

**THE ANALYSIS ON A SERIOUS TRAFFIC JAM IN
DAR ES SALAAM CITY**

By

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**A Dissertation submitted in partial Fulfillment of the Requirement for the
Award of the Postgraduate Diploma in Logistic and Transport Management
(PGDLTM) of the National Institute of Transport**

2016

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We, the undersigned, certify that we have read and hereby recommend for acceptance by the National Institute of Transport, a dissertation/thesis entitled **Analysis on a Serious Traffic Jam in Dar es Salaam City** in Partial/fulfilment of the Requirement for the award of the Postgraduate Diploma in Logistic and Transport Management (PGDLTM) of the National Institute of Transport.

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DEDICATION

This work is dedicated to my parents who gave me physical support as well as their encouragement that made me strong to my education ladder up to this education level.

Special thanks go to my son's Collin and Allen for patience and calmness all the time during my studies.

Thank you so much.

ABBREVIATIONS

CBD	Central Business District.
DMT	Dar es salaam Motor Transport Company
GHG	Green House Gas
JICA	Japan International Co-operation Agency
KBS	Kenya Bus Management Service
NEMC	National Environment Management Council
NIT	National Institute of Transport
OECD	Organization for Economic Cooperation's and Development
OTRACO	Operated by National Board of Public Transport Company.
PGDLTM	Postgraduate Diploma in Logistics and Transport management
SUMATRA	Surface and Marine Transport Regulatory Authority
TANROAD	Tanzania Roads Agency
TRA	Tanzania Revenues Authority
UDA	Usafiri Dar es Salaam
URT	United Republic of Tanzania
URT	United Republic of Tanzania
USA	United States of America
UTODA	Uganda Taxi Operates and Drivers Association

ABSTRACT

This paper analyzes a serious traffic jam in Dar es Salaam City and the expected solutions to eradicate the severity of the problem in the city so as to make ease traffic flow.

The Dar es Salaam public transport has been performing great despite the existing poor infrastructures. For the last decade the traffic jam has been yearly increasing causing many problems to consumers. The affected groups include the private vehicle owners, the commuter bus drivers, taxi drivers, employees from both private sectors and civil servants, students, pedestrians and all other city dwellers.

This study has observed that the following issues affected the traffic flow in the city of Dar es Salaam. The first issue is the unlimited influx of vehicles in the city that account for about 62 per cent of the total vehicles countrywide. The second issues is the inadequate quality of infrastructures to cope with the influx of vehicles in the city whereby potholes, sands, narrow roads, inadequate feeder roads and lack of frequent road maintenances give rise to a strict rise of traffic jams in the city. The fourth issue is the location of most services and major activities in the city centre that enforce the city dwellers from peripheral areas to find their desired services in the city centre hence increasing traffic congestion.

The study finally recommends that there is a great need for authorities responsible for traffic control that include SUMATRA, traffic police and other stakeholders to act very seriously to resolve the situation because they seem not to fulfill their obligations accordingly. Also the government should reconsider deeply the regulations and principles governing the public transport in the city by taking serious drastic actions to prohibit the private vehicles in the city centre because it is the great cause of traffic jam in the city centre.

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CHAPTER ONE

PROBLEM SETTING

1.0 Introduction

Dar es Salaam is one of the fastest growing cities in Sub Saharan Africa. The 2002 census recorded the city's population to be 2,489,800, while currently the city population is estimated to be 3.7 million and is growing at 4.3 per cent. The relatively high growth rate reflects increased birth rates, migration rates, and more significantly a transient population. The Dar es Salaam population density as per 2002 population census was 1,787 per square kilometer; however the density now is estimated to be 2055 persons per square kilometer (Baraza, 2010). The city of Dar es Salaam has expanded faster than the capacity of government to cope with the growing need for infrastructure, resulting in incomplete and unconnected road networks. The conditions of the city roads both paved and unpaved contribute to congestion.

The rapid growth of population and size of the city of Dar es Salaam are directly linked with a rapid increase in vehicles. Dar es Salaam city hosts about 62 per cent of the total vehicles found in the United Republic of Tanzania (URT). The traffic density growth rate has been reported to be 63 per cent a year (JICA, 1995). There is a mismatch between traffic density and growth rate and the road network development. Kumar et al (2008) a growing urban population inadequately served by the transport system, declining standards of public transport, overlaps and conflicts among agencies responsible for planning and implementing transport solutions, massive growth in the use of minibus services, growing dependence on private transport (cars and motorcycles) inadequately and deteriorating transport infrastructure and poor facilities for non motorized transport (walking and cycling).

Unlike in recent past, traffic jams are currently experienced in all times of the day with the situation worsening whenever there is heavy downpour, due to a dilapidated and wanting sewerage system. Promises and assurances are yet to be fulfilled despite

strategies being drawn, plans put in place and proposals forwarded from several stakeholders (Kanyabwoya, 2010).

The problem is aggravated by the fact that the city has an inefficient public transport system management that has been left to the whim of private commuter bus operators. Available statistics show that Dar es Salaam has about 6,000 commuter buses that carry only 43 per cent of the city's daily travelers. Until very recently, congestion was mainly during 'rush hours' in the mornings and evenings when people were going to work or returning home. However, today more than 120,000 private vehicles plying the city roads daily, jams are even there on weekends (Elinaza, 2010).

Traffic congestion has now become a talk to many people who live in Dares Salaam because it is a problem that provides excuses for the late comers at different workplaces. It is not surprising to hear an employee or any Dar es Salaam resident giving an excuse for being late at his or her work station and appointments respectively. There is a sense of desperation among residents when they are caught up in unprecedented traffic jam. Some city dwellers are said to be spending up to two hours travel a distance of less than 15 kilometers (Ibid, 2010).

Although some efforts have been made to increase the capacity of Dar esSalaam roads within the past ten years, the existing road networks are still inadequately to meet requirements of the fast growing vehicles population. The great number of minibuses dominates the motorized public transport system on the roads of Dar es Salaam. As Dar es Salaam city continues to grow spatially and in terms of population, the demands for public transport increases in turn creates the need for increased numbers and operations of private cars and minibuses and deliberately contribute to long queues, congestion and increased rate accidents in Dar es Salaam (Mwanzi, 2010).

1.1 Statement of the Problem

The planning of urban public transport in the city of Dar es Salaam came into action in 1949 under the private British company known as Dar es Salaam Motor Transport

(DMT). The company was mainly formed to offer urban public transport services in the city but failed to offer an expected services compared to the city population. After the Arusha Declaration in 1967 DMT was nationalized whereby national parastatal organisation Usafiri Dar es Salaam was formed to offer the urban public transport services in the city including setting of fares. UDA however was able to meet only 60% of the urban public transport demand in the city. It was common to see long queues of passengers waiting and overcrowding in both buses and bus stops (DART Agency Establishment Order, 2007).

The failure of the Dar es Salaam state owned company (UDA) and the deregulation of urban transportation in the city since 1985 created an upsurge of private cars and minibuses from Japan to cover the public transport demand. The influx of these used cars in the early 1990s resulted greatly to congestion in the city, costing more and more to the society in terms of hours lost in traffic and longer commuting times. The consumers that are greatly affected by city traffic jams include students of all levels of education, employed and unemployed in private sectors, civil servants, self employed in both petty trading and big business. All these city victims of traffic jams are of all ages, sex and personalities.

The study was deeply highlighted important aspects to be under investigations that include the quantity and quality of the road infrastructures in the city, the infrastructure capacity and traffic control, the influx of vehicular traffic in the city and the location of most services and major activities in the city centre.

1.2 Research Objective

The research objective of this study is characterized into categories, general objective which cover broad knowledge of the objective of the study and specific objectives.

1.2.1 General Research Objective

The general objective of this study is to analyze on a serious traffic jam in Dar es Salaam City.

1.2.2 Specific Objectives

The specific objectives of this study was simply covered the following aspects

- i) To determine the quantity and quality of the road infrastructures in the city.
- ii) To examine the infrastructure capacity and traffic control in the city.
- iii) To determine the influx of vehicular traffic in the city of Dar es Salaam.
- iv) To investigate the location of most services and major activities provided in the city centre.

1.3 Research Questions

This study was guided by the following research questions

- i) What are the quantity and quality of the road infrastructure in the city?
- ii) What are the infrastructure capacity and traffic control in the city?
- iii) What sit e influx of vehicular traffic in the city of Dar es Salaam?
- iv) Is there any location of most services and major activities provided in the city centre?

1.4 Significance of the Study

The findings of this study deeply verified the analysis on a serious traffic jam in Dar es Salaam City. The findings also clarified the cause of traffic jam in the city and how to rectify the situation. Also the findings of this study may influence the policy makers and city planners to set policies that will overcome the current situation of city traffic jam.

1.5 Scope and Limitations of the Study

The study focused on how the traffic jam in the city of Dar es Salaam can be reduced the burden to city dwellers and maintaining the ease traffic flow.

1.5.2 Limitations of the Study

The study however met several limitations which some of them the researcher found to be essential. Most of them are time limit and financial constraints which made the researcher to suffer a lot as he financed himself for the study.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

In reviewing the literature, focus was on historical background of the Dar es Salaam urban transport, previous studies on urban transport carried out in Dar es Salaam City, sector legislation related to urban transport in Tanzania and experience of urban public transport in other cities in sub Saharan Africa.

2.1 Urban Public Transport after Trade Liberalization

A gap in service provision under UDA necessitated the Government to allow the private sector to enter into the urban public transport business alongside UDA in 1983. However, public transport service in the city continued to be inadequate and poorly managed. By year 2000, UDA market share declined to only 2% (Howe et al, 2000) paving way for private operators to dominate the market. The dominance of private sector in the operation of urban public transport resulted into rapid increase in buses of small carrying capacity and poor condition. Furthermore, Wiki travel (2010) observed that majority of the private owned buses crew did not even comply with traffic laws and safety regulations and stopped anywhere for embarking and disembarking passengers.

2.2 Quantity and Quality of the road Infrastructures in Dar es Salaam.

Most roads were laid when the city had a single centre, and before the rapid growth in personalized forms of motorized transport. The primary road network radiates from the city centre to surrounding areas, orbital or circumferential links are missing. The majority of the roads have one lane in each direction, where the roads are wider, one lane is often taken up by pedestrians and parked vehicles (Kumar et al, 2008).

Many of the Dar es Salaam road sidewalks are missing therefore pedestrians and motorized vehicles are forced to share the same space. Where they do exist, sidewalks are poorly maintained, in many areas of the city dirt roads are still the norm and poor drainage contribute to serious flooding during the rainy season. There

signs that the existing infrastructure is increasingly being overloaded as the number of vehicles increase. Elinaza (2010) observed that most of roads in the city are in a very poor state of repair as they are frequently narrow, inadequate bus stands. A number of bridges on roads outside the city are also very narrow and can only accommodate one or two vehicles at a time. The presence of potholes, sand soils on roads and lack of adequate provision of road signs are greatly contributed by the low quantity and quality of roads available which do not match with available vehicles (Rwebangira, 1999).

2.3 Capacity and Traffic control in the City of Dar Es Salaam

Most services and major activities overflow on roads, limiting the infrastructure capacity in particular illegal parking and commercial activities. Illegal parking for example in the city's busiest areas can take up to two lanes of capacity. Public transport is often running on the right lane and is consequently stack in traffic (Meyer, 2003). The capacities of city roads which are normally extended from the city centre to peripheral areas are incapacitated to handle various vehicular flows in the city. Traffic flow in the city also seem to have low performance as the provision of parking places and the law and regulation enforcement is poorly controlled and therefore contribute much to city traffic jam (Attey, 2003). Also Meyer (2003) pointed out that traffic jam is a problem in Dar esSalaam; its causes are poor management of traffic flow, inadequate parking and weak enforcement. Having evolved over the years without adequate planning, the city is unable to cope with growing motorization. Capacity is limited, service lanes are absent, pavements are deteriorating and street lighting is minimal.

According to Organization for Economic Co-operation and Development [OECD], report (2007) on managing urban traffic congestion there is no single broadly agreed definition of traffic congestion due to the fact that it is both a physical and a relative phenomenon. As a physical phenomenon traffic congestion can be defined as situation where demand for road space exceeds supply and is reflected by slower speed, longer trip times and increased motor vehicular queuing (Institute of Transport Engineers, 1989). As a relative phenomenon it can be defined as a

difference between road performance and road user's expectations. Traffic congestion is a problem in many cities of the World, both in developed and developing countries and it is predicted that it will get worse in the future (Jain et al., 2012; Cambridge Systematics Inc. & Texas Transport Institute, 2004).

According to Institute of Engineers (1989) traffic congestion can be viewed from two main opposing perspectives. The first perspective is that it can be considered is an indicator of economic growth and as long as we live in urban areas it is here to stay with us. The second perspective is that congestion as an indicator of deterioration of urban life. 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 (Institute of Transport Engineers, 1989; Remi et al., 2009; Aderamo, 2012; Mahmud et al., 2012; Agyemang, 2009; International Association of Public Transport [UITP], 2003); Cambridge Systematics Inc. and Texas Transport Institute, 2004; LONDON ASSEMBLY Transport Committee, 2004).

The impacts of traffic congestion can be categorized into four main groups of environmental, economical, health and social (Mahmud et al., 2012; Weisbrod et al., 2003; Remi et al., 2009; Levy et al., 2010). The nature, extent and severity of the impacts differ from one city to another depending among other things the city size, road capacity and road layout, spatial distribution of land uses, modes of public and private transport systems and travel patterns. The general environmental impacts due to traffic congestion include air and noise pollution and visual intrusion. Air pollution leads to increase of Greenhouse Gases (GHG) in the atmosphere thus contributing to climate change. The economic impacts are increase in fuel consumption, which leads to higher transportation costs, wastage of working time

and delay in service delivery. Health impacts, which primarily occur due to extended exposure to polluted air and unnecessarily long periods spent on roads, are mental stress, tiredness, and headache. Social impacts include reduction in quality of life as reflected by reduction in personal incomes due to increased transportation costs, loss of time that could have otherwise been spent on social activities.

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 (Institute of Transport Engineers, 1989; OECD, 2007). 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 typical supply actions for controlling traffic congestion are divided into two main areas of adding new facilities and improving the management of existing facilities. 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 and road 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 car pooling, ramp metering, congestion charge, promoting cycling and walking and introduction of flexible working hours.

2.4 Influx of Vehicular Traffic in Dar es Salaam

There is a great influx of vehicles in the city of Dar es Salaam whereby 300,000 registered road vehicles are plying Dar es Salaam routes which is equivalent to 62 per cent of the registered vehicles countrywide. These registered city vehicles

comprise of 120,000 private vehicles which is approximately 40 per cent and operating commuter buses which is approximately 2 per cent and serves about 43 per cent of the city's daily travelers (The Guardian, 2010).

Kanyabwoya (2010) pointed out that increasingly numbers of private vehicles in the city of Dar es Salaam contribute much to the ongoing city traffic jams. During peak hours in the mornings and evenings several roads that include Mandela road, Ali Hassan Mwinyi Road, Kawawa Road, Old Bagamoyo Road and Morogoro Road seem to be fully occupied by many private vehicles than commuter buses and force the road users to spend a very long time in queues. Centre for economic prosperity (2010) observed that the travel time that during peak hours took 1 hour and 21 minutes to drive in 16 kilometers. Below are the evidences that observed in Ali Hassan Mwinyi Road and Morogoro Road respectively during peak hours.

2.4.1 Rapid increase of Number of Cars

In the recent years, there has been a rapid increase in a number of imported cars in Tanzania due to a number of factors including increase in population and increase in incomes of the city dwellers, removal of restrictions on importation of cars and availability of bank loans for buying cars. The number of cars in the city has increased from 24 600 in 1979 to between 606 439 to 707 521 in 2011 Marshal and (Macklin Monaghan Ltd., 1979; Elinaza, 2012). The increase in the number of vehicles has compounded traffic congestion problems in the city. The situation is made worse by the increase of motorcycles and tricycles in Dar es Salaam using City roads.

2.4.2 Inadequate Road Infrastructure and Parking Facilities

Dar es Salaam has inadequate capacity of roads to cope with increased number of cars due to four main factors. Firstly, the spatial road coverage is low, covering only 2.5 per cent of land in Dar Salaam compared with recommended Tanzania physical planning guidelines of 15 to 20 per cent coverage (Mittal, 1976; United Republic of Tanzania [URT], 1997). Secondly, many of roads in the City are not in good condition due to lack of regular maintenance. Thirdly, all main road intersections do

not have either overpass or underpass to facilitate smooth flow of traffic. Fourthly, 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. All these factors exacerbate the traffic congestion problems in the city. Finally, a number of motorists especially during morning and evening peak hours violate traffic regulations. The famous breakers of traffic regulations are the mini bus drivers and motorcyclist.

2.4.3 Poor Public Transport

Public transport in the city is poor due low quality of services provided by mini buses (known as Daladala), tricycles and motorcycles. Public service is poor due to a number of factors including limited spatial coverage provided by mini buses, lack of fixed bus time schedules, long waiting hours at the bus stops, overcrowding and at times not adhering to scheduled bus routes. Services provided by cyclists is poor because of rough riding leading to high rate of accidents. In addition poor public transport is contributed by the city being predominantly be served by mini buses instead of regular buses, which are not comfortable. Poor public transport forces a number of city dwellers who have cars to opt to use private vehicles instead of public transport.

Figure 2.1: Traffic Jam Samora round about near posta area



Source: Researcher 2015

Figure 2.2: Traffic Jam Morogoro Road near kimara area



Source: Researcher 2015

2.5 Location of Most services and Major Activities in the City Centre.

Various activities tend to overflow on roads, limiting the infrastructure capacity, in particular illegal parking and commercial activities. Previous studies Kumar et al (2008) indicated that there are commercial activities along the roads which include news papers and magazines vendors, illegal garages, small items and cloths vendors greatly known as ‘machinga’ especially in the most busiest and highly concentrated areas. All these commercial activities seem to narrow the city roads and contribute greatly to the intense traffic jam in Dar es Salaam.

Furthermore, the city’s transport sector is burdened with high travel demand soaring from the uneven distribution of public and private facilities within the city. This donates, firstly a concentration of employment and market opportunities in the city centre. According to Olvera et al (2003) for example Dar es Salaam’s main urban facilities like port, the main Hospital, the largest market and commercial district (Kariakoo) all are located in the centre of the city which obliges the inhabitants to commute to access the opportunities there. And secondly, it donates lack of services such as schools and health units, within or close to residential areas that makes commuting unavoidable and increase traffic jam.

Kombe et al (2003) showed that indeed traffic congestion is one of key and a growing problem in the City. The City authorities are implementing a number of strategies such as increasing the capacity of roads, improving traffic management, and improving public transport including introduction of urban train in order to reduce private cars in the roads. In addition the new master plan, still under preparation, has proposed developing of satellite towns. The satellite towns are expected to spatially redistribute centers for service provision and therefore contribute to reduction of congestions in the City. It appears that the emphasis for decongesting the City is on improving the capacity of roads and traffic management and to some extent improvement of public transport, but less emphasis physical planning (Nkya et al, 2010). This approach may not lead to the desired results for three main reasons. Firstly, 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. Secondly, the rate of increase of cars is higher than the increase of road capacities. Finally, population growth rate of Dar es Salaam is high. This means that continued increase of cars will outpace the capacity of the City authorities in provision required road infrastructure. Therefore in order to minimize traffic congestion in the City, strategies for improving road capacity should strongly be supported by efforts of reconfiguring land uses through physical planning. The introduction of satellite towns as proposed in the new master plan is the move in the right direction. This however, should be supported by the actual implementation of the satellite towns (UN-HABITAT, 2008).

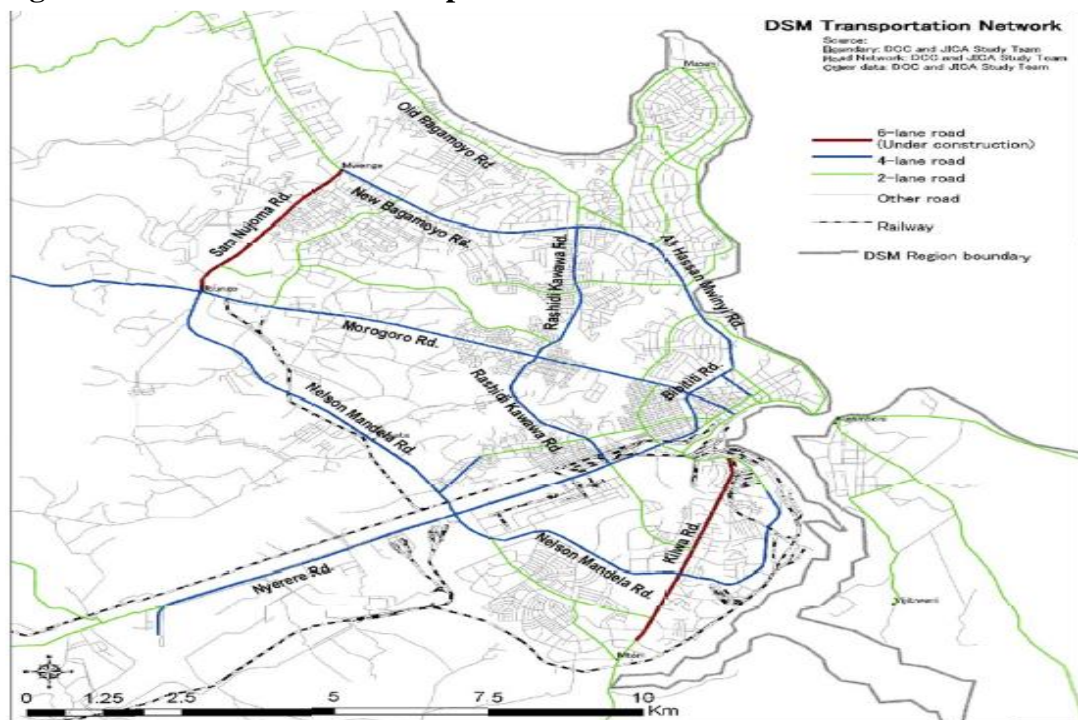
2.6 Empirical Literature

2.6.1 Local

Dar es salaam City development is partly influenced by the arterial road network consisting of five main radial roads and one ring road all terminating in the Central Business District (CBD). The five radial roads are Kilwa Road, Nyerere Road, Morogoro Road and New and Old Bagamoyo Road and the main ring road is Mandela Road. The total length of roads based on 2005 data is about 1717 Kilometre out of which 395 or 25 per cent are paved, mostly arterial roads (JICA, 2008).

Elinaza (2012) the main roads in the City below illustrate the condition of many roads in many of the residential and commercial areas are not paved and poorly maintained. In recent years there has been a rapid increase in importation of different types of cars in the country as reflected by Tanzania registration records. Based on the Tanzania Revenue Authority records between 2003 and 2011 a total of 1,010,732 cars were registered by the authority. It is estimated that about 60 to 70 per cent or between 606, 439 to 707, 521 cars are plying in Dar es Salaam City roads. In addition a total of 245, 180 motorcycles and 7, 408 tricycles were registered by the TRA in 2010 and 2011 respectively. Even though there is no definite figure, most of the imported motorcycles and tricycles are plying in Dar es Salaam roads.

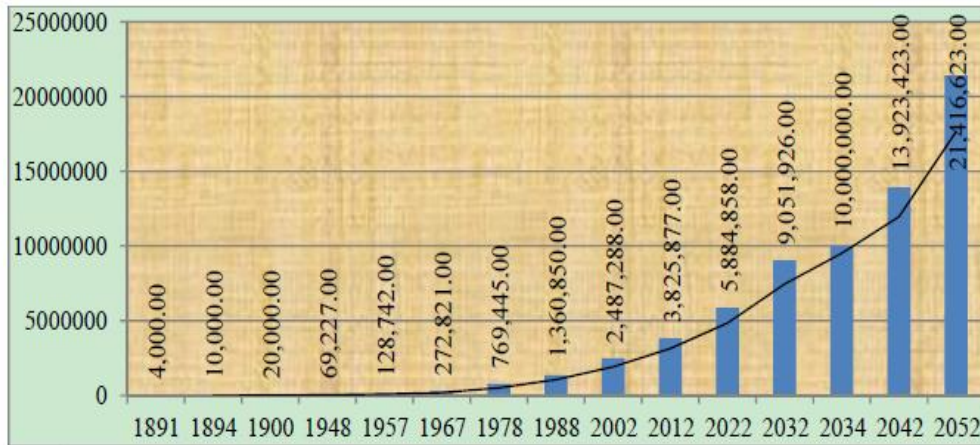
Figure 2.3: Dar es Salaam Transportation Network



2.6.2 Dar es Salaam Population Increase

As already pointed out about 4 million people, equivalent to 10 per cent of the urban population in the country are living in Dar es Salaam. The City is growing at a very fast rate as reflected by the increase of its population from 0.85 million in 1978 to 1.36 in 1988 to 2.49 million in 2002 and 4 million in 2007.

Figure 2.4 Trends of population growth for the Dar essalaam (1891-2052)



Source: Lupala and Kiuni

The trends of population growth rate in the City from 1891 to 2052. The current growth rate is estimated to be 8 per cent per annum compared to 9.7 per cent from 1976 to 1978, 4.8 per cent 1978 to 1988 and 4.4 percent 1988 to 2002. The growth rate of dare s Salaam City is one of the highest in sub Saharan Africa. As a result of this the City cannot provide adequate services and infrastructure including transportation infrastructure to cope with population increase and therefore contributing to traffic congestion. As a matter of fact, Dar es Salaam will become a mega city within the coming 25 years that is by 2034. The increase in population will continue to exert pressure on road infrastructure and the social and economic services unless deliberate efforts are made to address traffic congestion in the City (Lupala, 2010).

As already indicated Dar es Salaam is low rise sprawling City. Due to resource constraints the expensive character of the city has it has been difficult for the City authorities to provide adequate basic services including road infrastructure to new areas. In addition to poor service provision urban sprawl forces urban dwellers to use motorized transport to travel long distances to work places and other parts of the city to obtain their basic goods and services. The two factors of poor road infrastructure and the necessity to use motorized transport contribute to congestion in the City (Kiunsi et al, 2011).

2.6.3 Foreign Empirical Literature

2.6.3.1 Experience of Other Cities in Sub Saharan Countries

For the purpose of understanding the current status of urban transport practices, several urban transport systems for major cities in other countries were reviewed. This included Sub Saharan countries where studies have shown that getting to work is increasing difficult particularly in sprawling commercial centres. According to the studies among the factors attributing to poor services included poor infrastructure and maintenance, overloading of buses, low fares and irregular subsidies that did not permit sustainable operations.

2.6.3.2 Kampala

Urban public transport for the city of Kampala comprised of aged mini buses with an average of 13 years. About 90% of the public transport buses were owned by private individuals with availability rate of 85%. It was further noted that 90% of the newly registered buses were imported as second hand (Kumar et al, 2008). Moreover, the city was dominated by small size buses. In 1994 some initiatives were taken to introduce large capacity buses. However such initiatives proved futile as were heavily opposed by Uganda Taxi Operators and Drivers Association (UTODA).

2.6.3.3 Bujumbura

Public transport services in Bujumbura-Burundi were rendered by both Public and Private Companies. A public company (OTRACO) served only 10% of the market share. The rest was served by private individuals owning mostly minibuses (Kumar et al, 2008).

2.6.3.4 Kigali

Public transport services in Kigali were mostly rendered by privately owned minibuses of seating capacity between 14 to 20 passengers. The number of private buses is estimated to be around 2,000. A government owned firm, operated by National Board of Public Transport (ONATRACOM) complimented provision of urban transport services. The company owns about 120 relatively large buses of carrying capacity between 30 and 60 passengers.

2.6.3.5 Nairobi

Nairobi City was served mainly by three companies namely: Double M Commuter Train, City Hoppa (aka City Metro) and Kenya Bus Management Services (KBS). The three companies were serving the Central Business District of Nairobi. The outskirts of Nairobi city were serviced by individual operators using mini buses, popularly known as MATATU.

2.6.3.6 Lessons Learnt from Experiences of Other Cities

Generally, the literature reveals inefficiencies in the provision of urban transport services in most cities of Sub Sahara countries. Moreover, the review suggests that dominance of small sized buses, owned by individuals, is a common phenomenon. Large capacity buses are seen in cities where companies were involved in service provision.

2.7 Efforts for Decongesting Dar es Salaam City

The City is taking some actions to minimize congestion, which can be divided into those focusing on the supply side of traffic congestion i.e. increasing road capacity and those on the demand side i.e. reducing the number of private cars in roads. According to Guardian News paper Reporter (2010) actions taken to improve road capacity include paving more roads (Ubungo Terminal via Kigogo to roundabout of Kigogo road, Kigogo to Jangwani, Jet corner to Devis corner road, KigogoTabatadampo road, Old Bagamoyo road and Ununio and roads), increasing the number of lanes for the main roads (Morogoro Road, Sam Nujoma Road, Kilwa Road, New Bagamoyo Road, Kawawa Road), building new roads (Mabibo to kimara road, Mbezi Victoria via Kilungule to KimaraKorogwe road, tangibovu to Goba Road, Ununio Road, Gobategeta road) and improving access roads in residential areas. To further increase road capacities in the City new ring roads (Wazo hill to Mbezi Lewis and Mbezi Lewis to Ukonga) and underpass or overpass for main road intersections at ubungo and Tazara have been proposed. Actions to improve traffic management include increasing the number of traffic signals (Sam Nujoma Road, New Bagamoyo Road, Kilwa Road), deploying traffic police at the main road intersections especially during the morning and evening peak hours, introduction of

one way roads mainly in the city center (independence avenue) and reversible lanes (Old and New Bagamoyo Roads). Harsh penalties especially for offenses that directly contribute to traffic congestion have been introduced to reduce traffic offences.

In order to reduce private cars in roads a number of actions have been taken. These include the improvement of public transport through the introduction of rapid transit system. The necessary infrastructure for phase one of the rapid transport system including dedicated lanes and stations along the Morogoro and Kawawa roads are now under construction. The City for the first time of its existence has also witnessed an introduction of urban trains on a limited basis from Ubungo to the City Center. The train at the moment is making only five trips per day between the City and Ubungo. The numbers of trips are expected to increase in future. The City authorities have also prohibited mini buses with capacity less than 25 percentages to transport passengers to and from the City Centre.

In terms physical planning, the City is currently preparing a new master plan, which addresses congestion problem. In order to minimize traffic congestion in the city the master plan has proposed four new satellite towns to be built at Bunju, PuguKajiungeni, Kimbiji and Kongowe (Athuman, 2010). It is hoped that the introduction of satellite towns will reconfigure land uses in the City and therefore redistributing traffic

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

Research methodology is the process used to collect information and data for the purpose of making business decisions. The methodology may good publication research interview, surveys and other research techniques and could include both present and historical information.

This chapter describes the methodology applied in conducting this research study. It included research design, area of the study, sample size, data collection and expected results.

In it we study the various steps that are generally adopted by a research in studying his research problem along with the logic behind them.

3.1 Research Design

Kothari (2006) defined research design as the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy procedures. The research design is the conceptual structure within which research is conducted; it constitutes the blueprint for the collection, measurement and analysis of data.

The design of this study was qualitative (case study) and method had been preferred to the quantitative one by essentially taking on board, the views of Kothari (1990) who argues that a case study tends to examine a smaller number of units across a larger number of variables and conditions. The qualitative method however, has been observed to have some limitations. For instance, some findings of a particular case study cannot be generalized to cover the entire population. Furthermore, case studies are too loose broadness as they only provide in depth study of one type of phenomena. Despite these limitations most of them can be abandoned if researchers

are always conscious of them and are well trained to cope with the modern scientific techniques of collecting assembling classifying and processing the data.

3.2 Expected Results

The results produced is a challenge to the government as well as the stakeholders to ensure that traffic control policies and procedures followed properly so as to attain the ease frequently traffic flow in the city of Dar es Salaam. To the public and those who aims at conducting research in same topic will help as an added advantage.

3.3 Sample Size

The study was carried out taking into consideration the number of city dwellers as the main traffic jam victims that includes private vehicle owners, commuter bus drivers, employees and all other city stakeholders. The number of respondents was 50 i.e. 10 private vehicle owners, 13 commuter bus drivers, 10 students, 8 employees SUMATRA staff were 9.

3.4 Methods of Data Collection

In conducting this research study both qualitative and quantitative methods were applied during data collection. This implies that both primary and secondary data were collected.

3.4.1 Primary Data

Is the data observed or collected directly from first-hand experience. It involves the collection of original primary data by researchers. It is often undertaken after researchers have gained some insight into an issue by reviewing secondary research or by analyzing previous collected primary data.

Primary data was gathered through a survey using a questionnaire with both closed and open ended questions, direct observations and face to face interviews. The questionnaire administered to private vehicle owners, commuter bus drivers, employees, students and all other city dwellers.

3.4.1.1 Questionnaire

Is a paper form yet to be filled in by the respondent. It is a research instrument consisting of series of questions and other prompts for purpose of gathering information from respondents. Although they are often designed for statistical analysis of the responses is not always the case.

A questionnaire was administered to private vehicles owners, commuter bus drivers, employees, students and all other traffic jam stakeholders. A self administered questionnaire was distributed to each specific group. Each questionnaire was assigned a self identification number to monitor the response and return rate and follow up purposes in case there was a delay in the response and return.

Table 3.1 The general framework of how the questionnaires were administered during the research

S/N	Categories of Respondents	Questionnaire answered
1	Private vehicles owners	10
2	Commuter bus drivers	13
3	Employees	8
4	Students/ Pupils	10
5	SUMATRA staff	9

Source: Researcher's Estimated Sample (2015)

3.4.1.2 Interview

Is a commonly used method of collecting information from people. In many walks of life we collect information through different forms of interaction with others. Any person-to-person interaction between two or more individuals with specific purposes. This refers to the collection of information just through a live, oral or verbal communication between the researcher and the respondent(s). The method was used to collect information from different Dar es Salaam city dwellers. The rationale for choosing this method is that, if designed and conducted in professional manner the

method would be found to be a useful way of exchanging views, exploring perception and therefore seeking opinions from the respondents on various issues pertaining to the traffic jam facing the Dar es Salaam city residents.

Table 3.2 The General Framework of how the Interviews were Administered during the Research

S/No	Categories of respondents interviewed	Interviewed
1	Taxi drivers	15
2	Pedestrians and cyclists	15
3	Other city dwellers	5
	TOTAL	35

Source: Researcher's Estimated Sample (2015)

3.4.1.3 Observation

Is a purposeful, systematic and selective way watching and listening to an interaction or phenomenon as it takes place. The technique guided the researcher on getting the required data and information through the process of paying personal visits on the field ground and therefore to have a live coverage of what happened over there and more time to discuss with respondents. This virtually helped the researcher to justify some supportive events to be included in the research report.

3.4.2 Secondary Data

Refers to data that was collected by some one other than the user. Common sources of secondary data for social science include census information collected by government departments, organizational records and data that was originally collected for other research purposes.

Secondary data was gathered through library research and documentary evidence. Both published and unpublished sources of information were reviewed. The secondary data was collected at National Institute of Transport (NIT) library and offices, research reports, workshop papers, books and other secondary data from

various sources such as Sumatra Annual reports also from media publications i.e. newspapers, journals, the internet etc.

3.5 Data Presentation and Analysis

Data collected was analyzed quantitatively and qualitatively. The descriptive analysis was used to analyze the data from the questionnaires and interviews. The qualitative data obtained from the source was subjected to content analysis. On other hand, fact findings from quantitative data were quantified in percentages calculated and thereafter tabulated for ease interpretation and analysis. Data entry started immediately after the interviews.

CHAPTER FOUR

DATA ANALYSIS AND PRESENTATION

4.0 Introduction

This chapter discusses the findings and relates them to literature review. It is basically guided by the research objectives and research questions. Data was collected through a combination of methods i.e. survey, questionnaire and interviews. The survey was conducted from September 2015 to December 2015.

A total of fifty (50) respondents were submitted and answered the questionnaires as shown in the table below as follows. Ten (20%) respondents were private vehicle owners, thirteen (26%) respondents were commuter bus drivers, eight (16%) respondents were employees in both civil servant and private sectors, ten (20%) respondents were students/ pupils and nine (18%) respondents were SUMATRA staff.

Table 4.1 Composition of Respondents to Questionnaires

Category	Frequency	Percent
Private vehicle owners	10	20
Commuter bus drivers	13	26
Employees	8	16
Students/Pupils	10	20
SUMATRA Staff	9	18
TOTAL	50	100%

Source: Researcher's Estimated Sample (2015)

On other hand, a total of thirty five (35) respondents were interviewed in this study as shown in table below as follows. Fifteen (42.86%) respondents were taxi drivers, fifteen (42.86%) were pedestrians/ cyclists and five (14.28%) respondents were other city dwellers.

Table 4.2 Composition of Interviewed Respondents

Category	Frequency	Percentage
Tax Drivers	15	42.86
Pedestrians/Cyclists	15	42.86
Other City dwellers	5	14.28
TOTAL	35	100.00

Source: Researcher's Estimated Sample (2015)

4.1 Analysis of Data

In relation to the proposed methods of data collection, in this case the researcher was able to collect relevant data from 85 respondents for the whole study as population thus fifty (58.82%) respondents answered and returned the questionnaires whereas thirty five (41.12%) respondents were interviewed.

Table 4.3 Rating on Quantity and Quality of Road Infrastructure to Reduce the Traffic Jam in the City.

SITUATION	ANSWERED		ANSWERED		TOTAL	
	YES		NO		RESPONDENT	
	No.	%	No.	%	No.	%
Do you think quantity and quality of road infrastructures can be used to reduce traffic jam in the city?	41	82	9	18	50	100

Source: Researcher's Estimated Sample (2015)

Basing on this response on the table above, it can be noted that the quantity and quality of road infrastructure is clearly known. The research shows that 82% of the respondents pointed out that many quantities and great qualities of the roads infrastructure can definitely reduce the traffic congestion in the city. Many roads that have great quality being widened and repaired frequently seem to eradicate the traffic congestion.

On other hand, the research shows that 74.28% of the respondents interviewed the same questions supported the idea of quantity in terms of many roads and quality of the road infrastructure can greatly reduce the traffic congestion in the city of dare s Salaam.

Table 4.4 Rating on the Influx of Vehicular Traffic in the City.

SITUATION	ANSWERED YES		ANSWERED NO		TOTAL RESPONDENT	
	No.	%	No.	%	No.	%
	Does the influx of vehicular traffic in the city contribute to severe traffic jam?	36	72	14	28	50

Source: Researcher's Estimated Sample (2015)

Regarding on responses from the table above, it is clearly indicated that the influx of vehicular traffic in the city is the main contributing factor of severe traffic jam. The results show that thirty six (72%) of respondents answered the question through questionnaire verified that the influx of vehicular traffic in the city especially the private vehicles are the great source of severe traffic jams as fourteen (28%) of the respondents negate on the same question.

On other hand, twenty seven (77.14%) of respondents interviewed made it clear that that the influx of vehicular traffic in the city comply much with severe traffic congestion whereas eight (22.86%) said NO on the same asked question.

Table 4.5 Rating on Restricting Private Vehicles in the City Centre During Peak Hours.

SITUATION	ANSWERED YES		ANSWERED NO		TOTAL RESPONDENT	
	No.	%	No.	%	No.	%
	Do you think by restricting private vehicles in the city centre will reduce the severe traffic congestion during peak hours?	32	64	18	36	50

Source: Researcher's Estimated Sample (2015)

Taking into account on responses from the table above, it is pointed out that restricting private vehicles to enter the city centre so as to reduce severe congestion during was clearly understood. The study shows that thirty two (64%) of respondents answered the question through questionnaire appreciated the question by indicating that restricting private vehicles traffic towards the city centre can possibly reduce the severe traffic congestion during peak hours whereas eighteen (36%) answered the same question opposed by saying private vehicles in the city centre will not reduce severe congestion during peak hours.

On other hand, twenty nine (82.86%) of respondents interviewed supported the question asked by agreeing that restricting private vehicles entering the city will reduce the severe traffic congestion whereas only six (17.14%) opposed the same asked question.

Table 4.6 Rating on the Location of Services and Major Activities in the City Centre.

SITUATION	ANSWERED YES		ANSWERED NO		TOTAL RESPONDENT	
	No.	%	No.	%	No.	%
	Does the location of services and major activities in the city centre contribute to traffic jams?	34	68	16	32	50

Source: Researcher's Estimated Sample (2015)

Basing on responses from the table above, pointed out that thirty four (68%) of respondents asked this question agreed that location of services like main Hospitals (Muhimbili, Agha Khan and Indumandal) and major activities like market (Kariakoo) and business centre in the city centre contribute much in traffic jams whereas sixteen (32%) of respondents negated the question.

On other hand, thirty (85.71%) of respondents interviewed agreed on the asked question by pointing out that location of services and major activities in the city centre contribute to traffic jam whereas five (14.29%) said NO on the same asked question.

Table 4.7 Rating on how many Affected by Traffic Jam?

SITUATION	Private vehicles owners		Commuter bus drivers		Employees		Students	
	No	%	No	%	No	%	No	%
Do you think the following were greatly affected by traffic jams?	29	70.73	36	87.8	27	65.85	41	100

Source: Researcher's Estimated Sample, (2015)

Regarding responses on the table above, the researcher wanted to know the exactly the affected group by the traffic jams. The study pointed out that forty one (100%) of respondents responded through questionnaire, the greatly affected group pointed to be students followed by commuter bus drivers which was thirty six (87.80%) of the respondents asked. Therefore the study discovered that the students/pupils spend long time on bus stops to board commuters during peak time thus in the morning when they leave their homes to school and in the evening when they are returning back to their homes from school.

Table 4.8 Rating on the Time Spent on Traffic Jam During Peak Hours

	Private vehicle owners		Commuter bus drivers		Employees		Students	
SITUATION	1 hour		1 hour 30 minutes		2 hours		2 hours 30 minutes	
	No	%	No	%	No	%	No	%
What time do you spend from home to workplace during the morning and vice versa?	30	73.17	39	95.12	37	90.24	40	97.56

Source: Researcher's Estimated Sample, (2015)

Basing on responses from the table above the researcher wanted to understand what was the exactly time spent on traffic jam during peak hours from different groups. The study revealed that students spend more time thus 2 hours and 30 minutes which is about 97.56 per cent on traffic jam followed by commuter bus drivers that spend 1 hour and 30 minutes on traffic jam. Consequently, the study revealed that the average time spent on traffic jam during peak hours for all appointed groups is approximately 1 hour and 45 minutes from starting point to destination.

CHAPTER FIVE

CONCLUSION

5.0 Introduction

This chapter which comprises of one sections. The section present general conclusions of this study.

5.1 Conclusion

This study revealed that the city of Dar es Salaam had severely stumbled by traffic jam in its several road junctions of the six main roads which include Ali Hassan Mwinyi road, Kawawa road, Morogoro road, Nyerere road, Mandela road and Kilwa road. The traffic jam in the city is turning into a serious situation which seem to be caused greatly by inadequate infrastructure thus extended roads and many feeder roads to meet the vehicular influx as well as quality roads which need to be repaired frequently so as to avoid speed limit in highways.

It is therefore observed that private vehicular influx in the city is the most leading factor for traffic jam in the city as it believed to be 120,000 private vehicles out of 300,000 vehicles hosted by the city of Dar es Salaam, this increase exceeds the commuter bus by almost 20 times as the public commuters believed to be only 6,000. The study also revealed that the location of services and major activities in the city centre contribute much to traffic congestion whereby many people from peripheral areas are forced to enter the city centre for major services as it observed in Kariakoo market, Machinga Complex and Hospitals like Aga Khan, Muhimbili And InduMandal as well as banking services which are greatly available in the city centre.

CHAPTER SIX

RECOMMENDATIONS

6.0 Introduction

This chapter presents and discusses research findings from observation, interviews and questionnaires and then provides recommendations. The discussion is based on major research questions articulated in chapter one.

6.1 Recommendations

Basing on the views from the given findings, analysis and conclusion, below are recommendations which deliberately will pave the way forward in eradicating the city traffic jam, if drastic measures will not be seriously taken for the ten coming years the situation will be more than worse.

- The Surface and Marine Regulatory Authority (SUMATRA) need to act very seriously on the current situation as several bodies responsible for controlling the city traffic jams seem to be a deep sleep because the traffic is increasingly grow year after year seemingly that nobody cares about this itching problem.
- The government should reconsider deeply the regulations governing the public transport in the city by inserting serious measures to reduce vehicular traffic in the city as currently Dar es Salaam hosts 300,000 vehicles which are approximately 62 per cent of the total vehicles found in the United Republic of Tanzania.
- Also the government and city policy makers should put in place the great encouragement of most services and major activities to be found in peripheral areas so as to allow the massive switching of people demanding for services to peripheral areas especially the students who suffer a lot when struggling with other older people to board commuters during peak hours and hence reducing traffic jams in the city centre.

- Lastly, the body responsible for controlling traffic flow i.e. SUMATRA, Tanzania Road Agency (TANROADS) and traffic police should introduce in a hurry the congestion charging for any private vehicle causing traffic congestion, this will hinder the private vehicles entering the city centre, eradication of illegal parking currently available in the city centre roads that will affirmatively empower the public transport that include commuter bus services popularly known as ‘Daladala’ and taxis. The congestion charge aim at reducing congestion and emissions by encouraging people to use public transport instead of private vehicles in parts of the busy capital. Motorists who choose to use their private vehicles instead of public transport are made to pay for congestion charging a day in advance to drive through designated areas. The fees and fines go towards upgrading city’s transport infrastructures.

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APPENDICES

APPENDIX I

QUESTIONNAIRE

The management is informed that the data collected in this research is for academic purposes only and that confidentiality will be maintained, no in this research will be used otherwise.

Dear Respondent; currently I'm a candidate at National Institute of transport (NIT) pursuing an Postgraduate Diploma in Logistics and Transport Management (PGDLTM). Wishes to undertake research on Analysis a serious traffic jam in Dar es Salaam city, please I request you to take a few minutes to answer the questions below. The research is for academic purpose only and I assure you that your answer will be kept completely confidential.

INSTRUCTIONS:

Put a tick for the question with multiple answers and fill the blank spaces with your own answers

1. Do you think the quantity and quality of road infrastructure can be used to reduce traffic jams in the city?

- i) YES
- ii) NO

2. Does the influx of vehicular traffic in the city contribute to severe traffic jam?

- i) YES
- ii) NO

3. Do you think by restricting private vehicles in the city centre will reduce severe congestion during peak hours?

- i) YES
- ii) NO

4. If YES give reasons

- i)
- ii)
- iii)
- iv)

5. Does the location of services like main Hospitals (Muhimbili, Aga Khan and InduMandal), market (Kariakoo) and major activities (major offices) contribute to traffic jam?

- i) YES
- ii) NO

6. Do the road works and major activities along the city roads a mere source of traffic jam?

- i) YES
- ii) NO

7. Do you think the following were greatly affected by traffic jam in the city?

- i) Private vehicles owners
- ii) Employees
- iii) Students
- iv) Commuter bus drivers

8. What time do you spend in jam from home to workplaces/school during the morning and from workplaces/schools back home?

- i) 1 hour
- ii) 1 hour 30 minutes
- iii) 2 hours
- iv) 2 hours and 30 minutes

9. What do you think is the major cause of traffic jam in the city?

- i) Increased private vehicles

- ii) Poor quantity and quality of the road infrastructure
- iii) Poor traffic control
- iv) Commuter buses 'daladala'

APPENDIX II
INTRODUCTION LETTER

National Institute of Transport
P.O Box 905
Dar es Salaam
10th December, 2016

To Chief Executive Officer

.....

P.O Box

Dar es Salaam

Dear Sir/Madam

RE: PERMISSION TO CONDUCT RESEARCH

Kindly refer the heading above.

My name is Dingiswayo Zacharia Gama, a student at the National Institute of Transport (NIT). In the course of completing my Postgraduate Diploma in Logistics and Transport Management. I am obliged to undertake a research. My topic of interest is the Analysis on a serious Traffic jam in Dar es Salaam City.

I would therefore request your permission to collect data in your institution, specifically in commuter public transport.

I would like to assure you that this research is purely for academic purpose only.

Among the tools that will be used to collect data, questionnaire is one of them. The data to be collected will be highly confidential.

In view of the above I request you to fill under mentioned questions concerning your customers/clients.

Thank You.

Sincerely yours,

Dingiswayo Z. Gama