AN ASSESSMENT OF THE METHODS OF CAR PARKING IN LAGOS STATE, NIGERIA

BY

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DECLARATION

I declare that this thesis entitled "An Assessment of the Methods of Car Parking in Lagos State, Nigeria, has been carried out by me in the Department of Geography, Faculty of Science, Ahmadu Bello University, Zaria. The information derived from the literature has been duly acknowledged in the text and a list of reference. No part of this thesis was previously presented for another degree or diploma at the Ahmadu Bello University, Zaria, or at any other institution.

Kafewo Agnes Egiganya	Signature	Date

CERTIFICATION

This thesis entitled "An Assessment of the Methods of Car Parking in Lagos State, Nigeria" by **Kafewo Agnes Egiganya** meets the regulations governing the award of the degree of Masters of Science in Transport Management of Ahmadu Bello University, Zaria, and is approved for its contribution to knowledge and literary presentation.

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DEDICATION

This research work is dedicated to Almighty God the Most Merciful, Omnipotent, Omniscient and Omnipresent. I also dedicate this work to the memory of my loving husband PROF SAMUEL AYEDIME KAFEWO who believed in me so much and encouraged me to start this programme and to my late father MR TIMOTHY AYO EGILA who gave me life and brought me into this world and for making me to be what I am today by taking me by hands to school when I was a baby. The work is also dedicated to my mum, Mrs. Helen M. Egila, for being there for me.

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ABSTRACT

This study assessed the methods of car parking in Lagos state, Nigeria. The goals of the study is to examine the car parking management systems in the study areas, describe the effects of car parking on free flow of traffic in the study areas, examine the challenges of car parking management systems in Ikeja and Victoria Island, describe the nature of car parking in Ikeja and Victoria Island and map the various locations of car parking in the study areas.Data were obtained from both on- street car parking users and on- street car park operators or managers. The instruments used for data collection were close ended questionnaires as well as structured interview with on street car park operators. The population of on- street car parking users was 4,436 while that of Victoria Island was 4,117 with total population of 8533.The respondents were sampled randomly and 385 respondents were interviewed, questionnaire addressing methods of car parking and challenges of on- street parking was given to car park operators or managers. Descriptive statistics such as tables, pie charts andmean rank analysis. The mean rank analysis of the challenges of car park operators or managersin the study areas shows that statement (1) lack of signages ranked first amongst the challenges listed in Ikeja and Victoria Islandwith (mean =0.90, mean = 0.00) making it the most critical amongst the challenges identified, statement (2) The government has provided a permanent parking space in your areais also less in Ikeja with(mean = 0.00). The second least mean was in statement (6) Parking is an important location factor for companies, shopping malls, factories etc in Victoria Islandwith (mean=1.08) and statement (11) Parking policy is an important tool to reduce cartraffic within urban area for Ikeja was (mean=1.09) was ranked third.Similarly, the analysis on the duration of parking in the study areas indicate that Victoria Islandwas 42.9% between 3 hours and above, Ikeja was 44.3% between 2-3hours.The analysis of the results shows that parallel parking in Ikeja is 58.2% and Victoria Island is 65.2%. Parking facilities in the areas is traditional method of parking.Traditional method in Victoria Islandis 72.4% and Ikeja is 77.4% which shows that Ikeja has high responses and it shows traditional searchis mostly used to locate an appropriate parkingspaceforusers. The analysis on challenges of on-street parking indicates that time wasting is 36.4% for Victoria Island and 36.8% for Ikeja while narrow roadsindicate Ikeja with 33.2% and Victoria Island with 31.3%.The study therefore recommends that adequate modern car parking systems with computerized modern car parking meters and parking occupancy sensors should be made important in the budget by the Lagos state government, parking management policies and pricing should be enforced to discourage long stay parking,application of appropriate traffic management, off-street parking facilities and spaces provided by the government to reduce on street car parking in the two study areas.

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DEFINITION OF TERMS

Parking: Parking is the act of stopping and disengaging a vehicle and leaving it unoccupied.

Carparking system: A mechanical device that determines and calculate parking capacity inside a parking lot.

Parking management: It pertains to policies and strategies that lead to more optimum and efficient use of parking facilities.

Kerbside management system: Refers to policies and programme that address different kinds of kerbside parking problems, and helps in providing the solutions.

Perpendicular parking: It means parking cars side by side, perpendicular to a wall, curb or something else.

Parallel parking:A process of parking a vehicle close to and parallel to the curb, typically between two other similarly parked vehicles.

Angle parking: Known as ***echelon parking***, cars are arranged at an angle to the aisle. (an acute angle with the direction of approach).

Double parking: Parking a car in a certain way that prevents another car from departing.

Parking meter:A device used to collect money in exchange for the right to park a vehicle in a particular place for a limited amount of time. Parking meters can be used by municipalities as a tool for enforcing their integrated on-street parking policy, usually related to their traffic and mobility management policies.

Parking Occupancy Sensor: These are innovative approach to increase the ability to manage and measure the kerbside parking in an efficient manner. They are fixed in the pavement to detect the presence of vehicle using electromagnetic changes.

Coupon parking: Coupon parking is a variation of parking payment. It is similar to the pay and display mechanism without the use of machines; the motorist is to purchase a booklet of coupons in advance from the authorities.

Parking disc: It is a circular disc having time marked on it within a pocket. Before parking, the motorist set the parking disc according to the time of arrival plus the time of departure.

CHAPTER ONE

INTRODUCTION

1.1 Background To The Study

The significant role of transportation in the movement of people, goods and services from origin to destination which thus improve the socioeconomic status and general development of the nation cannot be over emphasized (World Bank, 2002). The primary function of any form of transport is the movement of goods and passengers from point of origin to various points or specific destination. Transportation is the basis for economic, social, and political development in most societies as it exhibits a close relationship to the style and quality of living of the society (Oyesiku, 2002; Ndikom, 2006). The increasing population and expanding urban centers have been accompanied by increasing car ownership rate and increasing demand for movement for various purposes (Osoba, 2012) which has resulted to increased use of automobiles for transport.

Specifically, cities more dependent on the automobiles tend to have more street average per person but a smaller percentage of total land streets (Meyer and Gomaz-Ibanez, 1983). Frequent parking of vehicles demands valuable space and an unplanned distribution of parking space have negatively impacted on the traffic flow and order of the city patterns in general. Vehicles are parked before the occupants undertake any activity elsewhere. Thus, the significance of car parks in local and strategic planning and policy are essential components of consideration for any trip (Bates and Bradley, 1986; Hensher and Button, 2000). In the urban areas, automobiles are usually parked more than 95% of the time and consume close to half of the land area of cities (Button, 2006).

The concept of parking is the act of stopping and disengaging a vehicle and leaving it unoccupied. As parking is an essential component of a transport system, vehicles are parked at convenient locations. Parking convenience affects the ease of reaching destinations and therefore affects overall accessibility (Litman, 2013). Automobiles do not have excessive space for moving, they also have a "zone of influence" which expands as the speed and quality of traffic increases, thus

reducing the effectiveness of exchange space and the level of interaction. The interaction between street space and population density reveal that dense areas denote a greater share of land to streets, but also have less street space per capital. In places where most people drive, it fuels urban congestion, because street mileage cannot be increased as rapidly as increases in people, who bring with them increases in vehicle miles traveled. The space available to park car thus rises much faster than the space available for them to drive. This asymmetry between street layout and parking makes congestion worse and undermine one of density's great benefits, and vibrancy of street life.

Parking requirements are the responsibility of government and are thus defined by local needs. Municipalities require minimum parking requirements to ensure that a development contains an adequate number of spaces to avoid parking spillover on to adjacent streets and properties and to maintain traffic circulation (Wilson, 2000). The science behind creating parking standards is extremely complex as it is often difficult to determine the actual demand for parking that a development will create. Location is a very important factor for the car park operator. The nearer a car park is to the city center, the greater is the possibility to gain profitable business. The reasons are various; the city centre is a place of attraction for many drivers, due to the various activities present there: shopping, work and services. In the meanwhile parking policy tends to use parking pricing as tool to control the pressure of car in the city centre (short stay parking).The economics of parking shows that location and price are key factors that determine the choices of the drivers. Anderson and Depalwa (2004) argue that location is an important variable, in particular, when we refer to the city centre. In this area the concentration of car parking facilities heightens competition between them. Since the city is an important destination for drivers, the location of the car park close to potential customers destinations becomes an important factor (Froeb, Tschantz and Cook, 2003) especially if we consider the high costs of centre land, as rated by (Shoup, 1997). In addition,

the parking price structure is an important tool to attract more drivers (Feenrey 1989; Young, Thompson and Taylor, 1991), its pricing levels is dependent on its proximity to the city centre (Anderson and Depalwa, 2004). These variables (price and location) are used to implement policy to control and manage mobility in the city center.

The space that parking requires can be problematic in any city, but it poses particular problem in Central Business Districts (CBD). A CBD thrives on high density because its prime advantage over other parts of a metropolitan area is it's proximity to the immediate availability of a wide variety of activities. The clustering of museums, theaters, restaurants, and offices is the commodity a down town can offer that other areas cannot (Jacobs, 1961; Voith, 1998).The tremendous number of private vehicles in use due to inadequate public transport facilities jeopardizes the CBD's advantage, both because it renders proximity between some land uses unnecessary, and because the density that makes the CBD healthy makes it unsuitable for driving (Bottles, 1987; Foygelson, 2002; Jackie and Sculle, 2004). For Central Business District areas, the challenge of the auto age has been to accommodate the automobile enough to maintain their vitality, but not so much that they became paralyzed by congestion.

A car park market partially controlled by public authorities because parking, especially in a city centre, plays a key role in mobility, access and economic development of what appears to be an ever more car-dependent society (Rye, 2005). For this reason, there are obviously different points of view: public interest for the municipality (less traffic, congestion, pollution, general enhancement of the quality of life for the citizens in the city centre area) and car park sector interests (profit, leadership of the market, etc.). It has been recognized in literature that the amount and location of parking can influence the condition of traffic on roads in the city, the form and functioning of the area and the environmental quality of the city (Stubbs, 2002; Rye, 2007).

Lagos has the largest bus corridor public transit system in Africa and has been able to improve speeds and public transit use because of this type of system.If parking is going to be restricted, there has to be a comparable alternative. In addition because Lagos has closed corridors on some of it's bus routes like BRT bus lanes, buses can still move while cars are stuck in traffic, providing a compelling image for motorists to choose another mode of transportation.Lagos Metropolitan Area Transport Authourity (2010).

Parking today has become a major challenge in Ikeja and Victoria Island areas of Lagos State, though on-street parking facilities are provided along some roads in Lagos, but increased car ownership has rendered them grossly inadequate. The parking problem is more acute on major roads which provide access to centres of activities like Ikeja and Victoria Island in the city. The expectation is that government offices, public buildings, hospitals, schools, shopping centres among others should provide within their premises either on, above, and below the ground parking facilities. But callers to such premises are usually denied parking thereby compelling them to park on the roads and made to pay for short- term durations.

1.2 Statementof the Research Problem

Parking has been a long standing problems in many urban centres in Nigeria. This has been due to the absence of clearly designated areas of parking in many of our cities. This has led to traffic congestion and delay problems.

According to Young (1991) , transport planning and development, apart from building basic infrastructure and highways, is far behind the demand of vehicle activities. The provision of parking facilities in residential areas and CBDs has been an overlooked area in most of the developing countries and this may affect future economic activity and environmental quality. This is because parking on roadside, which is a common phenomenon in CBD areas reduces the traffic corridors meant for the efficient movement of automobiles.

Thus, it becomes a major problem in cities and especially in the Central Business District (CBD), where multi-storey buildings are common and the land use is devoted mostly to commercial purposes. The resultant effect of such illegal parking, therefore, is traffic congestion which leads to delay in traveling time and increases the cost of traveling because more fuel is used up in the process of accomplishing a delayed journey (go-slow/traffic jam).

Shoup (2006), studied and identified a set of conditions under which car users are more inclined to drive around and look for an on-street parking place, instead of off street parking. On street parking could be cheap, off street parking could be expensive, fuel could be cheap, the car user wants to park for a long time so as to accomplish all activities. Shoup also states that the search for an on-street parking place generally takes between 3-5 and 14 minutes. This study reveals that on-street parking will be seen along the road if there's lacking supply of off-street parking facilities. It clearly states that on-street parking is the last resort of the people if off-street parking is not available anymore.

The urbanization process that has taken place in Lagos state has been of such significance in the state and in Nigeria as a whole that it should receive special attention, with its various problems which include transportation. There is concentration of work places and activity centers in Ikeja to Apapa Axis home of two sea ports-Tin can Island port and Apapa port, while Victoria Island is the main business and financial centre of Lagos, this area is one of the busiest centres of banking and commerce which attract vehicles and create traffic congestion, delay which lead to narrow roads and air pollution of the environment.

Olayiwola, Olaseni and Fashina (2014), in their study reported that87% of illegal on-street parking is among the factors causing traffic congestion within Ikeja CBD. It further revealed that the major parking challenges within Ikeja CBD are inadequacy of parking lots, overzealousness of officials, poor design of parking lots, high cost of parking, inconsistent parking policy, management and operations, inadequate private investors and investments,

poor research base, poor utilization of parking space, inadequate tools and equipment. This might not be unconnected with the fact that there is no enough provision for the off street parking.

Free movement of people and vehicle in various Lagos (Ikeja and Victoria Island) is hindered by the absence of modern car parking management systems and by various challenges such as inadequate traffic management signages, non provision of off-street parking spaces by government, introduction of paid parking permits, problems of parks service delivery to commuters and drivers and also the introduction of parking policy. It is this gap in knowledge that this research intends to fill. The study will seek to provide answers to the following research questions:

i. What is the nature of car parking in the study areas?
ii. What are the car parking management systems adopted in the study areas?
iii. Where are the locations of car parking in the study areas?
iv. To what extent does the nature of car parking affect the free movement of traffic of vehicles?
v. What are the challenges of car parking management systems in the study areas?

1.3 Aim and Objectives of the Study

The aim of the study is to assess car parking methods in Ikeja and Victoria Island areas of Lagos state, Nigeria. The specific objectives are to:

i. describe the nature of car parking in Ikeja and Victoria Island
ii. assess the car parking management systems in the study areas
iii. map the various locations of car parking in the study areas
iv. describe the effects of the car parking on free flow of traffic in the study areas
v. examine the challenges of car parking management systems in Ikeja and Victoria Island.

1.4Justification of the Study

Parking plays a key role in a community's over-all transportation strategy. Parking affects the livability, affordability and economic success of a development. The management of the provision and use of parking space initially emerged out of "important but rather narrow concerns about safety and the obstruction of traffic flow on the streets". The development of desired infrastructures and system for commuter's satisfaction, in addition to having visionary leaders to man the car parks and public transport excellence cannot be over emphasized.

The result of this research will provide insight on how to improve the traffic situation in the study area through effective and efficient car parking management systems, ways to minimize the negative impacts of car usage on people's daily life and also the benefits that will be derived in equipping the car parking areas. It will also be ofgreat value and relevance for decision makers, transport planners, and managers, transport consultants, and to the general public, for awareness and compliance.

1.5 Scope of the Study

The spatial scope of this study will cover car parking in Ikeja (the CBD, GRA and its environs) as well as Victoria Island of Lagos State, Nigeria. In terms of content scope, the study will be centered on the specific locations of on-street car parking locations, car parking management systems as well as the challenges of on-street car parking management systems in the study area while the temporal scope will be limited to on-street car parking facilities provided and in use as at December, 2014.

CHAPTER TWO

CONCEPTUAL FRAMEWORK AND LITERATURE REVIEW

2.1 Introduction

Weant and Levinson (1990), state that parking contributes to the appearance of city and suburbs; affects traffic congestion and traffic operations; and equally influences the choice of mode and route of travel which also affects the viability and competitive posture of commercial areas. Since city is characterized by different land use activities and patterns of circulation is partly a function of the land use activities and their spatial distribution, therefore, efficiency of this circulation depends upon existing transportation system which parking facilities are major component. Osoba(2012), is ofthe view that the road transport operation is a circulatory system that must be a continuous process and any infringement at any point along the line will definitely affect the whole system and hinder its effectiveness.Therefore, parking facilities are essential in order to allow flow of traffic. Since, parking challenges are no longer confined to the city centres, the challenges now extend throughout the urban region.

According to Obot and Umoh (2007), in Nigeria, like elsewhere, where cars are one of the dominant modes of transportation, urban circulation is one of the most obvious problems and parking seems to be an overlooked element in transportation development. Several studies have shown that improvement in the living standards of people as a result of wage increase contributes almost as much as the growth of cities to contemporary urban traffic condition in Nigeria (Tanimowo and Atolagba, 2006).Akhuewu (2010), opines that however, for a city to function as a system, transportation must be efficient and reliable to facilitate, not only inter-city movement of people and their activities, but encourage intra-city

movements within the city. These movements are from point of origin to the point of destination.

On- street parking refers to the parking space made available along the curb or shoulder of a street or road that are designed to accommodate vehicle.Olorunfemi (2013), observes that if a city provides on-street parking, particularly in commercial area, it makes conscious choices to provide better access to adjacent land use at the expense of more efficiently moving traffic. The use of on- street parking affects the traffic movement in three ways; it reduces a street's capacity, it reduces safety, and increases service conflict (Richard and David, 2007). On street parking causes safety and congestion problems by blocking one or two traffic lane, reducing visibility, insecurity and forcing pedestrians to walk in the road if no proper footpaths are provided and it also obstructs access for emergency services thereby resulting into accidents and affecting traffic movement (Rye, 2010). There are two types of on-street parking, official and non-official parking. The official on-street parking includes bank car parks, administrative car parks, office car parks, and recreational car parks and media car park while non-official on-street parking is referred as kerbs as its nearness to destination.

Asiyanbola and Akinpelu (2012); Olorunfemi (2013) pointed out that On-street parking constitutes one major problem that makes traffic situation chaotic in Nigerian cities. Most roads in Nigerian cities are narrow and lack pedestrian lanes. There are cases of double parking along these narrow roads thereby causing traffic congestion. This is due to the non availability of off-street parking facilities along the transportation routes coupled with inadequate traffic management. Subsequently, some cities cannot cope with the explosive growth in the number of people due to urban activities especially at the urban centers. The situation is getting worse with the growing number of visitors and patrons due to urban revitalization, suburban development, and the increasing trend of mobility which make

parking situation more challenging. Therefore, Parking is increasingly giving attention as an important aspect of transportation planning (Jeffrey, 2007).

2.2 Theoritical Framework

2.2.1 Urban Car Parking Model

This model is of significance both at the local and at the strategic level of planning. Parking policy and supply play a major role in traffic management systems in dense urban areas. The amount and the location of parking affect, in particular, the levelof service and congestion on access roads. Parking behavior is characterized by complex dynamic relationship between multidimensional demands, performance and supply quantities. The most commonly used parking models related parking demand to the scale of a single land use (ITE, 1985; TANSW,.1985). The general approach has been extended (Le & Young, 1989) , to take into account mixed land uses. The Distinguishing features of the models that should be used to investigate parking policy is that they should accurately represent these relationships.

2.2.2Traffic Flow And Ullmans Theory Of Spatial Interaction

Traffic congestion emanates from the problems encountered with traffic flow. Traffic flow is the movement of individual drivers and vehicles between two points and the interactions they make with one another. Unfortunately, studying traffic flow is difficult because driver behaviour is something that cannot be predicted with one-hundred percent certainty. Geographical theories have also been used to explain traffic flow. A basic geographical interest in flow is to provide answer to the question – "why do people and goods move in space?" Ullman (1956), postulated three conditions for spatial interaction (flow), namely complementarity, intervening opportunity and transferability. The first condition, according to Hagget (1972), is a function of areal differentiation of places. In order for two places to interact, there must be a supply or surplus in one place and a demand or deficit in

another which must be specifically complementary. Complementarity will however generate flows between two places only if no intervening opportunity occurs. This means the absence of another location in-between the two places which may provide an alternative source of supply or demand. The third condition in Ullman's principle, transferability refers to the possibility of moving a product. It is a function of distance measured in terms of time and monetary costs (Hagget, 1972).

2.2.3 Traffic Assignment Models

This model assigns vehicles to the traffic and parking network given an original destination matrix. Austin (1973), presented two processes for the allocation of parkers to parking stations in the Central Business District (CBD). Firstly using trip generating-model to determine the number of trips destined to particular zones in the CBD.Parkers were then allocated to parking stations depending on the cost of parking and walking distance. The allocation of trips was in proportion to the composition cost associated with each origin and parking lot destination pair. The capacity of the parking system was included by fusing, an interactive procedure.

The Gur-beimborn model was part of a larger system used to analyse the impact of integrated transport systems management strategies in city centers. Included in the procedures were calculations of parking impedance for each parking location in the area, including illegal parking. The model included the amount of time spend looking for a parking space as an increasing function of the utilization level of the parking area. With this relationship, it was possible to describe and analyse the parking process within the framework or user-optimized equilibrium assignment.

In this model parking has been considered as daily system, arrival rate patterns vary throughout the day. Gur and Beimborn described the application of the model to a high-density section of Haifa, Israel. In the test case the sensitivity ofparking behaviour was

examined as it varied with the value of walk time, parking cost, parking fines, enforcement policies and level of travel demand.

2.2.4 Traffic Flow Theory

According to Wattle Worth (1976), reported that, there have been many significant development in traffic flow theory. Some of these developments have led to very useful relationship while some applications have not been all that useful.He further said that probably, the most useful result of traffic flow theory is the development of the relationship among the macroscopic variables of traffic stream flow (flow rate, speed and density). Traffic Engineering uses the flow theory for the development of the level of services concept.

However, there, has been some criticism of the traffic flow theory work regarding the lag between the theoretical development and the application of some portion of the flow theory work. The traffic flow theories have largely looked into the basic relationship (why things happen). The traffic Engineers owe them a lot, for these theorists are physicists and mathematicians.

The fundamental characteristics of traffic stream flow are:

a. Flow
b. Speed
c. Density

Litman (2011), conceptualized parking problem in terms of a paradigm shift which describes a fundamental change in how a problem is perceived and solutions evaluated.

*Parking problem and solutions can be viewed in terms of a shift from the old paradigm to the new one. The old paradigm assumes that parking should be abundant andfree at most destinations. It strives to maximize supply and minimize price (Willson and Shoup, 1999). The paradigm also assumes that parking lots should

almost never be filled and that parking facility costs should be incorporated into the costs of buildings or subsidized by governments and that every destination should satisfy its own parking needs. The old parking paradigm asserts that parking requirements should be applied rigidly without exception or variation and that parking management should be seen as a last resort to be applied only if increasing supply is infeasible.

* The new parking paradigm on the other hand strives to provide optimal parking supply and price. It considers too much supply as harmful, as too little, and prices that are too low are as harmful as those that are too high. The new paradigm strives to use parking facilities efficiently. It considers full lots to be acceptable, provided that additional parking is available nearby and any spillover problems are addressed. It emphasizes sharing of parking facilities between different destinations and favours charging parking facility costs directly to users and providing financial rewards to people who reducetheir parking demand. While the old paradigm tends to resist change and places a heavy burden of proof on innovation, the new paradigm recognizes that transport and land use conditions evolve so parking planning practices need frequent adjustment (Cuddy, 2007).

2.3 Nature of Parking in Commercial District

According to Marsden (2006), parking is one of the comprehensive components in land use appearing in residential shopping and industrial areas and is related to all kinds of trips occurring in commuting, shopping and leisure trips. Parking plays an important role in mobility access and the economic development of cities, at the same time it is profitable business for both the private and public sectors. Motorists are increasingly being called upon to pay directly for use of parking facilities. Parking supply management and pricing may be

used as a strategy to reduce vehicle traffic and parking problems in a particular location. In additions, parking prices may be set to recover parking facility costs or to generate revenue for other purposes. Parking supply management, particularly pricing could help shift auto dependence to more sustainable alternative modes and reduce congestion (Shoup, 2005).
Parking is seen as an infrastructure but it can only be a structure if it is paid for by those who use the infrastructure and left in the hand of the experts to manage the parking area is a major terminal facility and if not provided vehicles may be parked on the carriage way and this could reduce the road capacity and cause delay and accident as motorists obstruct traffic by involving in road side parking.

Kelly (2006) , states that ‘’Parking facilities are constructed in combination with some buildings to facilitate the coming and going of the buildings users. Although a car is parked in a variety of places for a large part of its life, little or no debate has focused on parking areas and in fact seen as transport hubs where the variety of transit means take place (e.g. car/bus, car/walking, car/cycling etc). It can be argued that much has not been done for parking despite the vital role that it plays”. Iles (2005) suggests that: where possible, it is desirable to provide shelters for passengers waiting at bus stops. They should be designed to accommodate the maximum number of passengers normally waiting and to provide adequate protection from the weather, they should be well lit and ventilated and approaching buses should be visible from inside the shelter. Where waiting times may be long, it may be desirable to provide seating. Requirements differ depending on the length and frequency of journeys and a higher standard of facility is required for long distance services. Shelters at bus stops may incorporate such facilities as kiosks for newsvendors or refreshments which may provide useful revenue.

Wells (1975), states that the purpose for parking is to provide a safe and convenient place for a vehicle to park. Traffic moves towards a destination but at a point it must be

parked while some business, whether private or public, recreation or servicing are transacted. Failure to supply suitable terminal facilities "results in jams, frustration and confusion." This eventually leads to the decline in importance and value of those areas which are at present considered most desirable for the day to day business of a city or town. Various land uses generate and attract traffic of varying proportions hence parking demand is generated according to distribution and type of land used in an area together with the level of accessibility provided by competing modes of transport. Commercial vehicle drivers like taxi and minibuses want easy delivery and its parking space are not immediately available. The tendency is that they will double park. However, the balance between the space for flow of traffic and that for parking has to be carefully decided as the amount of space required for parking and the flow of traffic will not be conflicting.

Current research has improved the understanding of factors that affect accessibility. For example, Levine, et al. (2012), found that urban density has about ten times as much influence on the number of destinations motorists can access in a given time period as a proportional increase in traffic speeds. Ewing and Cervero (2010) ,found that a 10% increase in roadway connectivity reduces average travel distances by 1.2%. Kuzmyak (2012), found that residents of urban neighborhoods with good travel options, connected streets and more nearby services drive a third fewer daily miles and experience less congestion delays than residents of automobile-dependent communities. These studies indicate that cities can provide high levels of accessibility, despite lower average traffic speed. However, increased density can also increase potential conflicts, also called external costs, such as traffic and parking congestion,of transport is instantaneous movement from one place to another, at no cost' (Hibbs, 2000:26)accident risk, and pollution emissions. Of all common activities people engage in, motor vehicle travel tends to impose the greatest external costs..

A large percentage of congestion in urban areas (8 to 74%) is caused by automobiles in search for a parking place. Shoup (2006), studies this problem and identifies a set of conditions under which car users are more inclined to drive around and look for an on street parking place, instead of off street parking. On street parking could be cheap, off street parking could be expensive, fuel could be cheap, the car user wants to park for a long time or the car user is alone and saving time is not important. Shoup also states that the search for an on street parking place generally takes between 3.5 and 14 minutes.

The population of Nigeria is currently estimated to be over 160 million with $1/30^{th}$ of the population in possession of at least one vehicle which is on the rise. Nigeria undoubtedly prides itself with the highest number of vehicles in the west coast of Africa. A recent statement by the Chartered Institute of Logistics and Transport revealed that more than seven million vehicles operate on Nigerian roads on a daily basis with lack of adequate road infrastructure which includes parking. In Lagos state alone, the population is expected to hit 25 million by year 2015 ending, projected at a growth rate of approximately 5% per annum. Expansion of the motorist brings the need to solve the static traffic. It has been estimated that about 242 vehicles per square kilometer are in Lagos metropolis with limited or insufficient parking spots all around the city.

The number of vehicles imported to Nigeria is still rising and 95% of vehicle life cycle time is parked. The excessive automobile use imposes many costs on society. Users' costs include reduced travel choices, increased vehicle and residential parking cost and increased accident risk. External costs include increased road and parking facility costs, congestion, accident, damages, environmental degradation negative and land use impacts, and reduced mobility for non drivers. Similarly, with the growing populations of Lagos, housing deficits and inadequate infrastructure have necessitated squatter settlements in the semi-urban and fringe areas of the city extending to other neighbouring states. These have resulted in

increased transportation needs within the city and from the peripheral areas to location of economic and industrial activities in the city. http://www.v-parkms.com.

According to parking estimates done during this classified survey by Step and Mint, most cities in Africa could lack up to one million parking spots by 2020. Despite the rapid pace of construction in South-Africa, Nigeria and many more developing countries rising car Consumption continuously out spaces it. While the overall number of vehicles increased in Nigeria by 11% on average from 2001 – 2011. http://www.v-parkms.com. private cars increased by 14% annually on average. Most observations in literatures shows that two serious disadvantages facing transportation in Lagos state are: Firstly, was the heavy increase in motor traffic in city centers which often creates almost insoluble parking and garage problems. The second is the vast increase in road congestion. According to Simmon (1996), in the developing countries, parking is a complex and long term problem which cannot be totally eradicated but managed.

2.4 Importance of Urban Transportation in Nigeria

The second half of the 20th century witnessed rapid rate of urbanization and emergence of cities in various parts of Nigeria due to a number of factors among which are introduction of wheeled transportation, particularly railway and road categorization of settlement into hierarchical order of township, introduction of monetized economy and consequently, production of cash crops and exploitation of mineral resources, continuous geopolitical restructuring through creation of states and local governments in 1967, 1976, 1987 and 1991 and the industrialization process between 1960 and 1975, which was based on import substitution strategy and consumers market for import goods and services (Oyesiku, 2002). In Nigeria, the pace of urbanization has been dramatic showing extraordinary high rates of 5-10 percent per annum (Egunjobi, 1999). Consequently, there has been rapid

expansion of Nigeria cities areal extent which is now sometime ten-fold their initial point of growth (Egunjobi, 1999; Ogunsanya, 2002 and Oyesiku, 2002). A crucial respect of this is that, city growth and expansion in Nigeria has been largely uncontrolled (Egunjobi, 1999; and Oyesiku, 2002). Consequently, the scaring and unsatisfactory situations in the cities have been increasing at an alarming rate. Egunjobi (1999), notes that, our cities in Nigeria are not only ailing, quite a majority of them are on the range of breathing the last breath. Several studies (Filani, 1994; Egunjobi, 1999; Oyesiku, 2002a and Foundation for Urban Development in Africa, 2006), has shown that inadequate planning of urban land uses in Nigeria and great intensity of use of land in the urban areas has exacerbated urban problems The current trend in the Nigeria cities is very frustrating. Mabogunje (1968), notes that whether we think of welfare services or employment opportunities, the urban system in Nigeria today is already proving inadequate as a means of achieving the types of social order that the country desires (Foundation for Urban Development in Africa, 2006:23).

The urban areas all over the world offer a number of advantages in terms of concentration of people followed by demand for commercial properties and transportation. Wyatt (1997) states that urban areas have tendency to develop at nodal points in transport network and places with good road network will possess relative advantage over locations having poor network. Urban locations with such relative advantage are found where different transport routes coverage with high degree of compactness, connectivity, density, length and accessibility exhibited within the intra and inter urban road networks. Nashakyaa (2006), believes that, "without transport, the efficiency of the world economy would be severely curtailed." He further remarks on Vanduchikolo's view that 'the speed of development of a country depends on the speed of its transport'. Mumby (1968) ,states that, 'irrespective of the activity, transportation remains undoubtedly compulsory and inescapable'. 'The ultimate and unattainable objective of the development.

2.5 Car Parking System

Indian Institute of Technology, (2007) define car parking system as a mechanical device that multiplies parking capacity inside a parking lot. Parking systems are generally powered by electric motors or hydraulic pumps that move vehicles into a storage position.

There are two types of car parking systems: traditional and automated. In the long term, automated car parking systems are likely to be more cost effective when compared to traditional parking garages. Automatic multi-storey automated car park systems are less expensive per parking slot, since they tend to require less building volume and less ground area than a conventional facility with the same capacity. Both automated car parking systems and automated parking garage systems reduce pollution - - cars are not running or circling around while drivers look for parking spaces. Automated car parking systems use a similar type of technology to that used for mechanical parcel handling and document retrieval. The driver leaves the car inside an entrance-area and technology parks the vehicle at a designated area. Indian Institute of Technology, (2007).

Hydraulic or mechanical car lifters raise the vehicle to another level for proper storing. The vehicle can be transported vertically (up or down) and horizontally (left and right) to a vacant parking space until the car is needed again. When the vehicle is needed, the process is reversed and the car lifts transport the vehicle back to the same area where the driver left it. In some cases, a turntable may be used to position the car so that the driver can conveniently drive away without the need to back up.Indian Institution of Technology, (2007).

2.5.1 Parking Management

Parking is the act of stopping and disengaging a vehicle and leaving it unoccupied. Parking on one or both sides of a road is often permitted, though sometime with restrictions. Parking plays an important role in the transport system since all vehicles require a storage

location when they are not being used.On-street parking means parking your vehicle on the street, anywhere on or along the curb of streets, in contrast to parking it in a parking garage. In some streets you can always park your vehicle on the street, but sometimes there are restrictions. Mostly these restrictions are presented on traffic signs. Sometimes you're only allowed to park on one side of the street, and sometimes you're not allowed to park your vehicle at all. There are also on-street parking situations where you need a parking permit to park. To make sure people follow these rules and restrictions, cities hire enforcement officers.Common types of on street parking are as listed below. This classification is based on the angle in which the vehicles are parked with respect to the road alignment. For most motorised vehicles, there are three basic modes of parking, based on the arrangement of vehicles – parallel parking, perpendicular parking, and angle parking. These are self-park configurations where the vehicle driver is able to access the parking independently.

TDM Encyclopedia(2008) states thatParking management pertains to such policies and strategies that lead to more optimum and efficient use of parking facilities. It generally includes a number of strategies that vary from case-to-case. The effective parking management provides numerous social, physical, and environmental benefits to all classes of society.

2.5.2Kerbside Management System

Kerbside parking management refers to such policies and programs that particularly address different nature of kerbside parking problems, and helps in providing the solution to each problem.

Kerbside parking management strategies can be classified on the basis of different parameters such as:

- Geometry
- Timing

- Pricing
- Technology
- Miscellaneous

The detail of each parameter is described below:

2.5.1.1Geometry

Considering geometry as significant parameter, the kerbside parking is adjusted physically on the ground in terms of different forms such as angle, dimensions, position, etc. This parameter provides a prognosis of each type of kerbside parking by highlighting the pros and cons of each arrangement. The detail is described below:

- 0 Degree Kerbside Parking
- 30 Degree Kerbside Parking
- 45 Degree Kerbside Parking
- 60 Degree Kerbside Parking
- 90 Degree Kerbside Parking

(a)Degree Kerbside Parking(Paraellparking)

Zero degree kerbside parking is also called 'parallel parking'. Your Dictionary (2009) defines parallel kerbside parking as:

"A type of city-street parking in which a vehicle is parked close to and parallel to the curb, typically between two other similarly parked vehicles." Wikipedia Encyclopedia (2009) also defines parallel parking as "Parallel parking is a method of parking a vehicle in line with other parked cars. Cars parked in parallel are in one line, parallel to the curb, with the front bumper of each car facing the back bumper of the adjacent one."

It is the safest method of kerbside parking so far as number of accidents is concerned since no backward movement is involved. As vehicles are parked length-wise parallel to the kerb, therefore, it causes less hindrance in smooth flow of traffic as compared to other geometrical

parking arrangements. Two disadvantages are associated with this arrangement. First, it utilizes the maximum.

Parallel parking means parking your car in line with the other cars parallel to the curb, front bumper to rear bumper. Parallel parking usually occurs on the side of streets where there are no parking facilities, because it leaves enough room for the traffic to pass. Parallel parking is a challenge to some people, because it requires a certain technique different than driving right into a parking space. Parallel parking is the most common mode of street side parking for cars. It may also be used in parking lots and parking structures, but usually only to supplement parking spaces that use the other modes. This method of parking produces least obstruction to the on-going traffic on the road since least road width is used.

(b)45Degree Kerbside Parking

An arrangement of kerbside parking in which vehicles are parked in a manner that they subtend an angle of 45 degree with the kerb. It is usually proposed on one-way streets, roads, etc having width between 38 to 40 feet. As compared to parallel kerbside parking, 45 degree parking can generate 60% more parking spaces under ideal conditions (Department of Transportation, 2009). As the angle of parking increases, more number of vehicles can be parked. Hence compared to parallel parking and thirty degree parking, more number of vehicles can be accommodated in this type of parking.

(c)60 Degree Kerbside Parking

Similar to other geometrical arrangements, 60 degree kerbside parking subtends an angle of 60 degree measuring from the length of the kerb as shown in figure 3,5. So far as parking accommodation is concerned, this parking arrangement increases the number of parking spaces two times as that of parallel parking under ideal conditions (Department of Transportation, 2009). The vehicles are parked at 60◦ to the direction of road. More number of vehicles can be accommodated in this parking type.

(d)90 Degree Kerbside Parking (Perpendicular or angle parking)

Also called right-angle kerbside parking or perpendicular kerbside parking. As the name suggests, 90 degree parking refers to an arrangement in which vehicles are parked in such a way that they make an angle of 90 degree with the kerb or are parked perpendicular to the direction of flow of traffic. This arrangement may cause various accidents as vehicles face complex maneuvering while entering and exiting from kerb space. The perpendicularly parked vehicles usually cause maximum disturbance in the smooth flow of traffic. Such hindrance may aggravate further if the road width is very less.As less space is consumed by each vehicle therefore, it easily accommodates maximum number of vehicles in a particular kerb length (Department of Transportation, 2009).

In right angle parking or 90◦ parking, the vehicles are parked perpendicular to the direction of the road. Although it consumes maximum width, kerblength required is very little. In this type of parking, the vehicles need complex maneu-vering and this may cause severe accidents. This arrangement causes obstruction to the road traffic particularly if the road width is less. However, it can accommodate maximum number of vehicles for a given kerb length.

Angle parking is similar to perpendicular parking, except the cars are aligned in an angle. Normally the angle is aligned with the direction cars approach the parking space. It makes it a lot easier to drive into the parking space in contrast to perpendicular parking, where the parking space is at a 90 degree angle. With angle parking there is a gentler turn. Not only is it easier to park, but it’s also faster and the parking spaces are smaller, making it possible to add more parking spaces in the same size area. Normally you see angle parking inside parking garages and on streets that are wide enough to have room left for the traffic to pass. (Austroads (2007).

Angle parking, known as ***echelon parking*** of cars is similar to perpendicular parking for these vehicles, except that cars are arranged at an angle to the aisle (an acute angle with the direction of approach). The gentler turn allows easier and quicker parking, narrower aisles, and thus higher density than perpendicular parking. While in theory the aisles are one-way, in practice they are typically wide enough to allow two cars to pass slowly when drivers go down the aisles the wrong way.

Angle parking is very common in car parking lots. It may also be used in street side car parking in the U.S. when there is more width available for car parking than would be needed for parallel parking of cars, as it creates a larger number of parking spaces. Some cities have utilized angled parking on-street (as compared to off-street parking facilities). This has been done mostly in residential, retail and mixed use areas where additional parking compared to parallel parking is desired and traffic volumes are lower. Most angled parking is design in a *head-in* configuration while a few cities have some *back-in* angled parking (typically on hills or low traffic volume streets).

Angle parking is considered dangerous by cycling organisations, especially in the *head-in* configuration, but unwelcome in either form. When comparing to parallel parking:

1. There is a significant risk to cyclists from vehicles reversing out, as approaching bicycles are in the blind spot of the reversing and turning vehicles.
2. Longer vehicles project further into the road; this can inconvenience/endanger other road users,
3. The "surplus" road space which enables angle parking could also be used for bicycle lanes.

(e) Perpendicular Parking

Perpendicular car parking means parking the cars side by side, perpendicular to a wall, curb or something else. This type of parking is mostly in parking bays and garages, because you can park many cars on limited space. (perpendicular) back-in parking style. With perpendicular parking of cars, these are parked side to side, perpendicular to an aisle, curb, or wall. This type of car parking is more scalable than parallel parking and is therefore commonly used in car parking lots and car parking structures.

Often, in car parking lots using perpendicular parking, two rows of parking spaces may be arranged front to front, with aisles in between. If no other cars are blocking, a driver may perform a "pull through" by driving through one parking space into the connecting space to avoid having to reverse out of a parking space upon their return.Sometimes, a single row of perpendicular car parking spaces is marked in the center of a street. This arrangement eliminates reversing from the man oeuvre; cars are required to drive in forwards and drive out forwards.

(f)Double parking

Double parking means that someone has parked their car in a certain way that prevents another car from departing.Double parking on-street-This type of double parking is illegal and you can get fined for it. Double parking on-street means that you park your car parallel to a car that is parked next to the curb. Double parking in this situation means that the car parked next to the curb cannot depart because it is blocked by your car, and often your car also blocks the traffic flow. Unfortunately, double parking on-street is quite common inlarger cities. Sometimes the people who double park their car even leave the hand break off so that people can push their car forward or backwards a bit if it blocks them.Plates 1-3shows

vehicles parked at Ikeja while plates 4-6 shows vehicles parked at Victoria Island in Lagos state. Parking around this areas are either parallel or angular in nature.

2.5.1.2Timing

Dan (2005) refers it to the amount of time one parks in an available kerb space. There is no hard and fast rule to manage parking timings. However, the parking timing strategy can be understood by citing a very useful example. Suppose, a downtown area of a city has a coffee shop, a sandwich shop and a day spa.The timings of staying at various uses vary from use to use. For instance, in case of coffee shop , a customer will stay for about 15 minutes while the sandwich shops' customer will stay for maximum of an hour and, and day spa customer would stay for a maximum of two hours. For instance, in the early morning, coffee shop will be occupying all the parking spaces of the block but will become mellow during afternoon (lunch time). Likewise, sandwich shop will be occupying every space of block in the afternoon (lunch time). The day spa will be occupying the spaces when both coffee and sandwich shops are not active (i.e. in the evening & night times). Because of shorter time limit, the empty spaces cannot be used by their customers (Dan, 2005).

It is very important to mention here that the imposing time limits alone cannot work without proper labor intensive enforcement.

The concerned enforcement officer will have to mark each tire with a chalk. He will have to visit the block again and again for effective monitoring to check the time limit of each space (whether 15 minutes, 1 hour or 2 hours). The frequency of monitoring depends upon the time limits. If the time limits are very short concerned enforcement officer will have to check the space frequently and vice versa. He may start overseeing the spaces if varying time limits are involved (Dan, 2005).

The employees may work out something to avoid the ticket by erasing the chalk in the absence of enforcement officer or employees may depute their co-workers for this task. To

prevent this behavior, some cities have divided the downtown into sub-zones with strict restrictions that one must leave the zone before the expiration of the time limit or purchase ticket (Dan, 2005).

In such downtown where appropriate market prices are not instituted, effective aggressive enforcement is the only way that can produce some positive results.

If enforcement is ineffective, people may easily work out some means to violate the time limits. Such violations are usually figured out by the employees who have the benefit of being in downtown all the day.

Aggressive enforcement means that "tickets are issued immediately upon the expiration of time limit with no grace period, and enough officers are on duty to ensure that violations are cited at all times. But effective enforcement leads to customers getting tickets too." (Dan, 2005).

The parking turnover can only be increased by instituting market-rate pricing. Such prices can create available spaces. Suppose, market rate prices are instituted and adequate spaces are available, then why time limits be imposed? (Dan, 2005).

2.5.1.3 Pricing

Shoup (2009) suggests that there are two policies, in terms of pricing, through which curb parking can be managed in terms of pricing. These include:

- Charging performance based pricing; and
- Local Revenue Returns.

(a)Performance Parking Pricing

Shoup (2009) defines performance based parking pricing as the pricing whereby balance can be achieved with a fixed supply of curbside parking spaces.This is also known as "Goldilocks Principle" - price is too high if so many spaces are lying vacant, and price is too low if no space is available.

The performance-based pricing refers to such pricing through which an occupancy rate of 85% can be achieved. It has three major benefits. First, curbside parking can be utilized in an efficient way since the spaces will be easily available for people to park their cars. Second, the transportation system can operate easily. Moreover, cruising for parking space will not take long time which ultimately results in less emission and wastage of fuel. Third, the economy can work more efficiently. The price of parking should be kept higher where the demand is high and on the other hand, the price of parking should be kept low where the demand is low. The demand based high parking price will produce more revenue. (Shoup, 2009). By 85% occupancy rate, it is meant that 1 out of every 8 parking spaces is vacant regardless of peak and off-peak hours. Adopting it as a management strategy, people feel convenience whenever they wish to park their vehicles. Such performance' based parking is not possible through imposing time limits but only through the use of appropriate pricing strategy.

To state it differently,Zack (2005) states that it can be said that rates of kerbside parking, being the most desirable spaces, rates are kept high especially along very busy roads, slightly less in side streets/roads whereas, and are kept low in case of off-street parking. In case, parking occupancy of some area is more than 85% meaning that area is congested and price must be increased. Likewise, if the same block has occupancy less than the average (i.e. 85%) meaning that area is under-utilized and the price must be decreased

(b)Local Revenue Returns

The performance based parking pricing can generate ample public revenue. If revenue is utilized as added public spending on the street, citizens will not feel any hesitation in spending it. Shoup (2009)states that the aggregate revenue should be used in cleaning and maintaining of sidewalks, landscaping, lighting improvements, removal of writing on walls, and provision of other public requirements.A major percentage of revenue collected from

kerbside parking must be utilized on the same area from where it is collected (Shoup, 2008). If such proposal is implemented and revenue comes back in the same geographic location, no one will say "no" while paying the amount of kerbside parking.

(c)Parking Increment Finance

Parking increment finance is similar to tax increment finance. Such type of increment finance causes increase in values of the properties in the redevelopment districts. Likewise, the commercial areas can receive the increment in the revenue collected from parking meter as a result of performance parking pricing (Shoup, 2009). Yoshi (2009) has developed a very useful interactive website to demonstrate the importance of setting the price of kerbside parking and its relationship with various variables such as parking occupancy rate, cruising time, parking duration, turnover rate, carbon-dioxide emission, etc. In order to understand it better, the overall situation can be divided into three (3) specific cases on the basis of two extremes i.e. minimum and maximum price of kerbside parking:

Case-1 : Normal-price situation;

Case-2 : High-price situation; and

Case-3 : Low-price situation.

Case-1: Normal Situation

Case-2: High-price Situation

This situation may be called as Donald Shoup's Right Price Situation. By using the slider, the price of parking is kept at a maximum of $1.50 / hour. It can be observed that increasing the price of kerbside parking has changed the situation drastically as:

I. Parking Occupancy has decreased (which is close to figure 85%)

II. Duration is reduced to 53 min (from 60 min)

III. Parking turnover is increased as 1.13 cars (from 1 car/hour)

IV. The revenue has increased up to 34%

Case-3**:** Low-price Situation

The price of kerbside parking is kept as low as $0.50/hr by using the slider. It is evident that reduction in price has caused some serious problems in the shape of increased cruising time, emission rate, parking duration and wastage of fuel. However, there is zero variation in parking occupancy rate. In comparison with case-2, the total gain from kerbside parking has also decreased significantly (only $50/hr).Wikipedia encyclopedia (2009b) defines:

> "material objects of use to humanity, such as machines, hardware or utensils, but can also encompass broader themes, including systems, methods of organization, and techniques"

In the context of kerbside parking, it refers to machinery or human beings used for the effective management and enforcement of related policy (if developed).

2.5.1.4Miscellaneous

Besides those strategies that have already been described, there are some other strategies which cannot be further classified and thus are placed under this head. These include:

- User Information and Way-FindingShared Parking
- Parking Security and Lighting
- Development of Overflow Parking Plan

(a)Shared Parking

Shared parking refers to a parking management strategy (either on-street or off-street) whereby parking spaces of various land use types can be shared keeping in view the peak time of different land uses located in close proximity. For instance, office may share its parking space with the restaurant (subject to the condition that restaurant must be located in close proximity) since the peak time -of both of the land uses is different. Share parking can

be categorized as on-street (curb) shared parking or off-street shared parking. On-street/curb parking is also called public parking while off-street parking is also known as private parking (TDM Encyclopedia, 2008)

In case of on-street(curb) shared parking, parking spaces between two sites are shared. Smith (1983) experimented shared parking and observed that total amount of parking could be reduced to 40-60%.Public Parking is considered to be the most efficient type of shared parkingbecause of the reason that each space targets at many parkers and different Parking way-finding is a technical term which refers to a strategy to direct drivers in locating the appropriate parking place as per their needs. Way-finding is generally a part of the whole system of parking information.

(b)Parking Security and Lighting

Since kerbside parking is a form of public parking, it must incorporate the principal of Crime Prevention system through Environmental Design (CPTED). Walker et al, (2007) argues that the principal states that the lines of sights should be clear, the hiding places be eliminatedtogether with the provision of adequate street lighting facilities such as sodium lamp, lamp post, suspended lights, etc.

(c)Development of Overflow Parking Plan

Overflow parking plan refers to a combination of different parking strategies for the management of kerbside parking during special events or unusual peak periods. Generally these include, shared parking, promotion of public transport facilities, enforcement of parking regulation to prefer priority users (disabled, HOV, etc), and walk-ability improvement (TDM Encyclopedia, 2008).

2.5.1.5 Car ParkingTechnology

Most of the available parking methods do not satisfy the user's requirements. Any parking management system must be able to provide features like accounting, dynamic

allotment of slots, security management, statistical reporting along with detecting the count of vehicles inside a parking zone. Information technology embeds microchips and sensors within vehicles, traffic lights, roads and makes transportation system to communicate using wireless technologies. Intelligent transport system embodies several functionalities such as traffic monitoring, parking assistant, and vehicle monitoring by making the system smarter. The biggest challenge in parking lies in how well the monitored information is being communicated from sensor nodes to users effectively and also the method being employed to carry out this. Timeliness, accuracy, reliability, and security are some of the important characteristics in a parking management system to be considered.

In general, the user follows the below steps to park the vehicle.

1.The user enters the parking zone

2.Searches for the available parking slot

3.Parks the vehicle in an empty slot

4.Pays the amount for the vehicle.

5.The user leaves the parking zone.

All these steps can be incorporated and monitored by a parking management system. Parking guidance approaches can be classified into four groups, such as Traditional Blind Search (TBS), Parking Information Assistant (PIA), Reservation Based Parking System (RPS), Centrally-assisted Parking System (CPS). Ran XueJun, (2010).

Various technologies are being utilized around the world for this purpose including parking meter, pay-and-display meter, pay-by-space, pay-by-cell phone, pay-by-satellite, occupancy sensors, etc. The detail of each is given as follows:

(a)Parking Meter

Parking meter can be defined by Wikipedia encyclopedia (2009c) as:

"A device used to collect money in exchange for the right to park a vehicle in a particular place for a limited amount of time. Parking meters can be used by municipalities as a tool for enforcing their integrated on-street parking policy, usually related to their traffic and mobility management policies"

Flaherty (1997) discusses that parking meters do start functioning immediately after the insertion of a coin. He further adds that main purpose of the parking meter is to allow kerbside parking either for fixed or varying duration of time up to a maximum prescribed time limit. If a vehicle uses the parking space up to the set time period, no violation signal will be displayed. However, on the other hand, if a vehicle remains occupied for more than the set time period, a violation signal will appear on the meter automatically.

(b)In-Vehicle Meter

Roth (2004) defines in-vehicle meter as a small computer containing a digital clock, a slot for pre-paid parking cards and buttons to enter the proper code.

These meters cannot be used without a smart card. Similar to mobile phone or cell phone parking, different numbers are allocated to different parking zones. Once a car enters upon a priced kerb space, the driver has to punch in all the codes assigned to different parking zones to be followed by the insertion of smart card to activate the meter. So, immediately after the activation, he/she places the meter inside the windshield to demonstrate the parking status.

The charges for the time period he remains parked at a kerb space are usually deducted from the pre-paid account of the driver until he/she turns off the meter. This technology is being used in Europe and America (Shoup (1999).

In-vehicle meter has number of advantages:

Street furniture is not required to be provided since it is installed inside the vehicle (Roth, 2004).It further contributes to improving beautification of the area (Roth, 2004) it is flexible

option as rates can be changed and varied accordingly (Roth, 2004). It is inexpensive as compared to a meter (Shoup,(1999) Buying Time at the Curb).

(c)Pay-and-Display Meter

Pay-and-Display Parking meter can be defined by Wikipedia Encyclopedia (2009d) as:

"Pay and display machines are a subset of ticket machines used for regulating parking in urban areas or in car parks. It relies on a customer purchasing a ticket from a machine and displaying the ticket on the dashboard, or windscreen or passenger window of the vehicle. Details included on a printed ticket are generally the location and operator of the machine, expiry time, fee paid and time entered."

Zack (2005)This meter works differently in comparison with pay-by-space meter. In pay-and-display meter, after parking, the parkers pays for the desired length of time during which he remained his vehicle parked in a kerb space.

The pay-and-display machines can be operated with coins and credit cards so that drivers are not bound to keep large amount in their pockets all the time. Since credit cards are used for payment, such machines also reduce the cost of persons who empty the machines. The pay and display system is being used particularly for kerbside parking in UK where access barriers are not installed. (Wikipedia Encyclopedia, 2009d). The system has some limitation as well. First, it force people to walk short distance. Second, monitoring is most difficult. Third, more parking signage is required as compared to other systems (Flaherty, 1997).

(d)Pay-by-Space Meter

Pay-by-space meter is another type of multi-space meter. In pay by space meter (which usually work differently as compared to pay and display meter), each parking space is assigned a unique number which is marked on the kerb. Upon arrival, parker enters the

corresponding number of his desired parking space, deposit payment for the time-period during he will remain parked at kerb, and parks his vehicle (Zack, 2005).

(e)Pay-by-Phone

As the name suggests, this technology allows parker to deposit parking payments for the length of time they wish to remain parked at a kerb space by using the credit of their mobile phones. DeCerreno(2002) states that the system works in such a way that the user calls a toll-free number when he is likely to park the vehicle, and makes a phone call again when he is going to leave. This technology is already being used in several European Cities of the world. Pay-by-phone technology has many advantages. First, it is a simple and fast parking system as almost even anyone can operate a cell phone easily. Second, it allows parker for remote parking payment. Third, in case of expiry of parking time, the information is communicated to the parker by sending a message (either voice mail or text). Fourth, it is inexpensive solution to kerbside parking problem (Carreno, 2008).

(f)Satellite Parking: refers to a system of managing kerbside parking space through the use of navigation satellite. The system comprises of three interrelated components:

(1) monitoring unit; (2) checking unit; and (3) location information computer unit.

The monitoring unit usually do start functioning by taking the photograph of a parking space, transmits the image to a parking space checking unit which further transmits the image to the location information computer unit so as to transmit position-based information to the navigation satellite. Kim(2008).

(g)Parking Occupancy Sensors

Parking occupancy sensors are another innovative approach to increase the ability to manage and measure the kerbside parking in an efficient manner. These sensors are usually fixed in the pavement and detect the presence of vehicle using electromagnetic changes.(Shoup, 2008).

Weaver et, al., (2009) stress that these can be categorized as loop sensor and remote sensor. Loop sensors are embedded under the pavement of the road that can sense the presence of the vehicle electromagnetically but transmit the information through a wired connection. While, the remote sensors work similar to loop sensor with a slight difference of transmitting the signal wirelessly. Among these two options, remote sensor -is considered to be the best option as it adheres to the pavement thus, reduces the implementation and maintenance cost

(h)Coupon Parking

Coupon parking can be defined by Wikipedia encyclopedia (2009e) as:

> "Coupon parking is a variation of parking payment. It is similar to the pay and display mechanism without the use of machines; the motorist is to purchase a booklet of coupons in advance from the authorities instead".

When a motorist parks his vehicle at a parking space, he usually purchases a coupon from parking attendant present at site. He may also purchase it from the concerned authority responsible for kerbside parking after paying the prescribed fee. Tan and Yeoh (2008) argues that motorist first scratches the panel keeping in view the date and time, then displays it at the dashboard. If the parking time expires, they can purchase or use another coupon for theirconvenience. In comparison with parking meter which is so expensive tool to install and maintain, the set up cost of coupon parking is significantly low. However, coupon parking system requires sufficient manpower for its effective enforcement. Coupon parking is being used in Singapore, Brazil, New Zealand, Australia, and Israel. (Wikipedia Encyclopedia, 2009e)

(i)Parking Disc

It is a circular disc having time marked on it within a pocket. Before parking, the motorist set the parking disc according to the time of arrival plus the time of departure. For

instance, if he arrives at 10:00 am, he sets the disk for 10:30 (30 min) with respect to the time limit allowed in a parking zone. Then, the set disk is displayed inside the windscreen. The patrolling traffic warden usually monitors the amount of time a vehicle is allowed for parking by using a watch. There are various negative points of disc parking. First, the system is complicated. Second, it requires more careful supervision since greater risk of cheating is involved. (Flaherty, 1997). This technology is being practiced in most of European countries. (Wikipedia, 2009f).

2.6 Importance OfOn-Street Parking

According toNorman and Wesley(2008) opined that On-street parking is a key factor in promoting businesses in cities, particularly within central business districts. As a type of shared parking, on-street parking is an efficient means for allowing multiple users to reach multiple destinations. On-street parking utilizes less land per space than off-street parking and provides easy access to businesses located on city streets. For pedestrians, on-street parking creates a buffer between moving traffic and individuals walking on the sidewalks, providing a measure of safety and reducing the level of perceived noise. Further, depending upon how on-street parking is situated on a street, it can also serve as a traffic calming device, thereby slowing vehicles and potentially reducing the number and severity of accidents However, on-street parking is not without trade-offs. The same barrier between moving traffic and individuals on the sidewalks can also create visual obstructions for both pedestrians trying to cross intersections and vehicles moving along a street, thus increasing accidents. On-street parking also competes with other uses of roadways, including additional lanes for traffic flow, bike lanes, and wider sidewalks. Further, as drivers search for open spaces, congestion on roadways is increased. Finally, on-street parking, like all forms of parking, attracts vehicles, which generates more traffic. There is a shared belief among transportation policymakers and parking officials alike that, when managed properly, the

benefits of on-street parking outweigh the negative trade-offs. However, the key is finding methods of effective management and maintenance that maximize opportunities and minimize difficulties associated with on-street parking.

Norman and Wesley (2008) identified a number of ways by which on-street parking could be of importance. These are:

• **Higher efficiency:** Users of the downtowns consistently select on-street parking spaces over off-street surface lots and garage parking. The on-street spaces experience the most use and the highest turnover.

• **Better land use:** Using the curbside for parking saves considerable amounts of land from life as an off-street surface parking lot. Medium-sized town centers can save an average of more than two acres of land by providing street parking. This efficiency can allow for much higher-density commercial development than the center torely solely on off-street surface lots.

• Increased safety: Drivers tend to travel at significantly slower speeds in the presence of features such as on-streetparking and small building setbacks. Slower vehicle speeds provide pedestrians, cyclists and drivers moretime to react, and when a crash occurs, the chance of it being life-threatening is greatly reduced. In short, on-street parking can help to create a safer environment. On-street parking can slow automobile traffic, making streets safer for bicyclists and pedestrians. In many communities in Europe, on-street parking make the road appear narrower and slow traffic in residential areas (Christopher, 2006). It can be an effective buffer between vehicle traffic in the street and the pedestrian environment on the sidewalk, making walking more pleasant.

Christopher (2006) and Olorunfemi (2013) state that On-street parking also creates potential hazards for bicycles or motorcycles, which are often struck bycar doors when opening. Children who are too short to be seen through car windows can also dart out into

traffic from between parked cars. In order to allow easy movement in the city,there is need for proper monitoring and transportation system must include adequate parking facilities in allplaces that attract vehicle traffic (Asiyanbola and Akinpelu, (2012)) and (Olorunfemi 2013). Asiyanbola andAkinpelu, (2012) opined that the argument in the literature is that the provision of parking for all automobile must be widely recognized as a responsibility where adequate facilities are not otherwise provided. He stressed that major attention should be on on-street parking for passengers cars as parking needs to reduce traffic congestion in a city.

Akhuewu (2010) identifies the characteristic of on-street parking which are noted to be the nature of parking which affects the street based on the nature of the environment. He observes that in developed countries like Europe and America, majority of the vehicle owners in a commercial area parked their cars in accordance to the parking principles and guideline. This is because there are provisions of parking space that are enough for both the users of the spaces and those residing within the area. This was as a result of planning with the inclusion of parking facilities to discourage any obstruction on the streets. The various characteristics that are linked with street parking are advantageous due to monitoring and control of street parking in the developed nations of the world. In African context, the nature of street parking is different from the way it is in developed nations.

2.7 Parking And Economic Development

According to Still and Simmonds, (2000) there is a clear and generally positive association between parking and retail growth. In fact, off-street parking requirements were seen as a means to promote economic growth in central business districts as early as the 1930s. In *The Dimensions of Parking*, for example, Smith explains that the adequacy of parking can influence economic return on public and private sector investments, and affect property values. In an earlier study, one-third of respondents to a survey of central business district retailers, conducted by the Federal Reserve Bank of Philadelphia and thePhiladelphia

Center City District, noted that improving parking would be the most important change to improve their business. While much of the research on the relationship between parking and economic development focuses on off-street parking, this sentiment was echoed at the June 12, 2002 peer-to-peer exchange session on on-street parking. One parking official noted that parking, and in particular, on-streetparking, "…is one of the best ways to help promote businesses in the central business district. Thus, there is a broadly shared belief that parking is good for central business districts, but there is also among business owners to press for free parking, believing that it is more attractive for consumers. Several cities, including Boston, are trying to educate business owners about the importance of charging for on-street parking in order to generate turnover and, thus, more potential customers. However, as Hartmutt Topp cautions in his 1995 article, "The Role of Parking in Traffic Calming," there needs to be a careful balance since increased turnover can also increase traffic.

Kelly and Clinch (2006) study the price sensitivity of on-street parking for business and non business trips. Their study in Dublin (Ireland) shows that the gap in price sensitivity between business and non-business trips increases as the price of parking rises. At first the impact of change in the price of parking affects all trip purpose in the same way, but as price further increases, a progressively widening gap between business and non business trips arises.

2.8Effects Of Parking And Traffic Congestion OnRoadway

Traffic congestions are characteristic features of most urban centres in Nigeria. The reason is that, demand for road space is often greater than the supply. Apart from this, the unplanned growth cities and the haphazard land use distributions are sometime responsible for traffic congestions. Transport has been seen as a crucial component of the city. As the city grows, transports also grow hand in hand and the interactions of transport and city result into

traffic flow. Hobbs (1974) observes that, parking in town affect traffic conditions. These include:

- On street parking reduces the traffic capacity of the roads.

The amount and type of parking space provided both on and off the street affects the amount of traffic entering the town without control. Parking on the street leads to dangerous traffic concession and the loss of road space needed for moving traffic. The use of control for on-street parking are the most important forms of practical restraint of traffic in order to reduce congestion, pollution and noise while enhancing environmental standards and the quality of pedestrian and cyclist movements. Parking leads to problems such as traffic congestion and accident.

For CBD areas, the challenge of the patronage has been to accommodate the automobile, Enough to maintain their vitality, but not so much that they became paralyzed by congestion. Parking lots are considered unattractive and hostile; they can increase congestion and lower land values.

Also, the problems of intra-urban traffic in Lagos Nigeria have been studied by Bashiru and Waziri (2008). The study found that 57% of commuters and motorists spend between 30 to 60 minutes on the road due to traffic congestion. They also found that the worst traffic congestion occurred on Mondays. This agrees with similar findings by Agbonika (2011) for Abuja City. Bashiru and Waziri (2008) listed the causes of traffic congestion in Lagos to include the following: Presence of pot holes/bad road, trading activities, on-street parking, loading and discharging of passengers, illegal bus stops, flooding/poor drainage, vehicle breakdown, narrow road sections, religious activities, high volume of traffic, lack of parking space and lack of traffic light at some road intersections. Oduola (1981) explains that, most urban congestion problems are caused by the sub-optima manner in which the

roads are used. Roadside and on roads parking, roadside trading and total disregard of traffic regulation by road uses are significant human contribution to the traffic problems.

Traffic management according to Adebisi (2004) involves a package of action designed to optimize the available highway network in a well focused manner. The package of acting comprises a variety of techniques for dealing with traffic and highway related issues. In general terms, the main feature of traffic management measures may be summarized as; be relatively inexpensive and be amenable to early implementation, improved the usefulness of existing facilities while dully accommodating the different requirements of the different categories of road users, improve safety or and a minimum maintain the existing level of safety, protect the environment, improving it where possible. Among the relatively inexpensive techniques available for developing comprehensive traffic management proposals are road capacity, traffic sign (that is, pavement markings, and road signs) guard rails, cross marking and traffic calming vehicle, parking regulations and controls, pedestrianization measures, accident reduction, programs, bus priority measures and application of Intelligent Traffic System (ITS).

Kaltho (2000) maintains that, 'various traffic techniques are in use in cities and towns of the More Developed Countries (MDCs) as well as the Less Developed Countries (LDCs).' They include; first, regulatory warnings and guide signs consisting of U-turns, Stop signs, and Speed bumps. Second, are markings consisting of Zebra crossings, pavements, curbs, delineations, and barricades. Third, are signals which may be simple and localized or complex electronic area traffic control. Fourth, are demand management measures that restrain car ownership or the use for example, road pricing, parking charges and so on.

Pignatara (1973) expresses that, parking is a major urban land use. Anyone who drives a car needs no introduction to the difficulties of finding a parking space in area which

are intensively used for business, commercial or residential purposes. An area containing a Central Business District (CBD), a region or community shopping centre, an industrial park, an airport, a civic centre, stadium or such other busy area is usually where extensive parking problems are found. The terminal, the roadway and the vehicle are the basic elements of the highway transportation system. The arrangement and design of each element influences the performance of the total system. For this reason, the problem of terminal design, its regulation and control must be tied to problem of traffic flow requirements and vehicle characteristics.

The land space allocated for vehicles ways is divided between space for movement and space for vehicular storage. Like any economic goods, this space resource is scarce in high density areas such as the CBD. In these areas, therefore, the vehicle is in competition with itself for its space needs. A classic example of this competition in the curb-parking problem of how to allocate the total street space resources and apportion them into space for vehicle in motion and space from vehicle at rest. However, this might sound simple, there is no straight forward solution since these criteria to be followed in providing a solution are dependent on the goals of the community and this land vary from one community to another. In other word, philosophies may differ in the approaches taken to solve the dilemma between the competing needs of the vehicle in motion and the vehicle which is to park; an agreement can be developed as to what principles should be followed in proper planning for vehicles in motion and vehicle at rest. For example, the highway network could be viewed on a composite of three subsystems namely: Arterial, Collector and Local, with each performing different functions:

- The Arterial subsystem: Arterial streets exist for the purpose of moving traffic. The traffic engineer has the responsibility of ensuring that each arterial highway be used to

maximize flow under safe conditions. The conflict between the moving vehicle and the stationary vehicle on the arterial should be resolved in favour of vehicle in motion.

- The Collector subsystem: Collector streets are for the purpose of channeling traffic between the arterial subsystem and the load street subsystem in some cases they serve as abating land uses. Conflicts between movement of traffic and parking may not always be solved in favour of the vehicles in motion.
- The Local subsystem: The primary function of the local street is to serve between the vehicle in motion and the vehicle which is to park, should be resolved in favour of the vehicles at rest. If these goal and objectives of each subsystem are clearly defined prior to tackling any requiring assistance with improvement of traffic flow and traffic parking street circulations systems could be planned in accordance with and respecting the basic principles of each subsystem. Thus, the job of reconciling the conflicting needs of the vehicle in motion and stationary vehicle could be greatly minimized. Having gone through various books that dealt on the problems of traffic and parking facilities, it was observed that these problems are universal in nature and as such, it is necessary to examine how the problems emanated and how they would be handled.

Hiene and Mitchell (2000) state that, accessibility to transport system is essential to equality of opportunity for all people in society. In recent years, particularly in relation to disability issues, there has been growing recognition of the impact of transport planning and policy upon certain group written socially.There are many groups and interest concerned with the effect of parking. Accompany the diversity of interest is a wide variety of views on how best to solve the parking problem. Some of these groups and interest are:Central business district or downtown business, Motorist, Property developers Commercial fleet operators, Taxis and trucks, Emergency vehicles, Mass transportation, Commuters, Economics losses

dues to traffic congestion, Parking lots and garage owners, Police, Traffic engineers, City planner and planning commissions.

The problem of traffic congestion in urban areas is worse at road intersections. Indeed, there is no other point on cities roads that can be greatly congested as road intersections. As defined by O'Flaberty (1997), intersections (where two or more roads meet), are points of vehicle conflict. Similarly, Mchsane *et, al.*,(1998) noted that at no other location within the street and highway systems are so many potential and actual conflicts than at road intersections. This is because at intersections, vehicular flows from several different approaches making either left-turn, through and right-turn movements seek to occupy the same physical space at the same time. In addition to these vehicular flows, pedestrians also seek to use this space to cross the street and thereby worsening the already bad traffic situation.

The problem of traffic congestion at road intersections in Ilorin Nigeria has been examined by Aderamo and Atomode (2011). Road intersections form a major component of urban roads and are generally prone to traffic congestion. The study found that traffic wardens and parking problems are the greatest causes of traffic congestion/delays at road intersections in Ilorin. Their study highlights the fundamental theory of traffic flow to underscore the importance of traffic flow characteristics such as flow, density and velocity to the planning, design and operation of urban roads. This is in line with Salter and Hounsell (1996).

Shoup (2005) states that the two biggest environmental impacts of parking are as a result of vehicle miles traveled and increased impervious surfaces. Shoup goes further that, an oversupply of under-priced parking encourages driving and congest our road ways, and that construction of parking often involves paving over land that once served as a filtration mechanism for rainwater. The paved area increases flood risks and degrades water quality, as

oil and other pollutants are washed into the water system. Dark pavement absorbs heat from the sun and results in increased air temperatures. Aside from the land they occupy parking lots also have several different environmental costs. They increase storm runoff and contaminant loads to freshwater systems, therefore increasing both pollution and flood risks. They also contribute to the urban heat island effect and have a biodiversity value of zero, i.e. are essentially biologically inert in that they do not support any biological organisms. Jackle and Sculle (2005) state that, "Expanses of open asphalt impact hydrology and climate across city space." Such hydrological impacts could include increased flooding of downstream locations, increased water flow which could lead to increased sedimentation in streams and rivers, and larger non-point pollution loads (Jakle and Sculle, 2005).

Bologi (2009) states that, as parking problems present challenges for vehicles owners and drivers, these parking problems are opportunities for touts (Agbero's) who earn some income for themselves and create a means of livelihood.

Bonnel (1995) takes a different approach to the study of parking in some European countries. In Switzerland, he studied the case of the reduction of the amount of car parking space in the city centres of Zurich and Bern as a means of restraining car traffic so as to reduce the level of pollution and improve living environments. In parallel, improvements in public transport have switched the driver to public transport. The provision of new public car parks is considered as a way to give users a choice of mode of transport.

2.9ParkingPolicyAnd Management

Parking is a critical component of transport policy and management for any locale, especially for the large central cities. The policies and management practices affecting parking lead to outcomes that, in turn, can affect land use, air quality, traffic congestion travel behavior, safety and economic development, not mention revenue lines.Shoup (1999, 2005a)

reviews the extent of which these parking policies have and continue to exacerbate urban sprawl by requiring the over provision of parking spaces, lowering the resultant density of commercial and residential development and encouraging further car dependence.

Valleley *et al* (1997) state that with the realization of the inability of cities to cope with unrestrained increase in car traffic, those management goals have emerged into a consideration of the degree to which parking policy contributes to the wider economic, environmental and social policies, in various ways, contribute to the promotion of a more efficient use of the transport network, lower emissions, higher densities and better more inclusive urban design. Poorly designed policies can act in the opposite direction.

Parking policy should not be developed in isolation but as a part of local and regional spatial and transport planning processes (Marsden and May, 2005). May, (1996); Marsden and Wotton, (2000) opines that parking policy acts as glue between the implementation of land use and transport policies. The objectives that it should fulfill therefore come from the overall objectives of urban policy that typically include:

- A strong and vibrant economy supported by an efficient transport system;
- Better accessibility;
- A clean and high quality urban environment;
- A safe and secure environment;
- A more equitable society.

Research and report from Environmental Protection Agency (EPA) show that, the way we develop our communities has a major impact on the quality of the natural environment. Region with walk-able, mixed used, compact neighbourhoods, towns, and cities, knit together by a robust network of transportation and environmental conditions, protect human health and the natural environment (EPA, 2001a).

As crude as the informal parking arrangements in Lagos State are, it rakes in millions of Naira daily into pockets of faceless collectors who do not remit to the government purse. The targeted audience of the new policy is said to include: hotels, mosques, churches, event centres, restaurant, inner streets, central business districts, residential areas and other places so designated (Urban and Regional Planning and Development law (URPD 2010)).

According to reports, with an estimate of 1.2 million registered vehicles, about 224 vehicles per kilometer of road space and a population of over 20 million, the State surely needs a sustainable state wide parking policy to complement the renewed urban development plant. The new state parking plan policy in hinged on the development of on-street and off-street, multi floor parking lot. The URPD (2010) policy is in keeping with the wholesome development plan of the metropolis.
(Nigerianmonitor.com/2014/04/01/Lagos-to-enforce-parkingpolicy-for-vehicle).

As observed from literature, parking policy acts as glue between the implementation of land use and transport policies. Three specific objectives of "Regeneration" of a specific part of the urban area, "Restraining" vehicular traffic and "Revenue" generation from the parking operation as discussed by Marsden (2006) confirms that in various ways, parking policy tries to contribute to the promotion of a more efficient use of the transport network, lower emission, higher densities and better, more inclusive urban design (Rye, 2007 and Stubbs, 2002).

Hensher and Button (2000) observe that:

> The amount and the location of parking affect; the level of service and congestion on access roads and internal city streets; the efficiency, effectiveness and financial performance of public transport; the amenity, safety and environmental integrity of the city and its surrounds and the form and functioning of the metropolitan region as a whole.

Mildner (1996) states that:

> Real improvements in mass transit need to be implemented. In as study on parking and travel behavior in the United States, there was a strong link between cities with good public transport systems and parking management system. Parking was utilized to support transit.

According to Gomez *et al* (2008):

> Management in all business and organizational activities is the act of getting people together to accomplish desired goals and objectives using available resources efficiently and effectively. Management comprises planning, organizing, staffing leading or directly and controlling an organization (a group of one or more people or entities) or effort for the purpose of accomplish a goal.

Resources encompass the deployment and manipulation of human resources, financial resources and natural resources.

Transport planning and development, apart from building basic infrastructure and highways, is far behind the demand of vehicle activities. The provision of parking facilities in residential areas and CBDs has been an overlooked area in most of the developing countries

and it may affect future economic activity and development. On one hand, the use of cars has definitely improved the efficiency of travel, productivity and convenience, and on the other hand, this has created widespread problems, particularly in respect to the limited space availability in most of the central business areas due to the increasing parking demand (Young, 1991).

Yue (1993) states that, "the balance of parking demand and supply is therefore needs to be considered together with other measures in a systematic way". Especially, the issue of parking planning control and management should be seriously considered at town and road network planning stage.

Generally speaking, there are three recognizable factors influencing the growth of parking demand in CBDs, the vehicle ownership of the surrounding areas, the level and form of public transport services and the established parking. On supply side, the provision of parking in land use planning and sufficient spaces are required to accommodate the demand. However, the supply of parking in CBDs is limited in most of the situations due to the containing growth of population and car ownership. To minimize the possibility of future collapse of the relationship between parking demand and supply, a realistic parking management system needs to be developed.

Parking management and control is important because it has the potential to modify demand on an area-wide basis yet, despite being readily available to authorities, often seems under-utilised to tackle traffic congestion. Like road-pricing and other demand-side approaches, parking management and control can assist the task of tackling traffic congestion by reducing the demand for travel to the area encompassed. Due to the considerable policy and operational flexibility available, parking control can also be quite specifically targeted, in the sense that it can be applied on the basis of location and time.

Edwards (2002) states that Management solutions tend to reduce most parking problems, providing a greater range of benefits and so are supported by more comprehensive planning. It is also important to define parking problems carefully in order to provide solutions. If people complain about a parking problem, for example, it is important to determine exactly what type of problem, and where, when and to whom it occurs. Increasing supply simply helps reduce parking congestion and spill over problems but increases most other problems.

Manville and Shoup (2005) state that "parking management embraces a variety of strategies that seek to either reduce parking spaces needed or to use parking spaces more efficiently".

The review of literatures have established the fact that effective car parking systems is important for the management and smooth on-street car parking and likewise the need to have efficient on-street car parking facilities put in places required to avoid traffic congestion, obstruction, time wasting, accidents and also management practices.

In conclusion, the management of car parking as a resource plays a pivotal role in the development of incentives for walking, cycling, public transport use and car sharing. Management solutions tend to reduce most parking problems, providing a greater range of benefits and so are supported by more comprehensive planning. It is also important to define parking problems carefully in order to provide solutions. If people complain about a parking problem, for example, it is important to determine exactly what type of problem, and where, when and to whom it occurs. Increasing supply simply helps reduce parkingcongestion and spill over problems but increases most other problems. Operators are instead, always considered as followers of policies suggested by the policy maker. This points to the need for further investigation and an attempt to fill in the literature gap. Location is a very important factor for the car park operator. The nearer a car park is to the urban centre, the greater is the

possibility to gain profitable business. The reasons are various. The urban centre is a place of attraction for many commuters and drivers, due to the various activites present there: shopping, work and services. In the meanwhile parking policy tends to use parking pricing as tool to control the pressure of car in the urban centre (short stay parking).

The traditional method of car parking system exist in Lagos state. There is as yet no work that considers the modern car parking system as a tool to manage car parking services as a whole. This is an important gap that the literature filled.

Parking has been a long standing problem in many urban centres in Nigeria. This has been due to the absence of clearly designated areas for parking in many of our cities and lack of moderntechnologies of car parking . This has led to traffic congestion and delay problems.

CHAPTER THREE

STUDY AREA AND METHODOLOGY

3.1 STUDY AREA

3.1.1Geographical And Locational Setting Of Lagos (Ikeja and Victoria Island)

Lagos state is located between Latitudes 6° 21' N and 6° 31' Nof the Equator and between Longitudes 2° 41' E and 4° 21' E of the Greenwich Meridian. Lagos State is bounded in the west by the Republic of Benin in the east and north by Ogun State and in the south it stretches for 180kilometers by the Bight of Benin (Atlantic Ocean). Lagos is by far the largest and most complex urban area in Nigeria. Territorially, Lagos State encompasses an area of 358,862 hectares or 3,577sq.km, with lagoons and waterways forming 22 percent (787 sq km) of which consists of lagoon and creeks. The area of Lagos designated as the Mega City Region comprises 153,540 hectares of continuously built up area including all local government areas in Lagos and about four others in neighbouring Ogun state. Ikeja and Victoria Island car parks are both located in Lagos State, Nigeria. Figure 3.1 shows map of Lagos state.

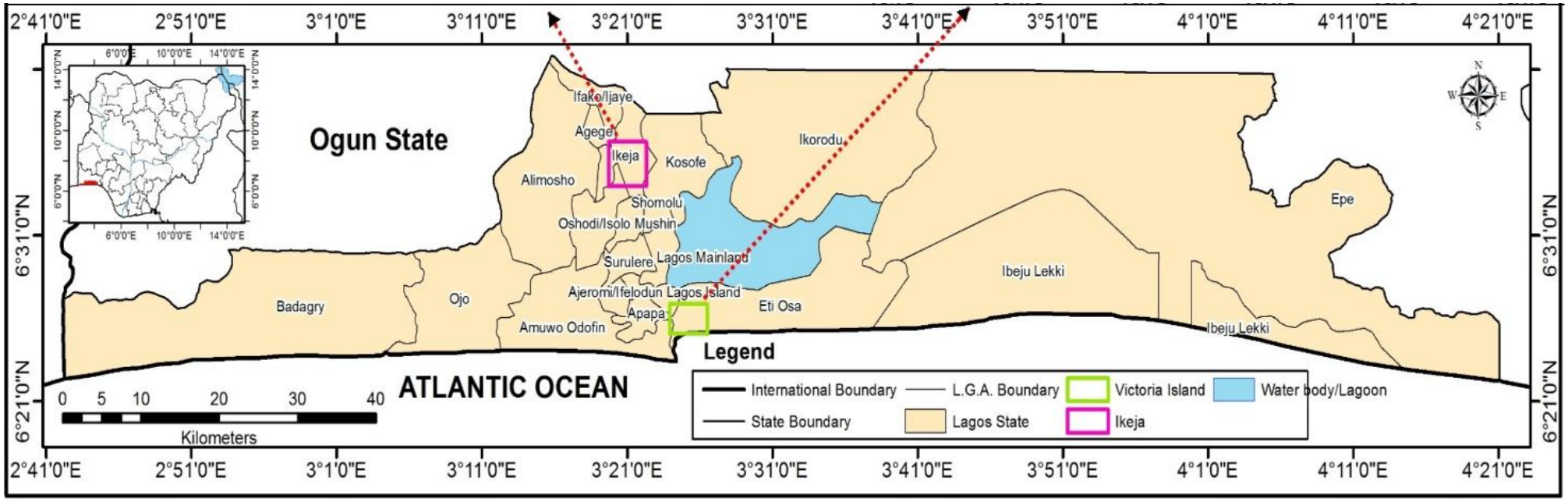


Figure 3.1: Map of Lagos State

Source: Modified from the Administrative Map of Lagos State, 2014

There is a concentration of work places and activity centres in Ikeja to Apapa axis home of two seaports- Tin Can Island Port and Apapa Port. Ikeja is a suburb of the city of Lagos and the capital. Ikeja is an abbreviation meaning Ikorodu, Epe Joint Administration; it was coined by colonial administrators for ease of administration. The population of this area is 313,196 (Population (POP), 2006). Ikeja has a lot of shopping malls, pharmacies, government reservation areas, music venues, plazas, cinemas, the Murtala Mohammed International Airport, Local Government Administrative Headquarters (Alausa), Computer village, cane village at Oba Okran and several Airline head offices located here and most industrial areas are located in Allen Avenue. Victoria Island is situated to the south of Lagos Island. It has expensive real estate properties and it is the main business and financial centre of Lagos, Nigeria. Today, Victoria Island is one of the busiest centres of banking and commerce, with most major Nigerian and international corporation's headquarters on the Island. The influx of banks, commercial ventures and street traders who cater to local bank employees, businessmen and long time residents complain about the increase in traffic and parking.

These two areas and their land use activities influence the direction and the flow of traffic and are largely responsible for the perennial traffic congestion in the city. This spatial structure of concentration of work and activity centers in the central business district is itself not problematic; in fact the structure lends its self to efficient public transit schemes. Trip length for commuters in the mega city region is said to range between 10-30 km daily (FRN, 2006). Despite the allocation of investment (fund) on road infrastructure, the mobility accessibility needs of the people are far from being solved as traffic congestion makes intra city journey around the metropolis and state too cumbersome" Figure 3.2 and Figure 3.3 show the streets both in Ikeja and Victoria Island.

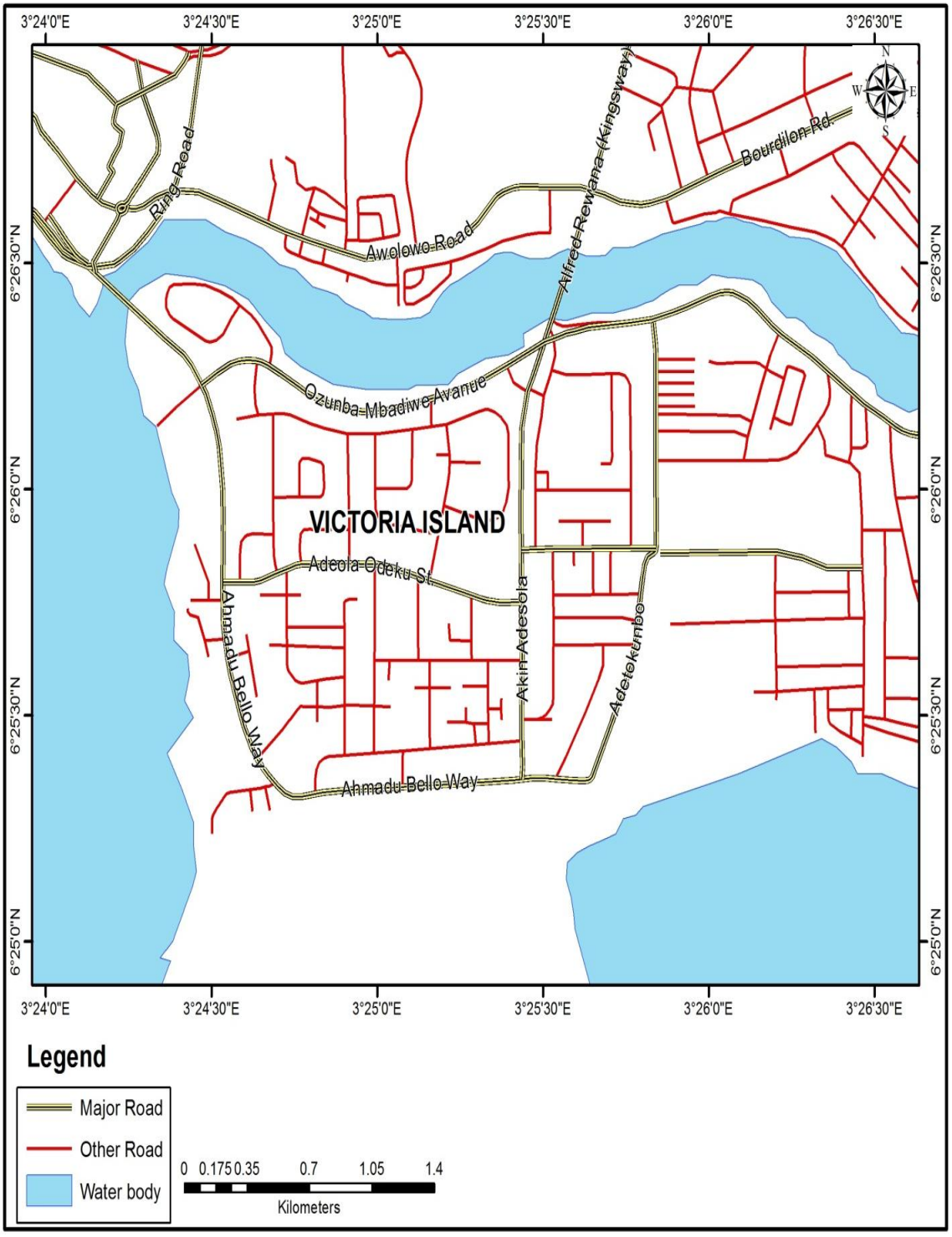


Figure 3.2: Map Showing Roads And Streets In Victoria Island.
Source: Modified from the Lagos Mega City Street Map.
Modified from the Administrative Map of Lagos State, 2014

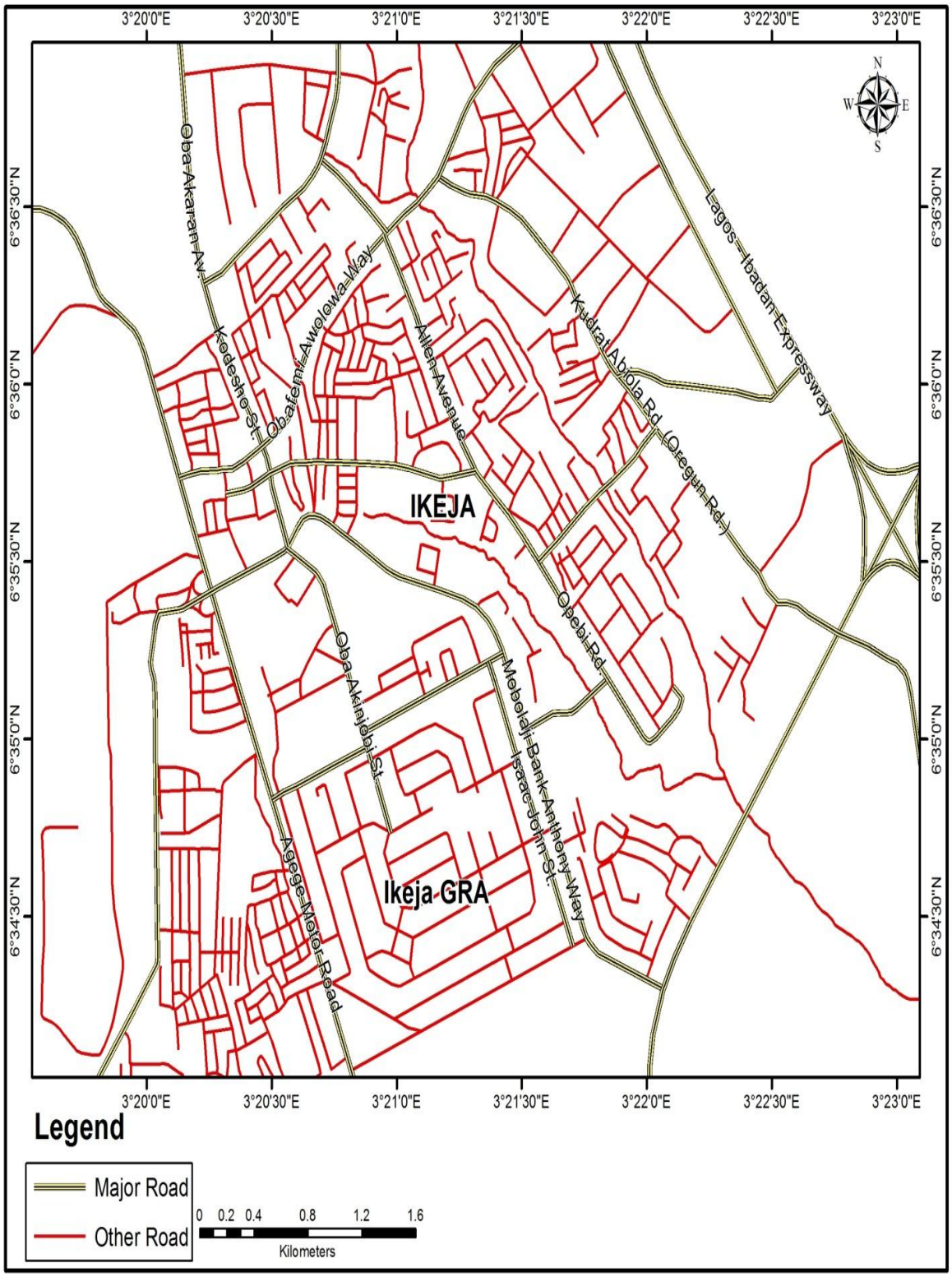


Figure 3.3: Map Showing Roads And Streets In Ikeja

Source: Modified from the Lagos Mega City Street Map.
Modified from the Administrative Map of Lagos State, 2014.

3.1.2 Urbanisation And Human Settlement System

The main urban centres in the state are Badagry, Epe, Ikorodu, Ikeja and Lagos. The urbanization process that has taken place in Lagos State has been of such significance in the State and in Nigeria as a whole that it should receive special attention (Oni, 2004). Although not European in origin, Lagos State represents most spectacularly one of that class of Nigerian cities which growth and development have been significantly shaped by European influences. Starting from a small settlement made up by the Aworis (a sub group of the Yoruba's) first at Ebute-Metta and later (for defense reasons) at Iddo, probably in the early part of the 17th century, the settlement of Lagos existed rather quietly up to the end of the 18th century (People, Population and Settlement of Lagos State, 2003).

Subsequently, various public programmes relating to industrial development, swamp reclamation and mosquito campaigns, pipe borne water, transportation facilities, commercial activities and the city's increasing functions as the capital of the federation accelerated the growth of Lagos into the greatest single concentration of skills and disposable income in the country. By 1963, the city (the Municipality of Lagos) made up of such components as Lagos Island, Lagos Mainland, Ikoyi and Victoria Island, (Apapa and other areas had an official population figure of 665,246 (Olukoju, 2003).However, the geographic city beyond the boundaries of the municipality was much larger. The spectacular road development works since the 1970's (the construction of the Eko Bridge, the reconstruction of Ikorodu Road into a 10 lane dual carriage way, the construction of the Third Mainland Bridge, the Apapa-Oworoshoki Expressway, the Lagos Badagry Expressway, the Abeokuta Expressway, the Victoria Island - Epe road as well as the interconnecting roads that link them into elaborate circumferential route ways and circulation paths have been both responses to and catalysts of the growth of metropolitan Lagos. The process of urbanization still continues in Lagos and

with it comes various problems concerning administration, land acquisition, housing and rents, sanitation, transportation, water supply and crime.

From 1821 onwards, it became an important slave port on the West African coast. Important turning points in the subsequent growth of Lagos include the bombardment of the city by the British in 1851, with the purpose of ousting the slave trade inclined King Kosoko and restoring Akintoye as King of Lagos; the resulting abandonment of the city by the civilian population and the slow growth thereafter; the formal cession of Lagos as a Colony to Britain in 1861; and the sub sequent establishment of regular government and administration of justice. Then followed piecemeal addition of hinterland areas to ensure political and commercial stability; the subsequent growth in commerce and the development of communications cuminating in the founding of the Lagos Chambers of Commerce in 1897. The construction of the railway started in 1895 and harbour improvement followed (1908-1917). The volume of trade has continued to grow over the years.

The process of urbanisation still continues in Lagos and with it comes various problems concerning administration, land acquisition, housing and rents, sanitation, transportation, water supply and crime. These issues are brought to the attention of the public continually through the news media, and they remain endemic subjects of governmental policy and programmes. The settlement system in Lagos state is obviously dominated by metropolitan Lagos which incorporates not less than 16 of the 20 local government areas (LGAs): Agege, Ajeromilfelodun, AmuwoOdofin, Alimosho, Apapa, EtiOsa, lfako ljaye, Ikeja, Kosofe, LagosIsland, Lagos Mainland, Mushin, Oshodilsolo, Somolu, Surulere and part of Ojo.In each of the four remaining LGAs, there is typically a focal town surrounded by numerous lower ordersettlements and village communities. In Badagry LGA, the focal town is the

ancientsettlement of Badagry which was a major slave out post in precolonial times and is reputed asbeing the first place in Nigeria where Christianity was preached in 1842.

There are about 120 other communities and villages in the LGA including Ajara, Topo, Panko, Akarakumo, Aseri, Egun and others. The situation in Epe LGA is similar, the focal town being Epe. The other settlements are about 311, including Agbowalkosi, ltoiki, Ejirin, Onisawasawa, Ubuja, lpabodo ment headquarters which is Akodo but a more developed small town, Ibeju. Distributed irregularly around and between these two are about 153 other village communities, including Lekki, Magbon Alade and others. Finally, Ikorodu LGA has as its focal town the local government headquarters, Ikorodu, which is a veritable commercial city in its own right.Being the location of the transmitters for the Federal Radio Corporation of Nigeria, the Voice of Nigeria and Lagos State Broadcasting Corporation (Radio and Television), it is an important communication centre as well as a major gate way to the country's hinterland.There are about 260 other settlements in the LGA, including lgbogbo, Imota, Maya, Baiyeku, ljede, Majidun, Ajegunie, Agbede, Aguru, Odugunyan and others. These four LGAs Badagry, Epe, IbejuLekki and Ikorodu contain virtually the totality of rural areas in Lagos State.

3.1.3 PopulationAnd Socio-Economic Activities

The megacity region of Lagos comprises about 37 percent of the Lagos land area; however, it is believed to accommodate nearly 90 percent of the state’s population (Federal Republic of Nigeria (FRN), 2006). The population of Lagos was put at 10.5 million according to the 2006 Federal government of Nigeria population census; however the independent census conducted by the state of Lagos put the population at 17.5 million (Lagos State, 2006). Other sources put the population figure at 13 million as far back as the

year2000. (FRN, 2006). Projected populations for Lagos exhibit a wide range of between 16 million (United Nations) (UN, 2006) and 25 million (FRN, 2006) by 2015.

Estimates by the United Nations and the Lagos State Regional Master Plan put the state's current population at about 10.6 million inhabitants. However, the 1991 census of Nigeria puts the population of Lagos State at 5,685,781 or 6.42 per cent of the national total. The figure still makes Lagos State the most populous state in the Federation. With its area of 3,577 sq. km. the smallest in the country, the state's population density of 1,590 persons per sq. km. is therefore high. The density value for built up metropolitan Lagos, estimated at 20,000 persons per sq. km. is even higher still. A 1988 estimate indicates that the population of Lagos State had been growing at an annual rate of 8 percent in the urban areas and 3 percent in the rural areas. Obviously, the urban growth rate has been enhanced by immigration. However, in view of the movement of the Federal Government to Abuja in December 1991, the growth rates are likely to have begun to decrease, or to increase at a decreasing rate.

3.1.4 Education,Economy And Industries

Lagos State has taken giant strides in fulfilling the educational aspirations of its citizenry. The state has 906 primary schools with 859,456 pupils. The state also has 360 secondary schools with 633,247 students, 5 Technical Colleges with 3,223 students, two Colleges of Education including that for Primary Education, a Polytechnic and a University - the Lagos State University (LASU) located at Ojo. It also houses the federally owned University of Lagos. The thrust of the government educational policy is the provision of qualitative education and the pursuit of academic excellence.Lagos State is the nation's economic nerve centre with over 2,000 industries. 65% of the country's commercial activities

are carried out in the state. Two of the nation's largest seaports -Apapa and Tin-Can Ports are located in Lagos state.

3.1.5Transport Network

Lagos is blessed with all the transportation modes, i.e. overland (Road and Rail), Water, Air and Pipelines. Roads in Lagos are of three categories. Trunk A called Federal Roads (highways), Trunk B – States Roads and Trunk C – Local Government roads. A major ingredient of rapid socio-economic development is a good quality road network. And also is the adequate maintenance of such roads and drain. Some important routes in Lagos Metropolis are as follows: Lagos-Ibadan Expressway, third mainland bridge, Obafemi Awolowo Way,Kudirat Abiola Way, Ojota Garaga etc. Despite these features, such problems as parking and traffic congestion, inadequate public transport and inadequate maintenance are still prevalent in the State.Figure 3.4Map showing transport network between Ikeja and Victoria Island, Lagos State.

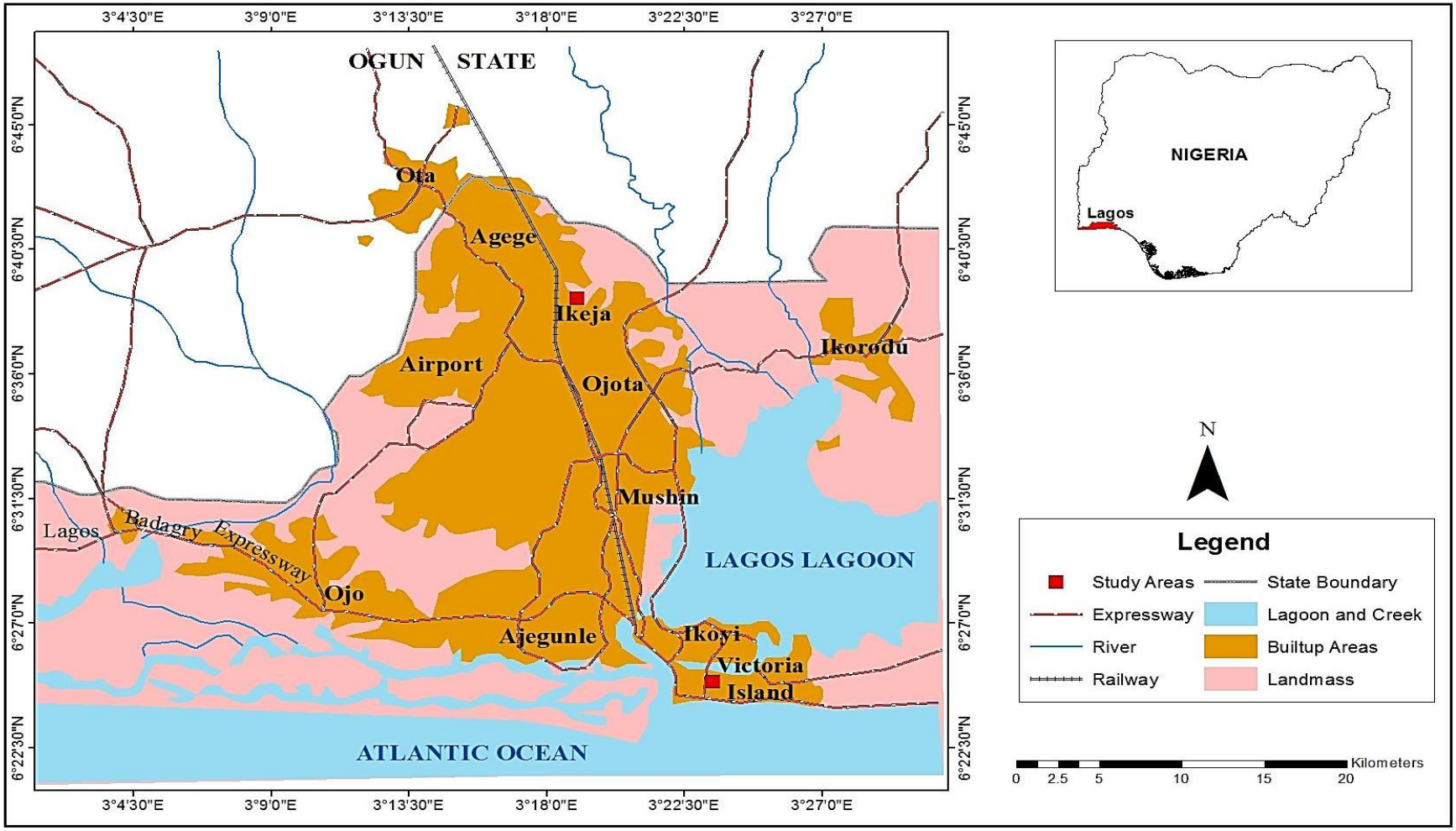


Figure 3.4: Map showing transport network between Ikeja and Victoria Island, Lagos State.

Source: FederalRepublic ofNigeria (2006)

3.1.6 Tourism And Recreation

The state has a Tourism Policy which recognises six tourism zones, namely: Bar Beach Water Argentinad recreational zone; Lekki-Maiyegun resort Argentinad zone; Kuramo Water Argentinad tourism zone; Epe-Marina Cultural tourism zone; Badagry Marina Recreational and Cultural zone.

Prominent tourist attractions in the state include; City Hall (headquarters of the Lagos Island Local Government); the National Theatre, National Museum, Onikan; Holy Cross Cathedral, Lagos, the seat of Catholic Archdiocese; Relics of Brazilian and other colonial quarters; the site of the fallen Agia tree, Badagry, where Christianity was first preached in Nigeria in 1842; Oso-Lekki Breakwaters; First storey building in Nigeria (1845) at Badagry. Others are the Bar Beach. Tarkwa Bay, Badagry Beach and Lekki Peninsula. There is also the Eyo festival which is held to mark important events in the state.Badagry town houses the first storey building in Nigeria, built in 1845 and still standing on its original

3.2Methodology

This section discusses the various methods employed in generating data for the study. The section explains the source of data, the sampling design, questionnaire administration and the methods of data analysis.

3.2.1 Reconnaissance Survey

A reconnaissance survey of on-street car parks in the study areas was carried out in order to have a better perspective of the area. The researcher visited Ikeja and Victoria Island on-street car parking areas from street to street to be acquainted with the nature of on-street parking in the study area. The researcher identified four different operators of on-street car parking services each in Ikeja CBD, Ikeja GRA, Ikeja and environs and Victoria Island. All these assisted the researcher to have a better view of the study area for data collection.

3.2.2 Types Of Data Utilized

The following data collected for this study;

i. Socio-economic characteristics of on-street car park users
ii. Nature of traffic around the on-street car parks
iii. On-street car parking management systems
iv. Methods of on-street car parking
v. map of Lagos state showing some locations of on-street car parks
vi. Administrative map of Lagos showing Ikeja and Victoria Island with the road network
vii. Effects of Nature of Car Parking on Vehicular
viii. Challenges of the on-street car parking management systems.

3.2.3Sources Of Data

In an effort to achieve a better and meaningful result for this study, the researcher used both primary and secondary data.

3.2.3.1Primary Sources Of Data Utilized

In order to achieve the aim and objectives of this study, primary data were obtained from well-structured questionnaire to on-street users and interview with the on-street car parking operators, as well as physical observation of the areas under study.

3.2.3.2Secondary Sources Of Data Utlized

The secondary sources of data were obtained from the published and unpublished transportation materials, relevant literature, journals, and series of information from past researches. The Ministry of Transport in Alausa in Ikeja, Federal Road Safety Corps (FRSC), Lagos State Transport Management Agency (LASTMA) and Lagos Metropolitan Area Transport Authority (LAMATA) was contacted for secondary information on existing regulations and policies on vehicle terminal and parking within the study area.

3.2.3.3Instrument ForData Collection

The study administeredwell-structured open and close ended questionnaire to the users of on-street car parks in the study areas as well as a structured interview to the Heads of Operation of on-street car parking operators. The choice is because they are the ones saddled with the responsibility of day to day operations of the on-street car parks. Field observation wasemployed to elicit information helpful in achieving the research objectives.

3.2.3.4 Sample Size and Sampling Technique

The sampling frame for this research consists of the locations of on-street car parking and the users of on-street car parks. Available data from car park operators shows that in Ikeja there are 4436 on-street car parking users while Victoria Island has 4,117, the sum total of the car park users are 8533. Random sampling of the users of these on-street car parking lots were used in sampling the population. The sample size were derived using Krejcie and Morgan formula (1970), $S=x^2l\}fP\ (1-P) + d^2\ (N-l) + X^2?\ (1-P)$

Where

S = the required sample size

X^2 = value of chi square at 1 degree of freedom which is 3.841

N = the known population size

P = the population proportion assumed at 0.50

D = the degree of accuracy expressed at 0.05

The calculated sample size is 385. To determine the proportion of the respondents, Yamane (1967) sampling method for determining respondents were also used, ie nx 385/N Where:

n = number of on-street car parking users in each location

N = total number of on-street car parking users in all the locations.

The distribution of the questionnaire to the on-street car parking users is shown in Table 3.1below.

Table 3.1: Distribution of Questionnaire to On-StreetCar Parking Users

S/No	Locations	No of Users	No of Respondents
1.	Maryland/Ikeja GRA	814	37
2.	Ikeja and Environs	2,722	123
3.	Ikeja Central Business District (CBD)	900	41
4	Victoria Island	4117	184
	Total	**8553**	**385**

Source: Lagos State Ministry of Transport, 2014

3.2.3.5 Methods of Data Analysis

Data obtained on the field was analyzed via descriptive method. The descriptive was through the use of frequency table and pie charts. Tables and pie charts was used to show the relationships or differences between car parking in Ikeja and Victoria Island.

Mean rank analysis was also used to identify the critical problems, using statistical package for the social sciences (SPSS 20.0). The variables with the critical problems were identified via the outcome of the mean. For example, variables with lower mean shows that they are critical problems while those with high mean are less critical problems.

The participants or respondents on the users of On-street car parking used open and close ended questionnaire, while managers, car park operators were exposed to interview and open end questionnaire were asked to rate their level of agreement on a five point likert scale format. This is in line with Gravetter and Forzahn (2006) who note that the likert scaling technique scored favourable and unfavourablestatements differently. The questionnaires were divided into three sections. Stating their objectives;

- On-street parking users concerned with the background information on age, sex, occupation, and qualification of respondents while other questions on nature of car parking and their methods of car parking, the effect of car parking on the free flow of traffic and challenges of car parking management systems in Ikeja and Victoria

Island. They were based on simple statistics supported by series of tables, and pie charts showing percentage calculation of some variables.

- Managers orcar park operators concerned with methodsof on-street car parking facility, number of car parking on each space of the park, methods of payment, use of parking policy, average number of cars that park daily. They were based on simple statistics supported by series of tables, and pie charts showing percentage calculation of some variables.
- Managers, car park operators concerned with challenges of on-street car parking were expose to mean rank analysis to identify the problems. The variables with the critical problems were identified via the outcome of the mean. Variables with lower mean shows that they are critical problems while those with high mean are less critical problems.

CHAPTER FOUR

DATA PRESENTATION AND DISCUSSION OF RESULT

4.1 Introduction

Data collected from the field was analysed and discussed in this chapter, using descriptive method and mean rank analysis. The descriptive statistics include frequencies, percentages, and pie charts. Mean rank analysis was also used to identify the critical problems, using statistical package for the social sciences (SPSS 20.0). The section analysed data collected from users of on-street car parks and on street car park operators or managers.

4.2 Socio- Economic Characteristics Of Users Of On- Street Car Parking

This sub section examines socio economic characteristics of those involved in on-street car parking. Data collected from the respondents include information onage, occupation, sex, level of their educational attainment, occupational status and years of driving experience.

4.2.1 Age Differential Orderof Users of On-Street Car Parks

Figure 4.1 Percentage distribution of age of drivers and motorists in the two study areas, Ikeja and Victoria- Island,the figure indicates that half of the population in Ikeja shows that the age range bracket of 21-30 years is higher at 50.7% and Victoria Island is 44.0% within age bracket of 31-40 years.The result shows that above 60years Victoria Island is 1.1% and Ikeja is 4%. Age bracket between 41-50 and 51-60years indicate that Victoria Island and Ikeja is 12.5%, 10.4%, 2.7% and 6.5%.Finally, less than 20years shows that Victoria Island is 3.3% and Ikeja 2% respectively.

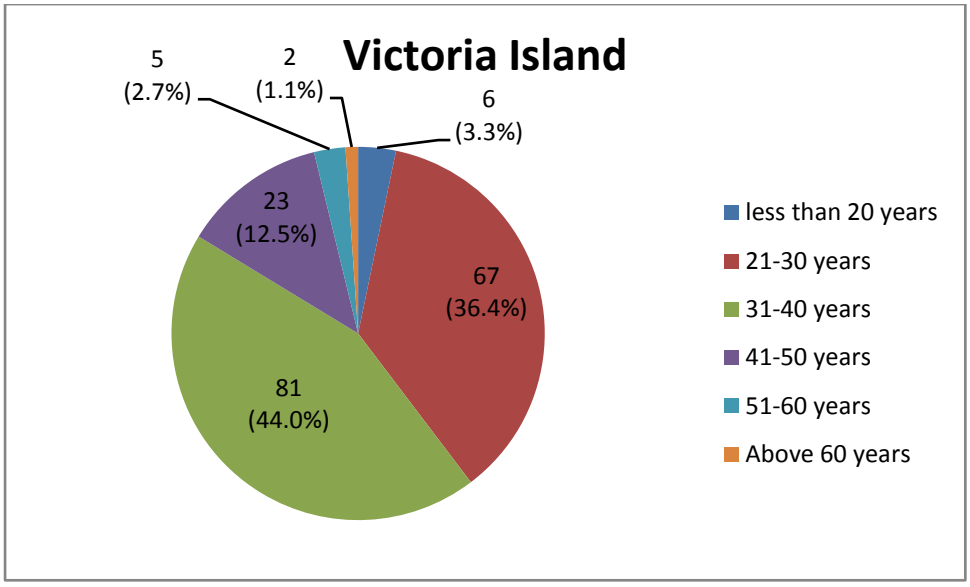


Figure: 4.1: Age Range Of Respondents

Source: Author's Field Work(2014)

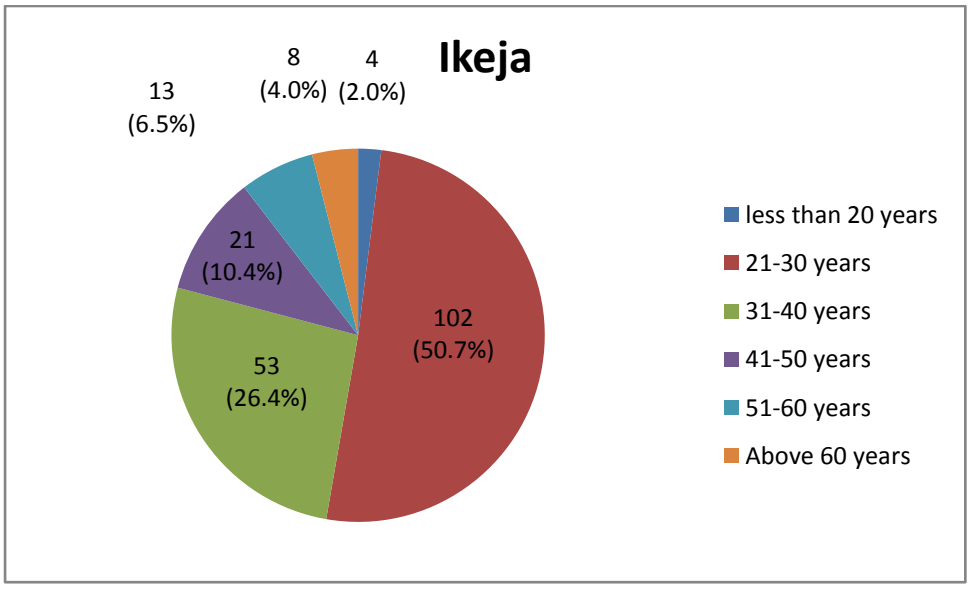


Figure: 4.1: Age Range Of Respondents

Source: Author's Field Work(2014)

Figure 4.1 shows the distribution of respondents by age for the two study areas. The figureshows that the age of drivers(between ages 18 and above) demonstrates self confidence that is remarkably stable and influenced by events of good driving skills.(Marottoli and

Richardson, 1998). Cumulatively, the age group between 20 and 49 years shows that the population sampled are in their youthful stage which indicate high productivity and high efficiency

4.2.2: Sex Distribution Of Respondents

The Sexdistribution of respondent fromTable 4.1 indicates that Victoria Islandwith 79.9% has high percentage of males than Ikeja with 69.7% male, while female respondents are 20.1% for Victoria Island and 30.3% for Ikeja.

Table 4.1: Sex Of Respondents

Sex	Cities					
	Victoria Island		**Ikeja**		**Total**	
Male	147	79.9	140	69.7	287	74.5
Female	37	20.1	61	30.3	98	25.5
Total	**184**	**100.0**	**201**	**100.0**	**385**	**100.0**

Source: Author's Field Work (2014)

All the data collected on sex distribution of respondents in the two study areas shows that male dominate the two study areas this shows that men take more responsibilities of their families and are engaged in economic activities and also shows the disparity level between male and female in transport operations.

4.2.3: Occupations Of Respondents

Respondents occupation are important aspect of car parking services. Daily mobility needs arise primarily because of the need to meet occupational demands or requirements.Users of carparks with different occupational status tend to move to their various places of work, business,social and educational purposes which brings about car parking. Figure 4.2 revealed that half of the population in Victoria Island were civil servants

with 49.5% and half of the population in Ikeja were 41.8% are company employees followed by business owners with34.8% in Victoria Island, 19.9% in Ikeja. Unemployed respondents in Ikeja is 1.5%,Victoria Island is 0.5%. Finally, traders in Ikeja with 9.0% and Victoria Island with 10.9%.

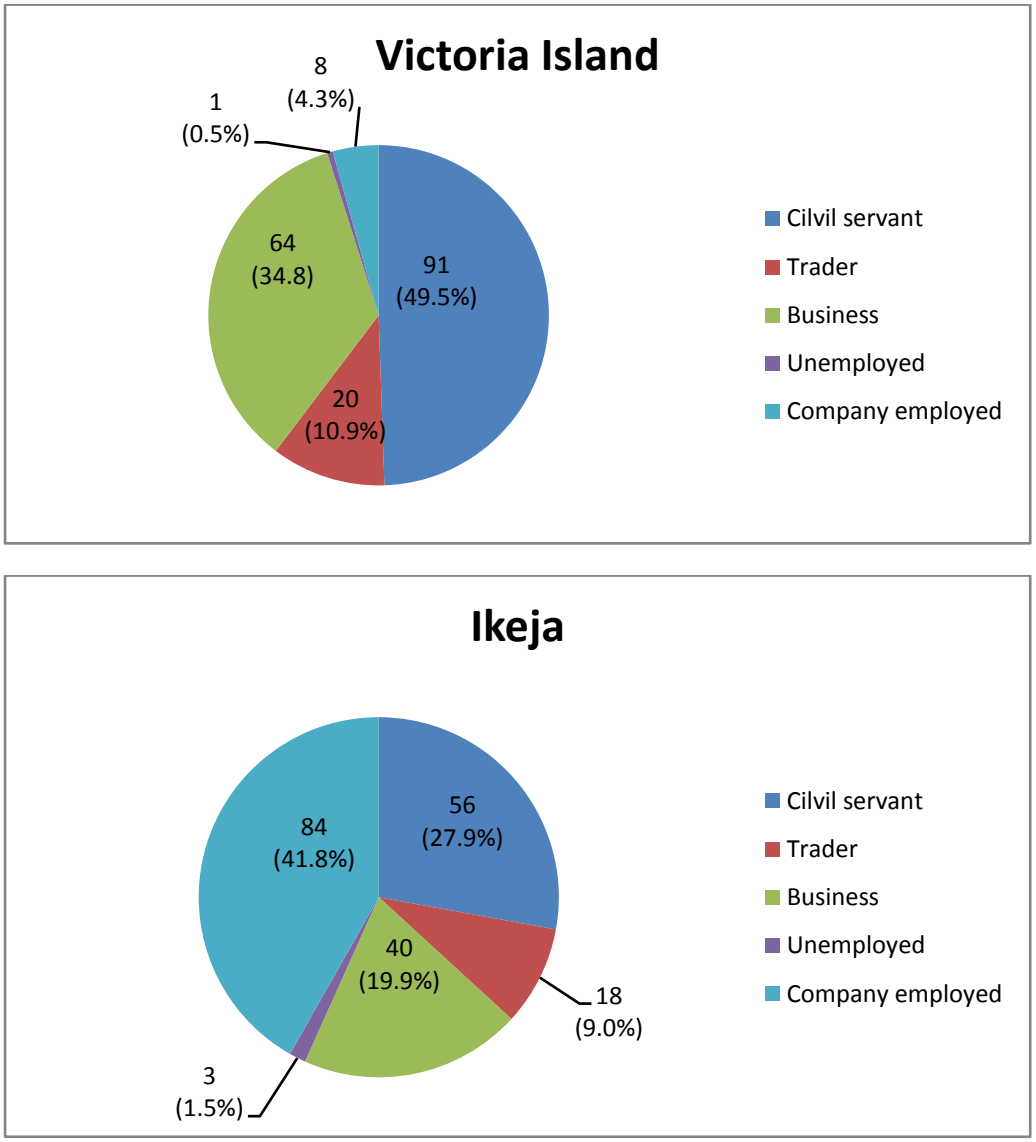


Figure 4.2: Occupational Distribution of Respondents

Source: Author's Field Work(2014)

Deduction from this result implies that civil servants and business owners are classified to the patronize car parks in Victoria Island due to the presence of financial institutions, plazas,shopping malls, trading and international corporationsheadquarters.The

reason for the high patronage in Ikeja is as a result of abundance of industries, pharmacies,Air ports and thehead office of Aviation,shopping malls like SHOPRITE etc

4.2.4: LevelOf Educational Status

From Table 4.2 shows that educational attainment is perhaps very important characteristics of the respondents for this study. There is a variation in the level of education of the respondents due to the different types of occupation passengers and commuters engage in.The various occupation available and the numerous Federal, State Government Agencies, private sector, industries and organization in the two areas,accomodates various level of labour who provide utility for the system. Table 4.2 shows that 43.7% inVictoria Island and 63.7% in Ikeja have Tertiary education followed by secondary education with 41.7% for Victoria Island and 23.3% for Ikeja.Primary and No formal education indicate that Victoria Island and Ikeja is 7.6%, 7.6% 3.3% and 5.5%.

Educational Level of Respondents

Table 4.2: Educational Distribution Level of Respondents

Educational level	**Cities**				**Total**	
	Victoria Island		**Ikeja**			
No formal education	6	3.3	11	5.5	17	4.4
Primary education	14	7.5	15	7.5	29	7.5
Secondary education	77	41.7	47	23.3	124	32.2
Tertiary education	87	47.3	128	63.7	215	55.8
Total	**184**	**100.0**	**201**	**100.0**	**385**	**100.0**

Source: Author'sField Work (2014)

It shows that thesehas been a great improvement in the educational background of the users of on-street car parks in the two study areas. This implies that an average person in this two areas has one form of education or the other due to the administrative,educational,commercial, industrial setting and relevance of the area.

4.2.5:Distribution Of The LevelOf Driving Experience

Analysis on Table 4.3 reveals that most of the respondents with the highest driving experience is between 6-10 years is 50% for Victoria Island and 40.8% for Ikeja.Driving experience between 2- 5years for Victoria Island is 27.2% and 33.8% for Ikeja.Further analysis indicate that driving experience less than 1year and also above 10 years for Victoria Island Ikeja is 8.2%,6.5%, and 14.7%, and18.9% respectively.

Table 4.3: Distribution Of Respondents Of Years Of Driving Experience

Educational level	**Cities**				**Total**	
	Victoria Island		**Ikeja**			
< 1 years	15	8.2	13	6.5	28	7.3
2-5 years	50	27.2	68	33.8	118	30.6
6-10 years	92	50.0	82	40.8	174	45.2
> 10 years	27	14.7	38	18.9	65	16.9
Total	**184**	**100.0**	**201**	**100.0**	**385**	**100.0**

Source: Author's Field Work(2014)

The above analysis reveals thatinexperience driving is associated with less ability to accurately perceive specific road situations, poor estimations of safe turning speeds, traffic gaps, and stopping distances, as well as slowed or inappropriate responses to traffic situations (Deery, 1999).Driving experience of drivers is very important because it reduces accidents. It also shows the level of responsibility of self-control and obeying traffic rules and parking regulations towards other drivers and the society at large.

4.3 NATURE OF CAR PARKING IN THE STUDY AREA

4.3.1Distribution By Trip Purpose

Further analysis on Table 4.4 shows that most of the trips made in Victoria Island isbusiness oriented with 34.8% and for work with 37%.While inIkeja 29.9% is business and42.3%for work.The analysis below shows that shopping trips in Victoria Island and Ikeja is 16.3% and 12.4%, respectively.Visit trips within Victoria Island and Ikeja is 6%, 7.5%,while that of education is 6% and 8% respectively. The result reveals that the business class travels most often with the intention of buying and selling in order to make profit and gainful employed.The workers may be civilservants,bankers etc who travelmost often on transfer, posting, special assignment or to visit families whom for some reasons may be residing in different geopolitical locations

Table 4.4: Distribution Of Respondents By Trip Purpose

Trip purpose	**Cities**				**Total**	
	Victoria Island		**Ikeja**			
Business	64	34.8	60	29.9	124	32.2
Shopping	30	16.3	25	12.4	55	14.3
Visit	11	6.0	15	7.5	26	6.8
Education	11	6.0	16	8.0	27	7.0
Work	68	37.0	85	42.3	153	39.7
Total	**184**	**100.0**	**201**	**100.0**	**385**	**100.0**

Source:Author's Field Work (2014)

Obot andUmoh (2007) opines that the number of trips made per day increases the chance of traffic congestion on roads especially during trips to churches, offices, markets, shops, sport centers and other places which often generate enormous parking demand. As

observed by Okoko (2006), the greater the number of attractions (shops, offices, work places etc) in an area the more traffic that will be attracted. This assertion has really manifested in thisstudy coupled with inadequate traffic management and parking spaces that have resulted to traffic congestion experienced in Ikeja and Victoria Island in Lagos.

4.3.2 Reasons For Parking

Parking has been a long standing problem in many urban centres.This has been due to the absence of clearly designated areas for parking in many of our cities.Table 4.5 reveals that most respondents identified parking near their destination. The analysis in Table 4.5 shows that Ikeja is 50.2% and Victoria Island is 42.4%, lack of parking space in Victoria Island is 26.1% and Ikeja is 20.9%,avoiding traffic congestion in Victoria Island is 21.2% and in Ikeja is 16.9% and security in Victoria Island is 10.3% and Ikeja is 11.9%.

Table 4.5: Distribution Of Respondents And The Reasons For Parking

Response	**Cities**					
	Victoria Island		**Ikeja**		**Total**	
Nearness to my destination	78	42.4	101	50.2	43	46.5
Lacking of parking space in my destination	48	26.1	42	20.9	179	23.4
Avoid traffic congestion	39	21.2	34	16.9	73	19.0
Security	19	10.3	24	11.9	90	11.2
Total	**184**	**100.0**	**201**	**100.0**	**385**	**100.0**

Source:Author's Field Work(2014)

Parking plays an important role in mobility access and the economic development of cities, at the same time it is profitable business for both the private and public sectors. The parking area is a major terminal facility and if not provided vehicles may be parked on the

carriage way and this could reduce the road capacity and cause delay, insecurity and accident as motorists obstruct traffic by involving in road side parking.

4.4: CAR PARKING MANAGEMENT SYSTEM IN THE STUDT AREA.

4.4.1:DistributionOfParking Methods

Figure 4.3 indicates that inVictoria Islandangular parking has 33.2%, parallel parking 65.2%, and perpendicular parking with 1.6%.For Ikeja angular parking is 40.3%, parallel parking is 58.2% and perpendicular parking is 5%. This means that more respondents adopt parallel parking in the two study areas.

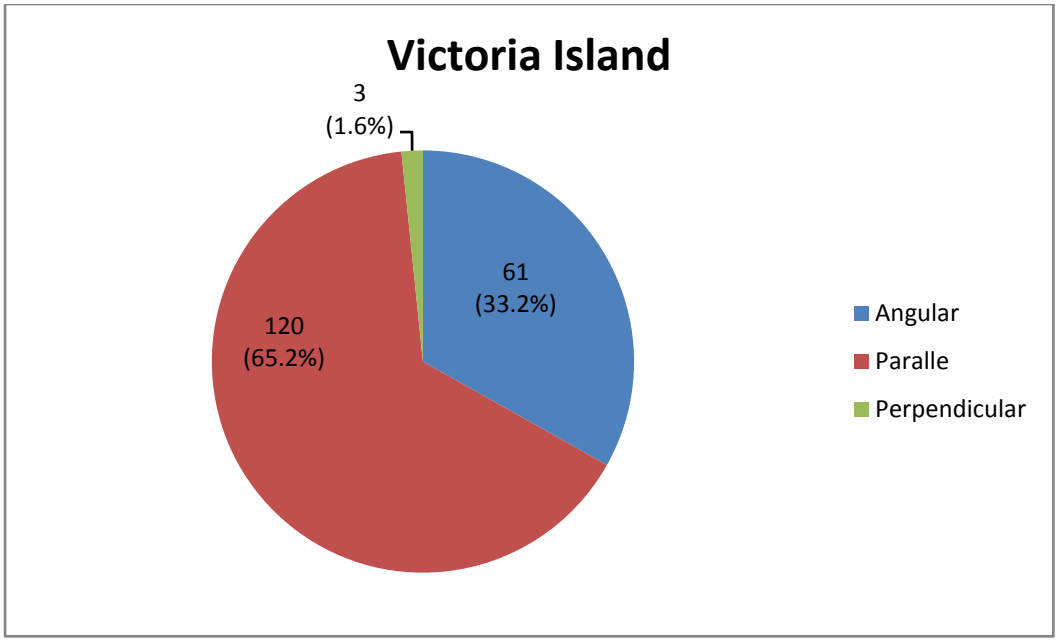


Figure 4.3: Distribution of Respondents on parking methods

Source: Author's field work (2014)

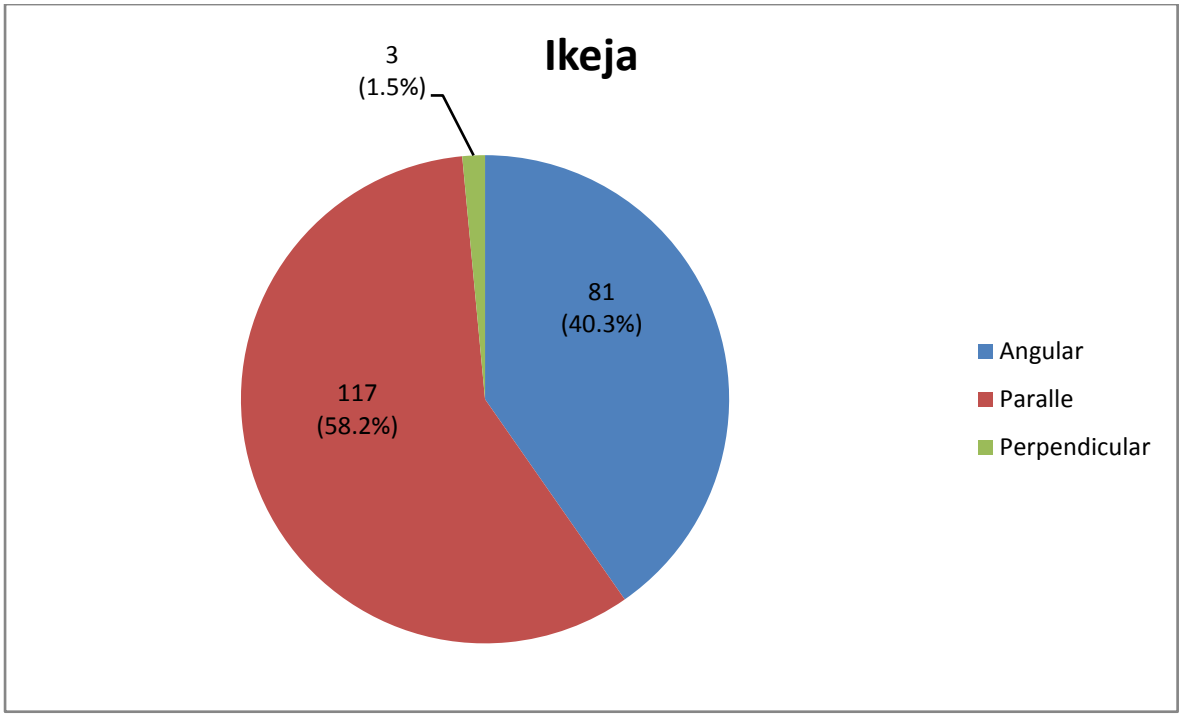


Figure 4.3: Distribution of Respondents of Parking Methods

Source:Author's Field Work(2014)

Parallel parking is a method of parking a vehicle in line with other parked cars. Cars parked in parallel are in one line, parallel to the curb, with the front bumper of each car facing the back bumper of the adjacent one. It is the safest method of kerbside parking so far as number of accidents is concerned since no backward movement is involved. As vehicles are parked length-wise parallel to the kerb, therefore, it causes less hindrance in smooth flow of traffic as compared to other geometrical parking arrangements (Department of Transportation, 2009).

Angle parking is similar to perpendicular parking, except the cars are aligned in an angle. Normally the angle is aligned with the direction cars approach the parking space. It makes it a lot easier to drive into the parking space in contrast to perpendicular parking, where the parking space is at a 90 degree angle. With angle parking there is a gentler turn. Not only is it easier to park, but it's also faster and the parking spaces are smaller, making it possible to add more parking spaces in the same area. Normally angle parking inside parking

garages and on streets that are wide enough to have room left for the traffic to pass Austroads(2002-07).

Plates 1-3shows vehicles parked at Ikeja while plates 4-6 shows vehicles parked at Victoria Island in Lagos state. Parking around this areas are either parallel or angular in nature.



Plate 1: On street car park in Ikeja



Plate 2: On street car park in Ikeja



Plate 3: On street car park in Ikeja



Plate 4: On street car park in Victoria Island



Plate 5: On street car park in Victoria Island



Plate 6: On street car park in Victoria Island

4.4.2: Awareness of Parking Facilitiesamong Respondents

Respondents are aware of streets with on street car parking due to the fact that demand for parking spaces and other facilities are high.The analysis on Table 4.6 shows that awareness of parking in Victoria Island is highest with 82.6% followed by Ikeja with 77.1%.This shows that most of the respondents are aware of the facilities while respondents in Victoria Island with 17.3% and Ikeja with 22.9% are not aware of the parking facilities.

Table 4.6: Awareness Of Parking Facilities Among Respondents

Awareness	**Cities**				**Total**	
	Victoria Island		**Ikeja**			
Yes	152	82.6	155	77.1	307	79.7
No	32	17.4	46	22.9	78	20.3
Total	**184**	**100.0**	**201**	**100.0**	**385**	**100.0**

Source:Author's Field Work(2014)

Asiyanbola and Akinpelu (2012) opined that the provision of parking for all automobiles must be widely recognized as a responsibility where adequate facilities are not otherwise provided. He stressed that major attention should be on on-street parking for passenger cars as parking needs to reduce traffic congestion in a city.

Pignataro (1973) expresses that parking is a major urban land use. Anyone who drives a car needs no introduction to the difficulties of finding a parking space in areas which are intensively used for business, commercial or residential purposes. An area containing a Central Business District (CBD), a region or community shopping centre, an industrial park, an airport, a civic centre, stadium or such other busy area is usually where extensive parking problems are found.

4.4.3: Respondents Awareness of Parking Facilities

From Table 4.7below shows it is shown that respondents are aware of parking facilities and that indicate that respondents use the following facilities of on street car parking in the two study areas.Table 4.7 reveals that traditionalsearching method in Victoria Islandis 72.4% and Ikeja is 77.4%. Ikeja has high responses and it shows traditional searching method is mostly used to locate an appropriate parking space for users.The result also indicate that parking information assistant in Victoria Island is 27.6% while in Ikeja it is 10.3%. Reservation of parking spaces for drivers and commuters in Ikeja has 12.3% responses. Few parking information assistant equipments or signages were present.Traditionalsearchway finding is the common strategy used to direct driverslocating appropriate parking space.

Table 4.7: Distribution Of Respondents On Awareness Of Parking Facilities

Awareness	**Cities**				**Total**	
	Victoria Island		**Ikeja**			
Traditional search method	110	72.4	120	77.4	230	74.9
Parking Assistant	42	27.6	16	10.3	58	18.9
Reservation	0	.0	19	12.3	19	6.2
Total	**152**	**100.0**	**155**	**100.0**	**307**	**100.0**

Source:Author's Field Work (2014)

Traditional search way finding is a technical term which refers to a strategy to direct drivers locating the appropriate parking place as per their needs. Way-finding is generally a part of the whole system of parking information.

4.4.4: Payment For Parking Space

Enforcement officers like LASTMA and LAMATA operate within the two study areas while Private operators are involved in making sure that they provide space for vehicles by placing tickets on cars parking along the streets.LASTMA and LAMATA fine wrong and illegal users of on street car parking.

From Table 4.8, the analysis shows that most of the respondents pay to the privateoperators in Victoria Island and Ikeja.The analysis shows thatVictoria Island is 82.6% and Ikeja is81.6% while enforcement officers in Victoria Island are 17.4% and Ikeja is 18.4% respectively.

Table 4.8: Distribution Of Respondents on Payment For Parking Space

Response	**Cities**				**Total**	
	Victoria Island		**Ikeja**			
Enforcement officers	32	17.4	37	18.4	69	17.9
Private operators	152	82.6	164	81.6	316	82.1
Total	**184**	**100.0**	**201**	**100.0**	**385**	**100.0**

Source:Author's Field Work (2014)

It is very important to mention here that the imposing price and time limits alone cannot work without proper labor intensive enforcement and professional car park operators. The concerned enforcement officer and car park operators will have to mark each tyre with a chalk. He will have to visit the block again and again for effective monitoring to check the time limit of each space (whether 15 minutes, 1 hour or 2 hours). The frequency of monitoring depends upon the time limits. If the time limits are very short concerned

enforcement officer will have to check the space frequently and vice versa. He may start overseeing the spaces if varying time limits are involved (Dan, 2005).

4.4.5 Periodicity Of Payment For Parking

The analysis on Table 4.9 depicts the percentage distribution of the method of payment. It shows that most of the respondents pay daily at the park and this may be due to businesses and those engaged in working long hours without access to parking garages or off street car parks.The percentage of those paying weekly and monthly is as a result of shopping,leisures,events and religious activities.

From the analysis on Table 4.9 daily payment in Ikeja is 88.6% and Victoria Island is 75.5%, weekly payment in Victoria Island is 14.1% and Ikeja is 5% and finallymonthly method of payment inVictoria Island is 10.3% and Ikeja is 6.5%.

Table 4.9: Distribution of Respondentson the Periodicity of Payment for parking

Response	**Cities**				**Total**	
	Victoria Island		**Ikeja**			
Daily	139	75.5	178	88.6	317	82.3
Weekly	26	14.1	10	5.0	36	9.4
Monthly	19	10.3	13	6.5	32	8.3
Total	**184**	**100.0**	**201**	**100.0**	**385**	**100.0**

Source:Author's Field Work(2014)

Controlling parking may be very effective in restricting and terminating traffic demand but any capacity on the roads that is freed-up will likely be filled by through traffic attracted from alternative routes by the improved travel conditions. Parking control will be of little assistance in circumstances where the current demand is to drop off or pick up

passengers – e.g. parents taking children to and from school. For these reasons, parking management as a tool for tackling traffic congestion needs to be supplemented by other measures (e.g. access control or pricing) to ensure the desired outcomes. It is also important that clear incentives and dis-incentives exist to ensure the effective enforcement of parking policies.

According to Still and Simmonds (2000) there is a clear and generally positive association between parking and retail growth. Smith explains that the adequacy of parking can influence economic return on public and private sector investments, and affect property values. On-street parking, "…is one of the best ways to help promote businesses in the central business district. Thus, there is a broadly shared belief that parking is good for central business districts, but there is also among business owners to press for free parking, believing that it is more attractive for consumers.

4.4.6 Amount Paid For Parking

Motorists are increasingly being called upon to pay directly for use of parking facilities. Parking supply management and pricing may be used as a strategy to reduce vehicle traffic and parking problems in a particular location. In additions, parking prices may be set to recover parking facility costs or to generate revenue for other purposes**.**Table 4.10 shows that the amount paid for parking in Victoria Island and Ikeja is N200 and above depending on the time limit.

Table 4.10: Distribution of Respondents for the Amount Paid For Parking

	Cities				**Total**	
	Victoria Island		**Ikeja**			
N 200 and above	184	100.0	201	100.0	385	100.0
Total	**184**	**100.0**	**201**	**100.0**	**385**	**100.0**

Source:Author's Field Work (2014)

Users often don't exactly know the parking charges, because charges differ between cities and also differ within certain areas of a city. Also, on street parking is usually paid up front. In general this causes people to pay more than they actually need just to avoid risking a fine. This affects the real price of parking, something that most parking users are not aware of.

Shoup (2009) states that the price of parking should be kept higher where the demand is high and on the other hand, the price of parking should be kept low where the demand is low. The demand based high parking price will produce more revenue. By 85% occupancy rate, it is meant that 1 out of every 8 parking spaces is vacant regardless of peak and off-peak hours. Adopting it as a management strategy, people feel convenience whenever they wish to park their vehicles. Such performance' based parking is not possible through imposing time limits but only through the use of appropriate pricing strategy.

To state it differently, it can be said that rates of kerbside parking, being the most desirable spaces, rates are kept high especially along very busy roads, slightly less in side streets/roads whereas, and are kept low in case of off-street parking. In case, parking occupancy of some area is more than 85% meaning that area is congested and price must be increased. Likewise, if the same block has occupancy less than the average (i.e. 85%) meaning that the area is underutilized and the price must be decreased (Zack, 2005).

Kelly and Clinch (2006), study the price sensitivity of on-street parking for business and non business trips. Their study in Dublin (Ireland) shows that the gap in price sensitivity between business and non-business trips increases as the price of parking rises. At first the impact of change in the price of parking affects all trip purpose in the same way, but as price further increases, a progressively widening gap between business and non business trips arises. The literature on the economics of parkingalso shows that location and price are key factors that determine the routine choice of the drivers.

Parking supply management, particularly pricing could help shift auto dependence to more sustainable alternative modes and reduce congestion (Shoup, 2005). Parking is seen as an infrastructure but it can only be a structure if it is paid for by those who use the infrastructure and left in the hand of the experts to manage.

4.4.7 Mode of payment For Parking Space

The mode of payment shown here indicatesthat the respondents pay cash. Figure 4.4shows that payment was done by cash by the respondents in the study areas.

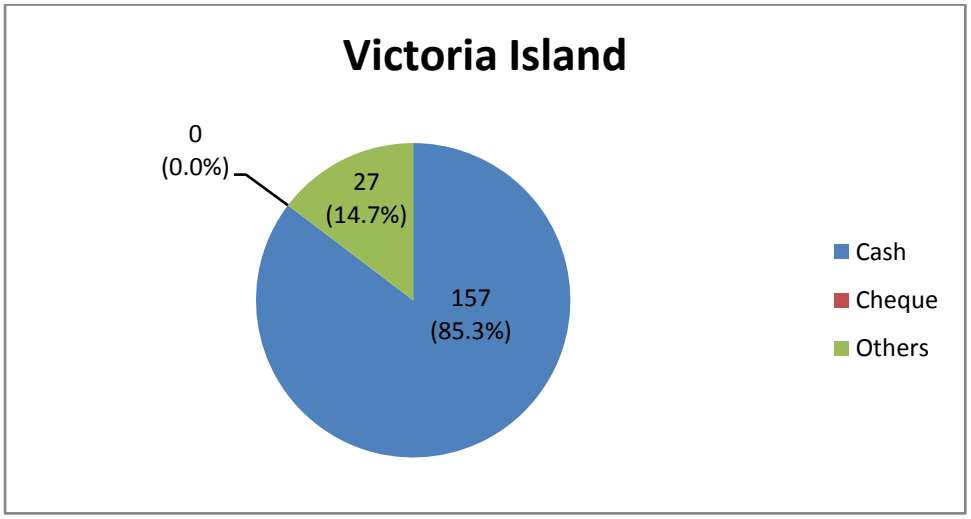


Figure 4.4: Distribution Of Respondents On The Mode Of Payment

Source: Authors Field Work(2014)

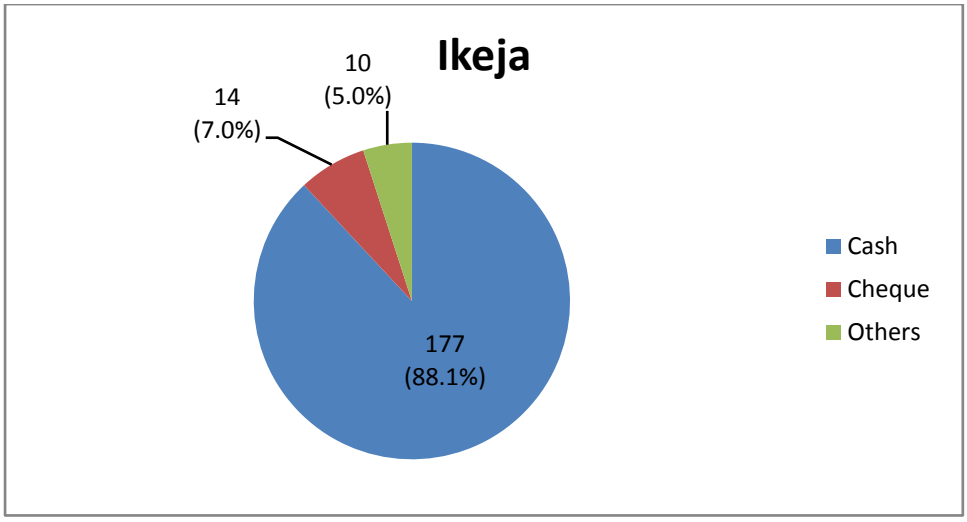


Figure 4.4: Distribution Of Respondents On The Mode Of Payment

Source: Authors Field Work(2014)

4.5: Effects of Nature of Car Parking on Vehicular Movement

4.5.1 Durationof Use of Parking Facility.

The city centre is a place of attraction for many drivers, due to the various activities present there: shopping, work and services.Table 4.11 shows respondents responses to the number of years using the car park.Table 4.11 shows the analysis that car parking between 6-10 years in Victoria Island is 47.3% and Ikeja is 43.3%, between 2-5years in Ikeja is 34.3% and Victoria Island is 28.8%, above 10 years in Victoria Island is 14.7% and Ikeja is 14.4% and finallyless than 1 year inVictoria Island is 9.2% and Ikeja is 8% respectively.

Table 4.11: Distribution of Respondents onthe Duration ofUseof Parking Facility

Duration	Cities				Total	
	Victoria Island		Ikeja			
< than 1 years	17	9.2	16	8.0	33	8.6
2-5 years	53	28.8	69	34.3	122	31.7
6-10 years	87	47.3	87	43.3	174	45.2
> 10 years	27	14.7	29	14.4	56	14.5
Total	**184**	**100.0**	**201**	**100.0**	**385**	**100.0**

Source:Author's Field Work(2014)

A central business district (CBD) thrives on high density because its prime advantage over other parts of a metropolitan area is proximity the immediate availability of a wide variety of activities. The clustering of museums, theaters, restaurants, and offices is the commodity a down town can offer that other areas cannot (Jacobs, 1961; Voith, 1998).

4.5.2 Regularity of Using the Parking Arena

The city is a place of attraction for many drivers and commuters due to the various activities present there: shopping, school, work and services.etc.Most activities (work and business) are daily,some are weekends like shopping,leisure,museum,cinemas and events. Figure 4.5 shows daily users of on street car parking in Ikeja is 62.2%, while Victoria Islandis 58.7%. Respondents parking once a week indicate that Victoria Island is 19.6% and Ikeja is 7% while respondents that park on weekends shows that Victoria Island is 11.4% and Ikeja is 7%.

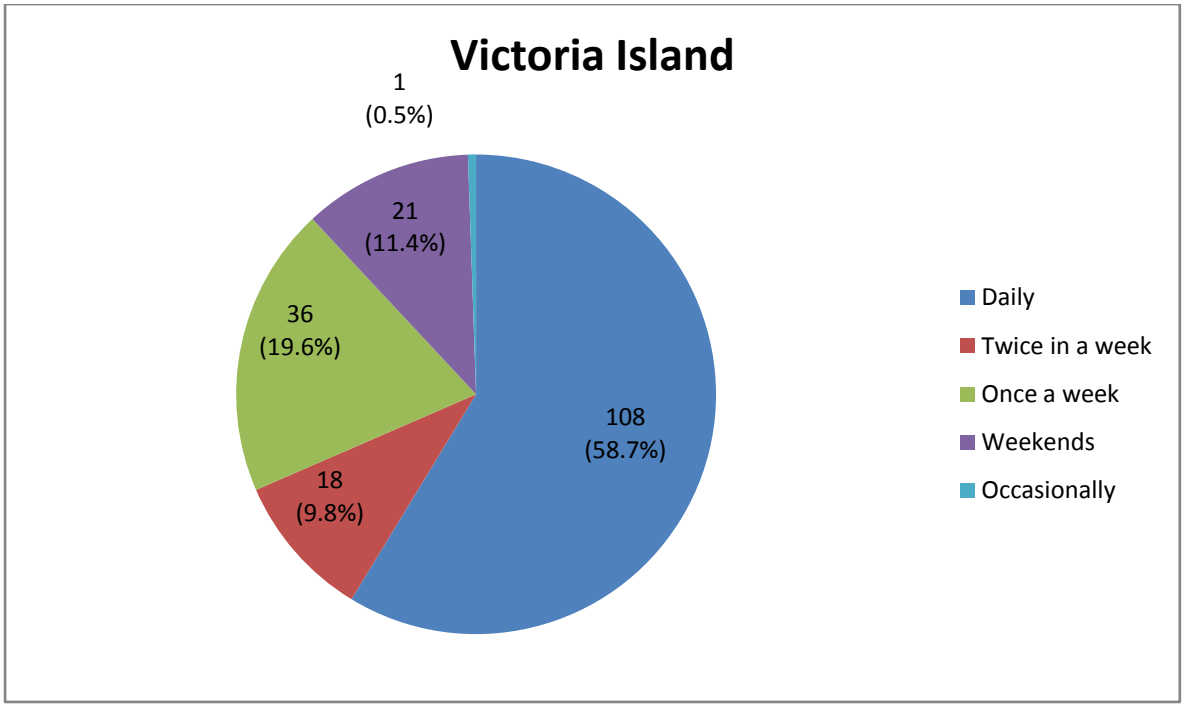


Figure4.5: Distribution of Respondents on How Often Respondents Park

Source:Author's Field Work(2014)

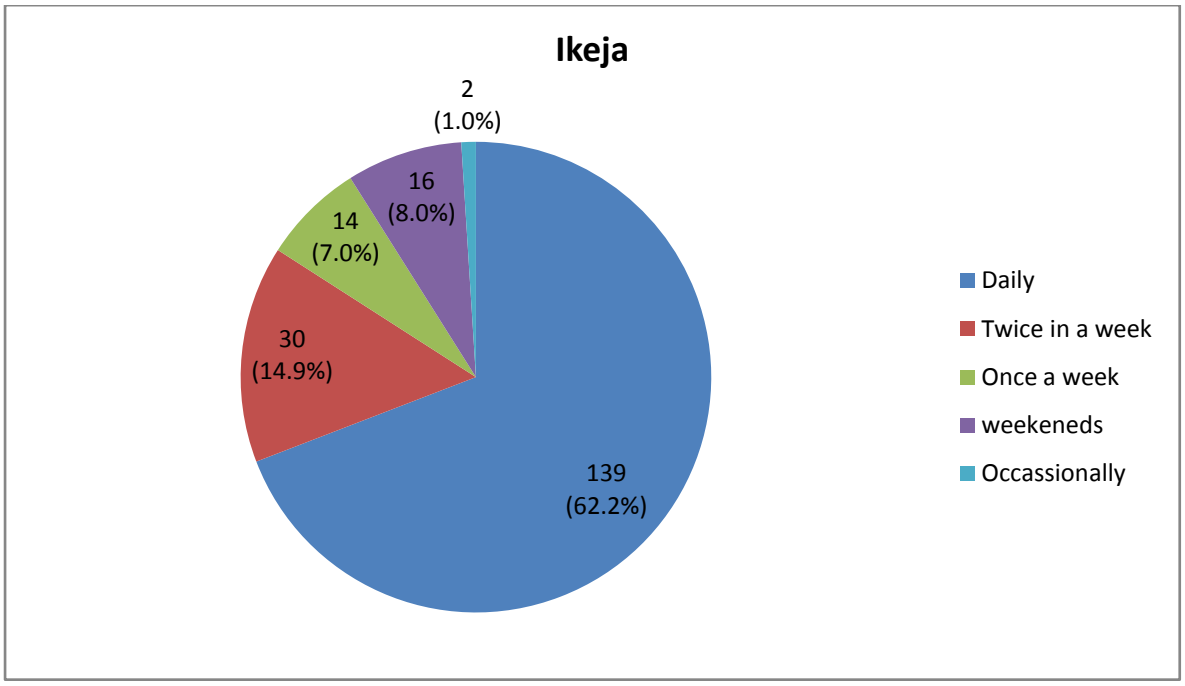


Figure4.5: Distribution of Respondents on How Often Respondents Park

Source:Author's Field Work(2014)

Findings revealed that Ikeja and Victoria Island with 62.2% and 58.7% of respondents engage in daily use of car parks (business and work trip) daily. It has been widely stressed in the literature among authors such as Okoko (2006) and Basorun (2004) that trips to business and work generate enormous traffic than any other activities inthe area of the city.

4.5.3 Usual Durationof Parking

Time is a critical factor in the operation of on street car parks.It simply refers to the amount of time one parks in an available kerb space. There is no hard and fast rule to manage parking timings. The analysis on figure 4.6 reveals that parking intervals between 2-3hours in Ikeja is 44.3%, Victoria Island is 25.5% and above 3 hours in Victoria Island is 42.9%, Ikeja is 5%. Time interval between 46-60min in Ikeja is 27.9% and Victoria Island is13.6%,31-45 min in Victoria Island is13.6% and Ikeja is 12.9% and finally, time interval below 30min in Ikeja is 10.4% and Victoria Island is 4.3%.

The analysis from figure 4.6 indicate that cars park at a longer period in Ikeja and Victoria Island was between time interval of2-3 hours and above 3 hours which results to traffic congestion,time wasting and pollution in the study locations.

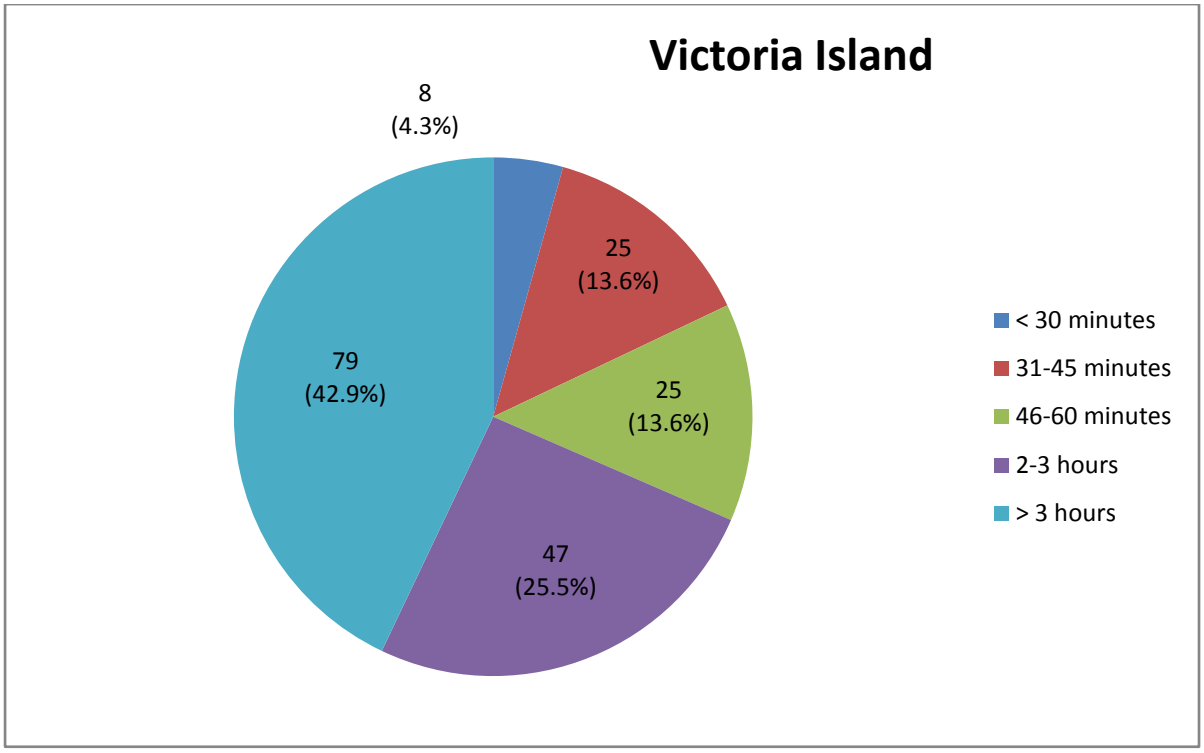


Figure: 4.6: Distribution of Respondents on the Duration of parking

Source:Author's Field Work(2014)

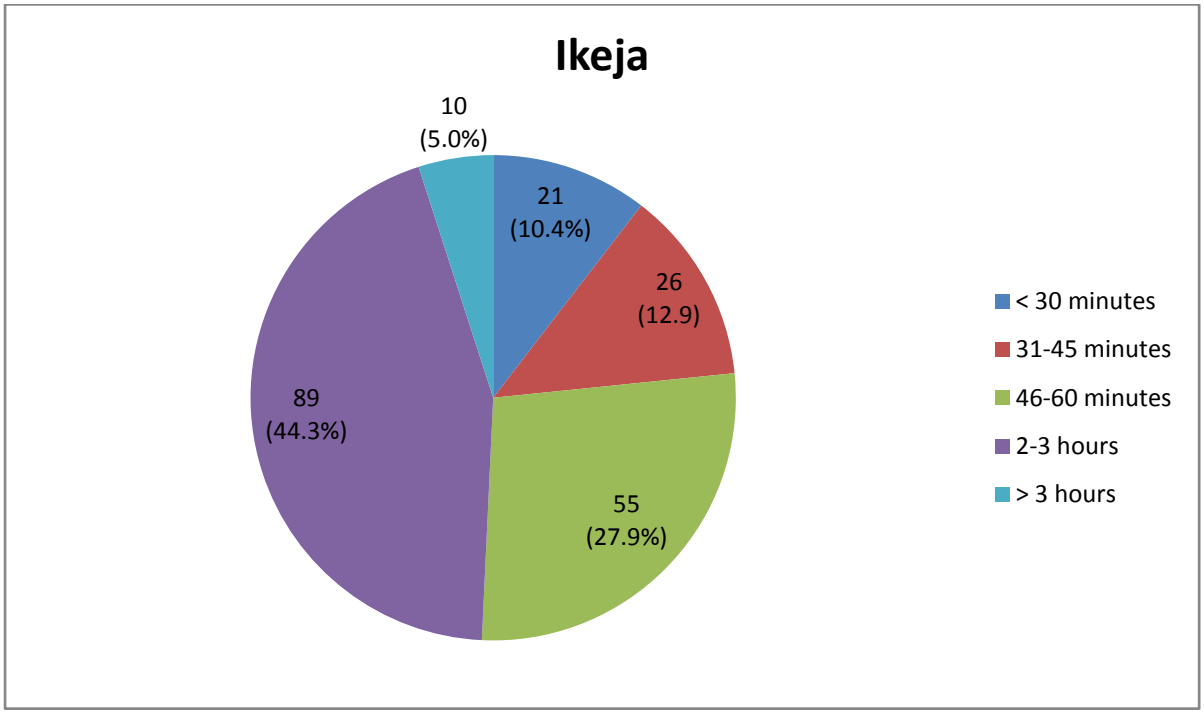


Figure: 4.6: Distribution of Respondents on the Durationof parking

Source:Author's Field Work(2014)

The timings of staying at various uses vary from use to use. Before fixing the time limits particularly in downtown areas, two things must be kept in mind. First, the downtown areas always have a wide range of business activities with irregular changes. Second, every parker wish to park in kerbside parking spaces as these are highly desirable and fixed in number. These two items lead to the fact that a parking space is suppose to cater to all the requirements of the uses. For better understanding, the situation may be split with regard to various peak hours. (Dan, 2005).

4.5.4 Effects of On-Street Parkingin Ikeja and Victoria Island

Table 4.12 shows that respondents identified traffic congestion as the major effect of on street car parking in the study areas.The analysis shows that traffic congestion in Ikeja is 71.1% and Victoria Island is 50.5%, accident rate in Victoria Island is 31.5% and Ikeja is15.9%,air pollution in Victoria Island is17.9% and Ikeja 12.9%.

Table 4.12: Distribution of Respondents on the Effects of On-Street Parking

Effects	**Cities**				**Total**	
	Victoria Island		**Ikeja**			
Traffic congestion	93	50.5	143	71.1	236	61.3
Accidents	58	31.5	32	15.9	90	23.4
Air pollution	33	17.9	26	12.9	59	15.3
Total	**184**	**100.0**	**201**	**100.0**	**385**	**100.0**

Source: Author's Field Work(2014)

Traffic congestions are characteristic features of most urban centres in Nigeria. The reason is that, demand for road space is often greater than the supply. Apart from this, the unplanned growth cities and the haphazard land use distributions are sometime responsible

for traffic congestions. Hobbs (1974) observes that, parking in town affect traffic conditions like On street parking which reduces the traffic capacity of the roads.

A large percentage of congestion in urban areas (8 to 74%) is caused by automobiles in search for a parking place. Shoup (2006) studies this problem and identifies a set of conditions under which car users are more inclined to drive around and look for an on street - parking place, instead of off street parking. On street parking could be cheap, off street parking could be expensive, fuel could be cheap, the car user wants to park for a long time or the car user is alone and saving time is not important. Shoup also states that the search for an on street parking place generally takes between 3.5 and 14 minutes.

4.6 Challenges of Car Parking Management Systems in the Study Area

4.6.1 Challengesof On-Street Parkingon Usersin Ikeja and Victoria Island

From Table 4.13 it shows that there is variation in the challenges of on street car parking between Ikeja andVictoria Island indicating time wasting as the major challenge in Ikeja wit h 36.8% and Victoria Island with 36.4%, obstruction of roadway in Victoria Island and Ikeja is 25%, 27.9%, narrow road in the two study areas is 33.2% for Victoria Island and 31.3% for Ikeja while pricing which shows low response by respondents indicate that Victoria Island is 5.4% and Ikeja is 4%.

Table 4.13: Distribution of Respondents ontheChallenges of On-Street Parking

Challenges	Cities				Total	
	Victoria Island		Ikeja			
Time wasting	67	36.4	74	36.8	141	36.6
Obstruction	46	25.0	56	27.9	102	26.5
Narrow road	61	33.2	63	31.3	124	32.2
Pricing	10	5.4	8	4.0	18	4.7
Total	**184**	**100.0**	**201**	**100.0**	**385**	**100.0**

Source:Author's Field Work(2014)

Olorunfemi (2013) observes that if a city provides on-street parking, particularly in commercial area, it makes conscious choices to provide better access to adjacent land use at the expense of more efficiently moving traffic. The use of on- street parking affects the traffic movement in three ways; it reduces a street's capacity, it reduces safety, and increases service conflict (Richard and David, 2007). On street parking causes safety and congestion problems by blocking one or two traffic lane, reducing visibility, insecurity and forcing pedestrians to walk in the road if no proper footpaths are provided and it also obstructs access for emergency services thereby resulting into accidents and affecting traffic movement (Rye, 2010).

The amount and type of parking space provided both on and off the street affects the amount of traffic entering the town without control. Parking on the street leads to dangerous traffic concession and the loss of road space needed for moving traffic. Oduola (1981) explains that, most urban congestion problems are caused by the sub-optima manner in which the roads are used. Roadside and on roads parking, roadside trading and total disregard of traffic regulation by road uses are significant human contribution to the traffic problems

Levine, et al. (2012) found that urban density has about ten times as much influence on the number of destinations motorists can access in a given time period as a proportional increase in traffic speeds. Ewing and Cervero (2010) found that a 10% increase in roadway connectivity reduces average travel distances by 1.2%. Kuzmyak (2012) found that residents of urban neighborhoods with good travel options, connected streets and more nearby services drive a third fewer daily miles and experience less congestion delays than residents of automobile-dependent communities. These studies indicate that cities can provide high levels of accessibility, despite lower average traffic speed. However, increased density can also increase potential conflicts, also called external costs, such as traffic and parking congestion, accident risk, and pollution emissions. Of all common activities people engage in, motor vehicle travel tends to impose the greatest external costs.

4.7Challenges Of On Street Car Parking Identified By Managers Or CarPark Operators In Ikeja and Victoria Island.

Most operators identified the challenges of inadequate space, wrong parking, long stay parking and pricing problems. Added to this, while the car park operator's objective is to maximise profits, the local authority may have a range of other objectives when deciding to apply new policies.They may wish to reduce the effect of the presence of cars in the city, limitingtheir access, or to promote the turnover of car park bays, to make them available for short stay visitors and shoppers at a relatively low hourly price, and high price forlong-stay commuters (to reduce the peak hour traffic). In other cases, the local authority can influence the mobility and accessibility by car, changing the accessibility of the car park, and reducing the potential demand – yet this may markedly impact on the viability of the car park and hence the interest of the private investor in that car park. Eight questionnaires were collected from the managers of on street carpark operators.The car park operators states that ownership type of car park in both Ikejaand Victoria Island is public ownership while the type of

management is public and private management.They indicate that most of the car parking facility in both Ikeja and Victoria Island is either both angular and parallel.The car parking space on each of the park is between 80 and 90 vehicles and the on street car parking is100 vehicles and above.

The operators states that most of the users of on street car parks are issued tickets and payments are cash.some of the challenges car park operators face providing on street car parking services are pricing problems.The car park market in urban centres plays a key role in access and economic development of what appears to be an ever more car dependent society.For this reason, there are obviously daily challenges that stand as constraints to services of the car parks. In essence, no individual business or organization can operate without certain probems such as the challenges.

Some of the challenges indentified by this study as affecting the operations of On street parking includes the following ; There is no signage in the parking areas, the government has provided a permanent parking space in your area, for urban shopping areas the availability of parking is more important than the price of parking, within 5 years, parking will only be charged based on the exact parking time and not per hour or the fixed time period anymore, For urban shopping areas the availability of parking is an important attraction factor for customers, parking is an important location factor for companies, shopping mall, factories, (when deciding where to locate companies, consider parking as an important factor), Parking is an important location factor for companies, shopping mall, factories, (when deciding where to locate companies, consider parking as an important factor), In the future (next 5-10 years) a regime of paid parking and residents parking permits should be introduced, With urban areas, parking should be supplied free of charge to visitors, commuters and resident. Generally speaking people are aware of the price they

pay for parking, Long stay parking (for visitors, and commuters) in the inner city should be discouraged, Parking policy is an important tool to reduce car traffic within urban areas, Parking policy is an important tool to reduce car traffic within urban areas, and how would you describe the parks service delivery to the commuters in aspect of security, safety, comfort and satisfaction(See table 4.14 and table 4.15) to show the analysis in both Victoria Island and Ikeja.

Hence, the mean rank order analysis of the challenges in Victoria Island on table 4.14and Ikeja on table 4.15reveals that there is no signage in the parking areas and they both rank first with a (mean = 0.90, mean = 0.00) making it the most critical amongst the challenges identified, meaning that the lesser the mean value the more importance attached to it. In Ikeja the statement that The government has provided a permanent parking space in your areais also less with mean = 0.00. Parks service delivery to the commuters in aspect of security, safety,comfort and satisfaction was ranked eleventh in the two study areas with(mean = 4.93 and for Victoria Island and Ikeja with mean = 4.89) showing that it is the least critical amongst these challenges. The challenges in statement 7 and 11 for Victoria Island (In the future (next 5-10 years) a regime of paid parking and residents parking permits should be introduced) and thatof Parking policy is an important tool to reduce car traffic within urban areas were both with (mean = 1.10) was ranked third.

The challenges that there is no signage in the parking areas has continued to be a major concern in car parking.According to Obot and Umoh,(2007), in Nigeria, like elsewhere, where cars are one of the dominant modes of transportation, urban circulation is one of the most obvious problems and parking seems to be an overlooked element in transportation development.Obot et al, (2009) states that the efficiency of this circulation depends upon existing transportation system which parking facilities are major component. In

situation of lack of provision and poor planning in respect to other urban land use activities the economic activities of the city may be affected.

Asiyanbola and Akinpelu, (2012) opined that the provision of parking for all automobile must be widely recognized as a responsibility where adequate facilities are not otherwise provided. He stressed that major attention should be on on-street parking for passengers cars as parking needs to reduce traffic congestion in a city. The failure of the existing funding mechanizing of governments accounts for the deterioration of these infrastructural facilities and the difficulty in the provision of additional highly computerized modern car parking facilities. inter change points, bus stop terminals, parking facilities among others are either absent, inadequate or ineffectively located.

Table 4.14:Challenges of on street car parking Identified by managers or carpark operators in Victoria Island

S/NO	Statement	SA	A	D	NA	SDA	Mean	SD	Rank order
1.	There is no signage in the parking areas	180(97.8)	2(1.1)	1(0.5)	1(0.5)	0(0.0)	.90	.445	1
2.	The government has provided a permanent parking space in your area	1(0.5)	1(0.5)	1(0.5)	12(6.5)	169(91.8)	4.26	1.691	9
3.	For urban shopping areas the availability of parking is more important than the price of parking	22(12.0)	159(86.4)	1(0.5)	1(0.5)	1(0.5)	1.91	.435	8
4.	Within 5 years, parking will only be charged based on the exact parking time and not per hour or the fixed time period anymore	10(5.4)	5(2.7)	4(2.2)	1(0.5)	164(89.1)	4.65	1.045	10
5.	For urban shopping areas the availability of parking is an important attraction factor for customers	172(93.5)	7(3.8)	3(1.6)	1(0.5)	1(0.5)	1.11	.478	5
6.	Parking is an important location factor for companies, shopping mall, factories, (when deciding where to locate companies, consider parking as an important factor)	175(95.1)	6(3.3)	1(0.5)	1(0.5)	1(0.5)	1.08	.430	2
7.	In the future (next 5-10 years) a regime of paid parking and residents parking permits should be introduced.	174(94.6)	5(2.7)	3(1.6)	1(0.5)	1(0.5)	1.10	.469	3.5
8.	With urban areas, parking should be supplied free of charge to visitors, commuters and resident.	2(1.1)	1(0.5)	6(3.3)	7(3.8)	168(91.8)	4.84	.606	11
9.	Generally speaking people are aware of the price they pay for parking.	161(87.1)	10(5.4)	2(1.1)	9(4.9)	2(1.1)	1.27	.803	6
10.	Long stay parking (for visitors, and commuters) in the inner city should be discouraged.	153(83.2)	12(6.5)	3(1.6)	11(6.0)	5(2.7)	1.39	.980	7
11.	Parking policy is an important tool to reduce car traffic within urban areas	171(92.9)	10(5.4)	1(0.5)	1(0.5)	1(0.5)	1.10	.450	3.5
12.	How would you describe the parks service delivery to the commuters in aspect of security, safety, comfort and satisfaction?	1(0.5)	2(1.1)	1(0.5)	1(0.5)	179(97.3)	4.93	456	12

Similarly, long stay parking (for visitors and commuters) in the inner city continues to constitute a major challenge. Weant and Levinson (1990) opined that parking contributes to the appearance of city and suburbs; affects traffic congestion and traffic operations; and equally influences the choice of mode and route of travel which also affects the viability and competitive posture of commercial areas .Since, city is characterized by different various land use activities and patterns of circulation is partly a function of the land use activities and their spatial distribution. Osoba(2012) is of the view that the road transport operation is a circulatory system that must be a continuous process and any infringement at any point along the line will definitely affect the whole system and hinder its effectiveness. Therefore, parking facilities are essential in order to allowed flow of traffic. Since, parking challenges are no longer confined to the city centres, the challenges now extend throughout the urban region.

Availability of parking is more important than the price of parkingis ranked eighth in Victoria Island and in Ikeja it is ranked seventh with (mean= 0.43 and mean = 0.509) On-street parking refers to the parking space made available along the curb or shoulder of a street or road that are designed to accommodate vehicle.Olorunfemi (2013) observes thatif a city provides on-street parking, particularly in commercial area, it makes conscious choices to provide better access to adjacent land use at the expense of more efficiently moving traffic.

Kelly (2006) states that ‘’Parking facilities are constructed in combination with some buildings to facilitate the coming and going of the buildings users. Although a car is parked in a variety of places for a large part of its life, little or no debate has focused on parking areas and in fact seen as transport hubs where the variety of transit means take place (e.g. car/bus, car/walking, car/bicycling etc). It can be argued that much has not been done for parking despite the vital role that it plays”.

Table 4.14 and 4.15 indicate the mean rank analysis of the challenge that parking should be supplied free of charge to visitors, commuters and residence. Victoria Islandand Ikeja were both ranked eleventh with (mean = 0.606 and mean = 0.792). Feenrey 1989; Young, Thompson and Tayor, 1991 states that pricing level is dependent on its proximity to the city centre (Anderson and Depalwa, 2004). Argue that location is an important variable, in particular. When we refer to the city centre. In this area the concentration of car parking facilities heightens competition between them. Since the city is an important destination for drivers, the location of the car park close to potential customers destinations becomes an important factor. These variables (price and location) are used to implement policy to control and manage mobility in the city center.

Zack (2005) states that it can be said that rates of kerbside parking, being the most desirable spaces, rates are kept high especially along very busy roads, slightly less in side streets/roads whereas, and are kept low in case of off-street parking. In case, parking occupancy of some area is more than 85% meaning that area is congested and price must be increased. Likewise, if the same block has occupancy less than the average (i.e. 85%) meaning that area is underutilized and the price must be decreased\

Table 4.14 for Victoria Island and 4.15 for Ikeja indicate statement 11 Parking policy is an important tool to reduce car traffic within urban areas.The mean rank analysis for Victoria Island shows that it was ranked third with (mean =1.10) while Ikeja was ranked third with (mean =1.09).May, (1996); Marsden and Wotton, (2000) opines that parking policy acts as glue between the implementation of land use and transport policies. The objectives that it should fulfill therefore come from the overall objectives of urban policy that typically include:

- A strong and vibrant economy supported by an efficient transport system;
- Better accessibility;
- A clean and high quality urban environment;

- A safe and secure environment;
- A more equitable society.

Research and report from Environmental Protection Agency show (EPA, 2001a). That, the way we develop our communities has a major impact on the quality of the natural environment. Region with walk-able, mixed used, compact neighbourhoods, towns, and cities, knit together by a robust network of transportation and environmental conditions protect human health and the natural environment.

Table 4.15:Challenges Of On Street Car Parking Identified By Managers Or CarPark Operators In Ikeja

S/NO	Statement	SA	A	D	NA	SDA	Mean	SD	Rank order
1.	There is no signage in the parking areas	123(61.2)	74(36.8)	1(0.5)	2(1.0)	1(0.5)	.00	.000	1.5
2.	The government has provided a permanent parking space in your area	1(0.5)	1(0.5)	14(7.0)	85(42.3)	100(49.8)	.00	.000	1.5
3.	For urban shopping areas the availability of parking is more important than the price of parking	26(12.9)	170(84.6)	1(0.5)	2(1.0)	2(1.0)	1.93	.509	7
4.	Within 5 years, parking will only be charged based on the exact parking time and not per hour or the fixed time period anymore	71(35.3)	32(15.9)	1(0.5)	1(0.5)	96(47.8)	3.09	1.870	9
5.	For urban shopping areas the availability of parking is an important attraction factor for customers	182(90.5)	15(7.5)	2(1.0)	2(1.0)	0(0.0)	1.12	.435	4
6.	Parking is an important location factor for companies, shopping mall, factories, (when deciding where to locate companies, consider parking as an important factor)	178(88.6)	18(9.0)	2(1.0)	1(0.5)	2(1.0)	1.16	.555	5
7.	In the future (next 5-10 years) a regime of paid parking and residents parking permits should be introduced.	2(1.0)	160(79.6)	2(1.0)	15(7.5)	22(10.9)	2.48	1.040	9
8.	With urban areas, parking should be supplied free of charge to visitors, commuters and resident.	2(1.0)	8(4.0)	8(4.0)	2(1.0)	181(90.0)	4.75	.792	11
9.	Generally speaking people are aware of the price they pay for parking.	168(83.6)	22(10.9)	3(1.5)	0(0.0)	8(4.0)	1.30	.849	7
10.	Long stay parking (for visitors, and commuters) in the inner city should be discouraged.	175(87.1)	12(2.5)	5(2.5)	2(1.0)	7(3.5)	1.28	.856	5
11.	Parking policy is an important tool to reduce car traffic within urban areas	193(96.0)	2(1.0)	3(1.5)	2(1.0)	1(0.5)	1.09	.482	3
12.	How would you describe the parks service delivery to the commuters in aspect of security, safety, comfort and satisfaction?	1(0.5)	1(0.5)	1(0.5)	14(7.0)	184(91.5)	4.89	.449	12

Source: Authors Field work (2014)

TABLE 4.16: LEVEL OF USAGE OF ON STREET PARKING IN THE STUDY AREA (IKEJA)

Street Name	Location	7-8am	8-9am	9-10am	10-11am	11-12pm	12-1pm	1-2pm	2-3pm	3-4pm	4-5pm	5-6pm	6-7pm
Adeniyi Jones	Oba Akran to Aromire and Ladipo to Adeniyi Jones	F	F	F	F	F	F	F	F	F	F	F	NF
Guinness Road	Guinness Road	NF	NF	F	F	F	F	F	F	NF	NF	NF	NF
WEMPCO Road	• WEMPCO/Metal box junction to WEMPCO/Oba Ogunnusi junction	F	F	F	F	F	F	F	F	F	F	F	NF
	• WEMPCO/Abiodun Jagun Junction to Metal box junction	F	F	F	F	F	F	NF	F	F	NF	NF	NF
	• IITA Research to WEMPCO/Odumasi junction	F	F	F	F	F	F	NF	F	F	NF	NF	NF
	• WEMPCO/Odumasijunction to WEMPCO/Abiodun Ajagun street	NF	F	F	NF	F	NF	F	F	F	F	NF	NF
Akilo street	• Corner piece water Coporation fence to Ogundipe street	F	F	F	F	F	NF	NF	F	F	F	NF	NF
	• From Ogundipe street to Suru street	NF	F	F	F	F	NF	NF	F	F	F	NF	NF
	• From Suru street to Lagos street	NF	F	F	NF	NF	F	F	F	F	F	NF	NF
ACME Road	• Filling station to Cocoa cola Industrial road	F	F	NF	NF	F	F	F	F	F	NF	NF	NF
	• Fence of Guinness plc to UBA fence	F	F	F	F	F	F	NF	NF	F	F	NF	NF

Street Name	Location	7-8am	8-9am	9-10am	10-11am	11-12pm	12-1pm	1-2pm	2-3pm	3-4pm	4-5pm	5-6pm	6-7pm
	• ACN secretariat to Zenith Bank corner piece	F	F	F	F	F	NF	NF	F	F	F	NF	NF
	• Victorious church to Fagba crescent junction	NF	F	F	F	F	NF	F	F	NF	F	NF	NF
Simbiat Abiola Road	Simbiat Abiola Road	NF	F	F	NF	F	NF	NF	F	F	F	NF	NF
Emina Crescent	Off Toyin street	NF	F	NF	NF	F	F	NF	F	F	F	F	NF
Oba Ogunnusi Road	Owole junction to Adedoyinbo street (near Excellence Hotel)	NF	F	F	F	F	NF	NF	F	NF	NF	F	F
Oba Akran Avenue	Oba Akran Avenue	F	F	F	F	F	F	NF	F	F	NF	F	F
Ladoke Akintola street	House No. 30A and 30B	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF
Olowu street	Spare parts market	F	F	F	NF	F	F	F	NF	NF	NF	F	NF
ISAAC John street	Isace John to Sobo Arobiodun junction	NF	F	F	F	NF	NF	F	F	F	F	F	NF

Source: Field work (2014) F=Filled up NF=Not filled up

TABLE 4.17 LEVEL OF USAGE OF ON STREET PARKING IN THE STUDY AREA (VICTORIA ISLAND)

Street Name	7-8am	8-9am	9-10am	10-11am	11-12pm	12-1pm	1-2pm	2-3pm	3-4pm	4-5pm	5-6pm	6-7pm
KEY STONE Bank (Bank	F	F	F	F	F	NF	NF	F	F	F	NF	NF
(Bank PHB Road)	F	F	F	F	F	NF	NF	NF	F	F	NF	NF
AFRI Bank	F	F	F	F	F	NF	NF	F	F	F	NF	F
Oyin Jolayemi	NF	F	F	F	F	F	F	F	F	F	F	NF
Ahmed Onibudo	NF	F	F	F	F	F	F	F	F	F	NF	NF
Omega Bank	F	F	F	F	F	F	F	F	F	F	NF	NF
Adeola Hopwewll	F	F	F	F	F	NF	F	F	F	F	NF	NF
Akimbo Savage	F	F	F	F	F	F	F	F	NF	F	NF	NF
Idowu Taylor	F	F	F	F	F	F	F	NF	F	F	NF	F
Engineering Close	NF	F	F	F	F	NF	NF	NF	F	F	NF	NF
Etim Nyang	F	F	F	F	F	NF	F	NF	NF	F	F	NF
Kofo Abayomi	F	F	F	F	F	F	NF	NF	N	F	F	F
Muri Okunola	NF	F	F	F	F	NF	F	F	NF	NF	F	NF
Idown Martins	F	F	F	F	F	NF	F	NF	NF	F	F	NF
Ajose Adeogun	NF	F	F	F	F	NF	NF	F	F	F	F	NF
Tiyamiu Savage	NF	F	F	F	F	F	NF	F	F	F	NF	NF
Adeyemo Alakija	NF	F	F	F	NF	F	NF	F	F	F	NF	NF

Street Name	7-8am	8-9am	9-10am	10-11am	11-12pm	12-1pm	1-2pm	2-3pm	3-4pm	4-5pm	5-6pm	6-7pm
Bourdillon Road	F	F	F	F	F	F	NF	F	F	F		NF
Adetokunbo Ademola	NF	F	F	F	F	F	NF		F	F	NF	NF
Awolowo Road Ikoyi	F	F	F	F	F	NF	F	NF	NF	F	NF	NF
Oko-Awo	NF	F	F	F	F	F	NF	F	F	F	NF	NF
Sinari Daranijo	NF	NF	F	NF	F	F	NF	F	F	F	NF	NF
Olosa	NF		F	F	F	F	NF	F	F	F	NF	F
Marinho Drive	F	F	F	F	F	F	NF	F	NF	NF	F	F
Ahmadu Bello way	NF	F	NF	NF	NF	NF	NF	F	F	NF	F	F
Akin Adesola	NF	F	F	F	F	NF	NF	F	F	NF	F	F
Broad Street	NF	F	F	F	F	F	F	F	NF	NF	NF	NF
Raymod Njoku	F	F	F	F	F	F	NF	NF	F	F	NF	NF
Mike Adenuga Close	NF	F	F	F	F	F	F	NF	NF	F	F	NF
Bishop Aboyade Cole	F	F	F	F	NF	F		F	F	NF	NF	NF
Adeola Odeku	F	F	F	F	F	F	F	NF	F	F	NF	NF

Source: Field work(2014) F=Filled up NF=Not filled up

Table 4.16 and 4.17 shows the level of utilization of the on street parking facilities in the study areas. The areas where the slots are full are mostly areas that have high activities shops and offices.Whereas areas that are not filled are mostly residential areas where the occupants have their parking space within their residences or some of the users go on break.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary Of Findings

Parking has today become a major challenge in urban centres in Nigeria. This has been due to on-street parking due to increased car ownership which has rendered them grossly inadequate. The parking problem is more acute on major roads which provide access to centres of activities in the city.

Theresult reveals that the mean rank analysis of the challenges of car park operators or managers, the results show that lack of signages (statement 1) is ranked first amongst the challenges listed (mean =0.90, mean = 0.00) making it the most critical amongst the challenges identified in the two study areas, meaning that the lesser the mean value the more importance attached to it. The analysis shows that lack of signages in an area with high traffic will create congestion, air pollution, time wasting, delay and also insecurity.

The government has provided a permanent parking space in your area (statement 2)is also less with mean = 0.00. Government in their own part have not provided parking spaces for trucks and vehicles and this is due to lack of space in Lagos state. Unavailability of space for car to find where to park creates the long queue of vehicles parked at wrong places. (Statement 12) Parks service delivery to the commuters in aspect of security, safety,comfort and satisfaction was ranked twelevth in the two study areas with(mean = 4.93for Victoria Island and Ikeja with mean = 4.89) showing that it is the least critical amongst these challenges. The statement in 7 and 11 for Victoria Island(In the future (next 5-10 years) a regime of paid parking and residents parking permits should be introduced) and that of Parking policy is an important tool to reduce car traffic within urban areas were both with (mean = 1.10) was ranked third. The introduction of paid parking permits controls parking,

restricting and terminating traffic demand. Paid parking could help shift auto dependence to more sustainable alternative modes and reduce congestion. Percentage distribution of age of drivers and motorists in the two study areas, Ikeja and Victoria- Island, shows that the age range bracket of 21-30 years is higher at 50.7% for Ikeja and Victoria Island is 36.4% while Victoria Island with age bracket of 31-40years is 44.0% and Ikeja is 26.4%, it shows that the age of drivers (between ages 18 and above) demonstrates self confidence that is remarkably stable and influenced by events of good driving skills. The Sex distribution of respondent indicates that Victoria Island with 79.9% has high percentage of males than Ikeja with 69.7% male, while female respondents are 20.1% for Victoria Island and 30.3% for Ikeja. Sex distribution of respondents in the two study areas shows that male dominate the two study areas this shows that men take more responsibilities of their families.

Respondentsoccupation in Victoria Island is 49.5% for civil servants followed by business owners with 34.8% and a deduction from the result also implies that in Ikeja company employee is 41.8% followed by civil servants with 27.9%. Most of the respondents with the highest driving experience is between 6-10 years is 50% for Victoria Island and 40.8% for Ikeja. Driving experience between 2- 5years for Victoria Island is 27.2% and 33.8% for Ikeja.The challenges of on street car parking between Ikeja andVictoria Island indicating time wasting as the major challenge identify Ikeja with 36.8% and Victoria Island with 36.4%, obstruction of roadway in Victoria Island and Ikeja is 25% and 27.9%, narrow road in the two study areas is 33.2% for Victoria Island and 31.3% for Ikeja while pricing which shows low response by respondents indicate that Victoria Island is 5.4% and Ikeja is 4%.Most respondents identified traffic congestion as the major effect of on street car parking in the study areas. The analysis shows that traffic congestion in Ikeja is 71.1% and Victoria Island is 50.5%, accident rate in Victoria Island is 31.5% and Ikeja is15.9%, air pollution in Victoria Island is17.9% and Ikeja 12.9%.

The analysis on the duration of parking in the study areas indicate that Victoria Island and Ikeja both have high duration of carparking between 2-3hours and 3 hours and above.Victoria Island is 42.9% from 3 hours and above while Ikeja is 44.3% for 2-3 hours. The analysis reveals that Long stay parking in the urban areas or inner city for on street parking causes congestion,obstruction,time wasting and also hinders pedestrian walkways. The analysis of the results shows that parallel parking in Ikeja is 58.2% and Victoria Island is 65.2% is mostly used between the two study areas.Parallel parking is a method of parking a vehicle in line with other parked cars. Parking facilities in the areas is traditional method of parking**.**Traditional search in Victoria Island is 72.4% and Ikeja is 77.4% which shows that Ikeja has high responses and it shows traditional search is mostly used to locate an appropriate parking space for users.

The results of the survey has permitted an in-depth and realistic analysis of the car parking sector. The question has improved our understanding that location is a very important variable in the choice of strategies for the operator. When they have to select where to locate their car park in respect to another operator who operates in the city centre they prefer to build a new car park in the city centre.

5.2 Conclusion

The study has appraised the menace of on-street parking and traffic congestion in Ikeja and Victoria Island, Lagos state, and it has been seen that parking problems and traffic congestion in the area are due to it's land use pattern coupled with inadequate parking spaces and facilities and ineffectiveness of the traffic devices in the area. Due to the fact, that the study area is an intervening city between Ogun state and Eastern part of the country which is embedded with a lot of commercial activities and has generated a lot of vehicular and pedestrian traffic. Therefore, demand for parking spaces and other facilities are high. The

inability of the existing situation to survive with the demand has later led to parking problem and traffic congestion.

Careless maneuvering of parking and un-parking leads to accidents which are referred to as accidents. Common type of parking accidents occur while driving out a car from the parked area, careless opening of doors of parked cars. They also cause pollution to the environment because stopping and starting of vehicle while parking and un-parking results are noise and fumes.To reduce the parking of vehicles we can implement the following:

- For short term measures pay and park method will be done at peak hours to control and regulate the parking.
- For long term measures Off street parking have to be provided near CBD areas, within the radius of 1 Km.
- Installation of parking meter and modern computerized car parking management systems both on-street and off-street parking.
- Suitable parking method to be introduced.
- Enlightenment of public and Enforcement officers on parking problems and their consequences.

5.3 Recommendations

Based on findings, the need to create a vibrant Central Business District environment that relies on sustainable,socio-economic and vibrant environment to support the population at micro and macro levels in the area is considered important.Though on street parking is an extravagant use of the precious space, it cannot be entirely prohibited.

The researcher's following recommendations are put forward which is hoped will assist car park operators, users and the government.

1. A judicious application of appropriate traffic management measures will help to mitigate some of the ill effects of on street parking. These measures should be of a comprehensive parking policy for the city. The regulatory measures range from waiting restrictions in a street to the comprehensive control over an extended area. The measures should be periodically reviewed and altered, if necessary. The regulatory measures are generally of two types, one where the use of parking space is authorized for certain periods free or for payment and others where parking is prohibited, but which allows parking for picking up or setting down the goods and passengers. When a controlled parking scheme is planned, the zone boundaries should be delineated and suitable traffic signs are installed.
2. Regulation of parking by charging fees has the desirable effect of curbing long term parking, while encouraging short term parking. Regulating demand through parking prohibition by collecting charges through installing parking meters, Computerized modern car parking management systems, enforcement and fines.
3. Optimizing supply through parking permissions
    - Time
    - Day
    - Duration
    - Permits
4. Land use location and allocation within the CBD environs should be integrated and planned, as to efficiently and aesthetically enhance the quality and functionality of the environment.Parking design, construction and operations be re-conceptualized to attract investors, while government create enabling environment, via legislative instruments to ensure adequate investment returns without unduly exploiting beneficiaries and the public at large.

5. Government and private establishments should embark on enlightenment programmes, using radio, television jingles, workshops, seminars, and conferences to educate on the relevancy of projects or programmes, revealing its benefits to the community at large; essentially towards improving the people's socio-economic wellbeing.
6. Also the tendency to improve control of on-street parking, using new technology (CCTV cameras) or making enforcement the responsibility of police as in Ikeja and Victoria Island, could have the potential to increase demand for off-street car parks. In some cases reduction of on-street car parking is linked with better provision for pedestrians.
7. Off –street parking should be adopted installing modern computerized car parking management systems. The types of off-street facilities to be considered are:
    a. Surface Car Parks
    b. Multi Storey Car Parks
    c. Roof Parks
    d. Under-ground Car-ground Car-park.
8. Local planning Authourity in the area should specify and enforce the provision of parking space into any structure(Building) be it commercial or residential before approval while all old buildings along the road in the study locations should be renovated to accommodate adequate parking space. This will reduce the current situation of traffic congestion and also forestall future occurrences.

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QUESTIONNAIRE FOR USERS OF ON-STREET PARKING FACILITIES AN ASSESSMENT OF THE METHODS OF CAR PARKING IN LAGOS STATE, NIGERIA

Dear Respondent,

This questionnaire is designed to obtain information for a study on the above topic. The exercise is purely academic in partial fulfillment for the award of M.Sc. Transport Management, Department of Geography, Faculty of Science, Ahmadu Bello University Zaria. Any information offered here would be treated strictly in confidence. I plead for your maximum co-operation and understanding in the completion of the questionnaire in the spaces provided.

Thank you.

Agnes Egiganya, KAFEWO
(M.Sc/13949/2010-2011)

Please tick appropriately.

1. Name of the street/Location of parking
2. Sex
   Male [ ]
   Female
   [ ]
3. Age
   Less than 20
   [ ] 21-30 [ ]
   31-40 [ ]
   41-50 [ ] 51-
   60 [ ] Above
   60 [ ]
4. Occupation Civil
   servant [ ] Trader [ ]
   Business [ ]
   Unemployed [ ]
   Company employee [ ]
   Others specify

5. Educational Status

   No Formal Education [

   ] Primary School [ ]

   Secondary School [ ] Tertiary [ ]

   Others specify

6. How long have you been driving in Lagos Less than lyear [ ]

   2-5 years [ ] 6-10 years [ ] Above 10 years [ ]

7. Trip purpose Business [ ] Shopping [ ] Visit [ ]

   Education [ ] Work [ ]

   Others specify

8. Parking methods Angular [ ] Parallel [ ] Perpendicular [ ]

   Double [ ]

9. Are youaware of this parking facility before now Yes[ ] No[ ]

10. If Yes, how Traditional search [ ] Parking Information assistant [ ]

    Reservation [ ]

    Others specify

11. How long have you being using this park Less than lyear [ ]

    2-5 years [ ] 6-10 years [ ] Above 10 years [ ]

12. How often do you park here Daily [ ] Twice in a week [ ] Once in a

    week [ ] Weekends [ ] Occasionally [ ]

    Others specify

13. How long do you always park Less than 30 minutes [ ] 31-45

    minutes [ ]

    46-60 minutes [ ] 2-3 hours [ ] Above 3 hours [ ]

14. Who do you pay to park here Transport union [ ]

    Local government [ ] Enforcement officers [ ] Private operators

    [ ]

15. How do you pay Daily [ ] Weekly [ ] Monthly [ ] Yearly [

    ]

16. How much do you pay

17. Mode of payment Cash [ ]

    Credit card [ ] Cheque[ ]

    Others specify

18. Why do you park here Nearness to my destination [ ]

Lacking of parking space in my destination [ ] Avoid traffic congestion [ ] Security [ ]

Others specify

19. What is the effect of on-street parking in this area Traffic congestion [ ]

Accidents [ ] Air pollution [ ]

Others specify

20. Mention some the challenges you face parking here

…….

……

.....

QUESTIONNAIRE FOR MANAGERS OF ON-STREET PARKING FACILITIES AN ASSESSMENT OF THE METHODS OF CAR PARKINGLAGOS STATE, NIGERIA

Dear Respondent,

This questionnaire is designed to obtain information for a study on the above topic. The exercise is purely academic in partial fulfillment for the award of M.Sc. Transport Management, Department of Geography, Faculty of Science, Ahmadu Bello University Zaria. Any information offered here would be treated strictly in c

confidence. I plead for your maximum co-operation and understanding in the completion of the questionnaire in the spaces provided.

Thank you.

Agnes Egiganya,

KAFEWO

(M.Sc/13949/2010-

2011)

1. Designation of Respondent
2. Which of the Organization do you work?
3. Locations of on-street parks managed by your Organization
4. Ownership type of the car park. Public [ ] Private [ ] Public/Private Partnership [ ]
5. Type of management. Public [ ] Private [ ] Public/Private Partnership [ ]
6. Date of commencement of service
7. Method of on-street car parking facility

   Angular [ ]

   Parallel [ ]

   Perpendicular

   [ ] Double [ ]
8. Number of car parking space on each of the park
9. Average number of cars that park daily
10. What method payment do you use
11. What is the impact of on-street car parking on the movement of traffic in the area
12. Is the use of parking policy acceptable to generate financial resources in the area?
13. What are your strategies in managing on-street car parks
14. What are some of the challenges you face providing on-street car parking services
15. Suggest how these challenges can be solved

CHALLENGES OF ON STREET CAR PARKING

S/NO	STATEMENT	LEVEL OFAGREEMENT				
		SA	A	D	NA	SDA
1.	There is no signage in the parking areas					
2.	The government has provided a permanent parking space in your area					
3.	For urban shopping areas the availability of parking is more important than the price of parking					
4.	Within 5 years, parking will only be charged based on the exact parking time and not per hour or the fixed time period anymore					
5.	For urban shopping areas the availability of parking is an important attraction factor for customers					
6.	Parking is an important location factor for companies, shopping mall, factories, (when deciding where to locate companies, consider parking as an important factor)					
7.	In the future (next 5-10 years) a regime of paid parking and residents parking permits should be introduced.					
8.	With urban areas, parking should be supplied free of charge to visitors, commuters and resident.					
9.	Generally speaking people are aware of the price they pay for parking.					
10.	Long stay parking (for visitors, and commuters) in the inner city should be discouraged.					
11.	Parking policy is an important tool to reduce car traffic within urban areas					
12.	How would you describe the parks service delivery to the commuters in aspect of security, safety, comfort and satisfaction.					