SAFETY AND OPERATIONAL CHARACTERISTICS OF WATER BASED TRANSPORTATION IN LAGOS STATE.

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Abstract

This study explores the operational characteristics and safety of operators of water based transport in Lagos State. Both primary and secondary data were used for the study. Primary data was sourced through the use of structured questionnaire administered to all registered operators operating in the three most patronized jetties in the state. Secondary data was sourced from relevant institutions, literatures, peer reviewed journals and internet. Findings indicated that only males operate in this sector and 71.2% of the operators owned their vessels. About 60% of the operators had spent 1-5years in the business. However, about 90% of the operators were willing to leave the business for a better monetarily rewarding job. Safety of this mode of transport has been compromised due to operators' misbehaviors and government inattention. Challenges such as water hyacinth, expensive safety materials and shallow water were mentioned by the operators.

The study suggested immediate removal of water hyacinth, subsidy for safety materials and enactment of water based transport policy so as to improve water transportation in Lagos state.

1. Introduction

Water transport being the oldest mode of transport is crucial to the development of any nation. It provides means of transportation for both rural and urban dwellers particularly those communities along the coastal areas and inland waterways. According to Ismalia (2008) water transport is associated with inland waterways, coastal waters and the deep sea. In spite of the socio-economic and environmental benefits of water transport, this mode of transport has been minimally utilized (Ezenwaji, 2010).For instance, in Bangladesh,demand for water transport constitutes 32% of the total transport sector (Rahmam, 1994); 20% in Philippines (Fellinda, 2006); 3% in Sierra Leone (Kimba, 2008); 0.15% in India (Raphuram, 2004) and only 0.08% in Nigeria (Ezenwaji, 2010) - in spite of her rich maritime endowment which covers over 800 kilometers along the coastal areas. Strengthening this mode of transport in developing countries particularly in Nigeria will reduce the increasing road transportation problems such as congestion, long travel time and parking among others.

Research on water transportation dated back to the early 1970s when the role and significance of inland waterways was highlighted to the European transport (Noortman, 1973). The study revealed the 19,000kms navigable waterways network of Western Europe (Germany, France, The Netherlands and Belgium) has limited relevance because only 40% of the length can allow barges to pass along. In his pioneering work on water transportation in Nigeria, Udo (1970) observed that water is one of the natural resources which Nigeria had in abundance and that the country had the opportunity to service most landlocked countries in West Africa such as Burkina Faso, Chad, Mali and Niger.

Various studies on the origin, management, problems and potentials of water based transport had been documented (Adetola, 1971; Badejo, 1995; Abams, 1998, 1999, 2004; Douglas, 200; Anyam, 2003;Ojile, 2006). Sulaiman et al. (2001) reviewed the potential of inland waterways

transportation in Malaysia. They observed that inland waterway transport was the most efficient, cost-effective and safest mode of transport compared to others modes. Similarly, Obed (2014) in his study of the characteristics of inland water transport in Nigeria noted that Inland waterway transport was more developed in the deltaic areas of southern Nigeria compared to the hinterland areas. Ezenwaji (2010) using Principal Component Analysis identified four groups of constraints (Environmental, Economic, Boat and Rural market) to effective water transportation in some riverine communities in old Anambra local government area of Nigeria. Furthermore, in terms of marine accidents, Lawal (2012) identified dilapidated jetties, ill-equipped marine police, non-functional vessels and wrecks as the main factors responsible for marine accidents in Nigeria. Human error accounted for more than 50% of these causes (Donatus 2013).

Transportation in Lagos is usually chaotic and travel times have doubled over the years because about 6 million passengers hustle between Lagos mainland and Island daily(Adejare *et al.*, 2011).Congestion is rife in the city and transport costs to users constitute a high proportion of disposable income (Jimoh*et al.*, 2013). This was largely due to the increasing demand on road transport which has consequently overstretched the road capacity. In fact, more than 98% of movement in Lagos state is undertaken by road (Frontier Market Intelligence, 2014) and city of this size cannot survive on one mode of transportation. It is against this backdrop that this paper assessed the operational characteristics of water based mode of transport (boat) and how it can complement the already saturated road mode in Lagos state. The paper is in four sections including this introduction. Section two is on study area and the methodology. Results and discussion are contained in section three while section four is the conclusion and recommendations.

2. Study Area and Methodology

Lagos State lies between longitudes $2^0 42'$ East and 3^0 42' East and Latitude 6^0 22' North and 6^0 52' North, in the southwestern area of Nigeria. The state is bounded by Ogun State, both to the North and East while bounded by Republic of Benin and Atlantic Ocean stretching for almost 180 kilometres of coastline, to the West and South respectively (Olayiwola et al., 2006). Lagos state is a mega city with an estimated population of about 9 million inhabitants which is about 6.5% of the total population of Nigeria (Census, 2006). However, according to Michael (2012), the city

of Lagos is expected to hit 24.5 million by 2025 and thus be among the ten most populous cities in the world. Twelve (12) out of the twenty (20) local governments of Lagos state are drained by rivers, which are: Badagry, Ojo, Amowo - Odofin, Apapa, Lagos Island, Eti - Osa, Kosofe, Somolu, Lagos Mainland, Ikorodu, Epe and IbejuLekki. Lagos state is running water transport on 12 routes under the supervision of Lagos State Waterways Authority (LASWA). The routes are Ikorodu-Marina/CMS; Marina-Mile 2; Ikorodu-Addax/Falomo; Ikorodu-EbuteEro; Marina-IjegunEgba-Ebute-Ojo; Mile 2-Marina/CMS-Mekwen-Falomo; Badore-Ijede; Badore-Five Cowries; Marina-Oworonshonki; EbuteOjo-IjegunEgba; Oworonshonki-Five Cowries; and Baiyeku-Langbasa. The metropolitan area accounted for the seventeen out of the twenty local government areas in Lagos State.
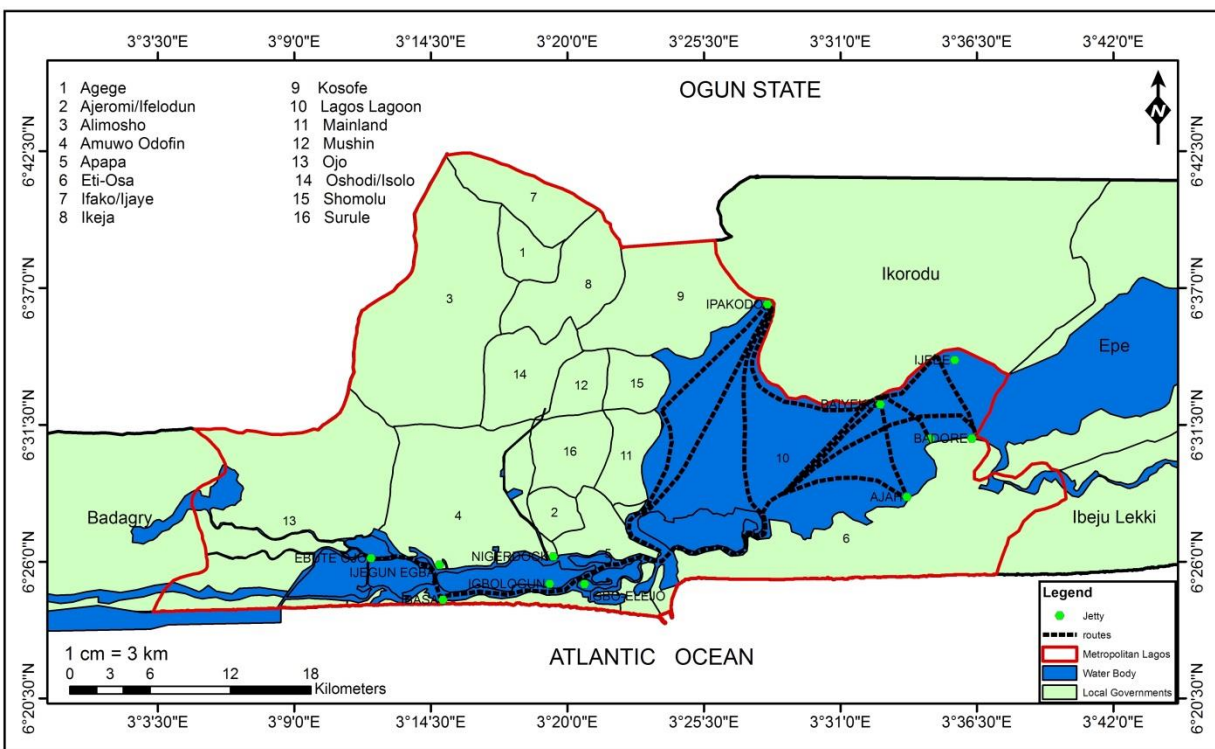

Figure 1: Lagos Inland Waterways Routes

Source: LASWA, 2014 and Author's Work, 2014.

This study adopted cross sectional survey research design. The study made use of both primary and secondary data which were gotten from various reliable sources. The secondary data was sourced from literatures, peer reviewed journals, internet, archives and institutions such as LASWA which provided patronage data, numbers of jetties and registered operators. The

sampling technique for the choice of jetties was purposive sampling. Among the jetties, three jetties with the highest patronage were purposively selected. They are Majidun in Ikorodu Local Government; Liverpool in Island Local Government and IjegunEgba in Badagry/Ojo Local Government. The total number of operators in these jetties was selected for interview. The technique used for primary data collection for the study involved the use structured questionnaires. Structured questionnaire containing socio-economic characteristics, travel pattern and safety of the operators were administered to the operators. Key Informal Interview (KII) was also used to elicit further information from the respondents. Descriptive statistics were used for data analysis.

3. Results and Discussion

This section is divided into three parts. Demographic and socio-economic characteristics of the operators are contained in first part, trip pattern and vessel characteristics in second part while the last part is on the safety and security of operators.

3.1 Demographic and Socio-economic Characteristics of the Operators

Table 1 describes the socio-economic characteristics of the respondents. All the operators were males. In terms of the age distribution of respondents, 53.8% of the operators were less than 30 years, 34.6% of the operators were between ages 31 and 40 years while those between 41-50 years accounted for 11.5%. None of the operators were above 50years. Substantial number of the operators falls within the productive age. Specifically, over half of the operators were less than 30 years which shows clearly that boat operation is basically a youth industry.

Furthermore, the educational attainment of the operators indicated that 7.7% of them had adult education, 9.6% possessed primary education and 63.5% were secondary school leaver. Only 19.2% had tertiary education. The large percentage of operators with secondary education is not surprising because the certificate cannot provide them job in formal employment that will give them a living income. Therefore, they settled for this type of employment. Studies of operators of other modes in Nigeria have also showed similar results (Ipingbemi, 2010; Morenikeji and Umaru, 2012). The operator's income varies depending on the level of patronage, seasonality and unforeseen circumstance (traffic gridlock on the road) among others. 7.7% of the operators

earned less than #20,000 per month, while 36.5% each earned between #20,000 - #40,000,as well as between #40,000 - #60,000. Also, 13.5% earned between #60,000-#80,000 while only 5.8% of the operators earned above #100,000. With this income, it is obvious that many of them would not be able to meet family needs taking into consideration the cost of living in Lagos state. In fact, some of them complained bitterly during interview about their inability sometimes to pay for rent, school fees of their children or even to eat well. Saving was not considered as priority because according to them 'there is nothing to save'. With respect to the length of stay in area of operation, 11.5% of the operators had been there since birth, 55.8% had spent 1-5years in the area, 11.5% had spent 6-10yearsand 3.8% had spent 11-15years. Over 17% of them had been there for more than 15 years. This shows the level of familiarity of the operators with the environment of operation.

Table 1: Socio-economic characteristics of Operators

Sex	Number of respondents	Percentage
Male	52	100.0
Female	0	0
Total	**52**	**100.0**
Age	**Number of respondents**	**Percentage**
less than 30 years	28	53.8
31-40 years	18	34.6
41-50 years	6	11.5
51 - 60 years	0	0
Total	**52**	**100.0**
Marital status	**Number of respondents**	**Percentage**
Single	37	71.2
Married	15	28.8
Total	**52**	**100.0**
Education	**Number of respondents**	**Percentage**
Adult education	4	7.7
Primary	5	9.6
Secondary	33	63.5

	Number of respondents	Percentage
Tertiary	10	19.2
Total	**52**	**100.0**

Monthly Income	Number of respondents	Percentage
Less than #20,000	4	7.7
#20,000 - #40,000	19	36.5
#40,000 - #60,000	19	36.5
#60,000 - #80,000	7	13.5
Above #100,000	3	5.8
Total	**52**	**100.0**

Length of stay	Number of respondents	Percentage
Since Birth	6	11.5
1-5 years	29	55.8
6-10 years	6	11.5
11-15 years	2	3.8
Above 15 years	9	17.3
Total	**52**	**100.0**

Source: Author's Field Work, 2014

3.2 Vehicle characteristics and Trip patterns of the operators.

Table2 describes the vehicle characteristics and trip patterns of the operators. 71.2% of the operators owned their vehicle, 5.7% were owned by a company and 23.1% were under lease. Those under lease were bought by investors and leased to operators for business. Example of company operating purchase and lease business is ADDAX. Operators said they were in this arrangement because they did not have the financial capability to purchase boat on their own. Also, year of experience indicated that about 60% of the operators had spent less than 5years in the business, 36.5% spent 6-10 years while only 3.8% had spent above 15 years. The current influx into the business may not be unconnected with yearly worsening of unemployment in the country. According to Nigeria Bureau of Statistics (2014), official unemployment rate in Nigeria is put at 6.4% but in reality it can be conveniently said that only one out of five youths in Nigeria is employed. Reason for engaging in the business indicated that about 85% of the operators were driven to the job because of employment. This confirms our earlier conclusion on the level of

unemployment in Nigeria. Family heritage accounted for 5.8% while love for water was 9.6%.Furthermore, more than 86% of the respondents were not satisfied with their current jobs and were ready to accept another job. This is obvious because many of the operators were forced to take up the business due to unemployment but that is not what they wanted. In other words, they took 'what was available but not what was desired'. Among the operators who were not satisfied with their job, 90% of them were ready to leave in order to earn more money while less than 10 % would love to leave in order to pursue academic activities.

Based on material of construction, there are two types of boat used by the operators. They are the wooden and rubber boats. The rubber boats are of two types; covered and uncovered boats. All the wooden boats are uncovered. Plates 1 and 2 depict the two types of boats respectively. Also, these vehicles vary according to passenger carrying capacity. The uncovered boats have passenger capacity of 10 and 12 passengers, while the covered boats have passenger capacity of 20 and 22 passengers. The type of vessel used indicated that covered boat accounted for 57.7% while uncovered boat was 42.3%.

Table 2: Vehicle characteristics and Trip patterns of the operators.

Vehicle ownership	Number of respondents	Percentage
Privately owned	34	71.2
Company owned	3	5.7
Others specify (lease)	12	23.1
Total	**52**	**100.0**
Engagement	**Number of respondents**	**Percentage**
1- 5years	31	59.6
6-10years	19	36.5
above 15years	2	3.8
Total	**52**	**100.0**
Engagement reason	**Number of respondents**	**Percentage**
Source of income	44	84.6
Family heritage	3	5.8
Love for water	5	9.6

Total	52	100.0
Acceptance of offer	**Number of respondents**	**Percentage**
Yes	45	86.5
No	7	13.5
Total	**52**	**100.0**
Reason of offer acceptance	**Number of respondents**	**Percentage**
Education	4	8.9
more money	40	88.9
Not satisfied	1	2.2
Total	**45**	**100.0**
Type of Vessel	**Number of respondents**	**Percentage**
Speed boat	22	42.3
Covered speed boat	30	57.7
Total	**52**	**100.0**

Source: Author's Field Work, 2014

Plate 1: Wooden boat

Source: Author's Work, 2014. 15/12/2014

Plate 2: Rubber speed boat

Source: Author's Work, 2014. 10/12/2014

3.3 Daily number of trips and Passengers' per on board trip

Table 3 indicated the number of trips made by the operators per day. About thirty seven percent of the operators made between 1-4trips per day, 23.1% made between 5 - 8 trips while 21.2% made 9 - 12 trips per day. Those operators who made more than 12 trips per day accounted for 19.2%.In terms of the average passengers per trip, 5.8% of the operators reported that they have 1-5 passengers per trip, 9.6% reported 6-10 passengers on board per trip, while 57.7% has over 15 passengers per trip. Those times the operators carried less than 10 passengers was because it was off peak period (12noon to 3 pm) when patronage was very low.

Table 3: Daily number of trips and Passengers' per on board trip

Daily number of Trips	Number of respondents	Percentage
1- 4trips	19	36.5
5-8trips	12	23.1
9- 12trips	11	21.2
above 12trips	10	19.2
Total	**52**	**100.0**
Number of passengers per trip	**Number of respondents**	**Percentage**
1- 5	3	5.8
6-10	5	9.6

11- 15	14	26.9
15 and above	30	57.7
Total	**52**	**100.0**

3.4 Safety and Security of the Operators

Safety and security are important components of maritime operations. Safety and security sustain the confidence of both operators and passengers in the system, and enhance the image of the industry. Involvement in maritime accident indicated that 11.5% of the operators had been involved in an accident one way or the other while 88.5% had never been involved in an accident. Out of those involved in boat accident, 33.3% had experienced it once, 16.7% twice and 50% up to three times. Furthermore, about 2/3 of the accidents were due to human error such as poor safety training and carelessness of the operators. Fifty percent of those who have been involved in boat accident were rescued by either passengers or co-drivers while the remaining half was done by the LASWA Search and Rescue unit. Response time showed that 50% of those rescued were attended to in less than 5 minutes after the accident while another 50% were between 5-10 minutes. In terms of safety measures, virtually all the operators had one safety measure of the other. About 60% of them had safety jacket only, 34.6% had safety jacket and life ring while 9.7% had safety jacket and fire extinguisher. Only the covered speed boats had life ring and fire extinguishers while the opened boat (rubber and wood) doesn't. This was due to the design of the boats. Life rings were hung at the side and top of the boat.

Table 4: Accident History of Operator

Accident involvement	Number of respondents	Percentage
Yes	6	11.5
No	46	88.5
Total	**52**	**100.0**
Involvement	**Number of respondents**	**Percentage**
Once	2	33.3
Twice	1	16.7
More than three times	3	15.0

23

Total	6	100.0

Cause of accident	Number of respondents	Percentage
Environmental factor	2	33.3%
Human factor	4	66.7%
Total	**6**	**100.0**

Rescuer	Number of respondents	Percentage
co passengers/operators	3	50.0
LASWA	3	50.0
Total	**6**	**100.0**

Time duration	Number of respondents	Percentage
Less than 5 mins	3	50.0
More than 10mins	3	50.0
Total	**6**	**100.0**

Safety measures	Number of respondents	Percentage
Safety Jacket	29	55.7%
Safety jacket and Life Ring	18	34.6%
Safety jacket and Fire Extinguisher	5	9.7%
Total	**67**	**100.0%**

Source: Field Survey, 2014

3.5 Association fee and effectiveness.

Transport associations are very powerful and exercise overridden influence on their members. All operators who belong to boat association pay of between N1000- N2500 as association fee yearly. The association fee varies among the operators based on the size/capacity of vessel used. Also, field observation indicated that CMS jetty does not have association. In terms of its effectiveness, 41.3% of the operators agreed that the association was very effective, 39.2% agreed it was fairly effective, 6.5% agreed it was effective while 4.3% reported it is not effective. 8.7% did not give a response.

Table 5: Association fee and effectiveness

Association affiliation	Number of respondents	Percentage
Yes	46	88.5
No	6	11.5
Total	**52**	**100.0**
Association fee	**Number of respondents**	**Percentage**
1000 naira	26	56.5
1000-2500 naira	13	28.3
No response	7	15.2
Total	**46**	**100.0**
Association effectiveness	**Number of respondents**	**Percentage**
Very effective	19	41.3
Fairly effective	18	39.2
Effective	3	6.5
Not effective	2	4.3
No response	4	8.7
Total	**46**	**100.0**

Source: Author's Field Work, 2014

3.6 Vehicle maintenance

According to table 4.6, it is obvious that all the operators do routine maintenance for their vessels. The amount spent on maintenance indicated that 71.2% of the operators spent less than #10,000monthly on vessel maintenance. Also, 13.5% spent between #10,000 and #20,000, 9.6% spent #20,000-#30,000 while 5.85% spent #30,000 and above on maintenance. These are operators who have more vehicles. Frequency of maintenance varies. For instance, 9.6% of the operators do routine maintenance once in a year, 26.9% twice in a year, 38.5% three times in a year, while 7.7% maintenance their vessels four times in a year.

Table 6: Vehicle maintenance

Routine maintenance	Number of respondents	Percentage
Yes	52	100.0
No	0	0
Total	52	100.0
Amount spent	**Number of respondents**	**Percentage**
Less than #10,000	37	71.2
#10,000 - #20, 000	7	13.5
#20,000 - #30, 000	5	9.6
Above #30, 000	3	5.8
Total	52	100.0
Periodicity	**Number of respondents**	**Percentage**
Once	5	9.6
Twice	14	26.9
Thrice	20	38.5
Four times	4	7.7
Others specify	9	17.3
Total	52	100.0

Source: Author's Field Work, 2014

3.7 Operational challenges on the waterways

Table 7 indicated that 5.8% of the operators identified shallow water as a hindrance to effective and efficient water transportation in Lagos state. Over 63% of them complained of the presence of water hyacinth. The water hyacinth appears August and remains till February of the following year if no cleared. Water hyacinth has been a threat to operators on waterways because it damages the boat engine propeller. Also, 19.2% of the respondents complained of expensive safety measures. The life jacket giving to passengers are of poor quality and sub-standard. 11.5% of the operators complained of other reasons such as lack of funding and investment from government and private body respectively as well as inadequate facilities.

Table 7: Operational challenges on the waterways

Operational challenges	Number of respondents	Percentage
Shallow river	3	5.8
Water hyacinth	33	63.5
Expensive safety measures	10	19.2
Others (e.g sea pirate)	6	11.5
Total	**52**	**100.0**

Source: Field Survey, 2014

5. Conclusionand Recommendations

Lagos state is increasing at a very fast pace and can no longer rely on road mode of transport, which has been found to be inadequate in moving people to and from in the city. It is therefore imperative to explore other alternate mode (water transport) that can relieve road transportation and help in the efficient discharge of urban functions. From the various issues in the investigation of water transport in Lagos state, it is very expedient that the followings suggestions be taken into consideration.

Government should ensure that adequate safety and security measures are provided on water. This could be achieved through effective surveillance and policing of water transport system. There should be more patrol vessels on the waterways. Furthermore, government should endeavour that the operators adhere strictly to the use of standard life jackets. Other safety materials on the waterways like life ring and fire extinguisher should be made compulsory. The operators should have a speed limit and the regulating agency must ensure the operators conduct themselves in accordance to the rules of waterways usage. Putting stringent safety measures in place and enforcement of safety regulations will make the waterways transportation safer.

The operators lack knowledge of waterways transportation. Therefore, the government or agency responsible for waterway transportation should ensure the operators acquired relevant knowledge in waterway operations through training and workshops. Consequently, this will also reduce accident rate and improve customer (users) management on the waterways.

Lastly, government should endeavour to periodically and effective clear the water hyacinth; dredge the shallow river course to aid navigation on the waterways, provide adequate facilities like jetty, parking lot and ferries to reduce the waiting time at jetty because of it large passenger carrying capacity.

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