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**INLAND WATER WAY TRANSPORTATION AS SAFETY AND ECONOMIC INTERVENTION PROJECT
IN LAGOS.**

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ABSTRACT

This study investigated the Lagos Inland Water Transportation from its perspectives as both safety and economic intervention project. The study objectives were availability, extent of use, safety and economic viability of this mode of transportation. The study made use of descriptive research design where both primary and secondary data were utilized. The researcher developed the study instruments to collect primary data from study respondents. Population for the study was 1400 respondents working in the inland water/maritime sub-sectors. Sample for the study was 140 respondents determined through the use of Yaro-Yemeni formular to reduce sampling error to the barest minimum. Statistical mean and standard deviation were used to answer the research questions. From the analysed data, it was revealed that there were unresolved issues about policy, investment, safety, economic viability among others. Based on these revelations, it was recommended that both Lagos State and the Federal governments should close ranks, work together to formulate and enforce quality policy, public/private investment synergy should be embraced, operators should take issues of safety more serious while being aware of need to make the sector viable and motivating, seeing its capital-intensive nature as both a challenge and an actuator

Keywords: Inland water way transportation, Safety and economic intervention project, Lagos

Introduction

Inland waterways transport mode traditionally has the history of early use to provide cheap, safe and effective means of conveying persons, goods and services, especially from riverine settlements to the various destinations of interest and commerce. It is a mode of transport that falls under the larger modal concept, "Maritime Transport" which operations span beyond national waters. According to Kuje (2001:10) inland waterways in Nigeria have a distance of over three thousand kilometres of navigable waterways which run from Badagry in Lagos, the extreme west, to Calabar in South –south, the extreme South and a coastal land of eight hundred and fifty kilometres Obed (2013).The waterways constitute indispensable component of a dynamic material economic development directly affected by the problem of seasonal

fluctuations, fallout of mono –economy which fate is often decided externally by the foreign oil pricing instruments Odewumi (2001).

The leading waterways in Nigeria, apart from massive presence of Lagos, the Delta region are Niger and Benue Rivers with river Niger having ports at Onitsha, Anambra State in the South East, Idah, Kogi State in the North Central, Bro and Yelwa, Gombe State, North East Nigeria while River Benue has its ports in makurdi, BenueState, North Central, Ibo Lan, Naman and Yola in Adamawa State, North Eastern Nigeria. The inland waterways mode characteristically comprises coastal lagoons and tidal creeks in the south –east, south –south and south –west. This naturally, will ease the movement of passengers and cargo along the entire coastal belt Kuje (2001:10). Utilization is defined as the act of using something, manner in which something is used, the state of being used. Gedders and Grosset (2001).

Effective is an adjectival word, defined (NEDECO, 1982) as having power to produce a required effect or effects, producing a decisive effect, efficient, serviceable or operative, available for useful work, actually in effect. Inland waterways operations are a branch of human business activities which are aimed at obtaining means of livelihood; it is an economic factor and therefore a transport model type which is employed to compliment the predominant road transportation and the dwindling rail modal for national growth. The rationale behind inland waterway transport as a means of spatial utility is to penetrate the country side, convey passengers, agricultural and solid mineral products as well as serve big cities to ease the chaotic transport situation emanating from congested road traffic that always results in loss of man – hour, stress, accidents, increased wear and tear and the attendant high cost of maintenance. It is also aimed at providing some relieve for other pre dominantly used transport modes and interface with maritime operations at harbours. This transport mode also has a unique background of frame work for the location of human settlement and economic activities.

Characteristically, inland waterway transportation has the following features:

Two defined seasons – rainy and dry seasons the rainy season favours navigations by accommodating crafts to sail up country from west to the east/south and the North through the coast, lagoons, rivers Niger and Benue. The navigable season lasts between June and December in the lower Niger and July to October in the upper Benue due to low water levels during the dry season which diminishes the water flow. Water levels in the creeks and lagoons that form East – West intercostal water ways have high tidal waves round the year, this has influence on the maintenance of favourable water levels with sufficient depth for navigation throughout the year and do not suffer much of navigational challenges except restricted channels, waterway width and tortous channel achievement in some areas. (Olugbende and Ede (1999).

Use of various water crafts among the under listed is predominant in waterways transport. Tugs, Boats, Barges, manually operated or prime mover propelled. Obadejo (2010), Ferries, Raft, Canoes Inland waterways transport interfaces with other transport modes, apart from harbour where delivery is made into the maritime crafts (ship), road; rail network are also serviced to create an operational synergy so as to increase the safety and economic benefits of the sectoral multi – modalism. Badejo (2001). Costs of inland waterways transport are cheaper

than those of competing modes in every country, though they vary in spite of subsidies often granted the other modes.

It has character of low – energy consumption compared to the road or rail transportation modes. Fuel consumed by the prime – mover is about 50% lower than that of road vehicles and 65% lower than that of train (rail). Speed – is low, mainly because of need to exercise focused care coupled with weight of tractive resistance emanating from tidal – water waves. Safety – this is obviously one of the greatest assets of inland water transportation. There is hardly occurrence of accidents, loss of lives and property. From point of embarkment to the point of arrival, the facilities used are: ports, harbours, jetties and platforms. Personnel – inland waterway transport requires specialised training for every cadre of operation involved in its activities.

The major essential needs for the inland waterways transport are: To penetrate the country side to ease exchange of agricultural and mineral products. To serve big cities where available, decongesting the city centres as a result of upsurge, roads (in Nigeria) heavy traffic and loss of revenue/man – hour and stress. Finishing as arteries of development. Alleviates modal burden and interface with maritime transport at harbours. Increase the competitive advantage of multi – modalism and creating healthy inter – modal operations. The most frequent use is to feed and distribute goods to and from harbours in less developed ports or for a specialized traffic, i.e. the goods are moved directly from inland water crafts to ship and also from ship loaded into the inland water crafts for onward transportation to jetties or ports where such goods are loaded into over land transport (rail or on –land). This method played a significant role in Nigeria after the civil War when the timbers meant for reconstruction of war – ravaged infrastructure transported from other African countries were loaded into tugs and barges for distribution purposes (Badejo 2003). Inland water transportation is ideal for the transportation of freight in large quantities over a long distance and a great socio – economic transportation mode for goods and passengers where over land transport connection is scarce. For speed increase, surface skimmers are a better choice, but their attendant higher cost which can be justified by faster speed and comfort enjoyed by leisure market seekers and holiday passengers who are cruised to floating hotels and leisure parks on water banks International Maritime Organisation (2000).

A key consideration is always the availability of an appropriate depth of navigable water to provide water transportation at affordable cost with increased safety in mind. Inland water transportation is a capital-intensive venture which requires continued, sustainable patronage in an economy that is both evolving and future promised (FRN 1993). It is against this backdrop that Lagos, which has the homogenous population spread across its local areas with ever sprawling business and commercial activities, is chosen for the population target of this study. The population of Lagos as at year 2017, has been put at 17.5 million (Lagos State Government, 2017) and 21.0 million (FRN, 2016).

This population cuts across all the tribes and ethnic nationalities that make up Nigeria as a country as well as foreign nationals with various sizes of presence. Lagos is also the commercial nerve centre of Nigeria with the country's busiest sea and air ports, Tin can, Apapa and Roro Sea ports, Murital Mohammed International and Domestic Airports, various national and

international markets such as Alaba International, Trade Fair International, Oke – Arin and Balogun/Nnamdi Azikwe markets. Most local and foreign products find their way to Lagos first before retail sales. Lagos State is classified into two main geographical areas – the Island and the Mainland. Aside from these classifications, there exist some other islands within the major islands, Victoria Island inside Lagos Island, Tarkwa – Bay Island, Snake Island in Apapa, (Tomaro Island, Sagbekoji Island, Badagry, Ise Island, Lekki island, Ita – Oko Island in Epe and others not documented Obed, (2013).

Island – mainland classification satisfies the threshold requirement for inland water transportation in an area that has an average patronage size requirement that will make this transport mode viable and capable of playing its expected role in the development and growth of the environment where it is operated. Nigeria was traditionally an agrarian and solid mineral economy before the advent of petroleum in 1957. Even thereafter, the dwindling economic fortunes of the country have proved that a concerted focus is imminent on economic diversification. This diversification may not suffice if agriculture and solid mineral sectors are ignored or ill – handled.

To pursue vibrant and economically viable agriculture/solid mineral based economic activities, transport component is key factor (Odewunmi, 2001). However, in Nigeria today, most inter – state and intra – city roads are dilapidated, big cities are highly populated that the chaotic heavy traffic takes economically viable man – hours of productivity on daily basis, possible goods transported through the predominant road transport mode become spoilt such that the overall cost and profit already aimed are passed on to eventual consumers, making most of them unaffordable by majority of the citizens. With this, farmers, retailers, transporters and various forms of creditors also count their losses.

It is against this obvious occurrence that apart from exportable solid minerals that are transported to Lagos ports from the various states of Nigeria where they are exploited for export processes, almost every farmer from across Nigeria wants to come to Lagos to sell his farm produce since it is believed it is only in Lagos that the desired payback profit could still be made in spite of transit spoilages. Lagos remains the commercial nerve centre and economic capital of Nigeria whose seaports lead to other parts of the world (FRN, 2015) Federal Bureau of Statistics, Abuja, hence the choice of Lagos for this study. There is the need to utilize Lagos inland waterways for domestic spatial utility and interfacing with other modes of transport for effective multi modal transport system, hence the choice of Lagos.

Statement of the Problems

One of the main problems facing the economic, commercial and social lives in an urban city today is the traffic congestion. Its occurrence the world over has an estimated cost. Annually, the United States of America incurs an average economic loss of \$100 billion and comparable costs in other countries of the world (Victoria Transport Policy Institute, 2005). Apart from man – hour loss which when quantified in cash terms, traffic jams are hardly predictable through control measures especially in Lagos where existing roads built decades ago are decimated to pave the way for the operation of the Bus Rapid Transit (BRT), a government transport initiative which has commercially brought more than three thousand high capacity buses which operation

cuts across the major corridors in Lagos even in spite of ill – maintenance of such roads, to talk less of expanding them or constructing new ones at a speed and quality that are capable of checking the menace of unabated traffic congestion.

Delays on road traffic routes, natural and artificial cause ripple effects, a flowing failure which spreads out and creates a sustained traffic jam, although, traffic jam can be attributable to economic failure but rather to an inevitable by – product of vibrant, successful cities Adeniji (2000). Traffic congestion exists in every major metropolitan city or area of the world especially at peak hours Oyesiku (2012) UNHCS (1998) asserted that travel speeds in cities are decreasing and the travel environment for pedestrians and people –powered vehicles are deteriorating in developing countries. Furthermore, inefficiency of the entire road transport system in five major cities with over 4 million people, namely: Jakarta, Kinshasa, Bucharest, Lagos and Manila in the sixteen developing countries experienced an average one – way journey to work of about one and quarter hours or more.

It is imperative therefore, that the economic and social wastage incurred from traffic congestion necessitates water transportation to improve lives and commerce and also enshrine a fully concerted developmental support for Lagos State which is obviously the centre of commerce and investment in Nigeria (Texas Transport Institute, 2009) which has also made it prone to severe traffic congestion problems. Transportation in Lagos has remained severely chaotic for some time now, more so, with about six million passengers moving from one location to the other, both on the island, mainland and the water – banked locations (Oyesiku, 2002). Motorised transportation accounts for over 90% of both passenger and freight traffic. This is coupled with enormous growth in car ownership and daily cruising, perhaps as a result of the available fairly – used vehicles imported from Europe and America. This has tremendously increased the Lagos traffic congestion, jams and above all, the unabated emission of toxic exhaust smoke in an environment where control policy measures are almost at zero level.

The abundance of navigable water bodies in Lagos makes a strong advocacy for a true shift from predominant motorized transportation to an inter – modal system where economic, commercial and social use of the inland waterways will play the role that it naturally has seen playing even before the advent of other modes earlier globally. The challenges however, are the wanton neglect and gross under – utilization of this all – important transport mode, this includes: dredging of low depths, planning, modernisation and maintenance of routes and jetties, formation and implementation of enabling waterway policy, necessary initial grant that will attract willing investors in water transport system. This study is aimed at highlighting the various factors that need to be considered to bring about the effective utilization of the inland waterways transport mode in Lagos, Nigeria for improved economic, social, security and safety coherence.

The purpose of this study is to highlight the various factors that are responsible for the ill – operation and participation in the inland waterway’s transportation. This will be followed with analysed suggestion on how to improve the operations of this important transport mode for it to play its inter – modal role as well as filling the gap created by other modal externalities, especially the road transport to fulfil the mandates required of it, availability, safety, affordability, effectiveness, security and reliability to be sequentially addressed through: Effectiveness of waterways transport in Lagos State. Role of government policy in the operation of inland

waterways in Lagos State. Level of infrastructural provision. Economic impacts of effective waterway transport. Extent of private participation. Inland waterways transport in Lagos State and security/safety of users

Significance of the Study (to be restructured)

Any mode of transport is a derived function of socio – economic activities of a country. A growing economy requires available, safe, reliable, effective and affordable means of transportation to energise its various activities. Many urban cities in Nigeria today face socio – economic hardship resulting from poor transportation system, varying from bad roads, transit insecurity, exorbitant fare, heavy traffic at the city centres resulting in stress, loss of man hour, release of more toxic exhaust smoke into the atmosphere, rapid wear and tear of vehicle components all put together, that have had their negative aftermath on man, animal, plant and other environmental factors. The road transport has, for many years enjoyed uneconomic monopoly and inhuman sole – existence.

This is so to: The commuters at the city centre like Lagos, have been made to limit their choice to only what is readily available, thereby making them pay whatever fare charged by the transport operators, government owned inclusive. Availability of other modes, especially the inland waterways will create competition, reasonable charges and other social consciousness. The government, road transport in particular has enjoyed exclusive economic monopoly and patronage from successive government in the area of subsidy grants, loans and other financial considerations which could be spread and amended to other transport modal system like inland waterways to cushion harsh socio – economic climates.

In business communities, if other transport modes, especially the inland waterways are given due attention, calculation of transport fare variables will suffice with competitive inclusiveness, therefore, pricing instruments by each modal sector will have to be reviewed to attract patronage, thereby giving some competitive relief to the business communities. he gathering, synthesising, analysis and release of data concerning transport studies as a whole which in turn will help all stakeholders in taking decisions based on empirical studies. The environment, since more passengers will have the modal choice, road traffic, will be light, volume of toxic emission will reduce, accidents due to logjam will also abate, noise and vibration likewise, will reduce and the environment will be better for it. All modal operators, healthy competition will probably be enshrined when choices are objectively spread across the available transport modes. Operation hours scheduling, flexible duty time and taking necessary rest will help human operators to be fit to work and their vehicles, boats, tugs, ferries and canoes etc. less depreciating, thereby limiting the frequency and cost of maintenance and down – time.

Scope of the Study (to be restructured)

This study is delimited to the inland waterways transportation as the major mode being studied with the occasional mention of other modes of transportation as they are applicable to any aspect of the study being investigated or reported. It should also be noted here that maritime transport which is operated mainly on international waterways may also be mentioned in this study, but it is not the focus of this study. All waterway routes mentioned in the study across

Nigeria have at a time or the other been functional and are treated here as still being functional till date regardless of any peculiar or common challenges being faced by the Lagos State inland waterways which is concern of this study. This study focused on the effectiveness of inland waterways transport mode in Lagos State. Its origin, its logistics management, hence the inclusion of logistics in the topic. However, the study did not concern itself with logistics as study concentration.

Research Questions

The following research questions will guide the researcher in this study in a procedural, systematic and analytical manner.

- (1) To what extent is the use of inland waterways transport in Lagos State?
- (2) What is the level of availability of inland waterways transport in Lagos State?
- (3) How effective is the inland waterways transport on the socio – economic of Lagos State?
- (4) What is the level of private participation in inland waterways in Lagos State?
- (5) How safe and secure is the inland waterways transport in Lagos State?

3-4 Hypotheses will be here

REVIEW OF RELATED LITERATURE

Lagos State was created in May 27, 1967 by virtue of Decree No. 14, 1967 which restructured Nigerian federation into 12 states. Before then, Lagos, the core of the state, was a federal capital territory having been annexed by the British Colonial Government in 1862, an incident which together with its strategic maritime location and world trade, historical past and sprawling population made the state the nation's centre of excellence. Politically, the state is divided into 20 local government areas. These are the jurisdictional areas in respect of which the state is empowered to make laws. Ikeja, located 30 kilometres North of Lagos is the administrative and political capital of the state.

Location

Lagos State lies in the South – Western part of Nigeria on the narrow coastal plain of the Bight of Benin. It is bounded in the North and East by Ogun State of Nigeria, in the West by the Republic of Benin and in the South, it stretches for 180 kilometres along the Guinea Coast of the Atlantic Ocean. Territorially, the state occupied an area of 3, 577km², 22 per cent or 787km² of which consist of water bodies.

Climate/Vegetation

Climatically, the state is influenced by two winds, the South – West monsoon and the North – East trade wind. Consequently, the state has two distinct seasons. The rainy (wet) season which runs from April to October and the Dry (Harmattan) season, from November to March. Rainfall, which is average about 175 cm annually, is heaviest between May – October with a break in July. Hence, the state experiences a double rainfall pattern. Temperature and humidity are generally high throughout the year and varies remarkably with changes in season. However,

because of extensive maritime location, its Atlantic coastland is greatly influenced by the cool oceanic breeze.

Lagos State is blessed with rich alluvial and ferralitic red – yellow soils. Tropical swamp forest, with its two variants, the mangrove and the forest water swamp, are the pre –dominant vegetation types 1 and 2 in the hinterland and southern fringe respectively. The wetland environmental characteristics of the state consist of a maze of lagoons, creeks, river etc., which forms about 22 per cent or 787km² of its total landmass. The drainage system of the state is dominated by the Lagos – Lekki lagoon, the Ogu, Osun and Yelma Rivers, and the Kuramo water. Others are the Ologe Lagoon, Badary, Porto Novo and Five Cowrie creeks and numerous water bodies.

Demography

According to the 1991 provisional National Census, the state has a population of 5, 685, 781 which is five per cent of the national estimate of 80.5 million. However, a UN study put the population at over 8.5 million of these Metropolitan Lagos, which is 37 per cent of the state land area and built around core Lagos Island and its satellite settlements is inhabited by over 85 per cent of the state total population. Thus, the rate of population growth is about 300, 000 persons per year with a density of 1, 308 persons per square kilometre in the sub – urban areas. Currently, the state has 1544 communities consisting of 1091 and 453 urban areas. Essentially, Lagos State consists of three Yoruba sub – ethnic groups namely: the Awori in Lagos (Eko), Ikeja and parts of Badagry Division, Oguns in Badagry and the Ijebu in Ikorodu and Epe Division respectively, with pockets of immigrants Eko – Awori settlements in the two areas. Adejare (2011).

Administration and Economy

Administratively, Lagos State is an autonomous state within the federation of Nigeria. Its governmental organs consist of the executive, legislative and judiciary all characterised by separation of powers, check and balances. The state public service, the public bureaucracy, which has its head, the Secretary to the State Government (SSG), consists of ministries, bureaux, offices, commissions, departments and corporations. In accordance with the Federal Constitution which guarantees Local Government system as the third tier of the federal structure and for ease of administration and accelerated grass root development, the state is divided into twenty Local government areas recognised by the Federal Government and thirty – seven Local Council Development Areas which the State House of Assembly created.

Education and Manpower

The availability of skilled manpower in large concentration in the state enhances the establishment of industries in Lagos. With a population of over 5.6 million, and over 1,200 public primary/secondary schools, having an enrolment of about 1.5 million pupils: the state has abundant pool of professional, managerial and artisanal manpower. The supply of necessary manpower is however, adequately sustained by the existence of several professional, tertiary and specialised apprenticeship and technical institutions within the state. These include: various universities and polytechniques nationwide.

Transport System in the Study Area

Road, rail and water are the main transport modes for intra urban movement in the study area. Road transport is the dominant mode and all the major classes of roads in the country (Trunk 'A', 'B' and 'C') are all well represented in Lagos State. The network is made up of four types of roads, namely, the expressways, arterial ways, collector roads and local streets. The main expressways (with six lanes and four service lanes) are the Ikorodu road, the Oworonsoki – Apapa expressway, and the Third Mainland Bridge. Others are Western Avenue, Eko Bridge, Marina, the Lagos – Badagry expressway, Moshood Abilola expressway, the Victoria Island – Epe road and a variety of other important streets and major inter – state roads. Public transportation is provided by both government and the private sector, the later accounting for the bulk of public transport vehicles in the state. Three main types of transport services are in operation, these are the conventional bus service, that of adapted vehicle operations and taxi service.

Apart from valuable inputs into the transportation sector, some local government authorities and a variety of corporate organisations and government ministries contribute in the form of staff buses in recent times. The main statutory provider of public transportation in the state are the Lagos State Metropolitan Area Transport Authority (LAMATA), Bus Rapid Transit (BRT), Lagos State Transport Corporation (LSTC) and Federal Urban Mass Transit Agency (FUMTA) which run both intra and inter –state services. They are state, federal governments and trade union initiatives. The adapted vehicle operators make use of mainly “Macopolo” which are 40 seater buses and Lories respectively and 12-16 seater buses popularly called “Danfo”. The services of other types, Danfor especially are unregulated with no defined routes. Taxi rank next to adapted vehicles in the provision of commuter service. Given the inadequacies of the organised bus operators and shabby services of adapted vehicles they offer at least a viable alternative to the use of private cars.

The activities of Private Boats Operators are noticeable at Jetties that are located in Apapa, Oyingbo, Maroko, Tarkwa Bay, Ojo Satellite Town (Ibese), Ikorodu and Epe. The Private Boats Operators make use of speed boats and canoes for long distance journeys especially along the routes in the rural riverine areas that are still inaccessible by land modes in the study area. In spite of the efficiency of the private boat operators, their impact is felt more by the people than the public ferry operators whose major services are limited to ocean and lagoon crossing on two routes in metropolitan Lagos. The movement of goods and people date back to earliest times. It was early man’s best means of extending the range of his activities, broadening his horizon and improving his living standards by securing raw materials, exchanging goods and culture between himself and other people. Records of man’s attempt at movement by various modes since time immemorial has been depicted in various forms. Rock painting depicting early man’s attempt at transportation using animals and canoes abound in various parts of the world while other forms of record keeping abound with accounts of man’s progress in transportation.

This, the hieragraphics of the ancient Egyptians, down to Chinese literature and literatures all relate to various modes of transportation shaped by environmental factors, technology and demand. In Nigeria, various studies (Ijeoma, 1990, Kain 1991, NPC 1991, Abubaka 1994) have identified the lack of adequate transport network as representing a major bottleneck for economic development and inefficient movement of a nation’s commerce and people. Ijeoma

(1990) maintained that the above situation has now been further escalated as economic development and construction that has taken off in the newly created states and local government areas requires quantities of goods and services be moved to an ever-increasing number of destinations. The bulk of agricultural products and energy which require modern transport systems, particularly water ways (since the country is richly endowed with these resources) is greatly needed to move products to markets.

Background to Transport

According to Ogwude (2008), transport is a derived function which necessities emanate from the need to move persons, goods and services from one point of embarkment to the other point of disembankment or destination. Badejo (2001) posited that transport is about time utility, place utility. Utility in this context is the efficiency or effectiveness of a measured capacity for a service/commodity to satisfy some human wants. By demand, supply of various goods/services becomes high due to depletion of stock, but where perishable items like tomatoes, orange, vegetables, fish etc. and some other industrial raw or finished products are involved, where refrigerated means of transport are not available, time of arrival and discharge as well as distribution must be taken seriously, else, the potency, usefulness and price upon such items become dwindled leading to loss of profit. Ajao (2002). Logistics as defined by Allen Rushton, John Oxley and Phil Cronchar (2000) is concerned with physical and information flows from raw materials through to the final distribution of the finished products. Logistics is also concerned with art and science of determining requirements, acquiring them, distributing them and maintaining them in use – ready condition. Hool (1995).

Background to Transportation in Nigeria

Before 1914, trade among the regions that now make up Nigeria was carried out by the use of “beasts of burden”, human portage and caravans. During the colonial period, transport development (Oguntoyinbo, 1982) was dictated by the need to evacuate cash crops from the interior to the Ports at the coasts. The major transport at that time therefore was the rail system incorporated within cash crop production centres of the North to the Sea Port in the South, Lagos in particular. The rail was making significant profits until 1959/60 when it suffered a financial loss for the first time in many years. This was a cause for concern by the various governments who directed attention to economic and operating conditions of various modes of transport. Over time, it was recognized that transport was to be planned. The first national development plan (1962 – 1968) emphasized economic efficiency and coordinated development of the various modes of transport.

The second national development plan spanned the period from 1970 – 1974. The transport sector was allocated the highest percentage share in the plan, emphasizing the transport infrastructure which were either damaged or neglected during the period of civil war, and which needed construction and rehabilitation. The oil boom of the period expanded economic and social activities and created excess demand in transport facilities and services. The government adopted the policy of Opening Up (FGN 1970) the vast areas of the country and binding together the people of Nigeria. However, most of the infrastructure shared to be

provided during the second plan period could not be achieved due to dependence on foreign capital which was not forthcoming (Asadu, 1991), therefore the Third Development Plan (1976 – 1980) took off when the whole transport infrastructure had deteriorated badly.

The roads needed repairs from the war effect, the ports had become bottlenecks in face of increasing sea – born trade. The aim of the plan was to ensure continued availability and expansion of fast and economical transport services needed in a growing and changing economy. The plan's achievements include new roads, six new air ports, six new sea ports at Apapa, four at Warri, Calabar and Port – Harcourt. By the 4th plan period (1981 – 1985 (FGN, 1981) maintenance and management of the facilities put in place during the earlier plan periods became a problem and therefore the objective however, throughout these plan period tended to place heavy emphasis on the land mode of transport especially road (Asadu, 1990) where over 60% of total sector allocation was expended. This has in favour of the road mode is responsible for the fact that road mode has over 80% total freight and passenger traffic.

The utter neglect of other modes of transportation especially inland waterway transport in favour of the road has been decried by various write – ups. The draft National Transport Policy (FGN, 1992) has pointed out that the use of economic analysis to determine the viability of a project in a mode, or whether a project in another mode is more suitable or what combination of investment in the various modes will achieve optimal returns and more efficient services have received little, if any consideration. Rather socio-political factors have influenced investment decisions in the sector. The result has been unbalanced investments whereby excess capacities are created in some modes like sea ports and air ports, while railway and inland waterways modes are left with little or no investment allocations. The Federal Road network is heavily trafficable compared to other highways in other countries, leading to the very poor conditions of the system consequent upon absence of control over maximum road capacity. Other modes that could conveniently carry heavy goods like the rail and inland waterways are laden with problems of inadequate facilities, insufficient funds allocation and patronage,

Inland Waterways and Water Courses in Nigeria

Nnana (1988) has appraised the entire inland waterways in Lagos and identified the problems of and limitations to year-round navigation. According to him, the creeks and rivers at Onitsha to 3.2 km and has a draught of 9m to 15m between June and July. At the Delta, the Niger divides into fourteen (14) outlets with Bonny and Forcados River as the important ones (being navigable throughout the year and can take 20, 000-ton ships). River steamers can navigate along the Niger up to Jebba from where the problems of rapid and fall starts. The River Benue is navigable up to Yola for three and half (3½ months of the year for vessels with draught of 2m. The ports on the Benue handled 50, 000 tons of traffic at their peak in 1980 (Abubakar, 1988).

Inland Waterways as an Alternative Mass Transit Mode

Badejo (2005) defined transportation as a system in which a large number of people, goods and services are moved from one place to another at a time. Its effective operation requires trains, trams, buses and ferries. Ferries are used to move people and goods in urban areas with waterways or where settlement is separated by water. The Lagos State Government

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accord high priority to water-based projects in its mass transit system. However, for effective mass transportation, the following operational requirements are necessary. (i) Identification of viable routes by studying movement characteristics of city dwellers (ii) Securing the right type of vessels (ferries, boats) in much expected number of passengers and goods on identified routes (iii) Modern and secure jetties for easy and safe boarding and disembarkation of passengers (iv) Good terminal building analogous to the departure/arrival lounge of an airport/train station (v) Employment of the right calibre of staff for continuous and hitch free operations (vi) Continuous supplies of fuel, lubricants and spare parts in the right quantities (vi) Provision of slipway/deck suitable for maintenance purposes.

The author therefore calls for public enlightenment on the fact that water transport is the safest means of transportation and to remove the problem attached to it, he advised against break in services and recommended the dredging of waterways from time to time. Anyoku (1986) noted that government recognises and accepts the need to develop our inland waterways because of their prospect in the industrialization of Nigeria. He however, identified difficulties in navigation on the Niger – Benue waterway system such as insufficient depth during the dry season, unstable river beds, and shallow channels. The waterway is also narrow and winding below the bifurcation. This reduces low sizes to less than economic proportions. The advantages of the mode on the other hand include being the cheapest and safest mode, ability to carry bulk cargoes over long distances, low fuel consumption leading to conservation of funds.

Existing Condition of Navigation on the Niger and Benue Rivers

The major problem for commercial navigation on Niger and Benue rivers, as has been stated, is caused by limitations in available depths in the channels during the dry season. For viable commercial navigation nowadays, least available depths (LAD) in the channels should not be less than 1.5 metres. LAD up to 3 metres and above greatly improve profitability. Commercial navigation can be practiced on the Niger for seven months from May and October.

River Management

This would entail continued studies, research and regular surveys of the rivers, channel patrols and buoyage, water level and discharge measurement and predictions and regular dissemination of information on channel conditions for the benefit of navigators; inland waterways Department has since been carrying out these activities

Night Navigation

This would be introduced as soon as the necessary buoys, beacon, and reading markings for the navigation are installed. River operators would also be encouraged to equip their vessels for night navigation.

Maintenance Dredging

This would involve dredging of restrictive sills at crossing in the river in middle low water season to increase long available depth. Dredging was carried out on the lower Niger between 1977 and 1983. The operation confirmed that with the right equipment and sufficient know – how, dredging could be adopted as a method of achieving temporary improvement in LADs. But such improvements would at best only last till the following high-water season when the flood

would obliterate the dredged channels. Dredging for channel improvement would therefore need to be repeated every year following each high season.

Discharge Regulation

This would entail construction of dams and locks at suitable sites to hold back excess high-water discharge in reservoirs for regulated release to supplement deficient low water flows. Such dams have since been built at Kainji and Jebba primarily for hydropower, but the potential for ancillary navigation benefits.

Free Flow River Development

This method of improvement would involve construction of structures such as longitudinal dikes, greyness and revetments at selected sites to increase the resistance of erodible banks, and transfer the erosive force of the current from the bank to the river bed, and thus increase depths. On accepting the NEDECO report, (1982) the Federal Government established Inland Waterways Department and charged it with the responsibility under the Honourable Minister of Transport for aiding inland navigation and working for progressive improvement of Niger and Benue Rivers. Successive administrations of the Federal Government have invariably supported development of inland water transport in the country and funded it. But the priority accorded this mode of transport, and the level of funding have so far not been such as to support major river improvement work.

River management therefore started with the Inland Water Department building up an invaluable hydrological data bank on these two rivers. Over the last decades, Government in its effort to open up the country for development has invested heavily on the road transport sector while the railway and the waterways have somewhat been neglected. Though in private economies, road transport may be preferred, the three modes – road, rail and river transports are essential in the development of our country's economy. Government has a duty to ensure (fairly) even development in all the three modes.

Safe Navigation and Inland Waterways Network in Nigeria

To provide safety efficiency and reliability of navigation on the waterways, the following hydraulic engineering options were considered basic (NITT 1988). Recurrent Dredging: Which is a temporary measure to provide deeper channels through crossings. This measure has been used on the Niger at N8 million (1983) to enable moving of 1 million tons of cooking coal from Warri to Ajaokuta. Permanent channel regulation works through the use of transverse structures to concentrate low water flow in the channel. This has been planned for River Niger from Baro to Forcados. Storage dams over channels to correct flow by holding floodwater of rainy season and releasing them during dry season to keep water level for navigation.

Examples include Jebba and Kainji on the Niger and Shiroro on Kaduna River. Barges that are low dam across river to ensure minimum water level during dry season low flows (None exist in Nigeria). Faulks (1969) viewed freight transport in Inland waterways as the interaction of two or more undertakings providing the same or different forms of transport to both providers and users. Accordingly, by this method, wasteful duplication is avoided and resources are thereby utilized to maximum advantage. A study carried out by ENPLAN GROUP (1980) for the inland

waterways Department emphasized that the present freight transport system between passenger and freight services in Nigeria is both wasteful and unfair to the waterways.

The Decline of Water Transport in Lagos

The Nigerian civil war (1967 to 1970) disrupted water transport severely as the lower Niger and Delta waterways were in war then. Produce from the northern parts of the country therefore had to find an alternative route to the south for export. To a large extent, road transport filled the gap. The reconstruction period after the civil war saw the federal government of Nigeria making new large investment in road development. This resulted in significant improvement and expansion in our road network. Our waterways received no such investment and had no improvement. Some of the shipping companies lost most of their floating and cargo handling equipment in the war and needed to repair/replace them to operate.

Also, the fact that road transport requires comparatively much smaller initial investment and relatively simple organisation to operate on small scale brought motor transportation business within the reach of many Nigerians. Unlike water transport, which requires much larger start – up capital, elaborate organisation and more skilled staff to operate, road mode, which requires less initial start off capital, took over a major share of the Nigerian produce traffic. The disadvantage of this development to the country is that road transport which is normally the most expensive mode for bulk goods over long hauls gained a prominent position at the expense of water and rail transport. The effect of the foregoing is that for Lagos, the custodians of the Federal Capital in Nigeria for many years playing host to both local and foreign investors, being the choice destination for every entrepreneur, be it agro, industrial, commercial etc. suffered a first-hand neglect—a fallout of Federal neglect which has not been easy to surmount even after the removal of the seat of federal government to Abuja.

Review of Transport Sector Investment in 1st to 4th Plan Period

Government expenditure on water transport has been comparatively very low. Percentage expenditure on water transport has declined from 25% of the total government expenditure on transport in the National Development plans of 1962 – 1968 to 9% in 1981 – 1985 (See table below)

Table 1: Intermodal share of transport sector investment (Percentage)

Plan	Road	Water	Rail	Air	Total
1962 – 1968	58.0	10.0	25.0	7.0	100
1970 – 1974	67.0	9.3	13.0	10.0	100
1975 - 1980	70.6	9.4	10.0	10.0	100
1981 - 1985	60.0	25.0	9.0	6.0	100

Source: 4th National Development Plan

Table 2 shows that by the 1980 – 1990 and 1991 – 1995 plan period. Inland waterways planned allocation declined from 3.8% to 3.2% respectively.

Table 2: Transport Sector Allocation

Plan	High ways	Ports	Railways	Inland waterways	Airports	Others
1986 – 1990	72.4%	5.8%	4.0%	3.8%	5.6%	8.4%
1991 - 1995	65.0%	7.5%	14.2%	3.2%	2.6%	7.5%

Source: Cumulative Budget Allocation

The level of efficiency of any transport system depends basically on the quality of funding and organisation to enable it carry out the task of provision of commercial services, conservancy, development and planning. Due to inadequate funding, the inland waterways Department finds it difficult to render these services adequately. In fact, the situation at hand appears as if there is no definite policy existing for the development of this mode.

Inland Waterways Overview in the UK

Inland navigation characteristics also vary in terms of scale of operation and governance arrangements. The majority of the UK network is characterized by seasonal recreational use, where inland navigation can be a key contributor to the local economy. However, whereas some waterways are heavily used, others are less so. There are also marked differences in the level of experience of boaters: some waterways may have a high proportion of relatively inexperienced users at certain times of the year. Inland navigation infrastructure is not designed to withstand the same range of extremes as marine infrastructure. It also tends to be older and potentially more vulnerable to the effects of floods and droughts which can affect not only structural integrity but also vegetation growth. In addition, the use of some parts of the canal network depends on an adequate supply of surface water. Behavioral issues are especially relevant to the use of inland navigation infrastructure – for example where users are inexperienced in navigating in strong stream or low flow conditions.

The main climate variables of relevance to inland navigation are air and water temperature, and seasonal changes or extremes of precipitation. High flows can cause overtopping and flooding of land-based assets, culverts, etc. They can also exacerbate bank erosion or scour and associated deposition; increase the risk of a failure or breach; and result in safety issues for users. Low flows conversely can lead to groundings or even waterway closures, and can threaten structural integrity or lead to subsidence. Water shortages might affect the operational viability of parts of the canal network; and bankside and in-channel vegetation management requirements are susceptible to changes in both temperature and flow.

Depending on the nature of the assets at risk, adaptation on inland waterways may involve raising, strengthening, replacing or otherwise modifying quays, moorings, embankments or bank protection. Headroom, weir or sluice capacity, bank erosion, sediment management and water supply issues might also need to be addressed. The condition and residual life of assets will be critical in determining whether modification or replacement is required and when. Regular monitoring and condition assessments supported by long-term and well-managed data

will be invaluable, not only in deciding when to upgrade infrastructure but also in ensuring effective communication with users, issuing warnings, etc.

Some of these requirements may become more urgent if warmer temperatures lead to increased numbers of recreational users. As with marine and coastal areas, climate change will also affect the ecology of inland waters. Related adaptation measures could therefore include changes in vegetation management to deal with algal blooms, excessive weed, or invasive species; structural integrity issues if characteristic riparian species are lost; or additional towpath maintenance. Opportunities to use soft engineering solutions for bank protection or to develop buffer strips might also be explored.

Although there is a reasonable level of agreement about the nature of potential climate change impacts on inland-navigation infrastructure, there is a notable lack of robust evidence. Both high and low flow conditions have the potential to require significant adaptation particularly of older infrastructure, but little research has been carried out and local levels of awareness are often low. This is compounded by uncertainties about changes in seasonal rainfall and evapotranspiration - and hence the consequences for flow. Even for parameters where there is more confidence, levels of preparedness seem poor - for example, warmer air and water temperatures increasing numbers of recreational users and affecting vegetation growth; or potential future summer water shortages.

Given the small scale at which many inland navigation authorities operate, their limited resources and the scale of adaptation likely to be necessary in the medium to long term, the development of a national 'toolbox' of possible adaptation measures would be useful. Overall, it seems likely that inland navigation authorities may both face additional challenges and find climate change adaptation comparatively more difficult than many commercial ports. Awareness raising, capacity building, data management and user education are therefore urgent short-term priorities.

UK inland navigation characteristics

Over the decades, the UK inland waterway network has changed from an essentially commercial operation to the point where - with a few exceptions including tidal rivers such as the Rivers Thames and Trent, the Manchester Ship Canal and parts of the canal network - it is now used primarily for leisure and recreational purposes. In recent years, planning policy has promoted the use of inland waterways for freight as a carbon- efficient alternative to road transport (Freight Transport Association, 2011). The inland navigation network is strongly regional with most navigable waterways in the Midlands, Yorkshire, the North West and East Anglia and some in Scotland. By comparison, there are relatively few inland waterways in the South and South East or in much of Wales. The four main players managing UK inland navigable waterways are: the Canal and River Trust (CRT, formerly British Waterways), responsible for more than 3,000km of canals and rivers¹- the Environment Agency, the second largest navigation authority with responsibility for managing around 1,000km of England's rivers including the non-tidal Thames, the Medway Navigation and the Fens and Anglian systems.

The Environment Agency's navigational responsibilities are expected to transfer to CRT in 2015. The Broads Authority, with responsibility for a further 200km³ of navigable waterways in

Norfolk and Suffolk, and-Scottish Canals (formerly British Waterways) in Scotland. All other navigations are managed by a variety of much smaller organizations including trusts and voluntary groups. The scale of operation varies from ship canals down to the narrow canal network, and many inland marinas are privately owned and operated. Some inland navigations are heavily used and over-subscribed by boating users, whereas others are under-utilized. Several restoration projects are ongoing and many more are in the pipeline (IWAC, 2009). Recreational navigation use tends to be strongly seasonal and often local, with many waterways having a high percentage of regular users. Some areas, though, have relatively higher proportions of boats available for hire and as a result a greater proportion of relatively inexperienced boaters. For inland waterways, the governance arrangements and the experience of users can both be key factors affecting climate change adaptation capacity.

Inland navigation infrastructure

Depending on the nature of the water body, infrastructure in river and canal navigations can include sluices, culverts, weirs and tunnels. Berthing facilities vary from mooring posts or buoys through piled quays or finger jetties to pontoons in on- or off-line marinas. In some areas, river or canal embankments are also flood defenses maintained by a third-party organization such as the Environment Agency in England. In others, the navigation authority might be responsible for erosion control. Canal navigation authorities typically operate and maintain locks and associated infrastructure (including water supply and/or storage where relevant) and manage towpaths. CRT maintains 15 km of docks as well as many thousands of associated locks, bridges, embankments and aqueducts. In privately operated marinas, the owner is responsible for infrastructure maintenance.

Existing vulnerabilities in inland navigation infrastructure

Physical infrastructure may be vulnerable - for example to flooding or erosion – but inland waterways are also arguably more susceptible than ports to safety and related behavioral risks. Both low and high flow conditions can pose communication challenges for the navigation authority as well as safety risks, particularly for inexperienced users. Safety issues include those associated with maneuvering a vessel in strong stream conditions or where increased water levels reduce operating headroom (IWAC, 2009). On the River Thames, for example, the Environment Agency displays warning boards at locks to warn users of conditions that may make navigating difficult and dangerous. Red boards, advising users of all boats not to navigate because of strong flows, have been displayed with increasing frequency in recent years, in turn affecting both recreational use and hire boat markets.

Extreme low flows or drought conditions can cause riverbank desiccation and problems of vegetation die-back and erosion affecting physical assets. Low flow conditions can also reduce the natural transport of sediment through the system with the resulting accumulations potentially threatening safety of navigation and requiring dredging. Unusually low and high flows can both have more serious implications for structural integrity. Low water levels can threaten the integrity of navigation infrastructure through removal of hydraulic support from the waterside face (Brooke and White, 2010) whereas high flows can cause damage through seepage or erosion or exceed the capacity of culverts, weirs and sluices. Such problems are illustrated

respectively by the breach of the Grand Western Canal at Halberton, Devon, in November 2012 after water spilled over the top of the embankment during torrential downpours and flooding; and the six-week closure of more than 95 km of the Leeds-Liverpool canal due to drought conditions in the summer of 2010.

The canal network is heavily dependent on surface water run-off - especially during the summer - and parts of the system are already susceptible to low flow conditions. The operation of some stretches relies on a stored water supply or the diversion of water from a nearby watercourse, and some older reservoirs already have a lower capacity than when originally constructed because of changes in reservoir safety requirements (IWAC, 2009). A few canals (e.g. Gloucester and Sharpness; Llangollen) also carry water for industry and drinking water purposes. Whilst these are typically river-fed, any reduction in supply could have significant wider consequences. Finally, the vulnerability of an organization is related to its adaptive capacity. Aside from the four main inland navigation authorities, many inland waterway operators are small organizations with limited budgets. These factors, combined in some cases with relatively low levels of awareness, can increase vulnerability to the effects of climate change.

Assessing and Managing Risks for Inland Navigation

Whilst rivers are also dynamic natural systems, the extent of natural variation for which inland navigation infrastructure is designed is proportionately less than for seaports (i.e. whilst high river flows have to be accommodated, there is no equivalent to tidal range). Canals are even less dynamic. This historic 'consistency' in terms of design requirements means that inland navigation infrastructure is potentially more susceptible to the effects of climate change than its coastal and estuarine navigation equivalent. As such, many inland navigation authorities are likely to have to replace, upgrade or retrofit infrastructure to accommodate the effects of changes in precipitation, temperatures, etc. Depending on the nature of the assets at risk, adaptation might involve raising, strengthening, replacing or otherwise modifying quays or berths, embankments and other flood defense infrastructure, or exploring alternative (e.g. non-structural) flood risk management solutions. Weir or sluice capacity or headroom issues may also need to be addressed; bank erosion and the effects of desiccation may require attention; and an understanding of any changes in sediment management or dredging needs will be required. Low flow conditions associated with reduced (summer) rainfall may affect the structural integrity of infrastructure and/or mean that new water supply or water storage options have to be assessed.

As with ports, harbours and marinas, decisions on risks and hence investment requirements will have to be based on an understanding of the design and residual life of existing assets and infrastructure; the nature of activities undertaken and the characteristics of users; and the relevant climate change variables. However, as relatively more of the network relies on older infrastructure designed for pre-climate change conditions; inland navigation may be more vulnerable to extreme events and less able to accommodate the effects of climate change. Embankments may be overtopped more frequently or damaged by high flows. Piling or other forms of bank protection may be more susceptible to washing out and to erosion.

Where infrastructure is in good condition, but is simply unable to cope with the consequences (for example) of changes in seasonal precipitation causing more frequent higher or lower river levels, climate change may be costly to accommodate. The identification and collation of existing information, the collection of new data and the management of long-term datasets will therefore be essential to inform timely investment decisions. Adequate data will help the navigation authority to decide whether to invest in upgrading existing infrastructure or wait until that infrastructure is due to be replaced; and when to invest – for example in a new piece of machinery to manage vegetation (i.e. the point at which this becomes an economically more efficient option than continuing to employ extra manual labour for the same purpose). A long-term data set can be crucial in informing such ‘just-in-time’ decisions. Indeed, a key finding of the IWAC report (2009) was the need for effective, long term, data collation and management.

Inland Navigation Interdependencies

Parts of the canal network depend for their operational effectiveness on an adequate supply of water from rivers or reservoirs. If this is not available, navigation is constrained. Measures such as enforced lock sharing may be required (Brooke and White, 2010) and, in extreme conditions, temporary closures of parts of the network may be necessary. In the longer-term, incentives to encourage boaters to use less water-stressed parts of the network might be used: however, such actions would clearly have significant consequences for the local economy in affected areas. Other interdependencies identified, for example by Canal and River Trust (2012) in their adaptation report, include: the role of relevant regulators in taking action to reduce runoff rates and control flood risks from new development and (to promote) projects to increase flood storage the need for landowners to take measures to reduce soil erosion in land draining to canals and canal feeders, or to improve nutrient controls in reservoir catchments the responsibility of third parties in ensuring that their locks, weirs, and other tidal structures are operated so as to protect CRT assets upstream.

Modal shift

Finally, of relevance to both ports and harbours and inland navigation, the evolving low carbon agenda could in future change the balance of different modes of transport (Thornes et al., 2013). This could, in principle, favour a shift towards waterborne transport (PIANC, 2011). However, the commercial and sociological issues involved in such shifts are complex and future societal preferences are difficult to anticipate. The IWAC report (2009) highlighted similar measures amongst a range of infrastructure-related actions to deal with the effects *inter alia* of high and low flow conditions and increased air and water temperatures. In addition to adapting existing physical assets, however, other operational and safety issues and management procedures may need to be addressed through a combination of warning systems, behavioral changes and, in some cases the provision of new infrastructure.

Adaptation Implications of Increased Precipitation

In addition to addressing the potential damage to infrastructure and the physical capacity issues discussed above, high flow levels and more frequent strong stream conditions require user education and the issuing of warnings (CRT, 2012). On some waterways, it may also become

necessary to provide additional moorings or safe havens and take other measures to ensure the safety of less experienced boaters (IWAC, 2009). Adaptation may also be needed to reduce river bank erosion caused by increased flow. Rather than conventional and often expensive engineering such as steel sheet piling, 'soft engineering' solutions (e.g. willow spilling, plant rolls and coir revetments) may be used to stabilize the bank and minimize erosion. If the problem is caused or exacerbated by boat wash, additional measures including vessel speed restrictions can help to reduce erosion (Brooke and White, 2010).

Adaptation Implications of Reduced (summer) Precipitation

By 2050, average summer river flows in England and Wales could reduce by as much as 50 to 80 per cent (Environment Agency, 2010). Two key areas of concern arising from these projected reductions are increases in the frequency of low flow conditions particularly in natural rivers, and the possibility of water shortages affecting the supply for canals. As already indicated low flow conditions can increase the risk of groundings or affect the integrity of infrastructure through desiccation or the removal of hydraulic support from the waterside face. In such cases, monitoring to detect potential problems followed by appropriate maintenance will be vital. As competition for water increases, summer water resource availability is likely to become more of an issue in the UK (CRT, 2012).

Water allocation and water accounting measures are already being implemented in relation to domestic and agricultural/industrial uses in Mediterranean countries such as Spain and Portugal (European Commission, 2012). In the UK, the Lower Thames Operating Agreement (Thames Water, 2010) provides an example of where navigation was a factor in water allocation decision-making. More attention might be focused on such agreements in future. The need to secure a long-term supply of water for dependent navigable waterways will require affected navigation authorities to prepare water resources, conservation and use strategies (i.e. understanding and setting out their requirements). Particularly where there are uncertainties, this should also act as an incentive to become involved in others' strategic water planning initiatives, for example the preparation and review of river basin management plans under the EU Water Framework Directive (IWAC, 2009).

Low flow conditions can also have significant consequences for ecology because of the associated reduction in dissolved oxygen, upon which aquatic life depends. It will therefore be important to ensure navigation-related activities do not exacerbate the situation. Releasing stored water or holding water to maintain levels; operating locks and sluices to improve aeration; or placing constraints on dredging or boating activity can all help in this respect.

Behavioural Challenges

Many of the adaptation measures relevant to inland waterways involve awareness raising and behavioural changes. Educating users about the implications of their actions, and how modifying their behaviour can both help to save money and protect the environment, can be an effective way of achieving shared objectives (Brooke and White, 2010). Self-imposed speed restrictions could save fuel (and money) as well as reducing breaking wash and hence bank erosion. A voluntary Code of Practice might be drawn up to educate users about water

conservation measures when using locks. Raising awareness of safety issues and appropriate responses is similarly likely to become more important as the frequency of extreme events increases, and it will be critical to ensure for example, that users know: what to do in times of strong stream conditions or when encountering low flow conditions; the location of safe havens; and what measures to take in the event of entanglement in thick vegetation.

Methodology

Research Design

Descriptive survey research design was used for the study, Gall and Borg (2007) described descriptive survey research as a method of data collection using questionnaire or interview to collect data from a sample of the population that has been selected to represent the target population to which the findings of the data analysis can be generalised. This research design is appropriate for this study because it allowed the respondents to put down their views and opinions on the effective utilization of water transportation in Lagos State, South – West Nigeria.

Area of Study

This study was carried out in Lagos State, South West Nigeria mainly in its inland waterway relevant areas such as Lagos East, comprising Ikorodu and all its adjoining riverine towns and villages, Epe, Ajah, Victoria Island, Lamgbasa, Magbon and Ojo, Oto – Ijanikin, Sagbe – Koji, Agbara, Satellite Town, Apapa, Kirikiri, Mile 2, Snake Island, Tin Can Island, Trinity, Olodi – Apapa, Liver Pool, other village based Island in Sagbe – Koji, Badagry, Oto – Ikanikin and Aara. Lagos Central comprising Lagos Island, Ilubirin, CMS, Bony Camp, Ijora, Leventis, Oworonsoki, Ebute – Metta, Ilaje (Bariga), Makoko, Awo – Lowo Road, Ikoyi, Queen’s Drive, Osborn Road and Ebute – Ero. Lagos West geography was not considered for this study because it does not possess the needed qualifying characteristics to be a relevant area for the operation of inland waterway transportation. More so, the only visible since balance of this, is the river between Egan in Alimosho Local Government Area and another densely populated area in Ogun State which predominantly uses this route. In order not to commit target population bias, this geographical area was excluded from the study.

Population and Sample of the Study

Because of the nature of this study, a target population of 1,400 was aimed since the operational periods are early/middle morning (6.00am – 12.00noon), late afternoon and early evening (4.00pm – 6.30pm). The Target population was 140. This comprised inland waterway passengers, operators, administrators or managers as well as other categories of their staff for even representation. A sample of the target population was used for this study. This sample size, 10% of population target was determined through the use of Yaro – Yamane formula; $n = \frac{N}{1 + N(e)^2}$,

Where:

n = sample size

N = the finite population

e = level of significance or limitation of tolerable error

l = unity (Constant)

Since we have a target (finite) population of 140, n (sample size) =

$$= \frac{140}{1 + 140(0.05)^2} = \frac{140}{1 + 140(0.05)^2} = \frac{140}{1 + 0.35}$$

$$n = 140/1.35 \quad 103.703 \text{ approx. } 104.$$

This sample figure was arrived at through an objective process; hence, it is credible to have a sample of the target population as 104. The respondents in this study were homogenous in terms of natural or historical characteristics, although, differed somewhat in education, status and age. Therefore, purposeful judgment research sampling was used. To minimize the sampling error in this study to the barest minimum, purposeful judgmental technique was used in determining the study sample, a scientific calculation method was also used to get the needed sample from the target population.

Instrument for Data Collection

Questionnaire is the instrument used for data collection for this study. It was carefully designed to obtain information from the target respondents. There were 50 question items derived from the research questions meant for this study. Question items in numbers exceeding the quantity of each research question were derived to conform with the dictates and expectations of the research question itself. The research questions were structured in LIKERT form of Strongly agreed, agreed, undecided, Disagreed and Strongly disagreed. The numerical rating of this arrangement is: Strongly agree (SA) = 5, Agree (A) = 4, Undecided (U) = 3, Disagree (D) = 2, Strongly disagree (SD) = 1.

The respondents were asked to check the response option to any of the items based on the level at which each of them is true and relevant to the effective utilization of the inland waterways in Lagos State. The questionnaire was hand – delivered to each of the respondents through a research assistant, because of the nature of question items and period of collection from research assistant, time was sought by respondents to enable them fill the questionnaire and return. An enabling period of three (3) days was sought and agreed. The research assistant collected the questionnaire from the respondents on due dates. Out of the 104-questionnaire distributed to respondents, 88 were filled and returned by the respondents. Rate of return therefore:

$$88/104 \times 100 = 84.615 = 85\%.$$

$$\text{This implies that total lost } 104 - 88 = 16$$

$$\% \text{ lost (unreturned)} = 16/104 \times 100 = 15.384 = 15\%.$$

The five research questions were analysed using Mean Statistics standard deviation was also calculated to know level of individual item importance as expressed by respondents, the higher the SD, the less importance level. A Likert rating method was used as follows: Response categories points Strongly Agreed (SA)=5, Agreed (A)= 4, Undecided (UD)=3, Disagree (D)= 2, Strongly Disagree (SD)= 1 Decision was taken by considering the limit of assigned value in each

case, this implies that any item with a mean rating of 3.00 and above were accepted while any item with mean below 3.00 was rejected.

Validation of Instrument

Effective utilization of inland waterways in Lagos State for logistics relief. Questionnaire copies were presented to and validated by two lecturers who are experts in Maritime Transportation. One lecturer from Lagos State University, Ojo, Lagos and the second lecturer from Ladoke Akintola University of Technology, Ogbomosho, Oyo State. One complete copy of the questionnaire was presented to each of the lecturer with prior appointment to identify ambiguities and or errors in the question items that could cause bias or difficulty for respondents. They were also to assist in ensuring that question items are clearly stated and are appropriate and relevant to the research questions. They were also to make addendum where necessary for the improvement of the instrument to achieve its objectives.

Face validation was equally carried out by six experts. Four of them from the academia while two were from professional bodies in transport. The validates were asked to look at the study instrument, reword, delete or add to the content as the case might require and make general suggestions as appropriate for the improvement of the instrument before the final copies were produced.

Reliability of the Instrument

Internal consistency of effective utilization of inland waterway utilization questionnaire was determined through the use of Kuder Richardson Formula 21

$$K - R_{21} = K \frac{1 - \bar{x}(K - \bar{x})}{K - 1} \frac{1}{KS^2}$$

Where \bar{K} = total number of question items
 \bar{X} = mean of test scores
 S^2 = variance of test

A trial test was carried out on the study instrument, 10 individual respondents were involved in this. Six of them were daily and constant route users of the inland waterways while four were fishermen in different locations within the Lagos state inland waterway coverage.

Method of Data Collection

One Hundred and four copies of the questionnaire were administered to the respondents in Lagos State, South – West, Nigeria with the help of a study assistant who was given adequate orientation on the ways and manners of administration approach, request or visit for retrieval, safe launching, general compliments.

Data Analysis and Results

The data collected for this study were strategically analysed and presented in this chapter. Percentage, mean and standard deviation were calculated, but mean was used for presentation while standard deviation was sometimes used for group within importance rating. Each table contains information from responses emanating from research questions.

Data Presentation**Table 1:** Distribution of Respondents by Sex

Sex	No. of Respondents	Percentage (%)
Male	48	55
Female	40	45
Total	88	100

Table 1 shows the respondents distribution by sex. It depicts forty-eight (48) male respondents, 55% of total, forty (40) female respondents representing 45% of total respondents. The slight difference in responses by sex indicates that number of men using the inland waterway as a means of transport is somewhat higher than that of the women. This may also point to the fact that men are more disposed than women when patronage of the inland waterway is considered and that more men than women have their means of livelihood across the water day – in – day – out.

Table 2: Distribution of Respondents by Status

Status	No. of Respondents	Percentage (%)
Top Management	10	11
Senior Management (Captains inclusive)	22	25
Junior Management (Ticketing & Security)	29	33
Passengers	27	31
Total	88	100

Table 2 represents the respondent's distribution by work status or category. Ten (10) respondents representing 11% of total are of top management status, twenty – two (22) respondents representing 25% are of senior management level, and these include administrative and operational staff. Twenty – nine (29) respondents representing 33% of the total responses are of junior cadre.

These include but not limited to administrative/management staff, operation staff, inclusive of ticketing, technical and security personnel while twenty – seven (27) respondents representing 31% are the passengers randomly selected at the various jetties and platforms. Distribution of questionnaire at jetties/platforms was done during three (3) periods namely: morning peak period, 7.00am, mid – day period, 1.00pm – 3.30pm and evening peak period of 4.00pm to 6.00pm on work days, Monday to Friday. This was to avoid bias emanating from periodic passenger disparity.

Table 3: Distribution of Respondents by Education

Education Qualification	No. of Respondents	Percentage (%)
Primary School (FSLC) Certificate	12	14
Secondary School Certificate	20	23
Ordinary Diploma	15	17
Higher Diploma/NCE	10	11

B. Sc. Degree	20	23
M. Sc. And Equivalent	10	11
P. hD	1	1
Total	88	100

Table 3 shows the distribution of respondents by their education. It reveals that twelve (12) respondents representing 14% of total sampled population have the primary school education, twenty (20) respondents representing 23% of total responses have secondary school education, fifteen (15) respondents representing 17% of total have the ordinary diploma while ten (10) respondents have the Higher Diploma or National Certificate in Education (NCE) which represents 11% of total. Twenty (20) respondents representing 23% have the first degree (B. Sc.) while ten (10) respondents have Master's degree (M. Sc.) representing 11% of the total. One (1) respondent have the Doctor of Philosophy (PhD.) degree which represents 1% of the total respondents. This implies that the use of inland waterway transport cuts across educational status, either as a worker in the inland waterway services, a trader, an administrator, a teacher, a farmer or a house wife/businessman, it is obvious through table three (3) that inland waterway transport has an encouraging patronage level.

Research Question 1

Table 64 To what extent do passengers use inland waterway transport for socio – economic activities?

S/No.	Factors	X	SD	Ranking
1	Regular Use of inland waterways	3.93	9.17	6
2.	Individual frequency of use of inland	4.06	9.30	4
3.	Passengers' confidence level	4.26	0.79	2
4.	Passenger's level of operational knowledge among riverine area dwellers	4.16	1.02	3
5.	Model choice among riverine dwellers with options is high	3.99	0.75	5
6.	Educational/sensitization on current issues of concern	4.35	0.79	1
7.	Government and private sector collaboration	3.93	0.93	6

In Table 4 most important factor as calculated is education/sensitization of passengers on current issues of concern with a mean of 4.35, followed by passenger's confidence level of mean 4.26 based on cut – off criteria of 3.00. Even though there is variance in level of agreement all the question items were positively agreed with. This implies that inland waterways users are sensitized/educated on current issues of concern as appreciable confidence level, level of operational knowledge of inland waterways as well frequently using the waterways transport.

Research Question 2

Table 5: How much inland waterways infrastructure is available for use in Lagos State?

S/No.	Factors	X	SD	Ranking
1	Ability of modern Jetties/platforms	4.07	0.69	6
2.	Use of new/modern boats/ferries by various operators	3.94	0.47	7
3.	Maintenance of jetties to cope with passenger population/safety	4.12	0.25	5
4.	Dredging of waterways as and when required to meet standard	3.83	0.73	8
5.	Availability of effective and up to date communication	4.33	0.77	2
6.	Timely routes maintenance through clearance of obstructions is promptly done	4.18	1.91	3
7.	Use of boats/ferries with the right technical specifications	4.51	0.55	1
8.	Availability of emergency maintenance personnel on voyage	4.15	0.92	4

It could be seen from Table 5 that based on cut – off criterion 3.00, question items bothering on issue of boats/ferries with necessary technical features is the most important with mean 4.51. This is followed by availability of effective and up to date communication with a mean of 4.33 followed by clearance of obstructions on water way routes promptly with a mean of 4.18, emergency maintenance personnel came 4th with a mean of 4.15. All statements were agreed with.

Research question 3

Table 6: How effective is inland waterways mode for socio – economic uses?

S/No.	Factors	X	SD	Ranking
1	Inland waterways transport is faster in spatial operation than road mode covering same corridor	3.96	0.98	6
2.	Inland waterways fare is cheaper	2.54	1.26	11
3.	Less delay in inland waterway	4.13	0.77	3
4.	Passengers' belonging losses not common in waterways	4.10	0.84	4
5.	Heavy traffic/man – hour losses and accident not common	3.93	1.04	7
6.	Stress/fatigue rare on voyage	3.41	0.97	8

7.	Arrival far behind schedule not common in inland waterways	3.00	1.18	10
8.	Inland waterways transport encourages riverine area residents in business	3.98	0.82	5
9.	Choice of inland waterways transport for bigger profit	4.17	0.91	2
10.	Riverine parents send their children school in towns and cities due to inland waterways transport availability	3.16	1.03	9
11.	Inland waterways transport allows cross – water business activities	4.29	0.78	1

From the Table 6, cross water business activities being allowed rated most important among the statements of questionnaire in research question 3 with a mean of 4.29. This was followed by choice of inland waterways comes a mean of 4.17, less delay in inland waterways comes third with a mean of 4.13. All the statements here are also agreed with, but the least mean of 3.00 is on late arrival is not common based on cut – off criterion of 3.00. Question item 2 which did not agree that inland waterways fare is cheaper with a mean of 2.54, below cut – off criterion.

Research Question 4

Table 7: What is the level of private participation in the inland waterways transport in Lagos?

S/No.	Factors	X	SD	Ranking
1	Private investment in Lagos inland waterways are encouraging	4.04	0.73	3
2.	Private sector operational participation has been encouraging	3.09	2.09	9
3.	There are investment incentives for private participation	3.45	0.94	7
4.	Operational fees and charges are affordable	3.73	0.84	6
5.	Legal violation penalties are not politically exploitative	3.75	1.04	5
6.	Private participants are involved in policy making	3.83	0.85	4

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7.	Policy favour for government operators is not inherent	3.43	1.04	8
8.	Legal framework for inland waterways operations applies	4.54	1.12	1
9.	The security between the Federal and Lagos State governments on inland waterways are all involved	4.48	1.15	2

In Table 7, equal legal framework ranked most important in this table 4 with a mean of 4.54, this is followed by all-inclusive security arrangement with a mean of 4.48, private investment in waterways transport comes third with a mean of 4.04 while the least mean of 3.09 went to scarcely agreed that private sector operational participation has been encouraging.

Table 8: Research Question 5: How safe and secure are the Lagos inland waterways?

S/No.	Factors	X	SD	Ranking
1.	Marine police officers are always patrolling the waterways for effective security	3.94	1.81	6
2.	Communication tools are always available on voyage	4.25	0.82	5
3.	Debris along waterways routes are evacuated on time	3.56	1.09	8
4.	Depth level inspection is always carried out and dredging done accordingly	3.48	0.96	9
5.	Operators always ensure jetty safety and conducive passage of road	4.49	0.67	3
6.	Street urchins constitute menace at jetties	4.53	0.66	2
7.	Joint security meetings are held at appropriate intervals	4.33	0.88	4
8.	Community policing and information gathering are employed for security	3.85	0.92	7
9.	Reported accident, rate is low in inland waterway transport	4.58	0.69	1
10.	Safety equipment for passengers and crew are always provided	4.58	0.62	1
11.	Boats/ferries are scarcely available to meet demand	2.22	0.98	10
12.	There is mutual policy agreement between the federal and Lagos State	2.11	1.97	11

government on issues concerning
inland waterways transport

In the Table 8, question items 9 and 10 bothering on security and safety came most important with a mean of 4.58 each followed by item 6 which alluded to the presence of street urchins at jetties, a menace to persons and property with a mean of 4.53. Item 5 with a mean of 4.49 alluded to operators' efforts at ensuring safe passage from boats/ferries to the road by passenger. Item number 11 with a mean of 2.2 did not agree that boats/ferries are scarcely available to meet demand while item 12 also disagreed that mutual policy agreement existed between Federal and Lagos State government on issues concerning the inland waterways transport with a mean of 2.11, all based on cut – off criterion of 3.00.

Table 5, mean = 4.35 and SD = 0.79. This implies that item is ranked first with highest mean and among the lowest SD. Items (1) and (7) have mean = 3.93, SD = 9.17 and X = 3.93, SD = 9.30. In spite of their mean within the region of acceptance, their SD means that these items are not regarded as important by most respondents as those with lower mean than them. Item (3) ranked second with X = 4.26, SD = 0.79, item number (4) ranked third with mean = 4.16, SD = 1.02 with this SD, item number (4) is agreed with by majority of the respondents. Item number (2) ranked fourth with mean = 4.06, SD = 9.30. This implies that this item was not as importantly regarded by most respondents, because of its high SD. Item (5) ranked fifth with mean = 3.99, SD = 0.75, item (1) ranked sixth, having the same mean = 3.99 with item (5), but with SD = 9.17 which implies that item (5) is not as important as item (5) as alluded to by respondents. Item (7) is ranked sixth with mean = 3.93, SD = 0.93.

Item number (1) ranked seventh with X = 3.93, SD = 9.7. With the SD of item (7), it means it is ranked more important than item (7) even with the same X, but different SD. Table 6: Item number (7) ranked first with mean = 4.51, SD = 0.55. This is followed by item number (5) with mean = 4.33, SD = 0.77, third is item number (6) with mean = 4.18, SD = 1.91. with this SD of item number (6) it implies it is not more important factor alluded to by respondents. Item number (8) is ranked fourth with mean = 4.15, SD = 0.92, followed by item number (3) ranked fifth with mean = 4.12, SD = 0.25. this item had the least SD, implying that the item is ranked very important among others in this table. Sixth ranked is item number (1) with mean = 4.07, SD = 0.69, ranked seventh is item number (2) with mean = 3.94, SD = 0.47., ranked eight is item number (4) with mean = 3.83, SD = 0.73, all items were accepted with varying collective importance ratings through the SD. Table 7 Item number (11) ranked first in this table with mean = 4.29, SD = 0.78.

With its highest mean and second lowest SD it has been given the highest position of importance by most respondents in the table among other items. It is followed by item number (9) with mean = 4.17, SD = 0.91. Item number (3) was ranked third in this table with mean = 4.12, SD = 0.77. The item is also ranked important by most respondents in this table with the least SD. Item number (4) ranked fourth with mean = 4.10, SD = 0.84, this is followed by item number (8) 5th rank with mean = 3.98, SD = 0.82, sixth ranked is item number (1) with mean = 3.93, SD = 1.04. This SD implies that not most respondents in this table were in collective support of item number (5), meaning heavy traffic/man – hour losses are in common in inland waterways transport. Ranked eight is item number (6) with X = 3.41, SD = 0.98, ninth ranked is item number (10) with

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mean = 3.16, SD = 1.03. Ranked tenth is item number (7) with mean = 3.00, SD = 1.18. the eleventh ranked item is number (2) in this table with $X = 2.54$, SD = 1.26. With the lowest mean and the highest SD, this item (5) was not accepted and ranked lowest in importance rating among other items in the table. All items except (5) were accepted based on their mean but varying degrees of importance within items as given by their SD.

Table 8 Ranking first in this table is item number (8) with mean = 4.54, SD = 1.54, this is followed by second ranked item number (9) with mean = 4.48, SD = 1.15. Ranked third is item number (3) with mean = 4.04, SD = 0.73, followed by item number (6) which ranked fourth with $X = 3.83$, SD = 0.85. Item number (5) came fifth with mean = 3.75, SD = 1.04 while item number (4) ranked sixth with mean = 3.73, SD = 0.84. Other items rankings are: Item number (3) ranked seventh with $X = 3.45$, SD = 0.94, item number (7) ranked eighth with mean = 3.43, SD = 1.04, item number (2) ranked ninth with mean = 3.09, SD = 2.09. All items were accepted but with varying SD which denote their level of importance in item group. In Table 9, item number (10) ranked first with mean = 4.58, SD = 0.62, item number (9) ranked second with mean = 4.58, SD = 0.69 even with same X as item number (10). Item number (6) ranked third with mean = 4.53, SD = 0.66, Item number (5) ranked fourth with mean = 4.49, SD = 0.67, Item number (7) ranked fifth with mean = 4.33, SD = 0.88, Ranked sixth is item number (2) with mean = 4.25, SD = 0.82, Item number (1) ranked seventh with mean = 3.94, SD = 1.81 while, Item number (8) ranked eighth with $X = 3.85$, SD = 0.92, Item number (3) ranked ninth with mean = 3.56, SD = 1.09, while, Item number (4) ranked tenth with mean = 3.48, SD = 0.96, The eleventh item ranked eleventh with mean = 2.22, SD = 0.98, Item number (12) ranked twelfth with mean = 2.11, SD = 0.98

5. SUMMARY, CONCLUSION AND RECOMMENDATIONS

Summary

Question 1: to what extent do passengers use inland waterways transport for socioeconomic activities?

As a result of the analysis of the data in this table using mean (\bar{x}) and standard deviation (SD), it was discovered that level of education and sensitization of inland waterways transport is high and encouraging, so also is their confidence level and the operational knowledge by riverine dwellers. Regular use of inland waterways by the passengers and individual frequency of use though were agreed with, however, their standard deviations (SDs) 9.17 and 9.30 respectively indicate lack of within group agreement. This can be inferred that even as inland water has become inevitable for some passengers, many of them still have reservation. This may be due to previous experience or hydrophobia. There is general agreement however, that to a large extent passenger use inland waterways transport for socioeconomic activities in Lagos for logistics relief.

Question 2: how much inland waterways infrastructure is available for use in Lagos State? The findings revealed general agreement with all the factors but varying means standard deviations. The factor with the highest mean, use of boats/ferries with the right technical specifications. This is in line with Anyoku's work on inland waterways development (1986), which in turn improves patronage and profitability. This will also improve safety and passenger confidence viz a viz downtime resulting from breakdown.

Question 3: How effective is inland waterways mode for socio-economic uses in Lagos State? The findings here reveal an improvement in socioeconomic activities in Lagos State as a result of availability, operation and patronage of inland waterways transport. The findings also attest to timeless, absence of or highly minimized accidents, delay, loss of belongings. All these confirm the work of Brook and White (2010). Findings here also revealed that inland waterways transport is after all not cheaper as made to believe by most writers. A fact that attests to this is the cost of travelling from Ebute-Ero on the Lagos Island to Oworonsoki and Ikorodu which cost between ₦200 and ₦400 in contrast to fares charged along the same road routes stretching between ₦100 and ₦200 respectively.

Question 4: What is the level of private participation in the inland waterways transport in Lagos? Findings reveal here a consensus agreement to the fact that is an appreciable level of private participation in the Lagos State Inland Waterways Transportation through the calculated means. Factors like legal framework, legal violation penalties, absence of policy favour for government operators as well all – inclusive security arrangement are on agreement scale, but a standard deviations that a bit higher and may have to do with unreported corrupt practices and face – off between the Federal and Lagos State Government on policy issues as confirmed by the report of the Nation Newspaper (04/10/2017)

Question 5: How safe and secure are the Lagos Inland Waterways? Through analysis, ten findings here reveal a general agreement with ten factors ranging from provision of safety equipment for passengers and crew members, low accident rate, as reported, presence of street urchins (hooligans) which is a negative report because the hooligans are hemp smoking young and middle aged men who lurk around the jetties and platforms to commit stealing and violence. One factor disagreed with the issue of scarcely available boats and ferries. This means there is commensurate number of ferries and boats to meet current demands.

The last factor here reiterated the issue of mutual policy agreement between the Federal and Lagos State Government. This was disagreed with, showing there are issues bothering on policy which need to be settled between the two tiers of government. This also confirms the Newspapers Article of the Nation Newspaper (04/10/2017) and This Day Newspaper (7/11/207). This study has been carried out in more unique manner as a result of scientific, logical, structured and systematic methodology. This is in sharp contrast with other similar works which were carried out as opinion papers, geographic generalizable.

Recommendations

Based on the findings, the following recommendations are made:

- (i) The Lagos State and Federal governments should close ranks, work together for a common goal in the area of policy formulation and implementation. They should see themselves as partners in progress, but not as competing entities. In the absence of this, pricing and enforcement on security, safety and operation are in jeopardy.
- (ii) Jetties/platforms/terminals facilities should be upgraded and secured to prevent street urchins from lurking around to commit various crimes that will beam Inland

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- Waterways Transport to bad light. State and Federal Securities Agencies should work together since both have various legal ownership claims.
- (iii) Both the Lagos State Government and the private investors should take the issue of facility upgrading and expansion with the seriousness it deserves. More people come into Lagos each passing hour. Majority of them cannot afford accommodation in the mainland, but can do when they are across the water. This will only be encouraged with means of crossing to and fro in a safe, secure and affordable manner.
 - (iv) Management and man-power issues are germane to inland waterways transport. This promotes viability, safety, growth and business sustenance. Existing staff should be subjected contemporary training and development programmes, both in technical and non – technical areas would be employees should be sourced from appropriate quarters while other concerned operators should be subjected to periodic performance evaluation to determine their currency of knowledge, skills and competencies in their respective areas of operation.
 - (v) Worker’s welfare, motivational incentives and competitive remuneration should be paramount in the minds of staff employers in the Inland Waterways Transport sub – sector so as to put in their best and contribute to the growth of the sub – sector.

Conclusion

For Lagos State to aspire, get to its mega-city dream, compete in today’s global economy, the key role played by Inland Waterways Transport must meet the increasing demand on it by the various socio-economic, environmental, climatic changes. It stands at a distant advantage as a complementing mode to other modes, but its position to road, maritime and rail transport modes is not controvertible. Effective operation, utilization and maintenance of Inland Waterways Transport is a way to go now more than ever city centres are congested, leading unabated like in living necessities and pressure on infrastructure. An available, affordable, safe and effective Inland Waterways Transport will help to decongest the densely populated city centre, allow movement of goods, persons and services to all nooks and crannies of riverine settlement, setting up industries at small, medium and large-scale levels.

Limitations and suggestions of the Study

During the course of carrying out this study, following limitations were experienced by the researcher.

(i) Respondents had control of time to fill and release the research instrument with them, thereby taking longer time before final release (ii) Some respondents were not very free with the researcher, they had thought the study might bring economic disadvantage to them. (iii) Due to the nature of the study, researcher had to spend more money on transportation and other logistic needs to the various far – apart water and road locations than ordinarily necessary As a state – wide study in densely populated environment, time taken for the study was inadequate. Nigeria, in which Lagos is a State, is large with the existence of rivers, canals, creeks and others. Also, there are other coastal States in Nigeria that have similar socioeconomic characteristics as

Lagos. Further studies on this same topic can be carried out in other geographical locations. They can also be carried out in Lagos, using different research designs and population coverage to further knowledge and course discover any variation in final outcome to improve and increase the intellectual literature volume and the attendant availability for use.

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**CUSTOMER RELATIONSHIP MANAGEMENT AND ORGANIZATIONAL PERFORMANCE IN
NIGERIA (A CASE STUDY OF SELECTED SMEs in ABEOKUTA SOUTH OGUN STATE)**

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Abstract

The study investigated Customer Relationship Management (CRM) and organizational performance in the area of Abeokuta south local government Survey research design was employed for the study. 114 respondents from selected SMEs for the study and were gathered through the use of structured questionnaire. Their responses were tested using appropriate statistical tools like the SPSS package using the ANOVA and the correlation and regression label; our study revealed that the Customer Relationship Management (CRM) has affected the growth of SME positively which has allowed youth to be self-employed and created economic growth and development. Therefore, the study recommended that solving the growth of SME development can be single handedly done by the use of Customer Relationship Management (CRM). Hypothesis one shows that The value of R-square of 22.66% shows the variance of innovation and quality that was explained by customer knowledge of the organization's products. The second hypothesis of this study states that "customer knowledge does not have effect on innovation and quality". Since the t-calculated of 5.84 is greater than the t-critical value of 1.96, the null hypothesis is rejected, while the alternative hypothesis which state that "customer knowledge has effect on innovation and quality" is validated. Hypothesis two it shows that . The correlation value is low but positive with the value of 0.287 (28.7%), it is then important to point out that the existence of statistically significant positive correlation between customer retention and customer relations. Based on the above conclusion, the following recommendations were put forward by the researcher; Communication is a key concept in the improvement of customer relationship management and its capabilities; Government and especially small industries can improve the SMEs performance by consultation, conferences and programs related to CRM.

Background of the Study

CRM (customer relationship management) has been increasingly recognized as a business strategy to effectively understand, manage, and sustain customer relationship with advanced information and communication technologies. Rapid development of customer relationship management applications have seen the trend that more and more SMEs (small and medium-sized enterprises) are seeking to implement SMEs relevance to country specific economic growth

has been strongly established with government driving SMEs growth through financing Oni et al (2012).

CRM in order to survive and compete in the world. In this study, the factors influencing the implementation of customer relationship management at small and medium-sized science and technology park of Iran were analysed.

Top CRM system vendors in are SAP, Siebel Systems (Oracle), and Microsoft dynamics. CRM is believed to have the potential to improve the performance and value of SMEs, but not many SMEs adopt CRM system due to various reasons such as lack of knowledge about CRM, lack of resources to acquire the CRM system, lack of skills and expertise to implement it and so on. Therefore, the objective of this research is to study the reasons SMEs do not implement CRM system, the benefits CRM system can bring to SMEs and the various methods CRM system can be implemented in SMEs.

This paper will study and review existing related works about the above-mentioned aspects especially implementing CRM system in SMEs so that the CRM system implementation success rate among SMEs can increase.

Statement of Research Problem

Small and Medium Enterprises contribute in no small measure to the growth and development of a country and is also seen as a tool for entrepreneurial development which in turn impacts the GDP of such country. SME's survival depends solely on its customer. Enhancing customer experience is always a challenge. In order to enhance business performance, SMEs have to expand their customer base. Growth happens only when customer relationships with the organization are robust and satisfied. And customer satisfaction can only be increased with effectiveness CRM in an organization.

Customer Relationship Management strategy is not the universal remedy it was hoped to be, and their implementations in some organizations have not wholly delivered on the vision. On the introduction of the strategy to SMEs by implementing CRM, the expectations were high. This included efficiency and effectiveness, faster resolution of customer complains within 7 days, updated customer database, accuracy in the billing cycle and others. Achievement of these expectations then could have led less estimated bills, centralization database, and proper procedures of performing the various processes.

Organizations are continually looking for innovative ways to acquire, increase and retain business because the cost of losing customers is rising. Organizations which can attract, satisfy, and retain customers are more likely to survive than organizations which do not do this. Retained customers represent an opportunity to increase profitability as well as loyalty. The importance of retaining customers is that there is strong evidence that customer relations and customer retention are directly related. It seems that the longer the customer stays with a seller/producer, the higher the likelihood that they will place a greater amount of business with them, even to the extent of single sourcing. Customer relation is a way business communicates and interacts with public to gain and retain customers.

Customer relation will bring about goodwill and larger market share for a business that practice it. The rate at which an organization relates with its customer will be bring about

customer loyalty and retention which in turn will leads to increased profit for such organization. However, the extent of practice of Customer Relationship Management in small and medium enterprises in Abeokuta is yet to be ascertained, while managers with the task of determining if customer relationship management leads to improved performance of small and medium enterprises in Abeokuta at all. Another problem is ascertaining if customer relationship management impacts small and medium enterprises competitiveness in the market place. It is these gaps in literature that this study sets out to fill.

Literature Review

The Concept of Customer Relationship Management

The measure of success is the growth of the share of the customer's business and its profitability (Parvatiyar and Sheth, 2002). Relationship marketing has a positive influence on the four aspects of organizational performance in services namely financial, customer, internal process, and learning and growth. Relationship marketing is concerned with building relationship at each and every possible point of interaction between firms and the customers. Overall relationship marketing focuses on identifying factors affecting customer relationship with firms and works towards those factors in order to retain clients Customer Relationship Management is the business strategy focused on the customer that increases the loyalty and satisfaction of customer by presenting him the personalized services and some know it as a managerial approach which includes identifying, attracting, developing and maintaining the successful relationship with customer in order to increase profitability.

This is concerned with building relationship at each and every possible point of interaction between firms and the customers. Relationship marketing is concerned with building relationship at each and every possible point of interaction between firms and the customers. Overall relationship marketing focuses on identifying factors affecting customer relationship with firms and works towards those factors in order to retain clients

Customer Knowledge

Customer knowledge is the combination of experience value and insight information which is needed created and absorbed during the transaction and exchange between the customers and enterprise. Customer knowledge as organized and structured information about the customer as a result of systematic processing. Customer knowledge refers to understanding your consumers, their needs, wants and aims.

Customer knowledge is widely accepted as a dynamic combination of experience, values, contextual information, and expert insight which are needed, created and observed during the transaction and exchange between customers and the organization and that provides a framework for evaluating and incorporating new experiences and information.

Customer Retention

Blattberg et al. (2001) state that customer retention is taking place when a customer keeps on buying the same market offering over a long period of time. For products with short purchase cycles, they define customer retention as occurring when 'the customer continues to purchase the product or service over a specified period'. For products with long purchase cycles,