PERCEIVED SERVICE QUALITY AND PASSENGER SATISFACTION WITH BUS RAPID TRANSIT (BRT) SERVICE IN LAGOS STATE, NIGERIA

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Abstract

With the increasing pressure on urban transport networks to provide efficient and reliable services, there is need to examine how passengers perceive service quality and the influence on passenger satisfaction. This study investigated the influence of the dimensions of service quality*, including reliability, comfort, convenience, responsiveness and safety* on perceived service quality of Bus Rapid Transit (BRT) service and its influence on passenger satisfaction *in Lagos State, Nigeria. A cross-sectional research design was employed using a structured questionnaire administered to 384 BRT passengers, with 248 valid responses. Structural Equation Modeling (SEM) was used to analyse the data. Findings indicate that perceived service quality significantly influence passenger satisfaction, with dimensions such as reliability, convenience, responsiveness and safety having significant positive influence on perceived service quality. However, comfort has no significant influence on perceived service quality. The study underscores the need for continuous assessment of service quality of BRT to align with passenger expectations and sustainable urban mobility.*

Keywords: Service Quality, Passenger Satisfaction, BRT, Transportation, Urban Mobility

1. Introduction

Service quality has been identified as a critical factor in industry performance and one of the requirements for business success (Afthanorhan, Awang, Rashid, Foziah & Ghazali, 2019; Djarot, 2023). Like many industries, the transportation industry is under increasing pressure to provide services that are efficient, integrated and accommodating to the diverse requirements of

passengers. According to Paget-Seekins and Munoz (2016) Bus Rapid Transit (BRT) was introduced on the premise of reshaping the urban space and restructuring the public transportation system. In the view of Levinson, Zimmerman, Clinger and Rutherford (2002) BRT can provide high-quality, high-performance, attractive rapid transit in diverse settings including metropolitan cities. The BRT system operates on dedicated lanes to reduce travel times and provide cost-effective, efficient and reliable transit options (Shen, Zheng & Nelson, 2022). Such initiatives are part of the global trends where mass transit systems are used to address urban mobility issues while enhancing sustainability and air quality.

Historically, public transportation in Lagos relied on informal modes such as mini-buses popularly called danfos and shared taxis. These modes were often unregulated, overcrowded, and unreliable, contributing to severe traffic congestion and air pollution. Recognizing these challenges, the Lagos State Government established the Lagos Metropolitan Area Transport Authority (LAMATA) in 2002 to reform public transportation and introduce structured transit systems. Urban mobility remains one of the defining challenges for developing economies, especially in megacities like Lagos with a population exceeding 20 million and a rapidly urbanizing landscape (LAMATA, 2023). To address these challenges, BRT system was introduced in 2008 under LAMATA. This initiative repositioned Lagos State transport system.

It became the first of its kind in Sub-Saharan Africa, modeled after successful systems in western countries (Fan, Beukes & Sheng, 2021; Oluwakoya, 2024). It was conceptualized to address three core challenges: urban congestion, environmental degradation and lack of affordable transportation for the city's growing population. The system was designed to provide faster, safer and more reliable travel options by reducing travel times by up to 50% compared to conventional transport modes. Globally, BRT systems have been hailed as cost-effective alternatives to rail-based transit systems, particularly in developing countries. They offer scalability, affordability and environmental benefits by encouraging the use of public transit over private vehicles (Cao, Wu & Ding, 2020). The BRT system represents a critical step towards achieving sustainable urban mobility and addressing the city's perennial traffic problems.

Despite these advancements, the system faced operational challenges, including insufficient fleet size, maintenance issues, and overcrowding during peak hours. While many commend its affordability and potential for reducing congestion, issues such as unreliable schedules, safety concerns, poorly maintained facilities and inadequate seating capacity have hindered user satisfaction (Oluwakoya, 2024). The lack of integrated ticketing and real-time information systems are notable drawbacks. These challenges underscore the need for ongoing evaluations of service quality to align with passenger expectations. Moreover, previous research has predominantly focused on operational performance and environmental benefits, neglecting the nuanced

relationship between perceived service quality and passenger satisfaction. A deeper understanding of how passengers perceive BRT is crucial for tailoring solutions that enhance public transportation effectiveness. Consequently, the objective of this study is to examine the influence of service quality dimensions (reliability, comfort, convenience, responsiveness and safety) on perceived service quality and the effect of perceived service quality on passenger satisfaction with BRT services in Lagos State. The following hypotheses were tested in the study:

i. H_1: Reliability has a significant influence on perceived service quality of BRT services.
ii. H_2: Comfort has a significant influence on perceived service quality of BRT services.
iii. H_3: Convenience has a significant influence on perceived service quality of BRT services.
iv. H_4**:** Responsiveness has a significant influence on perceived service quality of BRT services.
v. H_5: Safety has a significant influence on perceived service quality of BRT services.
vi. H_6: Perceived service quality has a significant effect on passenger satisfaction with BRT services.

2. Literature review

2.1 Perceived Service Quality

Parasuraman, Zeithaml and Berry, (1988) described service quality as the relationship between the overall quality evaluation of a service provider and client's expectations and the service received. In this study, perceived service quality refers to passengers' assessments and evaluations of the services they receive based on their expectations and actual experiences with BRT services. It is a multi-dimensional construct that considers various dimensions (Gong & Yi, 2018). Perceived service quality is not solely dependent on tangible attributes like the physical condition of the buses or the infrastructure but also on intangible aspects like the behaviour of the bus drivers, the punctuality of the service and the ease of use for passengers (Cao et al., 2020).

The SERVQUAL scale developed by Parasuraman et al. (1988) identified five parameters of service quality which are specifically based on tangibility, reliability, responsiveness, assurance and empathy. These dimensions have been widely used to evaluate public transport systems globally. Beyond these core dimensions, recent studies (Nwaogbe, Ojo, Ogbuji, Omoke & Eru, 2020; Ogundare, 2023; Osoja, Oloye, Adenaiya, Olasunkanmi & Ikenna, 2023) have highlighted additional factors that influence perceived service quality, especially in the context of urban transport systems. For instance, factors such as ease of use**,** accessibility and environmental sustainability have emerged as increasingly important.

When considering BRT systems specifically, several attributes are particularly critical in shaping passenger satisfaction (Nwaogbe et al., 2020). It has been observed that punctuality**,** frequency**,** and comfort are some of the most significant determinants of perceived service quality (Salisu, Odewumi & Abdul-Azeez., 2023). Punctuality or the timely arrival and departure of buses are essential in ensuring that passengers rely on the BRT system to meet their daily transportation needs. It has been observed that infrastructural decay, poor maintenance culture and inadequate investment in fleet expansion have contributed to the BRT's declining performance (World Bank, 2022). Delays can undermine passengers' confidence in the system and discourage usage.

The study of Cao et al. (2020) conducted in various cities, including South Miami-Dade, Orlando and Guangzhou provided valuable insights into the specific attributes that enhance passenger satisfaction in BRT systems. For example, in South Miami-Dade and Orlando, it was found that travel time**,** safety and reliability were the most important dimensions of service quality. In these cities, passengers were more likely to rate their experience highly when the BRT system offered a reliable, safe and fast journey. Similarly, in Guangzhou, passengers placed significant importance on ease of use and travel cost**,** both of which were seen as essential for improving overall satisfaction. Passengers in Guangzhou valued a straightforward, user-friendly system that was affordable and cost-effective.

These findings underscore the importance of a holistic approach to service quality in BRT systems. It is not enough for a transport system to simply meet basic functional requirements, it must also create a positive, seamless experience for passengers. Factors such as travel time, safety, comfort, ease of use, and affordability all interact to shape how passengers perceive and evaluate the service. In Lagos where the BRT system is still evolving, addressing these key elements will be crucial in improving passenger satisfaction and ensuring the system's long-term success.

Based on the review, the study identified the following dimensions of service quality:

Reliability

Reliability refers to the ability of the BRT system to provide consistent and dependable service, such as buses arriving on time and maintaining regular schedules. The BRT system is generally perceived as a reliable mode of transportation, with scheduled services and dedicated lanes contributing to consistent travel times (Levinson et al., 2002). Nonetheless, issues such as bus breakdowns and occasional service disruptions can affect this reliability (Cao et al., 2020).

Comfort

Comfort pertains to the physical aspects of the service, including the cleanliness of the buses, the comfort of the seating and the condition of the bus stations (Salisu et al., 2023). Commuters have

expressed satisfaction with the comfort levels of BRT buses, citing features like air conditioning and more spacious seating compared to traditional minibuses (Adebiyi et al, 2022). However, overcrowding during peak periods can diminish this comfort.

Convenience

Convenience refers to how accessible and simple it is for passengers to navigate the system, such as the availability of user-friendly ticketing methods or clear signage at stations. This includes considerations such as ensuring that the system is easy for people with disabilities or elderly passengers to use. The BRT system is designed to be user-friendly with structured bus stops that simplify navigation for passengers (Oluwakoya, 2025).

Responsiveness

Responsiveness focuses on how quickly and effectively the service provider addresses passengers' concerns or problems (Das and Ravi, 2021). BRT aims to provide accessible transportation to a broad segment of Lagos residents. However, passengers still experience challenges and the inability to resolve issues for some users may lead to poor perception of service quality.

Safety

Safety reflects the competence and confidence of the BRT operators, ensuring passengers feel safe and well cared for during their journey. Safety is a notable advantage of the BRT system (Cao et al., 2020). The structured nature of the service, with designated stops and regulated operations, enhances passenger security compared to informal transport modes (LAMATA in 2023).

2.2. Passenger Satisfaction

Passenger satisfaction is a concept that encompasses various elements of service delivery and individual experiences. Passenger satisfaction usually determines the success of a mass transit scheme based on assessing various satisfaction parameters (Ojadi, Iheanacho, Clinton & Maiyaki, 2024). Research indicates that when customers are satisfied with their service experience, they are more likely to exhibit loyalty**,** including a preference for continued use of the service and positive word-of-mouth, which can help build a stronger and more reliable public transport culture (Ighomereho et al., 2023). Passenger dissatisfaction remains a significant challenge in the transportation industry. Observations from passengers often cite unpredictable schedules**,** inadequate seating and overcrowding as the primary sources of frustration (Oluwakoya, 2025). While the BRT system was designed to alleviate traffic congestion and improve travel times, the

reality is that passengers continue to face discomfort and uncertainty during their commutes. The system's inability to fully meet the high demand, particularly during rush hours, results in a less-than-ideal experience for many users (Adebiyi et al., 2022).

In Lagos, the management of BRT system has taken several steps to improve passenger satisfaction through a customer-centred approach. This includes regular surveys and feedback mechanisms to understand passenger needs and identify areas for improvement. According to a survey conducted by LAMATA in 2023, while passengers reported increased satisfaction with punctuality and safety compared to the traditional bus services, issues such as overcrowding and bus cleanliness remained significant concerns. These findings suggest that while improvements have been made, addressing overcrowding and maintaining the cleanliness of the buses will be critical for enhancing the overall passenger experience.

As noted by Levinson et al. (2002) satisfaction is also linked to passengers' perceptions of service dependability which is the consistency and reliability of the service. Regular delays, overcrowded buses, and unclean vehicles negatively affect overall satisfaction, causing passengers to feel that the service is unreliable or uncomfortable. On the other hand, improvements in punctuality and safety can substantially boost satisfaction, leading to higher ridership and greater public acceptance of the BRT system as a reliable mode of transport.

3. Methodology

The study used a cross-sectional research design and a quantitative research technique. The population comprises passengers who utilize the Lagos BRT services for their means of transportation. Given that the population cannot be easily determined, Cochran's (1977) formula for infinite populations was applied to determine the sample size. The formula is given as:

$$n_o = \frac{Z^2 pq}{e^2}$$

Where:

n_o = Sample size

Z = Z value of confidence level as in Z table (95 % confidence level gives Z value of 1.96)

p = Estimated proportion of the population that has the attribute in question (maximum variability, p=0.5)

q = 1-p

e = The desired level of precision or margin of error usually 5% (0.05)

$$n_o = \frac{1.96^2 0.5(0.5)}{0.05^2} = 384.16 \approx 384$$

This calculation yielded a minimum sample size of 384. Therefore, the sample size is put at 384 BRT users in Lagos State. The respondents were selected using convenience and volunteer sampling. Only respondents who were willing to participate in the study were selected. Data were collected with the aid of a structured questionnaire. The questionnaire was designed based on the research objective. The data for the study were collected through face-to-face administration at the BRT parks in Ojodu-berger, CMS and Leventis where copies of the questionnaire were distributed to passengers.

A total of 384 copies of the questionnaire were administered; however, 300 copies were retrieved. Moreover, 52 copies out of the 300 copies retrieved were not completely filled and so, 248 copies of the questionnaire were used for the analysis. The data were analysed using descriptive statistics (percentages) and inferential statistics (structural equation modeling).

4. Results

Table 1. Socio-demographic characteristics of participants

Descriptive Characteristics	Frequency	Percent
Gender		
Male	133	53.6
Female	115	46.4
Age Range		
20-30	53	21.4
31-40	91	36.7
41-50	61	24.6
Above 50	43	17.3

Marital Status		
Married	142	57.3
Single	101	40.7
Others	5	2.0
Educational Level		
SSCE	14	5.7
OND	33	13.3
B.Sc./HND	108	43.5
Postgraduate	93	37.5
Employment Status		
Employed	180	72.6
Unemployed	16	6.4
Students	52	21.0

Source: Field survey (2025)

Table 1 shows the socio-demographic characteristics of the participants. The analysis shows that 53.6% of the participants were male, while 46.4% were female. The age range of most of the participants is between 31-40 years old. Findings on marital status revealed that 57.3% are married, 40.7% are single, and only 2% are in the "other" category. The majority (43.5%) of the participants possess B.Sc./HND degrees, followed by 37.5% of them with postgraduate degrees. Only a few (13.3%) and (5.7%) possess OND and SSCE respectively. Furthermore, the participant's employment status revealed that the majority (72.6%) are employed. This implies that BRT users are mostly males who are aged between 31 to 40 years, married with higher education and are employed.

4.1. Assessment of the Measurement Model

The assessment of the measurement model was determined using the Smart-PLS 4. The factor loading for each measured item was calculated to assess the variation of each shared item and its construct. The factor loadings were predicted to be more than the acceptable minimum level of 0.5 as shown in Table 2. In addition, the convergent validity of the measuring items was generated and verified using the construct variables and Average Variance Extracted (AVE).

Table 2. Construct reliability and validity

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average Variance Extracted (AVE)
PSQ	0.745	0.770	0.853	0.660
PS	0.780	0.811	0.859	0.607

PSQ=Perceived Service Quality PS=Passenger Satisfaction

Source: Smart-PLS (2025)

Table 2 indicates that all items' factor loadings measured returned values greater than the minimum 0.5 acceptable threshold. Hence, suggesting a significant variance between the path model and the construct variables. In the same vein, the composite reliability values of the construct variables are found to be above the minimum threshold of 0.7, indicating that the measured items satisfy the reliability condition. The Cronbach's alpha for perceived service quality obtained was 0.745, and 0.780 for passenger satisfaction. By implication, the construct variable satisfies the convergent validity.

4.3. Discriminant Validity

Furthermore, the discriminant validity of the data was assessed using the Fornell-Larcker criteria. According to Fornell and Larcker (1981), the square roots of the AVE for the constructs must be greater than the inter-construct correlation. Discriminant validity is the unique measures of a construct against other constructs (Ronkko & Cho, 2020). Discriminant validity is obtained when the square root of the average variance extract (AVE) is greater than the inter-construct correlation.

Table 3. Fornell-Larcker Criterion

	CNFT	CNVC	PS	RLTY	RPNS	SFTY	SQ
RLTY	**0.731**						
CNFT	0.518	**0.733**					
CNVC	0.521	0.442	**0.779**				
RPNS	0.624	0.606	0.505	**0.753**			
SFTY	0.674	0.626	0.601	0.621	**0.812**		
PSQ	0.557	0.495	0.556	0.566	0.545	**0.722**	
PS	0.709	0.643	0.621	0.679	0.610	0.713	**0.807**

RLTY=Reliability, CNFT=Comfort, CNVC=Convenience, RPNS=Responsiveness, SFTY=Safety, PSQ=Perceived Service Quality, PS=Passenger Satisfaction

Source: Smart-PLS (2025)

The results in Table 3 show a higher diagonal value than all the correlations, indicating that the constructs satisfy the discriminant validity criteria.

Path Analysis

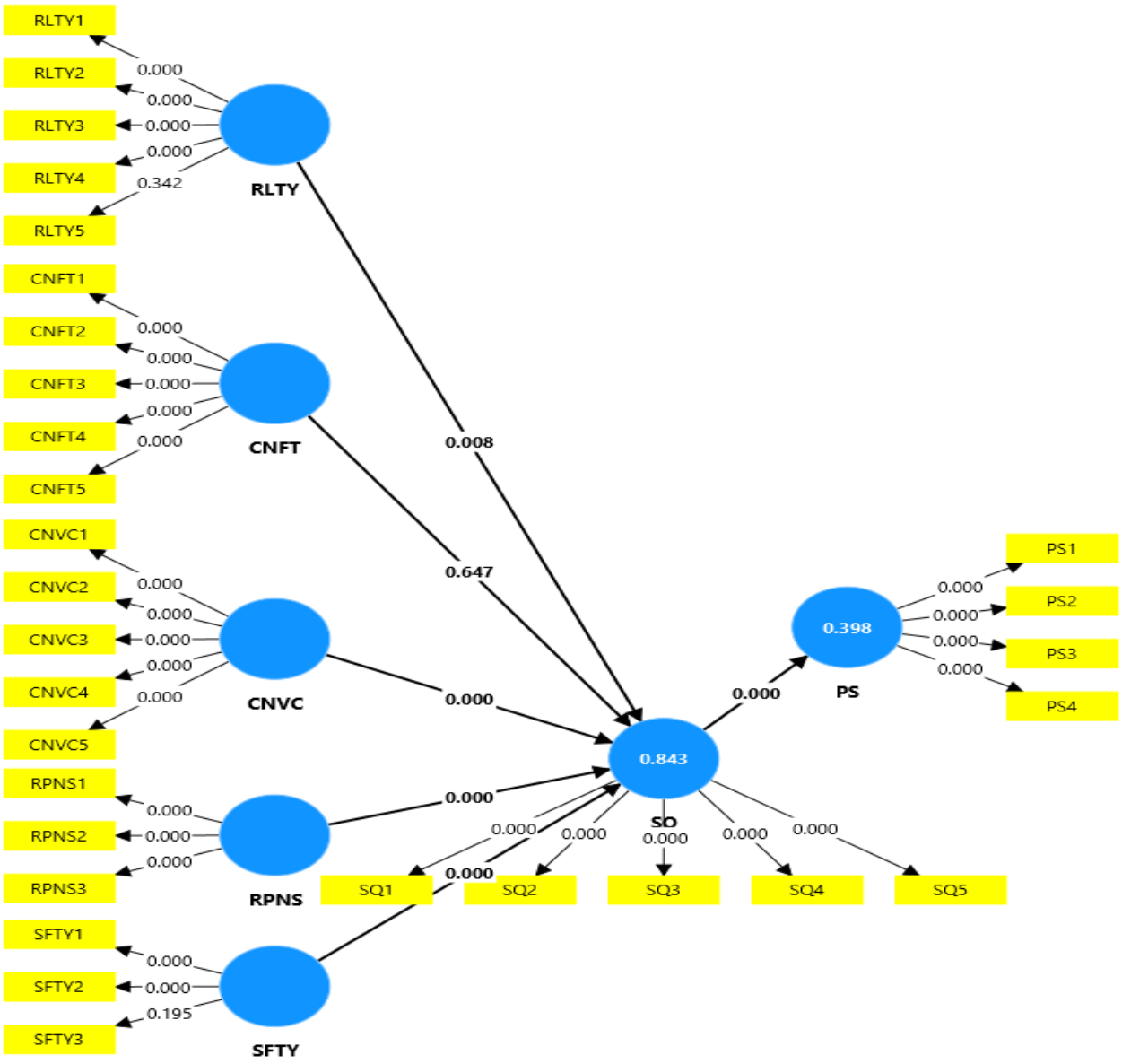

Figure 1. PLS algorithms

Source: Smart-PLS (2025)

The hypotheses for the relationship between BRT service quality dimensions and perceived service quality as well as the relationship between perceived service quality and passenger satisfaction were evaluated using Partial Least Structural Equation Model (PLS-SEM). The model fit is ascertained by the values of R-squared which is an indication of the extent of variation of the endogenous variables on the exogenous variable. Figure 1 shows the R-squared values in the

formative model. The construct variations show that all first-order construct variables explain 84.3% of perceived service quality while perceived service quality explains 39.8% of the variation in passenger satisfaction. Table 5 shows the results of the hypotheses testing.

Table 4. Hypotheses testing

Hypotheses path	Standard deviation	T-statistics	P-values	Decision
Reliability--- >Perceived Service Quality	0.051	2.652	0.008	Accepted
Comfort--- > Perceived Service Quality	0.046	0.457	0.647	Rejected
Convenience--- > Perceived Service Quality	0.044	6.756	0.000	Accepted
Responsiveness--- > Perceived Service Quality	0.042	8.105	0.000	Accepted
Safety--- > Perceived Service Quality	0.047	22.391	0.000	Accepted
Perceived Service Quality-->Passenger Satisfaction	0.028	22.391	0.000	Accepted

Source: Smart-PLS (2025)

It can be inferred from Table 4 that the relationship between reliability of BRT and perceived service quality has a p-value of 0.008, comfort 0.647, convenience (0.000); responsiveness (0.000) and safety (0.000). Furthermore, the relationship between perceived service quality and passenger satisfaction has a p-value of 0.000. The outcome of the analyses shows that perceived service quality significantly influences passenger satisfaction of BRT service and all the dimensions of service quality except comfort influences the perception of service quality.

Discussion

The objective of the study was to examine the influence of the dimensions of service quality on perceived service quality of BRT service and its influence on passenger satisfaction. The findings indicate that reliability, convenience, responsiveness and safety significantly influence the perception of service quality. These finding corroborate the assertion by Cao et al., (2020) that timely arrival and departure of buses is essential in ensuring passengers rely on BRT services to meet their daily transportation needs. This implies that reliable schedules, reasonable waiting time at service point, uninterrupted availability of BRT whenever needed make for pleasant experiences for passengers.

Outcome of this research also revealed that passengers find it convenient using BRT service as a result of top-notch ticketing process; good terminal locations, ease of trips plan, and considerate operation hours which passengers are satisfied with. Another aspect of service quality provided is the safety provisions. BRT users feel safe every time in transit due to provision of CCTV cameras and security personnel in buses and terminal points respectively. Apart from this, accident seldom occurs to the buses because of special route provision and well trained drivers handling the buses. These findings align with Nwaogbe et al. (2020) and Salisu et al. (2023) who noted that several factors influence the perception of service quality. The only aspect where there is disagreement is in the area of comfort which is not significant in this study.

Passenger satisfaction with BRT service is significantly premised on the quality provided according to this study. For continuous passenger satisfaction, better service quality is elicited as this study shows a positive relationship between perceived service quality and passenger satisfaction. This finding aligns with the finding of Levinson et al. (2002). For effective customer experience, the role of service quality cannot be undermined because it is the satisfaction derived that make passenger sees BRT as the best transportation alternative.

Conclusion

This study assessed how the dimensions of service quality influence perceived service quality of BRT and the impact on passenger satisfaction. Perceived service quality in BRT system is a complex and multi-faceted concept that requires careful consideration of various dimensions. Based on the findings, the study established that reliability, convenience, responsiveness, and safety are important dimensions of service quality that influence the perception of service quality by BRT users and that perceived service quality affect passenger satisfaction. By focusing on the dimensions identified in this study, BRT managers can improve the overall passenger experience and enhance satisfaction. The Lagos BRT system has made significant strides in improving public transportation across multiple service quality dimensions. While it offers several advantages, there is need for consistency in the existing advantages. By implication, as BRT systems continue to expand in Lagos, it is essential for policymakers and operators to prioritize reliability, convenience, responsiveness and safety in order to build a transport system that meets the needs of all passengers, encourages usage, and support sustainable urban mobility.

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