

Transportation and National Development: Emphasis to Nigeria

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Abstract

Development is crucial and essential to the sustenance and growth of any nation. A country is classified as developed when is able to provide qualitative life for her citizenry, also, the pride of any government is the attainment of higher value level of development in such a way that its citizens would derive natural attachment to governance. The development of transport in the overall activities of a nation is the ability to deliver an improved, efficient, effective, affordable, accessible, safe, reliable and an integrated transport system which will prosper the economic, social and political segments of the nation. Transport systems are closely related to socio-economic changes. The mobility of people and freight and levels of territorial accessibility are at the core of this relationship. Economic opportunities are likely to arise where transportation infrastructures are able to answer mobility needs and insure access to markets and resources. Despite the importance of transportation, it has huge effects on the environment.

Keywords: Transportation, development, national development.

1. Introduction

Development is crucial and essential to the sustenance and growth of any nation. A country is classified as developed when is able to provide qualitative life for her citizenry, also, the pride of any government is the attainment of higher value level of development in such a way that its citizens would derive natural attachment to governance. However, for a nation to be in a phase of development there must be some pre-requisites, which include socio-political and economic stability (Tolu and Abe Oluwatoyin, 2011).

Transport systems are closely related to socio-economic changes. The mobility of people and freight and levels of territorial accessibility are at the core of this relationship. Economic opportunities are likely to arise where transportation infrastructures are able to answer mobility needs and insure access to markets and resources (Jean, Claude and Brian, 2006). The development of transport in the overall activities of a nation is the ability to deliver an improved, efficient, effective, affordable, accessible, safe, reliable and an integrated transport system which will prosper the economic, social and political segments of the nation. All these functions makes transportation a derived demand as the sector in itself is not productive but is responsive to forces generation in the production and consumption sectors.

A growing share of the wealth of any nation is thus linked to its trade and distribution. However, even if transportation has positive impacts on socio-economic systems, there are also negative consequences such as congestion, accidents and mobility gaps (Jean, Claude and Brian, 2006).

Generally, the importance of transportation in the development of any nation can be summarized as:

1. Provision of infrastructures which improve the physical outlook,
2. Accessibility and facilities which enhances mobility,
3. Improving welfare, e.t.c

This paper deals with study of extent to which transportation impact the economic, social, and political development of the nation. It also examines the relationship between transport and environmental and between environment and transport.

2. Literature Review

2.1 Transportation

Transport which can also be referred to as transportation was derived from two Latin words 'trans' which mean 'across' and 'portare' which mean 'carry'. According to Merriam Webster Dictionary, transportation is an act, process, or instance of transporting or being transported. The same dictionary also defines it as a means of conveyance or travel from one place to another or a public conveyance of passengers or goods especially as a commercial enterprise. Longman Dictionary of Contemporary English (2003) defines transportation as a process or business of taking goods from one place to another or a system for carrying passengers or goods from one place to another.

Transportation refers to the process of conveying or moving of goods and people from place to place (Anyanwu et al 1997). According to Good and Jebbin (2015) transportation is a system for carrying passengers,

raw materials and goods from one place to another both internally and internationally, often through power driven machines. It is commonly said to refer to movement of people and goods from one place to another (Okefor, 1998). Transportation service is the part of physical distribution activity which is concerned with the actual movement of goods to their various consumers (Good and Jebbin, 2015).

Due to the fact that consumers are geographically separated from production areas, transportation is the basic activity which can make it possible for those residing outside the production areas to have access to the goods. It uses power driven machines to move goods through land, seas and mountains etc, using roads, railways, ships and aircrafts within and between nations (Good and Jebbin, 2015). Transport system made the transition from "isolated state" revealed by Von Thünen's theory, to an open economy. Necessity of developing economically space of a country is based on national and international transport system. A well developed internal transport system leads to linking economic activities by identifying locations that offer favorable conditions of production.

Transportation system has several elements or essentials without which it cannot function, the elements are;

1. Infrastructure, which includes the transportation network (i.e. roads, railways, airways, canals, pipelines, etc).
2. Vehicles, such as automobiles, trains, airplanes etc. This generally moves on the networks.
3. Operations, which deal with the control of the system such as traffic, signal and ramp meters, rail-road switches, air traffic control, etc, as well as policies, such as how to finance the system, for instance, use of tolls or gasoline taxes in the case of highway transport. Broadly speaking, the design of networks are the domain of civil engineering and urban planning, the design of vehicles, of mechanical engineering and special subfields such as nautical engineering and aerospace engineering, and the operations are usually specialized, though might appropriately belong to operations research or systems engineering.
4. Nodes or terminals (such as airports, railway stations, bus stations and seaports).

Generally, transport modes are combinations of infrastructures, vehicles, operations and terminals and the modes include walking, the automobile/highway system, railroads, maritime transport (ie ships, water-ways, pipelines and harbors) and modern aviation (i.e. airplanes, airports and air traffic control). Thus the main modern modes or forms of transportation in Nigeria include the automobile/highway system (road), railway or railroads, water or maritime transport, air or modern aviation and pipeline. Thus when we talk about developments in transportation, we are referring to developments in these forms or modes of transportation.

Transportation as a derived demand does not just occur without a purpose and the purposes are not far-fetched and not beyond the following;

1. Spatial interaction
2. Economic purposes
3. Social integration

The three reasons will be broadly discussed in the theory of spatial interaction;

A spatial interaction is a realized movement of people, freight or information between an origin and a destination. It is a transport demand/supply relationship expressed over a geographical space. Spatial interactions cover a wide variety of movements such as journeys to work, migrations, tourism, the usage of public facilities, the transmission of information or capital, the market areas of retailing activities, international trade and freight distribution (Jean, Claude and Brian, 2006).

Economic activities are generating (supply) and attracting (demand) flows. The simple fact that a movement occurs between an origin and a destination underlines that the costs incurred by a spatial interaction are lower than the benefits derived from such an interaction. As such, a commuter is willing to drive one hour because this interaction is linked to an income, while international trade concepts, such as comparative advantages, underline the benefits of specialization and the ensuing generation of trade flows between distant locations (Jean, Claude and Brian, 2006). Three interdependent conditions necessary for a spatial interaction to occur:

1. Complementarity: There must be a supply and a demand between the interacting locations. A residential zone is complementary to an industrial zone because the first is supplying workers while the second is supplying jobs. The same can be said concerning the complementarity between a store and its customers and between an industry and its suppliers (movements of freight). If location B produces/generates something that location A requires, then an interaction is possible because a supply/demand relationship has been established between those two locations; they have become complementary to one another. The same applies in the other direction (A to B), which creates a situation of reciprocity common in commuting or international trade (Jean, Claude and Brian, 2006).
2. Intervening opportunity: There must not be another location that may offer a better alternative as a point of origin or as a point of destination. For instance, in order to have an interaction of a customer to a store, there must not be a closer store that offers a similar array of goods. If location C offers the same

characteristics (namely complementarity) as location A and is also closer to location B, an interaction between B and A will not occur and will be replaced by an interaction between B and C (Jean, Claude and Brian, 2006).

3. **Spatial transferability:** Freight, persons or information being transferred must be supported by transport infrastructures, implying that the origin and the destination must be linked. Costs to overcome distance must not be higher than the benefits of related interaction, even if there is complementarity and no alternative opportunity. Transport infrastructures (modes and terminals) must be present to support an interaction between B and A. Also, these infrastructures must have a capacity and availability which are compatible with the requirements of such an interaction (Jean, Claude and Brian, 2006).

2.2 Development

Development as a concept is a victim of definitional pluralism. It is a difficult word to define. It is a commonly held view that development is a complex concept with a plethora of interpretations from the various schools of thought in the social sciences. For instance, its meaning has progressed from its narrow conception in terms of narrow economic indices such as a rise in per capita income in the 1950s and 1960s, to a broader one (Okowa, 1991; and Todaro, 1977). It is in this context that Okowa (1997) defined development simply as the process whereby a society changes in all its ramifications in a direction that is beneficial to all her citizens or at least to a majority of them. Some of these definitions will be explored for the purpose of this study.

According to Gboyega (2003) development is an idea that embodies all attempts to improve the conditions of human existence in all ramifications. It implies improvement in material well being of all citizens, not the most powerful and rich alone, in a sustainable way such that today's consumption does not imperil the future, it also demands that poverty and inequality of access to the good things of life be removed or drastically reduced. It seeks to improve personal physical security and livelihoods and expansion of life chances (Tolu and Abe, 2011). Chrisman (1984) defines development as a process of societal advancement, where improvement in the well being of people are generated through strong partnerships between all sectors, corporate bodies and other groups in the society. It is reasonable to know that development is not only an economic exercise, but also involves both socio-economic and political issues and pervades all aspects of societal life (Tolu and Abe, 2011).

Development is also defined according to Akpakpan, (1987); and Wilson, (2002) as a process of improvement in the general welfare of the entire society usually manifested in desirable changes in the various aspects of the life of the society such as:

1. A reduction in the level of unemployment;
2. A reduction in the extent of personal and regional inequalities;
3. A reduction in absolute poverty;
4. Rise in real output of goods and services and improvement in techniques of production;
5. Improvement in literacy, health services, housing and government services;
6. Improvement in the level of social and political consciousness of the people;
7. Greater ability to draw on local resources (both human and material) to meet local needs; and
8. Reduction in pollution and/or environmental degradation.

2.3 National Development

Longman Dictionary of Contemporary English defines "national" as a phenomenon that embraces a whole nation. National development therefore can be described as the overall development or a collective socio-economic, political as well as religious advancement of a country or nation (Tolu and Abe, 2011). Consequently, Okowa (1997) defined national development as the process whereby a given nation moves in its total setting in a direction beneficial materially and otherwise to its entire people. The import is that the whole of the people or at least a majority must be involved in the above process or motion and hence the need for national objectives which when achieved, will enhance the improvement of the social welfare of the people (Good and Jebbin, 2015).

3.0 The Evolution of Transportation in Nigeria

Geographically, Nigeria occupies a strategic and central position in Africa. In fact, the centrality and strategic position of Nigeria geographically in the African continent is described by Ukwu (1985) thus: "The area has from historic times been one of the major crossroads of Africa, culturally and economically. The boundaries of seven of the major language sub-families of Africa meet within it, and ancient, political and economic relationships link it with the surrounding areas and across the continent to the wider world. Some of those links have been of special historic significance. The Trans-saharan routes focused on Kano/Kaduna in the northwest and in Bornu in the northeast, through which the earliest trade links between the area and the Mediterranean Coast-lands and Europe were established and Islam introduced;

1. The Sudan corridor, the political currents of which continually swept the northern parts;

2. The trade routes linking the area to the forest kingdoms of Western Guinea lands; and
3. The less-intensively used links across the mountainous eastern borderlands, which mediated our links with Central Africa and the Indian Ocean lands and the introduction of some most important food crops today”.

The review pointed out that the initial phase of European contact with Nigerian territory was seaborne. The ports, both coastal and riverine, became the points of access to, and bases for the European penetration of the interior. One of the earliest and most significant results was the introduction of new crops, some of which have become central to the local agricultural economy. Thus the above excerpt summarizes the centrality and strategic position of Nigeria, geographically in the African continent. However, while the development of European trade led to the rise of many trade centers in the coast, creeks and river systems and greatly enlarged the scope of trade, the means of transportation remained traditional up to the beginning of colonial rule.

The dominant forms or modes of transportation were animal and human portage on land and dug out or hand-pooling canoe on water. Thus, although the extent and drive of trade and marketing was well attested to, the nature of the existing means of transportation limited the scope of long distance trade to a few trade staples that were able to bear their costs such as gold, salt, kola, pepper, metal tools, textiles, horses and slaves (Ukwu, 1985). Such trade did not involve many of the people whose daily cycle of interaction was confined by their location. Even where there was specialized production, it was usually under centralized control by the state or the merchant princes or by specialized communities. Thus the expansion of economic opportunity was by itself capable of stimulating greatly increased production without any significant change in transportation as was the case with the palm oil trade in the late 18th and early 19th centuries. Hence, it was not until the development of new means of transportation under colonial rule that the various parts of the country became drawn systematically into the orbit of modern society and the economy (Good and Jebbin, 2015).

3.1 Transportation Developments in Nigeria

According to Walker (1958) the development of transportation and communication under colonial rule reflected both the priorities of the metropolis and the local technological and economic environment. The initial phase of contact was waterborne, with the ports, both coastal and riverine, as the points of access to, and bases for penetration of the interior. Thus, the earliest British efforts at transportation development were concentrated on clearing and dredging rivers, notably between 1900 and 1931 and until the northern and southern railway systems were linked in 1912, the water ways provided the only mass transport links between the two areas (Ukwu, 1985).

However, with the integration and expansion of the railway system, the internal waterways were abandoned. Although motor vehicles were introduced as early as 1909, it was not until 1926 that there was a comprehensive plan to organize a road system. Thus, serious road construction did not start until the late 1930s, but subsequent development in road construction was so rapid that, according to Ukwu (1985) road transportation soon became the dominant mode for medium and long distance movements.

Taaffe Morrill and Gould (1963) undertook a comparative analysis of the development of transport in developing countries and they were able to show that certain broad regularities permitted “a descriptive generalization of an ideal typical sequence of transportation development”.

Their spatial model of transport network development in developing countries has proved to be a valuable help in the understanding of transport development and has been widely applied. The model which Taaffe and his colleagues devised was based upon Ghanaian and Nigerian experience, but it has been found to be applicable to other developing lands, for example, in Latin America.

Taaffe et al (1963) identified six stages in their sequence of transportation development, thus:

THE FIRST STAGE: This consists of scattered settlements and small ports along a coast, which arose from colonial occupation. Such coastal settlements developed trading functions, though in the beginning these were of a very limited nature and, in consequence, their hinterlands were very restricted. There was little lateral inter-connection between the scattered settlements, except for those effected by native fishing craft of occasional trading ships.

THE SECOND STAGE: This evolved slowly but gradually as lines of inland penetration developed and some of these which linked up mining settlements or centers of population became more important than the others. With the emergence of these major lines of penetration, often linked to the best located of the coastal ports, port concentration begins to develop and these commence to grow at the expense of their neighbors, some of which eventually disappear as trading centres or at best linger on as relict ports. This second stage goes on, hand in hand with the growth of an efficient administrative system and, more particularly, with the expansion of production for export.

THE THIRD STAGE: This is marked by the development of ‘feeder’ routes which focus more particularly upon the main ports and the more important centres in the interior. At the same time, as the growth in the export trade stimulates economic expansion generally in the hinterland, a number of immediate centres begin

to develop along the major access routes.

THE FOURTH STAGE: These intermediate centres begin to develop into nodes which become focal points for feeder networks of their own. The beginning of lateral interconnection also takes place with land between the major ports and the major inland towns being affected.

THE FIFTH STAGE: This is the emergence of complete interconnection as the feeder networks grow around the ports, major inland centres and main-line nodes and begin to link up.

THE SIXTH STAGE: As the economy becomes more developed and integrated, all the principal centres and many of the minor centres are linked together in the transport system, while a number of high priority trunk routes develop which link the largest or most important centres (Culled from geographynotes.com, 2013).

Relating the Taafe et al (1963) colonial model of transportation expansion to the specific case of Nigeria, Ukwu (1985) asserted that “For Nigeria, the second phase may be said to be represented by the railway development phase and today the association of the railway line with the concentration of modern facilities in Nigeria is still overwhelming”. The third phase is reflected in the rapid expansion of road transport between 1945 and 1960, while the development of the high priority linkages is still in process, the last developed now being the Lagos-Kano, Port Harcourt-Jos, and Lagos-Onitsha routes, the two of which reinforce the older pattern of dominance. And as observed by Ukwu (1985), today ultra-modern roads have emerged from nearly all parts of the country comprising of Trunk ‘A’ which is the federal road network made up of the North-South and East-West ones forming the basic grid of the national network into which other link roads enmesh, as well as Trunk ‘B’ and ‘C’ roads.

In addition, international highways leading to Nigeria exist, and they include the road link with Niger Republic via Zinder; Cameroon via Marocia or Mamfe; the Republic of Ghana, Togo and Benin via Idroko and the Republic of Chad from Ndjamena (Anyanwu, et al, 1997).

Nigeria has 193,200 km (120,049 mi) of roads. Most Nigerians travel by bus or taxi both between and within cities. During the 1970s and 1980s federal and state governments built and upgraded numerous expressways and trans-regional trunk roads. State governments also upgraded smaller roads, which helped open rural areas to development. However, by the mid-1990s lack of investment had left most of the roads to deteriorate (Microsoft ® Encarta, 2009).

Nigeria has 3,528 km (2,192 mi) of operated railway track. The main line, completed in 1911, links Lagos to Kano, with extensions from Kano to Nguru, from Zaria to Kaura Namoda, and from Minna to Baro. The use of railways, both for passenger and freight traffic, has declined due to competition from the road network.

Nigeria’s largest ocean ports are at Lagos (Apapa and Tin Can Island), Port Harcourt, Calabar, Sapele, and Warri. The main petroleum-exporting facilities are at Bonny and Burutu. Transportation along inland waterways, especially the Niger and Benue rivers, was very important during the colonial era. In the late 1980s the government upgraded river ports at Onitsha, Ajaokuta, Lokoja, Baro, Jebba, and Yelwa. Locks have been constructed at Kainji Dam to facilitate navigation. River transport is used mainly for shipping goods (Microsoft ® Encarta, 2009).

Nigeria has three international airports: in the Lagos suburb of Ikeja, in Abuja, and in Kano. Internal flights serve the majority of state capitals, of which Kaduna, Port Harcourt, and Enugu are the busiest. Nigeria Airways, the national carrier, offers both domestic and international flights. Several small regional carriers also compete for domestic traffic (Microsoft ® Encarta, 2009).

With respect to the various forms of transport, the main trends of development could be summarized by reference to a few key statistics. Thus, according to Ukwu (1985), there were some 1,300km of motorable roads in 1925, 40,000 in 1950, and 100,000 in 1975, in 1980, there were a total of 114,768km roads in Nigeria and the additional length of Federal Government roads between 2003 and 2006 are 34,340.95km in 2003 and 34,341.25km in 2006. The data is summarized in the figure below:

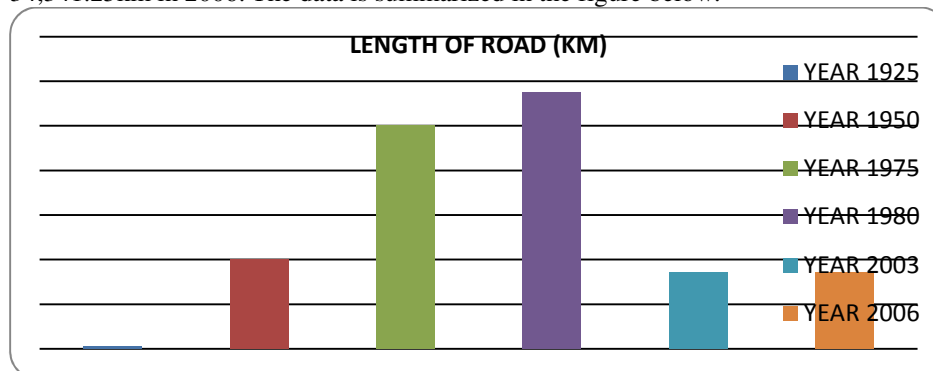


Figure 1: Graphical representation of the length of roads in Nigeria.

Source: Authors' work

On the other hand the railway reached the peak of its traffic in 1960/61 when it carried 7.9 million passengers, declining to 4.7 million passengers in 1973 (Ukwu, 1985). However, Anyanwu et al (1997) presented passenger traffic of 9.6 million in 1960-1971; 6.1 million in 1972-1978; 8.2 million in 1979-1982; 11.5 million in 1983-1987 and 4.4 million in 1988-1992, thus giving a peak in 1983-1987. The figures in the first decade of the 21st century are 987,088 in 2002; 1,622,271 in 2003; 1,751,159 in 2004 and 752,482 in 2005 (NBS, 2008). It is also depicted in figure 2 below;

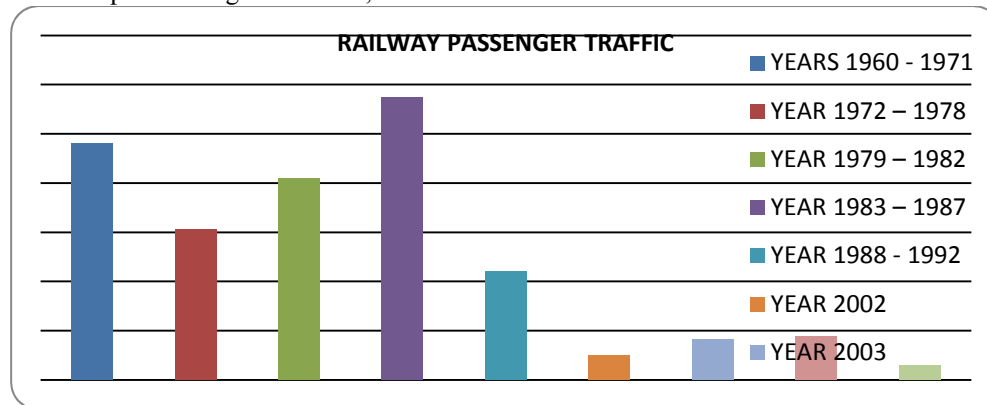


Figure 2: Graphical representation of the passenger traffic on railway in Nigeria.

Source: Authors' work

There has been a rapid increase in air transportation since the 1970s, although not all the cities are linked, and the linkage structure further reinforces those of road and rail.

Presently, Nigeria has 20 airports namely; Murtala Muhammed-Lagos, Aminu Kano-Kano, Port Harcourt, Margeret Ekpo-Calabar and Nnamdi Azikiwe-Abuja, all international airports. Others include Akure, Benin, Enugu, Ibadan, Ilorin, Jos, Kaduna, Maidiguri, Makurdi, Sokoto, Yola, Minna, Owerri, Katsina and the recently completed Akwa-Ibom airport at Mbo. This implies that 19 out of the 36 states have airports, since the names of most of existing airports tally with the names of states or state capitals (Wilson, 2005). In terms of passengers carried, it rose from 597,270 in 1975 to a peak of 2,575,038 in 1985 and started declining to a low of 354,000 passengers in 1993 (Anyanwu et al, 1997). In recent times, the figures for passenger arrivals at both international and domestic airports are 3,920,031; 4,938,077; 4,501,785; 4,532,334 and 5,700,311 respectively for 2003, 2004, 2005, 2006 and 2007, while the corresponding figures for passenger departures are 3,930,644; 4,443,537; 4,785,263; 4,573,457 and 4,725,785 (NBS, 2008). The information is illustrated in the figure 3.

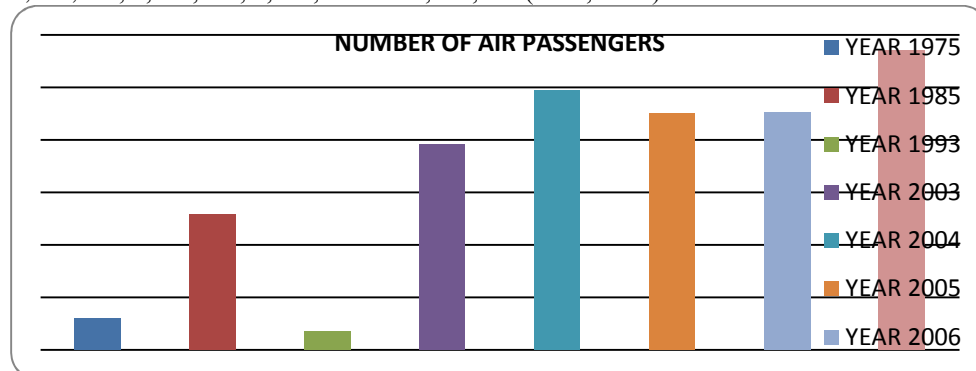


Figure 3: Graphical representation of the air passenger traffic in Nigeria.

Source: Authors' work

With regards to water transportation, the number of seaports in Nigeria has increased from two in 1960 to 14 presently. These include Apapa, Tin-Can Island, Port Harcourt, Okrika, Federal lighter Terminal, Bonny, Warri, Koko, Sapele, Container Terminal, Roro, Federal Ocean Terminal, Calabar and Tuma. In terms of foreign trade cargo loaded and discharged at Nigerian ports between 1999 and 2005, the figures for instance are: 96,817; 111,279; 10,679,109; 13,288,917; and 13,551,854 for 1999, 2000, 2003, 2004 and 2005 respectively for the loaded, while those for discharged are 13,975; 15,991; 23,099,847; 23,359,879 and 26,051,234 respectively for the 1999, 2000, 2003, 2004 and 2005 periods; and the net registered tonnage of vessels entered in Nigerian ports between 1999 and 2003 are 57,193; 123,037; 130,014; 118,211; and 132,388 respectively for 1999, 2000, 2001, 2002 and 2003 (NBS, 2008). Figure 4 below also depicts the information.

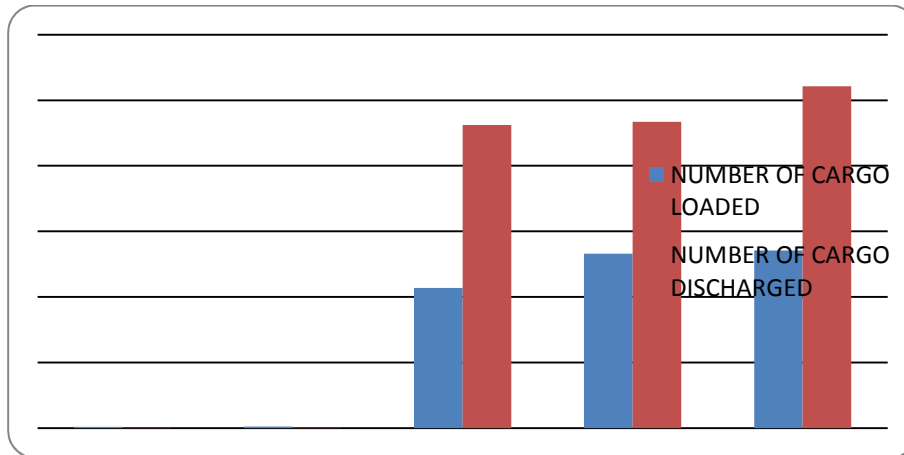


Figure 4: Analysis of loaded and discharged cargo in Nigerian port movement in the country.

Source: Authors' work

From figure 4 above, it can be shown that Nigeria import goods more than export.

The discovery of crude oil and the associated gas has popularized pipeline transportation in Nigeria. Thus there are two pipeline network in the country presently namely;

1. Petroleum and
2. Gas pipelines.

The petroleum pipeline network is made up of five subsystems namely: the South-West system connecting the major depots at Mosimi to Atlas Cove, Lagos, Ikorodu, Ikeja, Ibadan and Ilorin depots; the Warri to Benin to Ore pipelines; the North to South system made up of the 606km transmission line linking Warri and Kaduna for conveying Escravos crude oil and imported heavy crude to Kaduna refinery; the Kaduna to Jos to Gombe pipelines; the Kaduna to Zaria to Gusau pipelines as well as the Kaduna to Zaria to Kano pipelines. The other is the South to East line linking Port Harcourt to Aba, to Enugu to Markurdi. There is also the Warri to Escravos line designed essentially for the exportation of crude oil (Anyanwu, et al, 1997). Also, the natural gas pipeline network is made up two systems namely;

1. The Western systems and
2. The Eastern systems.

The Western system is made up of the Delta Steel Aladja to Ughelli area line and another which links Escravos through Warri and then Ajaokuta/Abuja, Egbin and Sapele thermal power stations. These lines are used to convey natural gas which serves as fuel to the various power stations, steel complexes and rolling mills in the country. Eastern system of the natural gas pipeline is not as developed as Western system. However, there are gas pipelines connecting the Obrikom and Obite from the ONELGA gas field, and from Soku through Rumuji to Bonny for the Liquefied Gas Plant.

4.0 Discussions

4.1 The impact of transportation on national development

The impact of transportation on Nigeria's national development has been pervasive (Good and Jebbin, 2015). However, for ease of analysis we choose to evaluate the impact on Nigeria's national development from three perspectives, which are;

1. Economic,
2. Social,
3. Political (Ukwuu, 1985 and Okeafor, 1998) and
4. Environmental.

The economic impact of transportation on national development

Economically, transportation impacts on our national development in the following ways;

1. It utilizes a sizeable number of the nation's labour force. For instance, the transportation industry provides employment to the following categories of Nigerians.
 - a. All operators on road, rail, sea and air transportation services;
 - b. Bus, taxi, truck including private drivers of such vehicles and owners of tankers;
 - c. Operators of transport related terminals such as motor-parks, airports, seaports and railway stations in various locations of the country;
 - d. Air craft, motor vehicle equipment dealers and parts dealers; and
 - e. Transport related industries such as car-parts dealers (both new and used), car mechanics and garages, fuel service stations, highway employees and agencies, government transport employees,

etc (Wilson, 2004). All these work in different capacities and different parts of the country to enhance the operation of the nation's transport system. In quantitative terms, the transportation sector accounted for at least 0.84 percent on the average of annual employment of 49,522,028 Nigerians between 2003 and 2007, and the real growth rates of employment in the sector at constant 1999 level were 13.28, 7.65, 5.39, 6.75 and 27.6 percent respectively for 2001, 2002, 2003, 2004 and 2005 (NBS, 2008).

The implication is that positive developments in transportation are more likely to increase employment opportunities for the citizens, taking into cognizance the consequences of unemployment on the nation.

2. It increases the Gross Domestic Product (GDP) of Nigeria in combination of number of ways;
 - a. Its services move goods and services to near and distant markets where they attract higher prices and profits for producers;
 - b. The higher prices and profits from sales attract business units to expand production which end up increasing their level of output. Second, transportation services spur the level of economic activities and economic development by enhancing the mobility of production factors such as labour, capital and entrepreneurship, thus permitting large-scale production or operation and the attendant increase in output. These activities widen the area that consumers and producers can draw upon for their products and resources as well as expanding the area to which a given producer can distribute its products.
 - c. Its services and related revenues to transport owners increase with increase in productive activities and the employment of personnel and their incomes, etc increase. All these increases in the value of goods and services arising from increases in the level of transportation services and prices combine to increase the value of the GDP. For instance, between 1981 and 2006, the transportation sector contributed above 3.4 percent on the average to Nigeria's GDP. Thus positive developments in transportation could really affect the economy favorably to make it a great and dynamic economy.
3. The Nigerian economy is crude oil and recently, natural gas driven. For instance, crude oil alone accounts for over 80 percent on the average of the Federal Government revenue annually as the figures 80.6, 84.7, 85.1, 87.2 and 78.1 percent for 2003, 2004, 2005, 2006, and 2007 respectively, show (NBS, 2008). But crude oil production in the country depend to a large extent on transportation especially pipeline, and to a lesser extent sea and road transportation. This implies that positive developments in transportation will affect the Nigerian economy positively through increase in crude oil production and the attendant increase in revenue to enable her become a truly strong and self-reliant economy and a land of bright and full opportunities.

On the other hand negative developments in transportation could adversely affect the oil sector and thus the revenue position of the country and the attendant negative multiplier effects.
4. Electricity is vital for development such that the rate of energy utilization is often used as a development index. This is due to the fact that the effect of electricity usage re-vibrate through the economy, serving first, as a source of energy for industrial and commercial outfits, as well as wide spread domestic use and second, as an outlet for the products of other industries like coal, fuel, oil, natural gas, diesel oil etc, and the attendant employment generation. Apart from the Kainji, Jebba, Shiroro and recently Zungeru power stations that are generated using water, the rests are thermal stations which make use of gas mainly, or fuel as the case may be. The gas that fuels these power stations are transmitted through pipeline as discussed earlier. The import is that positive developments in transportation have the potentials of enhancing uninterrupted power supply all things being equal, and the attendant boost in virtually all the sectors of the economy, thus making the economy a truly strong, self-reliant, great and dynamic one.
5. It allows geographical specialization of industries. The existence of transportation services allows firms as well as regions of a nation to specialize in the production of goods or products and services which they can produce most economically in line with the Richardian principle of comparative advantage which asserts that an area should specialize in the production of goods for which it has the greatest comparative advantage or the least comparative disadvantage. Without effective transportation service, it will be difficult for specialization to take place.

In Nigeria, the northern part uses its inertia to specialize in the production of crops like beans, pepper, onions, yams, vegetables, etc and rear cattle, goats and sheep etc in large quantities while the southern part concentrates on the production of forest products like kola-nuts, palm oil, garri etc. The availability of transportation has given room for the existence of a strong North- South internal trade relationship in which the excess products from the North are moved to the South where they are most needed while the excess products from the South are moved to the North where they are most needed, thus fostering unity between the two regions and strengthen the national economy. Equally, the above relationship permits large-scale production, expands local products market and provides place value to the products, all of which could

combine to make the Nigerian economy a truly great, strong self-reliant and dynamic one, and land of bright and full opportunities.

6. The world today is a global village in which Nigeria is a participant. The existence of transportation networks like roads and railways and terminals like airports and seaports enables Nigeria as a nation to participate in this global village (Good and Jebbin, 2015).

The social impact of transportation on national development

Positive developments in transportation service equally impact positively on the social life of a nation in two significant ways;

1. Transportation makes it possible for;
 - a. People who live in one area or part of the same city or different cities in the same country to travel to other areas or parts of the same city or different cities in order to maintain family or friendly ties over time;
 - b. Workers to and fro on daily basis from their work places;
 - c. Schools to operate and students to obtain education. Again transportation complements communication network. For instance letters, packages etc move from senders to receivers in other parts of the country or even outside the country. Thus, the Nigerian postal services e.g NIPOST, depend on the transportation system.
2. Finally, it brings people together. Individuals, economic units and communities develop at different rates and execute different programmes. Thus, effective transportation services can make it possible to bring together these separate individuals, economic units and communities to use common systems, standards and services such as education, sports and politics, thus fostering a united, just and egalitarian society.

Political impact of transportation on national development

Positive developments in transportation services can be used to regulate the political life of a nation in two basic respects;

1. It acts as an aid to govern the states and the nation. For instance, national, state and local governments design and construct feasible rout/routes or transport facilities around the country in order to maintain an effective transport network system. These facilities as earlier observed include highways, seaports, waterways, railway routes and airports etc. Government designs the transportation in order to enable its leaders and politicians to travel easily and interact with the people they govern.
2. Transportation is needed in order to create and maintain national unity and enforce national laws and regulations.
3. It makes the defense of a country cheaper. For instance, national governments generally recruit and maintain their armies at strategic locations within the country. Transportation services is what the national command uses to effectively move military personnel and equipments to troubled areas whenever the need arises; the deployment of the Joint Military Task Force (JTF) to the Niger Delta region of the country in the wake of the militancy in the area and recently to the Northern states of Borno, Yobe and Adamawa to quell the Boko-Haram insurgency are cases in point. Again, effective transportation services enable the government to retain the number of soldiers which can be effectively moved to protect the nation in the event of emergencies.

Environmental impact of transportation on national development

Emphasis for the environmental is needed when planning for the operation of transport infrastructure. There is need for environmental sustainability so that the future of the transport industry will not be compromised. In most developed countries, significant effort has been made in the area of sustaining transport development and this brought about several transportation policies, measures, and innovations.

The relationships between transport and the environment are complex. The relationship will be considered in two forms;

1. The impacts of the environment on transport and
2. The impacts of transport on the environment.

The impacts of the environment on transport

The environment has always played a constraining effect on the mobility of people and goods (Barke, 1986).The main elements are physical distance, topography, hydrology, climate and natural hazards.

- a. Physical distance: This has had a paramount effect limiting spatial interactions. Hence, the cost of overcoming the friction of distance. Human progress has been marked by technological developments in transport that have shrunk distance barriers, while never completely overcoming them, except for telecommunications (Jean, Claude and Brian, 2006).
- b. Topography: This continues to play an important role in shaping transportation. Several transport modes, such as rail and canals, are still very constrained by slopes, and while other land modes, such as roads and pipelines, have the capacity to adjust to gradients, their routings are influenced by

topography. Transport systems seek the paths of least resistance, and for this reason valleys and plains usually have the densest networks. Topography also influences water transport, since the configuration of river basins may or may not coincide with trade flows; and port sites may not be available where needed. Historically, mountains and deserts are also barriers to interaction, serving to isolate regions (Jean, Claude and Brian, 2006).

- c. Hydrology: This has a particular effect on water transport. The depth of channels may not be adequate to support the size of vessels required. Fluctuations in water levels because of seasonality may interrupt navigation. Tidal conditions influence access to ports and impede loading operations in ports where the tidal ranges are large. Also, land transport modes may be influenced by hydrological conditions. Rivers and estuaries may serve as barriers to interactions between the different shores, requiring transfers to ferries or necessitating long detours to bridgeheads. Permafrost makes construction of routes and transport infrastructures extremely difficult in arctic and sub-arctic regions (Jean, Claude and Brian, 2006).
- d. Climate: This affects transport systems in both direct and subtle ways. In the days of sailing ships, trade patterns were dictated by prevailing winds. Among many examples, there was the triangular trade between Europe, Africa and the Americas during the seventeenth to nineteenth centuries. Contemporary air travel is very much influenced by the air circulation of the upper atmosphere. Winter conditions, particularly the freezing of water bodies which interrupt regular shipments. Climate also has many more subtle impacts that are of shorter duration. Snow, fog, wind and rain events may cause delays and disruptions. Air transport is particularly prone to such impacts, although other modes may also be affected by such events (Jean, Claude and Brian, 2006).
- e. Natural hazards: These have the potential to impact greatly on transport systems, as indeed they affect all human activities. Geological events such as earthquakes, tsunamis, and volcanic eruptions can be catastrophic in their human impacts and along with more localized occurrences such as landslides affect the operations of all modes. Hurricanes and tornadoes have the power to at least disrupt activities and at worse to destroy infrastructures. Exceptional rain storms can produce flooding, and because transport routes tend to follow low-level paths, severe dislocations to transport systems can occur. Freezing rain events are particularly disruptive. Environmental conditions can complicate, postpone or prevent the activities of the transport industry (Jean, Claude and Brian, 2006).

Technological developments have permitted to overcome the obstacles of the physical environment. The physical relief had to accept changes. These changes are generating costs. Environments have been transformed, destroyed or even artificially created to such an extent that it is extremely difficult to identify a pristine reference. More importantly, transport operations, freight and passenger movements, maintenance activities and the construction of equipment, have led to major environmental impacts (Jean, Claude and Brian, 2006).

The impacts of transport on the environment

The issue of transportation and the environment is paradoxical in nature. Transportation activities support increasing mobility demands for passengers and freight, notably in urban areas. But transport activities have resulted in growing levels of motorization and congestion (Jean, Claude and Brian, 2006). As a result, the transportation sector is becoming increasingly linked to environmental problems (OECD, 1988). The most important impacts of transport on the environment relate to climate change, air quality, noise, water quality, soil quality, biodiversity and land take.

- a. Climate change: The activities of the transport industry release several million tons of pollutants each year into the atmosphere. These include the emission of lead (Pb), carbon monoxide (CO), carbon dioxide (CO₂), methane (CH₄), nitrogen oxides (NO_x), nitrous oxide (N₂O), chlorofluorocarbons (CFCs), perfluorocarbons (PFCs), silicon tetrafluoride (SF₆), benzene and volatile components (BTX), heavy metals (zinc, chrome, copper and cadmium) and particulate matters (ash, dust) (Jean, Claude and Brian, 2006). Numerous scientific studies attest that transportation contributes to climate change (Lenzen, Dey and Hamilton, 2003 Cited in Jean, Claude and Brian, 2006). Concentrations of CO₂, CH₄ and N₂O from combustion of fuels in vehicles are the main producers of greenhouse gases. The road, aviation, shipping and railways transport sector are responsible for global CO₂ emissions, and greenhouse gases which prevent electromagnetic radiation from leaving the Earth's surface and thus contribute to global warming. This is leading to an increase in the average temperature at the Earth's surface, reducing snow cover of polar regions, which in turn is contributing to sea level rise and an increase in ocean heat content (Jean, Claude and Brian, 2006).
- b. Air quality: Highway vehicles, marine engines, locomotives and aircraft are sources of pollution in the form of gas and particulate matter emissions that affect air quality, causing damage to human health (Holmen and Niemeier, 2003 in Jean, Claude and Brian, 2006). Toxic air pollutants are associated with cancer, cardiovascular, respiratory and neurological diseases. Carbon monoxide (CO) when inhaled affects the bloodstream, reduces the availability of oxygen and can be extremely harmful to public

health. The emission of nitrogen dioxide (NO₂) from transportation sources reduces lung function, affects the respiratory immune defense system and increases the risk of respiratory problems. The emissions of sulfur dioxide (SO₂) and nitrogen oxides (NO_x) in the atmosphere form various acidic compounds that when mixed with cloud water create acid rain. Acid precipitation has detrimental effects on the built environment, reduces agricultural crop yields and causes forest decline (Delucchi, 2003 in Jean, Claude and Brian, 2006). The reduction of natural visibility by smog has a number of adverse impacts on the quality of life and the attractiveness of tourist sites. Particulate emissions in the form of dust emanating from vehicle exhausts as well as from non-exhaust sources such as vehicle and road abrasion, have an impact on air quality. The physical and chemical properties of particulates are associated with health risks such as respiratory problems, skin irritation, eye inflammation, blood clotting and various types of allergies (Jean, Claude and Brian, 2006).

- c. Noise: Noise represents the general effect of irregular and chaotic sounds. It is traumatizing for the hearing organ and that may affect the quality of life by its unpleasant and disturbing character. Long-term exposure to noise levels above 75 dB seriously hampers hearing and affects human physical and psychological wellbeing (Valcic, 1980). Transport noise emanating from the movement of vehicles and the operations of ports, airports and railyards affects human health, through an increase in the risk of cardiovascular diseases. Increasing noise levels have a negative impact on the urban environment reflected in falling land values and loss of productive land uses (Jean, Claude and Brian, 2006).
- d. Water quality: Transport activities have an impact on hydrological conditions. Fuel, chemical and other hazardous particulates discarded from aircraft, cars, trucks and trains or from port and airport terminal operations, such as de-icing, can contaminate rivers, lakes, wetlands and oceans (Jean, Claude and Brian, 2006). Because demand for shipping services is increasing, marine transport emissions represent the most important segment of water quality inventory of the transportation sector. The main effects of marine transport operations on water quality predominantly arise from dredging, waste, ballast waters and oil spills. Dredging is the process of deepening harbor channels by removing sediments from the bed of a body of water. Dredging is essential to create and maintain sufficient water depth for shipping operations and port accessibility. Dredging activities have a two-fold negative impact on the marine environment. They modify the hydrology by creating turbidity that can affect the marine biological diversity. The contaminated sediments and water raised by dredging require spoil disposal sites and decontamination techniques (Jean, Claude and Brian, 2006). Waste generated by the operations of vessels at sea or at ports causes serious environmental problems, since it can contain a very high level of bacteria that can be hazardous for public health as well as marine ecosystems when discharged in waters. Besides, various types of garbage containing metals and plastic are not easily biodegradable. They can persist on the sea surface for long periods of time and can be a serious impediment for maritime navigation in inland waterways and at sea, also affecting berthing operations. Ballast waters are required to control ships' stability and draught and to modify their center of gravity in relation to cargo carried and the variance in weight distribution (Jean, Claude and Brian, 2006).
- e. Soil quality. The environmental impact of transportation on soil consists of soil erosion and soil contamination. Coastal transport facilities have significant impacts on soil erosion. Shipping activities are modifying the scale and scope of wave actions leading to serious damage in confined channels such as river banks. The removal of the Earth's surface for highway construction or lessening surface grades for port and airport developments have led to important loss of fertile and productive soils. Soil contamination can occur through the use of toxic materials by the transport industry. Fuel and oil spills from motor vehicles are washed off road sides and enter the soil. Chemicals used for the preservation of railroad ties may enter into the soil. Hazardous materials and heavy metals have been found in areas contiguous to railroads, ports and airports (Jean, Claude and Brian, 2006).
- f. Biodiversity: Transportation also influences natural vegetation. The need for construction materials and the development of land-based transportation has led to deforestation. Many transport routes have required draining land, thus reducing wetland areas and driving out water plant species. The need to maintain road and rail right-of-way or to stabilize slopes along transport facilities has resulted in restricting the growth of certain plants or has produced changes in plants with the introduction of new species different from those which originally grew in the area. Many animal species are becoming extinct as a result of changes in their natural habitats and reduction of ranges (Jean, Claude and Brian, 2006).
- g. Land take: Transportation facilities have an impact on the urban landscape. The development of port and airport infrastructure is a significant feature of the urban and peri-urban built environment. Social and economic cohesion can be severed when new transport facilities such as elevated train and highway structures cut across an existing urban community. Arteries or transport terminals can define urban borders and produce segregation. Major transport facilities can affect the quality of urban life by

creating physical barriers, increasing noise levels, generating odors, reducing the urban aesthetic and affecting the built heritage (Jean, Claude and Brian, 2006).

5. Conclusion

In conclusion, the positive developments of transportation in national development cannot be overemphasized; however, there is need for government to optimally allocate resources to the development of the transportation sector. Also, it is important to take cognizance of the negative impact arising from transport system; therefore, proper measures must be taken for sustainable development.

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