ANALYSIS OF PARKING SPACES AS FACTOR LEADING TO TRAFFIC CONGESTION IN CENTRAL BUSINESS (CBD) DISTRICT IN DAR ES SALAAM.

By

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A thesis/dissertation submitted in partial/fulfilment of the requirement for the award of the Postgraduate Diploma in Logistics and Transport Management (PGDLTM) of the National Institute of Transport.

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CERTIFICATION

We, the undersigned, certify that we have read and hereby recommend for acceptance by National Institute of Transport, a dissertation entitled “analysis of parking spaces as factor leading to traffic congestion in central business (CBD)” as a partial fulfillment for the award of Postgraduate Diploma in Logistics and Transport Management (PGDLTM).

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DECLARATION AND COPYRIGHT

I, Mayunga Masana Luyekela declare that, this dissertation is my own original work and that it has not been presented to any other university for a similar or any other Postgraduate award.

Signature_____

Date_____

ACKNOWLEDGEMENTS

I would like to thanks our Almighty God for making me health and strong at both normal and difficult times for the whole period of undertaking this researcher.

Also I would like to thank my family, parents, relatives and friends for their valuable contributions they made on accomplishing this research. Indeed, there is nothing better I can say to them than thanking and praying for them to continue having this heartfelt love and affection.

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It is definitely impossible to mention every person who has helped in one way or the other during the execution of this study, but I really recognize the role played by everyone who knowingly or unknowingly helped me particularly my respondents in various organizations such as UDART and SUMATRA and the managements as a whole for their support in data provision whenever needs arose.

DEDICATION

This research paper is dedicated to my family, my parents, and all relatives and friends who devoted their spacious time and other resources to support my research undertaking. I will always remember them.

ABSTRACT

The aim of this study was how the parking places contribute to traffic congestion in Central Business District at Dar es Salaam (CBD), Primary and Secondary sources of data were used to collect information. Documentary review on journals, new papers and books were used to collect secondary data; and questioners and interview were used to collect primary data. Data were analyze by using Microsoft excel and were presented in form of Tables and explanations were given those findings.

Summary of the study revealed that Poor management of parking which include on-street, parking lots, parking garages, public and private. Also, too much car parking in the wrong location results into large flows of cars to local streets, hence causes traffic congestion. Parking and traffic congestion were inter-related in the sense that the absence of parking spaces results to traffic congestion situations.

It is concluded that, there are many challenges on determining how parking places contribute to traffic congestion in Central Business District at Dar es Salaam (CBD).The challenges are lack of safety and comfort for the pedestrian movement, inadequacy of parking spaces, rapid increase in number of cars, inadequate road infrastructure, insufficient of location of parking places, favorable parking prices (cost charges) and demand for parking is greater than the amount of space available

It is recommended that shared parking in the destinations should be encouraged also public parking including on-street, municipality's off street and commercial parking (for profit) facilities generally may serve multiple destinations. Special shuttle buses or free transit service may be provided, building of underground and upstairs packinghouse should be emphasized so as to reduce the amount of land required for parking facilities, reduce the use of private automobile and increase an affordable and reliable public transport. Rates should be set to optimize parking facility use. Parking charge to be increased. Introduction of modern railway transport systems across the city. Diversification of basic social services from city center to other areas outside the city, Introduction of Restrictive policy should implemented.

LIST OF ABBREVIATIONS

BOT	Build, Operate, Transfer

BRT	Bus Rapid Transit
CBD	Central Business District
CBD	Central Business District
CEP	Center for Economic Prosperity
CTCP2	Second Central Transport Corridor Project
DARCOBOA	Daladala Community Buses Owners Association
DART	Dar es Salaam Rapid Transit
DCC	Dar es Salaam City Council
GDP	Gross Domestic Product
IBM	International Business Machines
PPP	Public Private Partnership
SUMATRA	Surface and Marine Transport Authority
TANROADS	Tanzania Roads Agency
TRL	Tanzania Railway Limited
UN	United Nations

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CHAPTER ONE:

RESEARCH PROBLEM SETTING

1.0 Introduction

Dar es Salaam is the oldest city among urban centers such as Arusha, Mwanza, Mbeya and Tanga and highly populated region in Tanzania. The area of the region is extends to 60 km south, north and west, for is allocated at west coast of the Indian Ocean. It is the fastest growing city in sub-Sahara Africa with the population of more than 4.5 million people and estimated annual population growth of 4.3% according to population census of Tanzania (2012).

Dar es Salaam is the commercial city and main port of Tanzania. Also is characterized by hot and humid climate throughout the year. The average temperature of the City is 29°C with maximum and minimum temperatures of 35°C and 25°C respectively (UN Habitat, 2008; Nicholls, 2011).

With a population growth rate of about 8 percent per year in city. City and municipal authorities face significant challenges with respect to providing new or even maintaining existing infrastructure and services, among them includes traffic congestion as (URT, 2011).

1.1 Background of the Study

Dar es Salaam city is a center for commercial and social-economic activities in the country, Most of Government and Non-Government offices are allocated within the city. Whilst no longer official capital of Tanzania, Dar es Salaam remain the heart of Tanzania revenues and business center. Also most of the ministries are allocated in Dar es Salaam city. Demand for parking in a given area is strongly influenced by land

use and by competing forms of transportation exists. Parking problem are likely to develop in areas devoted to multistoried residences and industrial buildings and areas, which are exposed to commercial and business activities. In many cities, persons enter into the CBD by private cars. The outcome of traffic flow towards the CBD results into traffic congestion in centers. (Matson-et-al, 1955).

According to Kadiyali 1987, one of the serious effects of parking motor vehicle in CBD is the loss of street space for parking and attendant traffic congestion. The capacity of the street is reduced, the journey speed drops sown and the journey time and delay increases. Not only do vehicle requires street to move about but also require space to park where can be loaded or unloaded. Every car owner would like to park he/his car close to its destination so as to minimize walking. This results into greater demand for parking space i.e. the systematic study of parking system and demand and regulatory measures are required for town and transport planners for control purposes.

According to Briefly J.1972 Traffic congestion is like a malignant disease which unless arrested will surely bring death to the heart of the city. Where there is traffic congestion with back of car parking facilities in the center of cities, land value will tend to fall. Something must be done and quickly to accommodate motor vehicles in our cites otherwise the consequences may be very serious in the loss of business and property values i.e. the provision of car parks should be related to the future traffic to city. The wise sting of car park can make it possible to increase the number of cars that can be parked his a city center

1.2 Statement of the Problem

Dar es Salaam city located along the Coast and is among the most important commercial city with a highly concentrated population in Tanzania. Recently, study shows that the morphology of the city has changed very rapidly beyond the ability of municipalities to recover its original status. For example, the construction of offices and hotel premises in Kariakoo and Samora areas attract more people with a private car who often visit the areas for leisure, employment and other services. On the

contrary, parking spaces available are not enough to accommodate the number of clients visiting the areas. Parking challenges occurring in the central city of Dar es

Salaam will continue to be the major problem due poor parking policies, poor planning of the city, population growth, increase of car to mention in a few (Bundara, 2010).

Given the above realities, car parking at the City Center remains a challenge to Dar es Salaam drivers who work and therefore must park in the city center and the City Council Management. The study is therefore important to explore the challenges associated with the problem and find resolution on it.

1.3 Objectives of the Study

1.3.1 The General Objective

The general objective of the research was analysis of parking spaces as factor leading to traffic congestion in central business (CBD).

1.3.2 The Specific Objectives

The study was guided by the following specific objectives;

i. To examine size and location of parking places in Central Business District in Dar es Salaam.
ii. To find out views from different users about quality of parking places in Central Business District in Dar es Salaam.
iii. To establish the relationship between parking spaces and congestion in parking places.

iv. To recommend appropriate measures to solve the problem of Congestion in Central Business District in relation to existing parking places in Dar es Salaam.

1.5. Research Questions

i. Is the size and location of parking places sufficient and suitable in Central Business District in Dar es Salaam?

ii. How quality of parking places in Central Business District in Dar es Salaam affect its users?

iii. There is any relationship between parking spaces and congestion in packing places?

iv. What are appropriate ways to solve the problem of congestion in Central Business District in relation to parking places?

1.6 Significance of the Study

The study is providing the following importance

The findings of this study help to identify and understand the cause of the congestion and its effect to the society as well as the government itself, the study provide knowledge to transport planner and research as well as the society as the base for discovering new theories in parking system, the study help to improve the transport policies and increase effort toward improvement of parking system and also help Developers and business operators often consider it a necessity that adequate car parking spaces are provided to meet demand and assist with the commercial viability of their businesses.

1.7 Scope of the Study

The study was conducted in Dar es Salaam city center where by utilization of city parking capacity in Central Business Districts was observed. Also it was possible for a Researcher to conduct the Research easily.

1.8 Limitations of the Study

Due to a fact that research is vital, a number of setbacks were encountered. These include:

i. Inadequate funds for stationeries, transport and daily meals payments. The researcher managed this; by borrow some money from family member and friend in mutual understanding.

ii. Attitudes towards giving proper and true information by the respondents due to their reluctance and failure to involve in findings. These also affect the smoothness in conducting this research because of lacking of cooperation. The researcher encounters this situation through convincing language, which was accompanied by clarification of the purpose of the study.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter is divided into two parts including theoretical literature review and empirical literature review. The theoretical literature provides a general information on parking place in Central Business District. The empirical evidence explains the experience and other views on the parking place in the world.

2.1 Theoretical Literature Review

2.1.1 Parking Place

Parking site is the set of designated bays for vehicles, for a certain period of time, at location within the urban area. The parking lots are built for temporary, and not permanent, use of bay. Parking's are a key component to any urban mobility policy, due to its direct relationship with accessibility, with management and operation of movement, and with use and quality of public space (Kerley, 2007)

2.1.2 Type of Parking Place

According to Hitendra, (2011) there is different type of parking places as follows;
First, on street parking,on street parking means the vehicles are parked on the sides of the street itself. This will be usually controlled by government agencies itself.

Second, off street parking, off street parking means vehicles are parked off the street itself. This will be usually controlled by commercial agencies itself.

Third, Parallel parking; the vehicles are parked along the length of the road. Here there is no backward movement involved while parking or un-parking the vehicle. Hence, it is the safest parking from the accident perspective.

In addition Kerley, (2007) said that, There are two types of parking lots: private and public. Private parking can be classified as individual or collective. The public parking can be used by any car. In economic theory, the public parking can be treated as a modified form of a public good or a common good, as it demonstrates a number of different dimensions (Kerley, 2007) Parking lots can also be classified as open or closed. The closed ones control the entry and exit of vehicles. The open parking do not have this control.

2.1.3 Importance of Parking Places

Lewis, (2008) said that, parking is more than a necessary element of larger residential or commercial uses; it merits consideration as a distinct land use that affects travel behavior and the environment. Even the perception of available parking can influence mode choice and economic competitiveness of an area. Communities planning for parking are wise to consider its impacts on nearby uses and travel behavior. Where possible, parking should be planned to encourage transit use and support commercial activity; opportunities for shared parking should be pursued.

If a municipality wants to reduce congestion on high-activity streets where there is a perception of limited parking, they can prioritize availability of parking spaces at the most convenient locations and shifting long-term parkers to lower demand spaces.

2.2 User of Parking Places in the Central Business District

i. **Daladala**

The most common form of public transportation in Dar esSalam are mini-vans which are commonly known as “daladala”. These vans a specific route with the start and ending point clearly marked on the front of the vehicle. The main user of this public transport workers which help them to reach in their working places and back to their premises, Also to businessmen as well as students.

ii. Taxi

There are no formal taxi companies in Dar-es-salaam nor are there any contact centers reachable 24 hours of the day (or at any time). Taxi drivers are not associated to any public transport company (they run their own business). The cars have a recognizable painted line or numbers and always stay parked at specific points across the city (in great numbers) (Arasan 2012).

iii. Private Car

Private cars are also use parking places in the city were people go for personal economic activities such as shopping, work, business and to find treatment in the hospital found in the Central Business District.

2.3 Congestion

Congestion occurs when transport demand exceeds transport supply at a specific point in time and in a specific section of the transport system. Under such circumstances, each vehicle impairs the mobility of others.

2.3.1 Cause of Congestion

The truth is that traffic congestion is caused by multiple causes and here they are not in the order of importance according to Allan, (2013).

i. Too many cars for the roadway due to inadequate mass transit options or other reasons.
ii. Obstacles in the road causing a blockage and merger. These can be any of the following: Double parking, Road work, Lane closure due to utility work. Road narrowing down and An accident
iii. Traffic signals out of sync many times on purpose or occasionally when the computers are malfunctioning.
iv. Inadequate green time
v. Too many pedestrians crossing not permitting cars to turn
vi. Too many trucks on the road due to inadequate rail freight opportunities

vii. Overdevelopment in areas where the mass transit system is already overcrowded and the road system is inadequate.

2.3.2Traffic Congestion

Traffic congestion is a condition on transport networks that occurs as use increases, and is characterized by slower speeds, longer trip times, and increased vehicular queuing. The most common example is the physical use of roads by vehicles. When traffic demand is great enough that the interaction between vehicles slows the speed of the traffic stream, this results in some congestion.

As demand approaches the capacity of a road (or of the intersections along the road), extreme traffic congestion sets in. When vehicles are fully stopped for periods of time, this is colloquially known as a traffic jam or traffic snarl-up. Traffic congestion can lead to drivers becoming frustrated and engaging in road rage.

2.3.3 Effects of Traffic Congestion

The following are some of effects of traffic congestion as explained by Lee (2013) and Lewis (2008).

i. Public transport inadequacy

Many public transit systems, or parts of them, are either over or under used. During peak hours, crowdedness creates discomfort for users as the system copes with a temporary surge in demand. Low ridership makes many services financially unsustainable, particularly in suburban areas. In spite of significant subsidies and cross-financing for instance tolls, almost every public transit system cannot generate sufficient income to cover its operating and capital costs. While in the past deficits were deemed acceptable because of the essential service public transit was providing for urban mobility, its financial burden is increasingly controversial.

ii. Difficulties for non-motorized transport

These difficulties are either the outcome of intense traffic, where the mobility of pedestrians, bicycles and vehicles is impaired, but also because of a blatant lack of consideration for pedestrians and bicycles in the physical design of infrastructures and facilities.

iii. Loss of public space

Majority of roads are publicly owned and free of access. Increased traffic has adverse impacts on public activities which once crowded the streets such as markets, agoras, parades and processions, games, and community interactions. These have gradually disappeared to be replaced by automobiles. In many cases, these activities have shifted to shopping malls while in other cases, they have been abandoned altogether. Traffic flows influence the life and interactions of residents and their usage of street space. More traffic impedes social interactions and street activities. People tend to walk and cycle less when traffic is high.

iv. High maintenance costs

Cities with an aging of their transport infrastructure are facing growing maintenance costs as well as pressures to upgrade to more modern infrastructure. In addition to the involved costs, maintenance and repair activities create circulation disruptions. Delayed maintenance is rather common since it conveys the benefit of keeping current costs low, but at the expense of higher future costs and on some occasion the risk of infrastructure failure. The more extensive the road and highway network, the higher the maintenance cost and the financial burden.

v. Environmental impacts and energy consumption

Pollution, including noise, generated by circulation has become a serious impediment to the quality of life and even the health of urban populations. Further, energy consumption by urban transportation has dramatically increased and so the dependency on petroleum. These considerations are increasingly linked with peak

mobility expectations were high energy prices incite a shift towards more efficient and sustainable forms of urban transportation, namely public transit.

vi. Accidents and safety

Growing traffic in urban areas is linked with a growing number of accidents and fatalities, especially in developing countries. Accidents account for a significant share of recurring delays. As traffic increases, people feel less safe to use the streets.

vii. Land consumption

The territorial imprint of transportation is significant, particularly for the automobile. Between 30 and 60% of a metropolitan area may be devoted to transportation, an outcome of the over-reliance on some forms of urban transportation.

2.4 Empirical Evidence

2.4.1 From Developed Countries

In congested urban areas parking of motor vehicles is time-consuming and often expensive. Urban planners who are in a position to override market forces must consider whether and how to accommodate or 'demand manage' potentially large numbers of motor vehicles in small geographic areas. Usually the authorities set minimum, or more rarely maximum, numbers of motor vehicle parking spaces for new housing and commercial developments, and may also plan their location and distribution to influence their convenience and accessibility. The costs or subsidies of such parking accommodations can become a heated point in local politics. For example, in 2006 the San Francisco Board of Supervisors considered a controversial zoning plan to limit the number of motor vehicle parking spaces available in new residential developments as reported by Vega, Cecilia (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 (Mersden, 2006). The challenges of parking

spaces seen in urban cities are claimed to be caused by urbanization, rapid increases of car dependence, high densities of the city and economic transition.

The Port of San Francisco had previously conducted a pilot on-street parking study in 2006, which found that, location and time of day were the biggest factors in parking demand. They also found that a significant number of people only pay for half of their stay, patrons parked an average of 75 minutes, and that there are a high number of disabled placards. Enforcement was also found to be relatively low. Revenue was expected to increase with new parking sensors and payment systems that would assist enforcement efforts. After conducting the study, the Port of San Francisco worked with SFMTA on Spark so that parking rates between the two project areas could function under a single system (Moyer, 2008).

2.4.2 From Developing Countries

Antonio (2009) pointed out that the parking on public streets, although it is convenient for the user, presents various conflicts, with losses to the society, ranging from jams to environmental pollution, as well as road safety and economic losses caused by delays in travel. However, in many cases, the parking sites on public roads are essential to the functioning of the activities in urban areas, especially for those already occupied and with a large number of private transport users.

The lack of transport planning and the failure of public transport in Brazil causes a shortage of parking lots that meet the demand in certain urban areas. When there are not enough places to park, unpleasant consequences are created on traffic, making drivers keep driving in circles, spending time and fuel, polluting the air and interfering with the traffic flow. The lack of space for parking in an urban area reduces the accessibility, causes impairment to the commercial activities and leads to irregular parking (Antonio 2009).

2.4.3 In Africa

In many areas in Ibadan North East local government in Nigeria, motorists suffer stress in searching for parking spaces at destinations such as Agodi-Gate, Oje, Beere, Idi-Ape Orita-Aperin and Oremeji of the local government area. Lack of loading or parking bays cause illegal on-street parking by motorists which has already reached crisis proportion in the area. Roadside hawking and trading along the road reduces road lane capacity. Rapid increase in the number of motor vehicles in the area has led to serious traffic congestion at peak hours of the day. The problems of on-street parking has made the area inaccessible and reduced the traffic speed and thus increasing traffic congestion as well as increasing journey time. In order to derive the maximum benefits from transport, there is the need to urgently address the challenges of on-street parking which has become an epidemic to the environment. It affects smooth flow of traffic and causes traffic congestion, lateness to work, accidents and hampering of other economic activities (Asiyanbola and Akinpelu, 2012).

Van der Schaaf (2001) studied the challenges of parking in Amsterdam and reported on a major implementation of city center parking restrain which forms a part of a large area wide mobility management plan. Most of the areas inside the inner ring road are now subject to significant parking restraint. Car mileage is the historical core which has been reduced and public transport trips to the center have increased. Furthermore, noted that the congestion problem has migrated to areas outside the ring road, in part, to the absence of strong land use policies and parking restraint in these areas.

According to Marsden and May (2006), parking policy should not be developed in isolation but as part of the local and regional, spatial as well as the transport planning processes. This is so because parking policy plays the role of an interconnector between the implementation of land-use and transport policies. Planning for parking plays a vital role in shaping our physical environment and landscape as well as determining the outcome of how walkable the built environment can become (John G. Shaw).

2.4.4 In Tanzania

In Tanzania, a major cause of the parking problems in cities is accelerated by the design of the city, the dominance of the automobile, the structural pattern of the roads and inadequate of parking facilities, especially in the traditional areas of the city and the unplanned growth, uneven distribution of the land use which imposes constraints on movements and to the facilities provided (JICA, 2008). The need to tackle the problems of parking is very important in order to reduce the chaos occurring in the urban cities of Tanzania.

Dar es Salaam city located along the Coast and is among the most important commercial city with a highly concentrated population in Tanzania. Recently, study shows that the morphology of the city has changed very rapidly beyond the ability of municipalities to recover its original status. For example, the construction of offices and hotel premises in Kariakoo and Kivukoni areas attract more people with a private car who often visit there as for leisure, employment and other services.

On the contrary, parking spaces available are not enough to accommodate the number of clients visiting the areas. Parking challenges occurring in the central city of Dar esSalaam will continue to be the major problem due poor parking policies, poor planning of the city, population growth, increase of car to mention in a few (Bundara, 2010).

2.4.5 Traffic Congestion

Urban traffic congestion can be contributed by a number of factors including rapid increase in urban population, economic growth, increase in employment opportunities, increase in number of cars and number of people using cars, low capacity of transport infrastructure, road layout, under investment in road infrastructure, poor traffic management, shortage of street parking, signal and equipment failure, non-adherence to traffic regulations, poor urban planning or poor urban development control, rapid expansion of city boundaries, poor public transport, increased use of private cars, car accidents, special events gatherings, road works, and bad weather as Institute of Transport Engineers, (2009).

May and Marsden (2007), however argue that congestion impairs us from moving freely and that it disrupts business activities in cities and reduces productivity. Congestion affects speed and smooth traffic flow. This affects a wide range of activities, services, goods, markets opportunities in the cities which can best be delivered through transport mobility. The report continues that congestion also reduces productivity through increased inventory holding by manufacturers and retailers as a result of unreliable travel conditions within cities. Business activities depend on timely delivery of logistics. However, freight movement in cities is impaired by traffic congestion, thus making productivity suffer.

Again improvement in transportation efficiency can influence cost of doing business, travel time, forecast reliability, comfort, safety and security of commuters. The direct benefit of an efficient and effective transportation system reflects in the reduced travel time, which translates into cost saving, increase in output and ultimately GDP (Kulash 1999, World Bank 2002). Eddington added that travel reliability is critical to some business sectors, especially those that deal with perishable goods as well as those that rely on just- in- time (JIT) deliveries. That is, to some businesses, productivity growth is underpinned by what they termed as predictable and time- critical deliveries.

This view is further shared by Weisbrod and Reno (2009), when they state that effective transportation system increases productivity in terms of job creation, reduction in business operation cost, improved output, expanded market and increase in economic competitiveness. It is argued that traffic congestion in urban areas cannot be completely eliminated but can only be minimized to acceptable level and there is no single solution. In order to minimize traffic congestion in urban areas three main approaches may be used. These are firstly, dealing with supply side that is taking actions that lead to increase in capacity and efficiency of transportation infrastructure. Secondly, dealing with demand side that is taking actions that lead to reduction in the use of cars in urban areas. Finally, physical planning which influences land use and infrastructure distribution in urban areas. The new transportation facilities that can be

added include building new roads, transit facilities, adding lanes to existing roads, constructing overpasses and underpasses at congestion intersections and building ring roads. Improved traffic management can be attained through the introduction of one way streets, turn prohibitions and reversible lanes, improving timing of the traffic signals, provision of pre-trip traffic information, faster responses to traffic accidents and addressing special events android works that cause traffic jams. Demand management can be attained by provision of high quality public transport that can reduce the use of private cars, parking restrictions, ride sharing or carpooling, ramp metering, congestion charge, promoting cycling and walking and introduction of flexible working hours.

2.5 Conceptual Frame Work

The overall policy framework for parking is outlined in the Central Area Redevelopment Plan (2000), and the earlier Sustainable Dar es Salaam plan. In essence, it calls for new development to be self-sufficient in terms of parking; buildings should provide enough off-street parking to satisfy the demand from residents, employees and visitors. On-street parking, meanwhile, is considered a common resource.

Parking prices (cost charges) significantly influence parking demand, parking space turnover and, ultimately, car use and ownership. The aim to use parking prices as a tool to regulate supply and demand. This is important as the demand for parking is greater than the amount of space available. By discouraging unnecessary car use, parking prices help to improve congestion, road safety, and local air quality, reduce carbon dioxide emissions, improve the quality of the local street environment and shorten bus journey times and emergency vehicle response times

Parking Location, Size and layout are regulating parking spaces for motor vehicles, such as a car or truck, on private property. Parking security essentials can increase safety, reduce crime, and protect your assets**.** Despite a garage or lot's vulnerabilities,

facility managers have a security tools and design measures they can implement to create a safer parking environment. Focus on these four strategies to protect occupants, their valuables, and your property (Jennie 2001)

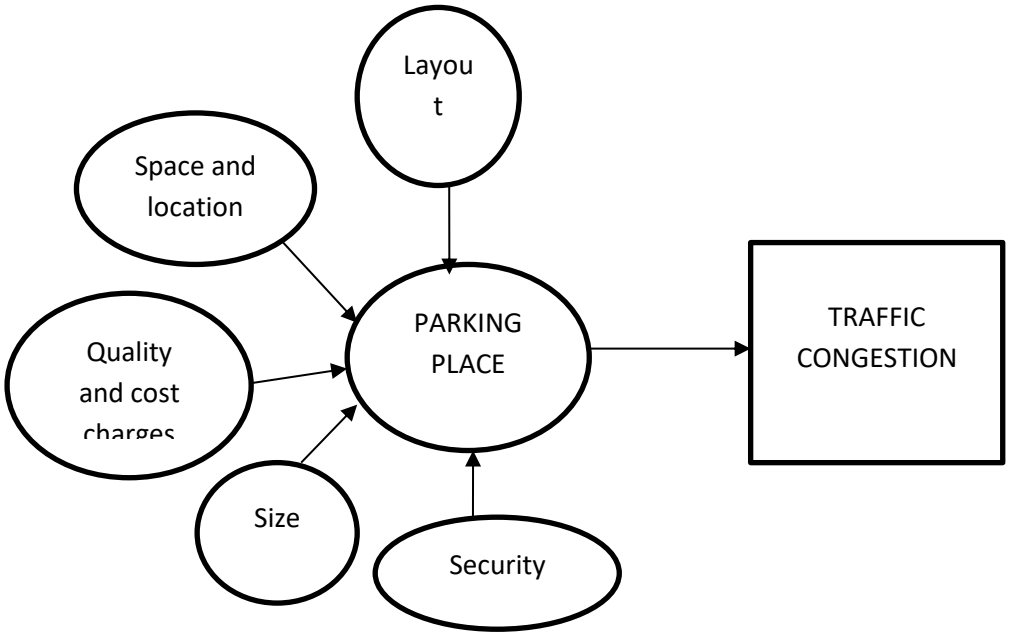

Figure 1. **Conceptual framework**

Source :Researcher Own Creation, 2016

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

Having described the background, defined the research problem, objectives, significance and justification of the study and literature review, this chapter provides for how the study design and how the fieldwork was conducted. Methodology of the study refers to the research design that is the overall logic general strategies or basic plans of the approach, methods of obtaining and analyzing data as represented by (Kothari, 2004). Therefore this chapter described the research design, area of the study, techniques used in selecting population samples and instruments was used in data collection.

3.1 Research Design

Kothari (2004), defines research design as the "conceptual structure within which the research was conducted, it constitutes the blue print for the collection, measurement and analysis of data". The research explained a case study included a survey to a specified area of the study at Central Business Districts Dar es Salaam city. Purposively and random sampling techniques which are too economical were used in obtaining data from 31 respondents. Also observation, Documentary Reviews, questionnaire and interview methods was used.

3.2 Area of the Study

This study was carried out at Ilala District in Dar es Salaam city center. The researcher selected Dar es Salaam city center as a case study because of an easy accessibility of respondents.

3.3 Study Population

Population was the target group involved in the study; it was the aggregate of all the units pertaining to a study (Krishnaswami et al, 2007). For the sake of this study population are drawn from the staff and other common people perform their daily activities in Central Business District.

3.4 Sample Size

Refers to the respondents selected for the representation of the total population in order to produce a miniature cross section (Powell,1997). The sample size for this study was drawn from a study population at Dar es Salaam city center.

Fifty (31) respondents were used as a sample size because it was a reasonable number manageable and affordable in analyzing the data which were collected so as to get good results instead of having more respondents which was difficult to administer or having few respondents which were for the study.

3.5 Methods of Collection Data

The methods of data collection involved are combination of secondary and primary data in order to obtain actual and complete information.

3.5.1 Secondary Data

In this study the following sources were used to collect information. Articles in journals, published books, various newspapers and other relevant documents found from internet provided as the means of secondary source.

3.5.2 Primary Data

They included the use of questionnaire (see the appendix 1) and interview (see the appendix II), the researcher submitted questionnaires consisting of questions concerning challenges towards utilization of city parking capacity in Central Business Districts. The method were suitable to the respondents because majority are literate, they can read and write (See the questionnaires in appendix 1).

3.7 Data Analysis

The result obtained from data collection instruments such as documentary review and questionnaire were analyzed by using Microsoft excel tool of analysis and the result were in the form of tabulation on the percentage distribution of the respondents.

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CHAPTER FOUR

DATA PRESENTATION AND ANALYSIS

4.0 Introduction

This chapter presents the findings, data presentation and analysis as the study carried out on analysis of Parking Spaces as factor leading to traffic congestion in Central Business District in Dar es Salaam. In this chapter contain the characteristic of respondents which explained by gender, age, education level and status.

4.1 Characteristics of the respondents

The total (31) questionnaires were distributed to respondents of the same character but different gender, level of education and type of respondents. Table 4.1; shows the characteristics of the respondents with regard to gender, age, education level and type of respondents.

4.1.1 Gender of Respondents

Table 1: Gender of respondents

Categories	Description	Frequencies	Percentage
Gender	Female	12	38.71%
	Male	19	61.29%
	Total	31	100%

Source: Data from research /2016

From the table 1 above it shows respondents were characterized by their gender. Majority of the respondents were of the male with total number of 19 (61.29%) and female are 12 (38.71%).This happen due to the fact that available female are not encouraged to participated well in same issue such as providing information that help

to collect data for the research rather than male were are willingly to participate. This show that women are still need high support from both government and society they are to practice some of issue in their life.

4.1.2 Age of Respondents

The age of the respondents could be classified in five groups, which are below 25, between 26 – 35, 36 – 45, 46 – 55, and 56 and above. 5 (equal to 16.13 %) respondents were below 25 years old, 6 (equal to 19.36 %) respondents were between 26 – 35 years old, 9 (equal to 29.03 %) respondents were between 36 – 45 years old, while 7 (22.58 %) respondents were between 46 – 55 years old and 4 (equal to 12.90 %) were in 56 and above year old as indicated in table 2 and figure 3 below.

Table 2: Age of respondents

Age in years	Frequencies	Percentage
Below 25	5	16.13%
26-35	6	19.36%
36-45	9	29.03%
46-55	7	22.58%
Above 55	4	12.90%
Total	31	100%

Source: Field data, 2016

4.1.3 Educational Level of Respondents

Table 3: Level of education of respondents

Level of education	Frequencies	Percentage
Primary	2	6.45%
Secondary	3	9.68%
Certificate	6	19.36%
Diploma	8	25.80%
Bachelor Degree	9	29.03%
Master degree	2	6.45%
Phd	1	3.23%
Others	None	None
Total	31	100%

Source: Field data, 2016

From the table 3 above, A sample size of 31 respondents was taken during this study, where under their different educational level,2 respondents (equal to 6.45%) are primary level were one students from Uhuru Mchanganyiko Primary School and one are businessmen, 3 respondents (equal to 9.68%of respondents) are secondary level were two are secondary students from Benjamini Mkapa and Dar es salaam secondary school and one are businessmen, 6 respondents (equal to 19.36%) are certificate holder, 8 respondents (equal to 25.80%)are diploma holder, 9 respondents (equal to 29.03%) are bachelor degree holder, 2 respondent (equal to 6.45 %) are master degree holder and 1 respondents (equal to 3.23 %) is Phd holder as shown on the table .In this research many of the respondents were in different level in their education perform different activities in their daily life.

4.1.4 Respondents Status

Table 4: Respondents status

Respondents status	Frequencies	Percentage
Workers	10	32.26%
Businessmen	14	45.16%
Patients	4	12.90%
Students	3	9.68%
Total	31	100%

Source: Field data, 2016

From the table 4. above state the status of the respondents as involved in this research in the aspect of work place or activities involved such as students which are 3 (equal to 9.68%), but one student was in primary school at Uhuru Mchanganyiko Primary School while other two students are in secondary at Benjamini Mkapa and Dar es salaam secondary school, 4 patients (equal to 12.90%) found in Hindu Mandary, Apolo Medical Center, Aghakan and Regency Hospital, 10 workers (equal to 32.26%) from different office and 14 businessmen (equal to 45.16%) from shops, markets such as kisutu and kariakoo as well as road seller.

4.2 Reasons for People Moving to CBD

From the respondents there are several reasons force them to move into CBD, most of the respondents are multitasks means are goes in central business district with two or more task, example one person can go into the office and the into the hospital or market/shop, other may go direct for single activities but not daily sometime also may perform multitask activities. Thus increase movement of car into the CBD.Therefore, the following are fluently reasons make respondents go to CBD such business, office, hospital, school and shopping (market).

4.3 Size and location of Parking Places.

One question asked, was the size and location of parking places is sufficient and suitable in Central Business District in Dar es Salaam. The respondent's answers are in Table 5.

Table 5: Size and Location of Parking Places in CBD

Question	Categories	Answer	Percentage
The size and location of parking places is sufficient and suitable in Central Business District in Dar es Salaam?	Strong agree	None	None
	Agree	7	25.58%
	Neutral	1	3.23%
	Disagree	19	61.29%
	Strong disagree	4	12.90%
	Total	31	100%

Source: Field data, 2016

The result in table 5 show that, 7 respondents as 25.58 % of respondents agree on availability of parking places as enough for parking of car with the views that every shops, hospitals, schools and offices they have their own parking so government should restrict other car to be parked to their respective place. 19 respondents equivalent to 61.29 % disagree on size and location of parking places in CBD are enough supported with 4 % as equal to 12.90 % who strong disagree. All (whose disagree and strong disagree) are with views that streets in Dar es Salaam have many functions such as movement of cars, buses, pedestrians and bicycles, exchange of social interaction and street vending and storage (parking). On many streets in the CBD, there is insufficient right-of-way to accommodate all of these functions, and

space dedicated to parking is unavailable for movement or exchange functions as shown in figure 2, 3,4 and 5.

Figure 2: Difficult of Parking Places at Kariakoo Street

Source: (www.tanzaniatoday.com,2016)

Figure 3: Difficult of Parking Places at Kariakoo Street

Source: (www.tanzaniatoday.com,2016)

Figure 4: Difficult of car Parking Places at Kariakoo Street

Source:(www.tanzaniatoday.com,2016)

4.4 Relationship between Parking Spaces and Congestion

The following are some of the statement given by the respondents on the existing to relationship between Parking Spaces and Congestion in parking places

i. Parking and traffic congestion are inter-related in the sense that the absence of parking will augment traffic congestion situations. When there is more parking supply than there is roadway capacity to serve that supply, congestion will result.

ii. Also, too much car parking in the wrong location, that is, where parking supply is concentrated so that large flows of cars exceed the capacity of local streets, localized congestion will result.

iii. Poor management of parking which include on-street, parking lots, parking garages, public and private, if not properly managed to ensure few spaces are almost always available in all locations, motorists will drive in circles trying to find available parking spaces. This situation may result in severe and entirely unnecessary traffic congestion.

iv. In recent years the CBD has continued to rapidly grow in terms of high rise buildings for office accommodation, hotel and commercial use. Therefore the CBD will continue to attract more and more traffic. There is limited parking space especially in the CBD. This forces some people to park on road sides thus reducing the road capacity by making the roads even much narrower.

Figure 5: Parking on Indiragandhi Street

Source:(www.tanzaniatoday.com,2016)

All these factors exacerbate the traffic congestion problems in the city. Traffic congestions therefore cannot be looked at without giving due consideration to solving parking problems in a city's CBD. Therefore, to solve traffic congestions, parking shortfalls must be tackled first. Therefore managing congestion in a city can include the elimination of minimum parking requirements,

4.5 Views of different users of parking places in CBD

This sub-section presents views given by different users of CBD about quality; size, space and allocation of parking places. The users who were involved in the study include businessmen, workers, buyers, students and patients

i. **Size, space and location:** The location of on-street parking spaces is governed by City Council guidelines, implemented by Nation Parking Solutions (NPS. According to NPS, these allow any width of roadway in excess of 6.5 meter to be used for parking. Exceptions include at the entrances of banks, places of worship, hospitals, near electrical equipment, or within 3-6m of an intersection. In some cases, legal parking spaces are marked with signs or curb striping.

   In many cases, parking spaces appear to be determined by custom and practice (with or without the assistance of Nation Parking Solutions (NPS) parking attendants). There are numerous examples of streets where the guidelines are not met (and where this is entirely appropriate, since the parking serves a traffic calming function), with the right-of-way for moving vehicles reduced to 2.5 meters or less.

ii. **Quality and cost charges:** The current charge is Tsh 300/- per hour at Indiragandhi street and Tsh 100/- in Kariakoo have not been increased since the advent of the paid parking program. Occupancy levels are more than 100% on busy commercial streets, but there is a large amount of space on other streets, even at peak times. Differential pricing should be introduced, with higher rates on “premium” streets where parking is fully occupied, such as

Samora Avenue and JamhuriStreet Initially, the rate should be 500/- per hour but this should be increased as necessary to ensure some space is available.

An increase in charges would have two advantages: (i) it would increase revenue to the City and NPS, compensating for the loss of parking spaces due to DARTconstruction, and (ii) reduce demand, helping to improve availability. Higher rates on "premium" streets would help shift all-day parkers to side streets and into parking garages, ensuring that prime, "front door" spaces are available for customers.

4.6 Solutions of Congestion in CBD in Relation to Existing Parking Places

In Tanzania, a major cause of the parking problems in CBD is accelerated by the design of the city, the dominance of the automobile, the structural pattern of the roads and inadequate of parking facilities, especially in the traditional areas of the city and the unplanned growth, uneven distribution of the land use which imposes constraints on movements and to the facilities provided (JICA, 2008).

The need to tackle the problems of parking is very important in order to reduce the chaos occurring in the urban cities of Tanzania. The following are some specific solutions suggested by the respondents in this research;

i. **Shared parking.** The parking facilities can be utilized by multiple users or destinations. Motorists can share parking space available, rather than being assigned as a reserved space. For example, 100 employees usually can share 60-80 parking spaces since at any particular time some are on leave, commuting by alternative mode of travel, on the field or working another shift. Hotels, apartments and dormitories can share parking spaces among several

units; the number of vehicles per unit varies over time. Shared parking in the destinations should be encouraged such a technique are very effective in the office building which can share parking with restaurant or theaters since the peak demand for offices occurs during the weekday and on weekend evenings for restaurants or theater. Public parking including on-street, municipality's off-street and commercial parking (for profit) facilities generally may serve multiple destinations. The developers must donate funds to build public parking facilities instead of providing private facilities which served as a single destination. This technique tends to be more cost effective and efficient when implemented accordingly.

ii. **Parking regulation and policies:** This controls who, when and how long vehicles may park at a particular location in period of time, in order to prioritize parking facility use. For example in the limited parking space it is important to classify duration in intervals of time (e.g. 5 minutes in road zones, 30 minutes adjacent to shop entrances, 1 or 2 hours shopping malls). Prohibit occupancy at certain times such as before 10am, to discourage employees use or between 10pm and 5am to discourage residents use and prohibit on-street parking on arterials during peak periods to increase traffic lanes.

iii. **Parking maximum:** The excessive parking supply should be discouraged by reducing the parking supply, imposing a special parking tax, by applying a regulation that limits temporary parking facilities. Maximum is applicable and

effective for certain type of parking such as long-term, single use, free or surface parking depending on the planning objectives.

iv. **Remote parking and shuttle service:** This is off-site parking facilities which involve shared facilities, such as office workers, parking at a restaurant parking lot during the day, in exchange for restaurant employees using the office parking lot evening and weekends. It can involve the use of public facilities such as commercial parking lots. Remote parking can also necessitate the use of parking facilities located on the peripherals of a business district or other activity center and use of overflow parking during a special event that draws large crowds. Special shuttle buses or free transit service may be provided to connect destinations with remote parking facilities, allowing them to park their cars in the public parking design to reduce chaos occurring in the cities. Park and ride facilities are another type of remote parking often located on the urban fringe where parking is free or significantly less expensive in cities.

v. **Smart growth:** This will be supported by parking management by reducing the amount of land required for parking facilities, in turn will reduce the automobile use and increase an affordable public transport. The land use patterns which reduce the vehicle dependence will also reduce the parking requirements. These will encourage people to shift to alternative modes of transport.

CHAPTER FIVE:

CONCLUSION AND RECOMMENDATIONS

5.0 Introduction

This chapter consists of the conclusion and recommendations based on the research findings on the determining how parking places contribute to traffic congestion in Central Business District at Dar es Salaam (CBD).

5.1 Conclusion

It is concluded that, there are many challenges towards determine how parking places contribute to traffic congestion in Central Business District at Dar es Salaam (CBD).The challenges are:-

i. Lack of safety and comfort for the pedestrian movement
ii. Inadequacy of parking spaces
iii. Rapid Increase in Number of Cars
iv. Inadequate Road Infrastructure
v. Insufficient of location of parking places
vi. Favorable Parking prices (cost charges)
vii. Demand for parking is greater than the amount of space available

Also parking planning in the urban cities of Tanzania is currently being inefficient, resulting in economic excessive parking supply, increased traffic congestion and more dispersed destinations contributing to various economic, social and environmental problems.

5.2 Recommendations

The researcher recommends the following in order to alleviate if not to eliminate the problem of parking places in CBD at Dar es Salaam that actually result into traffic congestion.

Introduction of modern railway transport systems across the city to provide more transport options to the residents. For example, there should be railway transport from Tegeta, Kibaha, Mbagala, Gongo la mboto to and from the city center. It will reduce private car to enter CBD.

Diversification of basic social services from city center to other areas outside the city, such as health centers, government agencies, supermarkets, schools and markets such as Kariakoo.

Introduction of Restrictive policy such as driving permits which will ensure improvement of Public transport in the city so that private cars should not be allowed to enter the city center.

The government should implement its plan to shift all government offices to Dodoma. This will reduce the influx of people in the city from other regions of the country. Influx is partly due to the fact that immigration is the major reason for the city's rapid population. According to 2012 Census, Dar es Salaam has a population of 4.3 million which is 10% of all population of Tanzania.

Parking facilities available in the cities that serve multiple goals and efficiently regulated or priced to favor higher value of uses tend to be more effective. On-street parking and commercial parking is particularly convenient for this type of management and it is important to encourage the use of the systems over unpriced and the off-street parking that serves a single destination should be controlled.

Since there are many cases when vehicles are parked on roads, so if there are proper parking places then traffic problem would be less. Even if there are less parking slots, if people are aware of the free space for the parking then they would go and park in that free space. Thus, an application would guide the vehicle owners in CBD towards the free spaced parking slots. This would avoid the traffic congestions in the roads. Also, due to proper parking system, the government could charge the vehicle owner and it could generate the income that could further be used to build another parking area.

The suggested solutions represented in this research are effective to change current practices and so various obstacles must be targeted to overcome the parking problems in order to achieve the optimal point when implemented.

5.3 Area for further study

The research is endless process; and due to limited time and funds the researcher could not study the causes of the problem of traffic congestion in CBD, therefore, the research should be received by other researchers for further studies so as to identify more challenges in CBD.

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www.tanzaniatoday, photo.com

APPENDIX I: Questionnaire

Dear Respondent;

I am **Mayunga M. Luyekela,** doing research on analysis of parking space as a factors leads to traffic congestion in Central Business District in Dar es salaam requirements for the award of the Postgraduate Diploma in Logistics and Transport Management (PGDLTM) of the National Institute of Transport**,** help me in obtaining reliable and accurate data I request you to respond to this set of questions by ticking the right answer or otherwise giving explanation as need arise.

General Instruction

- Don't write your name
- Fill it on your own time
- Be brief and precise
- In every table put a circle.

RESPONDENT CHARACTERISTICS

Age, gender, education level and employment status of respondents

A. Age

Age	Below 25	26-35	36-45	46-55	Above 55
Put circle	1	2	3	4	5

B. Gender

Gender	Male	Female

Put circle	1	2

C. Education level

Education level	Primary	Secondary	Certificate	Diploma	Bachelor degree	Master degree	Phd	Other
Put circle	1	2	3	4	5	6	7	8

D. Employment Status

Respondent Status	Worker	Businessmen	Student	Patient
Put circle	1	2	3	4

QUESTION 2a.	CATEGORIES	PUT CIRCLE
Reasons for people moving to Central Business District In Dar es Salaam	Business	1
	Work /office	2
	Hospital	3
	School	4
	Shopping	5

QUESTIONS 2b.	PUT A CIRCLE				
	SA	A	N	DA	SDA
Did parking place contribute to the congestion in Central Business District in Dar es Salaam?	1	2	3	4	5
The size and location of parking places is sufficient and suitable in Central Business District in Dar es Salaam?	1	2	3	4	5

There is any relationship between parking spaces and congestion?	1	2	3	4	5

1=SA= Strong Agree 2=A= Agree 3=N= Neutral 4=DA= Disagree 5=SDA= Strong Disagree

APPENDIX II:

Research Questions

Dear Respondent;

I am **Mayunga M. Luyekela,** doing research on analysis of parking space as a factors leads to traffic congestion in Central Business District in Dar es salaam requirements for the award of the Postgraduate Diploma in Logistics and Transport Management (PGDLTM) of the National Institute of Transport**,** help me in obtaining reliable and accurate data I request you to respond to this set of questions by ticking the right answer or otherwise giving explanation as need arise.

Questions

1. For how long have you visited and use available parking places?
2. From the experience you have on using parking places on CBD, how do you see the quality, size, location and free of parking places?
3. From experience of using parking places in CBD, do they have any contribute to congestion in the area? how
4. In your opinions what can be done to solve the problem of congestion in parking places?

Thank you