should not drive after getting drunk this because drugs and alcohol are the major cause of road accident.
- When enforcement of maintenance standard and checks on vehicles are compromised by the enforcement agencies and has made road unworthy vehicles to ply the roads.
- Distraction through the use of phones and other gadgets. Phone conversation and social interaction while driving, undermine drivers' sense of judgment and lead to distractions and increase the likelihood of crashes.
  Highway Code forbids the use of hand-held microphone or telephone handset (either to answer or make a call) while the vehicle is moving.
- Directional indicators and light signs violation. Safety signs violation (Geometrical shape, Coloured and Pictorial symbols) meant for prohibition, warning and safety signs are often neglected by drivers; these are regarded as major cause of accident on our roads.
- Dangerous overtaking such as driving against traffic has claimed a lot of lives in Nigeria.
- Brake failure: Minimum efficiency for the service of brakes (secondary brake, parking and handbrake) is not met and a such most brakes may likely to fail.
- Fatigue that might lead to sleeping and lost of concentration on steering.

3.1.2 Road Crashes: Global and Local Outlook

Road crashes are a leading cause of death and injuries in the world. Statistics from the Global data on injuries and violence shows that:

- In every five (5) seconds someone dies from injury, three thousand five hundred (3, 500) people leave home and never return daily.
- 1.3 million People worldwide die annually as a result of traffic injuries and 20 – 50 million injuries leading to disabilities including brain and spinal cord injuries.
- Road traffic injuries affect the poor and less privileged which had always lead to less chances of recovery and survival.

- It is the leading cause of death among able working bodies aged 15 – 29 years and 73% of those who lose their lives are male (leading to drastic effect on families' welfare, productivity and labour force).
- The road traffic mortality and morbidity rate is almost 300 percent higher for males in Asia and Africa (the highest in the world).
- Unless serious actions are taken road traffic death are forecasted to increase by 67% causing about 1.9 million deaths annually in Less Developed Countries (LDCs) whereas a decrease of 27% is expected in developed worlds between 2002 and 2020.
- 90 percent of road traffic accident deaths occur in Less Developed Countries and it's projected to increase in the future.
- Africa alone has a road traffic death rate of 28 per 100, 000 population (the highest in the world).
- Road crashes have high financial cost to the tune of $500 billion each year or 1.3% of each country's GDP (reflecting cost on medical treatment, rehabilitation, and loss of productivity).
- It is estimated that by the year 2020 road traffic crashes would be second leading cause of mortality in Less Developed countries (LDCs). (WHO 2013).

The situation in Nigeria from research findings can be summed up as follows:

- Road handles 90 percent of all transportation indicating absence of alternatives to it.
- With the over 7.6 million vehicular population on Nigerian roads, that is 44.4 per 1000 population, it is estimated that 35 vehicles per kilometre indicating inadequate road network in the country.
- With a population/road ratio of 861 people per kilometre, there is a clear proof of intense pressure on the available road network in Nigeria.
- At least 20 vehicular crashes with average of 15 deaths are recorded daily.
- For instance in 2014 alone, FRSC reported, a total of 10,380 crashes involving 16,779 vehicles that claimed 5, 996 lives with 32,063 injuries.
- On the average about 4 casualties per crash and over 47, 000 crashes are recorded annually.

- Five thousand five hundred and seventy seven (5,577) or 93% of the persons killed were adults while Four hundred and nineteen (419) or 7% were children.
- Similarly, thirty thousand and seventy (30,070) or 94% persons injured were adults while one thousand nine hundred and ninety three (1,993) or 6% were below 18 years of age.
- Generally, 42.8% of the vehicles in the crashes were Private, 55% Commercial, 2% Government and 0.2% Diplomat.
- 35% of the vehicles involved in crashes were Cars, 22% Motorcycle, 17% Minibus, 10% were trucks while 4% were Trailers.
- Total loss to road crashes has been put at over ₦7 billion annually representing about 3 percent of the GDP.

Table 6: Crashes and Causality Classification

STATE	CRASH CATEGORIES				CASUALTY CLASSIFICATION		TOTAL
	FATAL	SERIOUS	MINOR	TOTAL	KILLED	INJURED	CASUALTY
Abia	22	58	7	87	38	284	322
Adamawa	45	231	12	288	72	806	878
Akwa Ibom	18	34	5	57	23	111	134
Anambra	82	160	30	272	110	640	750
Bauchi	147	297	49	493	269	1,773	2,042
Bayelsa	10	54	31	95	21	152	173
Benue	91	190	9	290	169	973	1,142
Borno	2	12	-	14	2	51	53
Cross River	67	105	25	197	147	415	562
Delta	121	149	20	290	210	1,046	1,256
Ebonyi	93	113	42	248	113	501	614
Edo	109	111	19	239	216	708	924
Ekiti	22	35	3	60	48	165	213
Enugu	72	165	26	263	178	817	995
FCT	233	973	189	1,395	335	2,820	3,155
Gombe	53	124	2	179	107	779	886
Imo	63	144	34	241	103	672	775
Jigawa	43	56	2	101	115	480	595
Kaduna	263	249	13	525	539	2,242	2,781
Kano	163	219	22	404	358	1,482	1,840
Katsina	87	62	10	159	247	814	1,061
Kebbi	38	99	12	149	77	438	515
Kogi	134	107	13	254	304	1,095	1,399
Kwara	49	117	33	199	130	675	805
Lagos	61	188	72	321	110	731	841
Nasarawa	181	664	33	878	314	2,462	2,776
Niger	112	441	49	602	227	1,711	1,938
Ogun	129	133	36	298	232	983	1,215
Ondo	101	170	14	285	173	887	1,060
Osun	118	142	6	266	190	1,191	1,381
Oyo	145	121	6	272	277	1,137	1,414
Plateau	63	160	22	245	106	824	930
Rivers	38	67	32	137	67	353	420
Sokoto	35	111	12	158	108	341	449
Taraba	11	72	-	83	27	313	340
Yobe	24	34	12	70	127	382	509
Zamfara	72	189	5	266	107	809	916
TOTAL	3,117	6,356	907	10,380	5,996	32,063	38,059

Source: FRSC, 2014

In Nigeria the value of the estimated road crashes has high financial cost even though uncertain. This is because the Value of Statistical Life (VSL) is placed arbitrarily.

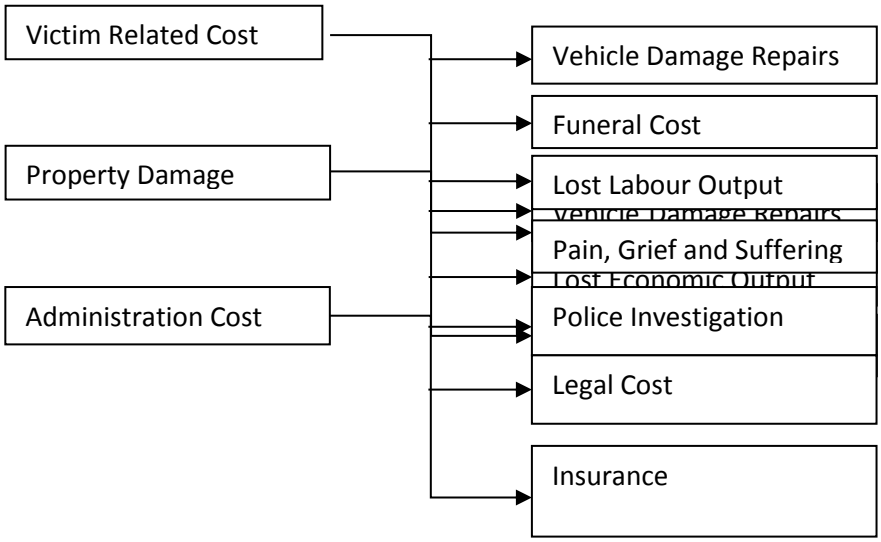

Fig. 4: Yardstick for estimating victim related cost in Nigeria

There are trend of events that occurred in which money were paid to families of victims who lost their lives during the events in Nigeria.

- During the 2011 election where some National Youth Service Corp (NYSC) members lost their lives, the sum of ₦5 million was paid to individual family.
- The management of Dangote Cement Company paid ₦2 million each as compensation to families of victims of accident in 2010 at Felele market.
- The families of Dana Air crash disaster got $100, 000 (about ₦16 Million each in 2012).
- Each of the 20 relatives of the Nigeria Police officer killed on duty from 2011 – 2012 were paid ₦ 500, 000 as compensation.

In the United State, the following estimates have been applied to determine the statistical value of life. The estimates are either for one year of additional life or for the statistical value of a single life.

- $50,000 per year of quality life (international standard, most private and public run health insurance plans used to determine new medical procedure).
- $129,000 per year of quality life (based on analysis of kidney dialysis procedures by Stefanos Zenios and colleagues at Graduate School of Business).
- $6.9 Million (Environmental Protection Agency)
- $7.9 Million (Food and Drug Administration).
- $6 Million (Transportation Department).
- $7 million (Median value for prime aged workers).

The income elasticity of value of statistical life has been estimated at 0.5 to 0.6. Note that development markets have small statistical value of life. This value also decreases with age.

In response to this growing global crisis of road traffic the United Nation Decade of Action for Road safety 2011 – 2020 was declared. The action plan covers four major areas of safety system aimed at stabilising and reducing global road fatality. They include:

(i) Building road safety management capacity
(ii) Improving safety of road infrastructure and transportation network.
(iii) Enhancing behaviour of road users.
(iv) Improving emergency services.

Sigurd (2003) proposed certain Transportation System Management programmes strive to adjust existing roadways networks and elements to improve capacity and facilitate traffic flow in the USA. He highlighted dozens of Transportation System Management methods including both physical features and operational approaches toward improvement of flow conditions. They include the followings:

1. Expediting traffic flow:
    - Improved signage to improve safety and cut unnecessary travel
    - Pavement markings to guide movements and enhance safety
    - Coordinate traffic signals to achieve continuity in movement
    - Channelization of traffic lanes to control flow
    - Left and right turn lanes and traffic signals expedite movement
    - Keeping lanes open at intersections (day lighting) to increase processing ability
    - Computer based traffic control to expedite all operations
2. Monitoring and metering:
    - Ramp metering signals to avoid overloads on vital facilities
    - Surveillance system to monitor traffic conditions (particularly on highways)
3. Giving attention to public services:
    - Bus priorities signals to expedite high density services
    - Bus turn out bays to remove blockage of lanes
    - Control of taxi operations; provision of taxi stands to minimise cruising
4. Controlling Parking:

- Strict enforcement of parking regulations to minimize entries
- Parking permits for local residents/workers to preserve livability

5. Adjusting the Use of the Network:
    - Reversible traffic lanes to balance supply and demand by time of the day
    - One way streets to increase aggregate throughput
6. Provide responsive management of operations:
    - Deployment of traffic police to discourage irresponsible behaviour
    - Collaboration with other traffic agencies for effectiveness
    - Incident management programs to clear obstacles quickly
7. Upgrading safety features:
    - Rumble strips along pavement edges or approaching stops to warn motorists
    - Motorist information systems to avoid unnecessary travel
    - Public education to foster responsible behaviour
8. Restricting Automobile Use or Entry
    - Auto-free zones; auto-restricted zones to allow important districts to operate
    - No drive days (by selective indicators, such as license plate numbers).

4.1 Bridging Research Gaps: Transportation Studies with Economic Analysis

In Nigeria most scholarly pioneering works on Transportation includes those of Hay and Smith (1973), Onokomaiya (1977), Filani (1981, Ogunsanya (1981), Bolade (1982), and Morenikeji (1998). In spite of the wide-ranging contributions to transportation study and modeling. The review of studies on transportation and road traffic are clearly done by geographic based scholars. Most of these studies lack economic theoretical bases. Economic scholars and researchers have completely neglected this area of study. This constitutes a gap in literature.

In bridging this gap, at the beginning I tried to employ the use of Classical, Neo-Classical and False Paradigm models, Implicit and Explicit growth models, Dualistic Theory of Growth, Theory of Production System and Economic Growth.

Similarly, most scholarly studies in transportation in Nigeria have been concentrated on intra-urban passenger traffic and freight to the negligence of inter-urban passenger traffic.

In the traditional gravity constrained and unconstrained models, variables such as population and distance have frequently been used to measure traffic from two points, origin and destination. This gap was also noted. In my studies additional variables such as, the level of education, industrial activities thus re-specified and modified the gravity model by enlarging the variables and scope of coverage.
Ullman (1957), explaining flows between regions suggested that they could be regarded as a flow of spatial interaction given the notion that is complementary. He considered distance as a factor that necessitated the expenditure of time, which was measured in real term. His findings revealed that flows were adversely affected if another source of supply closer than the first is available. He used the Newton law of gravitational force, which was expressed mathematically as:

$$F = \frac{GM_{1M_2}}{D^{2_{12}}}$$

Where; F = force
G = universal constant
M_1 & M_2= Sizes of the two masses involved
$D^{2_{12}}$ = Distance between the two masses (1,2).

In social science research the degree of attraction (flows between locations) is used as a proxy for force, while mass is associated with population, and distance is measured in cost term or in actual physical distance between the origin and destination. The constant G is empirically derived.

Filani (1981) modified the gravitational model in social science research as follows:

$$T_{ij} = \frac{a(P_i P_j)^{b_1}}{(d_j)^{b_2}}$$

Where, T_{ij} = the volume of passengers between cities i and j at a given time period.
$P_i P_j$ = the population of the cities i and j respectively.
d_{ij} = the distance between i and j

a, b_1, b_2 = estimated parameters.

Since the variables in the model include distance and population exponents, he transformed it to a regression equation expressed in logarithmic form as follows: $LogT_{ij} = a + b_1 Log(P_i P_j - b_2 Log(d_{ij})$. His finding agreed with the study of Revenstein (1885). This showed that migration occurs over a long distance, and tended to terminate in an urban area. He observed that the longer the journey the greater the likelihood that movement would end at a larger city. Thus the migration of workers tended towards larger cities and that as distance between the origin and destination areas increased the volume of flows will decrease.

Furthermore, Johnson (1975) and Morenikeji (1999) argued that each of the points in a system has a unique set of distance associated with it, in which case, any ordinary least squared estimate of the regression parameters for flows estimated from or destined for each point is peculiar to that peculiar configuration of distances and therefore distance exponents may not be reliable measures of interaction pattern.

Abler's extension can be expressed as;

$$V_i = \frac{M_j}{d_{ij}} + \frac{M_i}{d_j}$$

Where; V_i = the summation of the effects of n places on place i including the effects of i on itself.

M_j = the size of another place in the bound region.

d_{ij} = the distance separating i and j

The volume of movement is related to the medium, mode and nature of material to be transported and can be used as an indicator of the level of interaction and the level of connectivity between two or more points. Coffey (1981) observed that the structure of movement relates to its geometry. That is, the distance over which it takes place, the orientation of the movement, the shape defined by movement or a series of movements, the pattern of modes that are connected by movements and the absolute and relative locations of the termini of movement and the movement itself. Cox (1972) noted that there is correlation between direction and movement. He described direction–biased movement as that in which movement or the intensity of movements is restricted to a few of all possible directions. He concluded that if such channels or connections do not exist, then there would be no movement.

Siyan (2006) found this study relevant and in his studies of the overall form of Federal Capital Territory in relation to how transportation network affect the efficiency of operation. His investigations affirms that the problem of population densities and the density of other activities have very strong impact on travel demand and that urban growth combined with motorization has placed great pressure on the Federal Capital Territory of Nigeria. Thus, the emerging transportation problem in FCT, Abuja arises as a result of inadequate development of a proper road network. Growth of motorization and resulting traffic flows has not so far gained sufficient attention of the authorities. The available roads, parking facilities and public infrastructure have not been able to meet the rapidly growing demand. This shows clearly that the Federal Government has not learnt any lesson from her former mistakes of planning Lagos, the former capital city of Nigeria.

In order to provide efficient transportation for a rapidly growing FCT, Abuja therefore, there is need to be able to determine the rate of growth of the transportation need of the territory, in order to predict the rate of movement to the territory by the various transportation modes. The two principal modes are road and air transportation. By far road transportation is the dominant mode by which people move from every part of the country to the territory.

Our studies did a lot of modification to the work of White and Senior (1989) Newtonian gravity model. I arrived at this by appending a_1 and a_2, on the mass term to give a generalized gravity model of the form:

$$T_{ij} = G\, O_{ij}^{a1}\, D_o^{a2}\, d_{ij}^{-a3}$$

Where,

T_{ij} predicts gravitational model signifying the interacting quantity.
a_i = coefficient which is supposed to catch all those quantitative effect of any force for which they did not have quantitative data, d_{ij}^{-a3} shows the relationship between Transportation flow and spatial separation of a_3 determined empirically to show the closest fit between the observation and predicted flows d_{ij} measures the impedance effect of spatial separation of Transportation flows in terms of distance.
Siyan (2005, 2006 & 2016) specified four explanatory variables (Distance, Industrial establishment, Population, and School enrolment) against the flow of traffics and investigated the effect of the four variables on the volume and flow of traffic.

The result shows that the household trip rates were plausible and that distance and transportation cost minimize passenger movement. The study recommends the dualizaton of the major roads and increased funding through user charges, capital market and joint venture or fuel tax to boost road transportation development in the FCT, Abuja. It appears difficult for the government to rehabilitate old roads and construct new ones. The study, therefore, recommends the privatization of Nigeria's highways.

We have been able to modified version of white and Smith gravity model, which generally employed population and distance as the only mass terms. Their model, which shows interactions between only two places, has been extended.

Our studies over the years have shown very clearly interactions in terms of many variables at household, intra and inter zonal levels. The original and earlier works only considers interactions between two places at a time. Our researches over the years have shown interactions between the origin (FCT) and six geo-political zones of Nigeria in terms of population, distance, school enrolment and industrial activities.

5.1 Diagnosis and Prognosis of Road Fund

The economic reality is that most of the massive public investments in road transportation infrastructure are not matched by adequate resources to manage, maintain, rehabilitate or upgrade them. The manpower is weakly developed to manage the limited facilities. The implication is that most of this infrastructure lack proper maintenance and are gradually fading out.

The principle of private sector participation in businesses especially in road construction and management varies in intent and depth of government perception and strategic importance of certain sector. Here again, several options are available in the following forms:

(i) Outright privatization
(ii) Equity participation
(iii) Concessioning
(iv) Outsourcing
(v) Management contract
(vi) Restructuring and Commercialization

(vii) Divestiture and
(viii) Public–Private-Partnership

The road sector is going through serious period of restructuring. Countries all over the world are improving management of their road networks by introducing private sectors finance and setting up new funding styles.

The Road Maintenance Financing Reform program was embarked upon as part of the Road Sector Development Reform Program in Nigeria. Road fund is a dedicated Fund for road maintenance, following the principle that road users will pay the cost of maintenance on the bases of road use and services provided. Basically, it is designed with a vision to developing cost effective and dependable transportation system to the country. Adequate and sustainable financing to Roads at an optimum level with the necessity of using it efficiently and effectively is the core area of interest that is desired for achievement.

The Road Use Tax Fund (RUTF) is comprised of revenues originating from various sources. The major sources include: taxes on fuels, fees collected on vehicle registrations, titles and drivers' licenses, and use tax collected on motor vehicle purchases and related equipments. All vehicle registration fees, license fees, and motor vehicle fuel taxes are constitutionally mandated to be spent exclusively for the construction, maintenance, and supervision of the state's public highways. However, the use tax on motor vehicles and equipment are exempted from this constitutional mandate. All revenues deposited in the RUTF should be distributed for use through a formula shared to the Primary, Secondary, Farm-to-Market, and Municipal Road Funds which are used by state and local jurisdictions for the construction and maintenance of roads. These funds shall be used primarily for the construction and maintenance of highways.

Largely, Fund for road management in Nigeria and maintenance has been drawn from the federal government allocation to the appropriate ministry as the case may be. In the past the Petroleum Trust Fund (PTF), as part of its mandate, was responsible for monitoring roads, especially Federal Government roads. Perhaps because of the inherent inconsistency and inefficiency in the arrangement the Presidential Policy Advisory Committee (PPAC) was inaugurated to look holistically into the nations infrastructures. The committee endorsed the establishment

of a Road Fund through which the highway maintenance and funding was to be enhanced. The source of the fund was to include highway toll, vehicle taxes, Truck weight–bridges, parking fee and petroleum tax (formerly collected by the defunct PTF). The revenues are to be paid into the federation account. As a follow up to this arrangement Federal Road Maintenance Agency (FERMA) was also set up. The agency was responsible for administration and management of National Roads Maintenance Fund to ensure efficiency and accountability.

Transportation planners and managers must identify alternative sources of funding; owing to the fact that financial resources are dwindling and may continue if strategic alternatives ways of revamping the situation is not quickly looked into. The alternative financing sources could be grouped under: public, private and non-government organizations (NGOs) sources.

(a) The public sources are mainly statutory fiscal allocations from the federal government. These include:

ii) General tax collection – (personal income tax, corporate tax, value added tax and custom duties). All these taxes go into the federation account from which sectoral allocations are made.

iii) Users taxes and fees, as well as fuel tax (petroleum subsidy) and licensing/registration fees

iv) Toll collection

The second item has not been properly pursued while the third and fourth items have been completely abrogated in Nigeria.

(b) Private and NGOs sources are the other ways of financing road transportation infrastructure. These include those of individuals, private firms, NGOs, Community Based Organization (CBOs), and Joint Venture Companies (JVCs) mostly public and private initiatives; ploughing back profit earned by insurance companies, as well as vehicular spare parts dealers or manufacturers, tyre producing companies, and other Transportation allies. Unfortunately appropriate machineries are not put in place for this to manifest.

(c) The abrogated Petroleum Trust Fund (PTF) was once in vogue in Nigeria where reasonable share of the fund was used on road safety activities.

6.1 The Way Forward and Probable Cure

The first step in the developing of an adequate transportation for Nigeria is to review and update the existing transportation policy. Through planning rural and satellite towns could be developed to solve the problem of urban congestion and rural-urban migration. In solving the problem of congestion in Nigerian cities, I suggest that transportation plan must be given priority and planned with adequate infrastructure and personnel.

While planning is important, obeying traffic rules and orders will bring sanity to the road and reduce crashes and accidents significantly.
I make the following recommendations as probable solutions to our road transportation problems:

1. A well-developed transportation system with adequate access to cities and hinterlands would aid diversification and should be encouraged.
2. Invest massively in transportation infrastructure to address the current shortcomings and future needs of our transportation system and to support the flow of commerce within the country and globally.
3. Private individuals and firms should be encouraged to embark on institutional building, road safety works, and traffic safety funding in road construction and management. Appropriate business environment should be created and adequate incentives given when and where necessary for effective private sector participation.
4. All safety agencies should be empowered by law to discharge their duties and charge appropriately in order to be able to meet up with operational expenses of road management.
5. The federal ministry of transportation should initiate a funding system evolving from users' fees. The funding should be deposited in a special account and to be used for regular and routine maintenance and rehabilitation of our roads.
6. Tolls should be reintroduced with proper portfolio management and accountability of funds is highly desirable. The government should come up with an institutional framework for maintaining and financing our roads and all motorists should be compelled to pay full cost of driving on the highways to control daily travelling habit.

7. Improve on the existing policies to support integration to illustrate how different policies interact and their effect on modal split, congestion and pollution.
8. Enact and enforce a law that will encourage the use of updated tyres and outlaws out-dated ones. It should be an offence to use an already used 'Tokunbo'and unsuitable tyres on our road. Tyres must be inflated to the manufacturers recommended pressure. Refurbished or recycled tyres should be outlawed on Nigerian road to save lives.
9. Introduce and enforce "Speed Governor" otherwise known as Speed Limit Devices fitted into every vehicle operating on Nigeria roads to curtail speed and minimize accidents and blood on our roads.
10. The role and expertise of Economists must be emphasised in national building if cure to distortions ad shocks must be found.

7.1 Conclusion

Trend analysis has shown that the incidents of road crashes in Nigeria like other developing countries are phenomenal. Crashes and fatality will never and can never be completely eliminated, but further improvement steps can certainly be taken to reduce or ameliorate them. Recognising that accidents are caused by the inadequacies and failures in Human, Technical, and Environmental factors. To address these more training, mobilisation and enlightenment pogrammes should be organized for human (motorists/drivers, traffic agencies and policing) to reduce the trends and its tragic dimension on the economy.

The road sector is going through serious period of restructuring. Countries all over the world are improving management of their road networks by introducing private sectors finance and setting up new funding styles. Transportation planners and managers must identify alternative sources of funding; owing to the fact that financial resources are dwindling and may continue if strategic alternatives ways of revamping the situation is not quickly addressed.

Mr Vice Chancellor Sir, distinguished Ladies and Gentlemen, I thank you all for your Patience, Time and Attention. Remain blessed.

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