

## Integrating Technology to Boost Service Quality in the Lagos Bus Rapid Transit System

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### ABSTRACT

*This paper explores the integration of technology to enhance the quality of service of the Lagos State Bus Rapid Transit thereby improving customer satisfaction. Globally, the Bus Rapid Transit is a sustainable means of high-quality, comfortable, convenient, fast and cost effective means of urban mobility. In March, 2008, the Lagos State Government launched the state-owned mass transit, to regulate public transportation, and to address the issues of traffic congestion, which results into loss of productive man-hours, and its negative consequences on the economy. Data were collected randomly from 200 commuters across the BRT bus stops in the state, and analyzed using Descriptive statistics. The findings revealed that 55% of the respondents were dissatisfied with the seats in the BRT buses, 40% are of the opinion that there should be improvement in bus cleanliness, while 60% of the respondents believes that the digital facilities in the buses should be improved. The study concluded that the introduction of BRT services in Lagos state have regulated, and improved public transportation. However, in order to improve the BRT services, enhance customer satisfaction, and increase patronage, integration of further technological tools, to gather real-time data to enable buses respond to traffic situation, and passengers' demand against the existing conventional bus schedule, uninterrupted internet connectivity to encourage online payment and seat reservations, provisions of travel information ahead of trips such as bus arrival and departure, to enable passengers plan trips and reduce waiting time at BRT bus stops.*

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### INTRODUCTION

Transportation plays signification role in the social, economic and environment development of settlements. According to Ojekunle *et al.*, (2020) there are various definition of transportation, however, all definition possesses the unique component of moving people, goods and services from places of lower value to places of higher value. The growth and development of settlements, and the social and economic interactions gave rise to transportation demand. The governmental intervention through

policy actions and Implementation, creates effective and efficient transport system. In 1995, the city of Lagos attained the Mega-city status with a population of 10, 287 inhabitants and ranked 15<sup>th</sup> most populous city in the World (UNCHS, 1996). The growth in population led to various transport and environmental challenges such as: traffic congestion, environmental pollution, increase in the rate and frequencies of accidents, delayed travel time and exorbitant transport fare. This is largely, due to the unregulated nature of public transportation, which were mainly owned

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and operated by private concerns. In March 17<sup>th</sup>, 2008 Lagos State Government launched the Bus Rapid Transit (BRT) the first in the Sub-Saharan Africa. The Metropolitan Transport Authority (LAMATA) championed and provided the required infrastructure for the take-off of the system, after a 14 months planning and design phase. The infrastructure provided include: 29 bus shelters, lay-byes and 3 terminals facilities (Mile 12, Mosholashi and CMS), a bus garage, lightings, fencing, road marking and traffic signals.

The introduction of the BRT in Lagos State herald the commencement of bus planning, restructuring and government intervention in public transportation, with the 22km bilateral station arrangement from mile 12 to CMS. The significant advantage of the Bus Rapid Transit is in its lower capital and operating cost, flexibility and shorter implementation period. The first BRT corridor in Lagos State (Mile 12 –TBS corridor), and later extended to connect the peripheral settlements in Ikorodu to the intermediate settlement along the corridor to the Lagos Island. This corridor is regarded as the most important BRT route because of the high passenger volume and traffic generation. The carriage way is separated by medians with various intersections which are traffic signalized. The success of the first phase of the Lagos BRT led to the expansion and upgrade phase between Mile 12 and Ikorodu comprising of: 13.5km BRT lane, the carriage way is 15m dual carriage with 3.3m median, 15 bus shelters, 3 terminals (Ikorodu, Agric and Mile 12), 6 pedestrian bridges (Majidun-Ogolonto, Owode, Awori, Haruna, Irawo and Agric), 12 U-turn points 6 located on each direction, street lightings, 3 signalized intersections (Agric, Ogolonto and Ikorodu), and a 5-hectare bus depot built at Majidun. In order to ensure sameness of the existing and the expansion BRT project, the BRT Lite at the Mile 12 to TBS corridor was upgraded to BRT classic infrastructure to ensure sameness. The integration of technology was included during the upgrade of the infrastructure to include electronic ticketing (Cowrie card), and Intelligent Transport System (ITS). In summary, the Lagos BRT system comprises of: 44 bus shelters in both directions, 2 bus depots, 19 intersections, an

automatic washing bay, a fuel dump, administrative offices and appurtenances for the provision of efficient and effective service to the residents of the state. The purpose of this study is assess the level of passengers' satisfaction after the integration of technology into the BRT system.

## LITERATURE REVIEW

### Bus Rapid Transit

Bus rapid transit (BRT), also known as a busway or transitway, is a bus-centric public transportation system engineered to possess significantly greater capacity, dependability, and other desirable attributes compared to a traditional bus system (Institute for Transportation and Development Policy, 2024). Typically, a BRT system consists of dedicated bus lanes and provides bus priority at intersections where buses may encounter other vehicles; in addition to incorporating design elements aimed at minimizing delays stemming from passenger boarding or alighting, or fare payment. The goal of BRT is to amalgamate the capacity and speed of a light rail transit (LRT) or mass rapid transit (MRT) system with the flexibility, cost-effectiveness, and straightforwardness of a bus system.

### Lagos Bus Rapid Transit

The Bus Rapid Transit System in Lagos State, known as Lagos BRT, is overseen by LAMATA and managed by Primero Transport Services Limited (Olukayode, 2016). The inauguration of the Lagos BRT's initial phase was delayed to March 17, 2008, despite the original target of November 2007. The endeavor was instigated by the administration of the former governor, Bola Tinubu (Jen, 2015), running from Mile 12 through Ikorodu Road and Funsho Williams Avenue up to CMS. Currently, the Lagos BRT Corridor has been elongated from Mile 12 to Ikorodu, marking the second phase of the BRT project. With the endorsement of Governor Akinwunmi Ambode, the development of a new BRT route from Oshodi to Abule-Egba has commenced under the guidance of LAMATA.

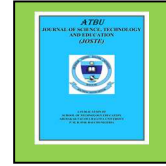
The Mile 12-CMS road boasts 26 bus shelters and three bus terminals (located at Mile 12, Moshalashi, and CMS), with the CMS terminal

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blueprint facilitating integration with the future railway and ferry transport systems planned by LAMATA.

As reported by The Nation on August 14, 2018, Mercedes Benz (MB do Brazil) is scheduled to supply 200 buses to Lagos by the end of the month. The first set of 800 buses was delivered in October 2018 (The Nation Nigeria, 2018).

Governor Babajide Sanwo-Olu of Lagos has sanctioned the establishment of a specialized security unit to supervise and enforce the Bus Rapid Transit (BRT) system's operations and ensure the safety of other transportation infrastructures.

### Bus Routes

Operating on twenty-six routes, the Lagos Bus Rapid Transit (BRT) managed by Primero Transport Services Ltd recently reduced fares along the Ikorodu to TBS corridor due to current economic conditions (Oladele, 2021). The BRT has also introduced a digital electronic payment system utilizing an access control system, inaugurated by the former Governor of Lagos State (Brand, 2021).

### Quality of Service

The assessment of Service Quality pertains to the extent to which the service provided aligns with the expectations of customers (Yarimoglu, 2014). The Bus Rapid Transit (BRT) system appears to present a superior level of service quality compared to the conventional buses operating within the city. It garners a substantial number of passengers, encompassing individuals who own private vehicles, along its routes. Nevertheless, there are apprehensions expressed by passengers regarding the decline in the service quality of buses within Lagos State.

### Technology Integration

The integration of technology within Bus Rapid Transit (BRT) networks is imperative for the enhancement of operational efficiency and user satisfaction. Several research studies suggest novel methodologies to enhance BRT functionality through technological means. One proposed approach entails the introduction of a mobile-

oriented payment system to streamline ticketing processes and improve passenger convenience (Andi, *et al.*, 2023). Furthermore, the utilization of intelligent transportation systems (ITS) in BRT strives to improve safety, usability, and productivity by facilitating data exchange among various components such as buses, sensors, and traffic signals, emphasizing communication technologies like Power Line Communication (PLC) systems for effective data transfer (Caio, *et al.*, 2022). Moreover, spatial-temporal integration strategies employing data-centric algorithms can optimize bus routes, decrease travel distances, and enhance the appeal of bus transportation by enabling smooth transfers between routes at specified virtual terminals (Julio, *et al.*, 2024). These technological incorporations play a crucial role in propelling BRT systems towards meeting the dynamic requirements of contemporary urban transportation.

### Empirical Framework:

Nguyen and Mogaji (2022) in the study of Management and Information Technology in the digital era, identified Four (4) major stakeholders in the development and integration of Information Technology for the enhancement of transportation in developing nations to include: Technology developers, transporters, transport Technology Start-Ups and the travelers (commuters). The authors opined that developing nations are faced with daunting socio-economic and infrastructural challenges that militates against the effective and efficient adoption and implementation of contemporary technologies. The Lagos State Government adopted the Contactless Digital Payment Technology (CDPT) in 2021. The Cowry is a contactless stored value smart card. The acceptance of the contactless digital payment technology is influenced by: potential obsolescence of the technology, the learning curve process and the risk propensity such as information piracy (Walter and Abendroth, 2020). According to Lee and Pan (2023) security, seamless user interface and attractiveness are some of the important factors that adhere commuters to the use of the digital smart payment cards. Polasik *et. al.*, (2012) conducted a study on

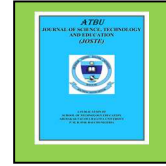
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the behavioral pattern of commuters in the transport sector to the adoption of contactless digital payment technology in developed nations, and concluded that factors such as the usage of mobile devices for internet access, and the availability of electronic banking services influenced the usage of these technology. Findings from previous studies suggests that the perceived usefulness of the technology, security, marital status and level of education of the commuters play significant role in its acceptance and usage by the public.

According to Amiegbebhor and Popoola (2018) in the study-The Lagos Bus Rapid Transit: Review of Users' Perception, observed that long waiting time, inadequate bus frequencies, delay in dissemination of information, overcrowding at stations and poor ticketing systems are amongst the various challenges of the transit which require improvement. The authors further stated that important attributes of BRT include: safety, security, service availability, reliability, travel time and comfort. The study recommends improved bus maintenance due to address the issue of low deployment of buses for operational purposes.

Kuye, Sulaimon and Azeez (2017) in the study Bus Rapid Transit and Socio-Economic Conditions of Bus Commuters in Lagos State concluded that the introduction of BRT in the transport system of the state has increased safety and security of commuters, thereby significantly improving the socio-economic conditions of the commuters. However, the study recommended the integration of technology into the BRT Services as obtainable in developed nations. According to Joseph

Afolabi (2016) in the study- Commuter Perception and Preferences on The Bus Rapid Transit in Lagos State opined that the efficiency and effectiveness of accessibility of passengers and goods to mobility determines the performance of the transport sector. Transportation stimulate economic activities, it is therefore, an indicator of the physical and economic growth of nations. The author concluded that the BRT in Lagos Metropolis has significant impact in the passengers' satisfaction, but recommends that transit drivers' conform with safety procedures,

adequate planning to enable appropriate management decisions, integration of real-time monitoring devices and other technological equipment such as Cameras to monitor the corridor and the environment in order to enhance safety.

According to Ogundare (2023) The Lagos State Bus Rapid Transit is a significant attempt by the state government to re-organize public transportation and in the process, improving the quality of lives of the residents. The BRT System addresses mobility issues within the state, and could be the basis for the development of multi-modal transportation. The study concluded that drawbacks in the transit system include: lack of provision for disabled commuters, lack of real-time monitoring devices both at the bus-stops and buses. The buses should run on scheduled time, reliable, integration of digital devices which can be accessed on commuters' mobile phone, and displayed on screens to provide accurate information of travel time, the bus drivers should be trained periodically, so that they can continuously imbibe the culture of courtesy and safety of passengers.

Akinyemi and Soyinka (2022) studied the Passengers' Perception of Bus Rapid Transit Access: Case Study of Ikorodu-Mile 12 Corridor of Lagos State, Nigeria. The authors adopt the dimensions of: accessibility, affordability, availability, acceptability and adequacy in the study. The result show that 50% of the respondents were satisfied with –accessibility, affordability and adequacy of the BRT service. The result further show that more than 50% of the commuters were dissatisfied with the transit service of acceptability and availability due to the long waiting time at bus terminals. The research advocates the formulation of transport policies that will lead to the development of sustainable transport system in the state.

Adedayo et. al., (2014) studied: Access to Intra-Urban Public Transport Across Varied Socio-Economic Groups: A Case Study of Lagos Bus Rapid Transit (BRT) the result show that 50% of Lagos dwellers are disadvantaged from accessing the transit system due to socio-economic circumstances. In order to enhance

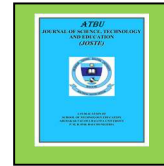
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accessibility to the transit by various socio-economic groups resident in the state, the study suggested the creation of opportunities to serve the various socio-economic groups with different mobility behaviors.

Oluwole (2012) carried out empirical study of: Accessibility to Lagos Rapid Transit Bus Stops, the findings show that significant variations exist between travel time and waiting time at BRT Bus Stops and the frequency of patronage. The paper recommends the increase in the number of BRT bus stops, the regulation and improvement of service delivery of other transport modes, to pave way for effective and efficient interdependence of BRT and other modes of transportation.

Abid et al., (2020) studied the Attraction of Bus Rapid Transit (BRT) For Cars and Bike Owners in Pakistan the finding revealed that BRT attracts considerable private Motorcycle owners. Socio-economic factors as: income, residents' location and accessibility plays significant in the selection of public transit as a means of transportation, and that increase in the BRT fares will considerably reduce the ridership of the system.

Aderinlewo et. al., (2020) carried the study- Analysis of The Operational Data of Public Transportation System: A Case Study of the Bus Rapid Transit (BRT), Lagos State, Nigeria and observed that BRT bus-stops of Ojota, Ketu, Costain, CMS and TBS has high influx of boarding and alighting passengers. The study recommended that bus stops that can accommodate high density of commuters should be provided, and more buses to reduce passenger waiting time. Adetunji (2013) highlighted some of the challenges facing public transportation in Nigeria include: inadequacy of mass transit facilities relative to demand, poor management and ineffective maintenance culture.

Osoja et. al., (2023) studied the Impact of Improved Bus Rapid Transit (BRT) Operation System On Commuters Satisfaction in Metropolitan Lagos, Nigeria. The study identified that the BRT service is characterized by long waiting queues, irregularity and uncertainty about the bus arrival and departure time, that has resulted in the frustration of commuters, making

them opting for other alternative means of transportation. This defeats the purpose of establishing the public transit. The research concluded that the BRT operations has significantly improved public mobility in the state, and that the delay in the arrival and departure time of the buses were due to non-adherence to the bus scheduled time-table. The study recommended that improvement in the services of the transit will enhance public confidence in the transit.

Aminu and Pearse (2018) studied Transportation Externalities Reduction and Ridership of Rapid Bus Transit (BRT)- in Lagos Metropolis, opined that the ridership of the BRT in Lagos metropolis is a result of the residents' determination to reduce transport externalities such as: traffic congestion, reduction of gasoline consumption, hazardous emissions, and its attendant health consequences. The result show that the introduction of the BRT into the public transportation system has significantly reduced the traffic congestion at the mile 12, on Ikorodu Road of the metropolis.

Alade, Olaseni and Adeniji (2019) studied- Commuters' Travel Characteristics, Modal Choice and Performance of Public Transport Options in Lagos, Nigeria. The authors evaluate commuters' access to three public transport options within the Lagos metropolis (yellow bus, BRT and ferry). The findings revealed that the BRT is the most affordable in terms of fares, but the worst in boarding and waiting time, the ferry was found to be the most efficient with respect to trip duration. The study recommended the provision of more BRT buses to reduce waiting time at the terminals, reduction in ferry fares and the upscaling of both BRT and the ferry for commuters' safety.

According to Odufuwa and Fasina (2012) observed that poor quality of bus stops, unemployment, inadequate transport infrastructure, poor law enforcement, inefficient regulation of public transport service and poor land use pattern are responsible for incidents of crime in public transit within the Lagos metropolis. The Lagos BRT has significantly improved and reshape the public transit within the Lagos

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metropolis. However, various studies are of the opinion that there is need for improvement in the service of the transit in order to achieve better passenger comfortability, safety, security, reduce prolonged waiting period, and to achieve the objectives of the scheme amongst many others. It is in this regard, that further integration of digital device will enhance the process of seat reservation, ticket purchasing, reduction in waiting time at terminals, and the provision of up-to-date information to commuters' regarding the scheduled trip.

### RESEARCH METHODOLOGY

The methodology adopted for this research is the use of primary data. In order to

achieve this, structured questionnaires were prepared and administered. Two Hundred (200) questionnaires were randomly administered across the BRT terminals in Lagos State, and all questionnaires were returned, and were adjudged suitable for the purpose of the study. Information on the socio-economic background of the respondents, and traffic information in order to determine the level of satisfaction of the commuters were obtained. The information obtained were presented in descriptive statistics, using tables of frequencies. The findings are presented below:

### RESULTS

#### A. Age of Respondents:

**Table 1:** Age of Respondents. Source: Field Survey (2024).

S/N	Age (in years)	Actual No.	Percentages
1.	0-20	12	6.0
2.	21-25	27	13.5
3.	26-30	30	15.0
4.	31-35	55	27.5
5.	36-40	47	23.5
6.	41-45	13	6.5
7.	46-50	08	4.0
8.	51-55	05	2.5
9.	56 & Above	03	1.5
10.	Total	200	100.0

**Source:** Field survey, 2024

The table shows that people within the ages of 31-35 have the highest numbers of users of the Lagos Rapid Transit. This indicate that youths which are mainly workers/traders are the most users of BRT. This is because it will enable them arrive at the destinations (offices & homes) on time. The transit is a vital alternative to the

unstructured yellow buses, owned and operated by private business concerns. The recklessness and lawlessness of the yellow buses makes them unreliable, and are prone to frequent delays and accidents. The yellow buses do not offer any form of satisfaction to the commuters.

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## B. The Respondents Level of Education

**Table 2:** The Level of Education of the respondents. Source: Field Survey (2024).

S/N	Level of Education	Actual No.	Percentages
1.	School Certificate and below	03	1.5
2.	Ordinary National Diploma	10	5.0
3.	Higher National Diploma	75	37.5
4.	First Degree	90	45.0
5.	Master Degree	18	9.0
6.	Others	04	0.2
7.	Total	200	100.0

**Source:** Field survey, 2024

The findings revealed that majority of the commuters of the Lagos BRT are educated with the greater percentage of the passengers having a university first degree. This is followed by the Polytechnic graduates. The advantage of

these attributes of the passengers is that they are literate and are able to interact with digital tools for smooth operation of the transit, making the introduction of online payment, seat reservation, and the use of digital facilities attractive.

## C. Gender of Respondents

**Table 3:** Gender Distribution

S/N	Gender of Respondents	Actual No.	Percentages
1.	Male	125	62.5
2.	Female	75	37.5
3.	Total	200	100.0

**Source:** Field survey, 2024

The table above shows that majority of the commuters of the Lagos BRT are male gender. The reason for this is that corridor commences from the peripheral settlement in

Ikorodu, and traverses' various intermediate settlement and terminating at the TBS, which is a Central Business District, and harbors various corporate organizations and industries.

## D. Type of Employment

**Table 4:** Employment Distribution

S/N	Type of Employment	Actual No.	Percentages
1.	Self-Employed	23	11.5
2.	Employed	125	62.5
3.	Unemployed	24	12.0
4.	Students	09	04.5
5.	Others	19	09.5
6.	Total	200	100.0

**Source:** Field survey, 2024

The employment distribution table reflects that majority of the users of the Lagos BRT are into employment with either corporate or industrial organizations. The nature of

employment may have been responsible for the male gender being more users of the transit. This is because males are prevalent in employment, whilst the female engages in business/trading.

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The implications of this for management decision makers is that route scheduling especially during the morning and evening peak periods is to have adequate number of buses to move commuters swiftly, thereby reducing the journey time, and waiting time at bus terminals.

This section of the report is concerned with the traffic survey which deals with commuter usage, safety, security and comfortability of passengers.

### A. Usage of Lagos BRT

**Table 5:** Frequencies of BRT Usage

S/N	Frequency	Actual No.	Percentages
1.	Daily	150	75.0
2.	Twice weekly	18.0	9.0
3.	Once a week	9.0	4.5
4.	Others	23.0	11.5
5.	Total	200	100.0

**Source:** Field Survey (2024).

The data from the table above reveals that daily users of the Lagos BRT ranks the highest. This indicate that improvement in the services of the transit, which will lead to better customer satisfaction and significant increase in patronage of the transit. Furthermore, it was observed during the study that the Lagos yellow

buses has not improved their services and it is not an alternative to the BRT. Therefore, with the integration of technology such as: internet connections for both bank applications linked to commuters' bank accounts, stored value contactless digital payment technology such as the Cowry Card will have prominent usage.

### B. Notice of Bus Schedule

**Table 6:** Bus Schedules

S/N	Bus Schedules	Actual No.	Percentages
1.	Yes	15.0	7.50
2.	No	185.0	92.5
3.	Total	200	100.0

**Source:** Field Survey (2024).

The survey revealed that 92% of the respondents replied that there is no prior notification of the bus schedule (arrival and departure time of buses). This results in prolonged waiting time, overcrowding and difficulty for the

passengers to plan their journeys. One of the importance of advanced notification of bus schedules, is that passengers are able to plan ahead of journeys.

### C. Comfortability of Seats

**Table 7:** Seat Comfortability

S/n	Comfortability of Seats	Actual No.	Percentages
1.	Yes	90.0	45.0
2.	No	110.0	55.0
3.	Total	200	100.0

**Source:** Field Survey (2024).

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Greater percentage of respondents are of the opinion that BRT bus seats are not comfortable. In order to improve user satisfaction,

bus seats must be comfortable, neat and secure. The management of the Lagos BRT should be look into providing seats that are comfortable.

#### D. Cleanliness of the Buses

**Table 8:** Bus Cleanliness

S/N	Cleanliness of Buses	Actual No.	Percentages
1.	Yes	120.0	60.0
2.	No	80.0	40.0
3.	Total	200	100.0

**Source:** Field Survey (2024).

The cleanliness of the buses is an important priority in order to increase patronage, improve service delivery of the transit system. Although, a large percentage of the respondents

are of the opinion that the buses are clean, however, significant numbers of the respondents (40%) are of the opinion that there is need to have cleaner buses.

#### E. Digital Facilities provided in the buses

**Table 9:** Digital Facilities

S/N	Digital Facilities	Actual No.	Percentages
1.	Yes	80.0	40.0
2.	No	120.0	60.0
3.	Total	200	100.0

**Source:** Field Survey (2024).

Preponderance of the data obtained from the survey showed that the passengers are not satisfied with the digit facilities provided in the buses due to poor network connections. Similarly,

the repetition of advertorials on the Television, poor quality transmission and low audio control amongst others are major complaints of the respondents.

#### F. The provision of digital screens at the bus terminals

**Table 10:** Digital Screens at Bus Terminals.

S/N	Digital Screen	Actual No.	Percentages
1.	Yes	00.0	0.0
2.	No	200.0	100.0
3.	Total	200	100.0

**Source:** Field Survey (2024).

In general, lack of adequate shelter and digital screens at all the Lagos BRT bus stop is a major drawback impeding the quality of service. Mounted screens are meant to provide information to the commuters about bus schedules,

advertorials and other major news items. The management/operators should look into provision of adequate shelters and digital screens at the bus stops.

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### G. The level of satisfaction of commuters

**Table 11:** Commuter Satisfaction

S/N	Commuter Satisfaction	Actual No.	Percentages
1.	Good	13.0	6.5
2.	Fair	150.0	75.0
3.	Poor	22.0	11.0
4.	No comment	15.0	7.5
5.	Total	200.0	100.0

**Source:** Field Survey (2024).

The result of the survey showed that majority of the commuters are not satisfied with the services and operations of the Lagos BRT. Although, the introduction of the transit heralds a structured public transit system in the Lagos

metropolis, there is need for improvement in order to encourage patronage and to compete with BRT system globally. Improved satisfaction will lead to safe and secured transit, integrated with modern technology.

### H. Duration of Journeys

**Table 12:** Duration of Journeys.

S/N	Journey Duration	Actual No.	Percentages
1.	45 minutes	35.0	17.5
2.	60 minutes	15.0	7.5
3.	90 minutes	40.0	20.0
4.	120 minutes & above	110.0	55.0
5.	Total	200.0	100.0

**Source:** Field Survey (2024).

The table shows that the average duration of journey is over an hour. There is need to reduce the time journey.

CLASS	X	F	FX	X-X̄	(X-X̄) <sup>2</sup>	F(X-X̄) <sup>2</sup>
0-20	10	12	120	-15	225	2700
21-25	23	27	621	-2	4	108
26-30	28	30	840	3	9	270
31-35	33	55	1,815	8	64	3,520
36-40	38	47	1,786	13	169	7,943
41-45	43	13	559	18	324	4,212
46-50	48	8	384	23	529	4,531
56 & above	28	5	140	3	9	45
	<b>251</b>	<b>197</b>	<b>6,265</b>	<b>43</b>		<b>23,329</b>

**Table 13: Analysis of Variance (ANOVA).**

**Source:** Authors Computation, 2024

$$\bar{X} = \frac{(\sum fx)}{(\sum x)} = \frac{6,265}{251} = 25.0$$

$\bar{X}$  = mean

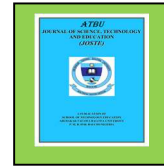
$$V = \frac{\sum fx - \bar{x}^2 \sum f}{\sum f - 1} = \frac{23,329}{197-1}$$

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$$= \frac{23,329}{196} = 119.02$$

This implies that the value is scattered from the mean. Variance is the measure of spread of data from the mean.

## RECOMMENDATION AND CONCLUSION

The study concludes that the BRT public transit system has improve public transit system in Lagos State with various upgrade and expansions carried out since inception. The improvement has led to increased patronage, however, the level of customer satisfaction can be improved. The study therefore, recommend the following improvements to enhance the level of customer satisfaction and by so doing, increase patronage:

In order to ensure improved customer satisfaction of the Lagos BRT system, it's crucial to prioritize training of the personnel in order to effectively provide seamless service to the passengers'. This involves organizing comprehensive training sessions and workshops to acquaint the staffs (drivers, conductor, and ticket-sellers). Additionally, establishing feedback mechanism is essential for gathering insights for the managers. This feedback mechanism allows for the identification of areas for improvement and enables enhancements to be made over time, ensuring that the system remains responsive to evolving needs of the passengers'. Planning is another key consideration, requiring careful preparation to accommodate potential growth and satisfaction of users'. Factors such as increased demand for the use of BRT services and future plans for expansion of service must be taken into account to ensure the system is developed enough to accommodate such improvement effectively. Furthermore, the operators of the Lagos BRT should provide shelters for passengers' whilst waiting for the arrival of buses in order to protect them from the adverse weather conditions, make them comfortable and thus improving the passengers' experience. Digital Screen providing vital information such as: journey time, bus arrival schedule and other necessary details pertaining to the trip is essential. Furthermore, advertorials and other societal

messages can be provided to keep the passengers and the populace updated (Ameer *et al.*, 2021). Similarly, digital features such as Wi-Fi can be provided as incentives.

Global Positioning System (GPS) can be introduced to collect and analyse real-time traffic to schedule buses in response to passengers' demand at the various bus stops/terminals, and to reroute buses based on traffic conditions to reduce travel time and waiting time at the bus stops.

The Cowry card should be improved with features in indigenous Nigerian languages in order to create more accessibility to the BRT usage. Digital infrastructures should be improved, in order to facilitate uninterrupted internet connections with the user-bank application to guarantee payments. The designed bus carriage capacity in terms of number of passengers at a single trip should not be exceeded.

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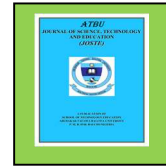
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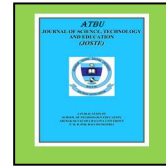
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