

**TRAFFIC JAM AND ITS SOCIAL IMPACTS:
THE CASE OF DAR ES SALAAM CITY**

**By
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**A Dissertation Submitted to the Institute of Development Studies in Partial
Fulfillment of the Requirements for Award of the Degree of Master of Science in
Development Policy (MSc. DP) of Mzumbe University.**

2013

CERTIFICATION

We, the undersigned, certify that we have read and hereby recommend for acceptance by the Mzumbe University, a dissertation entitled **Traffic Jam and Its Social Impacts: The Case of Dar es Salaam City** in partial fulfillment of the requirements for award of the degree of Master of Science in Development Policy of Mzumbe University.

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DIRECTOR, INSTITUTE OF DEVELOPMENT STUDIES

DECLARATION

I, **Nelson, Erick** declare that this report is my own original work and that it has not been presented and will not be presented to any other university for a similar or any other degree award.

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DEDICATION

I dedicate this piece of work to my family, wife and children

LIST OF ABBREVIATIONS

BOT – Build, Operate, Transfer

BRT - Bus Rapid Transit

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 Transport

DCC - Dar es Salaam City Council

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

URT – United Republic of Tanzania

US – United States

ABSTRACT

This study was conducted in order to identify the social impacts of traffic jam in Dar es Salaam City. A case study design was applied to obtain primary data from the unit of enquiry. Also various methods of data collection such as in depth interview, administered questionnaire and documentary review were applied. Simple random sampling was adopted to select 46 respondents from which data was collected.

The findings showed that traffic jam exists and it is a major problem to the commuters in Dar es Salaam city. According to the study, about 78.3% spend more than two to three hours on traffic jam. Some of the causes for traffic jam were said to be poor roads, increased number of cars and location of many offices at one place, lack of parking places as well as poor traffic management.

On the other side, traffic jam was found to have the following impacts on health. This includes spread of diseases such as airborne diseases and fainting just to mention few. At family level, traffic jam has led to misunderstanding among family members, separation and divorce and lack of time for parents to be with their children. At community level, traffic jam contributes to poor relation among communities due to lack of time to participate in social affairs, reduced visitation, late arrival of fire and rescue tracks during the occurrence of disasters in the community and late arrival at work or school.

In order to eliminate traffic jam in Dar es Salaam city, the following recommendations were made: improving the current infrastructures including construction of flyovers, reallocation of offices and services from the city center, establishment of other means of transport such as train and water transport.

This report was presented in five chapters, chapter one covered introduction of the study, chapter two, literature review, chapter three, research methodology, chapter four, presentation and discussion of the research findings and chapter five, the conclusions and recommendations.

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CHAPTER ONE

INTRODUCTION

1.1 Background to the Problem

Traffic jams continue to remain a major problem in most cities around the world, especially in developing regions resulting in massive delays, increased fuel wastage and monetary losses. Due to the poorly planned road networks, a common outcome in many developing regions is the presence of small critical areas which are common hot-spots for congestion; poor traffic management around these hotspots potentially results in elongated traffic jams. (Jain, V. S. et al, 2012)

Poor road traffic management is the primary reason for extended periods of traffic congestion throughout the world. According to Texas Transportation Institute's Mobility report (2011), congestion in the US has increased substantially over the last 25 years with massive amounts of losses pertaining to time, fuel and money. According to www.time.com, São Paulo, Brazil is known to experience the world's worst traffic jams where people are stuck for two to three hours every day in traffic jams. The issue of traffic congestion has affected both the developing and developed economies to different degrees irrespective of the measures taken to curb the issue. (Jain, V.S. et al, 2012)

The transportation with its branches, that is, the public and the private sectors, is one of the most important components of the development of a country. It is a concern all around the world and is supposed to cope with the rural and urban development. Traffic congestion however, is more the outcome of a basic mobility problem, which is that too many people want to move at the same time each day. For example, efficient operation of the entire society system requires people go to work, go to school and even run errands about the same hours and interact with each other.

The problem of congestion exists in every major metropolitan area in the world. Peak-hour traffic congestion in almost all large and growing metropolitan regions around the world is here to stay. In fact, it is likely to get worse during the next few decades mainly because of rising population and wealth (Arowemi, J.R. et al, 2009)

Traffic congestion is one of the grave problems in Dar es Salaam, Tanzania especially during the peak hours of the mornings and evenings. It is a relatively a new phenomenon and as recent as in the middle of the 1990s congestion was not a problem at all except for a few roads in the City center. (Kiunsi, 2013). This can be seen in Figure 1.1 below

Figure 1.1: A picture showing heavy traffic jam in Dar es Salaam city



Source: Field Data, 2013

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 (Osoba, 2012, Kiunsi, 2013)

The impacts of traffic congestion can be categorized into four main groups of environmental, economical, health and social. 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. (Mahmud et al., 2012; Remi et al., 2009) 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 (Kiunsi, 2013)

1.2 Statement of the Problem

Dar es Salaam City is one the core center for the country's development, High population growth and the continuing rapid rate of urban growth have put significant pressures on existing urban infrastructure and resulted in significant unplanned development. For example, it was estimated that by 1992, out of the 170,000 housing units of Dar es Salaam, approximately 75% were located in informal settlements. This has implications for provision of basic services, such as water supply, waste disposal, electricity provision, public amenities and road networks. The UN projects that the urban population will grow from 9.4 million in 2005 to 29 million by 2030, increasing the challenges to urban planning. (URT, 2011)

The problems are evident in terms of urban road congestion, where the number of vehicles needed to meet demand exceeds the capacity. Dar es Salaam has 50-60% of the vehicles in Tanzania on its roads. These roads are said to have been designed to support a population of about two million people, and actual capacity for the vehicles is stands at 15,000 cars, while at the moment there are more than 135,000 vehicles travelling on the same infrastructure on a daily basis (URT, 2011).

A study by the Centre for Economic Prosperity (CEP) indicates that a motor vehicle often spends up to two hours to cover a 16- kilometer trip, a distance which could have taken only 15 minutes if there were no traffic congestion (URT, 2011).

Traffic congestion is a sensitive issue in major cities in Tanzania and around the world. Anyone who spends any time commuting knows that the time and fuel wasted while sitting in traffic can be not only annoying, but can also lead to other real costs.

A quick review of literature shows that many previous analyses have estimated costs of congestion based on fuel and time wasted, but these studies don't include the potential social impacts such as health impacts, psychological impacts and other impacts at family and community levels. Sitting in traffic leads to higher tailpipe emissions which everyone is exposed to, and the social impacts of those exposures have not been explored. It is therefore the aim of this study to explore the social impacts of traffic jam in Dar es Salaam City, Tanzania.

1.3 Objective of the study

The main objective was to explore the social impacts of traffic jam to commuters in Dar es Salaam City.

1.3.1 Specific objectives of the study were:-

- To identify the profile of the commuters in Dar es Salaam city
- To identify the amount of time spent on traffic jam by commuters in Dar es Salaam city
- To identify primary and alternative mode of transport of commuters in Dar es Salaam city
- To explore the social effects of traffic jam on the families and communities of Dar es Salaam city commuters
- To identify the health effects of traffic jam to commuters in Dar es Salaam City
- To identify psychological effects of traffic jam on commuters in Dar es Salaam City
- To identify means to alleviate traffic jam in Dar es Salaam City.

1.3.2 Research questions

- What is the profile of the commuters in Dar es Salaam city?
- What amount of time is spent on traffic jam by commuters in Dar es Salaam city?
- What is the primary and alternative mode of transport of commuters in Dar es Salaam city?
- What are the health effects of traffic jam to the commuters in Dar es Salaam City?
- What are the social effects of traffic jam on the family and communities of Dar es Salaam city commuters?
- What are the psychological effects of traffic jam on commuters in Dar es Salaam City?
- What should be done to alleviate traffic jam in Dar es Salaam City?

1.4 Scope

This study collected data mainly in three areas where commuters were socially affected by traffic jams. Those areas are psychological, health, family and community level effects.

1.5 Significance of the study

The significance of this study has four bases: One, although many studies on traffic jam have been conducted in Europe and other parts of Africa, no study has been conducted in Tanzania, specifically on the social impacts of traffic jam. This study will fill this lacuna.

Two, this study will create a foundation for further studies on the effect of traffic jam and help the policy makers to develop appropriate solution to the problem.

Three, the study explored the magnitude and the extent to which traffic jam affects the life of people. This will help the government to take responsive measures.

Four, the study will help the researcher to fulfill the partial requirement for being awarded the degree of Master of Science in Development Policy of Mzumbe University.

1.6 Organization of the dissertation

This work was organized in chapters. Chapter one entailed the introduction of the study while Chapter two provides a literature review. Chapter three contains the research methodology and Chapter four involves the findings and its discussion. Lastly, Chapter five provides conclusion and recommendations.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter provides theoretical and empirical literature reviews of the study as well as its conceptual framework. The theoretical review puts the study about the social impacts of traffic jam in the context of a body of principles offered to explain this phenomenon anywhere in the world. The empirical review relates the social impacts of traffic jam to the observed experiences of Dar es Salaam City

2.2 Theoretical literature review

2.2.1 Definition of terms

Various terms were defined under this section. Those terms are social impacts, traffic jam, psychological effects, health effects and family and community relations.

2.2.1.1 Social impact

Social impact refers to the effect of an activity on the social fabric of the community and well-being of the individuals and family. In business and government policy, social impact refers to how the organization's actions affect the surrounding community. Social impacts can link to areas such as health and community.

Social impact can be distinguished from social problem. The term social problem means a social situation caused by repetitive patterns of social behavior that result in negative consequences and fall short of the affected society's normative ideal.

2.2.1.2 Family and community social relations

The word 'relations' according to thefreedictionary.com refers to mutual dealings or connections or communications among persons or groups. Relations also can be social, political, or personal connections between or among individuals, groups or nations.

Social relations according to Collins English Dictionary 6th edition, is a relation between living organisms (especially between people). On the other hand, family relation refers to the connection of a person and another by blood or by marriage; that is the relation between parents to a child or husband and wife. It also includes their mutual dealings and communications as well.

Community relation refers to the particular state of affairs in an area where ethnic, religious, cultural, political or linguistic groups live together.

2.2.1.3 Health effects (Health impact)

According to <http://en.wikipedia.org/wiki/Health>, Health effects or health impacts are changes in health resulting from exposure to a source. Health effects are important considerations in many areas, such as hygiene, pollution studies, occupational safety and health sciences in general. Some of the major environmental sources of health effects are air pollution and noise pollution.

This study will focus on health effects in general as well as that which is associated with air pollution as a result of traffic jam. Air pollution can affect our health in many ways with both short-term and long-term effects. Different groups of individuals are affected by air pollution in different ways. Some individuals are much more sensitive to pollutants than are others. Young children and elderly people often suffer more from the effects of air pollution. People with health problems such as asthma, heart and lung disease may also suffer more when the air is polluted. The extent to which an individual is harmed by air pollution usually depends on the total exposure to the damaging chemicals, i.e., the duration of exposure and the concentration of the chemicals must be taken into account.

Examples of short-term effects include irritation to the eyes, nose and throat, and upper respiratory infections such as bronchitis and pneumonia. Other symptoms can include headaches, nausea, and allergic reactions. Short-term air pollution can aggravate the medical conditions of individuals with asthma and emphysema.

Long-term health effects can include chronic respiratory disease, lung cancer, heart disease, and even damage to the brain, nerves, liver, or kidneys. Continual exposure to air pollution affects the lungs of growing children and may aggravate or complicate medical conditions in the elderly.

2.2.1.4 Traffic jam

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 Transportation 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 Systematic Inc and Texas Transport Institute, 2004). According to Institute of Transportation Engineers (1989) traffic congestion can be viewed from two main opposing perspectives. The first perspective is that traffic congestion can be considered as 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 traffic congestion is an indicator of deterioration of urban life.

Traffic jam is a result of several factors. Causes of traffic jam may be an ongoing road construction or road repair, accident or heavy congestion as a result of large number of vehicles than the capacity of roads. Traffic jam is now a major problem to the society in all cities around the world, from developed to the less developed ones. Governments are taking different measures to curb this problem, the more so as traffic jam affects the life of people in different ways.

2.2.1.5 Psychological effect

Psychology has been defined in various ways. Psychology according to Arnold, J. et al (1998), is a science of mental life. Mental life comprises of three components; behavior, thought and emotions. Psychology as a discipline is divided into several sub disciplines, each with its own distinctive focus. Collectively they can be termed as basic psychology. For example, social psychology concerns how our behaviors, thoughts and emotions affect, and affected by other people. It focuses on how groups of people make decisions, and the extent to which a person's attitudes towards a particular group of people influences his or her behavior towards them.

Another type of psychology is physiological psychology which is concerned with the relationship between mind and body. For example, physiological psychologists might investigate the electrical activity in the brain associated with particular behaviors, thoughts and emotions or they might be interested in the bodily changes associated with feeling stressed on the traffic jam. Hence, a psychological effect refers to negative consequences which have effects to the behavior, thoughts or emotions of an individual.

2.2.2 Theories of Traffic Jam

A theory is defined as an explanation whose status is still hypothetical and subject to experimentation, in contrast to well established propositions that are regarded as reporting matters of actual fact. Transportation researchers have long struggled to find satisfactory ways of describing and analyzing congestion, as evident from the large number of often competing approaches and models that have been developed. Early researchers hoped to develop models based on fluid dynamics that would not only be accurate, but also universally applicable. However, unlike fluid flow, congestion is not a purely physical phenomenon, but rather it *is the result of peoples' trip-making decisions and minute-by-minute driving behavior*. One should therefore expect the quantitative – if not also the qualitative – characteristics of congestion to vary with automobile and road design, rules of the road, pace of life, and other factors. Models calibrated in a developed country during the 1960s, for example, may not fit well a developing country at the beginning of the 21st century. (Lindsey,. R. and Verhoef,. E. (n.d.))

2.2.2.1 Mathematical Theory of Traffic Jam

Some traffic engineers have attempted to apply the rules of fluid dynamics to traffic flow, likening it to the flow of a fluid in a pipe. Congestion simulations and real-time observations have shown that in heavy but free flowing traffic, jams can arise spontaneously, triggered by minor events ("butterfly effects"), such as an abrupt steering maneuver by a single motorist. Traffic scientists liken such a situation to the sudden freezing of super cooled fluid (Koslowsky and Moshe, 1993) However, unlike a fluid; traffic flow is often affected by signals or other events at junctions that periodically affect the smooth flow of traffic.

Because of the poor correlation of theoretical models to actual observed traffic flows, transportation planners and highway engineers attempt to forecast traffic flow using empirical models (Homburger, 1992). Their working traffic models typically use a combination of macro-, micro- and mesoscopic features, and may add matrix entropy effects, by "platooning" groups of vehicles and by randomising the flow patterns within individual segments of the network. These models are then typically calibrated by measuring actual traffic flows on the links in the network, and the baseline flows are adjusted accordingly (Aworemi, J. et al (2009)

2.2.2.2 The three phase traffic theory

Three-phase traffic theory was introduced by Boris S Kerner as a reaction on a study of a huge number of measured data from many German and Holland freeways made during the author's work in 1995-1996 at the traffic consulting and software-development firm "Heusch-Boesefeldt" in Germany. Kerner, B.S. (n.d). Sometimes it is known as Boris Kerner's three phase traffic theory and it was developed between 1996 and 2002.

In the three phase theory, the traffic phenomena are explained by three phase; free flow, synchronized flow, and moving jam. The three phase traffic theory offers qualitative explanation of real traffic. (Park, M., (2012)

In the three phase's traffic theory, the three phases in traffic consist of free flow and two congestion phases: synchronized flow and wide moving jam. The three phases offer qualitative features of traffic congestion phenomena. However, because of the complexity of traffic system, such as in homogeneity among vehicles and behavior of drivers, the theory is limited to provide quantitative correspondence with reality although recent simulations have been able to reproduce qualitative features.

From data analysis the author understood that *none* of the well-accepted traffic flow theories and associated modeling approaches (including all earlier works of the authors made in 1993-1995 when he began to work in transportation science) are able to explain traffic breakdown as observed in real traffic flow.

2.2.2.3 IBM study on the social effects of traffic jam in the world

According to the survey conducted by IBM, (2010) to the adult drivers in twenty major cities around the world – repeating similar surveys done in the U.S. alone in May 2008 and August 2009, intended to gather drivers' opinions about local traffic and related issues, was conducted in native languages in Amsterdam, Beijing, Berlin, Buenos Aires, Houston, Johannesburg, Los Angeles, London, Madrid, Melbourne, Mexico City, Milan, Moscow, Montreal, New Delhi, New York, Paris, Sao Paulo, Stockholm and Toronto. There were 8,192 responses in the final data set – at least 400 from each City.

Among those interviewed 30% of respondents reported increased stress from traffic; 27% increased anger; 29% reported that traffic has harmed their performance in work or school; and 38% reported having cancelled a planned trip due to anticipated traffic. Thus the enormity of this problem is known both in its objective and subjective dimensions. Traffic congestion adds stress to our already-stressful lives not less it impedes economic development and increases air pollution.

2.2.2.3.1 The nature of the commute

Although driving is by far the main way in which Americans go to and from work, this is distinctly contrary to other parts of the world. For instance, while over 90% of the respondents in New York and Los Angeles reported driving to work, only 32% did in Paris, 34% in Amsterdam and Buenos Aires, and 37% in Milan. The worldwide average in this study is 56%, although all Latin American and Asian cities surveyed were below 50%. The only cities outside of the U.S. with comparatively high driving levels were Stockholm (64%), Toronto (70%), Johannesburg (81%), and Melbourne (91%).

After driving, the most popular form of transportation was bus – at 12%. Interestingly, the two cities with the most painful commutes, according to the survey – Beijing and Mexico City – had bus rates of 44% and 32%, respectively – raising the thought of how much worse traffic would have been if so many people did not travel by bus. (IBM, 2010)

For trips other than to work or school, the profile was quite similar, with the exception that carpooling edged out the bus as the second most popular mode of transportation.

Here Madrid led the way with 29%, followed by Stockholm and Mexico City at 20%, and Sao Paolo and Milan at 18%. (Ibid)

As for the type of roads on which commuters drive, the only noticeable pattern was that driving on downtown city streets was far more prevalent in Beijing (91%), Moscow (88%), Berlin (83%), New Delhi (80%), Mexico City (78%), and Sao Paolo (76%) than in the other cities. With the exception of Berlin, all of these cities have the most painful commutes. (Ibid)

The typical one-way length of commuting in these cities is 13 miles, or 32 minutes (average driving speed of 24.4 miles per hour). The variation among average distances was no more than 4 miles for these cities, but the times ranged from a low of 27 minutes in New York, Los Angeles, and Melbourne, to a high of 40-42 minutes in Mexico City, New Delhi, Beijing, and Moscow. (Ibid)

As for the time of day that commuters did most of their traveling, no patterns truly stood out. But when people tended to arrive at work or school later they tended to stay later.

2.2.2.3.2 Perceptions and other aspects of the commute

When it comes to pain, perception is reality, and the commuters in this survey clearly felt that roadway traffic has become worse in the last three years. 49% percent said it had become worse and 18% said it had become a lot worse. Conversely, only 20% of those surveyed said the situation had improved at all and only 5% said it had improved substantially. Interestingly, in the category of substantial improvement, New Delhi and Beijing led the way at 17% and 16%. This can be attributed to new transportation capacity being aggressively added in both these cities. The cities where respondents were most likely to say that the traffic situation had worsened somewhat or a lot were Johannesburg (80%), Moscow and Toronto (64%), Mexico City (62%), Sao Paolo (61%), Milan (59%), and Buenos Aires (57%). (IBM, 2010)

The perception of worsening traffic stemmed in large part from having been stuck in traffic for significant lengths of time. The average delay was one hour – very similar to the figure for the U.S. alone in the previous two Commuter Pain surveys conducted by IBM. The “best” cities in this regard were Melbourne, Stockholm, and Buenos Aires, where a quarter or more of the respondents said they had never been stuck at all. The

longest delays by far, were in Moscow, where the average reported delay was a whopping 2.5 hours and where more than 40% of the respondents said they had been stuck in traffic for over 3 hours. (Ibid)

Gas prices, notably in flux in recent years, appear to have a potential bearing on the willingness of commuters to drive to work. About a quarter of the respondents said that gas prices would have to rise by 20-30% for them to seriously consider other forms of transportation. A large proportion of the respondents (47%) thought that gas prices are already too high. Cities in which this feeling was particularly acute were Amsterdam and Madrid (66%) and Buenos Aires (64%). Cities in which it was relatively absent were New Delhi (24%), Moscow (31%), Los Angeles (36%), and Houston (39%) – perhaps suggesting that at least a modest rise in gas prices would not much affect traffic in those cities. (Ibid)

Regarding the necessity of working in the office as opposed to home and the effect of the economic downturn on the way people go to work, the findings were in some ways surprising. For instance, Moscow, New Delhi, and Sao Paolo – again, ranked among the most painful commutes – all recorded significant numbers of people who worked at home 2-5 days per week. As for the effect of the economic downturn, 23% said it made them change their transportation ways; 77% said it did not. The greatest percentage saying it did change their ways were in Mexico City (60%), New Delhi (50%), and Buenos Aires (41%) – suggesting that traffic alone, though bad, was not enough to make them switch their transportation modes. (Ibid)

Drivers also reported on the most frustrating aspects of their commute. Forty-three percent said it was the stop-start traffic; 32%, the rudeness and aggressiveness of drivers; and 26%, the unreliable journey time. The stop-start traffic was particularly pronounced in Johannesburg and New Delhi (66%), Mexico City (63%), Beijing (55%), and Madrid (53%). Further, the unreliable driving time was significantly more the case in Moscow (57%) and Beijing (49%) than in other cities. An interesting feature of this set of findings was that low speed was less of a frustration than was stop-start traffic.

When commuters cancelled a recent planned driving trip, the destination was work 24% of the time, recreation 22%, and shopping 1%. The work-related cancellations were most pronounced in Buenos Aires (43%), Mexico City (42%), Stockholm (36%), and Milan and Moscow (35%). The only surprise here was perhaps Stockholm, which, again, ranked best on our overall index. (Ibid)

2.2.2.3.3 The consequences of traffic

As for a reduction in travel stress, 36% of the respondents said that improved public transportation would help. Beijing topped the list here (65%), followed by Milan (57%), New Delhi (53%), Sao Paulo (52%), and Paris (51%). Only 17% of respondents said they did not experience traffic stress. Leading the way here was New York City (34%), trailed by Houston and Melbourne (33%), Toronto (32%), and Stockholm (30%). These are all cities with well-developed public transportation systems.

When asked whether traffic had harmed their health in any way, 57% said yes. Among those who said it had, increased stress (30%) and anger (27%) were the primary manifestations. Increased stress was most prominent in Mexico City (56%), Sao Paulo (55%), New Delhi (45%), Buenos Aires (44%), and Beijing (40%), while anger prevailed in Beijing (53%), Moscow (51%), New Delhi (48%), and Mexico City (43%). All of these cities were among those identified in the survey as having especially painful commutes. (Ibid)

If their commuting time could be significantly reduced, 53% said they would spend more time with friends or family, 44% would devote themselves to more recreation, and 42% would spend more time exercising. And 16% said they would work more (multiple answers were allowed). (Ibid)

Has traffic ever been so bad in the last three years as to alter the traveling plans of commuters? Overall, 31% of the respondents said yes, 69% in Beijing said yes, followed by 58% in New Delhi, 50% in Mexico City, and 45% in Sao Paulo. Similarly, when asked whether in the last month they had cancelled a driving trip due to anticipated traffic, 38% overall said yes. But 69% said yes in Moscow and Beijing, 62% in Mexico City, 59% in New Delhi, and 57% percent in Johannesburg. (Ibid)

2.3 Empirical literature review

Dar es Salaam is the largest city in Tanzania with a population of four point three million people. It covers an area of about 1,800 km², comprising of 1,393 km² of land mass and offshore islands. This city is made up of three local government areas or administrative districts namely Temeke, Kinondoni and Ilala municipalities. The three municipalities in Dar es Salaam are responsible for local issues such as managing the waste while the Dar es Salaam City Council (DCC) addresses cross-cutting issues like transport.

2.3.1 General observations

Moving from one place to another is nightmares to Dar es Salaam city residents, who are left without a choice but to endure long waiting hours, brave the sweltering heat and waste a lot of their valuable time stuck in traffic jams. www.thisday.co.tz/opinion/report. Workers spend hours on their way to workplaces and environmental pollution causes diseases such as cancer which cost huge sums of money to treat. What is more disturbing is that despite efforts made by various stakeholders to ease the situation, traffic jams in Dar es Salaam are increasingly getting worse and are now being experienced in almost all major roads and routes.

Unlike in the recent past, traffic jams are currently experienced at all times of the day with the situation worsening whenever there is a heavy shower due to a rundown and wanting sewerage system. Promises and assurances to deal with the problem are yet to be fulfilled despite strategies being drawn, plans put in place and proposals forwarded from various stakeholders.

According to the citizen correspondent, Karen von Schmieden, (2013) the traffic jams are not only annoying, but also dangerous, costly and causing pollution. About a third of road accidents in the country are reported to occur in Dar es Salaam alone. Many drivers are fond of speeding to compensate for the lost time in traffic jams. As a result, there are always fatal road accidents. Data from 2008 shows that about 67 per cent of pedestrians died in road accidents in Dar es Salaam when trying to cross the road during evening hours. The Muhimbili Orthopedic Institute observes a 64 per cent rise in the death toll last year (2012) and at least 695 people died in motorcycle accidents. (Masaoe, E, (n.d)

Blocked roads and high transport costs have paved the way for motorcycles and tricycles as alternative means of transport; however most of its drivers lack road safety training skills and knowledge.

Some studies show that the concentration of air pollutants such as sulphur dioxide, particulate matter and particulate lead was far above WHO guidelines in Dar es Salaam. Air pollution may lead to dangerous diseases and is linked to 1 million premature deaths worldwide every year. (Dora, C and Hosking, J, 2012)

Another study by Tabwe, M. (2013) titled “*Traffic jams may turn Dar residents into ‘zombies’*” shows that many people residing on the outskirts of Dar es Salaam and working in the city centre are forced to leave their homes early morning to beat the traffic and return to their homes equally late.

According to that study, a telecommunications employee residing in Bunju area says that he leaves at 4 a.m. from his house and gets to town an hour and half later and is forced to sleep in his car until 7.45 a.m. before he starts working. “This is the only way that I can make it to work on time. Leaving a mere ten minutes after 4 a.m. changes a lot of things, and being newly employed, this is not something I am ready to risk,” he said.

A bank employee said that before he shifted to Kigamboni, he lived in Sinza and used to leave home at 5.30 a.m. to beat the traffic but after shifting to Kigamboni, he is more relaxed, sleeps more and reaches work refreshed because after he crosses the ferry, he is home and dry. “Moving to Kigamboni has had very positive impact to my work because apart from sleeping more, I now don’t have the stress of spending long hours in daladalas and able to concentrate better at work,” he narrated.

Dr Datius Rweyemamu, The University of Dar es Salaam – Department of Sociology lecturer, told this researcher that he had little doubt that traffic jams in Dar es Salaam and other parts of the country had disrupted the sleeping patterns of the people.

He pointed out, first, that the traffic jams had a negative impact on working hours and people’s productivity and that there was little concentration in the last two hours before one leaves work. He thought that, sociologically, traffic jams have an impact on working

relations which spills over to other aspects of life. He observed that people who work in stressful environments that deal with people directly, for example occupational health workers, hospital personnel and even telecommunications customer care personnel, getting peace of mind while thinking of long queues on the road was nearly impossible.

He noted, secondly, that traffic jams made people who work in such environments not to care how they handled their customers. For people who get paid from the number of people they serve, productivity drops. He explained this spillover effect, by pointing out that traffic jams automatically interfered with usual social gatherings after work and allowed people to share other ideas and even helped ease tensions at family level.

Lastly, Dr Rweyemamu suggested that there was need for employers and work supervisors to help reduce the pressures that their employees experience. He also suggested that, people residing in one area should organize themselves through car pools to get to work to reduce the number of cars entering the city centre and for employers to have staff buses as a way to increase cohesion.

A research scientist with the National Institute of Medical Research, Dr Mary Mayige, told this researcher, concerning Dar es Salaam traffic jams, said that it had to be noted that an average adult needs about 8 hours of sleep and that sleeping less than 6 hours can lead to both social and health consequences.

She explained that daytime sleepiness, fatigue, difficulty in concentrating, poor thinking, increased risk of accidents and other health complications like weight gain, depression and other mood disorders were just some of the effects.

“The impact of lack of sleep to our school children” she noted, “translates to reduced cognitive performance and consequently poor performance in school. It may also cause the children to be irritable and have mood and attention disorders.” In this connection noteworthy are the US Sleep Foundation recommendations of sleep time for the different age groups: infants (3-11 months) need 14-15 hours, toddlers (12- 35 months) need 12-14 hours, and preschoolers (3-6 years) need 11-13 hours. Others are school age (6-10 years)

need 10-11 hours; adolescents (11-18 years) need 9.25 hours, adults need an average of 8 hours and the elderly adults may need less.

2.3.2 Dar es Salaam city and its traffic jam

The government of the united republic of Tanzania through the Ministry of transport has taken different initiatives to reduce traffic jam in the city. These measures are categorized as short term, medium term and long term solution.

To begin with short term solution, at the peak of traffic jam and for fear that the situation may aggravate, the government decided to do the following. Beginning on October 29 last year, (2012) city passengers could board two commuter trains that operate twice on working days. This new service is part of the government's efforts to improve public transport, which also includes plans for the construction of flyovers, road works and commuter bus route modifications. Additionally, there was introduced a Bus Rapid Transit (BRT) system, a project supposed to improve city public transport as a major city development.

However, the above mentioned commuter train transport has been facing some challenges. One of these is that, the cost of operation exceeds the revenues. That means the train is operating under loss, which implies that the sustainability of this service is at risk. The government, in order to solve this problem has promised to privatize the service, but this decision seems to many to be not a better solution due to the experiences of various privatized public service in the past. There is a good example of a central railway which was privatized to Tanzania Railway Limited (TRL) in 2007 but proved a failure until the government made an intervention to rescue it through \$4m exemption on fuel levy as well as infrastructure investments while TRL focuses on investment and maintenance of the rolling stock.

The second challenge is that there have been service breakdown several times. This has caused disturbances to more than five thousand passengers or service users who, according to the Minister of transport, depend on this service daily. And the third challenge is that, there are larger numbers of passengers than the capacity of these trains. This means that still a lot has to be done to improve railway transport in Dar es Salaam.

Another measure to reduce traffic jam is the implementation of Dar es Salaam BRT System (DART Project). This project is still under construction as shown in figures below and it is expected to be completed not earlier than 2015.

Figure 2.1 Ongoing road constructions under DART project



Source: STRABAG, 2013

Figure 2.2: A bridge under construction at Ubungo through DART project



Source: STRABAG, 2013

Figure 2.3: A new constructed road under DART project



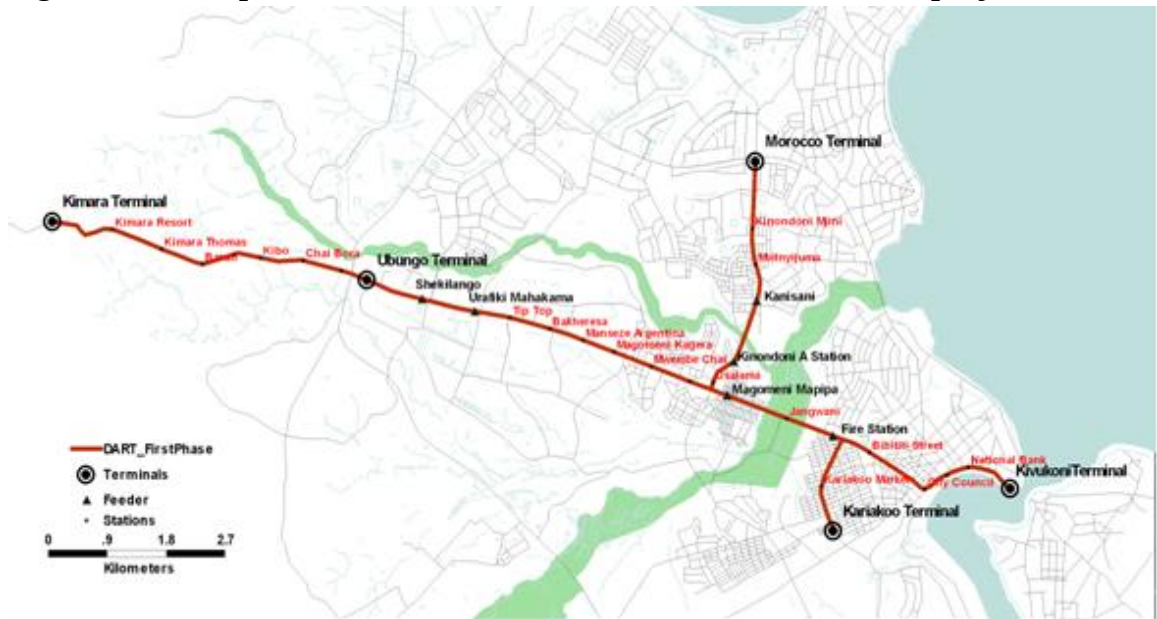
Source: STRABAG, 2013

At present, Dar es Salaam roads have a total length of 2,094 km out of which 494 km (24%) are under the supervision of Tanzania National Roads Agency (TANROADS) while 1,600 km (76%) are under the supervision of the three Dar es Salaam municipalities. Each municipal council has an obligation of maintaining roads that are in its area of jurisdiction except trunk and arterial roads.

The public transport in the city is currently provided by about 5,000 licensed, small capacity and privately owned minibuses commonly known as ‘Daladala’. The service offered is generally poor and unsafe, lacking professionalism, efficiency, quality and safety for the commuters. In 2003, DCC came up with the idea of introducing a Bus Rapid Transit (BRT) system in the city, which is currently being implemented by the Dar Rapid Transit Agency (DART). The system is also branded “DART”.

This project comprises of six phases which cover the six major corridors/ arterial roads in Dar es Salaam City. The Works for the first phase cover a length of 20.9 km starting at Kivukoni Ferry to Kimara Mwisho including sections of Kawawa Road from Magomeni to Morocco and Msimbazi Road from Fire to the intersection with Nyerere Road. The Works will also include construction of 29 ordinary bus stations (bus stops) within roadway; 5 bus terminals and 2 bus depots along the project corridor as illustrated in Figure 2.4 below.

Figure 2.4: A map to show bus stations and terminals under DART project



Source: DCC Website

In addition, the design for Phase 2 and 3 of BRT system is ongoing and it covers Nyerere road Corridor from the Central Business District (CBD) to Gongo la Mboto area and CBD to Mbagala respectively. The BRT project is designed to cover the whole Dar es Salaam city with its trunk and feeder routes.

In supporting this project, The World Bank Board of Executive Directors approved US\$100 million on January, 2012 as additional financing for completion of the Bus Rapid Transit (BRT) system in Dar es Salaam. The initiative will save the economy billions of shillings lost daily in the jams and provide relief to at least 300,000 commuters. An additional \$100 million from the Bank's International Development Association brought the total cost of the Second Central Transport Corridor Project (CTCP2 to \$290 million).

Dar es Salaam is growing rapidly according to World Bank's Country Director for Tanzania, Uganda and Burundi. As a result, traffic jams are a significant problem for the entire economy. They reduce productivity by wasting the time of road users; they threaten future growth prospects for the city and the country, and they pollute the environment.

The BRT is implemented by the Dar es Salaam Rapid Transport (DART) agency and is aligned to Tanzania's development strategy which underscores the need for improved transport infrastructures to achieve social and economic objectives. The combined works on the project including the construction of the road works, bus-passenger terminal buildings, feeder stations, utility power relocation will provide some 80,000 jobs by completion in 2015.

The BRT system will be operated by a US\$40.9 million public private partnership (PPP) arrangement with two private bus operators, one fare collector and a fund manager. The modern system will provide rapid boarding and dedicated right of way for 148 buses with a capacity of 140 passengers each, providing both normal and express services. Additionally, another 100 buses with a capacity of 60 passengers will transport passengers to the trunk system through feeder stations. The entire 20.9 kilometers will be provided with tree-shaded bicycle and pedestrian ways on both sides of the road with an average distance of 500 meters between bus stops.

“We are happy with the momentum of implementation of the BRT infrastructure as all works contracts have been awarded and the construction is proceeding,” said Yonas Mchomvu, the World Bank's Transport Specialist in Tanzania.

DART in collaboration with the Surface and Marine Transport Authority (SUMATRA) and the Daladala Owners Association (DARCOBOA) are currently mobilizing local transport operators to form companies that are expected to participate in the bidding for the BRT bus operation through joint venture agreements and/or operation contracts with experienced international operators. Further, preferential access to shares in the BRT bus operation will be given to the 1,800 daladalas (commuter mini-buses) that are expected to be displaced by the BRT operation.

2.3.3 Review of the existing public transport in Dar es Salaam

The present system is characterized by poor standards of comfort and safety, convenience and dignity for bus travellers, with a very negative impact on city traffic through competitive behaviour by Daladala drivers (speeding, over-crowding and accidents)

causing stress at all levels. Daladala buses stop at any location to catch passengers, they drive on the sidewalks when traffic is congested and they stop even on the exclusive left-turning lane at the intersection. Most buses are second-hand and are likely to break down at any moment, which might cause interruption to ordinary traffic on roads. The Surface and Marine Transport Regulatory Authority (SUMATRA) has been aware of the deficiencies caused by Daladala bus operation, however, actual enforcement in the field is lacking due to lack of staff (JICA 2008). This is captioned partly by Figure 2.5 below.

Figure 2.5: Public transport situation in Dar es Salaam city



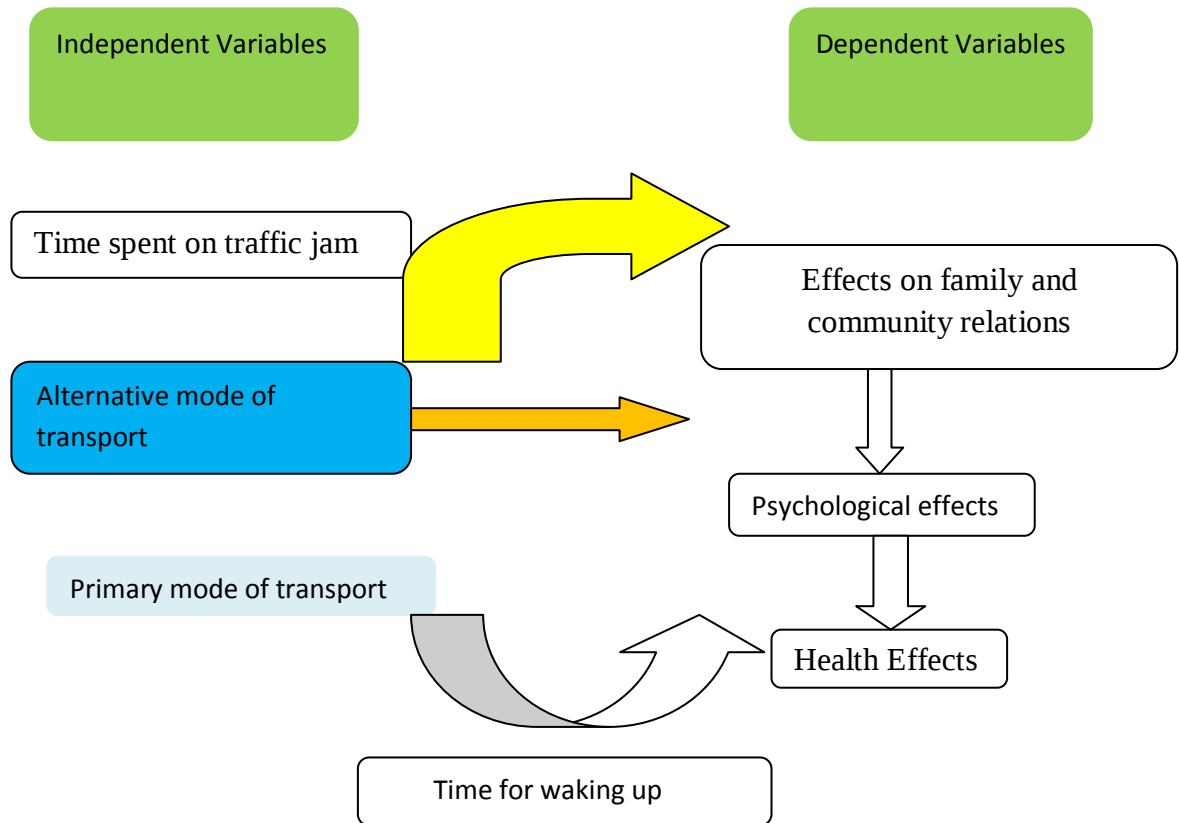
Source: <http://www.skyscrapercity.com>

The transport demand generated by residents in Dar es Salaam is estimated at 2.9 million trips per day. The modal share of public transport is 61% when “walk” trips are included and 82% when “walk” trips are excluded (JICA 2008). Other modes include bicycle, motorcycle, passenger car and taxi. Daladalas carry approximately 1.4 million passengers per day (Logit 2006). The average travel time per trip is estimated at 77 minutes and waiting time mainly for transfer to another mode is estimated at 35 minutes. The average travel distance ranges between 10 and 20 km under the assumption that the average travel

speed of Daladala is 10 to 20 km/hr in peak hours. The result of the household and attitudinal surveys by JICA (2008) indicated that: about 98% of Daladala passengers have no car or driving license and are captive to Daladala for their travel needs and only 0.7% indicates a preference for Daladala over a car; about 80% of passengers judge the current system as either unacceptable or at an unsatisfied level; nearly 90% of passengers evaluated the routing and comfort level of Daladala to be unacceptable or not satisfactory at all; and the waiting time at the bus stops, on board security and conductors manner also scored negatively.

There is a multiple of stakeholders that are in charge of urban transport: the Ministry of Transport in the area of transport policy and planning; Tanzania Roads Agency (TANROADS) and Dar es Salaam City Council (DCC) and its municipalities in project implementation and road maintenance; Traffic Police for traffic control and enforcement of the traffic regulations; and the Surface and Marine Transport Authority (SUMATRA) for regulation of public transport. Each institution is faced with problems of lack of staff, lack of technical capacity and low funding. There has also been little coordination between the institutions resulting in functional gaps.

Figure 2.6: Conceptual framework



Source: Researcher, 2013

The diagram above is a conceptualization of the study. It shows the relationship between variables. Independent variables included the amount of time spent on traffic jam, waking up time, primary mode of transport and alternative mode of transport. The dependent variables were effects at family and community level, health effects and psychological effects.

The above conceptual framework was operationalized by formulating questions which measured the relationship between independent and dependent variables. For example, the researcher wanted to know how much time was spent on traffic jam by a commuter, and how a commuter was affected psychologically, or how family and communities in Dar es Salaam city are affected by traffic jams.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the methodology used in conducting the study. It is subdivided into the following sections (i) Area of the study (ii) Type of the study and research design (iii) Study population and unit of analysis (iv) Statistical design which includes type and sources of data, sample and sampling procedure (vi) Operational design with the following sections: Variables and their measurement, Data collection methods, validity, data analysis and (vii) Chapter summary

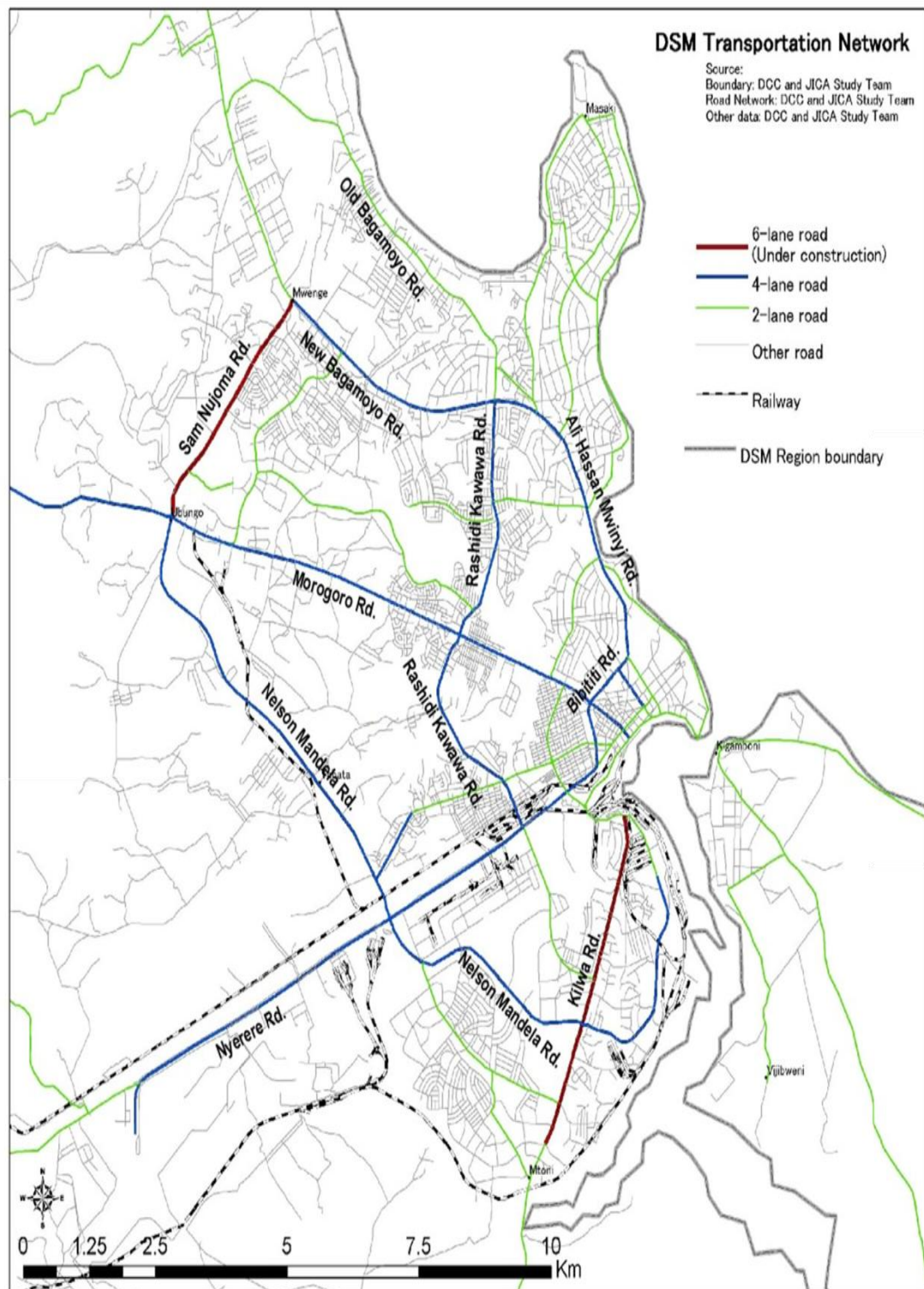
3.2 Area of the Study

The study was conducted in all three municipals of Dar es Salaam City namely, Ilala, Kinondoni and Temeke. This area was selected purposely mainly due to three reasons. Firstly, in the recent years Dar es Salaam City has been observed to have a higher rate of traffic jams than any other region in the United Republic of Tanzania. Secondly, business-wise Dar es Salaam is the industrial and commercial city which means that it attracts large numbers of people from other places in the country and thirdly, the researcher lives in Dar es Salaam City.

Dar es Salaam City is located between latitudes 6.36 degrees and 7.0 degrees to the South of Equator and longitudes 39.0 and 33.33 to the East of Greenwich. It is bounded by the Indian Ocean on the East and by the Coast Region on the North, West and South. The City has 4.3 million people according to 2012 census. Administratively, Dar es Salaam City comprised of three municipal councils which are Kinondoni, Ilala and Temeke.

The development of Dar es Salaam City 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. The five radial roads are Kilwa Road, Nyerere Road, Morogoro Road, New Bagamoyo Road and Old Bagamoyo Road and the main ring road is the Mandela Road. The total length of roads based on 2005 data is about 1717 km out of which 395 or 23 per cent are paved, mostly arterial roads (JICA, 2008). This can be seen in Figure 3.1 below.

Figure 3.1 Roads of Dar es Salaam city



Source: JICA (2008)

3.3 Research Design

A research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure. (Kothari, 2004), Decisions regarding what, where, when, how much, by what means concerning an inquiry or a research study constitute a research design.

Case study research design was adopted for this study. Case studies entail the detailed examination of one or a small number of cases (Bryman, 1989). It is a very popular form of qualitative analysis and it involves a careful and complete observation of a social unit, be that unit a person, a family, an institution, a cultural group or even the entire community (Kothari, 2004)

This study had intended to employ cross sectional research design, in order to collect data over a large geographical area at one point in time. However, this design was not employed and instead, the case study design was used due to the following reasons:

- (a) As noted by Kothari (2004), Availability of fund determines to a large extent the type of research design to be used for the collection of data. The researcher decided to use case study design instead of cross sectional design due to the available amount of fund. A case study research design was relatively cheaper compared to cross sectional design, also taking into consideration that the research was self financed by a researcher.
- (b) Another major factor for using case study design was the limited amount of time. The researcher abandoned use of cross sectional design as proposed before because it involves collection of data over a large geographical area. Hence the researcher opted for a case study design which helped to collect data from a small number of social units within a limited amount of time available.

Also, the information required was about the social impacts of traffic jam in Dar es Salaam city, both qualitative research and quantitative research were accordingly employed.

3.4 Unit of Analysis

The unit of analysis is the major entity that is being analyzed in the study. It is the ‘what’ or ‘who’ is being studied. In social science research, typical units of analysis include individuals (most common), groups, social organizations and social artifacts. As for this study, individual respondents (household) were the major units of analysis from whom data was collected. This was in the pursuit of the specific objectives of this study mentioned in Chapter one.

3.5 Study Population

This study intended to collect data from commuters in Dar es Salaam City. Dar es Salaam is one of the world’s fastest growing cities. With the population of 4.3 million people, the city is expanding fast. Based on the 2012 Population and Housing Census, Dar es Salaam has 4,364,541 inhabitants, of whom 2,125,786 are males and the rest 2,238,755 females. Of the city’s three municipalities, Kinondoni had the highest population, with a total of 1,775,049 inhabitants, followed by Temeke with 1,368,881 and Ilala with 1,220,611 inhabitants. (URT, 2013)

Dar es Salaam was originally dominated by Zaramo and a few other tribes especially Ndengereko and Kwere. However, due to urbanization many people of different ethnicity and origins have immigrated to the city in big numbers. This has caused the undefined cultural change.

The Age Distribution of the city’s population indicates that the majority of the city’s population (65 percent) are aged between fifteen and sixty-four years which is in the working age. However there are a few elderly people, only 2% of these are above 65 years.

3.6 Statistical Design

3.6.1 Type and Sources of Data

In the course of this study, a combination of primary and secondary data was collected to meet the main goal and specific goals. Primary data was collected directly from commuters in Dar es Salaam city while secondary data was obtained from various sources such as journals, newspapers and from unpublished research reports.

3.6.2 Sample and Sampling Procedure

The data used in this study were collected by the author during May 2013. They were obtained through structured questionnaires from a total of 46 respondents through personal interview. The 46 respondents which include 1 driver, 27 employed respondents, 15 secondary students and 3 self employed respondents were selected randomly from different parts of Dar es Salaam city.

3.7 Operational Design

3.7.1 Variables and their Measurements

In the course of this study, specific variables were employed. Those variables included the respondents profile, the amount of time spent on traffic jam, waking up time, primary mode of transport and alternative mode of transport. The dependent variables were effects at family and community level, health effects and psychological effects. The variables were measured by using indicators shown in Table 3.1 below:-

Table 3.1: Variables and their measurements

Variable	Operationalization and measurement
Time spent on traffic jam daily	Commuter should identify the amount of time spent on traffic jam daily
The primary mode of transport	Commuters should identify their primary mode of transport
Time by which commuters wake up daily	Commuters should tell at what time they wake up daily
Respondents profile	Age, gender, occupation, marital status
Health effects	Commuters have to explain how traffic jam affected their health
Psychological effects	Commuters should explain how traffic jam affects them psychologically
Effects on family and community level	Commuters should explain how traffic jam have affected their family and communities

Source: Author, 2013

3.7.2 Data Collection Methods

Data collection methods refer to the tools which are employed to gather specific information from the units of enquiry. In - depth interview and administered questionnaires were employed to collect data from 46 units of enquiry.

In – depth interview was conducted to two individuals, one the assistant inspector of police at Oysterbay police station and another interview was conducted with commander of operation, fire and rescue army.

Also, observation was used as one of the important tool for collecting data. Variables which were observed are presence of traffic jam in Dar es Salaam city, the causes of traffic jam and measures taken by to reduce it.

3.7.3 Data Validity

Validity refers to the truth of the measurement. It is the degree to which the measurement process measures the variable it claims to measure. In order to ensure the validity of data, the researcher afforded respondents the opportunity to discuss the themes of the research and ensure that respondents are aware of the confidentiality afforded to their answers. This was important to ensure that questions are answered honestly without fear of repercussions thereby increasing the validity of the research.

The relationship between the researcher and the respondents also had an effect on validity. The researcher ensured that respondents understand what was meant by the research through testing the research tool on a small group prior to the research.

3.7.4 Data Analysis Methods

Both quantitative and qualitative data analysis tools were employed to analyze data. The qualitative data were coded and categorized. The Statistical package that is SPSS version 16.0 was used to analyze data. Tables and charts such as pie charts and histogram were used to present data

3.8 Chapter Summary

This chapter presented the methodology used in conducting the study. It included area of the study, type of the study and research design, the study population and units of analysis, the statistical design which include type and sources of data, sample and sampling procedure, the operational design which had variables and their measurement, data collection methods, data validity and data analysis.

CHAPTER FOUR

RESEARCH FINDINGS: ANALYSIS AND DISCUSSION

4.1 Introduction

This chapter presents the analysis and discussion of the findings of the study. The presentation is organized according to the research specific objectives and research questions. The chapter is subdivided into the following subsections (i) Respondents profile (ii) Traffic jam awareness (iii) The amount of time spent on traffic jam by commuters (iv) the commuters' primary mode of transport (v) commuters' alternative mode of transport (vi) Roads with heavy traffic jam (vii) commuter view's about the causes of traffic jam (viii) Psychological impact of traffic jam (ix) Health impact of traffic jam (x) Social impact of traffic jam on family and community level (xi) view's of commuters on the appropriate solution of traffic jam in Dar es Salaam city (xii) chapter summary

4.2 The profile of respondents

4.2.1 The age profile of respondents

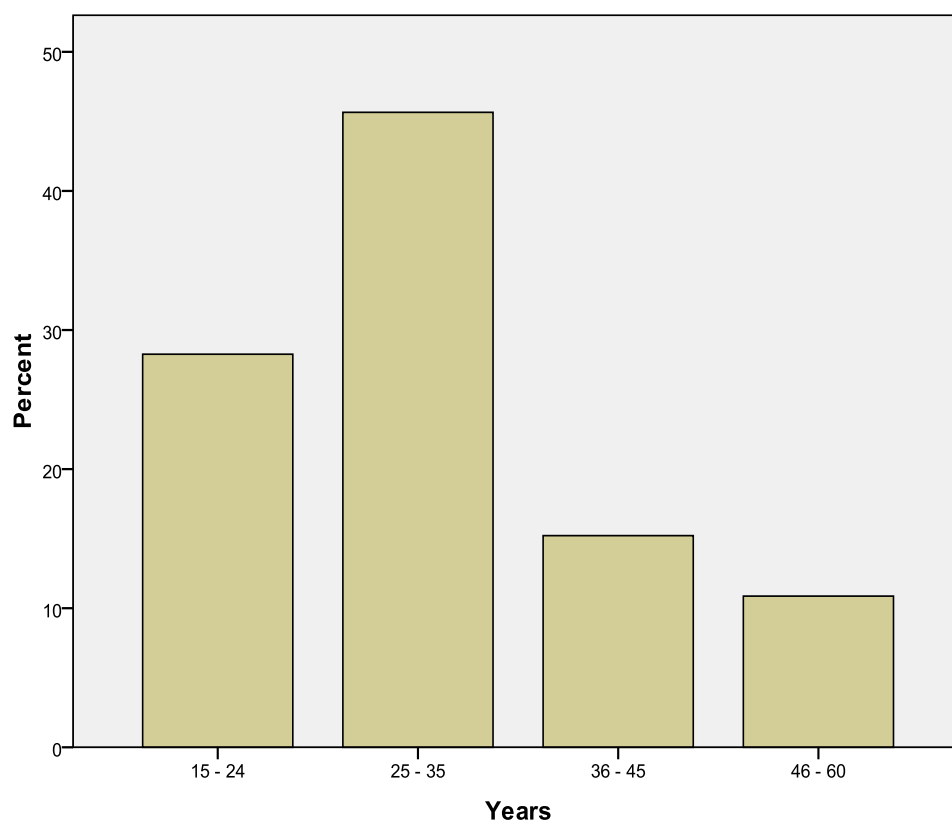
The age of the respondents could be classified in five groups, which are between 15 – 24, 25 – 35, 36 – 45, 46 – 60, and 61 and above. Thirteen (28.3%) respondents were between 15 – 24 years old, 21 (45.7%) respondents were between 25 – 35 years old, 7 (15.2%) respondents were between 36 – 45 years old, while 5 (10.9%) respondents were between 46 – 60 years old. See Table 4.1 and Figure 4.1 below

Table 4.1: The age profile of respondents

		Number	Percent
Valid	15 – 24	13	28.3
	25 – 35	21	45.7
	36 – 45	7	15.2
	46 – 60	5	10.9
	Total	46	100.0

Source: Field Data, 2013

Figure 4.1: Histogram showing the age of respondents



Source: Field Data, 2013

4.2.2 Gender profile of respondents

The aim was to include all respondents with consideration of gender. Out of 46 respondents, 31 (67.4 %) males were interviewed while females who were interviewed were 15 (32.6%) of the total sample size. See Table 4.2 and Figure 4.2 below

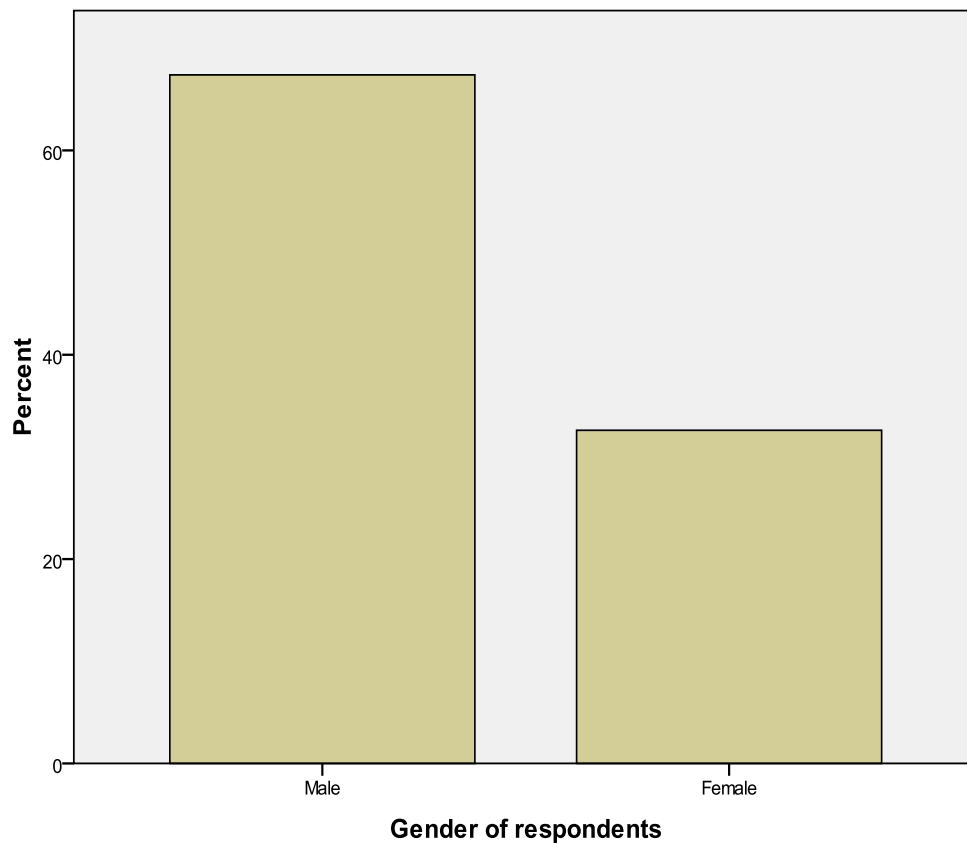
The aim was to provide an equal chance to both male and female respondents to identify their views concerning the social impact of traffic jam. The assumption was that males and females (students, employed, self employed, single and married) have different experiences of traffic jam.

Table 4.2: Gender of Respondents

	Number	Percent
Valid Male	31	67.4
Female	15	32.6
Total	46	100.0

Source: Field Data, 2013

Figure 4.2: Histogram showing the gender profile of respondents



Source: Field Data, 2013

4.2.3 Occupational profile of respondents

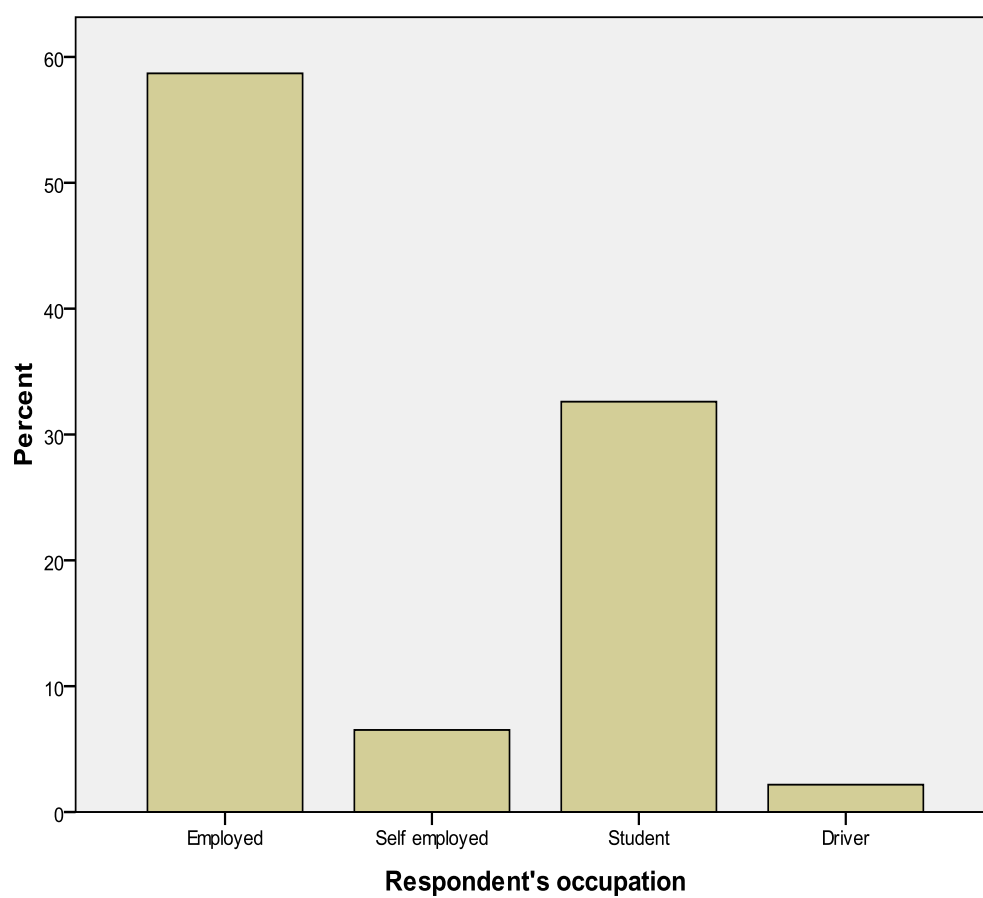
The targeted respondents were those who are employed, self employed, students, and drivers. Out of 46 respondents, 27 (58.7%) were employed, 3 (6.5%) respondents were self employed, 15 (32.6%) respondents were students while 1 (2.2%) respondent was a driver. See Table 4.3 and Figure 4.3 below

Table 4.3: Occupational profile of respondents

	Number	Percent
Employed	27	58.7
Self employed	3	6.5
Student	15	32.6
Driver	1	2.2
Total	46	100.0

Source: Field Data, 2013

Figure 4.3: Histogram showing occupation of respondents



Source: Field Data, 2013

4.2.4 Marital profile of respondents

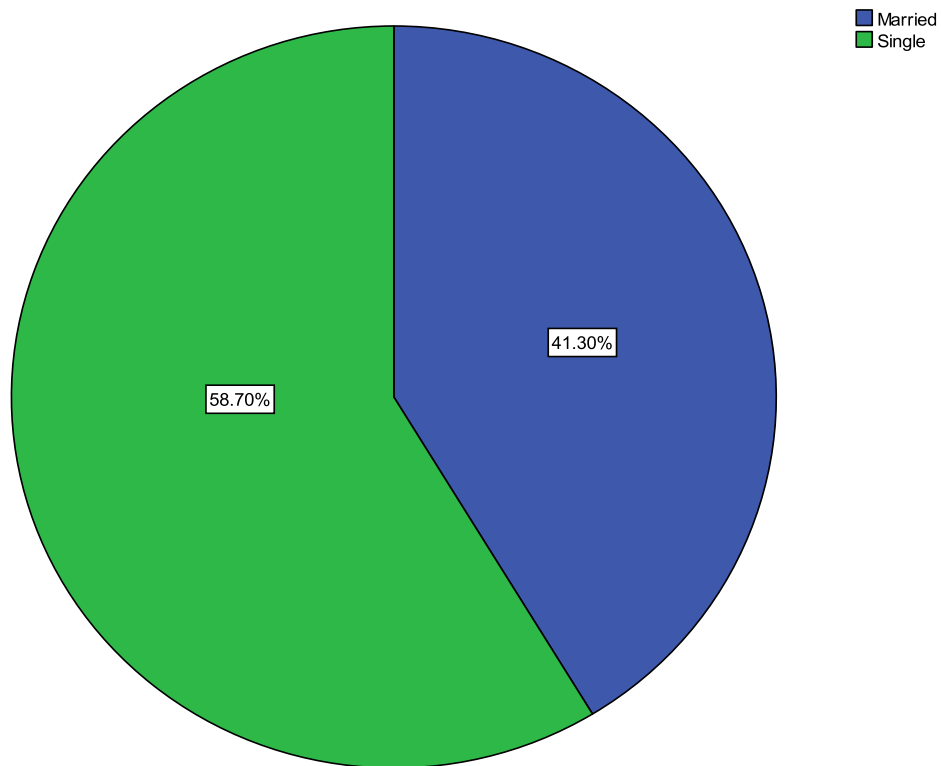
The aim here was to identify the marital status of respondents with the assumption that single respondents could have different challenges from that of married ones in relation to the study under investigation. Out of 46 respondents, 19 (41.3%) were married while 27 (58.7%) respondents were single. See Table 4.4 and Figure 4.4 below

Table 4.4: Marital Status of respondents

		Number	Percent
Valid	Married	19	41.3
	Single	27	58.7
	Total	46	100.0

Source: Field Data, 2013

Figure 4.4: Pie chart showing marital status of respondents



Source: Field Data, 2013

4.3 Traffic jam awareness

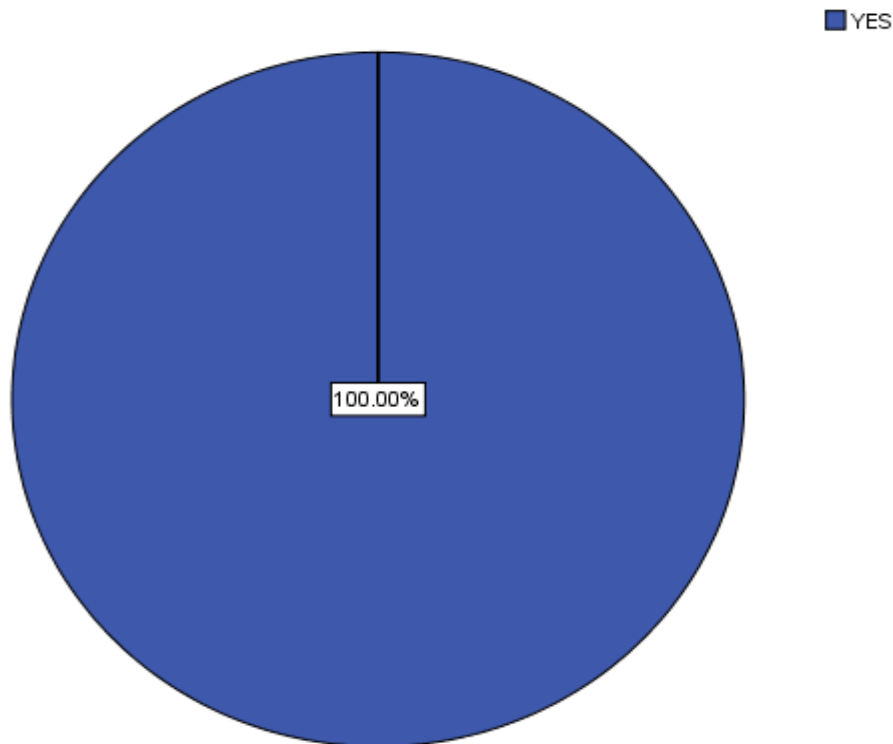
According to the respondents who were asked if they were aware of the problem of traffic jam in Dar es Salaam city, all 46 respondents which are equal to 100% agreed that they were aware of traffic jam and that is a topical problem which affects their day to day undertakings. No respondents said “No” to this question. See Table 4.5 and Figure 4.5 below

Table 4.5: Respondents traffic jam awareness

	Number	Percent
Valid YES	46	100.0

Source: Field Data, 2013

Figure 4.5: Pie chart showing traffic jam awareness of respondents



Source: Field Data, 2013

4.4 Time spent on traffic jam on daily basis

This statistics shows the response of 45 respondents who were asked to identify the amount of time which they spent daily on traffic jam. The amount of time was put into three groups, that is one (1) hour, two to three (2- 3) hours and more than three (3) hours. Out of 46 respondents, 9 (19.6%) respondents said that they spent one hour daily on traffic jam, another 27 (58.7%) respondents argued that they spent between two to three

hour daily on traffic jam, another 9 (19.6%) respondents spent more than three hours daily on traffic jam. Only 1 (2.2%) respondent did not specify the amount of time which was spent on traffic jam. See Table 4.6 and Figure 4.6 below

Implication

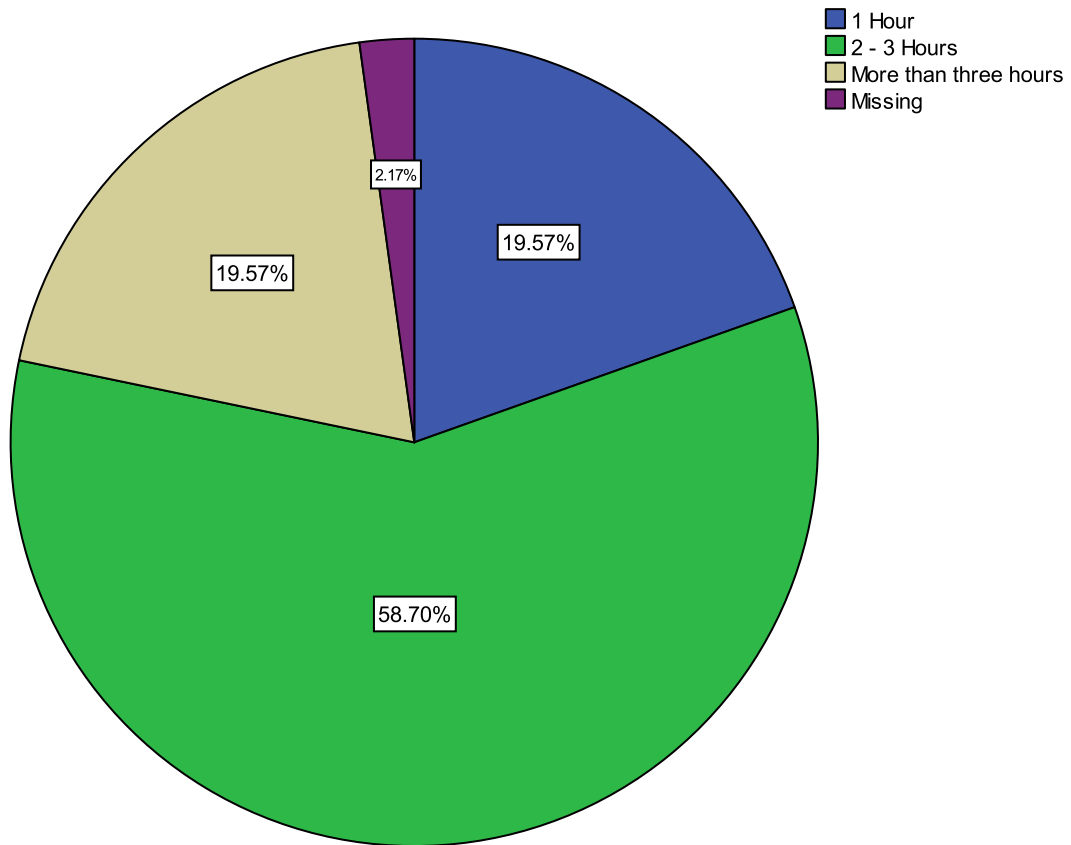
The findings imply that about 58.7% respondents spend two to three hours on traffic jam daily while 19.6% respondents spend more than three hours on traffic jam. This has a greater impact to the family level, community level, to the health of respondents as well as psychological impact as it is shown in other parts of this report.

Table 4.6: Time spent of traffic jam daily

		Number	Percent
Valid	1 Hour	9	19.6
	2 - 3 Hours	27	58.7
	More than three hours	9	19.6
	Total	45	97.8
Total		46	100.0

Source: Field, 2013

Figure 4.6: Pie chart showing the time spent daily in traffic jam by respondents



Source: Field Data, 2013

4.4.1 Time at which respondents wake up daily

The administered questionnaire was used to acquire answers to the question which asked, at what time do you wake up daily to go to work/school? Answers for this question were grouped in four categories (i) between 3:00am and 4:00 am (ii) between 4:00 and 5:00 am (iii) between 5:00 am and 6:00 am and (iv) between 6:00am and 7:00am.

The following were the response to this question: 3 (6.5%) respondents out of 46 used to wake up between 3:00am and 4:00am, 20 (43.5%) respondents out of 46 wake up between 4:00am and 5:00am, other 20 (43.5%) respondents out of 46 wake up between 5:00am and 6:00am and only 3 (6.5%) respondents out of 46 wake up between 6:00am and 7:00am. See Table 4.7 and Figure 4.7 below

Implication

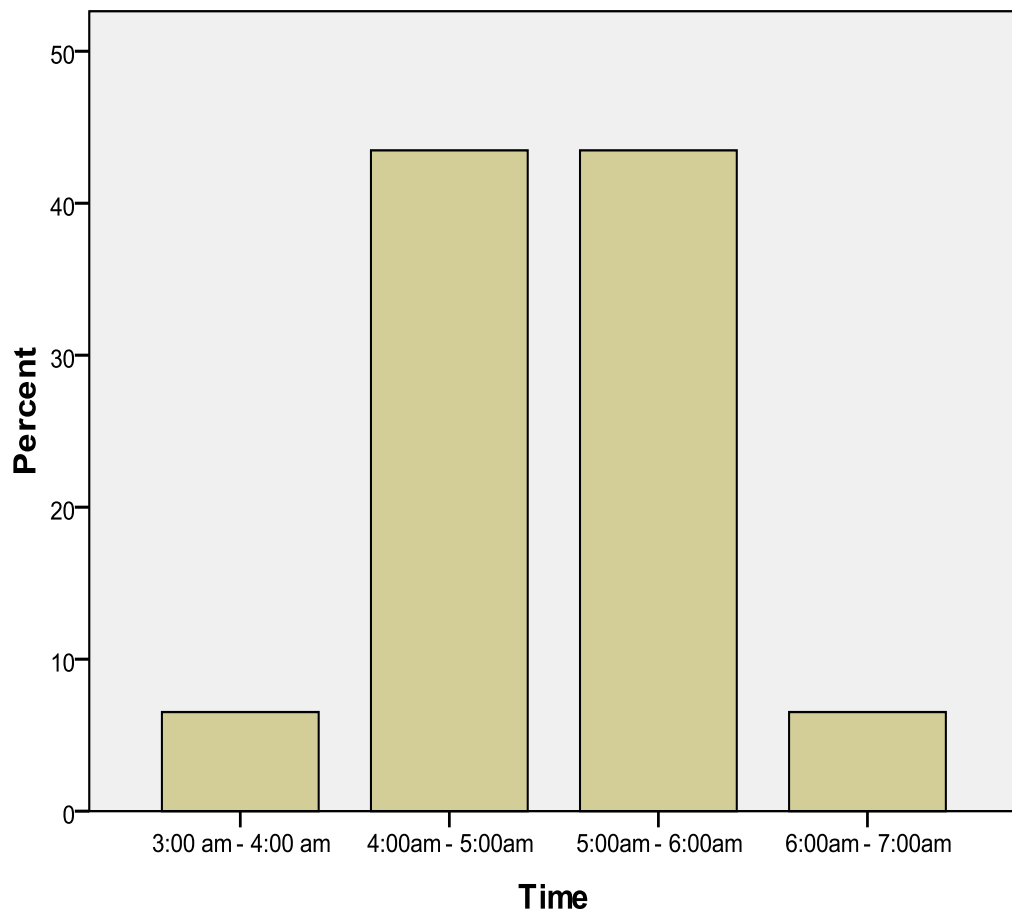
The findings imply that, 93% of the people in Dar es Salaam city are forced to wake up early in the morning for the fear of traffic jam. This factor on the other side has greater impact at family level, community level as well as on the health of respondents as it is shown under section 4:10, 4:11 and 4:12 of this report.

Table 4.7: Time at which respondents wake up daily

	Number	Percent
Valid 3:00 am - 4:00 am	3	6.5
4:00am - 5:00am	20	43.5
5:00am - 6:00am	20	43.5
6:00am - 7:00am	3	6.5
Total	46	100.0

Source: Field Data, 2013

Figure 4.7: Histogram showing the time at which respondents wake up daily



Source: Field, 2013

4.5 Primary mode of transport of the respondents

This shows the answer to the question which asked the respondents to identify their primary mode of transport. An administered questionnaire with five groups of mode of transports that are train, private cars, public buses (daladala), motor cycle and bicycles were used to collect data from 46 respondents.

The findings show that, 2 (4.3%) respondents use train as their primary mode of transport, while 9 (19.6%) respondents use private cars as their primary mode of transport, On the other hand 35 (76.1%) respondents use public buses (Daladala) as their primary mode of transport. No respondents use motor cycle or bicycle as their primary mode of transport. See Table 4.8 and Figure 4.8 below

Table 4.8: Primary mode of transport of respondents

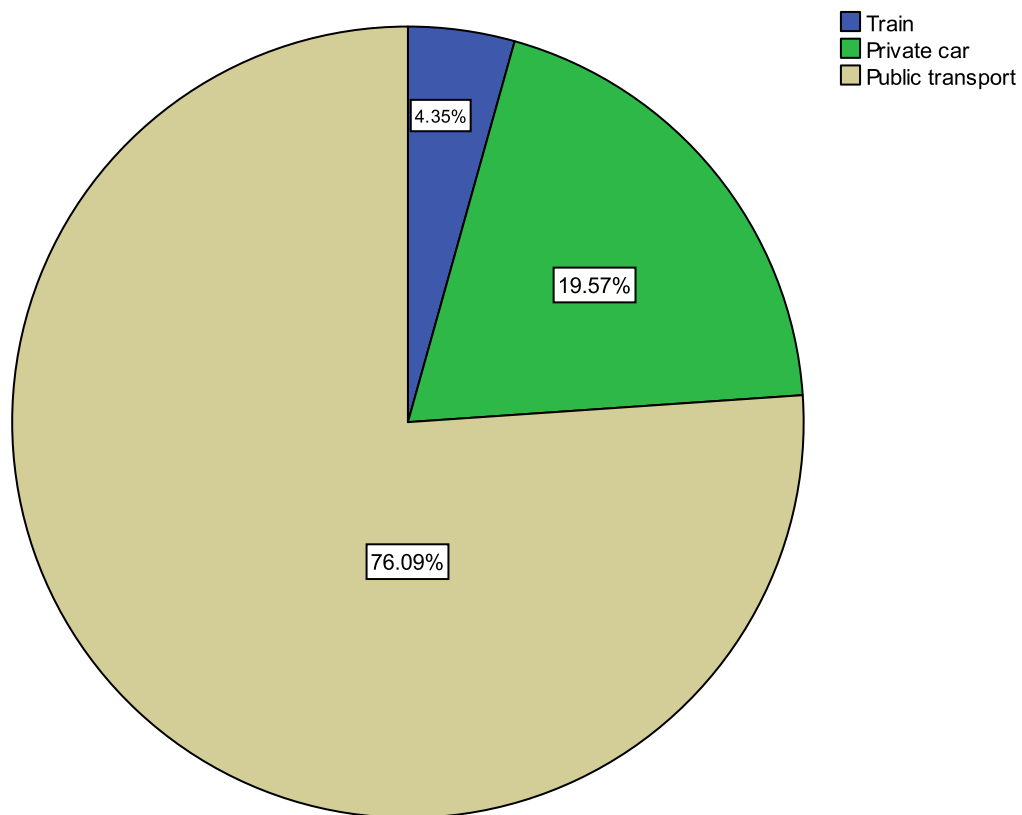
	Number	Percent
Valid Train	2	4.3
Private car	9	19.6
Public transport	35	76.1
Total	46	100.0

Source: Field Data, 2013

Implication

The findings from this study imply that, about 76.1% use public buses (Daladala) as their primary mode of transport while only 23.9% use other means of transport such as train and private cars as their primary mode of transport.

Figure 4.8: Pie chart showing the primary mode of transport of respondents



Source: Field Data, 2013

4.6 Alternative means of transport during heavy traffic jam

This is the response to the question that asked, identify alternative mode of transport during heavy traffic jam. The answer to this question was acquired through administered questionnaire from 46 respondents. There were two options of alternative transport which are hiring a motor cycle and walking by foot.

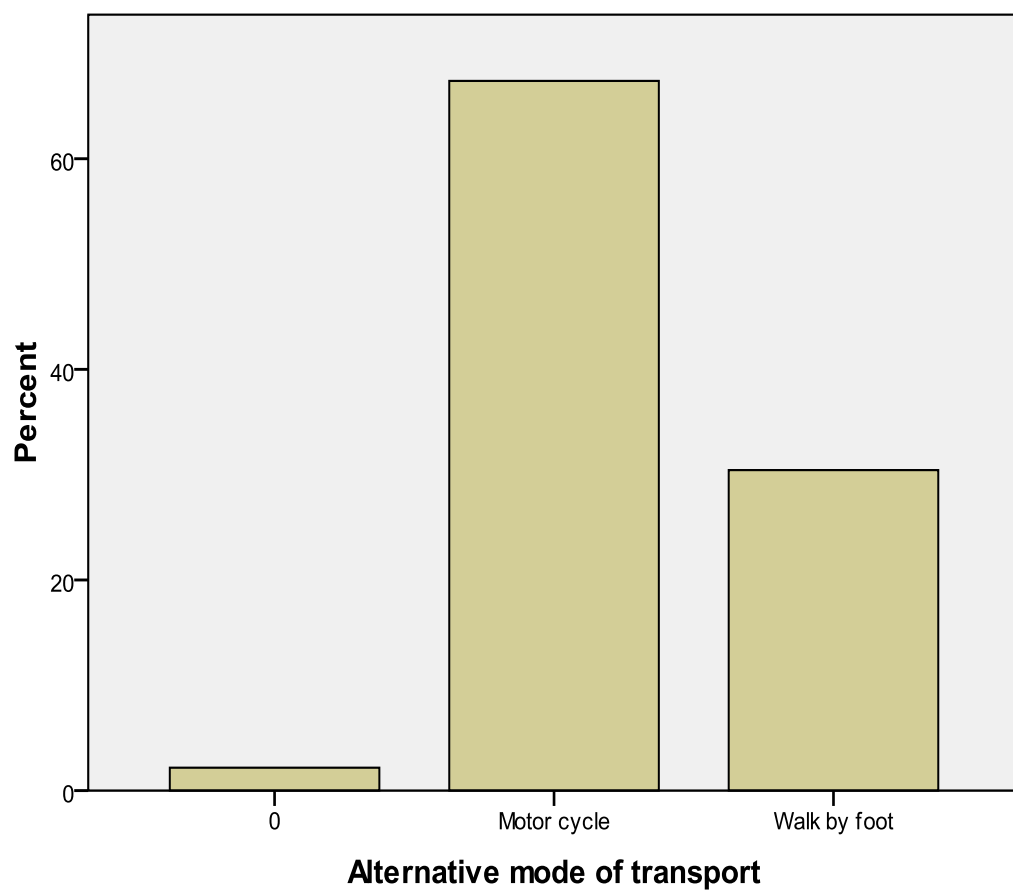
The findings show that, 31 (67.4%) respondents use motor cycle as their alternative mode of transport while 14 (30.4%) respondents walk during heavy traffic jam. See Table 4.9 and Figure 4.9 below

Table 4.9: Alternative mode of transport used by respondents

	Number	Percent
Valid 0	1	2.2
Motor cycle	31	67.4
Walk by foot	14	30.4
Total	46	100.0

Source: Field Data, 2013

Figure 4.9: Histogram showing the alternative mode of transport of respondents



Source: Field Data, 2013

Implication

The findings in Table 4.9 imply that 67.4% respondents use hired motor cycle as their alternative mode of transport while 30.4% respondents walk during heavy traffic jam. On the other hand, both have greater impacts to the well being of the people especially on their incomes, at family level, community and national level as shown by this report.

4.7 Respondents view's about the causes of traffic jam in Dar es Salaam city

In - depth interview with ASS Inspector of Police, Oysterbay Policy Station, Mr. L. S. Chuwa, traffic jam has become a critical problem in Dar es Salaam city. Traffic jam persists daily from morning to evening, from work days to weekends as well as holidays. Previously, some roads such as Nyerere road and Kilwa roads were not heavily congested but the situation is critical right now. There is no road which is not affected by traffic jam.

People from the city's outskirt such as Mbezi Beach, Mbezi Kimara, Tegeta, Gongo la Mboto and Mbagala are highly affected compare with those who resides near to the city center. These people spend up to four hours every day to get to work while others are forced to wake up much earlier around three to four A.M. due to traffic jam.

Mr. Chuwa argues that traffic jam is a result of poor planning of the city done very long time ago. Infrastructures such as roads are so limited while the numbers of vehicles (especially private owned) keep on increasing daily. Another major cause of traffic jam is the location of major services and buildings such as Ministries, Agencies and Departments at the city centre. As a result, large numbers of people are obliged to move daily to the city centre to go to work, to school or to acquire some services. Besides, traffic jam is an outcome of shortage of parking areas. This is due to the fact that construction of higher buildings is still going on at the city centre without providing parking places for people who need services or conduct business in those buildings. As a result people park their cars along the roadsides and cause traffic jams on the roads.

4.8 Roads where the respondents experience heavy traffic jam daily

Traffic jam is one of the major problems affecting Dar es Salaam City. According to the respondents, traffic jam is more serious in some sections of major arterial roads such as Morogoro, Kilwa, Pugu/Nyerere, Mandela, Rashidi Kawawa and Ali Hassani Mwinyi

roads mainly due to very low speed at road intersections especially during the peak hours. The jam is more serious in the morning and evening traffic peak hours. In the morning peak hours traffic speed dwindle to between 20 to 30 km/h at a distance of 25 to 30 km from the city center for most of the main roads. As one approaches the city center traffic speed is reduced to between zero to 10 km/h within the city center and the immediate surrounding traffic areas. In the evening peak hours the reverse happens. Traffic speed within the city center is between 10 to 20 km/h and decreases to between zero to 10 km/h.

Traffic jam is more critical in all major road intersections of Morogoro Road at Ubungo, Magomeni (Morogoro/Kawawa roads) Bibi Titi Mohamed and Morogoro Road junction, Nyerere Road at Tazara, Chang'ombe,, Msimbazi, UN/ Kinondonii junction, Old Bagamoyo at Mwenge and Nelson Mandela Road at Tabata and Buguruni intersection. At these road intersections it is not uncommon to spend between 10 to 25 minutes before crossing.

4.9 The health impact of traffic jam

Administered questionnaire were used to collect data from 46 respondents. Data collected from the respondents can be put into three groups: One is of late arrivals of seriously ill people particularly those who use ambulance, or those who hires taxes or private cars. Pregnant women are another group of people who are highly affected by traffic jam, especially those who use public transport for their daily transport, and also when rushing to the hospital for delivery.

The third group is of people who make use of public transport such as public buses commonly known as 'daladala' and those who use train as their means of transport. There is spread of airborne diseases such as Tuberculosis (T.B), skin diseases, fainting and vomiting as a result of standing for a long time on traffic jam, bad smell, high temperature as well as lack of oxygen due to air pollution. About 76.1% of all respondents who use public transports as their primary mode of transport have been affected their health in one way or another.

Another major impact of traffic jam is lack of enough sleep. About 93.5% of respondents reported that they had lack of enough time to sleep. This is because they were forced to leave their homes early in the morning between 3:00am and 5:00am to beat the traffic

jam, but they return to their homes equally late. Most of Dar es Salaam residents sleep less than eight hours which is against the required normal sleeping hours.

According to the US Sleep Foundation, sleep time recommendation for the different age groups is as follows: infants (3-11 months) need 14-15 hours; toddlers (12- 35 months) need 12-14 hours, while preschoolers (3-6 years) need 11-13 hours, school age children (6-10 years) need 10-11 hours; adolescents (11-18 years) need 9.25 hours. Adults need an average of 8 hours and the elderly adults may need less.

According to Dr. Mary Mayige, a research scientists from National Institute of Medical Research, an average adult needs about 8 hours of sleep and that sleeping less than 6 hours can lead to both social and health consequences. Some of these effects include daytime sleepiness, fatigue, difficult in concentrating, poor thinking, increased risk of accidents and other health complications like weight gain, depression and other mood disorders.

The impact of lack of sleep to school children translates to reduced cognitive performance and consequently poor performance in school. It may also cause the children to be irritable and have mood and attention disorders.

4.10 The psychological impact of traffic jam

All 46 respondents, that is 100% said YES to the question on whether they were affected psychologically. These psychological impacts can be grouped into three categories. Some respondents were stressed when they stayed in traffic jam for a very long time. Others got angry while others got frustrated which in turn led to headache and muscles pain.

4.11 The impact of traffic jam on social relations

4.11.1 Impact of traffic jam at family level

The answers for this question which required the respondents to identify the impact of traffic jam at family level were obtained through administered questionnaire from 46 respondents as follows; 20 (46.5%) respondents most of them parents stated that traffic jam has a greater impact on their families. They have no time to see their children during

week days. This is due to the fact that, they are forced to wake up early in the morning when children are still asleep, but also they return back very late because of traffic jam and find their children already asleep. According to these respondents, this situation has the following impacts: one, parents lack time to make follow up to their children concerning their progress at school and their behaviors at large. Secondly, children on the other hand lack their parental care. This leads to deterioration of ethics and bad morals due to lack of parental guidance.

Misunderstandings among family members are another impact of traffic jam. Thirty two point six percent (32.6%) responded that, there were conflicts in their families when they arrived late as a result of traffic jam. "Traffic jam has contributed to mistrust among beloved ones, separation and divorce to others," one respondent argued. Mostly, the married females and female students were affected, although both male and female respondents had this problem. One of the female student stated that "In most cases I arrive late at home because of traffic jam but as a result my parents have lost their trust in me. Also society has a negative perception that I am coming late may be because I am doing something which is against good sexual ethics." In relation to that, some respondents argued that this problem creates fear to other family members when their colleagues come at late hours as a result of traffic jam. Some respondents went so far as to argue that this has caused some people have blood pressure due to fears about their children or their beloved ones.

Another effect is failure for some people particularly women to perform some crucial family responsibilities such as cooking and other domestic work on the part of employed women. This is due to the fact that they spend two to three hours in traffic jam and as a result they arrive at home late and very tired.

Another effect of traffic jam at the family level is on income generation activities. Four respondents argued that their family income has been affected negatively due to the amount of time which was lost on traffic jam. In relation to this, traffic jam increases unnecessary cost of living to the family when people hire motorcycle as an alternative means of transport during heavy traffic jam. Thus 64.7% of the respondents argued that

they hired motorcycle during heavy traffic jam and this affected their incomes to a great extent.

4.11.2 Impact of traffic jam at community level

According to the answers obtained from 46 respondents through administered questionnaires, traffic jam has a greater impact at community level. These impacts can be grouped into three categories: (a) on people's social relation (b) on people's performance (c) and during hazards

To begin with peoples social relations, 32.6% of respondents argued that, traffic jam has affected their relationship with others including friends, neighbour and relatives. One respondent argued that "people nowadays do not meet to exchange ideas especially during the evening as it was in the past. This is a result of traffic jam since people are required to wake up early in the morning and coming back home very late in the night and very tired". In relation to that, 23.9% of respondents stated that they lack time to participate in social affairs such as wedding and funerals. Also, some respondents argued that they lack time to visit their relatives for the fear of traffic jams especially during weekends.

The second category of traffic jam's social impact is on people's performance. To begin with employed respondents, argued that they arrive late at work as a result of spending between two to three hours on traffic jam. This results in letters of warning, punishment, or even being fired from work. In relation to this, students in day schools find themselves being trapped in traffic jam for two to three hours as a result they get punished for arriving late at schools; they miss some of the first class sessions, they sleep in the cars. Also students lack time for sports, time to rest, time for private studies, hence get poor performance at school.

The last category of the social impact of traffic jam at community level as stated by respondents is during the occurrence of disasters such as fire. Some respondents argued that, roads are so congested to the extent that it took two to three hours for fire and rescue trucks to arrive. By the time they arrive, they find a massive distraction has occurred.

According to the in depth interview with Mr. Joseph Mwasabeja, Fire and Rescue is one of the most important institutions in any society. This is because communities are living in the environment where various disasters are occurring both manmade and natural

disasters. He agrees with the fact that traffic jam has imposed a great challenge on day to day functioning of the fire and rescue institution. “It is difficult nowadays to meet the standard time which requires the rescue trucks to arrive within ten minutes to the place where the event has occurred. Rescue work is very difficult during day time than night hours because roads are so congested during day time”.

As a result, community has been affected to a great extent by various events which have occurred. For example people have lost their life; properties have been burnt and destroyed by fire.

4.12 Respondents views about the solution of traffic jam in Dar es Salaam city.

The researcher required the respondent to answer the open ended question which asked, what do you think should be done to eradicate traffic jam in Dar es Salaam city? Answers for this question were obtained through administered questionnaire and in - depth interview. The answers to this question fall into four parts.

4.12.1 Infrastructure improvement/development

Twenty four respondents said the current roads should be either improved or expanded in order to accommodate the number of cars. Also, 13 respondents asked for improvement of feeder roads in order to reduce the amount of cars on the major roads in order to reduce traffic jam. Furthermore, 3 respondents suggested the introduction of other means of transport such as ferry (boats) from Bagamoyo to Posta especially for people who reside at Bagamoyo, Boko, Bunju, Tegeta and Mbezi beach. Also six respondents suggested construction of flyovers to every major road junction.

Grade separation is the method of aligning a junction of two or more transport axes at different heights (grades) so that they will not disrupt the traffic flow on other transit routes when they cross each other. The composition of such transport axes does not have to be uniform; it can consist of a mixture of roads, footpaths, railways, canals, or airport runways. Bridges, tunnels, or a combination of both can be built at a junction to achieve the needed grade separation. It has been argued that in Tanzania and in Dar es Salaam in particular, at the moment we need simple grade separation bridges (see Figures 4:10 below) for our critical intersections such as Ubungo, Tazara and Mwenge. It is pointed

out that in the future we might need complex grade separation as shown in figure 4:11 below depending on traffic demands, economics and the environment.

Figure 4.10: Simple Grade Separation



Source: Katala (n.d)

Figure 4.11: Complex grade separation



Source: Katala, (n.d)

4.11.1.1 Construction of a Fly-Over at Ubungo intersection

It is clearly understood that the volume to capacity ratio at Ubungo Intersection is very high and as a result there is huge traffic jam at the intersection since it is the major exit from Dar es Salaam to up-country cities and neighboring countries. Significant time loss is experienced at Ubungo due to this bottleneck. To solve the problem, a concerted Fast Track approach is required.

To solve this problem, it is proposed that construction of a mixed traffic fly over, using split design that takes into account the existing BRT lanes. In future the BRT lane along Morogoro road and Sam Nujoma road respectively is likely to offer most benefit in terms of intersection traffic operations. The benefits that could be expected by implementing the project include savings (in terms of cost and time, fuel, etc) to road users due to increased speed and capacity on roads.

4.11.1.2 Reducing Junctions

At present, the Morogoro road, from Ubungo to Chalinze Via Kimara, Mbezi, Kibaha, Mlandizi and Ruvu has Numerous junctions which cause a lot of interference with through traffic. There is also need to provide grade separation at some critical junctions and enhance service roads to cater for non through traffic. Grade separations can be done at Kimara, Mbezi, kibaha, and Mlandizi.

Alternatively, and to leave Morogoro road from Ubungo to Chalinze as an access road, the express way from Dar es Salaam to Chalinze should be built. It can be built in phases, phase 1 being from Dar es Salaam to Mlandizi and phase 2 being from Mlandizi to Chalinze. The Public and Private Partnership (PPP) approach could be used in this undertaking under the Build, Operate and Transfer (BOT) PPP type. BOTs are an effective way to bring private money into the construction of new infrastructure facilities or into the substantial renovation of existing ones. BOT agreements tend to reduce market and credit risks for the private sector because the government is the only customer, reducing the risks associated with insufficient demand and ability to pay. Private sector partners will avoid BOT arrangements where the government is unwilling to provide assurances that the private sector investment will be paid back.

In this regard, the private sector is taking over activities that would normally be carried out by the public sector. The private company bases the repayment of financing on project revenue. Another 6 respondents replied that train transport should be established in all parts of the region especially for the people who stay at Bunju, Boko, Tegeta, Mbezi beach and mwenge to the city centre.

From the in - depth interview conducted with the Assistant Inspector of Police at Oysterbay police station, Traffic police have taken some responsive measures towards the problem. One of the solutions has been the use of traffic police officers to regulate the flow of cars instead of traffic lights. This initiative has helped to reduce jam, although it has given police officers very hard time. They are forced to work from 6 am to 10 pm in a day. Also they are supposed to be at work regardless of holidays or weekends, day and night. Introduction of three roads system during peak hours, allowed three cars to move

to the city centre in the morning and three roads from the city centre during evening hours.

Under infrastructure development and improvement, Mr. Chuwa suggests the expansion of roads to accommodate more cars at a time which in turn will reduce jam on roads.

4.12.2 Policy and law reforms

To start with the answers which were collected through questionnaire, there should be introduction of high parking charges for private cars in order to discourage the entrance of private cars to the city center and promote the use of public transport. One respondent suggested that taxes for importation of cars especially private cars should be high. This will discourage the importation of cars since one of the reasons for traffic jam is larger number of cars than the capacity of current roads.

On the other hand, in - depth interview conducted with the Assistant Inspector of Police Mr. Ludovick S. Chuwa suggested the introduction of cars permits to private car owners to control the inflow of private cars in the city centre. Under this system, the owners are given cards which allow them to enter into the city centre two or three days only in a week. However this should go together with the improvement of public transport in the city centre.

4.12.3 Political reforms

One of the major causes of traffic jam in Dar es Salaam city was the location of many offices such as Ministries, Agencies and other institutions at one place: that is at the city center (e.g the Post office). Not only that, location of basic services such as hospitals like Muhimbili Hospital, Amana, and Mwananyamala, location of big markets such as Kariakoo, Ilala and Buguruni, supermarkets such as Imalaseko, Mlimani City contribute to traffic jam. Also, all financial institutions such as Bank of Tanzania and other commercial banks which have headquarters at the city center

Not only that, but also location of schools such as Tambaza, Zanaki, Jangwani, Tambaza and others necessitate people to move into one direction to work, to school or to acquire other basic services like financial, health and market services. So, in order to rescue the situation, data collected through administered questionnaire suggest that there should be

re-allocation of offices and basic services from the city center to the outskirts areas in order to restrict the inflow of people in one direction and to mitigate traffic jam problem in Dar es Salaam city.

Additionally, some respondents argued that, political leaders should learn from other countries which have succeeded to mitigate traffic jam. Studies on traffic jam and its impact on social economic development should be conducted and political leaders should implement their recommendations. In - depth Interview with Mr. Chuwa suggest reallocation of offices and basic services such as ministries, agencies, supermarkets and hospitals to outside the city centre, to areas like Kimara or Bunju.

4.13 Chapter summary

This chapter has presented respondents' profile, traffic jam awareness, the amount of time spent on traffic jam by commuters, the commuters' primary mode of transport, commuters' alternative mode of transport, roads with heavy traffic jam in Dar es Salaam city, commuters' views about the causes of traffic jam, psychological impact of traffic jam, health impact of traffic jam, social impact of traffic jam on family and community level and the views of respondents on the appropriate solution of traffic jam in Dar es Salaam city

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents a conclusion of what has been discussed on this report. It also makes the recommendations and points out policy implication of what should be done.

5.2 Conclusion

The study has revealed existence of social impacts associated with traffic jam in Dar es Salaam city. The findings of this study challenge all stakeholders to come together and collectively take responsive measures recommended below to eradicate the problem of traffic jam in Dar es Salaam city. The government through policy makers, Ministries, City and Municipal councils, media, international agencies as well as citizens have a great role to play.

It is important to know that there is a direct relationship between social and economic effects of traffic jam. For instance, a person whose health has been affected as a result of air pollution must spend an extra amount of money for treatment (medication). This in turn increases additional costs which could otherwise be spent on improving the living standard of the people. Also, a person who wants to attend important activity such as an interview, rushing to the hospital for maternity, or rushing to the airport and is trapped in traffic jam, may be obliged to hire a motor cycle, which may lead to incurring more economic costs than was necessary.

Late arrival or delay of rescue trucks during fire disasters caused mainly by poor infrastructures result into community loss of properties; people losing their lives and many being reduced to extreme poverty affecting their social well being in general.

Furthermore, traffic jam has a greater impact on special groups of people such as pregnant women, especially when they are on the way to give birth. Some of the women give birth before arriving to the health centre as a result of traffic jam.

It is very hard nowadays in the city, especially for ambulance to pass other cars when there is an emergence, due to heavy traffic jam.

5.3 Recommendations

The present report proposes that, it is vital therefore, for all the responsible authorities to make sure that these key projects are executed without delay to save the country from unnecessary losses of resources and to ease citizen's suffering on the roads as they endure excessive heat and long hours in traffic jams.

The researcher recommends the following in order to alleviate if not to eliminate the problem of traffic jam in Dar es Salaam city to reduce the social as well as economic costs.

- 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 centre.
- Diversification of basic social services from city centre to other areas outside the city, such as health centers, government agencies, supermarkets, schools and markets such as Kariakoo.
- Construction of flyovers at all main road junctions. This will ensure smooth movement of vehicles in the city. The research shows that there is higher degree of traffic jam from the road junctions, or in other words, most of traffic jam is experienced where there is road junction. By introducing flyovers cars will not spend much time waiting for traffic lights. This will reduce traffic jam.
- 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 centre.
- 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.

5.4 Policy Implication

- There is a need to review our urbanization policy so that government offices should be constructed out of the city centre to the areas like Bunju, Kitunda, Tegeta or Mbezi Mwisho to reduce congestion of people in the city center. In relation to this, urban planners should play their roles to avoid this problem in other fast growing cities in Tanzania.
- Also there is a need to review our internal migration policy. This means that, other regions should be improved with the availability of better services and better environment for business activities. This will reduce the influx of people from other regions to Dar es Salaam city.

All in all, traffic jam in Dar es Salaam city will remain history if only there will be a high sense of commitment, responsibility and political will by our leaders and authorities.

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APPENDICES

APPENDIX I

ENGLISH QUESTIONNAIRE

Dear respondent,

This questionnaire is intended to gather specific information about the social impacts of traffic jam in Dar es Salaam city. The research is a partial fulfillment of the award of the degree of Master of Science in Development Policy (MSc. D.P) of Mzumbe University. All the information provided in this questionnaire will be confidential and will be used for academic purposes only.

Thank you for your maximum cooperation.

SECTION A: PERSONAL INFORMATION

1. Please indicate your age

- a) 15 – 24
- b) 25 – 65 []
- c) 65 and above

2. Please indicate your gender

- a) Male []
- b) Female

3. Please indicate your occupation

- a) Employed
- b) Self employed
- c) Student []
- d) Driver
- e) Other

4. Please indicate your marital status

- a) Married

- b) Single []
- c) Separated

PART B: TRAFFIC JAM AWARENESS

5. Are you aware of traffic jam problem in Dar es Salaam city?
 - a) Yes []
 - b) No
6. How much time do you spend daily in traffic jam, when going to and coming from work?
 - a) 1 hour
 - b) 2 – 3 hours []
 - c) More than 3 hours
7. What is your primary mode of transport when going to and coming from work?
 - a) Private car
 - b) Public transport (Daladala) []
 - c) Motor cycle
 - d) Bicycle
8. What time do you wake up daily to go to work/school?
 - a) Between 3:00 am and 4:00 am
 - b) Between 4:00 am and 5:00 am []
 - c) Between 5:00 am and 6:00 am
9. What alternative mode of transport do you normally opt for during heavy traffic jam?
 - a) Hiring a tax
 - b) Hiring a Motor cycle []
 - c) Walk by foot
10. Please list down at least 3 locations (roads) where you experience congestion on a consistent basis
 1.
 2.
 3.
 4.

5.

11. In your opinion, what factors contribute to traffic jams in Dar es Salaam city?

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PART D: PSYCHOLOGICAL EFFECTS OF TRAFFIC JAM

12. Does traffic jam affect you psychologically?

- a) Yes []
- b) No

13. If the answer in Qn 12 is YES, explain how traffic jam affects you psychologically?

- a) Increased stress []
- b) Bad mood []
- c) Frustrations []
- d) Anger []

PART E: EFFECTS OF TRAFFIC JAM ON FAMILY AND COMMUNITY RELATIONS

14. What are the effects of traffic jam on your family?

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15. Do you agree that the following are the effects of traffic jam on the community social relations?

Effects	Disagree	Agree	Strongly agree
1. Poor participation in social affairs	1	2	3
2. Reduced number of relative visits	1	2	3

If there is any effect please mention it below

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16. How does traffic jam affect your health?

- a) Lack of enough time to sleep
- b) Respiratory problems as a result of air pollution
- c) Heart problems

17. In your opinion, what should be done to eliminate the problem of traffic jam in Dar es Salaam city?

- 1.

- 2.

THANK YOU FOR YOUR KIND COOPERATION

Ndugu Mshiriki, Dodoso hili lina lengo kuu moja la kukusanya taarifa kuhusu madhara ya kijamii yatokanayo na msongamano wa magari kwenye jiji la Dar es Salaam. Utafiti huu ni sehemu muhimu ya masomo yangu ili nitunukiwe Shahada ya Uzamili, Sayansi ya Sera za Maendeleo (Master of Science in Development Policy) ya chuo kikuu Mzumbe. Napenda kukuhakikishia kwamba taarifa zote utakazozitoa kwenye dodoso hili zitakuwa ni siri na zitatumiwa kwa lengo moja tu la kitaaluma. Natanguliza shukrani.

SEHEMU A: TAARIFA BINAFSI

1. Tafadhali ainisha umri wako

- a) 15 – 24
- b) 25 – 35
- c) 36 – 45 []
- d) 45 – 60
- e) 60 na zaidi

2. Tafadhali ainisha jinsia yako

- a) Mwanaume
- b) Mwanamke []

3. Tafadhali ainisha aina ya kazi unayofanya

- a) Umejiriwa
- b) Umejiajiri
- c) Mwanafunzi []
- d) Dereva

4. Je umeoa/ kuolewa? (a) Ndio (b) Hapana []

SEHEMU B: MSONGAMANO WA MAGARI/FOLENI

5. Je, unafahamu kuhusu tatizo la msongamano wa magari Dar es Salaam?

a) Ndiyo

b) Hapana []

6. Huwa unatumia muda gani kwenye foleni wakati wa kwenda na kurudi kutoka kazini/shuleni kila siku?

a) Saa Moja

b) Masaa 2 mpaka 3 []

c) Zaidi ya masaa 3

7. Huwa unatumia usafiri gani mara kwa mara wakati wa kwenda na kurudi kutoka kazini/shuleni?

a) Treni

b) Gari binafsi

c) Daladala []

d) Pikipiki

e) Baisikeli

8. Kwa kawaida huwa unaamka muda gani kila siku kwa ajili ya kujiandaa kwenda kazini/shuleni?

a) Kati ya saa 9 na saa 10 alfajiri

b) Kati ya saa 10 na saa 11 alfajiri []

c) Kati ya saa 11 na saa 12 asubuhi

d) Kati ya saa 12 na saa 1 asubuhi

9. Huwa unatumia usafiri gani mbadala kunapokuwa na msongamano mkubwa wa magari?

a) Unakodi pikipiki []

b) Unatembea kwa miguu

10. Tafadhali orodhesha maeneo matatu/ barabara ambapo huwa unakutana na msongamano mkubwa wa magari mara kwa mara.

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11. Unadhani ni sababu zipi zinasababisha tatizo la foleni Dar es Salaam?

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SEHEMU C: ADHARI ZA KISAIKOLOJIA

12. Je, tatizo la foleni linakuadhiri kisaikolojia?

a) Ndiyo []

b) Hapana

13. Ainisha ni kwa jinsi gani tatizo la foleni linavyo kuadhiri kisaikolojia?

a) Kuwa na msongo wa mawazo

b) Kujisikia vibaya []

c) Kujisikia hasira

SEHEMU D: ADHARI KWENYE NGAZI YA FAMILIA NA JAMII

14. Tatizo la foleni linaadhiri vipi familia yako? (Elezea kuhusu mahusiano baina ya wazazi na watoto na baina ya Wanandoa)

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15. Unadhani tatizo la foleni linaadhari gani kwa ngazi ya jamii? (Elezea kuhusu mahusiano kati ya ndugu, majirani na marafiki)

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SEHEMU: ADHARI ZA KIAFYA

16. Unakubali kwamba tatizo la foleni lina adhari zifuatazo kiafya?

(Weka alama ya tiki sehemu ya ndiyo/hapana)

1. Magonjwa ya hewa na ngozi (hasa wale wanaotumia usafiri wa umma kama treni na daladala)

2. Kutokupata muda wa kutosha wa kulala (hasa wale wanaolazimika kuamka mapema ili kuwahi foleni)

3. Tatizo la joto na miguu kufa ganzi kutokana na kusimama muda mrefu kwenye foleni

Ikiwa kuna adhari nyingine kiafya tofauti na zilizotajwa hapo juu tafadhali ainisha.....

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17. Unapendekeza nini kifanyike ili kuondoa tatizo la msongamano wa magari Dar es Salaam?

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NASHUKURU KWA USHIRIKIANO