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Research article

Significant factors affecting public transport use for leisure travel and tourism

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Abstract: Tourists' preferences for public transport at destinations are homogeneous, while the choice of private transport services is heterogeneous. This paper examined several facets of the existing public transport system to understand tourists' disapproval of the mode choice for pleasurable holiday travel in Lagos, Nigeria. The urban transport services were adjudged based on tourists' perceptions of satisfaction with service features related to mode choice. Statistical and structured analyses were used to explore the association between usage decisions and satisfaction with public transport services. The link between mode choice tolerability and usage decisions was identified using Pearson's correlation coefficient analysis. The *principal component analysis* (PCA) identified three (3) main factors comprising 16 service dimensions influencing the choice of public transport. The *Kaiser-Meyer-Olkin* (KMO) and Barlett tests confirmed the sampling adequacy for each variable in each factor and the combined elements. The analyses quantified the association between variables and tourists' usage decisions. The relationship between satisfaction and the variables explained the variation in satisfaction with the quality aspects of public transportation. Thus, the findings expressly explained tourists' usual dissatisfaction with Lagos public transport system for leisure excursions.

Keywords: tourists; public transport; Lagos; leisure travel; satisfaction; usage intentions; destination

1. Introduction

Tourism offers innumerable social and economic benefits to resort towns and communities. These benefits include increased tourists spending, employment creation, accelerative GDP earnings, and infrastructural development of the local resort towns. Although several studies emphasized the negative impacts of tourism, especially on the environment. Prior investigation [1] noted that tourism generates 4.4% of global CO_2 and about 75% of this greenhouse gas emission emanates from transport usage for leisure excursions and other touristic purposes. Transport is a vital component in the tourism system, which has a significant influence on tourists' experiences at destinations. Meanwhile, available studies [2,3] affirmed that satisfaction with public transportation directly influenced tourists' satisfaction at destinations. Since public transport plays a significant role in urban tourism development and sustainability, it is important to provide better-quality public modes of transport to add value to the overall tourism experience. Public transport, through its role in the movement of leisure passengers decisively influences tourism outcomes. Conclusive evidence further confirmed that "public transport has direct and indirect impacts on leisure travel and sustaining urban tourism" [4].

Transportation is the most decisive component of the tourism system, which enables tourists to explore all the places that they desire to see [5]. Public transport is particularly sensitive to urban destinations and is mostly requested by tourists to visit specific leisure places, travel to historical sites, and travel for pleasure [6]. Excellent and attractive public transportation systems remain a prerequisite for sustainable tourism growth in urban cities. To promote public transport use for urban tourism, their services should be demand-oriented following a better understanding of tourists' behaviors towards urban shared transport at destinations [7]. Tourists' choices for public transport at destinations are consistent, while their preferences in favor of private transport services are diverse. Meanwhile, satisfaction with public transportation services significantly impacts local destination travel demands and the overall holiday experience.

This paper investigated the significant impact of public transport on tourism sustainability in Lagos, Nigeria. The African megacity is a renowned leisure destination with exciting touristic attractions but grapples with a continuous decline in tourist arrivals in recent years. Nwachukwu et al. [8] cited the receding tourism performance of Lagos, which the authors attributed to the failure of the existing public transport system to accommodate tourists' travel needs in the city. According to a 2019 survey [9], the unappealing shared urban transportation problems had a negative impact on the city's leisure marketing and destination image, forcing 53.16 percent of total tourists who desired public transportation to eventually perform their entire holiday travel using alternative mode choices. Unlike Mexico City, Mexico where 27.63 million international tourists were recorded as commuting hourly in 2019 using public transport, only 16% of them decidedly used private transportation [10]. Consequently, the declining use of public transport for tourism-related travel presented a multifaceted problem that will continue to have unfavorable effects on tourists' overall experiences and the tourism development of Lagos. Figure 1 presents the transport mode usage split of tourists to popular leisure locations in Lagos, which was occasioned by overlooked service items leading to the substitution of public transport with private automobiles. This eventually resulted in unexciting leisure pursuits, a poor destination experience, and a continued decline in visitor arrivals to Lagos to date.

Based on the identified problem, this paper aims to identify factors influencing the use of public transport among tourists in Lagos, Nigeria for leisure travel and tourism. This study also seeks to determine the relationship between tourists' perceptions of the existing public transport service

attributes and their motivations to use the mode choice for future sightseeing tours and overall holiday satisfaction in the city. This study will proffer answers to the following research questions:

1). What factors significantly influence tourists' decisions to use public transport for leisure time travel in Lagos, Nigeria?

2). How do tourists' perceptions of the existing public transport service attributes impact their motivations to embrace the mode choice?

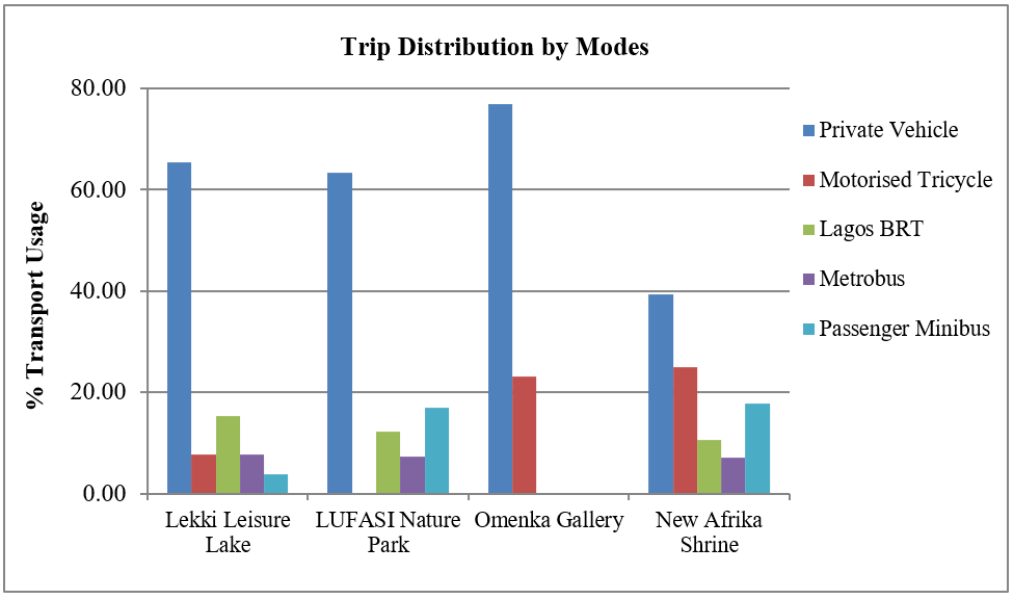

Figure 1. Tourists' modal split to popular Lagos leisure locations [9].

Comprehensive knowledge of tourists' satisfaction with public transport services is important in the transportation and tourism research domains [11]. Transportation planners and local governments can use this information to create and implement policies that make it easier for tourists to use public transportation to get around at tourist destinations. This prompted this study to conduct an exhaustive literature search into how tourists perceive transport at destinations and what factors motivate their decisions to use public transport for leisure travel and tourism.

As a result, Prayag et al. [12] considered tourists' satisfaction ratings of their leisure travel at destinations. The previous study, along with [13], designed constraint-based conceptual frameworks and used factor analyses to explore leisure travelers' satisfaction with public transport services in urban cities. The authors considered eleven (11) service quality aspects altogether, and eight of them were found to pose strong correlations between satisfaction and the frequency of use of urban transit systems for holiday travel at destinations. However, public transport is dominantly used in urban centers and many resort towns by tourists [14]. Recent research, e.g., Van Lierop et al. [15] and Hall et al. [16], indicated that public transportation users agreed to the use of sustainable modes based on their satisfaction with attributes such as *information*, *accessibility*, *safety*, *punctuality*, and *comfort*. Langkaweekate et al. [17] also found that visitors tend to be happier with public transportation in tourist resort villages but not so much in cities.

Preliminary analyses of transportation mode switching for leisure tourism travel at destinations revealed that service satisfaction variables influence sustainable mode choice usage decisions [16].

Additional evidence [18, 19] confirmed a strong correlation between mode choice usage decisions and public transportation service variables. This relationship also implies that unsatisfactory service quality aspects could have negative impacts on tourists' travel behavior and leisure activities while vacationing. The holiday satisfaction of German and Russian tourists visiting Alanya, Turkey was assessed, and the study concluded that tourists who switched to public transport are more satisfied than those who did not [20]. The past study further aligned with [21], which found that prior expectations are another critical factor influencing tourists' satisfaction with the public transportation experience at destinations.

It is evident that how tourists perceive public transport services in the city influences their decisions to use the mode choice for sightseeing tours and overall holiday satisfaction [2]. It is also important to know which factors influence their decisions. A five-year study on transport's role in fostering tourism in 27 European cities (between 2012 and 2017) reported that six (6) satisfaction dimensions derived from the analysis, which comprised several attribute-related statements [22]. The satisfaction dimension includes accessibility, information, comfort, aesthetics, the inner environment, and safety, which are found to influence tourists' satisfaction with public transport in EU cities. Though, the author's conclusion was inconsistent with reality in other non-EU cities, implying that tourists perceive public transport services differently at other global destinations. Certainly, several factors cause the variation in tourists' perceptions of public transport services. Hall et al. [16] and Langkaweekate et al. [17] agreed that these variations include those related to management (e.g., transit operators or providers) and individual behavior (e.g., culture and tradition).

Preceding discussions on factors influencing public transport satisfaction at destinations by *Le*-Klaehn & Hall [23] and Virkar & Mallya [24] named public *transit information*, *accessibility*, and *promptness* as additional facets influencing tourists' decisions to use the mode choice for leisure travel and tourism. Also, inadequate instructions and clues on visitors' use of public transport often resulted in lower satisfaction [25]. Irrefutably, unreliable services, along with overcrowding incidents and long waiting times at bus stops, also make public transport users dissatisfied [5].

Several service features of public transport were examined in the literature and the significant items measured varied accordingly. Service quality and perceived value should be greatly acknowledged to improve tourists' satisfaction [26]. Meanwhile, Prayag et al. [12] indicated the differences in tourists' perceptions between different transit operators on account of their specific characteristics and the service conditions. As revealed in the literature, the most significant satisfaction attributes across transit operators are public vehicle cleanliness, service frequency, transfer/interchange, information, and accessibility. Yet, the results varied with the transport systems. In a case study of visitors' satisfaction with public transport in Eskişehir in Turkiye, Yuksek et al. [2] identified two sets of service attributes. The first one is the sensitive quality factor, which *includes travel information*, *safety problems*, *visible condition*, and *comfort*. The second one is operability quality, which comprises *frequency*, *promptness*, *value*, and *ease of transfer* to other modes. The author believed that the operable factor was far more significant and should be given more attention to improving visitors' satisfaction using public transport.

Other studies, e.g., Van Lierop et al. [15] and [27], investigated tourists' satisfaction with public transport, and most of them focused on the travel mode usage experiences based on perceptive observance, e.g., *modesty and convenience*, *user connectivity*, *physical state*, and *safety* of public transportation. Meanwhile, only a few past studies critically examined the impact of consistency in quality service aspects such as *aesthetics*, *perceived fitness*, *reliability*, *inner environments*, and *responsiveness* on tourists' decisions to use public transport at holiday resorts.

Since the choice decision is a function of satisfaction, measuring tourists' satisfaction with public transport based on service quality and user experiences will be more beneficial to holiday destinations. Tourists possess complex perceptions and often exhibit diverse attitudes toward local destination transport services [21,28]. Meanwhile, several factors influence tourists' satisfaction with public transport at destinations. Related research, e.g., Herle [29], asserted that *accessibility*, *public vehicle information*, and *frequency* of using shared urban transportation are the most significant factors, while others such as tourists' social situation, travel behavior, and gender-based transport usage are less significant. Similarly, the study that identified cultural background as an important factor that strongly impacts tourists in Munich, Germany also found that British tourists are much more satisfied with local public transport services during their summer holidays than Germans and other European users [16]. The performance of public transport dimensions as measured showed the difference between local travelers' and overseas visitors' usage intentions.

Likewise, Pawlasová [14] studied the factors that influence satisfaction with public transport across Czech cities. The study explores the relationship between public transport performance and destination satisfaction. The findings revealed that visitors' ratings of public transportation performance significantly influenced their satisfaction with Czech resort towns. Likewise, available studies, e.g., Pérez Campdesuñer et al. [30], highlighted the importance of public transport's ease of use at destinations, which the authors inferred to have greater impacts on satisfaction than efficiency and safety. Public transport is an additional tourism product that adds value to tourists' experiences. Meanwhile, several visitors still decline to use public transport systems at destinations despite the huge public investment and touristic value of the mode choice [2]. It is essential for public transport to meet and even exceed tourists' expectations to encourage usage rates, as declared by Pawlasová [14] and Herle [29]. To attract more users, the transport service provider must understand tourists' behavior, motivation, and satisfaction with public transport.

2. Materials and methods

2.1. Literature review

The research methodology was finalized for this study following an evaluation of research procedures and strategies and their limitations. The process began with an extensive review of the literature. The literature review served two purposes.

Firstly, it provides the scope, covering existing theories, research, and evidence. Secondly, it supports the critical evaluation and discussion of the identified scope. The review of prior research and relevant literature led this study to acknowledge that the level of satisfaction with the existing local transport system features influences tourists' mode usage decisions. Figure 2 presents the flow diagram of the literature review process for studies on tourists' decisions to use public transport for leisure travel and tourism at destinations.

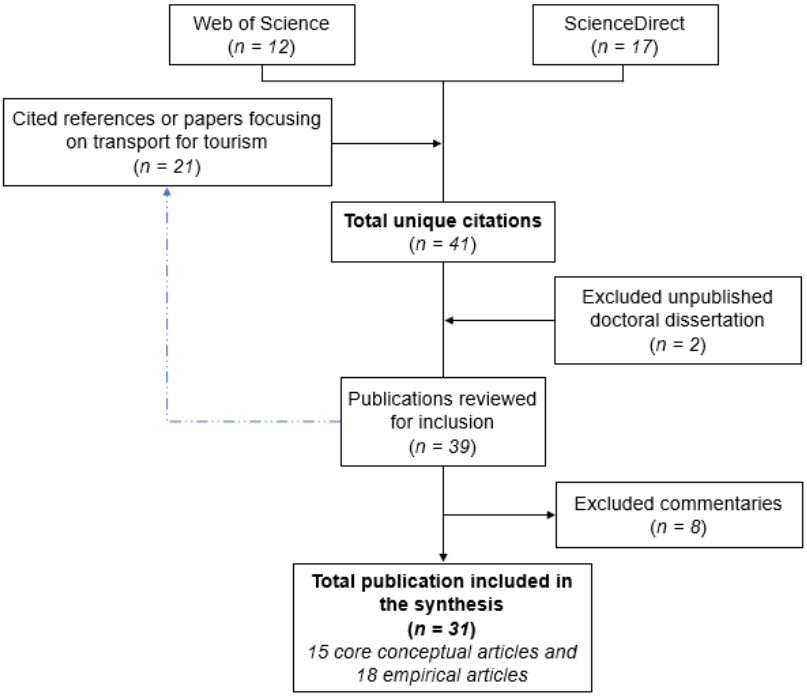

Figure 2. The Flow diagram of the literature review.

2.2. Data collection

2.2.1. Questionnaire survey

To actualize the aim of this study, a questionnaire-based survey method was used to collect data from the tourist population who were visitors to Lagos, Nigeria during the period of the survey. The target population was intercepted and sampled at four designated survey locations. The survey method chosen was deemed suitable to enable the inquiries conducted to reliably and carefully collect valid data for analysis. This enables the authors and research enumerators to cautiously investigate tourists' satisfaction with the service extent of the existing public transport system available for use for leisure travel and tourism in the iconic urban city. Since the geographical study area is a renowned destination with classical historical relevance, the questionnaire-based survey method was used, which is consistent with [13,25] travel behavior and destinations' transport usage satisfaction research. As a result, the questionnaire-based survey method was reckoned to help this study maximize the survey time specified and overcome cost limitations to conduct successful research. On these grounds, a closed-ended questionnaire was chosen as the ideal survey instrument design for this study for optimum research outcomes.

The survey was conducted between 6 August 2018 and 3 March 2019, following a successful preliminary examination of the surveyed locations. The tourist population intercepted comprised local tourists (visitors from other Nigerian provinces), sub-Saharan Africans, and international visitors to Lagos. The tourist population was directly sampled. The survey yielded an 85% useable questionnaire response rate and rejected 15% of incomplete survey responses.

Tourist populations are vast and surveying them must be done thoroughly. Therefore, the representative sampling strategy became incredibly useful to get insightful data from the survey.

Subsets of data from each group of tourists were obtained as part of the methodological process to portray similar characteristics across all the tourist groups studied. This is because a representative split of men and women across different groups during the survey helped this study assess responses based on gender and tourist groups to ensure consistency, diversity, and transparency. The survey questions presented to the respondents contained four (4) parts:

• Part 1 asks for "*personal information*" such as demographic survey questions to gain background information on each tourist's profile. The questions provided context for the collected survey data.

• Part 2 asks about "*trip information*," for example, the most useful questions that visitors are asked at destinations such as favorite places visited, who they travel with, travel preferences, etc.

• Part 3 asks "*transport mode evaluation*" questions that allow tourists to review and evaluate the transport mode for leisure travel in Lagos, the various means of transport they have used, their transportation mode decisions based on the evaluation of public transport mode characteristics, and the use of different transport modes in Lagos for leisure pursuits.

• Part 4 asks questions that focus on "*public transport mode usage*" versus "*destination holiday satisfaction*".

In tourists' behavioral and perception studies, e.g., [19] and [29], scale variables are divergently defined. Specifically, for this study, the scale was defined in relation to a multivariate (multiple-variable) frequency distribution. This study uses cross-tabulation frequency tables to describe the relationship between two categorical variables. The Chi-square Test of Independence was used to determine whether the variables are independent or related. The Chi-square test is sensitive to sample size and could not simply establish a causal relationship between the two variables.

2.3. Data analysis

The collected data were screened and analyzed in two stages. The first stage of the analysis focused on how satisfied tourists were with each existing aspect of public transportation. These service quality features were analyzed based on tourists' sensitivities and perceptions of the Lagos public transport service determinants. The second stage produced the *principal component analysis* (PCA) using the *Varimax orthogonal rotation* method. PCA was carefully considered to analyze the data and delineate the underlying service quality dimensions of Lagos public transport influencing tourists' usage satisfaction. The Varimax Orthogonal Rotation method only extracted factors having an eigenvalue greater than 1 and factor loadings greater than 0.5. Subsequently, Cronbach's alpha (a reliability analysis) was completed to assess the correlation between variables of each identified factor. All factors with α reliability above 0.50 were accepted for this study.

Furthermore, the correlation coefficient analysis (r) between tourists' classification (discrete) and satisfaction (continuous) was done to determine if the linear relationship in the dataset was strong enough to pattern a relationship in the tourist population.

3. Results

The results from the inquiries conducted and successive analyses are presented in the sub-sections below. The decisive outcomes as well as the ideal interpretations from the investigative study were genuinely summarized.

3.1. Respondent profiles

This study used the stratified random technique to sample the core respondents, yielding 222 usable survey responses for analysis. The statistical summary revealed that 51.4% of the total respondents surveyed were male and 48.6% were female, indicating a gender-based use of transportation for touristic travel in Lagos. The result also indicated an overrepresentation of respondents in the age bracket of 28–37 years old, who are 40% of the tourist population who use various forms of transportation in Lagos and are educated. Thus, 41.9% of them completed university/college degrees, and 14% possessed postgraduate qualifications. India has the overall highest population of international visitors to Lagos–Nigeria, followed by China, the United States of America, Pakistan, and the United Arab Emirates. In the category of sub-Saharan African nations, Cameroon emerged as the country with the highest number of visitors to Lagos, followed by the Republic of South Africa, Ethiopia, Ghana, Mali, and Niger. Meanwhile, none of the respondents have disabilities or indicated health restrictions regarding the use of the local public transport system.

Exactly 50.9% of the respondents are first-time visitors to the city, most of whom are sub-Saharan African tourists and other international visitors. Thus, 49.1% of the tourist population surveyed are returning visitors to Lagos, while 62% of the respondents are multi-destination travelers, and 38% performed mono-destination trips to Lagos for leisure vacations. The maximum duration of stay is 40 days, and the tourists spent a minimum of 5 nights in the city, while the average length of stay is 13.7 days with a deviation of 8.7 days. Most of the visitors were accompanied by friends, partners, colleagues, and family to experience the unique cultural activities, restaurants and dining, attractions, shopping, and entertainment of Lagos.

3.2. Tourists' satisfaction with the public transit system

Respondents were invited and asked to rate their satisfaction with existing public transport based on eighteen (18) service quality dimensions. The survey data collected were tested for statistical significance. For statistical hypothesis testing, Pearson *chi-square* tests if there are significant differences between the observed and expected frequencies in one or more categories. This is very critical for crosstab analysis to ensure that the *crosstab* representation of the findings is true or false. Accordingly, *Chi-square* analysis is conducted along with crosstab analysis to determine if the variables under study are independent of or related to each other. On one hand, if the two analyzed items are independent, the tabulation result becomes insignificant and could be considered a null hypothesis. In this case, the analytical outcome becomes unreliable. On the other hand, if a relationship exists between the two elements, that will underline that the tabulation results are significant, and the outcome is reliable to make analytical decisions.

However, the cross-tabulations analytical method evaluated the relationship between tourists' satisfaction and public transport service variables. The visitors were generally dissatisfied with most of the Lagos public transport service aspects. Almost all the items (except transport fare, affordability, and promptness) have satisfaction rating scores below 46% (mostly dissatisfied). Travel information, safety, accessibility, transfer or interchange, comfort at bus stops and in vehicles, value for money, and other aspects of the Lagos public transportation service elicited strong disapproval (satisfaction index ≤ 46.00, highly dissatisfied). The items that received the lowest scores were severally mentioned in the respondents' comments and suggestions for service quality improvement. Besides the tourists'

satisfaction rating of different public transport services aspects, the visitors were also invited to rate their overall satisfaction with the sustainable mode choice. Findings revealed a high level of dissatisfaction with aspects of Lagos public transportation, with lower satisfaction scores. The respondents' perceptions of Lagos public transport cleanliness, as shown in Table 1 revealed that 33.3% of the total respondents who are dissatisfied with Lagos public transport cleanliness are strongly dissatisfied with the local transit mode for leisure trips in the city.

Table 1. Crosstab assessment of cleanliness versus choice.

Tourists satisfaction score		Public transport cleanliness					Total
		Unsatisfactory	Poor	Fair	Satisfactory	Excellent	
Dissatisfied	%	0.0	33.3	33.3	33.3	0.0	100.0
Neutral	%	9.1	47.9	31.4	9.9	1.7	100.0
Fairly satisfied	%	5.4	19.6	56.5	16.3	2.2	100.0
Strongly satisfied	%	0.0	0.0	100.0	0.0	0.0	100.0
Total	%	7.2	34.7	43.7	12.6	1.8	100.0

Moreover, 47.9% of the respondents who hold neutral perceptions towards usage decisions to perform leisure travel using Lagos public transport expressed poor satisfaction with the cleanliness aspect of the transport mode. The public transport's cleanliness was perceived as satisfactory, while 41.9% of the respondents were dissatisfied with this aspect. The significant relationship between the two nominal variables was further analyzed and the result is summarized in Table 2.

Table 2. Pearson Chi-Square statistical test for association.

Public transport cleanliness	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-square	31.706a	12	.002
Likelihood ratio	34.473	12	.001
Linear-by-linear association	11.016	1	.001
N of valid cases	222		

The summary of the analytical test shows that the *p*-value obtained is less than the desired critical value $\alpha = 0.05$, $P = 0.002$. According to the findings, there is a significant association between tourists' decisions to use public transportation and transports cleanliness for enjoyable holiday travel in Lagos (X^2 (1) = 31.71, $p < .05$). Since the *p*-value is less than the acceptable significance level, this study rejects the null hypothesis. The result validates cleanliness as a factor influencing tourists' motivation to use local transport for leisure travel in Lagos. Finally, 43.7% of the total respondents are fairly satisfied and 33.4% are dissatisfied with the public transport's cleanliness.

Each item was analyzed as described in Tables 1 and 2. The *p*-value justifies the significance of each service item evaluated, and the Chi-square test validates the bivariate relationship between tourists' satisfaction and each service item.

Table 3 shows the service item correlation (in order of importance) premised on tourists' satisfaction with individual service quality items. Where {Crosstab is the "cross tabulation satisfaction score", L_R is the "Likelihood Ratio", $^{(y \propto x)}$Assc. represents "linear-by-linear association", χ^2 Test represents "Chi-square Test", and $P \leq 0.05$ represents "*p*-value significance"}.

Table 3. Bivariate correlation coefficient test analysis.

Public transport attributes	Crosstab	LR	(y∝x)Assc.	χ2 Test	P ≤ 0.05
Ease of transfer	19.80	42.414	8.480	42.762a	0.00
Overloading	8.60	22.942	12.056	20.572a	0.05
Transport fare	68.53	36.221	20.809	42.109a	0.00
Promptness	53.10	33.291	11.278	33.283a	0.00
Trip frequency	45.50	11.790	4.207	9.863a	0.23
Accessibility	28.40	24.412	6.921	28.406a	0.02
Dependability	16.30	26.537	3.078	25.311a	0.01
Travel information	6.30	29.584	19.759	27.340a	0.00
Vehicle appearance	8.61	48.065	37.346	44.023a	0.00
Aesthetic	15.30	36.883	29.884	32.835a	0.00
Affordability	61.30	35.629	18.166	31.749a	0.00
Cleanliness	14.10	34.473	11.016	31.706a	0.00
Value for money	37.80	30.775	21.887	31.541a	0.00
Comfort	14.40	26.129	16.862	24.291a	0.00
Travel convenience	2.70	13.289	7.740	11.909a	0.15
Suitability/Fitness	8.10	25.382	18.613	24.869a	0.00
Internal ambiance	9.00	53.726	17.570	47.791a	0.00
Safety	3.60	58.340	52.249	58.349a	0.00

The public transport service attributes revealed through the test statistics results and hypothesis tests summarized in Table 1 indicate that most of the service attributes have *p*-values lower than the significance level (0.05). The *p*-value (probability that a Chi-square statistic has 2 degrees of freedom) is significant for most of the items analyzed. Thus, sixteen (16) aspects of service quality were recognized to significantly influence tourists' decisions to acceptably adopt Lagos public transport services for satisfactory sightseeing tours. The two service items, namely, "trip frequency" and "travel convenience", do not have the required significant relationships with their *p*-values higher than the 0.05 significance level.

3.3. Predictive models: Dimensional data reduction analysis

Consequently, *principal component analysis* (PCA) was adjudged suitable to identify factors influencing Lagos public transport usage decisions. The analytical method reduced the dimensionality of the correlated variables into a small set of factors that still contain the identified variables while increasing the interpretability of the datasets and simultaneously minimizing the loss of information. The purpose is to create new uncorrelated variables that successively maximize variances. This analysis further helped in realizing the research objective of this study by reducing the correlated variables (16 service quality items) into sets of principal components using SPSS 24.0 and describing the variance-covariance structure of the variables set using linear combinations.

The linear composites' extraction of observed variables aided this research to establish the mutual connections between the correlated variables and the latent variables. The observed variables are subsequently modeled as latent factors of linear combinations. PCA analyzed the variables' relationships by abstracting the variables into smaller, interpretable underlying factors. Meanwhile,

each of the constructs was measured by weighting the factor loading value of each measuring item using the *Kaiser-Meyer-Olkin* (KMO) test to determine the suitability of the collected data for PCA and test the adequacy of each analyzed variable (Table 4). The KMO test statistically determines sampling adequacy for each variable in each factor and the combined factors. The statistical test consists of the proportion of variance measured among variables that might have a common variance.

Barlett's test was done to observe if the *p*-value corresponds to the test statistic. Bartlett's test was used to determine whether the variance weights of public transport service attributes tested are the same for all control groups and to evaluate the k samples from populations' variances. This test determines whether the *p*-value was less than the significance level ($\alpha = 0.05$) so that the null hypothesis can be rejected to infer that not all factors have the same variance. The findings showed that the sixteen (16) attributes tested are significant ($\chi^2 = 2026.69$, $p < 0.05$), and the KMO value of 0.925 obtained is higher than 0.6 as recommended. The tests affirmed that all items tested are suitable for further analysis and that the sample is adequate for structural detection.

Table 4. KMO and Bartlett's test.

Kaiser-Meyer-Olkin measure of sampling adequacy.		.925
Bartlett's test of Sphericity	Approx. Chi-square	2026.694
	Df	120
	Sig.	.000

Table 5. Variable communalities.

Service quality item	Items	Initial extraction
Accessibility	.629	.629
Dependability	.552	.552
Ease of transfers	.557	.557
Transport fare	.622	.622
Overloading	.631	.631
Promptness	.676	.676
Travel information	.590	.590
Vehicle appearance	.646	.646
Aesthetics	.729	.729
Affordability	.591	.591
Cleanliness	.583	.583
Comfort	.720	.720
Suitability/Fitness	.662	.662
Safety	.695	.695
Internal ambiance	.677	.677
Value for money	.636	.636

Note: Extraction method: Principal component analysis.

In any case, where Bartlett's test was found to be insignificant, the null hypothesis will be rejected, and the study can then conclude the variance is not the same across the classifications. The k is the

number of random samples that were each drawn from independent normal distributions. In variable reduction analysis, there are equal numbers of variables as there are factors, and each factor attracts a consistent overall variance from the observed variables.

This study classified these factors based on their explained variations, as shown in Table 5. The communalities index describes how much variance in the variables is accounted for by the extracted factors. Higher extraction values represent variables that satisfactorily fit, while variables with small values that did not fit were dropped from the analysis.

Observably, the extracted components explained 72.0% of the variance in transportation service items, and the same was true for other factor items.

The eigenvalue measures the quantity of the variance of the observed variables that each item describes. However, service items with eigenvalue ≥ 1 are statistically relevant (i.e., explain more variance than a single observed variable) and were selected for further analyses, while items with insignificant variance were discarded. The total variance explained in Table 6 indicates all the elements extracted from the analysis with their eigenvalues, the percentile of variance attributable to each factor, and the cumulative variance of the factors. From the analytical overview, three (3) factors were identified as having eigenvalues greater than 1. The three overall factors combined the sixteen items that made it through the initial hypothesis testing. Thus, the percentage of variance and degree of discernible variability of the factors and their cumulative squared loadings extraction account for 61% of the total variance shown by the factors.

Table 6. Summary of total variance findings.

Component	Initial eigenvalues			Extraction sums of squared loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	8.419	46.770	46.770	8.419	46.770	46.770
2	1.579	8.771	55.541	1.579	8.771	55.541
3	1.087	6.037	61.578	1.087	6.037	61.578
4	.863	4.795	66.373			
5	.739	4.106	70.479			
6	.653	3.628	74.107			
7	.617	3.427	77.535			
8	.595	3.308	80.842			
9	.527	2.930	83.772			
10	.508	2.824	86.597			
11	.422	2.346	88.943			
12	.379	2.104	91.046			
13	.346	1.922	92.969			
14	.318	1.765	94.734			
15	.279	1.548	96.282			
16	.261	1.450	97.732			

The 16 service quality dimensions were reduced to three significant factors, and each factor was identified based on the relevance of the individual items it combined.

Varimax rotation optimizes the variance summation of the squared loadings, in which all the coefficients are either larger or tend to zero, with only a few intermediate values correlating each

variable to at most one factor. The rotation component matrix diminishes the service variables into small factors that enable the variables to have high loadings, as shown in Table 7. The rotated component matrix represents factor summarization by categorizing factors that have similar characteristics. It was affirmed by Pallant [31] that significant factors can be recognized in the rotated component matrix. Thus, the variables are classified and thereafter dissolved into three (3) main factors that are subsequently specified. The reliability test for the specified factors showed that the test statistics produced higher values, which implies the permissibility of the data set and guarantees consistency (i.e., Cronbach's Alpha value ≥ 0.7). The reliability of the generated factors is within an acceptable range.

Table 7. Summary of factor (rotated component matrix[a]).

Public transport items	Factor component		
	Factor 1 (*SRP*)	*Factor 2* (*TFSA*)	Factor 3 (*PSCV*)
Accessibility	.417	.041	.674
Dependability	.459	.205	.547
Ease of transfers	.598	.248	.372
Transport fare	.700	.284	.306
Overloading	.773	.112	.104
Promptness	.756	.286	.150
Travel information	.540	.212	.504
Vehicle appearance	.371	.487	.521
Aesthetics	.398	.482	.582
Affordability	.043	.319	.698
Cleanliness	.158	.186	.723
Comfort	.365	.582	.497
Suitability/Fitness	.331	.736	.104
Safety	.384	.672	.309
Internal ambiance	.153	.801	.108
Value for money	.049	.710	.360

Notes: Extraction method: Principal component analysis; Rotation method: Varimax with Kaiser Normalization; a. Rotation converged in 6 iterations. *SRP* = Service responsiveness and pricing; *TFSA* = Transit feature safety and comfort assurance for passengers; *PSCV* = Service and vehicle attributes available to passengers.

Factor 1 is identified as the *Service Responsiveness and Pricing* (**SRP**) factor, comprised of five variables that reflect the condition and judgement of the public vehicles from tourists' cognitions. This new finding maximally agrees with Prayag et al. [12] study that examined three clusters of visitors based on their service expectations and profile and Ramos et al. [26] article that presented the outcomes of users' expectations of public transportation in metropolitan areas. These studies provided deeper insights into attitudes toward public transport and users' perceptions of the service components. The key findings in both studies agreed that public transport usage would increase if service responsiveness met users' expectations and a better connection was drawn between public transport users and responsive service items. The authors offered recommendations for managing expectations and public transport service response for city commuters. The SRP has a reliability coefficient of.821, accounting

for 32.9% of the total variance. This is consistent with the recommendations of Parahoo et al. [21]. This factor has a Cronbach's alpha value higher than the recommended 0.7 reliability value. Thus, SRP is a reliable factor that critically influences tourists' satisfaction, acceptance, and decisions to use local public transport options for leisure travel in Lagos.

Factor 2, identified as *Transit Features and Service Accessibility* (**TFSA**), has six items that describe different service aspects and therefore remain a significant factor influencing tourists' choice decisions on public transport use. This statement agrees with Rebstock [22] conclusion that satisfaction with critical service items remains the key factor that influences tourists' loyalty to public city transport and with Pawlasová [14] identification of service accessibility qualities comprising easier access, user-friendliness, and affordability as the most important factors influencing satisfaction with public transport in Czech Republic cities. The TFSA factor has a reliability coefficient value of .872, which explains 30.0% of the total variance, which agrees with Pawlasová [14], who used factor analysis and the Varimax method to categorize variables according to their mutual relations, and Parahoo et al. [21], who used structural equation modeling to evaluate factors and validate the model, which observed variables that influence tourists' satisfaction in Dubai. Consequently, the Cronbach value obtained for the TFSA is higher than the recommended value of 0.7 and is deemed a reliable factor.

Factor 3, which is interpreted as the *Perceived Safety, Comfort and Value-for-Money* (**PSCV**), has a reliability coefficient (*Cronbach's alpha*) value of 0.864. The factor comprised five aspects indicative of the perceived comfort, safety, fitness, internal environment, and the price-quality ratio of the public vehicles, which explains 24.2% of the total variance. Therefore, PSCV is again a reliable factor influencing tourists' use of the transport services for tourism-related travel and pleasurable holiday experiences in Lagos, which strongly supports Nwachukwu et al. [8] research that examined tourists' perceptions of public transport services in Lagos using descriptive statistics, principal component analysis, and discriminant function analysis. The author's study concluded that tourists were not satisfied with public transport services in the city based on the PSCV service quality items identified in this present study. Prayag et al. [12] research outcomes also agree with this conclusion.

3.4. Satisfaction and service variables relationship

The relationship between satisfaction and other variables (tourists' satisfaction with public transport and the quality variables) was tested using *Kaiser-Meyer-Olkin* (KMO) and Bartlett's tests confirmed that satisfaction with Lagos public transport was dependent on demographic and service quality elements of the public transport.

In particular, there is a slight connection between tourists' classification and their degree of satisfaction with Lagos public transport. The correlation coefficient produced a coefficient ($r = 0.159$), which inferred that the correlation coefficient was significantly greater than zero. This suggested that local and sub-Saharan African visitors are more inclined to be fairly satisfied with Lagos public transport than international visitors, who are less satisfied. The critical comparison coincides with the tourist groups' perception of public transport service quality aspects moderately influencing their satisfaction. Thus, the overall assessment attests that the more attractive public transport service seems to respondents, the more satisfied they are.

4. Discussion

The overall result affirmed that Lagos public transport providers are often preoccupied with the conventional operation of the urban transit system, whereas the tourist population held higher sensitivities and concerns for factors influencing their satisfaction with the viable mode choice. Transport remains an essential element in the tourism system, and tourism cannot exist without public transport at destinations. The analyses supported the relationship between the factors and the level of satisfaction. *Pearson's correlation coefficient* and *correlation analyses* quantified the association between the two continuous variables. It was also noted that an association between two variables does not necessarily mean that one variable explains the other. There could be a third factor (a confounding variable) influencing the variables. The literature recalled using public transportation as tourists' transport at destinations.

Thus, understanding tourists' perceptions of public transport at a destination is important for sustainable mobility, destination satisfaction, and public transport improvement. The data obtained enlightened that several tourists only visited places they were lucky enough to visit in Lagos, and this study's outcome is convincing that more places could be visited if public transportation were attractive and satisfactory for leisure travel. This does not apply to visitors in rural areas where the need for a private car to get around will be inevitable. However, in a major city like Lagos, tourists taking cabs or private cars to work is not so much a luxury as it is a disservice to the tourism industry. The international tourists also remarked how easy, cheap, and convenient it was to take public buses and trains in several cities visited around the world, unlike Lagos. Meanwhile, existing public transportation in Lagos is accessible, but many international tourists find it unattractive to use. This study identified tourists among public commuters using public transportation for leisure purposes, and the focus has not been on tourists who used public transport. This position could be different from non-leisure travelers desiring private cars at a destination for nothing but privacy. In Lagos, private transport service is not quicker or cheaper, but it has replaced public transport as tourists transport in the city.

Factor 1 (SRP) which comprised ease of transfers, overloading, transport fares, promptness, and travel information mirrored the condition of the public transport from tourists' cognitions and explained their dissatisfaction with the mode choice for expansive leisure travel and tourism in Lagos. The responsiveness of service and pricing was found to have had a significant impact on leisure visitors' motivations to use the existing public transportation system for pleasurable travel experiences in the iconic destination.

Factor 2 (TFSA) which comprised accessibility, dependability, vehicle appearance, aesthetics, affordability, and cleanliness was predicated on tourists' sensitivities and awareness of Lagos public transport service attributes that influence their decisions to adopt the mode choice for exhaustive holiday travel. Similarly, Factor 3 (PSCV) includes four service aspects: suitability/fitness, safety, the interior ambiance of public vehicles, and value for money.

The correlation coefficient is believed to be significant as there is sufficient evidence to conclude that there is a significant linear relationship between tourists' classification and satisfaction with the public transport factors identified because r is significantly greater than zero ($r > 0$). Testing the significance of the correlation coefficient aims to help this study determine the linear relationship to use to model the relationship in the tourist population toward satisfaction with public transport. The classification of tourists is an unmeasured element in this study. In the sociology of tourism, tourists are classified into types based on the degree of familiarity and novelty they seek. The satisfaction of

tourists portrayed their fulfillment with important destination components, which public transport symbolizes. The degree to which different tourist groups perceive the components of a destination may differ, but it must significantly surpass their expectations for those attributes to be satisfactory. The conclusion indicates that there is a significant linear relationship between tourists' classification and satisfaction.

5. Conclusions

It is amply understood that tourism in urban cities cannot survive without sustainable urban transportation. Thus, sustainable tourism is a function of sustainable mobility, which is dependent on public transport services. However, limited information on tourists' satisfaction with public transport at destinations prompted this study to seek an understanding of service quality factors that significantly influence tourists' decisions to use the sustainable mode of transportation for satisfactory holiday experiences in Lagos. The three (3) service factors identified were reliable and valid for the tourist groups surveyed and influenced their perceptions about Lagos public transport. The visitors were mostly dissatisfied with the urban transit system's promptness, dependability, cleanliness, transfer/interchanges, and accessibility. These aspects of service quality require attention and further improvement. Finally, improving tourists' satisfaction with public transport is greatly important to the future tourism development of Lagos.

The analyses of the survey respondents' demographic records explained the frequency of respondent ages, and the statistical result revealed that tourists in the age range of 28–37 have an over-representation, implying that tourists to Lagos are in the active age range. Meanwhile, other sources of information (i.e., official records of visitors) to the city were not obtained from or made available by the Lagos Ministry of Tourism at the time of the survey and data collection to support this statement. Pearson's correlation coefficient was regarded as a notable case of the multivariate linear correlation coefficient for both sets of variables. Linear correlation helped this study measure the degree of association between the two variables that are assumed to have a linear relationship. The "*Linear-by-Linear Association*" statistics and the correlation coefficient (r) determined the direction and strength of a linear relationship between the quantitative variables.

The rotation of factors via Varimax Rotation was perceived to improve the analysis in this study because the technique uses mathematical algorithms to maximize high-and-low value factor loadings while minimizing mid-value factor loadings. Meanwhile, future studies should specifically explore the use of oblique rotation methods, which are frequently flawless and realistic in most transportation and social sciences research. Since variables are usually interconnected and some degree of relationship between the factors is to be expected, oblique rotations do not incorrectly constrain the inter-factor correlations to zero but rather freely estimate them, which makes them the appropriate choice. Furthermore, when factors are not trivially related, orthogonal rotations do not produce simpler solutions.

5.1. Limitation

Further studies are needed to strongly explore tourists' transport usage psychology and behavior from the viewpoint of public transit service delivery. This will provide a better knowledge of tourists' psycho-social behavior and response to aspects of transport services and an understanding of how to

improve tourists' holiday experiences in Lagos and other developing cities. Future research should also investigate public transport practices and effective policies that would improve the service delivery of existing public transport systems to discourage a modal shift to alternative mode choices. However, the significance of bivariate analyses cannot be overlooked, and future studies should consider this as one of the limitations of this present study. This study focused on correlation analysis, whereas multiple linear regression analysis could predict the value of one variable based on the values of another. The correlation analysis aimed to compare functions and calculate the variable relationship with respect to tourists' satisfaction, which was strongly believed to majorly influence choice decisions, whereas multiple linear regression would further determine whether each public transport aspect analyzed affects satisfaction.

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Conflict of interest

The authors declare no conflict of interest. This is to certify that there are no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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