

Article citation info: Nwaogbe, O., R., Ojo, F., Ogbuji Ch., E., Eru, J., U., Tsaku, D., An evaluation of Abuja urban mass transit operation in Nigeria. *Transport & Logistics: the International Journal*, 2020; Volume 20, Issue 49, December 2020, ISSN 2406-1069

AN EVALUATION OF ABUJA URBAN MASS TRANSIT OPERATION IN NIGERIA

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Abstract

This study examines Abuja Urban Mass Transport Company (AUMTCO) passengers' perspective, level of performance and satisfaction, and the overall service quality. The aim is to assess urban mass transit systems in Abuja and its performance in terms of quality of service and users' satisfaction. Structured questionnaires and past literature were used as sources of data. The primary data included passengers' responses on the quality of service (reliability, safety, affordability, comfortability and waiting), road networks, and number of trips per day by operators, operating speed, vehicle speed, and waiting time. The total number of completed questionnaires for the survey was 200 for users. The sampling technique used was random sampling from several bus stops in the study area. Data were analysed using the appraisal standards for public mass transit systems and the IPA quadrant analysis and Multiple Regression statistical techniques for testing the hypotheses. The researcher observed that the operators of urban mass transit in the study area were operating at a load factor of 146% and 94.8% at peak and off-peak periods respectively, with an average of waiting time of 30 minutes at the bus stops. The overall performance of the service is considered moderate. While passengers are satisfied with safety, affordability and reliability, there is need for improvement in the waiting time and comfortability of the service.

The hypothesis test was used to test for statistical relationship between the overall operational performance in terms of the passenger throughput and fare, safety, reliability, comfortability and waiting time of the bus service. It was found that there is a statistical relationship (99.2%) between the various categories. It is therefore concluded the improving service quality and performance is crucial for users' satisfaction hence immediate attention must be paid to improving service quality and performance of the system.

Key Words: Urban Mass Transit, Performance, Transport and Quality of Service

1 INTRODUCTION

Urban mass transportation is defined as the act of commuting passengers to work or to other desired places, and of utmost importance, to reduce traffic congestion [1]. In contrast with the conveyance of individuals in personal vehicle which only has the ability to carry few people at a time, public mass transportation is the ability to convey large number of people “en masse”. In other words, public mass transportation is a system that warrants the carriage of greater number of people at a time along principal corridors [2]. This system comprises mainly of the bus system, rail system, tram ways and monorails, light rail system and where possible water transportation which may include mode vehicles such as omnibus and streetcars, cable cars, trolley coaches, gasoline and diesel buses, underground and above ground rail rapid transit, ferries, and some commuter rail services. The urban mass transportation system is generally refers to scheduled intra-city service on a fixed route in shared vehicle [3].

Urban transportation has greatly contributed to the growth and development of modern cities. Travel demands of urban residents have increased, causing complexity in the provision of effective systems to cocktail such dynamic conditions [4]. The condition has intensified road congestion, thus condensing urban mobility to critical positions in many cities in the world [5]. This causes the public transport system of several cities to be characterized by overpopulation, the use of old and overused vehicles, continuous traffic congestion due to continuous deteriorating road conditions slowing down traffic, increasing vehicular and pedestrian accidents and their associated increase in the cost of human capital growth and loss of man-hours for several weeks [6-8].

Policy makers in Nigeria are continuously faced with the challenges of urban mobility needs as dynamic shifts in population has become more and more unpredictable with response to the need for employment, housing, and sustenance [2]. The growth of cities in Nigeria with increasing population, results in increasing demand for transport provision. This demand has, ad hoc, uncoordinated, and poor [2]. Despite the vital role that buses play in urban areas, their services in Nigerian cities are often insufficient to meet demand, and the services provided suffer from low output [9].

However, the extent to which this initiative has affected the socioeconomic wellbeing of Nigerians such as mobility needs, income, safety, security, wealth, cost reduction and business activities generally is a matter of high concern especially in such a time that the cost of living in most Nigerian cities has become high owing to recession and other macro-

economic problems. Several studies [3], [10-14] show the significance of efficient urban transport systems to the economy and wellbeing of its citizens. Thus, this study examines the extent to which the mass transit initiative has been able to impact the socio-economic conditions of commuters in Nigeria. It should be that there are lasting solutions to the traffic situations in Nigeria such that these situations are controlled in other to facilitate the growth and development of cities and the country at large. Therefore determining the efficacy of the existing mass transit services is necessary and has strategic impacts on the citizens. With current population and projected increase and current transport situations, if studies like this are not done in order to address these situations the aching socioeconomic problems might persist and continue to hold down opportunities for the nation. The aim of the study is to evaluate urban mass transit service in Abuja and its impact on passengers' satisfaction. The following specific objectives are used in order to achieve the stated aim of the study are: to examine the urban mass transit performance of Abuja Urban Mass Transport Company Limited (AUMTCO); to examine the affordability of the service; to examine the passenger throughput the systems; to examine the comfortability of the service; to examine the overall quality of the service; to examine the waiting time at the bus stop and analyse the overall service quality of Abuja Urban Mass Transport Company Limited (AUMTCO).

Considering the problematic situation of urban mass transportation in Nigerian, it is justifiable to consider the imperative of carrying such empirical studies in order to address the prevailing upheaval. Doing this study would help provide more insights on critical areas of the Mass Transit System that need improvements, and aspects that should be abolished. The true impact of Mass Transit is not simply the physical system but rather the improvements that it creates in people's lives. Evaluating the performance of the system and its expected impacts on traffic levels, economic development, environmental quality, social interactions, and urban forms will help determine whether the system will add real value. This projection of system impacts is thus a crucial step in cost justification in development and construction. Furthermore, by examining the system's performance, it is possible to determine what types of improvements or modifications are required from the design.

Therefore in order to maximize such benefits it is important to analyse the operations and performance of the system which is the primary aim of this study such that improvement policies are implemented. Therefore this study is an attempt to examine how veritable services rendered by the mass transit system in Nigeria have positively influence Nigerians. It reveals the extent to which the Urban Mass Transport system has achieved its socioeconomic objectives in terms of overall performance to reduce congestion and facilitated mobility among other variables in Nigeria.

1.1 Research Questions

The study seeks to answer the following research questions

1. What is the performance of Abuja Urban Mass Transport Company Limited (AUMTCO)?
2. How affordable is the transport service in the study area?
3. How much passengers utilizes the system?
4. How comfortable is the transport service in the study area?
5. What is the overall quality of service of the study area?
6. How long do passengers waiting at the bus terminal before boarding the bus?
7. What is the overall service quality of Abuja Urban Mass Transport Company Limited (AUMTCO)?

1.2 Hypothesis

The following is the null research hypotheses raised for the study:

1. H_0 : There is no significant relationship between passenger throughput and revenue generated, number of drivers, bus ratio, number trips, and trip hours in AUMTCO.

1.3 Study Area

Abuja is the capital city of Nigeria located in the center of the country within the Federal Capital Territory (FCT). It is a planned city and was built mainly in the 1980s, replacing the country's most populous city of Lagos as the capital on 12 December 1991. The Presidential Complex, National Assembly, Supreme Court and much of the city extend to the south of the rock. The FCT has borders on the north with Kaduna State, on south-east with Nassarawa State, on the south-west by Kogi State and on the west by Niger state. Abuja is one of the ten most populous cities in Nigeria according to the 2006 census with a population 776,298. According to the United Nations, Abuja grew by 139.7% between 2000 and 2010, making it the fastest growing city in the world. In 2015, the city experienced an annual growth of about 35%, maintaining its position as the fastest-growing city on the African continent and one of the fastest-growing in the world. As at 2016, the metropolitan area of Abuja is estimated at six million persons, placing it behind only Lagos, as the most populous metro area in Nigeria. Abuja has the advantage of being well-planned over many capital cities. Visitors and arriving residents will be greeted by wide, well-designed and maintained roads and clean streets. Abuja also has excellent access to the wider road network to the rest of the country. It is built on a pre-Cambrian basement (granite) rock complex of distinctive domes and hills, the most striking of which is called Aso Rock.

1.4 Abuja Urban Mass Transport Company Limited (AUMTCO)

Abuja Urban Mass Transport Company Limited (AUMTCO) is the major mass transit system in the city. It was established by the then Ministry of Federal Capital Territory now the Federal Capital Territory Administration (FCTA) in 1984 as Abuja Bus Service (ABS) and later registered on 13th November, 1989 as Abuja Urban Mass Transport Company Limited, under the Companies and Allied Matters Act 1990. It operates a comprehensive Intra City Bus Service in the Federal Capital Territory from a purpose built Head Office on Plot 185 Cadastral Zone F03 (ONEX), Usuma District Kubwa Express Way, Abuja, Nigeria with Depots in other parts of the Federal Capital Territory. It is aimed at providing best value transit system – for money and safest, most reliable scheduled and Bus hire service in Nigeria.

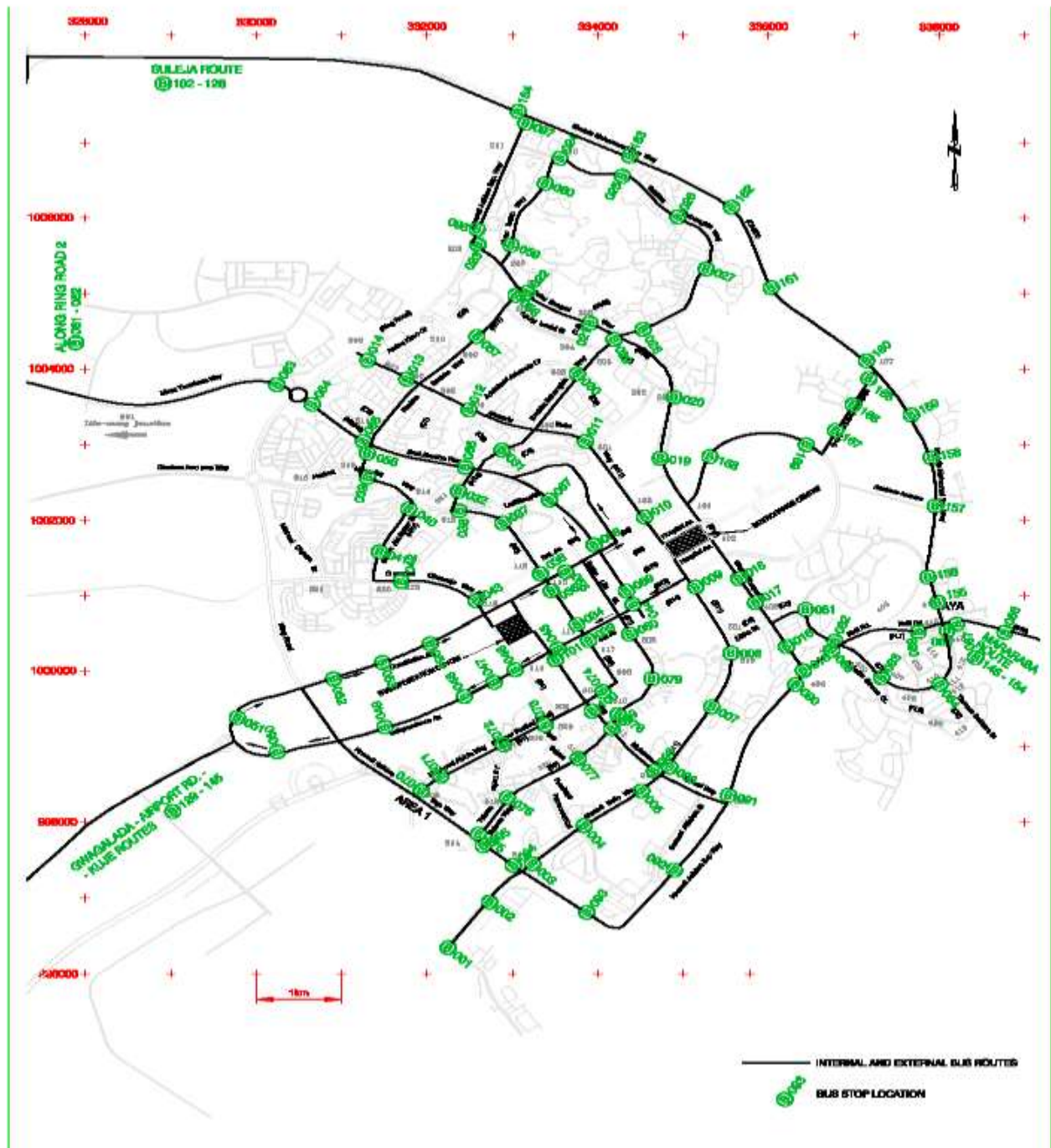


Fig. 1 Map Showing AUMTCO Route Network

2 LITERATURE REVIEW

The term "mass transit" has become a common feature in our recent transportation system. An improved service quality can attract more users to a transport system. This can solve the issues of traffic congestion, air and noise pollution, and energy consumption because individual transport would be used less [15].

2.1 Urban Mass Transport and Quality of Service

Urban mass transport has also proved to be an effective tool in combating congestion [16]. Several studies shows dissatisfying factors in the urban mass transport or public transport. From customers report of unnecessary waste of time, overcrowding , lack of comfort, time uncertainty, lack of control, unreliability, long waiting times, need to transfer, they cannot change route to avoid traffic congestion, lack of flexibility, and long walking time. This shows that public transport is still an alternative option for mobility needs of many people. Hence, in order to keep current passenger, urban mass transport has to improve the service to accommodate wide range of customer need and expectation [3].

On the other hand, quality of service depends to a great extent, on the operating decisions made by the managers of a transit system given their budget constraints, the level of service to be provided, the characteristics of the areas to be served, and others. In this setting, quality of service can also represent and measure how successful an agency is in meeting customer demands (customer satisfaction). Customer satisfaction is the overall level of attainment of a customer's expectations. It is measured as the percentage of customer expectations which has actually been fulfilled [17]. Quality is one of the key dimensions that is factored into consumer satisfaction judgments. Quality is the totality of features and characteristics of a product or service that bear on its ability to satisfy stated and implied needs. In the short term, product or service features determine quality, which then satisfies customer needs [18].

Arising from these challenges of the urban mass transport the need for direct government intervention in the urban transport system that could assure fast and reliable public transport, travelling time and safety thereby enhance the quality of service of the urban mass transport system. This is more so that a significant aspect of the expected turnaround of public transport service as a result of urban mass transport is short waiting time, more comfort, timeliness, accessibility, flexibility, efficient routing and scheduling among other attributes with the aim of providing a dependable modern public transportation services.

2.2 Theoretical Framework

2.2.1 Importance-Performance Analysis (IPA)

IPA is a very suitable transport management tool often used to easily identify the strengths and weaknesses of a transport system, and to assess customer satisfaction with the transport service provided. The primary assumption in IPA is the relationship between importance attribute and attribute performance toward customer satisfaction is linear and symmetric [19]. Thus, IPA focuses on the gap between the customer expectation on the importance and perception on the performance of specific attribute of the service consumed. In the traditional IPA, according to [20], the Quadrant model (QM) was used. This model consists of a pair of coordinates and four fields containing elements of importance and performance for a particular service/product, and which average values were calculated from direct assessment of users of services/products. Using the feedback gathered from the customers' assessment, central tendency of each (mean values) attribute is calculated and ranked from high to low categories. The central tendency of each attribute's importance and performance will be paired and used as coordinates for plotting respective attribute in a two dimensional grid that has been divided into four quadrants as illustrated in Figure. 2

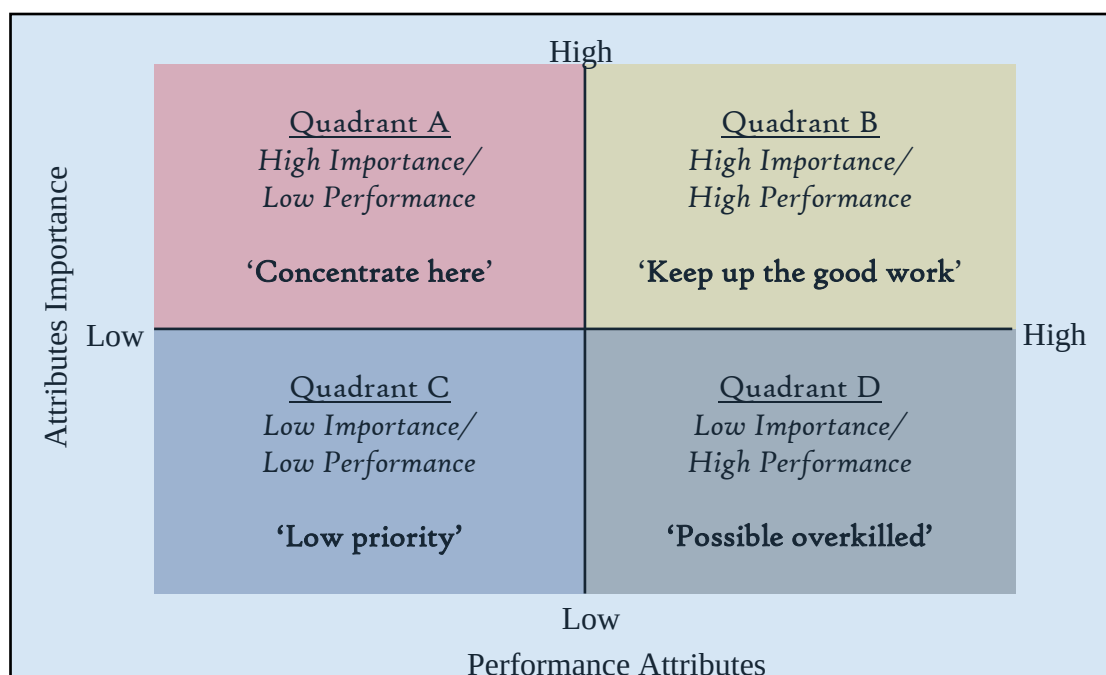


Fig. 2 Four quadrants of importance-performance analysis (IPA) developed by Martilla and James (Martilla and James, 1977).

As observed in Figure. 2, each quadrant in IPA is divided by the importance of attribute from high to low (in vertical axis) and the performance of attribute from high to low (in horizontal axis). Such that the gap between importance and performance can be attained. It provides indication that the customer is either satisfied or dissatisfied on the attributes of service consumed [21]. Given that IPA is a very vital, simple and practical method, which does not require much knowledge and application of statistical methods, it has found its usefulness in different areas such as traffic and transportation [22], [23] and, tourism.

2.2.2 Key Performance Indicator (KPI) Model

KPIs are indicators used to evaluate the progress of service delivery on factors recognized as critical to the success of the goals and objectives of a transportation system [24]. Performance indicators are usually intended to serve as means of achieving desired goals or avoiding unintended ones, appraising the degree of realization of goals and objectives, or evaluating the efficiency and effectiveness of alternatives [25]. Selection of an appropriate performance measure is a critical step during performance measurement process. It is also important to recognize the difference among input, output and outcome measures while selecting a set of performance measures. Performance measurement provides both important inputs for setting priorities and critical information that helps decision-makers detect potential problems and make corrections on route to meeting goals and objectives [26]. The ultimate purpose of measuring performance is to improve transportation services for customers.

Moreso, [23] uses set of performance indicators (table 1) based on the appraisal standards of the Department of Land Transportation, World Bank, to evaluate the performance and service quality of Trans Bandung Raya Bus service. The performance indicators are as follows:

Tab 1. Key Performance Indicators

	Performance indicator	Formula
1.	Load factor (peak/off-peak): These is the ratio of the number of passengers carried with the actual carrying capacity of the vehicle used at a particular time.	$Lf = \frac{P}{C} \times 100\%$ Where, Lf = load factor (%); P = number of passengers carried; C = carrying capacity.
2.	Traveling speed: The travel speed of the transport system is the ratio of the operating distance to the travel time required.	$V = 60 \times \frac{L}{t}$ Where; V = travel speed (km/hr), L = distance travelled, t = time of travel
3.	Travel time: Time to travel a kilometer along a route in unit minute/kilometer.	$T = \frac{t}{L}$ Where; T = travel time (min/km), L = distance travelled, t = travel time
4.	Headway (time between): Headway is the time interval between two vehicles moving in succession along the same route at a certain point	$H = \frac{60}{F}$ Where; H = Headway (min), F = Frequency
5.	Frequency: Frequency is the number of vehicles that operate within one hour	$F = \frac{N}{60}$ Where; F = Frequency (veh/hr), N = number of vehicles in operation
6.	Number of vehicle in operation (%): This is the Percentage of the number of operating vehicles with a total number of vehicle	$Vo = \frac{N}{TnV} \times 100\%$ Where; Vo = Vehicle in operation (%), N = number of vehicles in operation, TnV = total number of vehicles
7.	Hours of operation (service time): This is total operating hours in a day. Service time is very influential in determining the number of trips in one day, the operational cost, income and services of the transport system provides to the community	
8.	Passenger waiting time (min): This is the time a passenger spent at the terminal before transit. It is solely based on the time between bus departures (headway).	$Wt = \frac{1}{2}H$ Where; Wt = waiting time (min), H = Headway

Source: Damayanto et al, (2018)

2.3 Standard appraisal of public transport performance

The performance appraisal of public transport uses the indicators and standard of value published by the Department of Land Transportation, World Bank.

Tab. 2 Performance indicators of public transport

s/n	Indicators	Unit	Assessment standard		
			Not good (1)	Moderate (2)	Good (3)
1.	Load factor, <i>Peak</i>	%	> 100	80 – 100	< 80
2.	Load factor, <i>Off-peak</i>	%	> 100	70 – 100	< 70
3.	Travel speed	Km/hour	< 5	5 – 10	> 10
4.	Headway	Minutes	> 15	10 – 15	< 10
5.	Time travel	Minutes/km	> 12	6 – 12	< 6
6.	Service time	Hour	< 13	13 – 15	> 15
7.	Frequency	Vehicle/hour	< 4	4 – 6	> 6
8.	Number of vehicles operating	%	< 82	82 – 100	100
9.	Waiting time	Minutes	> 30	20 – 30	< 20
10.	Start and end time of trip	Time	05.00 - 18.00	05.00- 20.00	05.00 >20.00

Source: Damayanto et al, (2018)

Total performance value of public transport is categorized according to the standard in the following table 3.

Tab. 3 Standard appraisal of public transport performance

CATEGORY	TOTAL VALUE
Good	18,00 - 24,00
Moderate	12,00 - 17,99
Not good	< 12

Source: Damayanto et al, (2018)

3 METHODOLOGY

3.1 Sampling and data collection

Both primary and secondary data was use in the study. Data were collected by the use of a questionnaire, field observations, and oral interviews (primary) between August and September 2019, and company operational records and past literatures (secondary). Abuja bus commuters constitute the target population of the study since the study is focus on the bus level of service and their level of satisfaction with the service. A total of 200 commuters were randomly selected within several bus stops. A self-rated questionnaire was used to collect data for this study. Respondents were asked to rate their overall satisfaction with bus transport services and factors that influences their satisfaction. A five-point Likert scale with ‘strongly agree – 5, agree – 4, undecided – 3, disagree – 2, and strongly disagree – 1’ was used in the rating. Both primary and secondary data which was collected for the study are here by analysed using the World Bank appraisal standards for public mass transit systems adopted in [23] and the IPA quadrant analysis which is incorporated with efficient service quality decision making.

3.2 Data Analysis

The performance analysis of the Abuja Urban Mass Transit was done based of the appraisal standard of the Department on Land Transportation, World Bank as cited in [23].

4 RESULTS

This section describes the result of the analysis derived from the result computation.

Tab. 4 Performance Analysis of the AUMTCO Mass Transit

s/n	Indicators	Unit	Assessment standard			Result	Value of performance
			Not good (1)	Moderate (2)	Good (3)		
1.	Load factor, busy hour	%	> 100	80 – 100	< 80	146	1
2.	Load factor, no busy hour	%	> 100	70 – 100	< 70	94.8	2
3.	Travel speed	Km/hour	< 5	5 – 10	> 10	41.78	3
4.	Headway	Minutes	> 15	10 – 15	< 10	30	1
5.	Time travel	Minutes/km	> 12	6 – 12	< 6	1.43	3
6.	Service time	Hour	< 13	13 – 15	> 15	14	2
7.	Frequency	Vehicle/hour	< 4	4 – 6	> 6	2	1
8.	Number of vehicles operating	%	< 82	82 – 100	100	50.71	1
9.	Waiting time	Minutes	> 30	20 – 30	< 20	30	2
Total value of performance							16

Source: Author's Analysis, 2019

Tab. 5 Result of Performance Analysis of the AUMTCO

CATEGORY	TOTAL VALUE	SCORE
Good	18,00 - 24,00	16
Moderate	12,00 - 17,99	
Not good	< 12	

Source: Author's Analysis, 2019

From the results in table 4, AUMTCO (146%) over load their vehicles at peak periods, while at off peaks they load at 94.8% which is almost full capacity. The bus service travels at an average of 41.78km/hr and a headway of 30mins. The bus service operates only 14hrs a day, with a low percentage of operating vehicles of 50.71% which according to the standards of the public transport system as published by the Department of Land Transportation, World Bank, it is considered “Not Good”. However based on the overall performance assessment, it can be said that based on the standards of the Department of Land Transportation of World

Bank the *Performance of the AUMTCO* is included in the "Moderate" category. Therefore the public transport system can be considered to be performing on a Moderate level.

4.1 Service quality Analysis

The IPA (Importance-Performance Analysis) quadrant was used to analyse the service quality of the Abuja Urban Mass Transit System. The service quality is measured based on the users' response to the SERVQUAL Indicators used. ServQual method is used to divide the service quality into five dimensions in this study (main variable): Affordability, Reliability, Safety, Comfortability, and Waiting time. Table 6 shows the number of variables used.

Tab. 6 Public Bus Service Quality Attributes Measures

Variable code	Variable Description	Variable code	Variable Description
OS	Overall Satisfaction with public transit service	x11	Information on time schedules
X1	Affordability	x12	Safety
X2	All Income levels can afford the service	x13	Accident control
X3	Frequency	x14	Violence and theft control
X4	Number of bus	x15	Comfortability
X5	Terminal facilities	x16	Enough seating/standing space in buses
X6	Working conditions of facilities	x17	bus cleanliness
X7	Seats at shelters	x18	Convenient operating hours
X8	Reliability	X19	Waiting time
X9	Time schedule	x20	Fast (off)loading
x10	Adherence to time schedule	x21	Customer care

The service quality attributes used are divided into 5 main variables and 17 sub variables.

Table 7 shows the statistical (mean and standard deviation) distribution of passengers' expectation (importance) and perception (performance) of the overall service quality attributes of the AUMTCO as it affects their satisfaction of public transport services in the city of Abuja.

Tab. 7 Statistical Distribution of Quality of Service Attributes Responses of AUMTCO (N=100)

	N	Importance		Performance	
		Mean	Std. Deviation	Mean	Std. Deviation
OS	100	4.92	.273	2.63	.939
x1	100	4.84	.443	3.86	.985
x2	100	4.85	.479	3.57	.879
x3	100	4.71	.624	2.90	1.010
x4	100	4.89	.373	3.01	1.124
x5	100	4.90	.389	2.94	2.069
x6	100	4.97	.171	2.36	1.115
x7	100	4.86	.403	1.88	.967
x8	100	4.96	.197	3.17	.985
x9	100	4.89	.399	2.22	.871
x10	100	4.97	.171	1.98	.921
x11	100	4.87	.393	2.04	1.072
x12	100	4.97	.171	3.67	.943
x13	100	4.94	.239	3.61	.909
x14	100	4.90	.362	1.95	1.038
x15	100	4.82	.479	2.17	.911
x16	100	4.80	.512	2.15	.957
x17	100	4.90	.302	1.93	.807
x18	100	4.84	.443	3.27	.930
x19	100	4.98	.141	2.54	1.243
x20	100	4.90	.362	2.41	1.111
x21	100	4.88	.433	2.56	1.217
Valid N (listwise)	100	Ave. mean	4.89	Ave. mean	2.67

Source: Author's Analysis, 2019.

Based on the analysis of variables in table 7, the average value of service perception (Performance) is 2.67 and the average value of service expectation (Importance) is 4.89. Figure 3 describes the analysis of the results using the IPA quadrant.

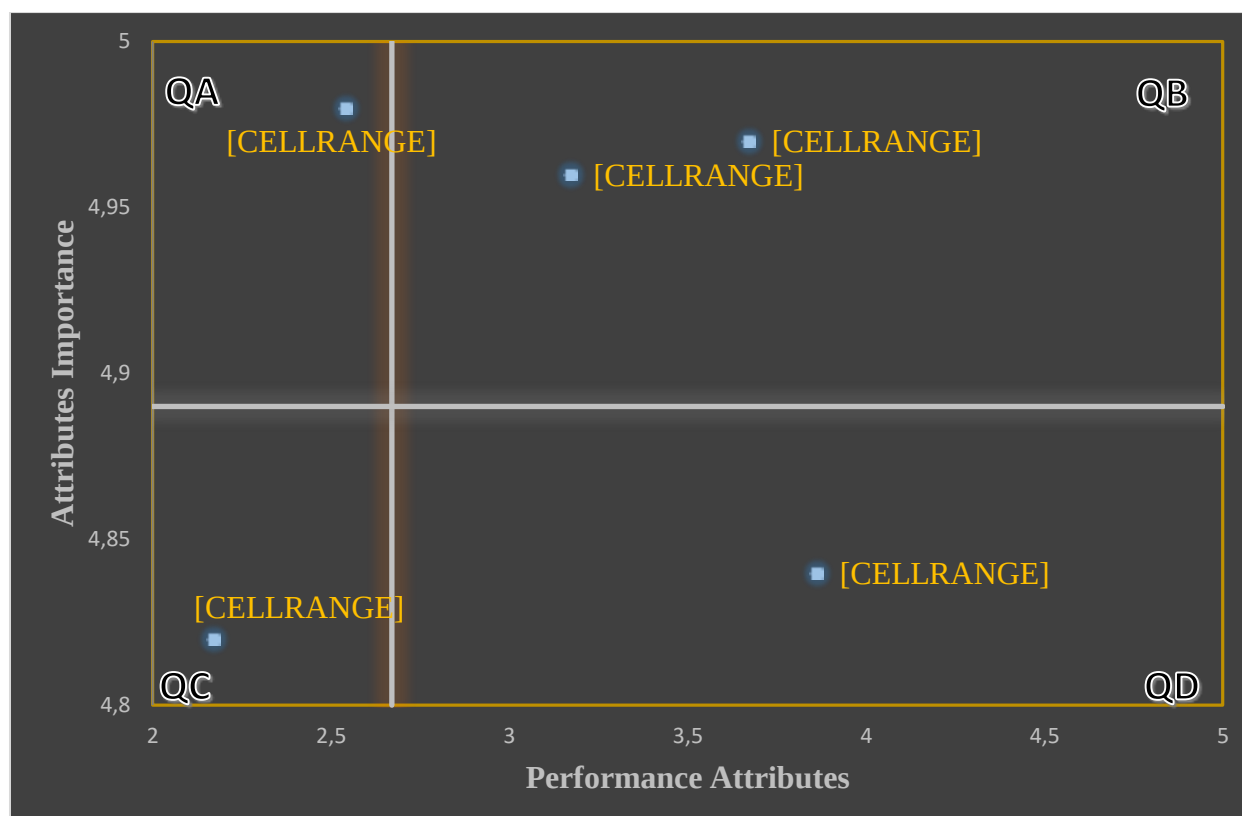


Fig. 3 IPA analysis of main variables of AUMTCO quality of service

Figure 3, shows that in the Cartesians diagram, there is one main variables in quadrant A, Waiting time. This means that AUMTCO needs to improve the waiting time of the bus service, this is because according to the users' responses the implementation of AUMTCO service related to waiting time still can't fulfill the expectation of the users. Quadrant B variables (safety, and reliability) are the tangible ones, meaning the users are satisfied with this variables as a good category and needs to be maintained. The variable in quadrant C are responsive variable. Comfortability is the quadrant C variable for AUMTCO, which means that the variable needs to be improved, even though it is not a priority variable. While the variable affordability is in quadrant D, which means this variable is performance is good, but felt more than is needed [23].

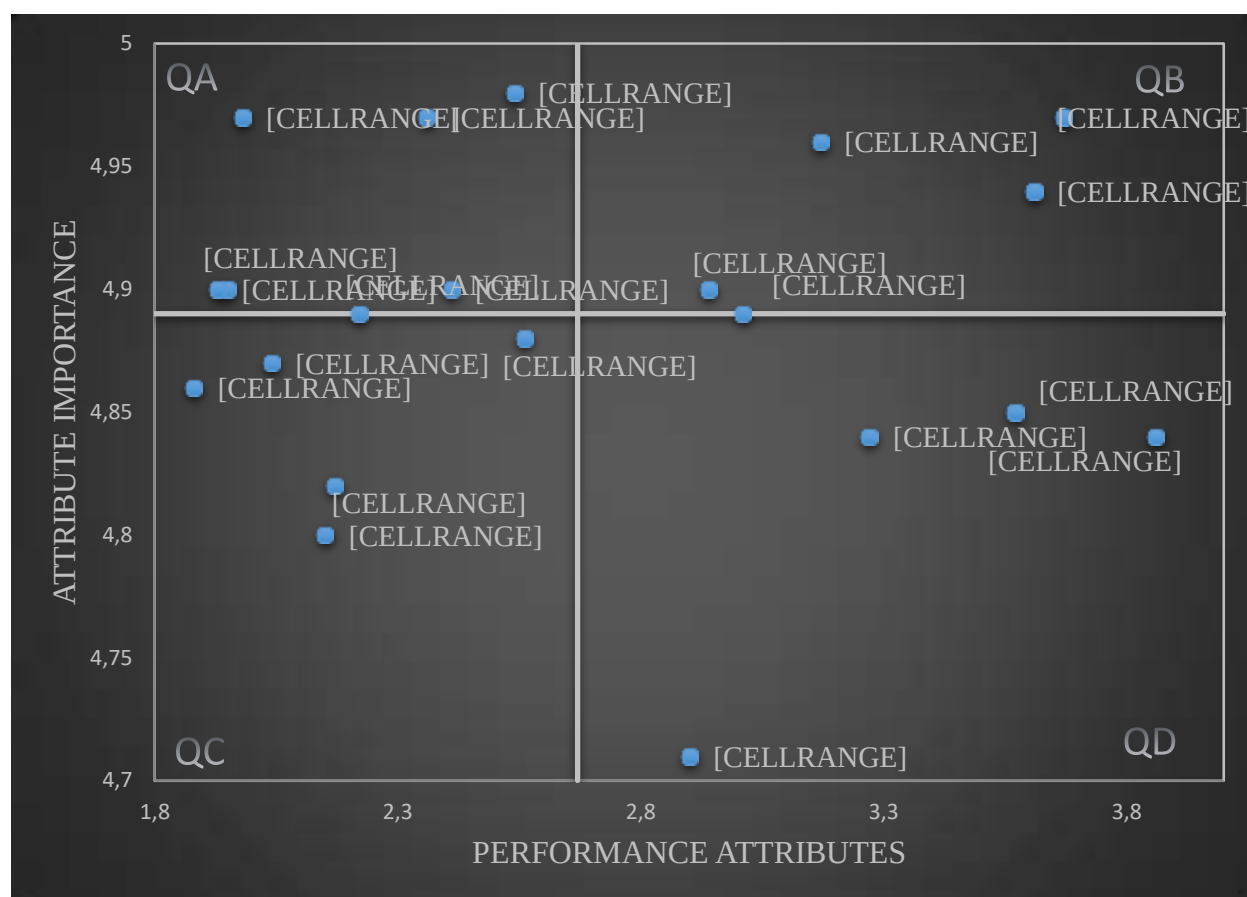


Fig. 4 IPA analysis of service quality sub variable of AUMTCO

Figure 4 shows the Cartesian graph showing users perception against their expectation of the public transport service. For the results the following can be deduced:

- **Quadrant A (Concentrate here / Main Priority):** In this quadrant, the users perception to the service quality of AUMTCO is lower than the user's expectation, or it can be said that the service level of some aspects in quadrant A is still disappointing/unsatisfactory, so the management of AUMTCO should pay attention, and improve some aspects of it. Some aspects that need to be improved/improved quality are: operator's adherence to time schedule, working condition of facilities at the terminal, waiting time, violence and theft control, bus cleanliness, service time schedule, and fast loading and unloading process.
- **Quadrant B (Keep Up good Work):** This quadrant shows some aspects that have been good or are leveled between the performance and expectations of the users, therefore the quality factors in the quadrant needs to be maintained and improved the more. These aspects of L-BRT service are: terminal facilities, number of service vehicles, reliability, safety, and accident control.
- **Quadrant C (Low Priority):** Indicates the level of satisfaction as lower than the user's desire to the service, so it is said to be less satisfactory so it needs to be improved, but that aspect includes low priority scale as the user's desires to the factors in this quadrants are not high. Figure 4 reveals seating facilities at shelters, information on time schedules, customer care, comfortability, and adequate seating/standing space in service buses.

- *Quadrant D (Possible Overkill)*: Factors in quadrant D are considered satisfactory and redundant in their implementation, although the user considers these factors less important. From figure 4 variables in this quadrant include frequency, users' convenience with operators operating hours, and affordability of the service.

4.2 Analysis of Operational Performance

Operational performance was further analysed using hypothesis testing. The hypothesis was to test for the statistical relationship between the overall operational performance in terms of the passenger throughput and fare, safety, reliability, comfortability and waiting time of the bus service.

4.3 Test of Hypothesis Two

1. H_0 : There is no significant relationship between passenger throughput and revenue generated, number of drivers, bus ratio, number trips, and trip hours in AUMTCO.

H_1 : There is no significant relationship between passenger throughput and revenue generated, number of drivers, bus ratio, number trips, and trip hours in AUMTCO.

Tab. 8 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.996 ^a	.992	.977	1083551.0323 91783000

a. Predictors: (Constant), Revenue generated , Trip Hours, Bus Ratio, Drivers

From the model summary in table 8, the computation of co-efficient of determination (R-square) shows that the strength of the relationship (R-square) is 0.992 which is 99.2%. This implies a very strong relationship. It follows that there is a 99.2% relationship between the passenger throughput and revenue generation, bus ratio, number of trips, number of drivers, trip hour of AUMTCO.

Tab. 9 ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	310186863204412.800	4	77546715801103.200	66.049	.015 ^b
	Residual	2348165679594.598	2	1174082839797.299		
	Total	312535028884007.440	6			

a. Dependent Variable: Passenger volume

b. Predictors: (Constant), Revenue generated , Trip Hours, Bus Ratio, Drivers

The result of the ANOVA computation shown in table 9. Indicates that F-cal (66.049) > F-table (18.00) at 0.01 level of significance. Therefore, the null hypothesis is rejected thereby accepting the alternative hypothesis. Thus, it was concluded that there is a statistical significant relationship between the passenger throughput and revenue generation, bus ratio, number of trips, number of drivers, and trip hour of AUMTCO [3].

Tab. 10 Coefficients ^a

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
1 (Constant)	-2751568.520	5165605.338		-.533	.648
Bus Ratio	27719147.190	2372634.424	1.195	11.683	.007
Drivers	-36770.328	7943.710	-.585	-4.629	.044
Trip Hours	2.774	3.514	.075	.789	.513
Revenue generated	.007	.003	.282	2.361	.142

a. Dependent Variable: Passenger volume

In order to evaluate the individual contribution of the independent variables to the stated relationship, the partial correlation ratio (Beta) also known as standard coefficient of the model was applied. The Beta indicates that the bus ratio (which is the ratio of operational vehicles to total vehicle available) contributed most (1.195) followed by revenue generated (0.282), then the trip hours (0.075), the number of drivers (-0.585) which is adversely affecting the passenger throughput. While number of trips variable shows no effect on the passenger throughput as seen in table 11 below

Tab. 11 Excluded Variables ^a

Model	Beta In	t	Sig.	Partial Correlation	Collinearity Statistics
					Tolerance
1 No. of trips	. ^b	.	.	.	.000

a. Dependent Variable: Passenger volume

b. Predictors in the Model: (Constant), Revenue generated , Trip Hours, Bus Ratio, Drivers

5 DISCUSSION

5.1 IPA Analysis of AUMTCO

Results in figure 2 reveals that passengers of AUMTCO spend long time waiting for bus t the bus stop. This indicates that the company is performing poorly as regards to waiting time, hence the need for the company to concentrate on how to improve the waiting time. Nevertheless passengers are satisfied with the company with regards to reliability and safety of the service. These are two good indicators and the company should put more efforts in maintaining them. Meanwhile the customers feels the bus service is too cheap and will not mind even if the fare price in increased in other to ensure achieve reduced waiting time or better still to ensure greater safety and reliability.

5.2 Operational Performance of AUMTCO

The operational performance of AUMTCO is only considered as “Moderate”. This is shown from the result of the analysis in table 4. While, travel speed and time is ‘good’ frequency,

bus ratio and load factor at peak hours is ‘not good’. This poses greater influence on the overall operational performance of the transport system. Thus, the need for improvement in the indicators in order to achieve greater performance. From the further analysis done on the operational performance of the transport system, it shows statistical relationship between operational performance in terms of passenger throughput and bus ratio, number of trips, trip hours, number of drivers and revenue generated.

6 CONCLUSION

This study has identified major findings which is the expectation and the perception level of users towards the services of Abuja Urban Mass Transit Company of Abuja. It was identified that the service are poor because most of the commuters said that the comfortability, reliability, efficiency are not up to standard. The major findings obtained shows that the overall satisfaction of the users is low and the waiting time is on the high side and that these components is very important in the success of transportation operations, thus, the commuters prefer that the operations of Abuja Urban Mass Transit company to improve on their services level and to pay attention to what is important to the users and what is less important. Bus system is used as an alternative of transportation because it has potentials of providing better service quality than other transportation system. Hence it is important to concentrate on improving such available systems. The Abuja bus service is an important transportation that need such concentration. From this study, stakeholders are advised to ensure the system is fast, convenient and secure, and timely in terms of schedule which ultimately improves the quality of bus services. Therefore bus operations needs to be improved steadily, because it is not functioning optimally yet. Recommendations are made that the Abuja urban mass Transit and the Federal Government Capital Territory should creatE park and ride park to increase the passenger throughput and revenue for the company Furthermore, they should create and build good bus stops to reduce walking time and waiting time at the bus stop. This will help to increase the service quality level of the urban mass transit operation in Abuja.

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