DELIMITING THE CENTRAL BUSINESS DISTRICT (CBD) OF BENIN CITY

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CERTIFICATION

This is to certify that this research work was carried out by OTOKUNEFOR MARTIN-LUTHER in partial fulfillment of the requirements for the award of Bachelor of Science (B.Sc.) Degree in Geography and Regional Planning of the University of Benin, Benin City, Nigeria.

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DEDICATION

This work is dedicated to God Almighty for his grace and protection over my life.

ACKNOWLEDGEMENT

I would like to take this opportunity to express my profound gratitude to God Almighty who gave me the strength to run this programme successfully.

I would also like to take this opportunity to express my profound gratitude and deep regards to my supervisor Dr. J. E. Agheyisi for his exemplary guidance, valuable feedbacks and constant encouragement throughout the span of the research work. His advice, suggestions and incisive criticisms helped shape the research work. I will also like to thank the Head of Department of Geography and Regional Planning Dr. T. F. Balogun for inspiration and advice, Prof. P. A. O Odjugo, Prof. M. O. Asikhia, Prof. Mrs. M. N Ezemonye, Dr. G. O Atedhor, Dr Onaiwu, Dr. Erimona, Mr. Orobator and other academics and non-academics who have contributed immensely to my academic success.

To my parents Dr and Mrs Otokunefor and my siblings for their patience, support and understanding throughout my years of study.

To all my friends and colleagues, I extend my sincere gratitude for their friendship and together, we shook the bridge.

TABLE OF CONTENTS

Page

LIST OF TABLES

ABSTRACT

This study examines the Delimitation of the Central Business District of Benin City. The objectives of the study were to examine the researcher's perception of the limit of the CBD in Benin City; identify the indicators in the researcher's perception of the limit of the CBD; and to use the indicators in the researcher's perception to delineate the boundary of the CBD of Benin City. The method of observation was employed in data collection in the study area. From the analysis of data, it was discovered that using the interstices, the boundary of the CBD could be delimited. It was also ascertained from the study that the volume of shoppers and shopping intensity are key in delimiting the CBD. The study recommends the removal of non-commercial uses from the CBD to enhance its functionality while emphasizing the need for proper subdivision of land use activities in the CBD.

CHAPTER ONE

BACKGROUND TO THE STUDY

1.1 INTRODUCTION

One of the most visible features of cities all over the world and their supremacy in national economies are CBDs (Sassen, 2001/2002; Drozdz and Appert, 2010). The Central Business District (CBD) of any City is the nerve-center of activities. It contains the highest order of economic, social and political functions. The CBD was what gave visual expression to the growth and dynamics of the industrial city (Knox and McCarthy, 2005). Cities have been the magnetic poles to which have flowed goods and wealth from tributary areas and to which have been attracted the most energetic, the most able, and the most ambitious of the population. The history of the world, to a considerable degree, is the history of cities. Cities have been the centers of political power, the seats of religious influence, and the center of the development of arts and sciences from the early days of civilization. The dominating influences of civilization have flowed from the cities of the world. Economic, political, military, and cultural power has reached out from one city, such as Rome or London, into the far corners of the world, with trade as the traveling companion of this power.

Central Business District has been extensively discussed in the literature because of its important role in city growth and development. The spatial organization of land use within the CBD tends to be dominated by a high-density core that contains the retail,

office, entertainment, and civic zones and a lower-density frame that contains zones of warehousing, educational facilities, hotels, medical services, and an intermixture of specialized shops and services that have neither the functional linkages nor the potential profitability to justify locations within the core (Knox and McCarthy, 2005). Thus CBD has become a symbol of progress, modernity, and affluence of cities.

Urban population growth and urbanization are major factors influencing Central Business District (CBD) development activities worldwide. Of significance in this growth and development of the world's population is the issue of traffic congestion which has come to be a global phenomenon in the management of city's Central Business Districts. United Nations (2011) first reported the urban population dominance in 2010, revealing that urban areas are home to 3.5 billion (50.5%) of world's population and cities population is expected to increase to 5.2 billion in 2050. The CBD remains the economic hub of city's core activities and businesses.

Central Business District (CBD) has been severally defined by different authors. According to McColl (2005), the CBD is the "nucleus of an urban area that contains the main concentration of commercial land use". It has also been defined as a unique area of massive concentration of activities and focus for the polarization of capital, economic and financial activities in cities (Drozdz and Appert, 2010).

Mayhew (2010) in connection with city centers describes the "central business district" (CBD) as the heart of a city, often a place the city's transportation system is

directed and which contains the highest percentage of shops and offices. Due to high accessibility the prices of land are high and therefore the area is utilized most intensively. Both the definitions stated above agreed on the fact that a city center is a place in which there is the highest concentration of services and business and the most expensive land. The Central Business District (CBD) therefore, is the hub of business and civic life and it exhibits certain distinct physical and human features, which distinguishes it from the surrounding areas. Thus, several authors described CBDs as areas marked by the various qualitative indicators relative to the surrounding urban environment.

According to Murphy (1971), Waugh (2000), Haggett (2001) and Heineberg (2001), the qualitative features of the CBD should include the dominance of tertiary sector activities, peak land values, high degree of accessibility and traffic density, high daytime versus low night-time population and low resident population, main concentration of commercial land use, main concentration of city's offices and high employment density, and that it should house the tallest buildings within a city. Whether an urban community was established at a junction of overland trade routes, along a navigable water body, at an inland break-of-bulk or at some strategic point favorable for manufacturing, religious or resort activities, the primary focus of internal activities and the major contact with a tributary area was found in the business district. This is the characteristic that makes the Central Business District (CBD) the predominant area within a city regardless of its size.

CBDs always show a dynamic nature in their morphology, structure, shape, size and in social patterns to meet the changing economic conditions. This dynamic nature of the CBD can be seen as the zone of assimilation and the zone of discard at the center. Cities do not grow by themselves but it is the countryside which sets them to do task which must be performed by them (Sidharta and Mukherjee, 2009). The Central Business District is referred to as the heart of the city. Here, one finds the greatest concentration of offices and retail stores reflected in the city's highest land values and its tallest buildings, chief focus of pedestrian and auto-mobile traffic. By way of the transportation net, the remainder of the city and an area of decreasing intensity extending far beyond the city's corporate limits are oriented toward the CBD (Raymond and Vance, 1954). It has been demonstrated that the CBD is a very special part of a central area complex. The emergence of the CBD has been a long process which has involved large-scale repercussions on the immediately surrounding areas. The emergence has been conditioned by a number of controlling factors derived from the special development of city (Carter and Rowley 1966). In any large urban community the central business district (CBD) plays a vital role. It would be impossible to understand the functioning of such a region without analyzing in some detail the ways in which the CBD serves as an integrating mechanism in such vital areas as communication, transportation, trade, finance and government (Donald and Gerald, 1951).

Each central business district has a spatial shape which in detail appears to be unique. In spite of the great complexity and irregularity of shapes, however, definite

geometric patterns are discernable. This arises from the fact that centralized commercial activities by their very nature operate primarily under the same principle namely; to choose central positions with respect to all internal and external activities of the city (George, 1950).

1.1.1 History of the CBD

Historically, the CBD developed as the market square in ancient cities. The market serves as forerunner and point where people, particularly farmers, merchants and consumers gathered on market days to exchange, buy, sell goods, services, ideas and socially interact. The city's center later grew and developed as fixed CBD location point for retail trading and commerce. This serves as city's oldest point or core area, which often is the convergence point of major transportation nodes. The 21st century CBDs within metropolitan areas are characterized by activities such as residential, retail, commercial, entertainment, theatres, shopping malls or complexes, government offices, financial institutions, medical centers, professionals' offices and cultural center, etc. CBD is majorly marked by skyscraper structures, high land value, especially at roads intersection. This buttresses the rationale for location of high-rise structures. The existing road networks at the CBDs are usually narrow coupled with inadequate off-street parking facilities that make on-street parking unavoidable. This reduces the road's right of way, thus marginalizes its design capacity leading to traffic congestion.

Examining the modern CBDs in terms of problems and challenges, two major issues were identified. First, is mainly urban decay or run-down, creating undesirable condition to live-in; and secondly, traffic congestion within the city center. Congestion is said to occur when transport demand exceeds transport supply at a specific point in time and in a specific section of the transport system (Aderamo, 2012). The traffic congestion is propelled by too many people working in the CBD areas, coupled with narrow streets and shortage of off-street parking facilities. This makes on-street parking inevitable and reduces road design capacity resulting in traffic jam. Solutions tried so far such as park and pay scheme, parking restrictions in areas reserved for public transport vehicles and the relocation of private-owned buses to the edge of the CBD have not yielded the desired result in alleviating traffic congestion in Benin City.

1.2 STATEMENT OF THE RESEARCH PROBLEM

Several authors have attempted to delimit Central Business Districts across the world using different methodologies. The great majority of these studies were based on a subjective delimitation of the CBD, such as the work of Hartman (1950) and Foley (1952). However, in 1954, Murphy and Vance published the article, "Delimiting the CBD", in which the first widely accepted delimitation method was described. The method, named Central Business Index Method (CBIM), was based on the calculation of central uses percentages in each block of the city. The main stages of this method are: Calculation of the Central Business Height Index (CBHI) and the Central Business

Intensity Index (CBII). CBHI is obtained by dividing the total floor area of all central business uses by the total ground floor area of the block. CBII is the percentage that total floor area of central business uses makes up of the total floor space at all levels. Central uses were regarded as retail shops and services, offices, factories for city newspapers and some large specialized office buildings. Before using these indices, it requires adequate data inputs on floor areas, determination of CBD functions, and delimitation of city blocks and the actual mapping of these data (Kaneda *et al*., 2012; Northam, 1975; Okoye, 1981; Waugh, 1995; Mayhew, 1997). Gathering these data to practically map the CBD of any settlement is no mean task. The situation is particularly tasking in the less developed countries where there are paucity of planning data. The peculiar situation of lack of basic data for prosecuting CBHI and CBII indices leads to the difficulty of applying this method in the delineation of a CBD such as in Benin City.

A modern method of delimiting a CBD is the quantitative methods of spatial analysis and begins with the promising method of Thurstain-Goodwin and Unwin (2000), which offers interesting and applicable solutions to the town center delimitation issue by exploiting the potentialities of geographical information systems (GIS) and geo-statistics. Though the work of researchers that embrace modern tools and techniques of spatial analysis (Thurstain-Goodwin, Unwin, 2000; Borruso, 2003; Borruso and Porceddu, 2009; Taubenbock *et al*., 2013) offers interesting technical solutions for town center delimitation, the theoretical justification of the proposed methods remains weak.

A third method through which the delineation of the CBD has been achieved is the method of intuitive perception used in Lawrence's study in (1986). In his study, he relied on people's perception in defining the boundaries of the CBD (Pissourios, 2014). Lawrence (1986) method was seen as a more characteristically simplified approach in town center delimitation as opposed to the more quantitative method of Murphy and Vance. The simplicity of Lawrence's perception method allows for a less quantitative but equally efficient way of delimiting the CBD.

In Nigeria, several studies on CBD have been carried out such as the work of Mabogunje (1964) on the CBD of Lagos. The application of the Murphy's index was found to be unrealistic in its implementation because of prevailing local conditions. The CBD is an important distinctive identity of any urban center which developed through time, increasing technological advancement in areas such as communication and transportation. The higher standard of living experienced in present day has helped in shaping the structure of cities from what it was in the past. The Central Business District of Benin City has no definable boundary. That is, the precise limit of the CBD is not known. This delimitation of the spatial limits of the central business district in Benin City is the gap this study attempts to fill.

1.3 RESEARCH QUESTIONS

In carrying out this research on the delineation of the CBD in Benin City, the following research questions are posed.

1. How can we know the limit of the CBD of Benin City?
2. Can residents tell where the Central Business District (CBD) of Benin City end?
3. What method can be used to delimit the CBD of Benin City?

1.4 AIM AND OBJECTIVES

The aim of this research is to delineate the boundary of the Central Business District of Benin City. To achieve this aim, the following objectives are to be pursued:

1. To examine the researcher's perception of the limit of the CBD in Benin City.
2. To identify the indicators in the researcher's perception of the limit of the CBD.
3. To use the indicators in the researcher's perception to delineate the boundary of the CBD of Benin City.

1.5 SIGNIFICANCE OF THE STUDY

The significance of this study lies in its attempt to delimit the Central Business District of Benin City. This study becomes beneficial in that the areal extent of the Central Business District (CBD), that is, the boundary of the CBD would be established via perception method. This would serve as a guide to other researchers looking to work on the Central Business District of Benin City while the data gathered or collected and conclusion reached from data analysis can also be used as input in future studies by other researchers.

1.6 SCOPE OF THE STUDY

The scope of this study is space based and it covers just the central business district of Benin City. The data for this research will be restricted to the day-time population in the Central Business District of Benin City.

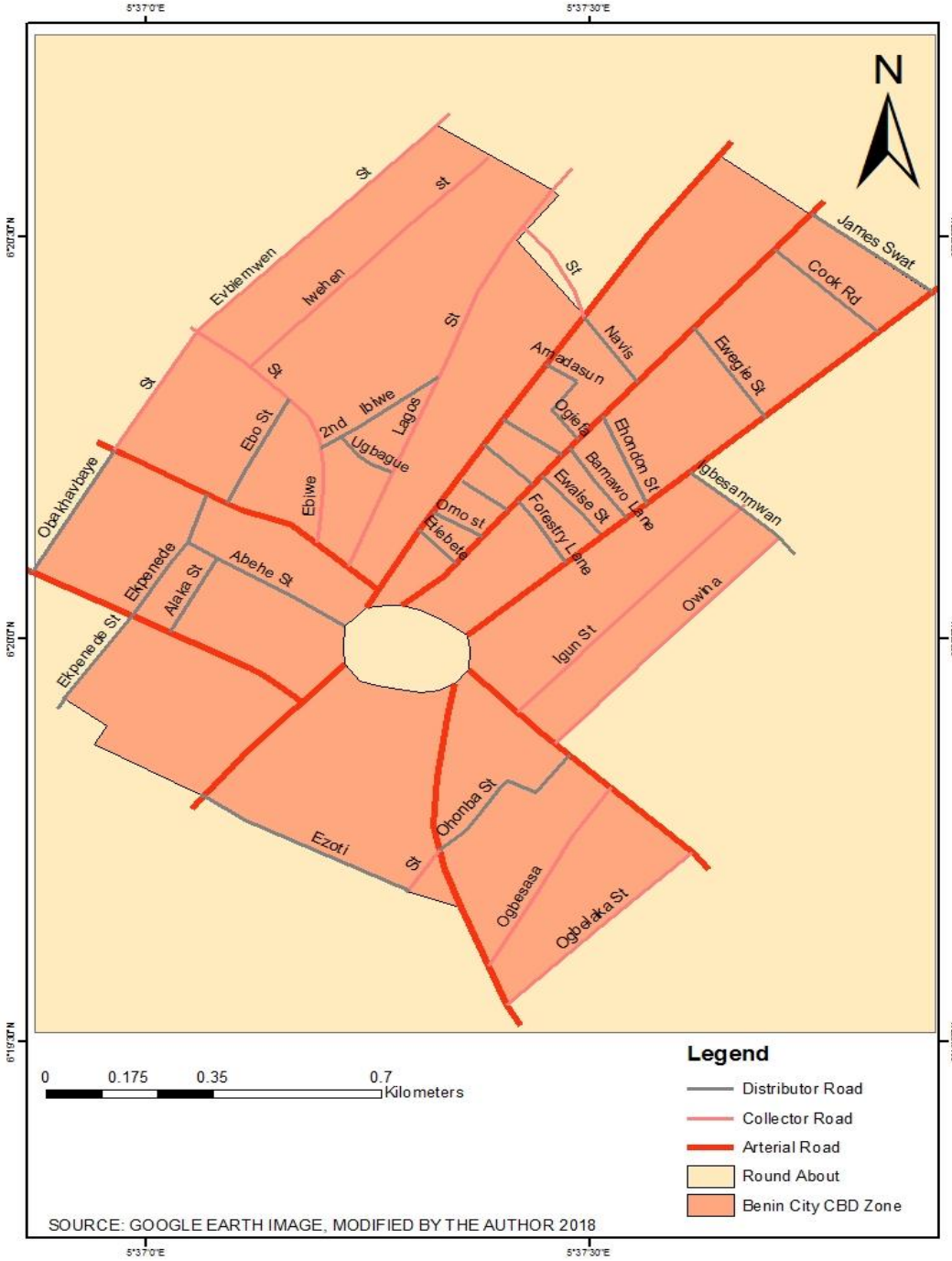
1.7 STUDY AREA

The study area is the Central Business District of Benin City. The CBD is located at the City center. The CBD of Benin City is quite obvious in terms of perceptual identification as it is linked with the geographic centroid of the city bordering the King Square. The Ring Road has so many axial roads leading to the different parts of Benin City and other settlements.

The CBD has many socio-economic activities. The most widespread of which is trading and transportation. Trading activities within the CBD is facilitated by the road networks connecting the Central Business District to other parts of the city and beyond. This is meant for easy accessibility from peripheral regions to the city center. Retail stores and servicing centers are common sights in the CBD.

The Central Business District of Benin City is undergoing structural changes. The intensification of activities resulting from the growth processes has led to high density of physical developments. There is hardly any open space except at the Oba Palace and the Benin Museum. Every part of the CBD is either covered by physical structures or wares displayed by retail traders or transportation (buses and cars) parks.

In terms of its cultural and political significance, the Oba's palace which is the traditional administrative unit of the Binis is located in the CBD. All forms of disputes are settled in the Oba's palace. The palace is still regarded as one of the greatest museums in the world because it still holds a large collection of royal court arts, sculptural pieces of past Obas in bronze and ivory and ancestral shrines. The state house of assembly is also located within the CBD. The Oba's palace and the state's house of assembly serve as pull factors for many dignitaries as issues relevant to the governance of Benin City and the state in general are discussed here. Other facilities of significance in the CBD are the Oba Akenzua's cultural center, the museum and the Urhokpota hall which serve as tourist centres.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CHAPTER TWO

THEORETICAL FRAMEWORK AND LITERATURE REVIEW

2.0 Introduction

This section deals with the review of related literature, theory and concepts in the delimitation of the central business district (CBD) of Benin City. These (theory and literature review) are of uttermost relevance in the understanding of this research work.

2.1 Theoretical Framework

Spatial location theories and concepts are of central importance and are often a consistent and logical way of explaining the pattern of interrelationship of economic activities in space. Economic phenomenon do not just occur in space but rather, they are systematically planned and spatially organized so as to yield a desired maximum result. For an apt and detailed understanding of this research endeavor, Walter Christller's central place theory (1933) and the accompanying concepts of population threshold and range of goods are reviewed.

2.1.1 Walter Christaller's Central Place Theory

Central place theory is a spatial theory in urban geography that attempts to explain the reasons behind the patterns of phenomenon in space namely; size and number of cities in a national settlement system. It also attempts to provide a framework by which settlements can be studied for the locational patterns of phenomena in space. Christaller

asserted in his theory that settlements simply functioned as 'central places' providing services to surrounding areas (Openshaw and Veneris, 2003).

The study of the delimitation of the CBD in Benin City can be related to the central place theory. The central place theory propounded in 1933 by Walter Christaller recognized the economic relationship between cities and their hinterlands. The basic principles (tenets) of the theory is explained below.

According to Christaller, central places are interdependent. He believed that settlements within defined regions are organized into orders of settlements, thus implying a settlement hierarchy. He opined that a certain amount of productive land supports an urban center. The urban center performs some essential large services for its surrounding areas. The functions and services it performs extend over a larger region where there are other central places of less importance. In his view, the central place is thus a settlement where services are provided for the non-urban population. The sphere of influence of a central place was regarded as its complementary region. He further opined that while the higher order central places produced higher order services, the lower order central places produced lower order services.

Christaller emphasized that central places at the same functional level which are usually of the same size are not located close to each other but rather they are evenly spaced. Larger central places are more widely separated compared to smaller central places. The larger central places acts as regional centers which provide goods and

services to a much wider market as opposed to smaller central places which provide goods and services to their immediate vicinity.

Christaller's theory emphasizes the spatial competition of settlements. He opined that as settlements become more attractive to customers who are distributed over space, the sphere of influence of that central place becomes larger. As customers and patronage increase, the space occupied by a central place may change. As central places increase and expand their boundaries, there is the tendency of their borders to extend and overlay into those of their neighbors. Due to his assumption of an even distribution of settlements, he argued that if the whole area or region is covered with several market areas, hexagonal networks will grow up such that each settlement will receive trade that is equal to three times the trade produced by its own population. He defined this total trade area as the K-value.

Further buttressing his argument, he stated that central places of the same order would have the same size of complementary region and that the most economical geometric form of this complementary region is the hexagon. This is because the hexagon covers the whole area without overlapping as opposed to the circle. He therefore envisaged a hexagonal pattern of central places and service area. He believed that the larger the central place, the larger its trade area. In effect, each larger class of settlement would be spaced on a hexagon of the next order size. Settlements therefore tend to nest into one another. Christaller found out from his survey that the smallest service centers were located at an average of 7km apart compared to the higher order central places

which serve a complementary region three times the area and thrice its population and which are located 12km apart.

The theory was built on the concept of range and threshold of goods and services. The range of a good or service is the maximum distance the dispersed population is willing to go in order to purchase a good and service offered for sale at a given price, while threshold is the minimum market (population or income) needed to bring about the selling of a particular good or service. The range of a good therefore, delineates the catchment area or central place for the central goods while the threshold population is the area below which the central place cannot supply a good at a break even profit.

The result of these consumer preferences is that a system of centers of various sizes will emerge. Each center will supply particular types of goods forming levels of hierarchy. In the functional hierarchies, generalizations can be made regarding the spacing, size and function of settlements. The larger the settlements are in size, the fewer in number they will be, i.e. there are many small villages, but few large cities. The larger the settlements grow in size, the greater the distance between them, i.e. villages are usually found close together, while cities are spaced much further apart.

As a settlement increases in size, the range and number of its functions will increase. As a settlement increases in size, the number of higher-order services will also increase, i.e. a greater degree of specialization occurs in the services. The higher the order of the goods and services, the larger the range of the goods and services, the longer the

distance people are willing to travel to acquire them. At the base of the hierarchy pyramid are shopping centers, news agencies, etc. which sell low order goods. These centers are small. At the top of the pyramid are centers selling high order goods. These centers are large. Examples of low order goods and services are: newspaper stalls, groceries, bakeries and post offices. Examples of high order goods and services include jewelry, large shopping malls and arcades. They are supported by a much larger threshold population and demand.

Christaller deduced that settlements would tend to form in a triangular/hexagonal lattice, as it is the most efficient pattern to serve areas without any overlap (Openshaw and Veneris, 2003). In the orderly arrangement of an urban hierarchy, seven different principal orders of settlement have been identified by Christaller, providing different groups of goods and services. Settlement are regularly spaced - equidistant spacing between same order centers, with larger centers farther apart than smaller centers. Settlements have hexagonal market areas, and are most efficient in number and functions.

When the central place theory is related to the CBD of the Benin City, it can be deducted that higher order goods and services are found in the city center. The CBD of Benin City supplies all forms of goods and services thus serving as the central service providing center in Benin City. The CBD is the first order service center in the study area and is supported by a large population threshold to match the goods and services provided. The level of specialization here is greater than in other places in the city. From

the CBD, goods and services flow to other centers in the city that offer goods and services in large quantities but not like the city center. These places also serve a wide range of people but not like the CBD. Example of such places are the New Benin market, Ekiosa market and Uselu markets, which are lower order central places compared to the CBD.

From these second order service centers, the flow moves to third order centers such as super markets and shopping malls where the population threshold and demand is not as large as that of the second order service centers and first order service center. Examples of such places in Benin City include Hallmark shopping mall, Kada Plaza, Voen shopping mall, Stop 2 Shop plaza, MM2 supermarket, etc. From these third order service centers, the flow of goods moves to the fourth order service centers such as kiosks and other retail shops were services are provided in a much smaller scale compared to higher order service centers. The population threshold in retail shops is smaller than the threshold of higher order service centers.

Due to the size of the CBD, it has more functions and provides higher order services compared to other service centers in Benin City. The population threshold for this region is also greater than in other parts of the city. The functions and population threshold decreases as one moves down the hierarchy of service providing centers in Benin City.

2.2 Literature Review

The CBD, was described as the 'heart of the city' by Murphy and Vance (1954), and is usually located in the central part of a city, together with particular central activities, such as banks, offices, hotels, cinemas and theatres. Because of CBD's central role in urban development and human life, there are many empirical evaluations and observations in urban studies trying to narrow the center of business and identify it (Thurstain-Goodwin and Unwin, 2000; Borruso and Porceddu, 2009; Hollenstein and Purves, 2010). These works generally implement both qualitative and quantitative indexes, with the former being mainly based on individual choices and the latter mainly used in quantitative and distributive analysis.

Classical study in urban geography defined the CBD by mapping land uses that contained the highest concentration of central activities and high land values. Several similar approaches are recently presented with computing indices of central business activity (Thurstain-Goodwin and Unwin, 2000; Borruso and Porceddu, 2009). They are specifically focused on the development of point pattern analysis, starting from data concerning social-economic activities geo-referenced at address point level. Specialized techniques using statistical methods are adopted to attribute the concentration of activities to area units as urban districts and to derive their density. In such sense the core of the city is highlighted in terms of dominance of the economic activities located there. In the era of big geo-data, the crowding-source data and the uploaded Volunteered Geographic Information (VGI) data make the urban facility Point of Interest (POI) easily be collected,

and also facilitate the urban spatial analysis such as CBD detection (Hollenstein and Purves, 2010; Elwood *et al.*, 2012; Sun *et al.,* 2013).

Since the 1950s, there have been research works to theoretically define or delineate city center using limited data sources (Murphy and Vance, 1954; Carol, 1960; Alonso, 1964; Murphy, 1972). Over the last decade, a number of approaches have been made available to quantitatively delineate the city center using a variety of data sources. In Thurstain-Goodwin and Unwin's (2000) study, a city center was delineated by creating an index called 'index of town centeredness', which is composed of a series of indicators to represent the typicality of a city center. The 'kernel density' estimation method is then used to transform the discrete geo-referenced data created by the relevant indicators into continuous surfaces denoting spatial densities. In terms of the individual density values of the indicators, a continuous surface for the 'index of town centeredness' was generated.

A similar study was made by Borruso and Porceddu (2009). The Kernel Density Estimation (KDE) used allows transforming point events in space in a continuous density function over the study region considered, thus allowing a visualization of the phenomenon by means of a three-dimensional surface, not limited to the single point event, but representing the variation of density of point events across the study region. The method allows modelling point data over a grid structure that covers the entire study region. The procedure considers using a fine grid over the study region and performing a routine that calculates the distance between each of the reference cells and the event's locations, evaluates the kernel function for each measured distance and sums the results

for each reference cell (Levine, 2004). Using this method, they were able to delimit the cities of Trieste and Udine. In order to delineate the area where the CBD is likely to be located, they examine the tail values of the density function, starting from two standard deviation units, with particular reference to areas of higher values

To present a behavioral science method for determining the reference of vague spatial terms, and particularly vague regions, Montello *et al.* (2003) asked pedestrians to draw the city center with 100% confidence and 50% confidence respectively. Respondents from the study were given a base map of the city and were asked to delimit the center of the city by drawing a line through were they perceive to be the boundary of the city. From their study, they found that people were quite willing and able to draw discrete boundaries around were they perceived to be the city center. Also of note in their study was how similar the respondents' perceptions of the city center was, though there were variations in their boundary limits (Montello *et al.,* 2003).

Using remote sensing data, Taubenboeck *et al.* (2013) presented a conceptual framework to define the CBD using physical and morphological parameters, and tests the approach using 3D city models of three European test sites. A transferable method was developed to detect and delineate CBDs over larger areas from a combination of Cartosat-1 digital surface models and multispectral Landsat ETM+ imagery. By applying a two-class unsupervised clustering process to the 3-D city model, comprehensive quantitative thresholds for object-based CBD delineation from the Cartosat-1 DSM was approximated. Thus, substitutes for the selected physical parameters were derived not

only from object level but also from pixel level of the 3-D model. Although some of these substitutes only presented proxies and were associated with a certain information loss, they reflected the typical physical features of CBDs. Due to the complexity of urban morphology, the physical parameters were combined, and as a consequence, the between class transition of parameter values is not entirely disjuncted. Overall, the uniform criteria derived from the analysis of 3-D city models should allow for a transferable and thus, comparable localization of CBDs on urban footprint level.

By the selected physical parameters of the built-up structure (McColl, 2005) and a high detail physical reference, CBDs can be physically distinguished from the surrounding urban morphology. With regard to this physical reference, CBDs were classified from HR Cartoat-1 DSMs and the area-wide urban footprint (Drozdz, and Appert, 2010) based on morphological filtering, hierarchical segmentation, and fuzzy-logic classification (Murphy and Vance, 1954b) with high spatial delineation and detection accuracies (Borruso and Porceddu, 2009).

Jaroslav *et al,* (2012) conducted a similar study of using spatial data in the delimitation of the central business district of the city of Olomouc in Czech Republic. In their study, they employed vector layers in design and shape formats in scales from 1:2 000 to 1:10 000 while data concerning services were created by means of GPS devices by students. They employed four criteria in delimitation of the CBD, they include; the delimitation of the CBD according to the price map of the city; the delimitation of the CBD according to the density of services; the delimitation of the CBD according to the

density of public transportation stops and the delimitation of the CBD according to the mental map of the city.

By selecting the most expensive pieces of land and areas in which services are accumulated (shops, national and municipal institutions, restaurants) very similar areas were delimitated. These areas also corresponded with the mental maps of the inhabitants of the city. Appropriate methods of delimitation of the city center were found. The best results were achieved when delimitating the center according to the price map and the density of services. In comparison with the delimitations already in existence (the basic settlement unit, the cadastral district, and the historical town reserve) the delimitations acquired in this thesis were significantly smaller. The delimitation of the city center according to the density of the public transportation lines proved to be unsuitable because public transportation bypasses the center of Olomouc.

Martin (2012) also attempted to delimit the CBD of three European megacities by employing the spatial data analysis technique. In his work, physical parameters were logically derived from qualitative statements of published literatures. This parameter set includes average and maximum values of building height and volume, building density of high-rise buildings, as well as floor space density. This holistic approach of parameter combination allowed for a comprehensive representation of the physical face of CBDs across the designated cities. Secondly he did a structural analyses of the CBD by comparison of CBDs and Non-CBD areas derived from 3D city models on district level which reveal significant differences regarding the classes' physical features.

With regards to all selected parameters, the analysis of within- and between-group variance clearly shows that CBDs are – across cities - more similar to each other than to the more homogenous urban environment. This confirms that CBDs can be differentiated from the surrounding urban morphology due to its physical characteristics.

In order to delineate CBDs from the surrounding urban morphology based on physical parameters, he combined multispectral Landsat images and HR DSMs (High Resolution Digital Surface Models) which provided the required physical features. Cartosat-1 stereo sensors proved to be particularly suitable for the generation of large-scale and high-resolution DSMs covering extensive urban agglomerations. Although the extraction of individual buildings is beyond the data's geometric capabilities, the above-ground building volume is presented in its correct dimension on pixel level for the spatial delineation of CBDs. In employing this methodology, Martin was able to delimit the CBDs of Canary Wharf in London; La Defense in Paris, and Levent in Instanbul.

As cited in Krueger (2012), a popularly approach to delimiting urban centers is the employment based method otherwise known as '10-10' or '20-20' which was developed by Giuliano and Small (1991). Their method involves first identifying all spatial units in a given region having employment densities over a certain threshold, then identifying contiguous groups of these units as sub centers when a group's total employment exceeds a certain threshold. In their original analysis, they find appropriate thresholds at a density cutoff of 10 employees per acre, and a minimum total employment of 10,000 (Giuliano and Small 1991), hence the '10-10' moniker. A more restrictive set

of thresholds, '20-20', is also employed. In this and in a later study using the same method, Giuliano and Redfearn (2007) found a steady erosion of the dominance of primary urban centers compared to their sub centers over time, leading them to conclude that the very notion of urban centrality is losing its currency.

Another method utilizing employment densities is Giuliano and Redfearn's (2007) study of Los Angeles. Giuliano and Redfearn converted aggregated employment density data into a smooth surface, proceeding to identify peaks in that surface and to test them for significance. The area around each significant peak is then divided by a contour whose threshold value is calculated locally for that peak, and the area inside the contour is declared to be a sub center. This method is less arbitrary than Giuliano and Redfearn's approach in that it does not require local knowledge to calibrate density cutoffs. The method allows for the significance of any given peak to be assessed locally to that peak, rather than establishing a global threshold. Giuliano and Redfearn's analysis finds asymmetry and dispersion among centers, but concludes that agglomeration remains a powerful force.

Besides simple employment density measures, another popular employment based indicator is the E/R ratio, or Employment to Residents ratio, exemplified by Greene's study of Chicago and Los Angeles (Greene, 2008). Simply put, the E/R method looks at the ratio of absolute employment to absolute resident workers in each given spatial unit. An E/R ratio greater than one indicates that the spatial unit attracts more workers commuting from other units than it sends to other units itself. After selecting a largely

arbitrary threshold for the value of the E/R ratio, one can then assemble contiguous spatial units which exceed the threshold into employment sub centers. Greene concludes that, while sub centers are generally widely dispersed, the notion of centrality remains relevant at least in local relation to sub-centers.

From the review of literature, several methodologies have been identified for the delimitation of Central Business Districts. Though the methodologies identified succeeded in delimiting several Central Business Districts across the world, none employed perception method strictly. Jaroslav *et. al,* (2012) attempted delimiting the CBD of Olomouc by employing respondents' perception via the use of mental maps, the procedure was more of a technical process as it employed maps of the city and respondents were made to draw their impression of the CBD of the city. In this study, however, the method that would be employed in delimiting the Central Business District of Benin City is observation method alongside respondents' perception. In this regards, respondents' of the Central Business District of Benin City perception as well as the observation of the researcher would be elicited in a descriptive format.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This section focuses on the methods that were used in data collection and analysis. The method of research indicates the procedure that is employed by the researcher in putting together the raw facts and data processing technique. Methodology in research typifies a process that includes the methods, procedures or modalities by which a researcher intends to accomplish the objectives of the research (Agbonifoh and Yomere, 1999). This section therefore includes the research design, research population, sampling method, sample size, research instrument, questionnaire administration method, data collection method and method of data analysis.

3.2 Research Design

The nature of the problem addressed in this study suggests the adoption of a survey research design. This involved the collection of data from the sampled population which will be drawn from the population that make up the study area. The data was collected at one point in time from the day time population of the CBD and the result of the analysis will be used to make generalization to the entire population from which the sample was drawn.

The interview guide was adopted in eliciting information from the study subjects because of its ability to provide detailed and accurate information on the study area such as the boundary of the CBD with the inclusion of the central and non-central uses in the

CBD. The study design was chosen to meet the study objectives which includes to examine residents' perception of the limit of the CBD in Benin City; to identify the indicators in residents' perception of the limit of the CBD and to use the indicators in residents' perception to delineate the boundary of the CBD of Benin City.

3.3 Sources of Data

The sources from which data were collected for this research will be from both primary and secondary sources. These include:

1. Personal observation by the researcher. This was achieved from the field survey where the researcher will take note of the various indicators of the boundary of the CBD.
2. Use of interview guide.

3.4 Data Collection Method

Data for this research was collected through the use of an interview guide. The questions in the interview guide were used to elicit information relevant to the research study from the respondents in the study area. In terms of obtaining data via the researcher's personal observation, the following indicators or variables were used; the discontinuity between commercial activities and the beginning of non-commercial activities; the opinions of the local residents which will embody their perception of what constitutes the CBD; the houses in the area with a predominant commercial use; the

volume of shoppers in the area; the volume of pedestrian flow and the volume of cars parked; the tenement prices in the area; population density; shopping intensity; structure of buildings; the width of the interstices co-joining the arterial roads; and the terminals where all public transports converge in the City center.

3.5 Research Population

The population of Benin City, according to the 2006 national population census was 1,147,188 and projected in 2013 by the Edo State bureau of statistics to be 1,385,845 by 2015. However the population of the Central Business District of Benin City is not known due to the fact that the population of the area is always changing as a result of the constant inflow and outflow of people. The population size for this research study was therefore the entire resident population, shoppers and traders in the CBD.

3.6 Sample Size

Determining the sample size for this research proved difficult due to the lack of a population figure for the CBD of Benin City. However, the sample for this research was taken from the day time population of the CBD. The interview guide was used to interview pedestrians, motorists and traders (the day-time target population) that were available as at the time of the survey. The researcher on the other hand made observations with regards to the houses in the area with a predominant commercial use; the volume of shoppers in the area; the volume of pedestrian flow and the volume of cars parked; the tenement prices in the area; population density; shopping intensity; structure of buildings;

and the width of the interstices co-joining arterial roads along the arterial routes in the city center.

3.7 Sampling Method

Purposive sampling was used for this study. Purposive sampling of a study population is a commonly used technique in sampling as it serves to elicit information about a specific phenomenon from the chosen members of the study population. Since the study is on the delimitation of the CBD of Benin City, the respondents that would be selected would therefore need to have a knowledge and understanding of what a CBD entails. This means that educated persons were selected for the interview. A cell phone was used to record the information from respondent. The recorded information was transcribed and the content analyzed.

3.8 Method of Data Analysis

Data collected in this research was analyzed using the statistical package for social sciences (SPSS). Descriptive statistical analysis such as the frequency distributions was used to analyze the data. Frequency distributions simply shows the number or percentage of occurrences in each category of a given variable. In this study, frequency distribution tables was used to summarize the data obtained from the research.

The indicators were analyzed and the result was used in delimiting the boundary of the CBD with the aid of the ArcGIS software.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND INTERPRETATION

4.1 Introduction

This section deals with the presentation, analysis and interpretation of data derived from the field survey. The field survey was carried out by the researcher using the method of observation to gather the required data from the study area with the aid of the selected indicators. These indicators were used in the observation process across the seven major routes that converge at the city center and their interstices. The routes include; Airport Road, Sapele Road, Sokponba Road, Akpakpava Road, Forestry Road, Mission Road and Oba Market Road. The results obtained from the analysis of the data collected from the field is shown in Table 4.1 below and is discussed accordingly.

Table 4.1: Major Roads in the Study Area and Indicators Used in Delimiting the CBD

CBD Indicators	ROADS						
	Mission Road	Forestry Road	Akpakpava Road	Sokponba Road	Sapele Road	Airport Road	Oba Market Road
1	✓	✓	–	✓	–	–	–
2	✓	✓	✓	✓	✓	✓	✓
3	✓	✓	✓	–	–	–	✓
4	✓	✓	✓	✓	✓	✓	✓
5	✓	–	–	–	–	–	–
6	✓	✓	–	✓	–	–	✓
7	✓	✓	✓	–	–	✓	✓
8	✓	✓	–	–	–	–	✓
9	–	–	–	–		–	–
10	–	–	–	–	–	–	–

Source: Field Survey, 2018

Table 4.2: Key for Indicators used in delimiting the CBD of Benin City

Number	Indicator
1	Discontinuity of commercial activities
2	Houses with predominant commercial use
3	Volume of pedestrian flow
4	Volume of cars parked
5	Payment for off-street parking
6	Volume of shoppers
7	Population density
8	Shopping intensity
9	Local residents' opinion
10	Structure of buildings

Source: Field Survey, 2018

Table 4.3: Distance of CBD Boundary from City Center

ROAD	CBD BOUNDARY	DISTANCE FROM CITY CENTER
Mission Road	James Watt Road	1.18 km
Forestry Road	James Watt Road	1.15 km
Akpakpava Road	Igbesamwan Road	0.53 km
Sokponba Road	Owina Road	0.22 km
Sapele Road	Ogbelaka Street	0.42 km
Airport Road	Ezoti Street	0.38 km
Oba Market Road	Obakhavbaye Street	0.70 km

Source: Field Survey, 2018

4.2 Mission Road and Forestry Road CBD Boundary

From the field survey carried out, there were several interstices linking Mission road and Forestry road. These interstices include Etebete Street, Omo Street, Butcher Street, Ugbague Lane, Ugbague Street, Amadesun Street, Ogiefa Lane, Nevis Street, Obamedo Street, Cooke Road, Ovouramwen Street, Dawson Street and James Watt Road. Observations showed that commercial activities are in full swing along the major routes of Mission Road and Forestry Road down to New Benin. Deciphering where the CBD terminates in the Mission Road-Forestry Road axis will therefore prove difficult as there is no clear-cut discontinuity of activities along the major routes. However, it was discovered that the interstices between these routes met the criteria for delimiting the end point of the CBD in the Mission Road-Forestry Road axis.

Using the parameters as shown in Table 4.1, it was discovered that all the interstices joining these two routes are predominantly occupied with commercial activities with retail shops the most predominant structures in these areas. It was noticed that the volume of traffic in these areas especially in Etebete Street down to Amadesun Street was very high with a lot of vehicles parked by the road side. The volume of vehicles was seen to reduce as one moves away from Etebete Street down to Nevis Street and the road was seen to be relatively free as one approaches James Watt Street. The volume of cars parked by the side of the road was also reduced as one tends towards James Watt Street thus reducing the volume of traffic in that area. It was found out from

the survey that there is payment for off-street parking in this axis. Car owners who want to park their cars are required to pay the sum of ₦200 for parking along Mission Road. However, it was discovered that payment for parking is no longer being practiced along Forestry as the practice was stopped about four months ago (July 2018).

The volume of shoppers in this axis was discovered to tend towards the city center. The volume of shoppers and shopping activities were found to increase as one moves towards the city center especially from Obamedo Street down to Etebete Street which is the closest interstices to the city center along the Mission Road-Forestry Road axis. Jaroslav *et al,* (2012) used the applied shopping intensity as a criteria in delimiting the CBD Olomouc in Czech Republic. However, as one moves away from these areas down to Cooke Road, Dawson Street and to James Watt Road, one finds the volume of shoppers and the shopping intensity reducing. Also of note is that pedestrian flow in these areas tends to favor the city center as more people are found going in the direction of the city center especially with the highest volume noticeable from the hours of 12:00 noon down to 5:00 pm. The population in this axis was found to be at its peak from 2:00 pm to 4:00 pm. Heavy pedestrian as well vehicular traffic can be noticed during this period. From Table 4.3, the distance from James Watt Road to the city center on Mission Road axis is approximately 1.18km.

From the above, 80% of the indicators were used in delimiting the boundary in this axis. It can be deduced that the bulk of activities begin to filter out from James Watt

Road. It was found that there are more of residential buildings after this point than there are retail shops. Though commercial activities especially retail activities in shops continued down to New Benin along Mission Road and Forestry Road. The volume of activities along the interstices was found to drastically reduce from James Watt Road. Less than 50% of the buildings after this point is used for commercial or institutional activities as opposed to over 50% as one moves to the city center. Following from the criteria employed and the observations made from these criteria, there is a sharp discontinuity between commercial and non-commercial activities from this interstices. The indicators not used in delimiting the CBD in this area include the opinion of the local residents and the structure of buildings. It can be concluded thus that the CBD of Benin City along the Mission Road-Forestry Road axis ends at James Watt Road.

4.3 Forestry Road and Akpakpava Road CBD Boundary

The interstices linking these two roads include the Forestry Lane, Ewaise Street, Bamawo Street, Ehodan Street, Ewegie Street, Cooke Road, James Watt Road, Eben Road and Dowson Road. As was found along Mission Road and Forestry Road, commercial activities are in full flow along the Akpakpava Road especially within the interstices joining these roads. However, unlike in Mission Road where there is payment for off-street parking, cars are parked without payment along Forestry and Akpakpava Roads. From the survey as shown in Table 4.1, it was found out that volume of cars parked along the roads and along the interstices was not as much as is found along

Mission Road and the interstices connecting it to Forestry Road especially along Forestry Lane which is the closest interstice to the city center. This can possibly be explained by the presence of the Central Bank of Nigeria (CBN), the Benin electricity distribution company (BEDC) and the Post office just before the BEDC office. The CBN is located along the Akpakpava road and as was noticed in this area, pedestrian flow was allowed before the Central Bank and no cars parked as a result of the bank security. However, from Forestry lane down to Dawson Road, dense activities could be found along the interstices. Vehicular movements and volume of cars parked were found to be denser while the volume of pedestrian was also found to be high. Majority of the buildings in these areas are used for commercial purposes as retail stores and small firms occupy most of the building blocks with the proportion of residential houses very small in these areas.

The traffic situation in the interstices between Forestry Road and Akpakpava Roads was found to be not much different from what can be obtained in the Mission Road-Forestry Road axis as the volume of cars parked in these interstices was found to be very high especially in Ehodan Street, Ewegie Street and Cooke Road, with a reduction coming in from Eben Road down to James Watt Road where there is a reduction in the volume of cars parked by the road along the interstices. The volume of shoppers and pedestrian flow was also found to be of a similar pattern to that of Mission Road-Forestry Road axis with the peak of activities also coming in the afternoon periods. Population was found to be denser in these areas compared to the areas after James Watt Road. The

distance of the interstice on Forestry Road to the city center is recorded as 1.15km as reflected in Table 4.3.

From the above analysis, it can be noticed that the volume of activities starts to fade as one moves towards the James Watt interstice and from this point down to the New Lagos Road axis, the volume of activities ranging from commercial activities to transportation can be regarded as being normal. Since the James Watt interstices marks the point of a sharp decline between commercial and non-commercial activities in the Forestry Road-Akpakpava Road axis, it therefore has been chosen as the boundary point of Benin City CBD along Forestry Road-Akpakpava Road axis.

4.4 Akpakpava Road and Sokponba Road CBD Boundary

Between Akpkakpava Road and Sokponba Road, it was noticed from the research survey that there is no direct interstice than links them together as if found on the Mission Road, Forestry Road and Akpakpava Road axis. However what is obtainable in this area is more of inter-street linkages running between these two major roads. The interstices on this axis include the Uyi Ekpen Road which leads from Akpakpava Road down to Igun Street and to Sokponba Road while the second interstice is Owina Street which runs from Sokponba Road down to Igbesamwan Street and is finally terminated at Akpkakpava Road, Igbesamwan Street itself is off Akpakpava road and has Igun Street, Owina Street and Oza Street lead from it directly to Sokponba Road.

The volume of shoppers in this area is high but cannot be compared to that of Mission Road or Forestry Road. Pedestrian flow was found to be high down to First East Circular Road and a reduction in this flow can be noticed from there. The volume of cars and other vehicles were noticed to be as much as can be found on Mission Road but a marked difference can also be noticed as there are more vehicles on the Owina Road and Igbesamwan Street axis than there are after these interstices, although on the major roads itself (Sokponba and Akpakpava) the vehicular movement is high and off street parking too. It was also noticed from the survey that the majority of the buildings after these routes are primarily used for residential purposes whilst the buildings on these routes and before it are used majorly commercial purposes. Retail stores can be found lining both sides of the road on this axis as pedestrians and shoppers could be seen filing out in their numbers along the streets.

The perception of local residents pinned the boundary of the CBD between Akpkakpava Road and Sokponba Road at Third East Circular Road. However, it was discovered from the survey using the various indicators that the boundary of the CBD terminated farther back. Montello *et. al,* (2003) asked pedestrians to draw the boundary of the CBD using perception method but the results were mixed though there was general similarities in the respondents' perceptions. The discontinuity between commercial and non-commercial activities between Akpakpava Road and Sokponba Road can be strongly noticed in the Owina/Igbesamwan interstices as the majority of the buildings on interstices after these streets are used primarily for residential purposes with few retail

stores lining the roads and a reduced volume vehicular and pedestrian flow. The endpoint of the CBD on the Akpakpava Road and Sokponba Road axis is thus put on the Owina/Igbesamwan interstice. The distance of this boundary from the city center is given as 0.53 km from Akpakpava Road and 0.22 km from Sokponba Road as shown in Table 4.3.

4.5 Sokponba Road and Sapele Road CBD Boundary

From the survey carried out, it was found that there are several interstices linking these two roads and they include, Ohunba Street, Ogbesasa Street and Ogbelaka Street, Omoruyi Ezoba, First, Second and Third East Circular roads. Observations showed that commercial activities are rife along the major routes of Sokponba Road and Sapele Road. It will therefore prove difficult pinpointing were the CBD terminates in this axis as there is no clear-cut discontinuity of activities along the major routes. However, it was discovered that the interstices between these routes met the criteria listed for the delimitation of the CBD on this axis.

Using the criteria provided, it was discovered that all the interstices joining these two routes are predominantly occupied with commercial activities with retail shops the most predominant structures in these areas. It was noticed that the volume of traffic in these areas was very high with a lot of vehicles parked by the road side. The volume of vehicles was seen to reduce as one moves away from Ogbelaka Street. The volume of cars parked by the side of the road was also seen to drastically reduce as one tends

towards Ogbelaka Street thus reducing the volume of traffic in that area. It was found out from the survey that though there is off-street parking in this axis, money is not collected for such endeavors.

The volume of shoppers in this axis was discovered to tend towards the city center. The volume of shoppers and shopping activities were found to increase as one moves towards the city center especially from Ogbelaka Street which is the closest interstices to the city center along the Sokponba Road and Sapele Road axis. However, as one moves away from these areas down to Ogbelaka Street, one finds the volume of shoppers and the shopping intensity reducing while from Ogbelaka Street, there is more of residential activities than commercial activities (note that this is in the interstice). Also of note is that pedestrian flow in these areas tends to favor the city center as more people are found going in the direction of the city center especially with the highest volume noticeable in the afternoon and towards the evening period. Heavy pedestrian as well vehicular traffic can be noticed during this period.

It was found that there are more of residential buildings after Ogbelaka Street than there are retail shops. Though commercial activities especially retail activities in shops continued. The volume of activities along the interstices was found to drastically reduce from Ogbelaka Street. Less than 50% of the buildings from this point is used for commercial or institutional activities as opposed to over 50% as one moves to the city center. Following from the criteria employed and the observations made from these

criteria, there is a sharp discontinuity between commercial and non-commercial activities from this interstice. It can be concluded thus that the CBD of Benin City along the Sokponba Road and Sapele Road axis ends at Ogbelaka Street. The distance of Ogbelaka Street from the city center as shown in Table 4.3 is 0.42 km.

4.6 Sapele Road and Airport Road CBD Boundary

The interstices linking these two roads is Ezoti Street. As was discovered in the other routes, commercial activities are in full flow in this axis especially in Airport Road. However, unlike in Mission Road where there is payment for off-street parking, the payment for off-street parking is not collected on Sapele/Airport road. Vehicular movements and volume of cars parked were found to be denser along Airport Road than on Sapele Road while the volume of pedestrian flow was also found to be high. Majority of the buildings in these areas are used for commercial purposes with retail stores and small firms occupying most of the building blocks with residential buildings accounting for a very small proportion in this area.

The traffic situation in the interstices between Sapele Road and Airport Road was found to be not much different from what can be obtained in the Mission Road-Forestry Road axis with a high volume of vehicular movement. However, a reduction in the volume of vehicular movement is noticeable from Ezoti Street. The volume of shoppers and pedestrian flow was also found to be of a similar pattern to that of Mission Road-Forestry Road axis with the peak of activities also coming in the afternoon periods. The

Airport Road axis before Ezoti Street has a mixture of both commercial and institutional activities with the Oba's palace being the most prominent of these institutions. Other institutions that can be noticed in this axis is the post office which is gradually being over-run with commercial activities, and also the Oba Akenzua cultural centre is found in this axis too. However, as one moves away from Ezoti Street, it is noticeable that there is a decline in the volume and tempo of activities in this axis. But it is worthy of note that if the linear road is to be followed in delimiting the boundary on Sapele road, it will end at third east circular junction and also if same is to be done for Airport road, it will end at Akenzua junction. In this case the delineation of the CBD is to get the 'area' and area is not in 'linear' form because it must take a closed shape. This is why the interstice is of importance here.

From the above analysis, it can be noticed that the volume of activities starts to fade as one moves from Ezoti Street. Since the Ezoti Street interstices marks the point of a sharp decline between commercial and non-commercial activities in the Sapele Road and Airport Road axis, it therefore marks the boundary point of Benin City CBD along Sapele Road and Airport Road axis. Table 4.3 shows Ezoti to be 0.38 km from the city center.

4.7 Airport Road to Oba Market Road and Mission Road CBD Boundary

In this section there is no direct interstice linking these roads, similar to the case of Akpakpava/Sokponba road. Plymouth Road is a major road that runs between Airport Road and Oba Market Road and was of great importance in linking the interstices

between these two roads (Airprort/Oba market road). On Airport Road, if the major road is to be followed, the CBD will end at Akenzua Road as commercial activities continued way down the road. This therefore makes the usage of the interstice key in determining the actual boundary of the CBD in this axis. Off-street parking in this axis is free though it is limited in this area as traffic wardens are against parking on the road side in this axis. From beside the palace (Ezoti road) led to Alaka Street (Behind the palace). Ezoti Road runs through Alaka Street and terminates on Plymouth Road. From here, Obakhavbaye Street meets and crosses the Oba Market Road (Ore Oghene Road). Obakhavbaye Street meets and crosses Isekhere Street as Evbiemwen Street. This is where University of Benin shuttle buses are parked. Off Evbiemwen Street is Iwehen Street which leads to Lagos Street. Lagos Street terminates at Nevis Street which is later reconciled with Mission Road.

Using the criteria for delimiting the CBD, it was noticed from the field survey that along Airport Road, there are more of institutional activities with the Oba's palace, post office and the Oba Akenzua cultural centre located on this axis. The level of commercial activities on Airport Road is very low as the majority of buildings here are more of institutions. However, commercial activities can be found along the corridors mostly due to the informal nature of the city. It was discovered that the areas around the post office is gradually being commercialized while the cultural center has been converted to a commercial hub in this area. Pedestrian flow and the volume of shoppers was found to reduce after the vegetable market on Airport Road. On the Oba Market Road, the volume

of shoppers and pedestrian flow was found to be very high mostly due to the presence of the market. There is no payment for off-street parking though not all areas are allowed for parking. This continued to Obakhagbaye were the volume of activities began to reduce.

As one tends towards Mission Road, it was discovered that there is a high volume of commercial activities in Ibiwe with the flow of pedestrians very high. The volume of shoppers was also found to be very high especially in the afternoon periods. This area can be referred to as the core market of the CBD as traffic is its peak in this area. Majority of the buildings in this axis are used for commercial purposes. This trend follows through down to Lagos where the same high level of commercial activity can be noticed. Off Lagos Street is Nevis Street which links to Mission Road.

From the above, the marked point where the high level of commercial activities begin to reduce in this axis is Evbiemwen Street after Ibiwe Street. The flow of pedestrians and traffic was found to reduce drastically in this interstice while the volume of shops were also reduced as more residential buildings could be noticed compared to buildings used for commercial activities. According to Murphy (1971), Waugh (2000), Haggett (2001) and Heineberg (2001), the features of the CBD should include the dominance of tertiary sector activities, peak land values, high degree of accessibility and traffic density, high daytime versus low night-time population and low resident population, and the main concentration of commercial land use. From Table 4.3, the distance of the CBD from the city center is 0.70 km.

The analysis done on the interstices of the major routes in Benin City has shown that though there is hardly a striking discontinuity of commercial activities along the major routes such as Mission Road and Airport Road in Benin CBD, marking the boundary of the CBD can be achieved using the interstices of these roads. The boundary of Benin City CBD from the survey carried out is therefore marked as follows: James Watt Road in the Mission Road-Forestry Road axis; James Watt Road in the Forestry Road-Akpakpava Road axis; the Owina/Igbesamwan interstice on the Akpakpava Road-Sokponba Road axis; Ogbelaka Street on the Sokponba Road-Sapele Road axis; Ezoti Street on the Sapele Road-Airport Road axis and Evbiemwen Street in the Airport Road, Oba Market Road and Mission Road axis. Due to the centering of activities that is found in the CBD and the various services that act as a pull factor for people in the surrounding areas and beyond, the CBD of Benin City is thus a central place. This was buttressed in Openshaw and Veneris, (2003).

CHAPTER FIVE

FINDINGS, DISCUSSION AND RECOMMENDATION

5.1 Introduction

This section deals with the summary of the research findings which were drawn from the data analysis. This is followed by the conclusion and the recommendation while attempt is made to identify opportunities for further research.

5.2 Research Findings

The research has been able to study the delimitation of the Central Business District (CBD) of Benin City. After the careful analysis and synthesis of data collected from the field, a series of deductions were made and these include the following;

Firstly, it was discovered from the survey that using the major routes in a bid to pinpoint the limit of the CBD of Benin City proved a very difficult task as there is no point along these linear routes where the sharp decline of commercial activities could be marked due to the fact that on the linear routes commercial activities could be seen running the length of the roads. This necessitated the usage of the interstices connecting these major routes. The usage of these interstices as a marker for delimiting the boundary of the CBD proved to be very effective.

Secondly, it was found out from the survey that not all the criteria used in the assessment of the limits of the CBD were applicable in all locations, for example, in the

Forestry Road and Akpakpava Road axis, it was noticed that the high pedestrian flow which was used as one of the major markers of the limit of the CBD in the Mission Road-Forestry Road axis was not very applicable as the volume of pedestrian flow before the chosen termination point of James Watt Street and after the street was found to be roughly the same while the volume of residential buildings in this area was also not distinctively different from what is obtainable in the James Watt interstice. However the volume of commercial activities was found to drastically reduce after the James Watt interstice in the axis.

Thirdly, it was discovered that the majority of the local residents used the linear the linear routes as the marker for the limits of the CBD due to high level of commercial activities that flow down the length of the road. This proved that majority of the sampled respondents do not have an intricate knowledge of the CBD and of the criteria provided. It was also discovered from the survey that there is no payment for off-street parking except at Mission Road were vehicle owners are required to pay the sum of ₦200 to park their vehicles. However in areas such as in Airport Road axis, off-street parking is not allowed and areas where such is allowed are generally marked for such activities. Areas such as front of shops and Bank premises are allow parking.

Lastly, it was discovered that the volume of shoppers and volume of traffic was a key criteria in delimiting the CBD of Benin City as these were the most observable criteria in marking a sharp decline in the level of commercial activities in the study area.

It was noticed from the survey that wherever the volume of shoppers begin to reduce, the level of commercial activity in such a zone also begins to wilt and the increase in residential buildings could also be noticed in such zones.

5.3 Conclusion

The research has been able to assess the limits of the Central Business District of Benin City. From the survey, the various boundaries of the CBD using the interstices of the major roads leading from the city center include James Watt Road in the Mission Road-Forestry Road axis; James Watt Road in the Forestry Road-Akpakpava Road axis; the Owina/Igbesamwan interstice on the Akpakpava Road-Sokponba Road axis; Ogbelaka Street on the Sokponba Road-Sapele Road axis; Ezoti Street on the Sapele Road-Airport Road axis and Evbiemwen Street in the Airport Road, Oba Market Road and Mission Road axis. These selected limits were found to be the areas where the parameters chosen for the delimitation of the CBD were most applicable. However, not all the parameters were applicable per time in all the chosen boundaries.

From the analysis of data, it was discovered that the Central Business District of Benin City has a rhombus shape and having a wide areal coverage. It was noticed that the level of commercial activities was higher in some zones than in other zones. For instance, in the Ibiwe-Lagos Street zones of the Oba Market Road-Mission Road axis, the volume of commercial activities was found to be at its peak while in the Sapele Road axis, the least volume of commercial activities was recorded. This can be traced to the fact that

Ibiwe-Lagos Street zone is the primary market of the CBD right at the center of the city. Also of note is that though the majority of the areas are marked out with the high level of commercial activities, the Sapele Road-Airport Road axis is marked with more of institutional activities compared to commercial activities though corridors of commercial activities could be found along the road and in some pockets of space in the institutions.

5.4 Recommendation

Following from the evaluation of the limits of the CBD of Benin City and based on the findings, the following recommendations are made;

It has been observed from the study that there is the potential for land use conversion in the future. In the event of a massive development it is imperative that in the CBD area, non-commercial uses should be removed in favour of uses that are purely commercial and institutional as this would further enhance the functionality of the CBD.

The building development in the CBD area in recent years has been noticed to be vertical in nature. This reflects that potential wise, the buildings in the CBD are going to be high rise buildings in the future. It is thus imperative that adequate physical planning should be put in place by the planning authorities to ensure the smooth transition of this process.

It was noticed that the residential buildings in the CBD are being converted for commercial usage thus implying the spread of the CBD. However, buildings that have

been converted for commercial uses is difficult to be converted back to residential purposes because the land lords make more money from commercial uses compared to residential uses in their buildings.

From observation carried out in the field, it was noticed that there is a high level of informal commercial activity taking place in the CBD especially in areas such as the Oba Akenzua Cultural center which has been converted to a motor park and a trading center. It therefore imperative that the government implements functional policies that would reduce the level of the informal activities in the area of the CBD especially.

Lastly, adequate planning should be put in place, such as the proper subdivision of activities in the CBD as this would enhance the functionality of the CBD. The current state of the CBD shows inadequacy in planning implementation. However if policies are implemented and strictly worked out, the functionality of the CBD will be enhanced.

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APPENDIX

DEPARTMENT OF GEOGRAPHY AND REGIONAL PLANNING

FACULTY OF SOCIAL SCIENCES

UNIVERSITY OF BENIN

Delimiting the Central Business District (CBD) of Benin City

Interview Guide

Preamble: The CBD is an area in the city center that is entirely occupied by business activities and other non-residential activities.

1. In your own opinion, where is the end of this area as defined above?
2. Where did payment for off-street parking end in this road?
3. Up to what percentage did business activities take in this house?
4. If I give you a sketch of Benin City CBD, would you be able to demarcate its boundaries?