Assessment of the Relationship between Intercity Public Transport Service Quality and the Service Attributes

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ABSTRACT

The study assessed the relationship between intercity public transport service quality and the attributes of public transport services. The focus of the study was to ascertain the coefficients of passenger comfort, passenger safety, travel punctuality, public transport service information, and crew quality of intercity public transport operators as key attributes of public transport service quality. The study also established the degree of passenger comfort, safety, punctuality, service information and crew quality of public transport operators in Imo State on intercity public transport service quality. The study used survey research design in which primary data was obtained and used in the study. In particular, questionnaires were used as survey instruments to obtained data from selected intercity public transport passengers. The sampled operators include Good is Good Motors (GIGM), Heartland Travels, LIBRA Motors, EKESONS Transport, CHISCO Transport, GUO Transport, Young Shall Grow Motors, and ABC Transport. The study used the principal component factor analysis method and the log-linear multiple regression analysis to analyze the data obtained. The findings of the study indicate that GIGM has the highest comfort coefficient of 79.82% followed by ABC transport with mean comfort score of 79.32%. CHISCO Transport had the least comfort with mean comfort score of 52.8%. GIGM also offered the highest level of safety with a mean safety coefficient of 75.2%. This was followed by ABC transport with mean safety score of 71.9% while Young Shall Grow with mean safety score of 57.4% had the least safety coefficient. The result of the study indicates that for each individual intercity travel operators, the r-square which measures the explanatory power of the relations is above 50% (71%>53.1%>50%). For example, GIGM has r-square of 53.1%, indicating that about 53.1% variations in service quality of GIGM on the Owerri-Lagos route and Owerri-Abuja route is explained by passenger comfort, crew quality, safety, punctuality and travel information. The main contributions of the study is that public transport the operators that offer the highest level of comfort, safety and punctuality in service delivery have the highest service quality scores which also influences positively the extent of passenger patronage for their services. It was recommended that operators should improve the identified significant

factors of service attributes in order to improve intercity public transport service quality on Owerr-Abuja and Owerri-Lagos corridors.

Keywords: intercity-travel, service-quality, public transport, service-attributes, passenger-satisfaction

1. Background of the Study

Public transport service in most cities in Nigeria over the years have faced development challenges such that dissatisfaction of passengers with public service delivery, infrastructure, customer relations, among other things led to the preference for the use of private cars and other sub-modes. The effects of this is the traffic congestion challenges that has often times greeted most city roads and streets in Nigeria. Consequently, the patronage to public transport operators continue to decline as passengers in the intra city sub-sector opt for the use of Para-transit modes such as the tricycles and motorcycles, etc. This decline is linked to issues related to service quality which are perceived as poor and below average.

In the intercity travel sub-route, it is not all categories of individual intercity travelers that have income capacity to use the private car mode. Safety concerns also limit travelers with income capacity to use the private mode from using it to meet their intercity travel needs. Thus, despite the perceived poor quality of services rendered by the major operators and service providers in the intercity public transport sub-sector, travelers have limited or few options for changing their choice of operator, travel mode, or pattern. This is even worse with the lack of passenger rail transport infrastructure and services linking most Nigerian city centers [1].

The implication is that the intercity public transport service attributes, including passenger comfort, passenger safety, punctuality, service information, and crew/driver cum driving quality, arrival and departure time, and pattern of response to complaints, based on which intercity travelers chose service operators to travel with, are neglected by most operators to the disadvantage of the passengers. The passengers consequently lose value for the fare paid to consume public transport services. Intercity public transport service quality is jeopardized when the service attributes are neglected and not improved upon.

Though it seems that most intercity public service travel providers offers less value to the passengers, studies have found that service providers that offer improved quality of services by improving the identified service quality attributes gain higher patronage. By implication, intercity public transport service providers in Nigeria can actually compete for passenger patronage on the basis of the quality of services rendered and the extent of improvement in service quality attributes. This is the singular right completion strategy that is obtainable in a free and competitive public transport sector; otherwise, it suggests a collusive approach in the sector where almost all operators refuse to improve service quality in the situation that travelers have no alternative travel modes to meet their travel needs [2], [3].

To overcome the challenges of rendering poor quality of service to intercity passengers relative to the high travel fare paid by travelers, intercity public transport operators need to have empirical knowledge and information of what constitutes their current performances with regards to service.quality

attributes. Therefore, empirical knowledge on intercity travelers perceptions of the level of comfort, passenger safety, punctuality (departure and arrival time of journey relative to what operators promised before journey), service information, which involves the ability of the service to provide accurate and reliable route and travel information about the services to the customers before and during the journey, and crew quality, which involves matters of crew empathy, assistance, and support to passengers, among other attributes of public transport service delivery, needs to be provided. These service attributes have effects on the passenger's perception of service quality; the effects of these service attributes on intercity public transport service quality are lacking in available empirical literature over the years. These gaps in knowledge need to be determined.

The significance of this is that it will provide empirical knowledge of the extent of influence of public transport service attributes on traveler's perceptions of the quality of services rendered by public transport service providers. This will subsequently guide the intercity public transport service providers to develop policies and strategies to actualize improvement in the quality of public transport services provided to the Nigerian public. It would also guarantee that intercity travelers get value for the fare paid to travel by the intercity public transport mode [4].

In line with the aforementioned challenges, the following objectives have been identified to be achieved by the study include:

i. To ascertain the coefficients of passenger comfort, passenger safety, travel punctuality, public transport service information, and crew quality of intercity public transport operators as key attributes of public transport service quality, from the perspectives of the passengers.
ii. To establish the effects of passenger comfort, safety, punctuality, service information and crew quality attributes of service quality of public transport operators in Imo State on intercity public transport service quality

2. Literature Review

Zeithamal, Bery and Parasuraman [4] posit that public transportation is comprised of transport facilities which passengers don't use for personal means of transportation, which may include shared-taxis, mini buses, luxurious buses and trains. Passengers cherish the use of public transportation due to the fact that it permits them to move from one location to the other with ease. The enhancement of the quality of life in societies in relation to safety, efficient and inexpensive transportation services are most of the functions performed by public transportation [4].

Gilbert and Forester [5], Nwokedi et al. [6] and Ojo, Mireku and Dauda [7], listed in their studies, the variables leading to the choice of public bus travel which are summed up in the table below. There exist numerous alternatives available to public bus service, which include auto rickshaws, share autos and call taxis. But the passengers at times prefer the public bus services due to several benefits accrued to using public bus transportation.

Table 1. Variable leading to choice of Public Bus Travel

S/No	Variables	S/No	Variables
1	Access	7	Comfort
2	Fare	8	Waiting time
3	Number of Bus Stops	9	Availability
4	Speed	10	Safety
5	Frequency of service	11	Distance to Travel
6	Waiting Time	12	Transit Network

(Source: Stopher *et al.,* 2004, Gilbert, 2007)

Bus service quality in relation to passengers is examined under three main headings namely: core service quality [8]; value added service quality [9]; and critical service quality [10], [11]. These opinions underscore the importance of considering quality of services rendered by intercity public transport service providers in assessing traveler's perceptions of value for money, created by individual service providers, which equally have implications on passengers' satisfaction for services consumed and patronage for services. Table 2 below itemizes the sub-component factors of intercity public transport service attributes that influence the quality of services rendered by service providers.

Table 2. Variables of added value service quality variable

S/No	Variables	S/No	Variables
I	Comfort and convenience	3	Neatness and Professionalism
1	Correct loading	4	Crew Courtesy
2	Better seating Arrangement	IV	Service Information
3	Ease of Boarding and Alighting	1	Route Information
4	Ease of Movement	2	Announcement of Stops
5	Quick service	3	Complaint Redressal
II	Safety	V	Special Responsibility
1	Maintenance of Vehicles	1	Special Trips
2	Probability of Breakdown	2	Cheaper
3	Probability of Accident	3	Helping Attitude
4	Driving	IV	Punctuality
III	Crew Quality	1	Journey Time
1	Better Crew Attitude	2	Departure and Arrival Time
2	Better Crew Appearance	3	Stops at Regular Interval

(Source: reference [9]

These attributes of public transport service are identified to have implications on passengers' perceptions of the quality of services rendered or being rendered by service providers. The implication is that negligence of and non-improvement in the service attributes could hamper service quality levels and lead to customer dissatisfaction with public transport services provided by operators.

Zeithamal, Bery and Parasuraman [4] measured the quality of public transport services with the help of the attributes related to the given dimension namely; reliability, responsiveness, assurance, tangible and empathy, while [12], applied the 30 variables related to physical comfort, time and punctuality, safety responsibility to assess the service quality of bus transport.

Some other studies in relations to the measure of service quality of public bus travel are: [13], [2] and [14].

Moreover, value has varied meanings to customers. To some, the value could mean price (e.g. what is the value of this vehicle), while to others, the value may mean benefits (i.e. the value I got from this vehicle), the worth of something [15]. Others may prefer money for value, meaning that they are willing to pay for what they consider as benefits as from a brand or a better product [15].

From the point of dictionary, it means the regard that something is held to deserve, the importance, worth, usefulness, utility, practicality, advantage, desirability, benefit, gain, profit, good service, etc.

Zeithamal and Bitner [15] define customers as the perception of what a product or service is worth to customer with respect to the possible alternative. While Mishra et al. (2010), posits that customer value on the service is the outcome of comparison between the customers perception of the benefits and the cost of the service they availed. Nwokedi, Onwuegbuchunam, Ejem and Tochukwu [16] listed the benefits as product, service and company benefits while the costs are time, search convenience and psychic costs on the services. Customers use the product or the service but in all cases do not buy the product or service. The perception of customers about the value of a product or service influences the buying evaluation and decision about the quality of the product or service [16]. There are sources of value; use, esteem and exchange value. Zeithamal and Bitner [15] and Somayajulu [17] measured customer value on service using the following variables in the table below.

Table 3. Variables in customer value on services

S/No	Variables	S/No	Variables
1	Economy of service	6.	Innovative
2	Comfortableness in Service	7	Interior Design
3	Cheaper	8	Opportunity Cost
4	Ambience	9	Value Addition
5	Luxuries		

(Source: Reference [17]

It is obvious that available empirical studies are in agreement that public transport service attributes such as comfort, safety, punctuality (travel time), crew quality, among other influence passengers perception of public transport service quality as well as choice of service providers and travel mode. However, there is no empirical study has been able to determined what constitute the coefficients of the public transport service attributes in any given City in Nigeria as basis for seeking improvement in quality of public transport services rendered by intercity public transport service providers. The influences of these public transport service attributes on passenger perceptions of quality of services rendered by operators is equally lacking in available empirical literatures. These are the knowledge gaps which the study is determined to bridge in line with the objectives of the study.

2.1 Data and Methods

The study area of the research is the Nigeria public transport sector with particular emphasis on intercity public transport operators in Imo state Nigeria. The study used selected major intercity public transport service providers in Imo state Nigeria to determine the coefficients of passenger comfort /utility improvement factors, passenger safety, crew quality, service information, and punctuality/travel time public transport service attributes. It also established the relationship between the service attributes and intercity public transport service quality rendered by operators on the Owerri-Abuja and Owerri-Lagos service corridors. Eight major intercity public transport operators that carry the most intercity travelers on the Owerri-Lagos and Owerri-Abuja routes, which also represent the long distant intercity routes with the highest demand for intercity travels from Owerri City, were sampled. The sampled operators include Good is Good Motors (GIGM), Heartland Travels, LIBRA Motors, EKESONS Transport, CHISCO Transport, GUO Transport, Young Shall Grow Motors, and ABC Transport.

3. Research Design

The study employed a survey research design method in which primary data obtained from surveys (primary sources) were used to carry out the study. In adopting the survey research method, data was sourced from primary sources using questionnaires and interviews as survey methods. Specifically, a cross-sectional survey type of design targeted at the major intercity public transport service providers on the Owerr-Abuja and Owerri-Lagos routes was used to source the data used in the study by using a questionnaire and interview as survey instruments.

As aforementioned, the data used for the study were collected from primary sources. Primary data on the service quality expectations and post-service perceptions of the intercity travelers on the Owerri-Abuja and Owerri-Lagos routes were sourced from eight major intercity public transport operators that carry the most intercity travelers on the Owerri-Lagos and Owerri-Abuja routes. They include Good is Good Motors (GIGM), Heartland Travels, LIBRA Motors, EKESONS Transport, CHISCO Transport, GUO Transport, Young Shall Grow Motors, and ABC Transport Ltd. The data served in determining the intercity public transport service quality offered by the major providers of service on the routes. Similarly, data on the service attributes were also collected from primary sources.

3.1 Population of the Study and Sampling Technique

The population of interest of the research from which primary data were sourced mainly the public transport users in Imo state Nigeria, particularly intercity travelers from Owerri-Lagos and Owerri-Abuja travel routes. They comprise mostly of female and male intercity travelers on the above identified routes. Data on the population of Imo state from the National Population Commission (NPC), indicate that, the State has population of 4.8million people. However, the actual number of people that demand for intercity travels from Owerri-Abuja corridor and from Owerri-Lagos corridor cannot be accurately determined. Thus, the study used the Z score formula for unknown population in order to determine the sample size; while adopting a purposive random sampling method in which the intercity travelers on the

Owerri-Abuja route and Owerri-Lagos route, using any of the identified eight major service providers were randomly sampled in the survey, interviewed and questionnaires administered.

According to [18]), the determination of sample of unknown population using Z score is given as:

$$N = Z2(P)\ (1\text{-}P)\ /C2 \quad (1)$$

Where Z = standard normal deviation set at 95% confidence interval =1.96

P = percentage picking a choice or response =50%

C = confidence interval =0.05

Therefore N = (1.96)2(0.5)(1-0.5)/(0.05)2

N= 0.9604/0.0025

N= 384.16

=384

Therefore, about four hundred questionnaires were produced from and administered to the intercity public transport service consumers in Imo states. 50 questionnaires were administered to travelers using each of the eight service providers selected for the study.

3.2 Testing Reliability of the Instrument

Reliability assesses repeatability and consistency of the responses to the survey instrument. For example, a response to survey instrument and/or measurement is said to be reliable if it produces the same output or almost the same result when repeated under the same or similar conditions.

Reliability was determined using the slit-half reliability index and the Cronbach Alpha index.

Since many respondents, the 384 raters rated their pre service quality expectation and post service perceptions of service quality and the influences of the public transport service attributes. The inter-rater-reliability was also be measured by using the correlation method to compare the correlation between the different responses of the raters (respondents) as with test- retest reliability method. The result shows a correlation coefficient of 0.74 which shows that the data is highly reliable, about 74%.

3.3 Validity Test

Validity test was used to measure how well the collected data accurately covers the real purpose of the survey and/or investigation. It was used to ensure that, the survey instrument (questionnaire) measure basically what is intended to be measured. The content validity test was used to evaluate content of questionnaires (survey instruments) to ensure that only questions (items) that are essential are allowed while undesirable questions and items are struck out. The survey questionnaires were sent out my PhD supervisors and co-supervisors as well as the Directors of operations of the eight intercity public transport operators used in the study. Each item in the questionnaire was assessed based on a three-point scale: not necessary, useful but not essential, and essential. The content validity ratio (CVR) was thus be determined by using Lawshe's method: $\text{CVR} = \frac{ne-(N/2)}{N/2}$ (2)

Where CVR =content validity ratio, n_e = number of experts or panel members indicating essential, N is the total number of experts or panel members.

Items in the survey instrument that are non-significant at the critical level were eliminated.

The study used an expert population of 10 to validate the content of the survey instrument.

3.5 Data Analysis Methods

The study in line with the identified objectives used the Gap Model of SERQUAL, the Principal Component factor Analysis (PCA), Descriptive cum Inferential Statistics and the Log-linear Multiple Regression Analysis to analyze the data obtained.

The SERVQUAL (Gap Model of Service Quality) model identifies the service quality expectations and perceptions of customers/consumers of services as the basis for evaluating the service quality (SERQUAL). The gap model in determining service quality compares consumer's pre service expectations and the post service quality perceptions. The quality of intercity public transport passenger services rendered by operators in Imo state on the Owerri-Abuja and Owerri-Lagos service routes was thus determined using the Gap Model of Service Quality (SERVQUAL) be comparing the pre service quality expectations of passengers patronizing each of the eight selected service providers and the post service perception (Ugo et al, 2022, Nwokedi et al, 2022). Thus, equation for intercity public transport service quality (SERVQUAL) as used in the study therefore is:

$$SQ_{ia} = P_{ia} - E_{ia} \quad (3)$$

Where;

SQ_i= intercity public transport service quality for route I and operator a.

Similarly, $SQ_{jn} = P_{jn} - E_{jn}$

P is the individual's perceptions of given service delivery

E is the individual's expectations of a given service delivery

i = route in consideration = Owerri-Abuja

j = Owerri-Lagos route

a …. N = number of operators or service providers selected on the routes.

When the service consumers' (passengers) expectations 'E' are greater than their perceptions "P', service quality is deemed low. When perceptions exceed expectations, then service quality is high. Using equation (3.4), we determined the intercity public transport service quality of all the operators on each of the Owerri-Lagos and Owerri-Abuja road corridors.

The Principal Component Analysis (PCA) was used to determine which public transport service attributes constitute the significant attributes that influence intercity public transport traveler's service quality perceptions and expectations. The eight public transport service attributes, identified in literature namely - Passenger Comfort /utility, passenger safety, crew quality, service information, Punctuality/travel time attributes, condition of physical infrastructure (terminal condition), Fare levels charged and number of stops at non designated points were examined for significance using PCA [2], [7], [3], and [13].

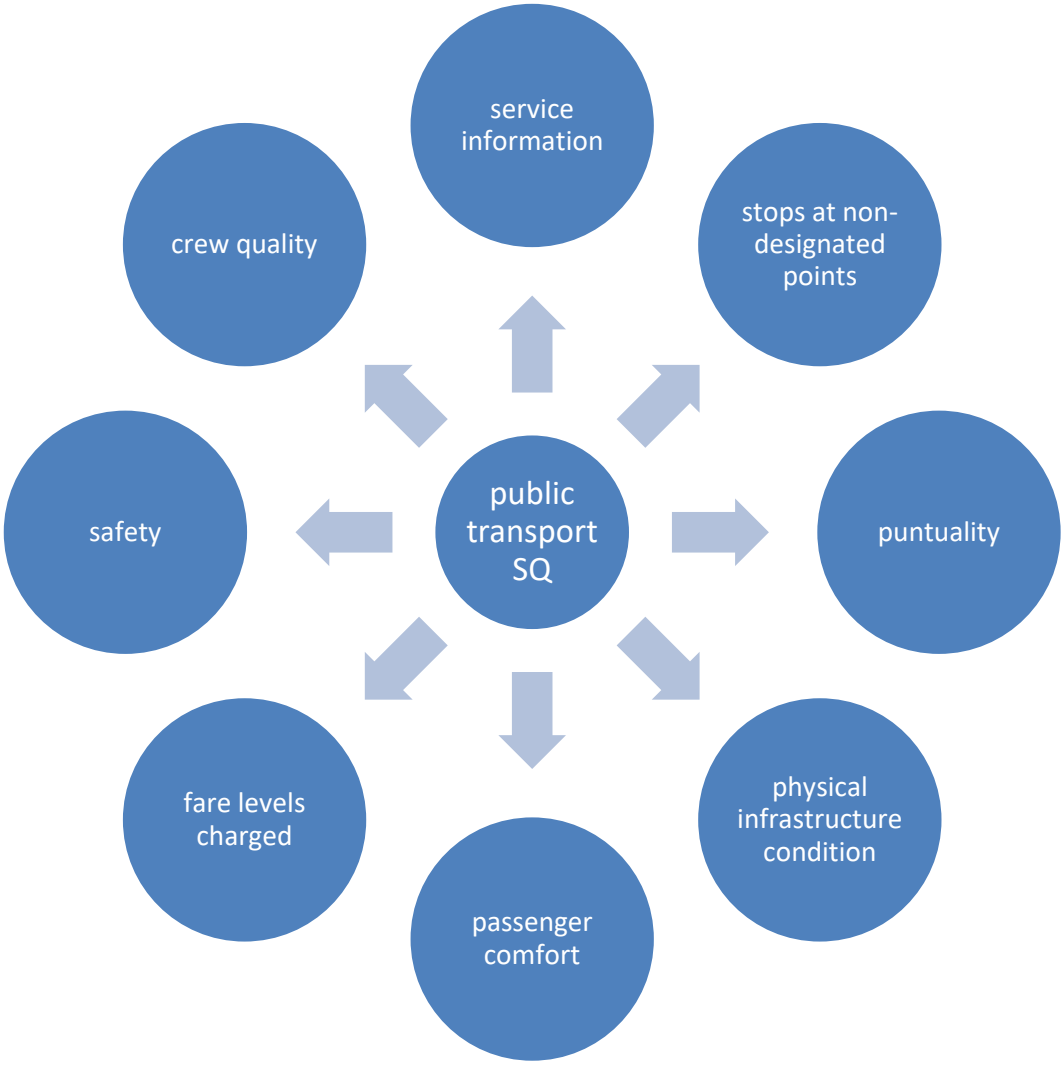

Figure 1. Factors of intercity public transport service quality.
Source: Authors preparation.

The PCA determined five determinant intercity public transport service attributes that most significantly influence service quality to include: Passenger Comfort /utility improvement factors, Safety/safety factors, Crew quality, Service information, and Punctuality/punctuality attributes. These were subsequently used to determine the relationship between significant intercity public transport service attributes and the service quality (SQ) of public transport services rendered by major service providers in Imo state, Nigeria using Log-linear multiple regression analysis discussed below.

The Log-linear multiple regression model was used to estimate the relationship between the significant public transport service attributes and the quality of public transport services rendered by major intercity public transport service providers on the identified corridors in Imo state.

The relationship between the intercity public transport service quality (SQ) and the determinant service quality attributes was determined by the use of the Lo linear multiple regression analysis.

The model specifications for the individual service providers are as shown below. For God is Good Motors (GIG) for example, we write:

$$LogSQ_{GIGM} = \beta_0 + \beta_1 LogCF + \beta_2 LogCQ + \beta_3 LogSF + \beta_4 LogPT + \beta_5 LogSI + e \quad (4)$$

For Heartland Motors we write:

$$SQ_{HRTLND} = \beta_0 + \beta_1 LogCF + \beta_2 LogCQ + \beta_3 LogSF + \beta_4 LogPT + \beta_5 LogSI + e \quad (5)$$

$$SQ_{LIBRA} = \beta_0 + \beta_1 LogCF + \beta_2 LogCQ + \beta_3 LogSF + \beta_4 LogPT + \beta_5 LogSI + e \quad (6)$$

, and similarly for other major service providers.

Where:

β_0= constant

β_1 ---------- β_5= coefficients of regression

SQ = service quality

CF = passenger comfort

CQ = crew quality

SF = Safety factors

PT = punctuality of the operators

SI = service information provision by operators

4. Results and Discussion of Findings

Table 4. Public Transport Service Attributes Scores of the Selected Inter-City Public Transport Service Providers in Imo State

Service Provider	Parameter	Service Quality Attributes				
		Comfort	Crew Quality	Safety	Punctuality	Service information
GIGM	Mean score (%)	79.8200	81.2000	75.200	77.2000	60.8000
	Std. Deviation	8.03231	7.18275	6.5434	5.63879	10.16998
HEARTLAND	Mean score (%)	68.4000	57.8000	58.900	55.1000	61.6000
	Std. Deviation	9.86852	7.70370	8.4085	8.23693	11.75602
LIBRA	Mean score (%)	69.9000	76.1000	73.200	67.4000	60.8000
	Std. Deviation	10.52160	10.9865	9.1896	10.74947	10.56370
EKESONS	Mean score (%)	64.7400	57.7000	57.600	55.0000	62.1000
	Std. Deviation	11.87487	7.96741	8.1591	8.01784	12.08347
YOUNG	Mean score (%)	59.6800	56.5000	57.400	54.6000	68.7000
	Std. Deviation	11.74637	7.90569	8.6449	8.38122	9.57303
GUO	Mean score (%)	67.9800	68.3000	58.900	59.0000	65.4000
	Std. Deviation	11.45264	11.1396	8.6478	10.0000	13.12577
CHISCO TRANSPORT	Mean score (%)	52.8000	53.3000	58.100	58.0000	63.7000
	Std. Deviation	5.08700	7.11495	8.5051	8.2065	13.58308
ABC TRANSPORT	Mean score (%)	79.3200	81.2000	71.900	58.4000	67.8000
	Std. Deviation	8.03675	7.79586	10.045	8.04579	9.90568

Source: Author's calculation

Table 4 above shows the result of comfort, crew quality, safety, punctuality and service information scores as attributes of public transport services and factors of service quality. The result indicates that GIGM has the highest comfort score of 79.82% followed by ABC transport with mean comfort score of 79.32%. CHISCO Transport has offers the least comfort with mean comfort score of 52.8%.

GIGM also offers the highest level of safety with a mean safety score of 75.2%. This is followed by ABC transport with mean safety score of 71.9% while Young Shall Grow with mean safety score of 57.4% has the least safety score. The figure4.1 below is a chart presentation of the comfort, punctuality, safety and crew quality scores of the individual operators on intercity transport services in Imo State Nigeria.

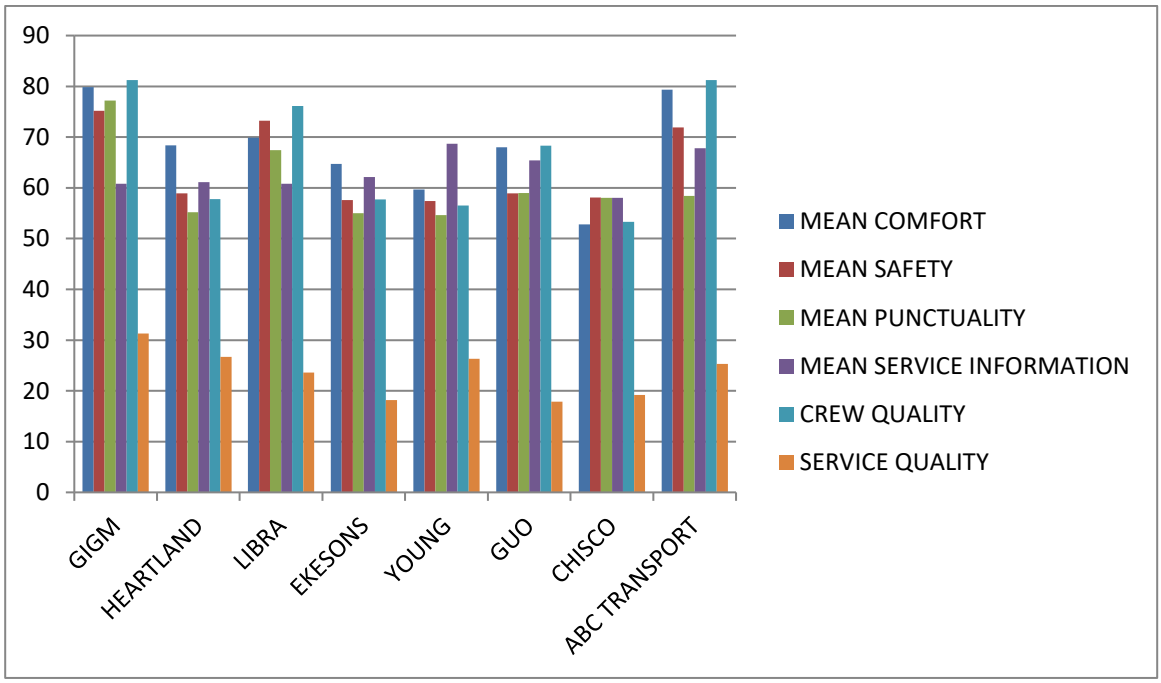

Figure2. Bar chart presentation of the comfort, punctuality, safety and crew quality scores of the individual operators

Source: Author's calculation

Table 5. The Effects of Service Attributes on Intercity Public Transport Service Quality of the Selected Service Providers in Imo State

Service Provider	Regression constant	Regression coefficients					
		Comfort(CF)= β_1	Crew Quality (CQ)= β_2	Safety (SF)= β_3	Punctuality (PT) = β_4	Service information (SI) = β_5	R-square
GIGM	37.197	-.077	.134	-.26	-.047	.213	.531
HEARTLAND	33.093	-.220	-.529	.382	-.081	.342	.511

LIBRA	30.765	-.080	.039	.020	.040	-.140	.581
EKESONS	73.038	.117	-.588	-.315	-.120	-.061	.711
YOUNG	82.052	-.278	-.557	.228	-.437	.042	.704
GUO	39.377	-.334	.084	.014	-.010	-.071	.619
CHISCO TRANSPORT	-6.175	.954	-.314	-.180	.112	.025	.660
ABC TRANSPORT	17.189	.017	-.129	-.091	.217	.048	.519

Source: Author's calculation

Table 5 shows the regression coefficients of the relationships showing the effects of passenger comfort, crew quality, safety, punctuality and service information attributes of intercity public transport on service quality of the selected major intercity travel operators on the Owerri-Lagos and Owerri-Abuja routes.

The result of the study indicates that for each intercity travel operator, the r-square which measures the explanatory power of the relations is above 50% (71%>53.1%>50%). For example, GIGM has r-square of 53.1%, indicating that about 53.1% variations in service quality of GIGM on the Owerri-Lagos route and Owerri-Abuja route is explained by passenger comfort(Better seating arrangement, correct loading, Ease of boarding& alighting and ease of movement), crew quality (Better crew attitude, better crew appearance, Professionalisms & neatness, crew courtesy), safety (Maintenance of vehicles, breakdown probability, probability of accidents, Driving patterns and), punctuality (journey time, departure time, and Arrival time) and travel information (Route information, announcement of stops, and Complaint redressal), leaving about 47% unexplained variations. Similarly, HEARTLAND Motors, LIBRA, EKESONS, YOUNG, GUO, CHISCO and ABC transport each have r-square scores of 51.1%, 58.1%, 71.1%, 70.4%, 61.9%, 66% and 51.9% which indicates the percentage of variations in the dependent variable-service quality that is explained by the service attributes of comfort, crew quality, safety, punctuality and service/travel information. The equations below shows the relationship and the effects passenger comfort, crew quality, safety, punctuality and service information attributes of intercity travels through the individual operators on the service quality.

$$InSQ_{GIGM} = 37.197 - 0.77InCF + 0.134CQ - 0.26InSF - 0.047InPT + 0.213InSI \quad (7)$$

$$SQ_{HRTLND} = 33.093 - 0.220InCF - 0.529InCQ + 0.382InSF - 0.81InPT + 0.342InSI \quad (8)$$

$$SQ_{LIBRA} = 30.765 - 0.088InCF + 0.039InCQ + 0.020InSF + 0.040InPT - 0.140InSI \quad (9)$$

This implies that unit increases in comfort score, crew quality safety, punctuality and service information of GIGM on the routes will respectively effect service quality by -0.77 units, 0.134 units, -

0.26 units, -0.047 units and 0.213 units. The unit increases in comfort score, crew quality, safety, punctuality and service information HEARTLAND motors will affect the service quality of the operators by -0.22units, -0.529units, 0.382units, -0.81units and 0.213units respectively. The uniformity in the directions of the effects of the service attributes suggests that the directions of the effects intercity travel service attributes on service quality of service providers is operator dependent and is affected by other factors such as competition, route factors, and passengers perceptions. The equations showing the relationships and effects of comfort, crew quality, safety, punctuality, and travel information on service quality of other operators is also given below.

$$SQ_{EKESONS} = 73.038 + 0.117InCF - 0.588InCQ - 0.315InSF - 0.120InPT - 0.061InSI \quad (9)$$
$$SQ_{YOUNG} = 82.052 - 0.278InCF - 0.557InCQ + 0.228InSF - 0.437InPT + 0.042InSI \quad (10)$$
$$SQ_{GUO} = 39.377 - 0.334InCF + 0.84InCQ + 0.014InSF - 0.01InPT - 0.071InSI \quad (11)$$
$$SQ_{CHISCO} = -6.175 + 0.954InCF - 0.314InCQ - 0.180InSF + 0.112InPT - 0.025InSI \quad (12)$$
$$InSQ_{ABC} = 17.189 + 0.017InCF - 0.129InCQ - 0.091InSF + 0.217InPT + 0.048InSI \quad (13)$$

As aforementioned, the uniformity in the directions of the effects of the service attributes of comfort, crew quality, safety, punctuality and service information of the operators suggests that the directions of the effects intercity travel service attributes on service quality of service providers is operator dependent and is affected by other factors such as competition, route factors, operator internal factors and passengers perceptions.

Table 6. Test of Hypothesis H_{01}: The coefficients of passenger comfort, safety, service punctuality, service information and crew quality attributes of service quality of public transport operators in Imo State cannot be quantified

Operator	Mean service attribute scores comfort (CF), crew quality(CQ), safety(SF), service information(SI) and punctuality (PT)					Decision: if CF//CQ/SF/SI/PT each=*0, Accept* H_{01}
	CF %	CQ	SF%	SI%	PT%	
GIGM	79.8	81.2	75.2	77.2	60.8	*81.2>79.8>77.2>75.2>60.8>0;Reject* H_{06gigm}
HEARTLAND	68.4	57.8	58.9	55.10	61.60	*68.4>61.6>58.9>57.8>55.1>0;Reject* $H_{06HRTLAND}$
LIBRA	69.9	76.1	73.2	67.4	60.80	*76.1>73.2>69.9>67.4>60.8>0;Reject* $H_{06LIBRA}$
EKESONS	64.7	57.7	57.6	55.00	62.10	*64.7>62.1>57.7>57.6>55.0>0;Reject* $H_{06EKESONS}$
YOUNG	59.6	56.5	57.40	54.60	68.70	*68.7>59.6>57.4>56.5>54.6>0;Reject* $H_{06YOUNG}$

GUO	67.98	68.3	58.90	59.00	65.40	*68.3>67.9>65.4>59.0>58.9>0;Reject* H_{06GUO}
CHISCO	52.80	53.3	58.10	58.00	63.700	*63.7>58.1>58.00>53.3>52.8>0;Reject* $H_{04CHISCO}$
ABC TRANS	79.32	81.2	71.90	58.40	67.80	*81.2>79.3>71.9>67.8>58.4>0;Reject* H_{06ABC}
Industry Mean	67.8	66.5	63.9	60.6	63.9	*67.8>66.5>63.9≥63.9>60.6>0;Reject* H_{06}

Source: Authors' calculation

The result of the test of hypothesis H_{01} shows that the five service attributes of the intercity public transport operators each have mean scores greater than zero (CF.0; CQ>0; SF>0; SI>0; PT>0). Also the industry average for each service attribute is also greater than zero (i.e:*67.8>66.5>63.9≥63.9>60.6>0*). Thus we reject the null hypothesis H_{01} that, the coefficients of passenger comfort, safety, service punctuality, service information and crew quality attributes of service quality of public transport operators in Imo State cannot be quantified and accept the alternate hypothesis that, the coefficients of passenger comfort, safety, service punctuality, service information and crew quality attributes of service quality of public transport operators in Imo State is quantified.

Table 7. Test of H_2: The relationship showing the effects of comfort, safety, service punctuality, service information cum crew quality attributes of service quality on intercity public transport service quality in Imo State is not significant

Hypotheses	Mean F-cal.	F-critical	p-value/sig.	Decision
H_{02}	3.661	2.68	0.091[b]	Reject H_{02}
Variable means	t-cal.	t-critical	p-value/sig.	Decision
COMFORT	0.909	1.75	0.538	Not significant
SAFETY	0.065	1.75	0.702	Not Significant
CREW QTY	0.947	1.75	- 0.201	Not Significant
SERVICE INFO	0.729	1.75	0.421	Not Significant
PUNTUALITY	0.342	1.75	0.756	Not Significant

Source: Authors calculation. Reject *null hypotheses if F-cal> f-critical; Accept null hypotheses if F-cal.< F-critical*

The test of hypothesis H_{02} shown above in table 7. 24 indicates F-score of 3.661, F-critical of 2.68, and p-value of 0.091. Since F-score is greater than F-critical, (3.661>2.68), we reject the null hypothesis H_{02} and accept the alternate hypothesis. We conclude that there is significant effect of service quality attributes of level of passenger comfort, safety of services, crew quality, services information and punctuality of service on operators intercity public transport service quality (SQ) in Imo State.

Similarly, t-test was conducted to investigate the significances of the individual effects of level of passenger comfort, safety of services, crew quality, services information and punctuality of service on

operators' intercity public transport service quality (SQ) in Imo State. As shown in the table above, individually, none of level of passenger comfort, safety of services, crew quality, services information and punctuality of service have significant effect on operators' intercity public transport service quality (SQ) in Imo State. This implies that to improve the quality of services offered by operators in the industry, the operators must develop policies that address improvement in service quality by considering jointly level of passenger comfort, safety of services, crew quality, services information and punctuality of service as the multiple factors that influence travellers service quality expectations and perceptions. By so doing, it will be expected that customers' satisfaction with the services offered by operators will improve in line with the service quality of operators, leading to improvement in patronage/demand for services with the consequent improvement in revenue and profitability.

5. Discussion of Results and Policy Implications

Furthermore, the findings of the study provide evidence that jointly, there is significant effect of service quality attributes of level of passenger comfort, safety of services, crew quality, services information and punctuality of service on operators intercity public transport service quality (SQ) in Imo State. In a similar manner, the result of the t-test that investigated the significance of the individual effects of level of passenger comfort, safety of services, crew quality, service information and punctuality of service on operators intercity public transport service quality (SQ) in Imo State reveal that individually, none of level of passenger comfort, safety of services, crew quality, services information and punctuality of service have significant effect on operators intercity public transport service quality (SQ). This is in line with the findings of [17]. The implication is that to improve the quality of services offered by operators in the industry, the operators must develop policies that address improvement in service quality by considering jointly the level of passenger comfort, safety of services, crew quality, service information and punctuality of service as the multiple factors that influence travelers service quality expectations and perceptions. By so doing, it will be expected that customer satisfaction with the services offered by operators will improve in line with the service quality of operators, leading to improvement in patronage/demand for services with the consequent improvement in revenue and profitability. The uniformity in the directions of the effects of the service attributes of comfort, crew quality, safety, punctuality and service information of the operators suggests that the directions of the effects intercity travel service attributes on service quality of service providers is operator dependent and is affected by other factors such as competition, route factors, operator internal factors and passengers' perceptions.

6. Conclusion

The study concludes as follows:

The coefficients of passenger comfort, safety, service punctuality, service information and crew quality service attributes of the intercity public transport operators each have mean scores greater than zero (CF.0; CQ>0; SF>0; SI>0; PT>0). Also the industry average for each service attribute is also greater than zero (i.e:$67.8>66.5>63.9\geq63.9>60.6>0$). Thus, we reject, the coefficients of passenger comfort,

safety, service punctuality, service information and crew quality attributes of service quality of public transport operators in Imo State can be quantified. We also conclude that there is significant effect of service quality attributes of level of passenger comfort, safety of services, crew quality, services information and punctuality of service on operators intercity public transport service quality (SQ) in Imo State. Similarly, individually, none of level of passenger comfort, safety of services, crew quality, services information and punctuality of service has significant effect on operator's intercity public transport service quality (SQ) in Imo State. Following the result and findings of the study, the focus of further research is to determine to what extent passenger patronage for the services of individual intercity public transport service providers in Nigeria can be improved by improving passenger comfort, safety, punctuality, service information, crew quality, and consequently, the quality of intercity transport services rendered by the operators.

In line with the findings of the study, it is recommended that the uniformity in the directions of the effects of the service attributes of comfort, crew quality, safety, punctuality, and service information of the operators suggests that the directions of the effects of intercity travel service attributes on service quality of service providers are operator dependent and are affected by other factors such as competition, route factors, operator internal factors, and passengers perceptions. Operators should thus consider route factors, internal/company factors, and customer experiences in conjunction with fare levels in making service quality decisions.

Lastly, the implication is that to improve the quality of services offered by operators in the industry, the operators must develop policies that address improvement in service quality by considering jointly the level of passenger comfort, the safety of services, crew quality, service information and punctuality of service as the multiple factors that influence travelers service quality expectations and perceptions.

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