An Analysis of the Travel Behaviour of Water Transport Commuters in Lagos Metropolis.

AGBOGA, Silas Ehimen; ASENIME, Charles; ASAJU, Joel Ayodeji

School of Transport & Logistics Lagos State University, Ojo

DOI: https://dx.doi.org/10.47772/IJRISS.2025.907000123

Received: 26 June 2025; Accepted: 30 June 2025; Published: 02 August 2025

ABSTRACT

Inland water transport has the potential to reduce the number of daily commuters on the three primary arterial roads leading to the CBD within the Lagos Metropolis in Nigeria by 41%. However, it currently serves less than 5% of the total passenger traffic, which has led to increased congestion on Lagos roads. A commuter's frequently chosen mode of transportation depends on many factors, which include promptness, accessibility, convenience, and eco-friendliness, amongst others, in relation to the level of satisfaction derived from using the adopted mode. This study analyses the travel behaviour of water transport commuters within the Lagos metropolis. A mixed-method survey was adopted for the study (which includes direct observation, interviews, and a questionnaire). The study population comprises inland water transport commuters, boat operators, and officials of the Lagos State Waterways Authority (LASWA). Purposive, quota, and convenient sampling methods were used to collect data from Three Hundred and Eighty-Four (384) respondents drawn from the daily average ridership of Nine Thousand, Six Hundred and Seventy-Six (9,676) passengers reported by LASWA. Descriptive and inferential statistical analyses (percentages and central tendencies) were used for the data analysis. The study findings revealed that most passengers (92.6%) used water transport daily because of the prompt arrival at their destinations, an advantage that they cannot achieve with road travel. It was also discovered that a greater percentage of the passengers (68%) are willing to pay up to 50% increase in the transport fare due to the just-in-time advantages. The study therefore recommends, among others, that LASWA improve and publicize the safety architecture currently in place for water transport and conduct boat worthiness checks for operating boats every three (3) months to ascertain the integrity of the water vehicles. The study further recommends expanding the usage of Cowry cards (a digital payment method) to include water transport.

Keywords: Commuters, travel behaviour, water transport

Word Count: 301

INTRODUCTION

Water is a vital mode of transportation. It is the movement of people, animals, goods, and services from one place to the other by boat, ship, barge, canoe, and other water navigation machines over the sea, ocean, lake, rivers, and canal (Jafar, 2015). Inland water transportation (IWT) makes use of pontoons, river ferries, wooden boats, and others to transport goods such as cargo solid (building materials, ore, scrap, oil, coal, coke and agricultural products, and chemicals) and movements of passengers (Deja, et al., 2018). Water transportation is instrumental to the sustainable development of societies, it contributes to urban growth, and it balances the economic and social development of a country. Several countries, such as Egypt, China, India, the United States of America, Germany, Bangladesh, and the Netherlands, have used inland water transportation (IWT) for the enhancement of their development. IWT contributes 46% of the Netherlands' inland freight, 32% in Bangladesh, 14% in the United States, and 9% in China (Boadu et al., 2021).

In Nigeria, 22 out of 36 states in Nigeria use water as a means of transport. Water transportation started with the movement of people, goods, and services by the use of small dug-out canoes. Later, the imperialists, in their quest for more trade, introduced the steam engine. As time went by, the colonial masters introduced other types of vessels for water transportation. Water transportation remains one of the major contributors to economic

development in Nigeria. Nigeria's earliest importation and exportation of goods was carried out largely via water transportation due to the high cost of transportation and the poor level of development of other modes of transportation during this time. Water transportation contributed about five billion, forty million naira to the Gross Domestic Product of the Nigerian economy in 2022 (Central Bank of Nigeria (CBN) annual report, 2022).

In Lagos State, inland water transportation is sustainable and the most environmentally friendly means of transportation, which has helped improve intra-city transportation and reduce traffic congestion in the state. This is because most places in Lagos are accessible by water, making water transportation a suitable complement to road transportation within the state. However, Inland Water Transportation usage is low and carries less than five percent of the total passenger traffic in the state (News Agency of Nigeria (NAN), 2021) because it is perceived as dangerous, slow, and archaic. The rising concern for safety, which stems from low investment in water transport infrastructure, inadequate human capacity, and lack of proper policy to regulate the mode, has given water transportation a terrible reputation.

The Lagos State Waterways Authority (LASWA) as the coordinating agency for inland water transport in Lagos State has made commendable efforts to improve water transport patronage through the provision of jetties for seamless onboarding and alighting of passengers, dredging of the waterways, creation of more ferry routes, removal of wrecks on the waterways, regulating the operations and enforcement of safety compliance regulations. Despite these efforts of LASWA, water transport patronage in the state is still very low for various reasons, such as hydrophobia, water accident occurrences, and the perceived high cost of water travel when compared to road travel for the same destinations. This study therefore analyses the travel behaviour of inland waterways passengers and provides ways to improve the level of patronage.

Significance of the Study

The low patronage of inland water transportation in Lagos has become a subject of concern, given the volume of investment by the government in the sector and the increased congestion of Lagos roads. This study presents information to many residents in the Lagos metropolis on the developments in water transportation to positively influence their patronage of water transport. The outcome of this study provides policymakers and potential investors with the needed information on the perceived areas of improvement for inland water transportation within the state.

Scope of the Study

This study is limited to inland waterways commuters within the Lagos Metropolis. It examined the economic impact of water transport in Lagos Metropolis and the factors limiting the efficient use of inland waterways as an alternative means of public transport in Lagos Metropolis. The study examined the travel behaviour of water transport commuters in the Lagos Metropolitan area.

Figure 1: Lagos Metropolis in Lagos State

Source: Agboga, Giwa, Asenime & Asaju, (2024)

Empirical Review

Travel behaviour is an idea that encapsulates the decisions individuals have to make while traveling. These choices include the reason for travel, mode of transportation, route selection, frequency of trips, time of travel and duration of journey. Travel behaviour may be influenced by several factors which may be socio-economic (income, social class, education, infrastructure etc.); personal (phobias, health needs, disabilities, ego etc.); demographic (age, occupation or gender); spatial arrangement and land use (proximity to water bodies for inland water transportation, bus station or rail terminals).

Asenime (2008) submitted that water transport could remove 41% of commuters daily from the three primary arterial roads leading to the CBD within the Lagos Metropolis. However, at the time of carrying out the research, only 0.76% of the passengers within the metropolis utilized water transport options as against the 4% claimed by the Lagos State Ministry of Public Transport, Lagos Metropolitan Area Transport Authority (LAMATA), and the Lagos State Ferry Services.

Ezenwaji (2010) identified four constraints to effective water transportation in some riverine communities in the old Anambra Local Government Area of Nigeria. These constraints, according to him, are environmental, economic, boat, and rural markets.

In terms of water travel safety, Sigurd et al., (2016) opined that younger passengers and passengers on shorter trips have and exhibit less safety knowledge than older passengers and passengers on longer trips.

Ogunbajo & Adeniyi (2017) appraised the prospects and problems of water transportation in the Lagos metropolis and reported that high cost of travel (72%), safety concern (25%), enforcement of regulation (28%) and provision of conducive operating environment (33%) are the major challenges of water transportation in Lagos.

Infrastructural development, inadequate funding, and poor maintenance have been pointed out as reasons for slow development and low patronage of inland water transportation (Bassey and Ekpenyong, 2018; Usman and Animashaun, 2020, Agboga, 2024; Agboga et al., 2024). Particularly, Usman and Animashaun (2020) confirmed in their study that while 67.3% of the trips via Lagos inland waterways were work-related, inland water patronage was low due to comparatively high fare costs and passenger safety concerns, as indicated by 67.4% and 58.7% of the respondents, respectively.

Aiyegbajeje and Deinne (2021), using step-wise multiple regression analysis, revealed that passengers' perception of poor safety of water transportation predicted a significant 78.1% of reluctance to travel by water within Lagos metropolis ($F = 27990.685$, $p<0.05$).

Zhao, Papaix, Cao and Lyu (2024) explored how commuting influences the well-being of commuters in London and found that boat commuters are happier than non-boat users. Their analysis showed that there were significant differences in commuting satisfaction, personality traits, and life satisfaction between commuters who used different modes of travel.

Agboga (2024) submitted that commuters were more interested in arriving at their destination in good time, and this is achievable through water transport. The study further concludes that the shorter travel distance by water transport, when compared to road transport, is a major reason commuters prefer water transport.

While there have been many studies conducted on water transportation in Nigeria and Lagos State specifically, most of the studies focused on the incidences of water transport accidents—the causation factors, effects of accidents, and the safety measures put in place to prevent accidents. This study will examine the travel behaviour of inland waterways passengers and provide ways to improve the level of patronage for inland water transportation.

Theoretical Framework:

This study follows the Discrete Choice Models (DCM), which are usually used to predict a choice from a set of

two or more mutually exclusive alternatives. For example, picking a choice between walking or driving to work. The DCM operates within a framework of rational choice; i.e., people make choices based on the option from which they derive maximum satisfaction or utility, taking into consideration the characteristics of the different options and the characteristics of the person making the choice. For example, the choice to walk to work would be influenced by the characteristics of walking to work and the characteristics of the individuals making the choice, such as their physical fitness or proximity to their place of work. Similarly, the choice of whether to adopt inland water transport is based on the perceived satisfaction of its usage in terms of promptness, eco-friendliness, and safety, among others, compared to other modes of transport. The goal of a discrete choice model is to characterize and make inferences from the random utility function describing utility as a function of features of potential choices and subjects.

METHODOLOGY

This study adopted a mixed method involving questionnaire administration and interviews. The study population comprises water transport commuters at the selected Jetties; Falomo, Liverpool, Ebute Ikorodu, and Ebute Ojo. The pattern of traffic flow and class of commuters was determined by observation at the selected jetties.

Figure 2: Inland Waterway Routes in Lagos Metropolis

Source: Researcher's fieldwork, 2024

To determine the commuters/passengers population, reference was made to data gathered from Lagos State Waterways Authority Data Center (2023) which revealed that the daily average ridership (number of passengers) for year 2021 and 2022 at Liverpool jetty is 3,508 while that of Falomo jetty, Ebute-Ikorodu jetty and Ebute-Ojo are 861, 3,203 and 2,104 respectively, amounting to 9,676 passengers for the four jetties. By Yamane's formula, a sample size of 384 was derived. Primary data was collected using a structured questionnaire, which was divided into 2 sections. Section A focused on socio-economic characteristics (gender, age, occupation type, educational status, and income, age, educational background, years of experience, position in the organization, etc.) while Section B focused on the travel behaviour of respondents. The study adopted quota sampling technique to determine the number of copies of the questionnaire to be distributed at each jetty, while purposive and convenience sampling techniques were adopted for the distribution of the questionnaire. Other information was gathered through interviews with commuters and LASWA officials, both at their head office and at the selected jetties. The secondary data was sourced from journals, newspapers, periodicals from the National Inland Water Authority (NIWA) and Lagos State Waterways Authority (LASWA). The transcribed qualitative data produced through the key informant oral interview and focus group discussion and the qualitative secondary data from various literatures were thematically analysed. The socio-economic data sources of the questionnaire were

analysed using simple descriptive statistics (frequency tables and charts).

DISCUSSION OF FINDINGS

Of the 384 copies of the questionnaire administered to the water transport passengers across the selected jetties, 311 copies were returned, giving a response rate of 81% (Liverpool - 28.65%; Falomo – 7.55%; Ebute Ikorodu – 25.0% and Ebute Ojo – 19.79%). According to Bryman and Bell (2011), the achieved response rate is ideal for the study. The demographic characteristics of the respondents is presented in Table 1.

Table 1: Demographic and Socio-Economic Characteristics of the Respondents

Demographic	Responses	Frequency	Percent (%)	Skewness	Kurtosis
Sex	Male	216	71.3	0.946	-1.113
	Female	95	30.6		
	Total	**311**	**100**		
Age	<20 Years	10	3.2	-0.088	-0.131
	21-30 Years	34	10.9		
	31-40 Years	106	34.0		
	41-50 Years	113	36.3		
	>50 Years	48	15.6		
	Total	**311**	**100**		
Education	No Formal Education	52	16.7	-0.082	-1.014
	Primary	54	17.4		
	Secondary	93	29.9		
	Vocational	73	23.5		
	Tertiary Education	39	12.5		
	Total	**311**	**100**		
Occupation	Vocational Work	27	8.7	1.920	2.974
	Civic/Public Service	84	27.0		
	Trade/Businessman/Trade	177	56.9		
	Woman				
	Retired	23	7.4		
	Total	**311**	**100**		
Income (₦)	Less than ₦50,000	13	4.2	-0.213	-1.041
	₦50,000-₦100,000	61	19.6		
	₦100,001-₦150,000	52	16.7		
	₦150,001-₦200,000	64	20.6		
	₦200,001-₦250,000	97	31.2		
	Above ₦250,000	24	7.7		
	Total	**311**	**100**		

Source:Researcher's Field Survey, 2024

Findings revealed that 28.3% of the respondents confirmed that they could swim, while 71.7% confirmed their inability to swim. The standard deviation with a value of less than one insinuates a convergence opinion that most respondents cannot swim, since the standard deviation was less than one. These responses show a potentially high casualty rate in the event of an accident occurrence on the waterways, especially when there is a delay in emergency response protocol.

Figure 3 depicts that 65% of the respondents have travelled using water transport within the last six months, with Table 2 showing that 74.3% of the total respondents confirm they make at least 2 trips daily. This implies that the respondents have the required experience to provide the information required for this study. The purpose of the trips made by the respondents, as presented in Figure 4, revealed that most respondents travel by water transport to get to their places of work, while 18% travel by water for leisure, which gives credence to the fact that water transport aids tourism. These figures are likely to increase should there be an improvement in the waterway facilities. Education and Shopping are also other significant reasons for which the respondents use water transport, as students and residents in riverine areas go to school or shop across the waterways.

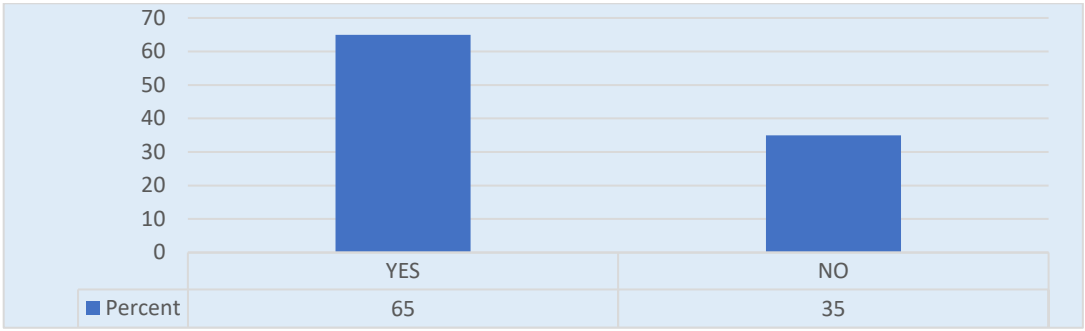

Figure 3: Water transport patronage by passengers in the last 6 months

Source: Researcher's Field Survey, 2024

Table 2: Daily frequency of trips by respondents

Frequency of trips	Percent	Mean (Standard Deviation)
Once	25.7	1.9241 (0.72618)
Twice	59.8	
Thrice	10.6	
Four times	3.9	
Total	100.0	

Source: Researcher's Field Survey, 2024

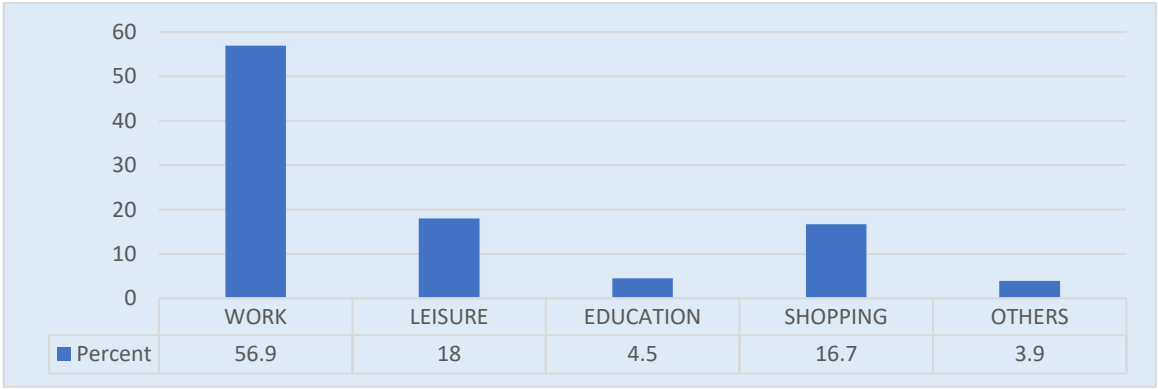

Figure 4: Purpose of your trip made by passengers

Source: Researcher's Field Survey, 2024

On a general note, while 92.6% of the respondents confirmed water transport as a faster mode of travel within Metropolitan Lagos when compared to road transport, the specific reasons for patronizing water transport by the respondents are as presented in Figure 5.

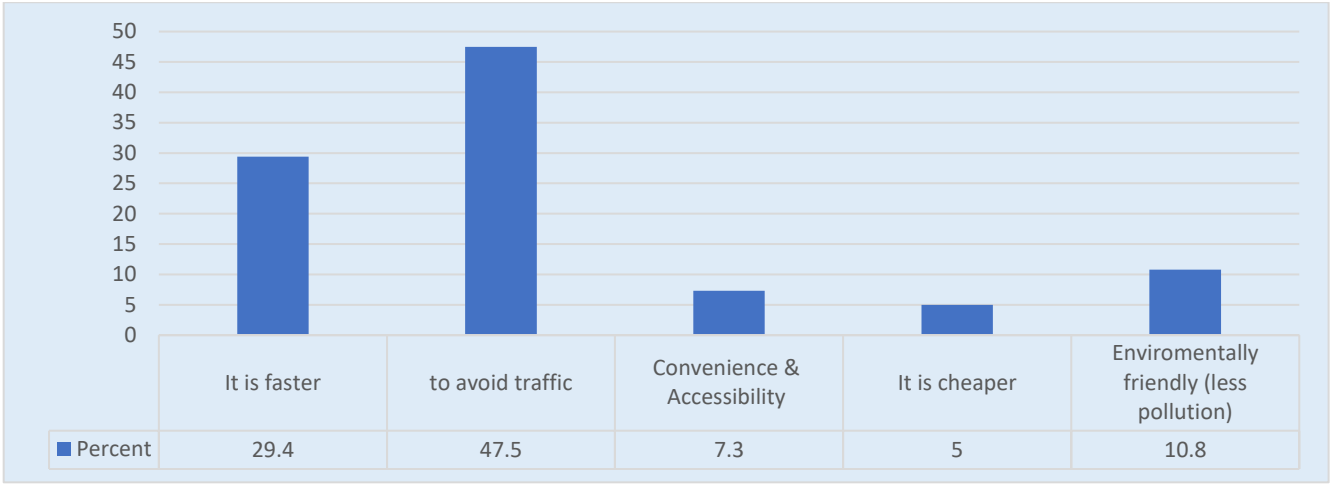

Figure 5: Reasons users prefer water transport to other modes of transport

Source: Researcher's Field Survey, 2024

Investigating the willingness of respondents to continue to patronise water transportation despite increment in cost of travel, Table 3 revealed that 71.4%, 70.4%, and 67.9% of the respondents confirmed they would continue to travel by water even if the fare is increased by 10%, 25%, and 50% respectively. Interviews revealed that the majority aligned with water transport because it is faster when compared to road transportation, thus helping the respondents meet the appointment time at their destination. However, a sharp decline was revealed when the cost of travel was increased by 75% and 100% as only 28% and 24.4% of the respondents, respectively, opted for water travel, with most of the population converging in their opinion to consider traveling by alternative modes, and a few respondents undecided.

Importantly, reasons respondents prefer water transport over other modes as expressed in Figure 5 is that 28.4% believe water transport because it is faster, 47.5% prefer it to avoid traffic, 7.3% prefer water transport because it is more convenient and accessible, 5% believe water transport is cheaper, while 10.9% prefer water transport because it is environmentally friendly (less pollution). The observed divergence in the opinion of respondents shows that respondents may have a phobia of water transport but still patronize it for reasons such as speed, no traffic congestion, affordability, convenience, and eco-friendliness. Movement via water transport enables most commuters to meet up with their appointment at the scheduled/ targeted time.

Table 3: Commuters reaction to variations in transport fare

Percentage increase in fare	Yes	No	Undecided
10	71.4	28.6	0
25	70.4	29.6	0
50	67.9	34.7	0
75	28.0	66.6	5.5
100	24.4	63.4	12.2

Source: Researcher's Field Survey, 2024

On the other hand, if one needs to travel from one part of Lagos to another by a route not directly navigable via

the waterways, road transport may be faster. Table 4 shows a comparison of water and road travel in terms of distance and journey time. Inland water transport is limited to areas near the coast and major water bodies such as the Lagos Lagoon and the Atlantic Ocean. It is important to note that the availability and reliabilityof inland water transport options can also affect the time comparison.

Table 4: Comparison of Water and Road Travels by Distance and Time ofTravel (Comparative Advantage)

S/N	Route	Water Travel		Road Travel	
		Length (km)	Travel Time (minutes)	Length (km)	Travel Time (minutes)
1	Badore-Five Cowries	30	34	22	39
2	Badore-Ijede	6	6	79	124
3	Baiyeku - Ajah Oke Ira nla	7	8	40	77
4	Baiyeku-Langbasa	4	5	73	123
5	Baiyeku-Addax	17	19	54	85
6	Ebute-Ojo-Ibasa	7	8	20	153
7	Ebute-Ojo-Ijegun Egba	8	9	14	30
8	Ebute-Ojo-Ijegun-CSM	26	29	30	49
9	Ebute-Ojo-Irewe	7	8	No route by road	
10	Ijede-Marina/CMS	29	33	49	75
11	Ijegun Egba-Ibasa	0.4	1	13	138
12	Ijora-Ebute Ero	1	2	4.7	15
13	Ikorodu-Addax/Falomo	21	24	45	53
14	Liverpool-Five Cowries	6	7	12	19
15	Liverpool-Igbo Elejo	6	7	10	39
16	Liverpool-Olodi Apapa	2	3	5.4	11
17	Marina/CMS-Ikorodu	22	24	35	48
18	Ebute Ero-Ikorodu	19	22	34	41
19	Mile 2-Addax/Falomo	16	18	15	23
20	Mile 2-Marina/CMS	12	14	14	22
21	Marina- Taekwa Bay	6	9	40	168
22	Addax-IgboElejo	14	16	21	33
23	Ikorodu (Metro)-Addax	21	22	39	65
24	Ebute Ero-Ijede	27	29	47	69
25	Ibeshe-Addax	16	17	50	64
26	Ebute Ojo-Liverpool	21	23	20	33
27	Badagry - Apapa/ Liverpool	53	60	60	86
28	Badagry to Ebute Ero /CMS	62	80	63	92

29	Ilaje Bariga - Ebute Ero	11	13	17	24
30	Ilaje Bariga - Five Cowries	16	18	19	26

Source: Agboga et al (2024)

CONCLUSION

Lagos State, in its drive to join the league of smart cities, would require a functional transport system comprising road, water, and rail. Over the last decade, there has been less than proportionate development for inland water transportation when compared to the massive improvements in road and rail transport modes, as seen in the expansion of several roads, construction of flyovers and pedestrian walkways, and recently, the commissioning of the blue and red train lines. However, the increasing road traffic challenges within the Lagos metropolis have raised the demand for water transport to complement road transportation within the state.

Despite the concerns for water transport safety, the study concludes in line with the discrete choice model that water transport commuters choose the mode because of its promptness, eco-friendliness, safety, and a desire to enjoy nature, amongst other benefits, irrespective of changes in fare prices. However, commuters would seek alternative transport modes if fares are increased arbitrarily by 75% and beyond.

As against the position of Obamiro, Elegunde and Kumolu-John (2018) that the inland waterways transportation system serves as an alternative transportation system to ease traffic congestion in Lagos State, this study further concludes that water transport is popular amongst residents of coastal areas and complements road transportation in the state.

RECOMMENDATION

The study recommends that the federal and state governments should increase publicity about the opportunities and benefits of water transport travel. Moreover, the safety architecture and emergency response preparedness of LASWA should be publicized to ensure the mode of transport gains the confidence of commuters. LASWA should make onboarding of potential investors in this sector easy, especially for investors with a focus on the deployment of energy-efficient mass transit boats to reduce boating fares. The safety arm of LASWA must carry out routine boat worthiness/integrity checks at least every three months and regular patrols of the waterways to ensure safety compliance, as this would improve the commuters' faith in inland water travel. Finally, the Lagos State Government should extend the integrated payment system (Cowry cards) operational for the mass transit buses and rails within the metropolis for water travel; this would present water transport as a seamless payment option for travel within the state.

REFERENCES

1. Agboga, S. E. (2024) . Evaluation of emergency responses to water transport accidents in Metropolitan Lagos. Unpublished Ph.D. research thesis submitted to The School of Transport and Logistics in Partial Fulfilment of the Requirements for the Award of Doctor of Philosophy (Ph.D.) Degree in Transport & Logistics of Lagos State University
2. Agboga, S. E., Giwa, O. M., Asenime, C., Asaju, J. (2024). Optimizing Emergency Responses on Water Transport Accidents in Metropolitan Lagos. Developing Country Studies. Vol.14, No.2; pp 84-94. ISSN 2224-607X (Paper) ISSN 2225-0565 (Online). www.iiste.org
3. Aiyegbajeje F. O. & Deinne C. E. (2021). Assessment of commuters' perception of water transportation safety and patronage in Lagos Metropolis, Nigeria. Ghana Journal of Geography Vol. 13 (3), 146-164
4. Asenime C. O. (2008). A study of Inland Waterway Transportation in Metropolitan Lagos. Ph.D. research work submitted to the Postgraduate School, University of Lagos.
5. Bassey S. I & Ekpenyong NSA, M (2018). Problems and prospects of developing inland water transportation in Nigeria: The case of Calabar River. IOSR Journal of humanities and Social science 23(7) Pp 27-37

6. Boadu S., Otoo E., Boateng A. & Koomson D. (2021). Inland Waterway Transportation (IWT) in Ghana: A Case Study of Volta Lake Transport. International Journal of Transportation Science and Technology. Vol. 10, Issue 1, pp 20-33, ISSN 2046-0430,https://doi.org/10.1016/j.ijtst.2020.05.002. (https://www.sciencedirect.com/science/article/pii/S2046043020300332)
7. Bryman, A., & Bell, E. (2011). Business research methods, 2nd edition. Oxford University Press Inc.
8. Central Bank of Nigeria (2023) Annual Economic Report for year 2022
9. Deja, A., Kopec, A., Michaloovski, P. (2018). Analysis of the status of Inland Waterway Transport in Poland. AUTOBUSY – Technika Eksploatacja, Systemy Transportowe 19 (9), 516–521.
10. Ezenwaji, E.E. (2010) Constraints on Effective Water Transportation in Some Riverine Communities of Old Anambra Local Government Area, Anambra State.
11. Jafar K. (2015). The impact of water transport and economic development of uganda's landing sites; case study of Ggaba region, Makindye division of Kampala city. B.Sc. research report submitted to the college of economics and management sciences, Kampala International University.
12. News Agency of Nigeria (NAN). (2021, October 02) Water transportation in Lagos increases to 3.2% in 2021. The Guardian Water transportation in Lagos increases to 3.2% in 2021 — Nigeria — The Guardian Nigeria News – Nigeria and World News
13. Obamiro, J.K., Elegunde, A.F. & Kumolu-John B. (2018). Inland waterways transportation system and promotion of business activities in Lagos State, Nigeria. Crawford. Journal of Management Review 1(2); 57-65
14. Ogunbajo, A. & Adeniyi, A.. (2017). The Prospects and Problems of Water Transportation in Lagos Metropolis. LASPOTECH Journal of Scientific, Engineering and Technology Research 1, (1), 1 - 12,
15. Sigurd, W., Oyeniyi S.O., & Jarle, E. (2016). Safe Travel: Passenger Assessment of Trust and Safety during Seafaring. Transportation Research Part F, 38(10), 29-36
16. Train, K. (2009). Discrete choice methods with simulation. Cambridge University Press. [Link: https://www.scirp.org/reference/referencespapers?referenceid=1321134]
17. Usman, B. A. & Animashaun, K. H. (2020). Inland Water Transport and Urban Mobility in Ikorodu-Ebute Ero Route, Lagos, Nigeria. *Geosfera Indonesia, 5*(1), 127-146. doi:10.19184/geosi.v5i1.14714
18. Zhao X., Papaix C., Cao M. & and Lyu N. (2024). Boat commuting, travel satisfaction and well-being: Empirical evidence from Greater London. Transportation Research Part D: Transport and Environment, Volume 129, ISSN 1361-9209, https://doi.org/10.1016/j.trd.2024.104122. (https://www.sciencedirect.com/science/article/pii/S1361920924000798)