**Title Page**

# THE QUALITY OF INTRA URBAN PASSENGER BUS SERVICES IN ZARIA, KADUNA STATE, NIGERIA

**BY**

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## DECLARATION

I declare that the work in this dissertation entitled THE QUALITY OF INTRA URBAN PASSENGER BUS SERVICES IN ZARIA, KADUNA STATE, NIGERIA, has been carried out by me in the Department of Geography. The information derived from the literature has been duly acknowledged in the text and a list of references provided. No part of this thesis was previously presented for another degree or diploma at this or any other Institution.

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## CERTIFICATION

This dissertation entitled THE QUALITY OF INTRA URBAN PERSENGER BUS SERVICES IN ZARIA, KADUNA STATE, NIGERIA, by Okechukwu Herbert ASOGWA meets the regulations governing the award of the degree of Transport Management of the Ahmadu Bello University, and is approved for its contribution to knowledge and literary presentation.

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## DEDICATION

This dissertation is dedicated to God Almighty for His divine gift of life and favor He rendered on me to carry out this work, and also to my family members for their love, care and support throughout the period of my studies.

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## ABSTRACT

Regardless of the vital role that intra urban transportation play in any urban area, their services are frequently insufficient to meet passengers demand and services for their daily commuting. This study assesses the quality of intra urban passenger bus services in Zaria urban area, Nigeria, taking into recognition the perception of passengers. The specific objectives were to map the area coverage and route of intra urban passenger bus services, estimate the average walking distance, waiting time, passenger's access to areas of bus pick up and alight points, determine the passenger bus service quality attributes that influence passenger satisfaction and transportation problems encountered by passengers and investigate the passengers' perception on the quality of bus services in the study area. A purposive sampling technique was used in the administration of questionnaire to 384 passengers. A five-point Likert scale with "strongly agree" equal 5, "agree" equal 4, "undecided" equal 3, "disagree" equal 2, and "strongly disagree" equal 1 was used in the rating. Maps, descriptive statistics, tables, graphs and percentage analysis were used to summarize the data collected. This study revealed that majority of the passengers (74.5%) walk within the range of 1-400 metres to access a bus, and a total of 73.5% of the passengers waited between 1 - 20 minutes before the arrival of a bus, while 44.5% of the passengers walk to their nearest bus pick up and alight point. Furthermore, the study revealed that passengers showed satisfaction with transport price with a mean of (3.4), and were undecided on the sufficiency of buses and frequency of bus services with a mean of (3.0), resulting to the conclusion that passengers of public bus transport are not satisfied with the services provided in Zaria urban area of Kaduna state. The study therefore recommends "quality indicators" for public bus transport to be used to benchmark high quality.

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# CHAPTER ONE

# INTRODUCTION

## 1.1 BACKGROUND OF THE STUDY

Urban transport services in Nigeria is inadequate both in qualitative and quantitative terms considering the rate of population growth and the economic condition of an average Nigerian on the affordability of transport services to meet his or her travel demands over the past four decades. The structural adjustment programme of the middle 80's had made the importation of new automobile vehicles relatively expensive to purchase for urban mobility in the country. Similarly, the price of motor spare parts had risen astronomically and many Nigerians could hardly maintain their old vehicles which invariably compounded the mobility issues in Nigerian. Incidentally, most of urban trips in Nigeria are made by road, rail and water based mode and these accounted for about 95%, and the remaining 5% were mainly by walking (Oyesiku, 2001).

Transport is important for the survival of modern society and without it there would be no life in the city (Onokala, 2001). As an essential service in urban centers', Transport enables people, firms and other organizations to carry out their activities at sites selected for these purposes in separate locations in the cities. Transport provides a key to the understanding and operation of many other systems at many different scales, and is an epitome of the complex relationships between social and political activities and the level of economic development, Buchannan (1969); (Hoyle and Smith 1992). Today, experiences show a need for a greater variety of public transport modes, but buses are choice of a majority of the communities and are the only means of mobility that can be afforded by the poor in developing countries of the World, (Armstrong 1993). The choice of any or a combination of the public transportation

systems enumerated above could be influenced by population and area/size of the urban area, their transportation demands and characteristics and land use pattern. Given our level of technological development, the bus system is chosen in this work. The bus system is the transportation system that uses bus which have a range of passenger capacities and performance characteristics, and may operate on fixed routes with fixed schedules, or may be flexibly routed (Smerk, 1974).

Bus also called Omnibus is any of a class of large self propelled wheeled vehicles that is designed to carry passengers generally on fixed routes. Because of the high population in cities of developing countries, buses provide an easy means of transport that they can afford (Armstrong, 1993); Thus the quality of transport services provided by busses needs to be addressed. Bus system has the potential of being used as a policy tool to reduce the number of cars on urban roads and so, reduces traffic chaos in the city. It has also the potential of extending transportation services to a greater proportion of urban residents who do not have private cars, and cannot afford frequent taxis fares (Andeleeb, 2007). These are "captive" bus riders. The bus riders seek a convenient ride between their points of origin and destination. They do not wish to walk very far to their bus stops. Having arrived at the bus stop, they do not wish to wait for a very long time (Faulks, 1990). Added to this, they require comfortable ride at a fare which they can afford (Disney, 1998).

It is pertinent to note that, of all the trips made by vehicles 70% were by public transport; which is dominated by private sector operators. According to Oyesiku (2002), more than 95% of all urban public transport journeys in Nigeria were provided by private operators using mainly taxis and transit buses. It is interesting to note that many of the urban residents are less accessible to these transport services. Besides, the service delivery of public transport operators is less

satisfactory to the urban commuters in Nigeria. Most of the research works carried out on the mode of operation of public transport services in Nigeria do not consider the quality of transport services in relation to comfort, affordability, safety and income level; which are all of paramount important to mobility pattern of urban residents in any country of the world. To keep and attract more bus passengers, public bus transport must have high service quality to satisfy and fulfill a wider range of different passengers' needs. Increases in passenger satisfaction are translated into retained markets, increased use of the system, new customers, and more positive public image.

Assessing and improving the quality of bus transit service holds a great priority for all stakeholders associated with transport. The international literature on public transport specifically on bus transit service revealed the great value of improving the quality of the services and offered numerous applications. The transport literature review emphasized the essential need to identify concise methods of measuring and evaluating bus transit quality based on different perspectives, not only to overcome the multidimensionality of bus transit stakeholders, but also to identify the relative impacts of the service quality over all bus transit service stakeholders.

The term service quality in the transportation has long been investigated and has been defined as; the quality criteria and the accurate measures for which the providers are responsible to provide the measurement process on how the service quality level delivered, matches the customer satisfaction. The assessment that reflects users` perceptions towards the service, the pre-defined standard of service attributes relatively to the actual service quality, the measuring of customer expectation on a constant service standard base. These definitions have opened the door for further in-depth analysis of the quality process in the context of bus transit service.

## 1.2 STATEMENT OF THE RESEARCH PROBLEM

The introduction to the 2010 National Transport Policy document, page 4 states that; "At present, the Nigerian transport system functions in a crisis situation", and one of the principal causes, it identified was "a major imbalance between the needs of Nigerian society and economy for adequate transport facilities and the ability of the transport sector to meet such demands". This statement remains valid today, in respect of the quality of services most of the transport systems render. The fundamental goal of the National Transport Policy of Nigeria 2010 is to develop an adequate, safe, environmentally sound, efficient and affordable integrated transport system within the framework of a progressive and competitive market economy. Given the current condition of most of the transportation sector the rate at which the goals can be achieved will be subjected to the realities of resource availability, and practical implementation constraints. It is therefore essential that the implementation of policy is based on a careful prioritization of goals and objectives and that plans in each of the transport modes are realistic and consistent. Thus, some of its objectives focused on the provision of public transport and its overall quality such as: To promote the use of public transport over private cars; to promote a culture of maintenance and continuous upgrading of transport infrastructure and services; to promote competition and efficiency and cost reduction of transport services in Nigeria; to improve the safety, security, reliability, quality, and speed of movement of goods and people, at local, national, and international levels.

In most cities of Nigeria, Zaria urban area in particular, the quality of passenger bus services is poor in terms of the time spent in waiting for a bus to get filled up by passengers, the overload of passengers in the bus especially on the engine seat of the buses, hanging of bus conductors on the door due to the nature of congestion in the bus, driving of buses by unskilled

persons, the use of rickety buses which usually breakdown along the road, and improper fare charges especially from PZ to Samaru, insisting that passengers pay a fixed amount of money once they cross the fly over bridge (Kwangila). As a result of the above problems, passengers tend to be discouraged from patronizing the public bus services within Zaria urban area, especially private cars owners. Thus this limits the achievement of the National Transport Policy of Nigeria 2010 in promoting the use of public transport over private cars.

Previous studies on public bus transport services at national and local levels, focused on constraints (Aworemi, 2009; Aderamo ,2010), impacts (Gbadamosi, 2009; Ashiedu, 2011), effect of congestion on vehicle movements (Ibitoye, 2012), waiting time, walking distance, convenience and safety (Francis, 2013). There is scanty literature on passenger satisfaction with levels of public bus service provision in Nigerian cities. To keep and attract more bus passengers, public bus transport must have high service quality to satisfy and fulfill a wider range of different passengers' needs. Customer satisfaction with transportation services can be placed in the framework of stakeholder (passengers) interest. Zaria urban area is characterized with Institutional organizations, neighborhood settlement pattern and as such activities take place, they attract passenger's movement within the settlement. As such, different types of vehicles provide services to the commuters to work place, to kingship visit, to hospitals and schools. The nature of operation of the vehicle as it affects service quality that has to do with efficiency, safety, availability, comfort, affordability, information, esthetics; etc are poor in Zaria urban area. So also is the characteristics of movements, which is characterized with lots of picks and drops, continuous alighting and picking which adds to the travel time. No wonder it takes not less than 35 - 45 minutes to commute from Zaria city to Samaru and even more in the evening

after closing from work. This and other reasons motivated the need to assess the quality of intra urban passenger bus services in Zaria, Kaduna State, Nigeria.

The research questions addressed by this study have been summarized below:

i. What is the area coverage of intra urban passenger bus services in the study area?
ii. What is the average walking distance, waiting time and passenger's access to bus pick up and alight point?
iii. What are the service qualities attributes that influence passenger satisfaction?
iv. What are passengers' perceptions about the quality of bus services?

## 1.3 AIM AND OBJECTIVES OF THE STUDY

The aim of this study was to assess the quality of intra urban passenger bus services in Zaria, Kaduna State, Nigeria, and make recommendations on possible improvements on the operations.

The specific objectives of the study are to:

i. map the area coverage and route of intra urban passenger bus services in the area;
ii. estimate the average walking distance, waiting time, passenger's access to areas of bus pick up and alight point;
iii. assess the passenger bus service quality attributes that influence passenger satisfaction and transportation problems encountered by passengers; and
iv. investigate the passengers' perception on the quality of bus services in the area.

## 1.4 SCOPE OF THE STUDY

This study is on the quality of intra urban passenger bus services in Zaria urban area, Nigeria. The study will estimate the average walking distance, waiting and travel time for a passenger; determine the service quality attributes that influence passenger satisfaction, investigate the

perception of passengers on the quality of bus services and map out the coverage area and route of intra urban passenger bus services.

The spatial scope of Zaria urban area is premised on the fact that Zaria is seen to be a centre for learning (educational area). Thus, the need for people to move from their places of work to their homes arises. As such, the public bus has a significant role to play in helping the people fulfill their daily activities.

Since the movement of passengers within Zaria urban area is a daily affair, the temporal scope of the work is limited to one month.

## 1.5 SIGNIFICANCE OF THE STUDY

The need to understand the quality of intra urban bus services cannot be overemphasized. Knowledge about the quality of intra urban bus services is important for transport policy formulation to improve the efficiency of urban bus services. One of the policy objectives of the Draft National Transport Policy, August, 2010 of Nigeria is to promote the use of public transport over private cars, and in trying to achieve this, the quality of bus services is of important value to the passengers. Improving the efficiency of bus services can lead to reduce system congestion, reduced delay, improving delivery time and a safe and environmentally friendly environment.

# CHAPTER TWO

# LITERATURE REVIEW

## 2.1 CONCEPTUAL FRAMEWORK

### 2.1.1 Public Transportation

This refers to transportation by bus, rail, or other conveyance, either publicly or privately owned, which provides to the public general or special service on a regular and continuing basis, also known as "mass transportation," "mass transit," and "transit."

### 2.1.2 Bus (Motorbus)

A bus refers to a rubber tired, self propelled, manually steered vehicle with fuel supply carried on board the vehicle. Types include advanced design, articulated, charter, circulator, double deck, express, feeder, intercity, medium size, new look, sightseeing, small, standard size, subscription, suburban, transit , and van.

### 2.1.3 Passenger

This refers to any occupant of a motor vehicle travelling in or upon the vehicle who is not the driver.

### 2.1.4 Types of bus routes

i. **Radial routes** (or trunk routes) are the backbone of a transit system and operate mainly along arterial streets. Radial routes typically serve the Central Business District (CBD) or urban core and are considered the nucleus of the transit network. These routes are characterized by frequent stops, short passenger trips, and relatively slow average bus speeds.

ii. **Cross town routes**, on the other hand, are non radial in nature and do not serve the CBD directly. Cross town routes are used to link major activity centers with direct routing or serve high density corridors outside the CBD. They generally intersect radial lines, and schedules should be coordinated to provide optimal transfer connections.

iii. **Circulator routes** provide service that is confined to a specific location, typically downtown or residential areas. Circulators connect to major activity centers and allow passengers to transfer to other routes to gain access to the rest of the network. They typically operate in a loop fashion, sometimes with only one way directional service.

iv. **Feeders or shuttle service** provide service in higher density or higher demand areas that feed to other routes in the system, an activity center, or another mode of transportation (air, rail, etc.). Routing is generally short and as direct as possible to maximize customer convenience. Special event service can be classified as feeder service.

v. **Regional service** provides transportation that is regional in nature, connecting one major urban area with another major urban area. Regional routes are typically long with few stops and act as a limited stop or express type of service.

### 2.1.5 Bus Stop Location

Generally, stops should be located at the far side of an intersection to facilitate bus and traffic operations. However, far side stops are occasionally impractical or conflict with existing development. Specific attributes of potential transit stops must be reviewed. Sight distance is critical. Transit drivers need to be able to see to the rear sufficiently to safely re enter traffic, following vehicles need to see the stopped bus in time to safely stop or merge left, and vehicles

on side streets or driveways need to be able to see oncoming traffic (Grand Junction/Mesa County MPO Transit Design Standards and Guidelines 2003).

Near side stop – use in combination with a far side stop if transfer activity shows strong directional pairing to minimize pedestrian crossings. Far side stop – use when there is a high volume of right turns or the route alignment requires a left turn (stop is after the left turn) or at complex intersections with multi phase signals or dual right/left turn lanes. Mid block stop – use when the route alignment requires a right turn and the curb radius is short (Transit Authority of River City Transit Standards Manual: A Reference Guide 2006).

Bus stops at intersections should be located in the safest position, considering traffic and street conditions. Where possible, stops should be located close to signalized intersections (York Region Transit – Transit Service Guidelines 2006).

Far side stops are preferable where buses can pull out of the main traffic lane and maneuver to the curb. Near side stops are preferable where traffic is heavier on the leaving side than on the approaching side of the intersection. Mid block stops should be avoided unless block faces are long or unless stops serve a major trip generator (Service Evaluation & Performance Measurement Program Madison Metro 2000).

Bus stops should be located as close to the corner as possible to facilitate transfers and promote safe pedestrian crossings. Location on the far side of the intersection is standard (Valley Metro Performance Criteria and Service Standards 1999).

## 2.2 Service Quality Indices

Service quality refers to how transit is perceived by users. Dhinghi (2011); Hale (2011); Kenworthy (2008); Kittleson & Associates (2003); Litman (2008 and 2011); Marsden and Bonsall (2006); Stradling, *et al.* (2007); TRB 2010; Tomer, *et al.* (2011); and Tumlin, *et al.* (2005); provide guidance on evaluating transit service quality from various perspectives, considering the following indices:

a. Availability (when and where transit service is available), and coverage (the portion of a geographic area, or the portion of common destinations in a community, located within reasonable distance of transit service.

b. Frequency (how many trips are made each hour or day).

c. Travel speed (absolute and relative to automobile travel).

d. Reliability (how frequently service follows published schedules).

e. Integration (ease of transferring within the transit system and with other travel modes).

f. Price structure and payment options.

g. User comfort and security, including riding on, walking to, and waiting for transit.

h. Accessibility (ease of reaching transit stations and stops, particularly by walking).

i. Universal design (ability to accommodate diverse users including people with disabilities, baggage, inability to understand local languages, etc.).

j. Affordability (user costs relative to their income and other travel options).

k. Information (ease of obtaining information about transit services).

l. Aesthetics (appearance of transit vehicles, stations, waiting areas and documents).

m. Amenity (extra features and services that enhance user comfort and enjoyment).

### 2.2.1 Service Quality and Measurement

In recent years, institutions, companies and academia have gradually focused their attention on service quality and the passengers' customer satisfaction. In particular, public transport, since long dominated by a "production-oriented approach", is tending towards a "customer-oriented approach". This change underlines and reiterates the importance of analyzing and measuring service quality in view of that fact, an improved service quality might attract more users. Customer satisfaction surveys, usually implemented with a questionnaire, are the most common tools to measure service quality and data are generally gathered through the SERVQUAL method (Parasuraman *et al*. 1988, Deveraj *et al*. 2002, Hartikainen *et al*. 2004, Lai 2006). The SERVQUAL method is a multi-item scale for measuring service quality and to determine the relative importance of the different dimensions influencing customers' overall quality perceptions on a five to seven-point Likert scale. Likert scale is a scale showing respondents' agreement or disagreement. It measures the degree to which people agree or disagree with a statement, usually on a 3 – 5, or 7 point scale. The main idea is to identify the gap between expectations and perceptions. It identifies the most salient quality dimensions for each target market and compares itself to the competition in terms of strengths and weakness regarding these particular dimensions (Parasuraman *et al*. 1988). See table 2.1.

Table 2.1 The SERVQUAL Description

| **Dimensions** | **Description** |
|---|---|
| Tangibles | Physical facilities, equipment, and appearance of the personnel |
| Reliability | Ability to perform the promised service dependably and accurately |
| Responsiveness | Willingness to help customers and provide prompt service |
| Assurance | Knowledge and courtesy of employees and their ability to inspire trust and confidence |
| Empathy | Caring, individualized attention the firm provides its customers |

Source: Parasuraman *et al*. 1988.

Another way to obtain data for measuring service quality is based on SP analysis that overcomes some critical factors linked to the use of scales. These include: psychometric problems, conceptual basis and difficulty in translating evaluations into quantitative measures (Gatta, Marcucci 2007). In particular, quality is linked to the utility achieved by the consumers. The utility of each choice alternative is composed by a systematic and a random component. The framework theory is the Random Utility Theory (RUT), originally proposed by Thurstone (1927). Here, service quality dimensions (attributes) are needed to diversify the hypothetical alternatives.

### 2.2.2 Level of Service Concept

A level of service (LOS) is a letter designation that describes a range of operating conditions on a particular type of facility. The 1994 Highway Capacity Manual defines levels of service as "qualitative measures that characterize operational conditions within a traffic stream and their perception by motorists and passengers." The critical point in this definition is the need to define service quality in terms that are perceived by drivers and passengers. Several key measures are used to describe service quality in these terms:

i. Speed and travel time: One of the most easily perceived measures of service quality is speed, or its inverse, travel time. Drivers and passengers alike are keenly aware of the amount of time it takes to get from place to place. On freeways, speed is a very evident measure of service quality, while on street systems, the driver is very sensitive to total travel time.

ii. Density: Density is a parameter not often used in traffic analysis. Nevertheless, it is an excellent descriptor of service quality in many cases. Density describes the proximity of vehicles to each other in the traffic stream and reflects ease of maneuverability in traffic stream, as well as the psychological comfort of drivers.

iii. Delay: Delay can be described in many ways. Highway capacity analysis uses delay in several different ways. At intersections, delay is defined in terms of the average stopped time per vehicle traversing the intersection. On rural two-lane highways, percent time delay is defined as the percent of time that all drivers spend in platoons behind slow-moving vehicles they cannot pass. In any of its uses, it represents excess or additional travel time due to traffic conditions or controls. Delay times are portions of travel time that are particularly obvious to drivers and are particularly annoying or frustrating.

iv. Other measures: A variety of other measures are used to describe service quality. In some cases, measures used are not directly discernible to drivers or passengers. Such measures generally rely upon volumes or flow rates because the state of the art does not yet include other calibrated quality measures.

#### 2.2.2.1 Level of Service Definitions

Six levels of service are defined for capacity analysis. They are given letter designations A through F, with LOS "A" representing the best range of operating conditions and LOS "F" the worst. The specific terms in which each level of service is defined vary with the type of facility involved. In general, LOS "A" describes a free-flowing condition in which individual vehicles of the traffic stream are not influenced by the presence of other vehicles. LOS "F" generally describes breakdown operations (except for signalized intersections) which occur when flow arriving at a point is greater than the facility's capacity to discharge flow. At such points, queues develop, and LOS "F" exists within the queue and at the point of the breakdown. Levels of service "B", "C", "D", and "E" represent intermediate conditions, with the lower bound of LOS "E" often corresponding to capacity operations.

i. Level of Service A: This is a condition of free flow, accompanied by low volumes and high speeds. Traffic density will be low, with uninterrupted flow speeds controlled by driver desires, speed limits, and physical roadway conditions. There is little or no restriction in maneuverability due to the presence of other vehicles and drivers can maintain their desired speeds with little or no delay.

ii. Level of Service B: This occurs in the zone of stable flow, with operating speeds beginning to be restricted somewhat by traffic condition. Drivers still have reasonable

freedom to select their speed and lane of operation. Reductions in speed are not unreasonable, with a low probability of traffic flow being restricted. The lower limit (lowest speed, highest volume) of this level of service has been used in the design of rural highways.

iii. Level of Service C: This is still in the zone of stable flow, but speeds and maneuverability are more closely controlled by the higher volumes. Most of the drivers are restricted in their freedom to select their own speed, change lanes, or pass. A relatively satisfactory operating speed is still obtained, with service volumes suitable for urban design practice.

iv. Level of Service D: This level of service approaches unstable flow, with tolerable operating speeds being maintained, though considerably affected by changes in operating conditions. Fluctuations in volume and temporary restrictions to flow may cause substantial drops in operating speeds. Drivers have little freedom to maneuver, and comfort and convenience are low. These conditions can be tolerated, however, for short periods of time.

v. Level of Service E: This cannot be described by speed alone, but represents operations at lower operating speeds, typically, but not always, in the neighborhood of 30 miles per hour, with volumes at or near the capacity of the highway. Flow is unstable, and there may be stoppages of momentary duration. This level of service is associated with operation of a facility at capacity flows.

vi. Level of Service F: This describes a forced flow operation at low speeds, where volumes are below capacity. In the extreme, both speed and volume can drop to zero. These conditions usually result from queues of vehicles backing up for a restriction downstream.

The section under study will be serving as a storage area during parts or all of the peak hour. Speeds are reduced substantially and stoppages may occur for short or long periods of time because of the downstream congestion.

### 2.2.3 Quality Loop

In order to understand and assess bus transit service quality, the process of quality management must be broken down into manageable items and the correlation between these items must be investigated. Based on that fact, CEN (2002) has developed and proposed the service quality loop which explains the process of quality management. The quality loop has identified three basic aspects which influence the overall quality process including; quality, satisfaction, and management. Furthermore, the quality loop has introduced in-depth analysis for these three aspects. This analysis has identified four different types of quality aspects, two levels of satisfaction, and different proposals for quality management processes.

However, CEN (2002) has identified the different correlations between the quality loop aspects. This correlation analysis has revealed sixteen different correlations. Firstly, CEN (2002) identified the positive correlations between the individual items of the service quality, on one hand, and the correlations between the overall service quality and these items – desired, targeted, delivered, and perceived – quality on the other hand. Nathanail (2008) identified the positive one direction correlation between the overall service quality – desired, perceived, targeted, and delivered – and the overall user satisfaction. While, Lai and Chen (2010) broke down this conclusion into more detailed analysis in which they have identified that, service quality has a positive correlation with perceived quality, and overall quality with perceived quality have a positive correlation with user level of satisfaction. Users` satisfaction has a major

impact on both level of involvement and user loyalty (behavioural intentions). However, the entire correlation analysis for bus transit quality loop is illustrated in Figure 2.1.

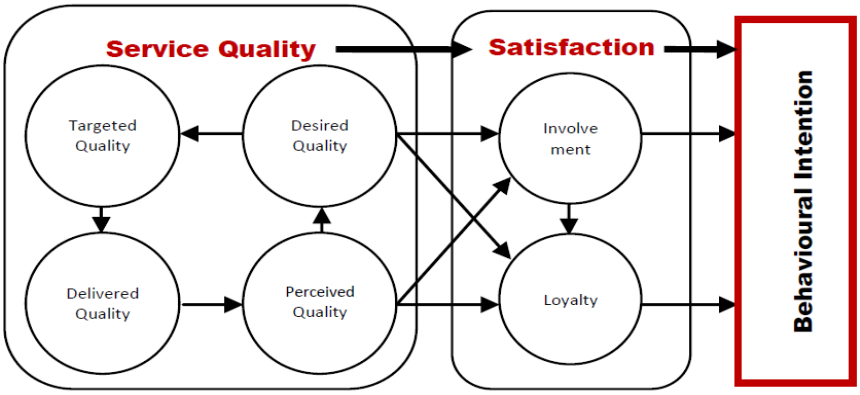



Figure 2.1: Service quality loop correlation analysis

Source: Adopted from CEN, (2002), Lai and Chen (2010) and Nathanail (2008).

### 2.2.3.1 Quality Gaps

The transport literature has identified several gaps associated with bus service quality loop. These gaps include the issues of identifying the level of satisfaction for potential and current users, the difference between operational and physical quality measurements, and the integration between strategic policy direction and targeted quality. The quality process gaps are illustrated in Figure 2.2.

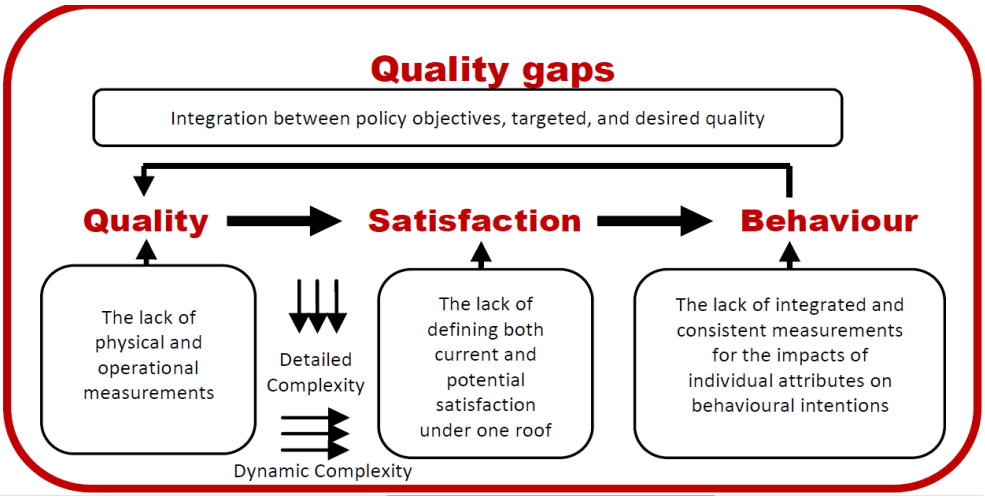



Figure 2.2: Quality Gaps

Source: Adapted from CEN, (2002), Lai and Chen (2010) and Nathanail (2008).

### 2.2.4 Satisfaction and Service Quality Dimensions

Satisfaction is a multidimensional construct (Oliver 1997). The idea of a generic structure of quality factors composing the overall satisfaction response has received a great amount of attention. An early example of this is Gronroos' (1984, 2000) model of service quality as consisting of two broad groups of service attributes - technical and functional - corresponding to what the customer receives and how he/she receives it. In line with this tradition, several attempts have been made to specify this broad dichotomy further, with the aim of finding more specific, yet still generic dimensions of service quality. In an ambitious research program, Parasuraman, Zeithaml, and Berry (1985, 1994) and Zeithaml, Berry, and Parasuraman (1988) identified five such generic service dimensions: reliability, assurance, tangibles, empathy, and responsiveness. These or similar dimensions have been widely used in service research and practice (including in Parasuraman et al.'s own SERVQUAL instrument).

It could also be argued that the dimensions of Parasuraman et al. (1994) are adapted to service situations dominated by personal interaction between customers and service employees. This could make them difficult to apply to services like public transport, which are more reliant on technical perceived satisfaction with public transport systems and physical artifacts. In the aforementioned study by Friman (2001), for example, it was shown that tangibles and system properties were prominent features of the service experience. Without going into details regarding the critique against the generic models and the ensuing debate, it makes sense to apply the idea of generic service quality dimensions with some care. Even within the same industry, there might be considerable differences in how the service is perceived by the customers, due to various ways of producing the actual service and due to customer differences. Such differences do not reduce the value of satisfaction measurement.

## 2.3 Relevance of Public Bus Transport

The level of public transport provision in the third world countries is very low and public transport supply cannot cope with the demand. This is due to rapid urbanization and the increasing economic activities in the developing countries which make it difficult for the transportation needs of the people to be fully satisfied. According to Hilling (1996), there are 40 percent fewer buses per head of population in the third world and the average number of buses operated per 100,000 populations is 65, whereas in the United Kingdom, the figure is 90. In low-income households in Jamaica, Heraty (1980) found only one car per 49 persons while in Beijing, private car ownership is almost non-existent and 45 percent of all journeys are made by bicycle (Lam, 1992). In West African cities, generally, car ownership levels is very low, an average of 5 - 15 per 1000 population (Barret, 1986). This compares poorly with cities of the developed countries with an average of 20 - 40 cars per 100 inhabitants (White, 1990). In the

developed environment where similar mobility problems exist or where there are some signs of crisis, the majority of the populace rely heavily on various forms of public transport for their movement (Nash,1997).

The advantages of public transport are many; amongst them are its effective use of space, more energy efficient, emit less airborne pollutants, minimize the amount of land used for transport purposes including parking and generally result in better physical environment in urban areas (Hilling, 1996). Public transport has also proved to be an effective tool in combating congestion (Banister, 1998). Because of the numerous advantages of public transport, governments in third world countries are now becoming aware that for developing countries to be more productive, improving public transport should be one of the most pressing items on their agenda. In countries where public transport is provided, the need to make their operations functional in order to satisfy the mobility needs of the people also becomes pertinent.

Today in Nigeria, one of the essential means of facilitating movements within the cities is through public transports. Public transport systems provides the most efficient means of moving large numbers of people especially in density populated urban centres. White (2002) opines that public transport is all modes of transportation available to the public, irrespective of ownership. Mass transport systems are varied, they are either land based (rail), road based mass transit system or water based. Common modes of public transport systems includes buses and mini-buses, shared taxis, and converted pick-ups vans, motor scooters, auto rickshaws and pedal rickshaws. In some coastal areas especially in Bayelsa, Cross River, parts of Lagos, Delta and River State, public transport could be commercial transport boat which can carry more than 20-25 people at a time. In developing countries, the dominant mode of public transport is road based. (Adesanya, 2011; Asiyanbola, 2007) opined that public transport as an integral back

bone of urban life is one of the factors which determines the forms and socio-economic development of a city.

The importance of public bus transport stemmed from the fact that it provides mobility for those who cannot afford to buy a car and helps in creating and maintaining livable communities by relieving high way congestion and assuring long-term sustainability in terms of resources consumption (Paul, 2001). Problems pervading urban transport sector in most developing countries range from inadequate and poor quality of infrastructures mismatch between demand and supply. These problems are triggered by interrelated trends such as urban population growth, rapid unplanned urbanization and rapid uncoordinated growth of cities (Aderamo, 2011). Today, experiences shows a need for a greater variety of public transport modes, but buses are choice of majority of the communities and are the only means of mobility that can be afforded by poor in the developing countries (Armstrong, 1993). The bus system is the transportation system that uses buses that may have a range of passenger's capacities and performance characteristics, which may operate on fixed routes with fixed schedules or may be flexibly routed.

## 2.4 Sustainable Urban Transport

A sustainable urban transport system requires strengthening various features of the system including mobility, accessibility, affordability, social equity, efficiency, safety, security, convenience, low carbon, comfort, and environment friendliness. In order to achieve all these elements, various challenges need to be addressed in an integrated manner. These challenges include improving human health through the reduction of urban air pollution, tackling climate change, reducing the number of deaths and injuries from road accidents, controlling excessive motorization, improving public transport services, encouraging more walking and cycling, and

recognizing the specific needs of urban poor, women, the elderly, people with disabilities, youth, and children. It is critically important to understand that urban transport (or mobility) is not an isolated issue and is related to many other aspects of urban life in general.

In general, sustainable transport emphasizes the use of public transport, bicycles and walking and discourages the use of individual motorized modes of transport (cars and motorcycles). It also promotes the improvement of institutions, urban development plans, sound policies, appropriate technologies and the development of promotional schemes that persuade users into using sustainable urban transport modes.

### 2.4.1 Push and pull approach

One way to view the problem is to analyze it from the standpoint of "where" people should be in transport (where we should "push" them) and from which modes we should "pull" them. This is commonly called the "push and pull" approach. It emphasizes that urban transport measures must persuade users into using public transport and nonmotorized transport, while developing strategies to "push them out" of automobiles and similar transport modes. To achieve the "pull" component, one must provide good quality of service in public transport, develop infrastructure for public transport and non motorized transport and in general develop policies that improve conditions for the use of these modes. To arrive at a situation where people are "pushed from cars", policies must be in place to discourage their use by eliminating fuel subsidies, creating charges to automobile ownership and use, and in general creating policies that increase the cost of using these modes while using the revenue from those charges to enhance sustainable urban transport modes. This approach is generally used by transport economists as it follows a rationale of "price-driven-behavior".

## 2.5 Benefits of Improved Bus Service

Improved bus service can bring about significant benefits to the community as a whole by introducing a cost-effective, reliable and affordable transportation system.

### 2.5.1 System benefits

In terms of transportation and system benefits, enhanced bus services combine the advantages of rail system such as “network flexibility” with the advantages of bus systems in terms of lower operation and maintenance costs. The main benefits concern travel time, reliability and punctuality, as well as perceptions of improvement in safety, image and identity (FTA, 2009).

When running along exclusive right-of-ways or benefiting from priority signalization, enhanced bus services operate at a higher average speed than conventional local bus routes and demonstrate a better adherence to scheduling. Travel time savings are strengthened when the system allows for pre-paid fare collection and all-door boarding (FTA, 2009).

The most significant effect of these improvements is an increase in transit ridership. Transit authorities surveys indicate that additional ridership has mostly come from passengers that are new to transit (FTA, 2009).

### 2.5.2 Community Benefits

***Transit-Supportive land development***

Significant positive development effects can result from the development of a new bus service or the improvement of an existing one. Transit infrastructures and facilities such as bus stations have the potential to shape urban development by fostering accessibility to employment and

economic centers, increasing property values and creating more livable places (FTA, 2009). These new developments will feature higher densities and intensity of uses, emphasizing a greater mix of activities including housing, employment, retail, and leisure activities.

***Environmental quality***

In terms of environmental impacts, additional ridership suggests that some people have given up their cars to opt for public transit, contributing to reduce traffic congestion and automobile emissions.

# CHAPTER THREE

# THE STUDY AREA AND METHODOLOGY

## 3.1 The Study Area

### 3.1.1 Physical Setting of the Study Area

#### 3.1.1.1 Geographical Location of the Study Area

The study area is in Zaria, Kaduna State, Nigeria. Zaria is located on the High plains of northern Nigeria and lies between latitude $11^{0}00$ and $11^{0}28$ North of the equator and longitude $7^{0}31$ and $7^{0}53$ East of the Greenwich meridian (see Figure 3.1). The town is almost centrally located in Northern Nigeria and is a major city in Kaduna state (Satellite Imagery 2014). The plane of Zaria is on an undulating one, which is gently rolling and above 670m above mean sea level and has numerous valleys and streams (Wright and McCurry, 1970).

#### 3.1.1.2 Drainage

Zaria is drained by three major rivers namely; Kubani River, Saye River and Galma River. The climatic characteristics are that of the tropical savanna, marked by an alternating wet and dry seasons. The area experiences a tropical continental climate, which is characterized by distinct wet and dry seasons. Analysis of the long term records of rain fall from Institute of Agriculture Research and the meteorological station Zaria, shows that the area enjoys mean annual rainfall of 1060mm (Hore, 1970).

#### 3.1.1.3 Physical Form of Zaria urban area

There are two Local Government Areas (LGAs) in the study area: Zaria LGA (this comprises Zaria city, Wusasa, Kongo and Tudun Wada), and Sabon – Gari LGA (which includes

Sabon – Gari, Basawa, Chikaji, and Samaru). Zaria has numerous industries and institutions of learning, which include primary schools, secondary schools and tertiary institutions for acquisition of knowledge and skills.

### 3.1.1.4 Climate

Zaria experiences the typical seasonal climate of northern Nigeria. It belongs to the Aw climate of the Koppen's classification that has two distinct seasons; the dry or the harmattan season lasting between October to May, while the other season is the rainy season and lasts from May to October. The temperature of Zaria varies throughout the year. Mean monthly minimum temperature rises gradually from its lowest 9.4°C in December to its highest 26.0°C in April, while mean monthly maximum temperature rises gradually from its lowest 29.7°C in January to highest 40.6°C in April.

### 3.1.1.5 Population

Zaria LGA has the second largest population in Kaduna State, with a total of 406,990, with 210,900 males and 196,090 females (NPC, 2009). The indigenous people are generally referred to as 'zazzagawa' or 'zage zagi', and they constitute 'Hausawa' and Fulani, and they speak Hausa and Fulfulde. The major languages across northern Nigeria and some sub-Sahara African countries. There are other ethnic minorities such as Yoruba and Igbo among others who have come as immigrants from the western, eastern and other parts of the country. Islam is the major religion with Christianity and other traditional religions. Despite being an administrative, commercial, transportation and manufacturing centre; it is Zaria's educational function that most influences its character today and gives it distinction as an urban centre.

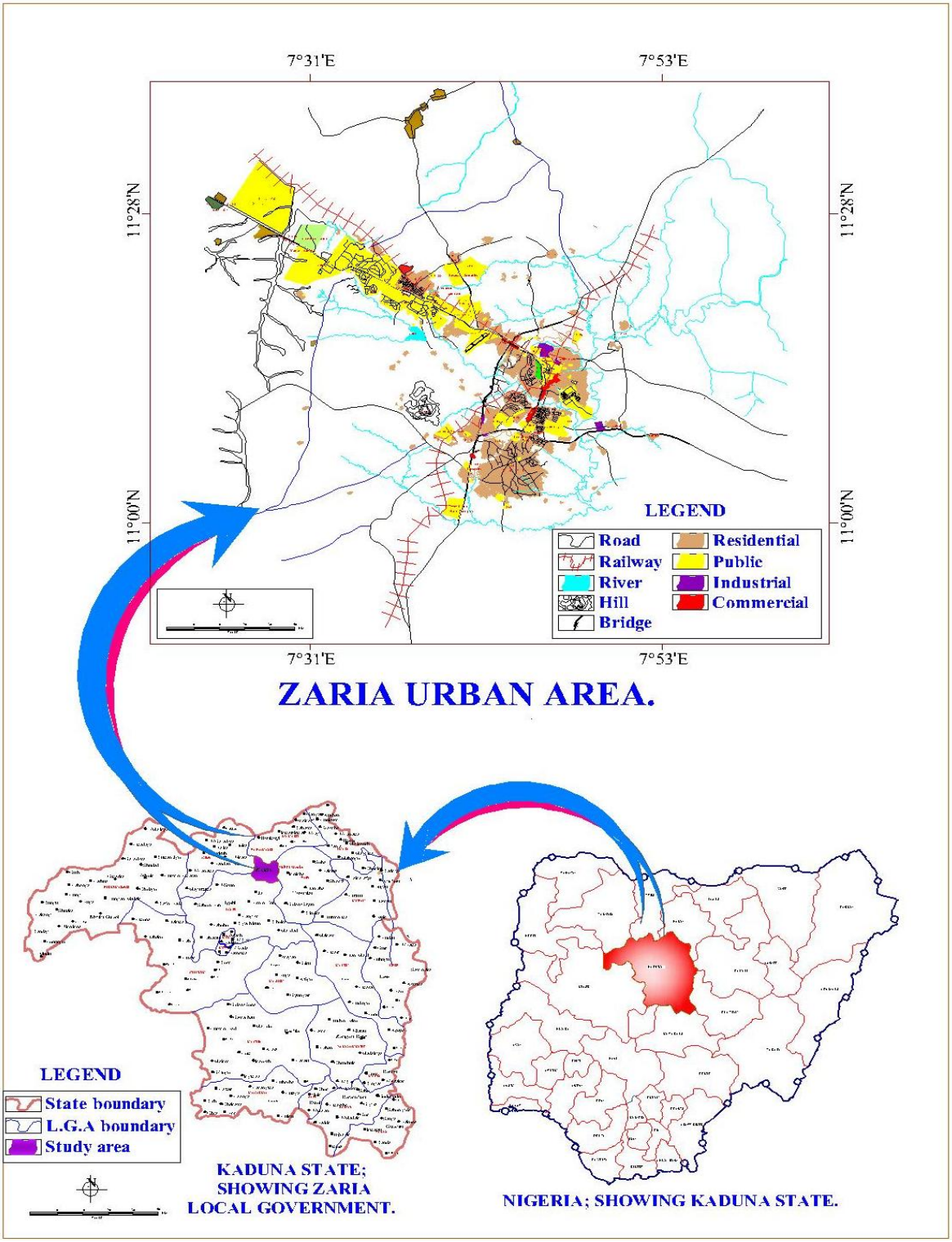



Figure 3.1: The Study Area

Source: Adapted and Modified from Topographic Map of Zaria Sheet 102.

## 3.2 Methodology

### 3.2.1 Reconnaissance Survey

The researcher conducted a reconnaissance survey in the study area with the purpose of familiarization with the urban passenger bus services within Zaria urban area. It assisted in gaining adequate knowledge about the passenger buses and their mode of operation, and gave the researcher an insight on how to carry out the specific objectives. The specific type and sources of data employed to achieve each of the study objectives are outlined below:

### 3.2.2 Types of data utilized

The types of data required for this research include:

i. Map of the study area route and pick up and alight points.
ii. The perceptions of passengers on the quality of bus services.
iii. Pictures (taken with digital camera) showing the nature of passenger bus interior and exterior for visual perception.
iv. Operations of the urban passenger bus system (routes).
v. Travel characteristics of passengers (waiting time, walking distance and access to bus stop).

### 3.2.3 Sources of Data

Two principal sources of data were used for the purpose of this research:

#### *3.2.3.1 Primary sources*

The primary data consist of questionnaire administration to a sampled number of passengers. Questions were asked on the users' perception of the services rendered by the bus

transport system. The emphasis was based on the quality of passenger's bus services. Factors to be considered includes income, fares charged safety, comfort, reliability and convenience. In addition, questions were asked on problems encountered by passengers. Factors to be considered are in respect to overcrowding, delays, organization, and frequency of breakdown.

#### *3.2.3.2 Secondary sources*

The secondary data were obtained from records of the union of the bus transport services and these include type of ownership, routes plied, fares charged and organizational structure. Other secondary data were collected from books, magazines, articles, internet based documents, thesis and journals.

## 3.3 Sample Size and Sampling Techniques

### 3.3.1 Sampling Size

According to the preliminary field survey conducted by the researcher, there are 950 registered buses under National Union of Road Transport Workers (NURTW), with a capacity of 10 passengers.

Using Yamane (1967) formula to determine sample size for known population, the sample size was determined for this research:

$$\frac{N}{1+N(e)^2} = n$$

Where N = population; n sample size and e = error margin (at 5%).

N = 950 × 10 = 9,500 Passengers

$$\frac{9500}{1+9500(0.05)^2} = n$$

$$\frac{9500}{1 + 23.75} = n$$

n = 383.83

Based on the calculations, a total of 384 passengers were purposively sampled.

Data collection for this studies was based on the five segregated urban districts of Zaria; the Zaria city, the GRA, Tudun Wada, Sabon Gari and Samaru. 10 major activity areas were selected, based on the following criteria:

(i) Various foci of employment where at least 500 workers are employed estimated from the number of employment houses available in a centre

(ii) Market centres having at least 200 stores.

(iii) Educational centres where schools are located with at least 2000 students enrolment.

(iv) Along bus routes within major bus pick up and alight points.

These activity areas were adopted as major centres because they are traffic-generating points/originating and terminating points of outward and homeward bus commuter trips respectively in Zaria.

In determining the sample size for each of the district in the study area, the stratified sample formula by Stat Trek (2012), was used to calculate the size for each sampled points.

$nh = \left(\frac{Nh}{N}\right) X\ n$

See Table 3.1 and figure 3.2.

Table 3.1: Selected Sampled Activity Areas in Zaria

| **Districts** | **NO. of Buses** | **NO. of Passengers** | **Total NO. of Sample Size** | **Activity Areas** (Sample point) |
|---|---|---|---|---|
| **Zaria city** | 127 | 1270 | 52 | Kofan Doka, Wusasa. |
| **GRA** | 216 | 2160 | 87 | PZ, Kwangila (Fly over). |
| **Tudun Wada** | 163 | 1630 | 66 | Agoro junction, Dan Magaji. |
| **Sabon Gari** | 258 | 2580 | 104 | Lagos street, Kasuwan Mata. |
| **Samaru** | 186 | 1860 | 75 | Samaru market, Emanto. |
| **TOTAL** | **950** | **9500** | **384** | **10** |

Source: Field survey 2015

Table 3.1 shows the selected sample areas in Zaria urban area, alongside the sample size for each sample point. This was made possible through the clustering of the study area based on the five districts in Zaria urban area. Two activity areas were selected to be the sample points in each district considering the fact that they are traffic-generating points/originating and terminating points of outward and homeward bus commuter trips respectively in Zaria.

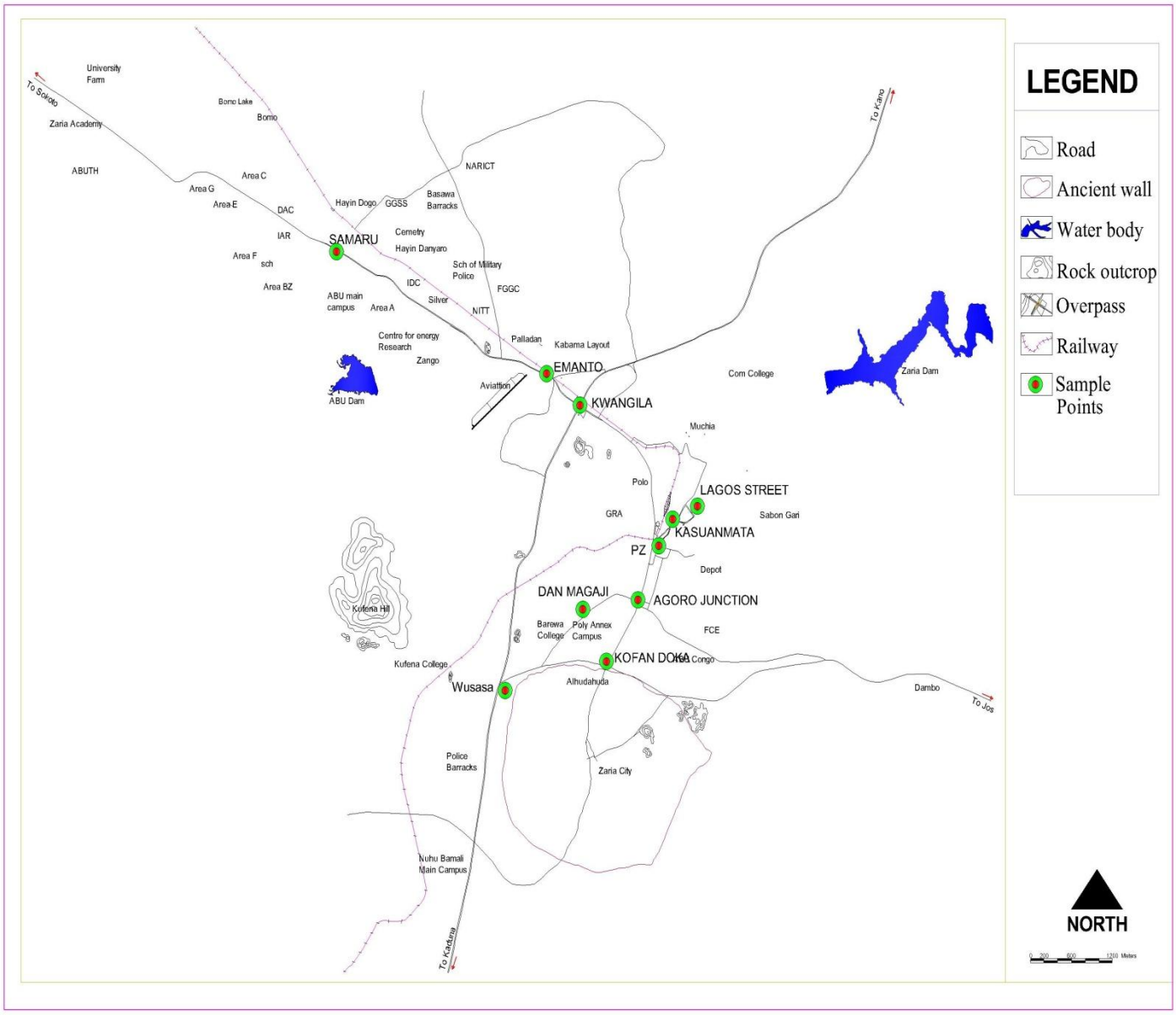



Fig.3.2: Zaria Urban Area: Sample Points

Source: Adapted and modified from topographic map of Zaria sheet 102

### 3.3.2 Sampling Techniques

A cluster sampling technique was used to obtain a representative sample of the respondents in the study area. The study area was clustered based on five districts (the Zaria city, the GRA, Tudun Wada, Sabon Gari and Samaru), and two activity areas (areas of traffic-generating points/originating and terminating points of outward and homeward bus commuter trips) were selected in each of the district.

A purposive sampling technique was subsequently used in administering the questionnaire, this is because of the characteristics and information the passengers' posses.

## 3.4 Data Analysis

For clarity, the methods that were employed to analyze the data collected to meet the study objectives have been outlined below on objective-by-objective basis:

**Objective 1: To map the coverage area and route of intra urban passenger bus services in the area.**

This was achieved through an effective study of the passenger bus route as well as mapping and digitization of the satellite image of Zaria urban area. It also entailed the location of passengers bus pick up and alight points within the area. Data generated were analyzed using maps.

**Objective 2: To estimate the average walking distance, waiting time and passenger's access to bus pick up and alight points.**

This was achieved by means of questionnaire administration to passengers, to determine the time spent by passengers while walking to a bus pick up and alight points, waiting time and passengers' access to the public bus. This was analyzed through tables, charts, and descriptive statistics.

**Objective 3: To determine the service quality attributes that influence passenger satisfaction.**

The data required to achieve the above objectives was obtained from published studies reviewed for this work, extensive brainstorming, and in-depth interviews with bus passengers, and the researcher's personal experiences with public bus transport services, which was done based on public bus service quality attributes measures.

**Objective 4: To investigate passenger's perception on the quality of bus services in the area.**

In order to determine passenger's perception on the quality of bus services in the area, the following indices were used to assess the level of service quality; Availability, Frequency, Travel speed, Reliability, Integration, Price structure, User comfort Accessibility, Universal design, Affordability, Information, Aesthetics and Amenity of the passenger bus service system. The data was generated by means of a self-related questionnaire, oral interview. A five-point Likert scale with "strongly agree" equal 5, "agree" equal 4, "undecided" equal 3, "disagree" equal 2, and "strongly disagree" equal 1 will be used in the rating. Data obtained was analyzed using tables, graphs and percentage analysis.

The frequency values are the number of times respondents mentioned a variable as their answers or options. This gave room to obtain the mean scores, of the frequency counts of the response values. Adding all the ratings (strongly agree =5 + agree =4 + undecided=3 + disagree=2 + strongly disagree=1) gave us 15 points for overall satisfaction and for each of the specific service quality attributes that affect passenger satisfaction. Thus, $Q = \frac{\sum fx}{N}$

Where, Q = mean, Σ = summation, fx = frequency of x, and N = number of occurrences.

By summing the nominal values and dividing by the total number of scaling variables, the cut-off point is determined. Thus, Q = $\frac{\sum fx}{N} = \frac{15}{5}$ = 3.0

Dividing the total ratings of each variable gives us a mean of 3. Thus, any mean above 3 indicates passenger satisfaction and below 3 indicates passenger dissatisfaction with service quality attributes and overall satisfaction of the public bus transport system. A mean of exactly 3 shows undecided on satisfaction level.

# CHAPTER FOUR

# PRESENTATION OF RESULTS AND DISCUSSION OF FINDINGS

## 4.1 Introduction

The data generated in the field through the questionnaires were critically analysed in this chapter for in-depth understanding. A total of 362 copies of questionnaire were used in the analysis out of the 380 copies distributed in the field. This is because 18 copies were not completed by the respondents and were invalid for analysis . these results and discussion are done in subsections such as 4.2, 4.3, 4.4, 4.5 and 4.6.

## 4.2 THE SOCIO – ECONOMIC CHARACTERISTICS OF RESPONDENTS

### 4.2.1 Gender distribution of the respondents

The gender distribution of the respondents is seen in the Table 4.1. The number of respondent for male was 197 and that of female was 165.

Table 4.1: Gender Distribution of the Respondents

| Gender | No. of respondents | Percentage (%) |
|---|---|---|
| Male | 197 | 54.4 |
| Female | 165 | 55.6 |
| Total = | 362 | 100 |

Source: Field survey 2015

As seen in Table 4.1, statistics shows that men utilize the services of busses more than women in Zaria urban area, as this could be attributed to the fact that males are very active within their immediate environment more than females, and as such, there is need for them to

move from their point of origin to their destination. Such movements are influenced by the nature of activities taking place within the environment, such as economic, social, educational, religious and political activities.

### 4.2.2 Age distribution of the respondents

The nature and type of activities taking place in any given area has a great significance on the age distribution. The Zaria urban area is a good example, because it has a peculiar type of activity which is triggered by the different institutions within it. As seen in Table 4.2, it shows that most of the respondents were within the age group of (15 - 24) years which is the highest age group, followed by the age group of (25 – 34) years, and the last age group of 60 years and above.

Table 4.2: Age distribution of the respondents

| Age (yrs) | No. of respondents | Percentage (%) |
|---|---|---|
| 15 – 24 | 121 | 33.4 |
| 25 – 34 | 93 | 25.7 |
| 35 – 44 | 52 | 14.4 |
| 45 – 54 | 37 | 10.2 |
| 55 – 64 | 35 | 9.7 |
| 65 and above | 24 | 6.6 |
| Total = | 362 | 100 |

Source: Field survey 2015

This shows that majority of the users of public bus services falls under the age group of (15 – 24) and (25 – 34) years as it is attributed to the fact that Zaria urban area is an institutional area, thus students patronize the buses. The workers mostly use their private cars and motorcycle.

### 4.2.3 Occupation of the respondents

The occupation of any passenger determines the movement pattern of such passenger which in turn influences the patronage of bus services, because the passenger has a reason to move from his origin to his destination to meet his or her commuting needs. Table 4.3 shows that 33.7% of the passengers are students, which reflects the highest percentage, followed by civil servants which reflects 25.7%, self employed 18.5%, with unemployed 14.1% and pensioners having the least of 8%.

Table 4.3: Occupation of the Respondents

| Occupation | No. of respondents | Percentage (%) |
|---|---|---|
| Unemployed | 51 | 14.1 |
| Student | 122 | 33.7 |
| Self Employed | 67 | 18.5 |
| Civil Servant | 93 | 25.7 |
| Pensioners | 29 | 8 |
| Total = | 362 | 100 |

Source: Field survey 2015

As seen in the Table 4.3, it shows that students and civil servants are the major users of the public bus services within Zaria urban area, as it is attributed to movement of people from their residence (point of origin) to their various working areas (point of destination) and vice - versa for their various distinctive purposes.

### 4.2.4 Respondents level of education

As seen in the Table 4.4, 26.8% of the 362 respondents attained an educational level of primary, with 40.1% respondents having secondary level of education, while 18.5% respondent have tertiary level of education, finally 14.6% having none. This is because of the period when this research was conducted (when schools and institutions were on session).

Table 4.4: Respondent's Level of formal education

| Educational level | No. of respondents | Percentage (%) |
|---|---|---|
| Primary | 97 | 26.8 |
| Secondary | 145 | 40.1 |
| Tertiary | 67 | 18.5 |
| None | 53 | 14.6 |
| Total = | 362 | 100 |

Source: Field survey 2015

This leads to say that majority of the users of public bus services in Zaria urban area are educated people, with secondary level of education having the highest. This relates to the fact that the public bus services system will be at its peak during working days and when academic activities are on session, giving rise to the movement of people by means of the public bus services.

### 4.2.5 Monthly Income of Respondents

The passengers' level of income per month was categorized in to seven (7) groups (₦ 0 – 2,000) to (₦ 60,100 and above), as seen in Table 4.5.

Table 4.5: Monthly income of respondents

| Amount (₦) | No. of respondents | Percentage (%) |
|---|---|---|
| 0 – 2,000 | 18 | 5 |
| 2,100 – 5,000 | 47 | 13 |
| 5,100 – 10,000 | 62 | 17.1 |
| 10,100 – 20,000 | 91 | 25.1 |
| 20,100 – 35,000 | 68 | 18.8 |
| 35,100 – 60,000 | 45 | 12.4 |
| 60,100 and above | 31 | 8.6 |
| Total = | 362 | 100 |

Source: Field survey 2015

As seen in Table 4.5, passengers' who are willing to move from point A to B are also able to pay for their transportation fare, considering their level of income per month. This shows that 5% of the passengers earn below ₦2,000 per month, 13% earn within the range of (₦ 2,100 – 5,000) per month, 17.1% passengers earn within (₦ 5,100 – 10,000), and 25.1% passengers' earn (₦ 10,100 – 20,00), with 18.8% earning (₦ 20,100 – 35,000), 12.4% also earn within (₦35,100 – 60,000), and finally 8.6% earning ₦60,100 and above.

## 4.3 COVERAGE AREA AND ROUTE OF INTRA URBAN PASSENGER BUS SERVICES

The coverage area for passenger bus services in Zaria urban area encompass all the routes which passengers bus service, and are displayed in maps for proper visualization of its surrounding environment, see Figure 4.1 and 4.2.

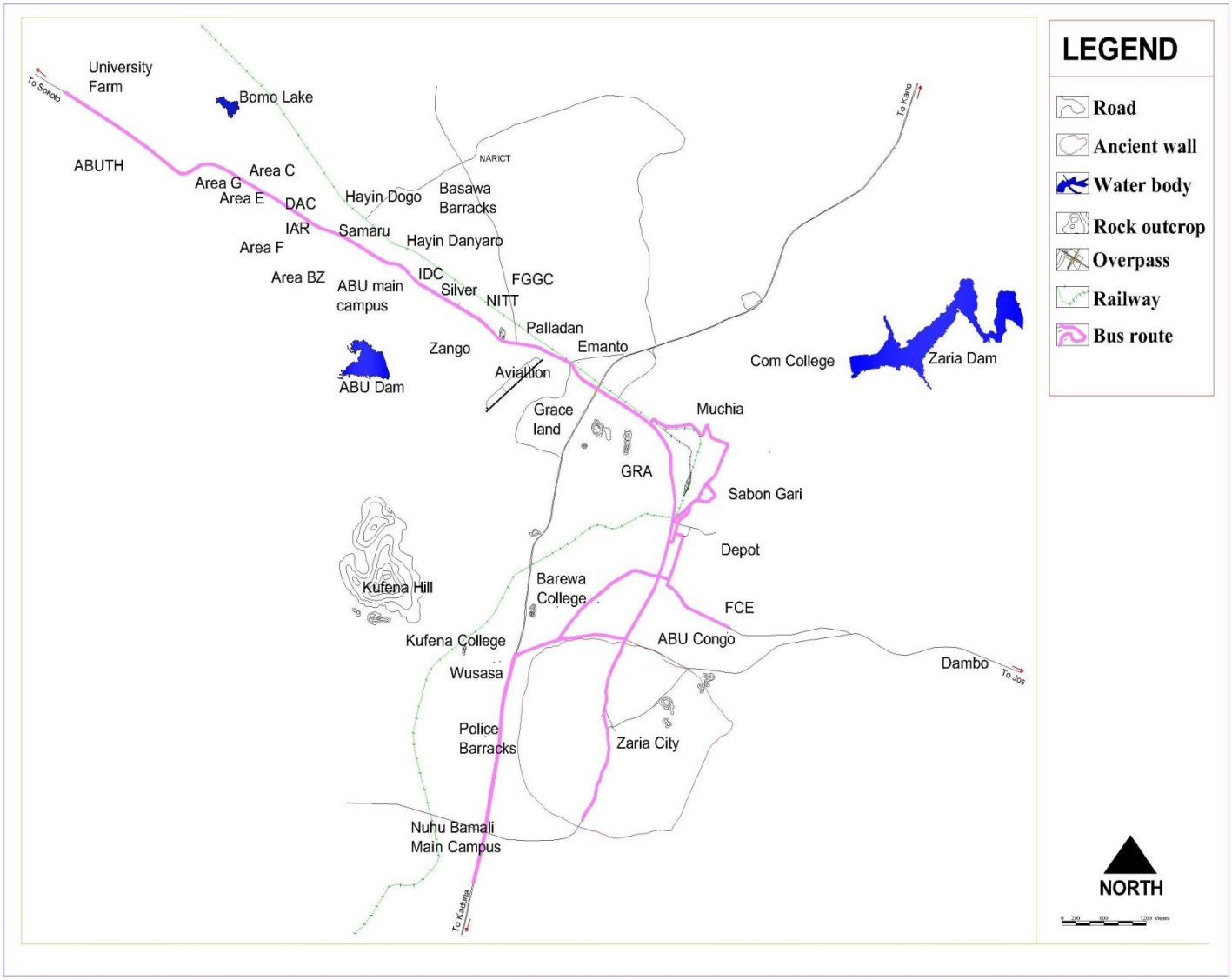



Fig. 4.1: Intra Urban Coverage Area and Route of Passenger Bus Services in Zaria Urban Area

Source: Adapted and modified from topographic map of Zaria sheet 102

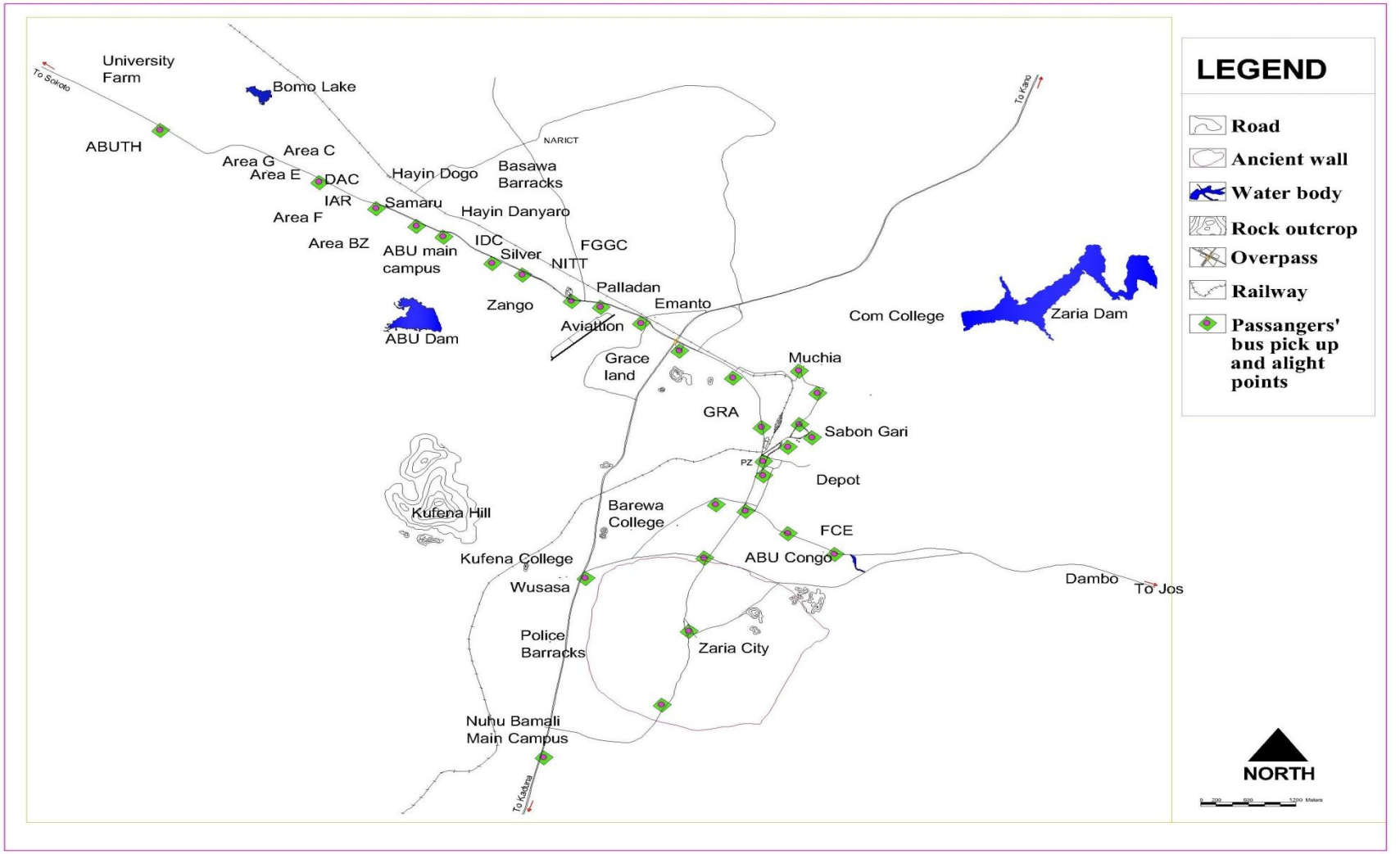



Fig. 4.2: Zaria Urban Area: Existing Passengers Bus Alight and Pick up Points

Source: Adapted and modified from topographic map of Zaria sheet 102

### 4.3.1 Existing routes and stops in Zaria urban area

There are different route which bus operators ply in order get to their destination. The passenger bus service route follows a linear pattern which eventually takes different directions forming a network of different route. There are numerous stopping point along the route, as passengers are seen to alight from the bus at any point which they deem fit, thereby creating an in orderly pattern of bus stoppage, and leading to a prolong travel time of passenger bus services within the study area. The existing routes and bus stop of passenger bus services in Zaria urban area is shown in Table 4.6.

Table 4.6: Existing Routes and Stops in Zaria urban Area.

| Routes | Routes followed | Major stopping points |
|---|---|---|
| Route 1 | Samaru - P.Z - Sabon gari | Samaru market, Dogon Itche, ABU North gate, ABU Main gate, ABU Police gate, ABU Silver Jubilee Estate, Zango, Emanto, Kwangila, Hanwa Yangoro, MTD, NEPA/Post office junction, P.Z, Bank road, Kongo junction, Kasuwan Mata, Lagos street. |
| Route 2 | Sabon - Muchia – Samaru | Muchia, Chikaji, Old Kano road, Kwangila, Emanto, Paladan junction, Zango, ABU Silver Jubilee Estate, ABU Main gate, Kowa, Dogon Itche, Cinema. |
| Route 3 | P.Z - Samaru – Shika | Route 3 extends to Samaru market, Agric, Savanna, Area C, Area G gate, ABUTH pedestrian and entrance gate. |

| | | |
|---|---|---|
| Route 4 | Kwangila – chikaji | |
| Route 5 | Sabon gari – tudun wada – Zaria city | P.Z, Tudun Wada market, Old ABUTH gate, Agoro junction, Kofan Doka, City market. |
| Route 6 | Sabon Gari – Gaskiya – Danmagaji – Wusasa | Agoro junction, Gaskiya press, Nuhu Bamali Polytechnic gate, St. Luke Hospital and Wusasa market. |
| Route 7 | Sabon Gari – Kongo | Park road, Shagalinku, ABU Kongo gate, Gyellessu, Kongo Conference Hall (KCH). |
| Route 8 | P.Z – Tudun wada – Zaria city | P.Z, Tudun Wada market, Old ABUTH gate, Agoro junction, Kofan Doka, City market. |
| Route 9 | P.Z – Dan Magaji – Wusasa | Agoro junction, Gaskiya press, Nuhu Bamali Polytechnic gate, St. Luke Hospital and Wusasa market. |
| Route 10 | Kwangila – Wusasa – Zaria city | |
| Route 11 | Kofan Doka – wusasa | |
| Route 12 | Park road – Kongo | Park road, Shagalinku, ABU Kongo gate, Gyellessu, KCH. |
| Route 13 | Palladan – Bassawa | |

Source: Field survey 2015.

As seen in the Table 4.6, it shows the routes and bus stops of the passenger bus services in Zaria urban area which are further explained:

**i. Samaru – P.Z – Sabon gari Route:**

This is the north-east route which connects Samaru, P.Z and Sabon gari. Buses on this route starts from Samaru straight to Kwangila, P.Z and then turns at the road round about just before Kubanni bridge to Park road and then Hospital road by first bank and enters Sabon gari market. The journey terminates at lagos street in Sabon gari. On its way back the vehicle passes through Sabon gari from Lagos street and then pass through Chikaji - Muchia and MTD junction from where it turns right to link Samaru. Buses on this route usually use two (2) routes i.e. the Samaru – PZ – Sabo route and the Sabo – Muchia – Samaru route.

The road section is a dual carriageway from Samaru to Kwangila. It continues from Polo field to P.Z and straight to the roundabout just before Kubanni bridge, veering left by Park road, a double lane of single carriage collector road and terminates at Sabon gari market.

**ii. P.Z – Samaru – Shika Route:**

This route is predominantly serviced by busses with a starting point at P.Z to Samara. Buses load from here to Samaru and extends to Ahmadu Bello University Teaching Hospital in Shika and usually gets to Shika village and then make a u-turn back to Samaru – P.Z.

**iii. Kwangila – Chikaji Route:**

This is a route mostly serviced by buses. The busses found along this route are mainly dilapidated busses which ply the route daily. There is less traffic on this route, with tri-cycles serving as feeders to the buses.

**iv. Kwangila – Wusasa – Zaria City Route:**

Although this route is rarely used as a major route for intra city transport, because of its location which is at the peripheral of the town.

**v. Sabon Gari – Gaskiya – Wusasa Route:**

The bus starts from Sabon Gari via hospital road, park road, Sokoto road in Tudun Wada and then branch to Gaskiya and Dan Magaji , then finally terminating at Wusasa. Sometimes when they are in full capacity they follow through Tudun Wada and then turn right at Kofan Doka on Kaduna road and terminates at Wusasa market.

**vi. Sabon Gari – Tudun Wada – Zaria City Route:**

This is the West South route which connects Sabon Gari to Zaria City and the Old ABU Teaching Hospital. It starts from Sabo, following the Aminu road, through park road and makes a u-turn to Tudun Wada to Zaria City which terminates at the city market. On its way back, instead of following the Park road, it passes straight to P.Z and follow the one way that adjoin park road and enters back into Sabon gari.

**vii. Tudun Wada City Route:**

Passengers alight from buses going to Sabo in other to reach either Tudun Wada or Zaria city. Some buses also pick passengers still at P.Z to Gaskiya, Dan Magaji and Wusasa, depending on where passengers are headed. Whichever their destination, there are buses available to convey them. The road section on this route is a primary distributor road which runs through to Zaria city Kaduna road. It is a dual carriage way with two (2) lanes on both sides.

## 4.4 THE WALKING DISTANCE, WAITING TIME AND PASSENGER'S ACCESS TO BUS PICK UP AND ALIGHT POINT

### 4.4.1 Passengers' walking distance to bus pick up and alight points

Passengers' (commuters) tends to respond to proximity in consideration to walking distance to bus stop. As such passengers' walking distance to a bus pick up and alight points is of important value to the quality of the bus services because it has a direct impact on the passengers'. There is only one designated bus stop in Zaria, and is located at ABU Main gate. The remaining are not designated, but serves as a bus stop without the necessary facilities ( shelter, real time information about bus arrival and departure).Walking distance of a passenger can be defined as the distance a passenger covers by walking before reaching the nearest bus stop from the point of origin or destination to catch a bus for a ride. The extent by which bus passengers' walk before reaching the nearest bus stops to them depends on the spacing between adjacent transit bus routes and the spacing between adjacent bus stops (Jende Hsu and Surti, 1976).This could be seen in the inability for respondents to actually take note of the time they spend in walking to a bus stop, but could create a positive mental picture of the actual distance they cover while walking to the bus stop as seen in Table 4.7.

Table 4.7: Passengers' walking distance to bus pick up and alight points

| District | D1 | % | D2 | % | D3 | % | D4 | % | D5 | % | D6 | % | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Zaria City** | 7 | 10.2 | 9 | 15.8 | 11 | 16.9 | 16 | 20.5 | 5 | 9.1 | 4 | 10.8 | 52 |
| **GRA** | 17 | 24.6 | 6 | 10.5 | 14 | 21.5 | 20 | 25.6 | 8 | 14.5 | 13 | 35.1 | 78 |
| **Tudun Wada** | 13 | 18.8 | 10 | 17.5 | 7 | 10.8 | 12 | 15.4 | 19 | 34.6 | 5 | 13.5 | 66 |
| **Sabon Gari** | 22 | 31.9 | 18 | 31.6 | 21 | 32.3 | 14 | 18 | 11 | 20 | 7 | 19 | 94 |
| **Samaru** | 10 | 14.5 | 14 | 24.6 | 12 | 18.5 | 16 | 20.5 | 12 | 21.8 | 8 | 21.6 | 72 |
| **Total** | **69** | **100** | **57** | **100** | **65** | **100** | **78** | **100** | **55** | **100** | **37** | **100** | **362** |
| | **19.1%** | | **15.8%** | | **18%** | | **21.6%** | | **15.2%** | | **10.3%** | | |

Source: Field survey 2015

N:B: D1 = 1 - 100 metres D2 = 101 - 200 metres D3 = 201 – 300 metres

D4 = 301 – 400 metres D5 = 401 – 500 metres D6 = 501 metres and above

As seen in the Table 4.7, 19.1% of the respondents cover a distance within 1-100 metres, 15.8% also cover a distance of 101 - 200 metres, while 18% covers a distance within 201-300 metres, and 21.6% cover a distance of 301 - 400 metres, finally 15.2% covers 401-500 metres, leaving a total of 10.3% covering 501 metres and above before getting to a bus stop. In a well functioning urban transport system, the range of distance a passenger is expected to cover from his/her working place or home to the next bus stop is between 300 - 400 metres, while distance above 500 metres may be accepted in low density areas (World Bank, 1987).

### 4.4.2 Passengers' waiting time at bus pick up and alight points

Passengers' waiting time is defined as that limited period during which a passenger spends at the bus stop while expecting to board a bus, till the very moment the bus departs from the bus stop to convey passengers to their destination. The average passenger waiting time in the world over as observed by the World Bank (1987), ranges from 5 - 10 minutes, indicating high quality of bus services and the maximum time passengers are expected to wait for the arrival of buses at bus stops, ranges from 11 - 20 minutes indicating moderate quality of services. Table 4.8 shows the time passengers' spend in waiting for a bus to convey them to their various distinctive destinations in Zaria urban area.

Table 4.8: Passengers' waiting time at bus pick up and alight points

| District | T1 | % | T2 | % | T3 | % | T4 | % | T5 | % | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Zaria City** | 19 | 13.1 | 16 | 13.2 | 9 | 13.6 | 5 | 23.8 | 3 | 33.4 | 52 |
| **GRA** | 37 | 25.5 | 21 | 17.4 | 11 | 16.7 | 7 | 33.3 | 2 | 22.2 | 78 |
| **Tudun Wada** | 25 | 17.2 | 31 | 25.6 | 6 | 9.1 | 4 | 19.1 | - | - | 66 |
| **Sabon Gari** | 42 | 29 | 34 | 28.1 | 13 | 19.7 | 2 | 9.5 | 3 | 33.3 | 94 |
| **Samaru** | 22 | 15.2 | 19 | 15.7 | 27 | 40.9 | 3 | 14.3 | 1 | 11.1 | 72 |
| **Total** | **145** | **100** | **121** | **100** | **66** | **100** | **21** | **100** | **9** | **100** | **362** |
| | **40.1%** | | **33.4%** | | **18.2%** | | **5.8%** | | **2.5%** | | |

Source: Field Survey 2015

N:B: T1 = 1-10 minutes, T2 = 11-20 minutes, T3 = 21-30 minutes,

T4 = 31-40 minutes, T5 = 41 minutes and above.

An appraisal of Table 4.8 reveals that forty one percent of the respondents spend 1-10 minutes, 33.4% spend 11-20 minutes, making a total of 73.5 % who spend the recommended time as stipulated by the World Bank (1987), while 18.2% spend 21-30 minutes, with 5.8% spending 31-40 minutes, and 2.5% who spends 41 minutes and above.

### 4.4.3 Passengers access to bus pick up and alight points

A fully accessible bus service is a critical element in delivering a fully inclusive society. Accessibility remains the key to the growth and development of any society or region, as commuters tend to locate their destination by the presence of accessibility to their bus stop. There is only one designated bus stops in Zaria urban area, which is located at ABU Main gate, Samaru, as such using the term bus stop might mean a different thing entirely. Thus bus pick up and alight point was used to refer to undesignated bus stop, this is because they are particular areas where passengers gain access to the bus and are without any form of appropriate bus stops. Passenger accessibility to bus pick up and alight points in Zaria urban area incorporate 3 forms, which are by means of walking, motorcycle (Okada or Achaba) and tricycle (Keke NAPEP), as seen in Table 4.9.

Table 4.9: Passengers' Means of Access to Bus pick up and alight points

| District | MA1 | % | MA2 | % | MA3 | % | Total |
|---|---|---|---|---|---|---|---|
| **Zaria City** | 23 | 14.3 | 12 | 11.3 | 17 | 17.9 | 52 |
| **GRA** | 33 | 20.5 | 19 | 18 | 26 | 27.4 | 78 |
| **Tudun Wada** | 29 | 18 | 21 | 19.8 | 16 | 16.8 | 66 |
| **Sabon Gari** | 42 | 26.1 | 30 | 28.3 | 22 | 23.2 | 94 |
| **Samaru** | 34 | 21.1 | 24 | 22.6 | 14 | 14.7 | 72 |
| **Total** | **161** | **100** | **106** | **100** | **95** | **100** | **362** |
| | **44.5%** | | **29.3%** | | **26.2%** | | |

Source: Field survey 2015

N:B: MA1 = Walking, MA2 = Motorcycle (Okada / Achaba), MA3 = Tricycle (Keke NAPEP).

As seen in the Table 4.9, many passengers regularly walk to their bus pick up and alight points, with 29.3% of the respondents patronizing motorcycle as means of access to their bus pick up and alight points. This was due to the temporary banning of motorcycle passenger operation in Zaria between October and November 2014, but few operators still carry out operation within certain areas. Tricycle (Keke NAPEP) is gradually taken over the operations of motorcycle, as they are seen to operate regularly within the town, with a total of 26.2% of the respondents patronizing tricycle. Walking is the major means in which passengers access their bus pick up and alight points, with a total of 44.5% of the respondents engaged in it.

## 4.5 COMMUTTER BUS SERVICE QUALITY ATTRIBUTES MEASURES THAT INFLUENCE PASSENGER SATISFACTION

Satisfaction is an important concept that deserves further interest. From consumer research, satisfaction is known to be of great value in understanding customers' perceptions and evaluations (Oliver 1997), repeatedly showing itself to be an important indicator of future customer behavior (Fornell 1992, Johnson & Gustafsson 2000). Customer satisfaction, therefore, highlights and explains the link between what a company does (in terms of the products and services offered) and how its customers react. For public transport, this link is a key concern.

The dimensional structure of satisfaction measures is also important in performance-based contracts (Henscher & Stanley 2003), which have become increasingly popular in the public transport sector in line with the general trend toward market orientation in that sector (Osborne & Gaebler 1992). Customers' subjective experiences are then used in tandem with objective measures to monitor and evaluate suppliers' performance. This requires a comprehensive, yet manageable set of measures that covers all relevant areas of the customer experience.

Understanding the cognitive structure of this experience is pivotal for developing and implementing such a comprehensive measurement system. Attributes like reliability, frequency, comfort, information, driver behaviour, and cleanliness are shown to be key elements of public transport user satisfaction (Bates *et al.* 2001, Beirão & Cabral 2007, Friman & Gärling 2001, Hensher *et al.* 2003). To summarize, passenger's satisfaction is increasingly being put forward as key to the future development of public transport, both in theory and in practice.

The qualities which was used to ascribe the public bus service of Zaria urban area were based on the peculiar issues associated with the activities and functioning of the passenger bus services, and is seen in Table 4.10.

Table 4.10: Commuter bus service quality attributes measures that influence passenger satisfaction.

| Variable Code | Variable description |
|---|---|
| Q1 | Information about public bus transport services |
| Q2 | Seats generally available in buses |
| Q3 | Enough leg space in buses |
| Q4 | Frequency of bus services |
| Q5 | Facilities inside buses are in good condition |
| Q6 | Bus stop have enough shelters |
| Q7 | Buses are well maintained |
| Q8 | Sufficient number of buses in urban area |
| Q9 | Transport fare affordability |
| Q10 | Safety of passengers on board |
| Q11 | Driver and conductor behave well |

| | |
|---|---|
| Q12 | Buses are clean inside |

These attributes were used in the designing of the questionnaire, and was made to be easily digested by the respondents through the use of a Likert Scale, in other to determine their perception on the quality of passenger bus services in Zaria urban area.

### 4.5.1 Transportation problems encountered by passenger bus users in Zaria urban area

The transportation problems encountered by passenger bus users within Zaria urban area is seen in Table 4.11. These problems has a negative impact on the quality of services been rendered to the passengers in general.

Table 4.11 shows that passengers suffer from lack of bus stop shelters to shield them from weather conditions, as about one fourth of the respondents perceived it as their problem. This was followed by the use of dilapidated buses, close to nineteen percent of the respondents. Poor communication between operators and passengers had the least percentage of the respondents.

N:B: TP1= Frequent stops, TP2= The use of dilapidated buses, TP3= Poor communication, TP4= Lack of bus stop shelters, TP5= Reckless bus drivers, TP6= Traffic jam, TP7= Improper pricing system.

Table 4.11: Transportation Problems Encountered By Passenger Bus Users in Zaria Urban Area

| District | TP1 | % | TP2 | % | TP3 | % | TP4 | % | TP5 | % | TP6 | % | TP7 | % | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Zaria City** | 14 | 21.5 | 9 | 20.5 | 7 | 13 | 5 | 10.6 | 10 | 19.6 | 3 | 7.5 | 4 | 6.5 | 52 |
| **GRA** | 17 | 26.2 | 12 | 27.3 | 10 | 18.5 | 11 | 23.4 | 6 | 11.8 | 8 | 20 | 14 | 23 | 78 |
| **Tudun Wada** | 8 | 12.3 | 6 | 13.6 | 15 | 27.8 | 9 | 19.2 | 5 | 9.8 | 13 | 32.5 | 10 | 16.4 | 66 |
| **Sabon Gari** | 19 | 29.2 | 4 | 9.1 | 17 | 31.5 | 12 | 25.5 | 14 | 27.4 | 7 | 17.5 | 21 | 34.4 | 94 |
| **Samaru** | 7 | 10.8 | 13 | 29.5 | 5 | 9.2 | 10 | 21.3 | 16 | 31.4 | 9 | 22.5 | 12 | 19.7 | 72 |
| **Total** | **65** | **100** | **44** | **100** | **54** | **100** | **47** | **100** | **51** | **100** | **40** | **100** | **61** | **100** | **362** |
| **%** | **18** | | **12.2** | | **14.9** | | **13** | | **14.1** | | **11** | | **16.9** | | |

Source: Field survey 2015

Images of some of the problems were also captured for further description of the nature of the problems experienced by the passengers.

1. The use of dilapidated buses which usually break down along the road, thereby delaying passengers from meeting their daily aspirations, as seen in Plate I



Plate I: Examples of dilapidated buses used for passenger bus services in PZ of Zaria urban area.

Source: Field survey 2015.

2. Lack of bus stop shelter to protect passengers against harsh weather conditions while waiting to board a bus, or alighting from the bus. This can be seen mostly to discomfort passengers during the raining season. Plate II shows passengers waiting along the road side for buses under the scourging sun.



Plate II: Passengers waiting for bus under the scorching sun in the North Gate of ABU Zaria

3. Traffic jam, which is mostly caused by indiscriminate parking of buses and the high number of private vehicles plying the road. See Plate III.




Plate III: Traffic jams along the centre business district of Zaria urban area (PZ).

Source: Field survey 2015.

## 4.6 PASSENGER'S PERCEPTION ON THE QUALITY OF BUS SERVICES IN ZARIA URBAN AREA

The perception of passengers' on the quality of bus services distribution of the overall satisfaction and specific service quality attributes that affect their satisfaction of public bus transport services in Zaria urban area is shown in Table 4.12 In order to understand passenger's perception on the quality of bus services in the study area, the data was generated by means of a self-related questionnaire and oral interview. A five-point Likert scale with "strongly agree" equal 5, "agree" equal 4, "undecided" equal 3, "disagree" equal 2, and "strongly disagree" equal 1 was used in the rating.

Table 4.11, shows the specific service quality attributes of public bus transport services that affect passenger satisfaction were also poorly perceived in the study area. For example, variable Q1 (information about the public bus transport services), with a mean score of 2.3 (mean < 3.0), indicates that passengers are not satisfied with the nature of services. There is lack of information been provided to guide the movement pattern of passengers on real time arrival and departure. Variable Q4 (frequency of bus services) had a mean score of 1.9 (mean > 3.3), which also indicated passenger dissatisfaction. Variable Q8 (sufficient number of buses in urban area) recorded a mean score of 3.0 (mean = 3.0), indicating that passengers were undecided not knowing whether the number of buses are sufficient or not. Variable Q9 (transport fare affordable) recorded a mean score of 3.4 (mean > 3.0), indicating that passengers are satisfied with the transport fare because it is very affordable. Variable Q10 (safety of passengers on board) recorded a mean of 2.7 (mean < 3.0), indicating passenger dissatisfaction. Variable Q12 (buses are clean inside) recorded a mean score of 2.4 (mean < 3.0), also indicated passenger dissatisfaction.

Table 4.12: Statistical frequency distribution of passengers' perception on the quality and satisfaction of public bus services

| Variable Code | Variable description | Strongly agree (5) | | Agree (4) | | Undecided (3) | | Disagree (2) | | Strongly disagree (1) | | Mean |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | NO. | % | NO. | % | NO. | % | NO. | % | NO. | % | |
| Q1 | Information about the public bus transport services | 0 | 0 | 65 | 18 | 79 | 21.8 | 116 | 32 | 102 | 28.2 | 2.3 |
| Q2 | Seats generally available in buses | 0 | 0 | 43 | 11.9 | 74 | 20.4 | 194 | 53.6 | 51 | 14.1 | 2.3 |
| Q3 | Enough leg space in buses | 3 | 0.9 | 37 | 10.2 | 71 | 19.6 | 164 | 45.3 | 87 | 24 | 2.2 |
| Q4 | Frequency of bus services | 24 | 6.6 | 76 | 21 | 152 | 42 | 65 | 18 | 45 | 12.4 | 3.0 |
| Q5 | Facilities inside buses are in good condition | 0 | 0 | 34 | 9.4 | 48 | 13.2 | 177 | 48.9 | 103 | 28.5 | 2.0 |
| Q6 | Bus stop have enough shelters | 0 | 0 | 41 | 11.3 | 82 | 22.7 | 148 | 40.9 | 91 | 25.1 | 2.2 |
| Q7 | Buses are well maintained | 0 | 0 | 37 | 10.2 | 74 | 20.5 | 67 | 18.5 | 184 | 50.8 | 1.9 |
| Q8 | Sufficient number of buses in urban area | 31 | 8.6 | 118 | 32.6 | 93 | 25.7 | 72 | 19.9 | 48 | 13.2 | 3.0 |
| Q9 | Transport fare affordable | 63 | 17.4 | 131 | 36.2 | 79 | 21.8 | 53 | 14.6 | 36 | 10 | 3.4 |
| Q10 | Safety of passengers on board | 27 | 7.5 | 54 | 14.9 | 88 | 24.3 | 164 | 45.3 | 29 | 8 | 2.7 |
| Q11 | Driver and conductor behave well | 0 | 0 | 32 | 8.8 | 75 | 20.7 | 159 | 43.9 | 96 | 26.5 | 2.1 |
| Q12 | Buses are clean inside | 0 | 0 | 42 | 11.6 | 146 | 40.3 | 91 | 25.1 | 83 | 22.9 | 2.4 |

Source: Field survey 20

The frequency distribution is presented in Figure 4.1, shows that out of 12 variables analyzed, 9 service quality attributes of public bus transport service in Zaria urban area of Kaduna state were unsatisfactorily perceived by passengers.

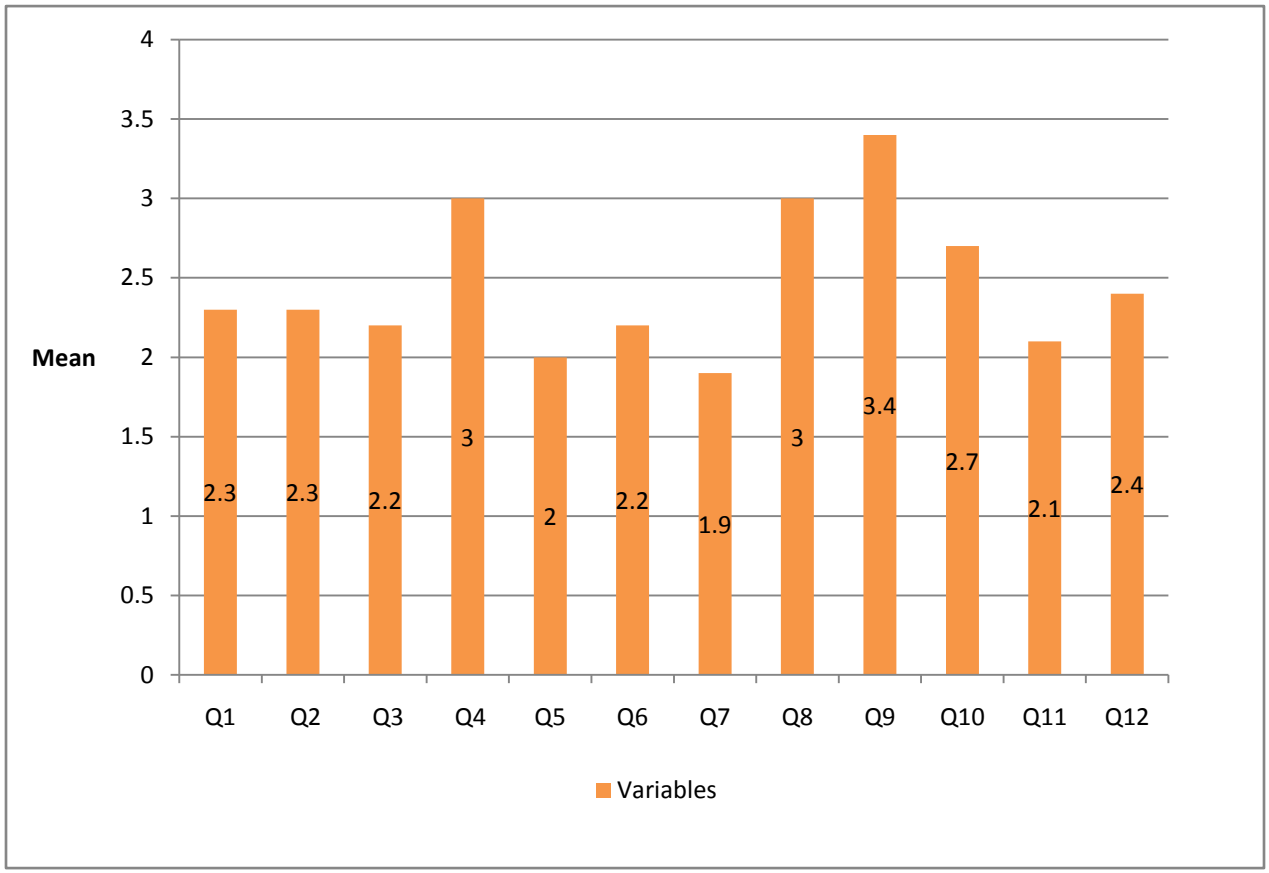



Figure 4.3: Overall satisfaction and service quality.

Source: Field survey 2014

As seen in Figure 4.1, Passengers were undecided on variables (Q4) and (Q8), which means that their perception on the quality of bus services was not certain. Only variable (Q9) met their expectations which show that the transport fare for bus services is affordable. The conclusion from the analysis is that, generally, passengers of public bus services are not satisfied with the services provided in Zaria urban area of Kaduna state.

# CHAPTER FIVE

# SUMMARY, RECOMMENDATION AND CONCLUSION

## 5.1 Summary of Findings

This dissertation is basically a study on intra urban passenger bus service in Zaria urban area, Kaduna State, Nigeria. A questionnaire survey was conducted to tabulate the passengers' demographic and the finding indicates that majority of Zaria urban bus users are students (33.7%), majority of age range is 15 to 24 years (33.4%), with a walking distance of 301 – 400 metres (21.6%), passengers waiting time of 1 – 10 minutes (40.1%), and passenger's access to bus pick up and alight points as walking (44.5%). From the questionnaire survey, the passenger socio economic characteristics was analyzed using cross tabulation to find relationships of respondent's age, occupation, level of income, passengers walking distance to bus pick up and alight points, passengers waiting time, access to bus pick up and alight points, coverage area and routes of passenger bus services, transportation problem encountered by passengers, and the perception of passengers on the quality of bus services.

The specific service quality attributes of public bus transport services that affect passenger satisfaction were poorly perceived in the study area, with only two (1) variable (Transport fare affordable) meeting the expectation of the passengers, and passengers were undecided on 2 variables (Frequency of bus services) and (Sufficient numbers of buses in urban area). From the study, the frequency level of service is graded as level of service D, with fluctuations in volume and temporary restrictions to flow which causes substantial drops in operating speed. Drivers have little freedom to maneuver with comfort and convenience being low. The evaluation is limited to information discovered during data gathering and questionnaire survey.

## 5.2 Recommendations

There are many possible ways to optimize public transit and to make it more attractive to discretionary travelers without having to increase network capacity, they include the following:

1. Passenger's access to bus stops needs to be improved, through better walkways, safe and convenient crossings.
2. Drivers and conductors monitoring by the NURTW, to improve transportation safety and enhancing performance through behavioral change and regular maintenance of vehicle (every 3 month).
3. The use of interior panels of shelters for posting route and schedule information. Side panels may be large enough to display the entire system map and can include backlighting for display at night.
4. Install real time information display boards at key stops to give patrons up to the minute information on bus arrival times and delays. For people with visual impairments, a button may be provided that gives audio information when pressed.
5. Convenience improvements, such as reduced crowding, better seats and cleaner vehicles should be incorporated into the transport system.
6. Provision of benches at bus stops to improve passengers comfort while waiting for buses.
    - Seat dimensions: 20 inches (510 millimeters) minimum to 24 inches (610 millimeters) maximum in depth and 42 inches (1,065 millimeters) minimum in length;
    - Seat height: 17 inches (430 millimeters) minimum to 19 inches (485 millimeters) maximum above the floor or ground;

- Back support: 42 inches (1,065 mm) minimum in length and that extends from a point 2 inches (51 mm) maximum above the seat to a point 18 inches (455 mm) minimum above the seat;

7. Placing bus stop signs at the location where people board the front door of the bus. The bus stop sign marks the area where passengers should stand while waiting for the bus and serves as a guide for the bus operator in positioning the vehicle at the stop. The bottom of the sign should be at least 7 feet (2.1 meters) above ground level and should not be located closer than 2 feet (0.6 meters) from the curb face.
8. Deciding locations for bus stops and signposts should be coordinated with local and/or state jurisdictions.
9. Bus stop location and design is recognized as a crucial element in the drive to improve the quality of bus services. The concept of 'Total Journey Quality' recognizes that bus passengers are also pedestrians at each end of the bus trip and requires that all aspects of the journey are considered. The convenience and comfort of bus stops must not be overlooked. See Figure 5.1 and 5.2 respectively.

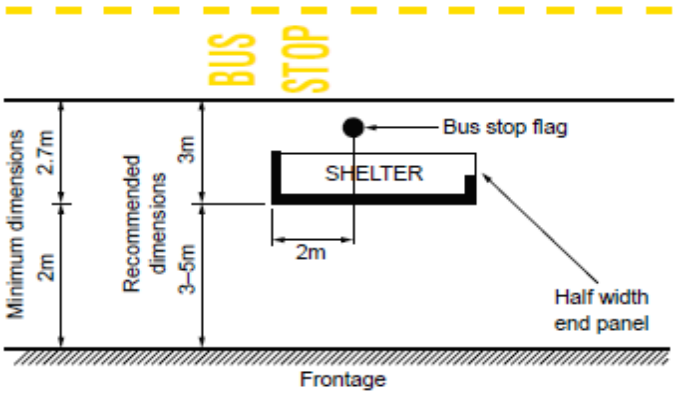



Fig. 5.1: Proposed bus stop for Zaria urban area

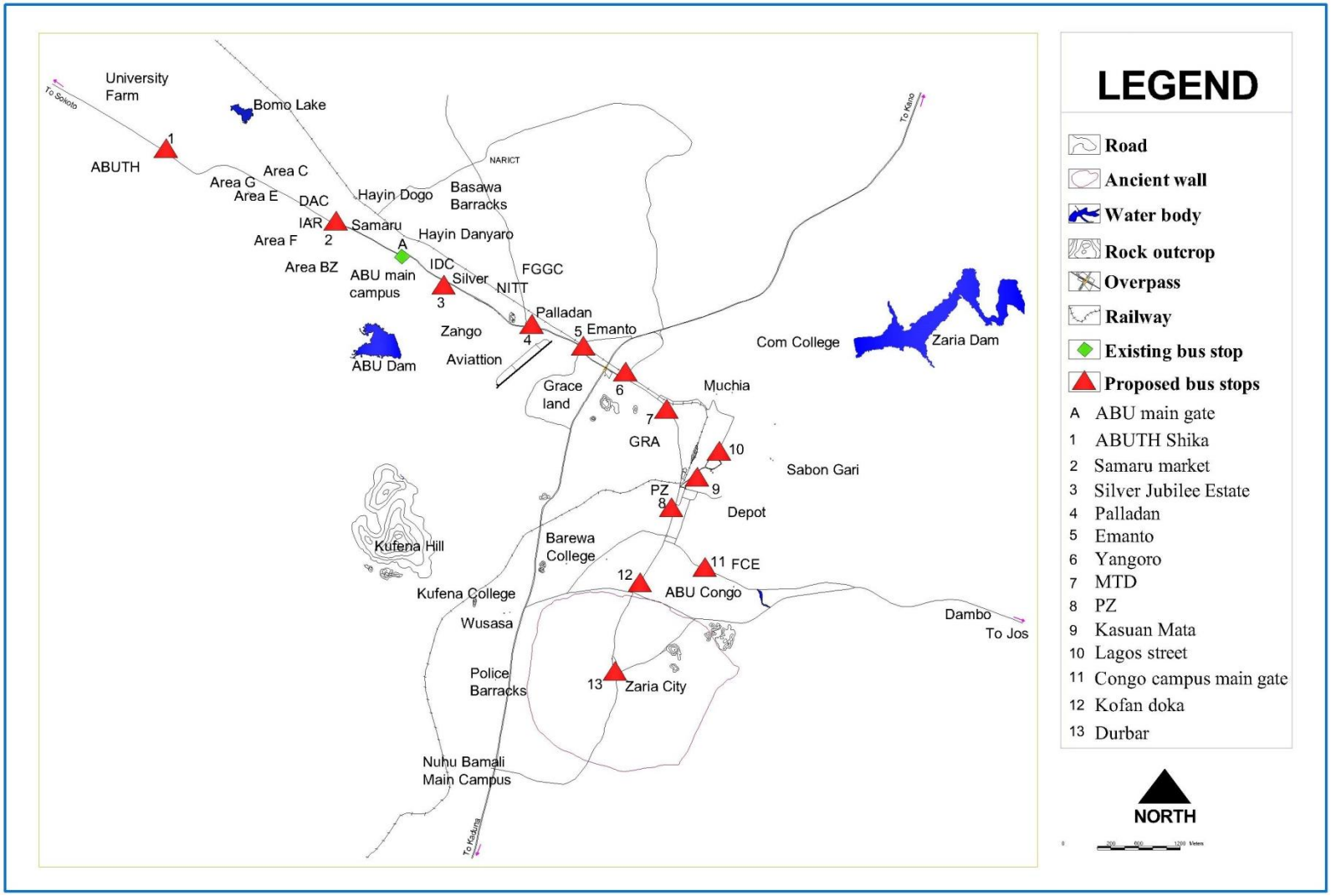



Fig. 5.2: Proposed location of bus stops in Zaria urban area

## 5.3 Conclusion

The study observed that intra urban passenger's bus services in Zaria urban area are inadequate and poorly maintained, and has shown that passengers are not satisfied with the public bus transport services provided by operators in study area. The contribution of this study is the identification of factors that determine passenger satisfaction with the quality of services provided by public bus transport operators in Zaria urban area. The determinants (quality attributes) identified are comfort in buses, information about public bus transport services, bus stop facilities, adequacy of bus capacity and affordability. The study thus provides a direction for public bus transport management in the study area whereby areas for improving services may be identified and passenger satisfaction of public bus transport services may be improved.

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## Appendix 1:

## Questionnaire for Bus Passengers

## DEPARTMENT OF GEOGRAPHY, FACULTY OF SCIENCE, AHMADU BELLO UNIVERSITY ZARIA, MSC TRANSPORT MANAGEMENT

**INTRODUCTION**

Dear Sir/Ma

The purpose of this questionnaire is to collect relevant information for the research study which aims at assessing the quality of intra-urban passenger bus services in Zaria urban area. The information collected will be used for academic purpose only. Your corporation is kindly requested as all information provided will be treated as confidential. Thank you

1. Name of Respondent……(optional)
2. Sex: Male [ ] Female [ ].
3. Age: 15-24 [ ]. 25-34 [ ]. 35-44 [ ]. 45-54 [ ]. 55-64 [ ]. 65 and above [ ].
4. Occupation: Unemployed [ ]. Student [ ]. Self-employed [ ]. Civil servant [ ]. Pensioners [ ].
5. Level of education: Primary [ ]. Secondary [ ]. Tertiary [ ]. No formal education [ ].
6. Level of income per month (₦): 0 – 2,000 [ ]. 2,100 – 5,000 [ ]. 5,100 – 10,000 [ ]. 10,100 – 20,000 [ ]. 20,100 – 35,000 [ ]. 35,100 – 60,000 [ ]. 60,100 and above [ ].
7. How did you get to the nearest bus stop?

By walking [ ]. By motorcycle (okada) [ ] By Tri-circle (Kekenapep) [ ]. By taxi [ ].

8. If by walking, what is the average walking distance from your residence to the bus stop?

1-100 m [ ], 101-200 m [ ], 201-300 m [ ], 301-400 m [ ], 401-500m [ ], 501 m and above[ ]

9. How long do you spend waiting at the bus stop before boarding a bus?

1-10 minutes [ ], 11-20 minutes [ ], 21-30 minutes, 31-40 min [ ], 41 min and above [ ].

**Overall Satisfaction with Public Bus Transport Services in Zaria Urban Area**

(Thick your degree of agreement or disagreement to the statement below)

10. There is adequate information about the public bus transport services

Strongly agree [ ]. Agree [ ]. Undecided [ ]. Disagree [ ]. Strongly disagree [ ].

11. Seats are generally available in buses

Strongly agree [ ]. Agree [ ]. Undecided [ ]. Disagree [ ]. Strongly disagree [ ].

12. There are enough leg-space in the buses

Strongly agree [ ]. Agree [ ]. Undecided [ ]. Disagree [ ]. Strongly disagree [ ].

13. The bus services is very frequent

Strongly agree [ ]. Agree [ ]. Undecided [ ]. Disagree [ ]. Strongly disagree [ ].

14. The facilities inside the buses are in good condition

Strongly agree [ ]. Agree [ ]. Undecided [ ]. Disagree [ ]. Strongly disagree [ ].

15. The bus stops have enough shelters

Strongly agree [ ]. Agree [ ]. Undecided [ ]. Disagree [ ]. Strongly disagree [ ].

16. The buses are well maintained

Strongly agree [ ]. Agree [ ]. Undecided [ ]. Disagree [ ]. Strongly disagree [ ].

17. There are sufficient number of buses in Zaria

Strongly agree [ ]. Agree [ ]. Undecided [ ]. Disagree [ ]. Strongly disagree [ ].

18. The bus transport fare is very affordable

Strongly agree [ ]. Agree [ ]. Undecided [ ]. Disagree [ ]. Strongly disagree [ ].

19. The safety of passengers on board is guaranteed

Strongly agree [ ]. Agree [ ]. Undecided [ ]. Disagree [ ]. Strongly disagree [ ].

20. The bus drivers and conductors behave well

Strongly agree [ ]. Agree [ ]. Undecided [ ]. Disagree [ ]. Strongly disagree [ ].

21. The buses are very clean inside

Strongly agree [ ]. Agree [ ]. Undecided [ ]. Disagree [ ]. Strongly disagree [ ].

**22. Transportation problem encountered in the use of bus services**

(Thick the transportation problems you encounter in the use of bus services)

a. Frequent stops at short distance [ ].
b. The use of dilapidated buses `[ ].
c. Poor communication between passengers and bus conductors [ ].
d. Lack of bus stop shelters [ ].
e. Reckless bus drivers [ ].
f. Traffic jam [ ]
g. Improper pricing system [ ].

Others ( specify please)……