

Effect of Fare Charges on The Operations of Inland Waterways Transport in Lagos State



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ABSTRACT: The study looks at how fare prices affect Lagos State's ferry operations, with a particular emphasis on commuter comfort and the distance traveled. Water transportation offers benefits like cheaper costs, increased capacity, and safety, but its potential has not been completely realized. This is because canal ports have defects that prevent the flexibility and convenience required for the flow of goods and services.

The study focuses on the Lagos State Waterways Operations. A small number of carefully chosen canal terminals that link different regions of Lagos State make up the study's population. Purposive sampling was done at the Elegbata/Ebute Ero Terminal, Ebute Ojo Terminal, Ikorodu Terminal, and Badore Terminal. The snowballing technique was used to randomly select 818 passengers.

Investigation revealed that daily fee charges have an effect on Lagos State's water transportation operations, and that commuters' comfort level and distance traveled were statistically significant for each of the seven independent components. This analysis showed how daily ticket costs affect the waterways transportation operations in Lagos State. The analysis shows how the low fees actually promote more traffic on Lagos State's waterways, raising the cost of upkeep and lengthening the time needed for servicing. It was recommended that efforts be made to reduce fare prices and provide suitable infrastructure at the ports in order to have efficient inland waterways operations that result in a complete reduction in operational expenses.

KEYWORD: Fare, Water transportation, Distance Covered, Commuters' Comfortability

I. INTRODUCTION

According to Ademiluyi et al. (2016), water transportation still hasn't realized its full potential despite having several benefits such as cheaper costs, increased capacity, and safety. In impoverished countries, people choose the most accessible and least priced form of transportation when they are going somewhere. (Acheampong *et al.*, 2020). When choosing a mode of transportation in an urban region, commuter family income is a crucial factor that positively correlates with the volume of traffic along the waterways. Hörcher & Tirachini (2021) discovered that each citizen's modal choice is negatively impacted by financial difficulties. Generally speaking, civilizations that are close to bodies of water are favored, in part because traveling over water is more dependable and efficient than traveling over land. Because they can move large quantities of commodities and services, waterways are vital to global transportation of people, products, and services.

The National Inland Waterways Authority of Nigeria has limited ferry operations starting at 6:45 p.m. due to safety concerns; nonetheless, there are still instances of nighttime ferry trips, suggesting that compliance with this policy is quite poor. According to the Adesanya (2023), purchasing vessels to manage massive traffic flows is also crucial to the inland waterways transport sector. A visit to some of the terminals in Lagos State will show the conspicuous absence of security personnel in the evenings, a sign of the governments' lack of authority and incapacity to enforce adherence to safety regulations. Reducing high traffic on Lagos State's main route and meeting commuters' trip behaviors depend on an efficient, sustainable ferry service. (Oloye & Oloruntoba, 2022). This egregious flaw in these terminals has been undermining their efficacy and failing to provide the flexibility and convenience that are sorely needed to foster a welcoming atmosphere for both the movement of products and services and travelers. The study tries to analyze the effects of fare charges on ferry operations through distance covered and commuter comfort in the study region, with respect to the aforementioned variables that influence inland waterways operations in Lagos State.

II. LITERATURE REVIEW

Passengers' Comfortability: It goes without saying that passenger comfort is crucial in transportation. The protection of people and property by the legislation, oversight, and technological advancement of all modes of transportation is the focus of transport safety. According to earlier studies, trip frequency essentially determines how passengers' or commuters' initial assessment of the quality of the service is affected. The availability of personnel security and the state of the ferry, among other things, are elements that affect passenger pleasure and comfortability in ferry-based public transportation services and may also apply to other forms of transportation. The idea of comfortability and how it relates to the traveler's prior experiences, this is an additional element that influences the mode of transportation selection.

Distance: The form of transportation that is selected is also influenced by the distance. All available forms of transportation cannot be utilized due to the anticipated distance of journey. Only a small percentage of them are appropriate for lengthy trips, when a distance needs to be traveled across two or more nations that is the case. Therefore, the methods used to move people and products within a nation differ from those used to move people and goods between nations.

Yin *et al.*, (2020) stated that "the application of cost management techniques in which they simultaneously improve a firm's strategic position and reduce costs" is what is meant to be understood by strategic cost management. Based on the assumption that there would be a positive, negative, or neutral influence on the organization's competitive position, these two researchers proposed three different types of cost control initiatives. The following is an example of a cost management program that improves an organization's standing. When a transportation company redesigns its organizational structures for its customers, it will become more effective and convenient for commuters. When commuters have options, a dependable transportation company or business will draw in more passengers due to its reputation for dependability. The following is an illustration of the second cost-management strategy that will erode the organization's ability to compete.

There are just two workstations in a large transport corporation dedicated to ticket administration and sales. Customers that employ this method often have to wait in long lines, which can lead to significant levels of unhappiness and a negative reputation for the transportation system. If we compare this to the competitors in the transport system, we might see a decline in overall ticket sales. While having just two customer workstations might be more economical in the short term, it is detrimental to the business in the long run. An organization should, in general, never adopt any behavior that is expected to impair the organization's standing.

Furthermore, Min, Zacharia & Smith, (2019) believe that all facets of producing and distributing the product, such as the procurement of acquired parts, product design, and manufacturing, should be included in strategic cost management. Therefore, strategic cost management ought to be ingrained in every phase of a product's life cycle, including research, production, distribution, and service life.

According to Kaya, Türkyılmaz & Birol, (2019) Accounting professionals have a lot of intriguing opportunities in the field of strategic cost management. Additionally, they stressed the significance of strategic cost management, which aims to lower expenses while strengthening an organization's strategic position in light of the global competition that forces businesses to continuously assess their position. A company needs to be competitive in price, quality, customer service, and adaptability, and all efforts to cut costs should be directed toward strengthening its strategic position. (Juanamasta, Wati, Hendrawati, Wahyuni, Pramudianti, Wisnujati, & Umanailo, 2019). The importance of having a thorough understanding of an organization's cost structure cannot be overstated when looking for long-term competitive advantage by Ifeoma, Purity & Chuka, (2019) who describe strategic cost management as the managerial application of cost data specifically targeted at one or more of the four stages of strategic management: creating and executing plans, disseminating plans across the company, creating and executing tactics to carry out plans, and creating and executing controls to keep an eye on goal success.

According to Madhani (2019), Achieving and maintaining a strategic competitive advantage through long-term foresight and formulation of costs structure, costs level, and costs behavior pattern for resources, processes, and goods has made strategic cost management an essential component. Strategic cost management must therefore give managers distinct information. Products, procedures, and resources themselves are viewed as creative objects by strategic cost management in order to achieve a strategic competitive advantage. Conventional cost management may not be able to accomplish this goal.

Additionally, they contend that long-term cost determinants and their impact on cost level, cost structure, and cost behavior pattern must be identified and analyzed via strategic cost management. Lastly, in order to prevent expenses from arising too early in the life cycle of the product, strategic cost management should start with involvement throughout the product's design and research and development (R&D) phases.

Porter refers to these various causative elements as cost drivers, and they determine the cost behavior pattern of each activity. The cost structure is determined by the management's ability to effectively manage these interactive cost drivers. To determine relative competitiveness, the strategic cost analysis also entails determining the value chain and how competitors' cost drivers operate. Porter argued that companies should use this data to find ways to cut costs, for as by rearranging the value chain or strengthening control over the cost drivers. In the latter case, the firm's competitive advantage is determined by identifying the

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value chain segments. If competitive advantage is to be maintained, it is imperative that the organization's and its main competitors' cost-cutting performance be regularly assessed.

In their study, Chi, Li, Trigeorgis, & Tsekrekos, (2019) claimed that cost control is an essential course of action that, the more opportunities it creates for identifying new markets or opportunities, the greater strategic relevance it gains. In order to satisfy all important stakeholders, strategic cost management is typically an integrated, proactive component of strategic management. Furthermore, Zacharia, Plasch, Mohan, & Gerschberger, (2019) conducted interviews with executives from European companies regarding strategic cost management and came to the conclusion that businesses should incorporate strategic cost management into their plans in order to achieve a significant and sustained rise in the value of their businesses. Employees, upper management, and information technology must all support strategic cost management because its implementation requires efficient and timely communication. In conclusion, strategic cost management must take into account the value systems, beliefs, and projections of the workforce; modifications to the business and the manner in which activities are conducted must be backed by non-monetary systems and incentives; it must also establish win-win scenarios and effectively convey the advantages to all parties.

Though it might be challenging to downplay the significance of costs for a company's performance, increasing revenue is a challenge that can be made easier with the help of effective cost management. Knowledge and information about cost management are essential to the success of their firm. Organizations should prioritize strategic cost management since it involves more than just keeping an eye on expenses. 21st-century successful businesses will consider value and revenue to be equally as significant success determinants as costs. At this point, the researcher makes the case that strategic cost management is a set of methods, a mindset, and a philosophy that can help shape the company's future. (Bougie & Sekaran, 2019).

Theory of Cost- Benefit Analysis

The goal of a cost-benefit analysis is to weigh the advantages of an investment or policy against the expenses involved in putting it into action. In any case, there is a broad economic argument in favor of making the investment or putting the policy into place if the total benefits of both outweigh the costs. Generally speaking, cost-benefit analysis is a framework for social accounting in which all other expenses and benefits are compared to any benefit or cost that can be quantified and valued. Because of the limitations on the information available and the means for estimating and monetizing all of the potential implications of the proposed investment or policy, cost-benefit analysis actually always assumes a relatively narrow area of study.

Thankfully, the field of economic analysis of transportation investments is well-developed, with the main advantages going to the system's users and producing good estimates using tried-and-true techniques. Planning for transportation requires integration across many different analytical scales. Making an investment can have significant upfront fees and long-term rewards. The advantages of investments are felt both locally and widely, benefiting many categories of system users as well as a broad geographic area. The travel demand modeling techniques used by regional planning bodies acknowledge and take into consideration the intricacy of these issues.

Accurate cost and benefit accounting that may directly aid in decision-making is a logical development of these modeling techniques. Cost-benefit analysis is a popular method for this type of accounting, and in Washington State, using these techniques is required to meet state-mandated requirements for regional planning, which are categorized under the more broad term "least-cost planning." (Fu et al., 2006).

The relative ranking, or prioritizing, of many investment possibilities, as well as the economic utility of making a particular investment in the first place, can be decided upon using cost-benefit analysis. Benefit-cost analysis, like any analytical method, has many limitations. These range from uncertainty over values to be utilized in the analysis (due to either poor science or philosophical and ethical disagreements) to the accuracy of the data used in the estimating process. The goal of analysis is to give a comprehensive body of data gathered in an organized way that might help decision makers faced with challenging investment or policy decisions, not to settle all such conflicts or remove uncertainty (and hence the need for judgment). In this context, communal well-being is understood in terms of economic welfare, which holds that maximizing economic usefulness or welfare is the aim of human endeavor.

In economic theory, these phrases have a formal, quantitative meaning that can be measured with the right data. Essentially, the rationale is that the demands made on society's finite financial resources must be weighed against the financial well-being of its citizens. In this application, the term "economic resources" refers to the amenity value of natural resources like clean air and water as well as labor, energy, raw materials, and man-made physical assets.

Oluwole, Akintayo & Ojekunle (2018) estimated cost of transportation in the metropolitan area of Lagos. The socioeconomic traits of households that commute, such as income, wages, mode preference, commuting expenses, trip purpose, origin and destination, travel time, and availability of public transportation services, were the subjects of data collection. The outcome demonstrates that the immediate expenses of using a private vehicle, such as commute time, stress, parking costs, insurance, depreciation, maintenance, and repairs, are generally poorly understood and underestimated. Nigeria has a lower rate of car ownership than other developed nations, but a greater rate of car use, which can be explained by people's ignorance of the true

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costs associated with car ownership and use. Therefore, the study suggested that the planners of the Lagos megacity should coordinate policies related to housing and transportation, either by constructing affordable housing close to planned hubs for public transportation or by focusing on improving transportation in areas where a large proportion of middle-class workers live and have to travel long and expensive distances for work.

Ogboeli, Brown & Onuegbu, (2024) examined the socioeconomic effects of enhanced waterborne public transit in the local community. A number of factors were examined, such as the cost of real estate, employment rates, daily commutes, and interest in development, demography, and tourism in the communities. It soon becomes evident that the locations of the terminals are mostly chosen in accordance with factors such as the neighborhood's ongoing gentrification, a high level of interest in investment, the area's recreational and tourism potential, or upcoming reconstruction projects. As a result, it is debatable whether the ferry actually causes additional socioeconomic growth or if growth is already expected.

III. METHODOLOGY

Nigeria's fastest-growing metropolis is Lagos. As a result, other nearby communities including Agege, Ipaja, Ogba, Oregun, Ojota, Alausa, Ojodu, Ketu, and so on have also been established and are growing. Lagoons and waterways make up the metropolitan region that encompasses seventeen of the twenty LG areas. Lagos Lagoon has a surface area of roughly 426.0 km², including waterways and a coastline. Its average annual depth is 1.6 m. Several waterways may be found in the lagoon, the Lighthouse Creek, the Ologe Lagoon, the Badagry Creek, the primary canal that leads to Badagry and Port Novo.

The study's population consists of a few chosen waterway terminals that connect various parts of Lagos State. Elegbata/Ebute Ero Terminal, Ebute Ojo Terminal, Ikorodu Terminal, Badore Terminal, and Five Cowries Terminal are these chosen terminals. Due to an increase in traffic along these routes, four of the five terminals which are Elegbata/Ebute Ero Terminal, Ebute Ojo Terminal, Ikorodu Terminal, Badore Terminal were purposively sampled, and 818 passengers were chosen at random using the snowballing sampling technique. Both primary and secondary sources of data were employed in the investigation. Multi-variance was used in the data analysis.

The following is the model used in this study

$$Y_1, \dots, Y_2 = B_0 + B_1x_1 + B_2x_2 + B_nx_n + e \quad (4)$$

Where Y_1 = Distance Covered

Y_2 = Comfortability

X_1 = Fuel cost

X_2 = Maintenance cost

X_3 = Training

X_4 = Monthly dues

X_5 = Security

X_6 = Advert

X_7 = Operations expenses

B_0 = Intercept

B_i = Coefficient of Parameter

e = Error Terms

IV. RESULTS & DISCUSSIONS

The table 1.1 displays the results, which indicate a favorable and significant relationship between the functioning of waterways transit in Lagos State, Nigeria, and the comfort of passengers as a result of fare charges. Additionally, the outcome demonstrates that inadequate security measures have an impact on the standard of waterway operations. When the security of life and property cannot be guaranteed, commuters or passengers are unable to experience ideal and trustworthy mobility due to the aforementioned variables. There should be a notable ($P < 0.05$) improvement in the quality of operations carried out by maintenance units during transitional servicing, scheduled servicing, and overhauling service magnitude of 79.48 when ferry providers with a per-trip fee mediated. As a result of jetty dues, staff development, and training, commuters using the ferry service have a 0.221 to 0.088 decrease in comfort.

Advertisement and marketing costs, along with other operating expenses, show a similar pattern. The commuters' fare increases of 0.79 and 0.71 were not statistically significant at the 5% level. Increases in tariff would result from inland waterways transport operators spending more on all operating costs, which would have a detrimental impact on inland waterways operations in the study area.

The table 1.1 also shows the interaction effect of the distance traveled on each trip as a result of waterway activities. The outcome shows that the fare charged for each journey is based on the distance traveled by the commuter. The magnitude of the operational expenses increases from 13.89 to 21.58, and at the 0.05 level, they are determined to be significantly higher. Comparably, the level of waterways operations was also seen to result in a reduction in the ticket charged for mobility by a

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magnitude of 20.75 to 37.76, with jetty dues, security, advertisement and promotion, as well as other operational expense; nevertheless, the results are not noteworthy at a conventional level.

Further results show that the cost of fuel has a sum square of 80.914 and a F value of 3055.914, the cost of maintenance is 79.487 and has an F-value of 1217.727, the cost of training and personnel development is 83.120 and has an F-value of 4874.412, the cost of daily jetty due is 89.977 and has an F-value of 1176.181, and the cost of security personnel is 87.085 and has an F-value of 739.939. Similarly, the sum square for advertising and promotion was 101.424 with an F-value of 1055.480, whereas the sum square for operations expenses was 95.518 with an F-value of 686.315. At the 0.05 level, the commuters' distance traveled was statistically significant for each of the seven independent factors. Analysis revealed that the operation of Lagos State's water transportation is impacted by daily fee costs. This investigation demonstrated how Lagos State's waterways transportation operations are impacted by daily fare charges.

Table 1.1: Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	Fuel Cost	80.914 ^a	3	26.971	3055.914	.000
	Maintenance Cost	79.487 ^b	3	26.496	1217.727	.000
	Training and Personnel Development	83.120 ^c	3	27.707	4874.412	.000
	Monthly Jetty Due	89.977 ^d	3	29.992	1176.181	.000
	Security Personnel	87.085 ^e	3	29.028	739.939	.000
	Advert and Promotion	101.424 ^f	3	33.808	1055.480	.000
	Operations expenses	95.518 ^g	3	31.839	686.315	.000
	Intercept	Fuel Cost	178.456	1	178.456	20219.606
Maintenance Cost		165.990	1	165.990	7628.825	.000
Training and Personnel Development		163.409	1	163.409	28748.325	.000
Monthly Jetty Due		167.009	1	167.009	6549.460	.000
Security Personnel		166.496	1	166.496	4244.047	.000
Advert and Promotion		170.791	1	170.791	5332.046	.000
Operations expenses		169.679	1	169.679	3657.519	.000
Comfortability		Fuel Cost	.221	1	.221	25.011
	Maintenance Cost	.001	1	.001	.024	.876
	Training and Personnel Development	.025	1	.025	4.339	.038
	Monthly Jetty Due	.088	1	.088	3.462	.063
	Security Personnel	.077	1	.077	1.959	.162
	Advert and Promotion	.196	1	.196	6.116	.014
	Operations expenses	.160	1	.160	3.449	.064
	Distance	Fuel Cost	13.893	1	13.893	1574.105
Maintenance Cost		19.537	1	19.537	897.934	.000
Training and Personnel Development		19.060	1	19.060	3353.153	.000
Monthly Jetty Due		20.043	1	20.043	786.009	.000
Security Personnel		19.660	1	19.660	501.146	.000
Advert and Promotion		21.581	1	21.581	673.751	.000
Operations expenses		20.816	1	20.816	448.709	.000
Comfortability * Distance		Fuel Cost	.520	1	.520	58.916
	Maintenance Cost	.005	1	.005	.220	.639
	Training and Personnel Development	.025	1	.025	4.339	.038
	Monthly Jetty Due	.072	1	.072	2.822	.093
	Security Personnel	.051	1	.051	1.294	.256
	Advert and Promotion	.191	1	.191	5.957	.015
	Operations expenses	.125	1	.125	2.698	.101
	Error	Fuel Cost	7.184	814	.009	
Maintenance Cost		17.711	814	.022		
Training and Personnel Development		4.627	814	.006		
Monthly Jetty Due		20.757	814	.025		
Security Personnel		31.934	814	.039		

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	Advert and Promotion	26.073	814	.032
	Operations expenses	37.763	814	.046
Total	Fuel Cost	1096.000	818	
	Maintenance Cost	1114.000	818	
	Training and Personnel Development	1089.000	818	
	Monthly Jetty Due	1132.000	818	
	Security Personnel	1147.000	818	
	Advert and Promotion	1151.000	818	
	Operations expenses	1168.000	818	
Corrected Total	Fuel Cost	88.098	817	
	Maintenance Cost	97.198	817	
	Training and Personnel Development	87.747	817	
	Monthly Jetty Due	110.733	817	
	Security Personnel	119.018	817	
	Advert and Promotion	127.498	817	
	Operations expenses	133.281	817	
	a. R Squared = .918 (Adjusted R Squared = .918)			
	b. R Squared = .818 (Adjusted R Squared = .817)			
	c. R Squared = .947 (Adjusted R Squared = .947)			
	d. R Squared = .813 (Adjusted R Squared = .812)			
	e. R Squared = .732 (Adjusted R Squared = .731)			
	f. R Squared = .795 (Adjusted R Squared = .795)			
	g. R Squared = .717 (Adjusted R Squared = .716)			

Source: Fieldwork, 2024.

V. CONCLUSION

This study's foundation was formed by the findings of preliminary satisfaction surveys, which revealed passengers' discontent with the circumstances of canal transportation, particularly with regard to comfort and traveling distance. The study demonstrated how the socioeconomic status of passengers impacted the way inland waterways in the study region operated. It was also found that the amount of comfort a passenger received and the distance each trip covered determined the fee. Additionally, the analysis of this study demonstrates how the low fares actually encourage increased traffic throughout Lagos State's waterways, which in turn leads to an increase in maintenance prices and servicing time. Conversely, low traffic along the chosen water transport due to high fares results in quicker servicing times and reduced servicing costs, which also reduce traffic.

The study concluded that the rate paid on inland waterways was influenced by several operating expenses, such as fuel costs, repair costs, training and personnel development, monthly jetty dues, security personnel, advertising, and promotion. Efforts should be made to reduce jetty dues, improve the waterways channel, remove wood logs from the waterways, lower fare costs, and provide adequate infrastructure at the terminals in order to achieve efficient inland waterways operations that lead to a total reduction in operational costs.

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