CAUSES AND CONSEQUENCES OF TRAFFIC FLOW IN KAMPALA CAPITAL CITY

BY

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DECLARATION

I declare that this report is my original work and has not been presented for examination in any other University.

Signature…… Date…….

APPROVAL

This is to certify that this term paper was developed under my supervision and guidance and is for examination with my approval.

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DEDICATION

I dedicate this paper to my family.

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ABBREVIATIONS AND ACRONYMS

ICT	Information and Communication Technology
KCCA	Kampala Capital City Authority
KPDP	Kampala Planning and Development Plan
UDSA	Uganda Driving Standard Agency
UK	United Kingdom
UN	United Nations
UNRA	Uganda National Roads Authority
URA	Uganda Revenue Authority
US	United States

ABSTRACT

The study aim was to determine challenges facing the implementation of the existing framework which has resulted to traffic congestion in Kampala. In all the objectives of the study included; to establish the causes of traffic congestion in Kampala City and to examine the consequences of traffic congestion in Kampala. This paper presents the accelerating rates of unfavorable traffic flows in Kampala City despite the agency energies and government efforts to curb the congestion with both policy and infrastructural frameworks to level the road network with the increasing number of vehicles and people population within the surrounding of the authority. The researcher used explanatory mixed research methods with qualitative and quantitative approaches to mind data through documentary reviews, interviews and questionnaire survey. However, this still falls short due to mismatch between policy design and implementation by mainly enforcement teams, for traffic rules and regulations, lack of political will within the city, absence of a condensed physical and development plan as well as limited funds arising from low revenue and budgetary allocations. The write up further narrates the causes and consequences that accrue to the authority due to traffic flows such as rapid rural urban migration, poor road infrastructures, increased vehicle population, driver indiscipline, obstruction of major running lanes due to limited and poor park management, heavy trailers and poor city planning. That if these are not attended to urgently could spill over into increased injury and accidents, time wastage, decline in customer satisfaction and foreign direct investment frustrations, low productivity at work due to stress, social and economic stagnation, health hazards due to pollution and environmental issues as well as slow response to emergencies like fire outbreaks. This write up examined that the entire process of managing traffic flow demands coordinated effort between all city stakeholders to work interdependently, being aware of the existing laws, their implementation with high political will and massive sensitization. It calls for setting up strict laws and establishing a strong stand by traffic police that is more robust in enforcement and arrest of law abusers with high penalties following existence of a less biting implementation policy framework. Among others, the paper recommends driver training, improving coordination among traffic and road safety institutions while aligning the plans, resumption of passenger rail services, establishing Boda-Boda free zones, regulating heavy vehicle CBD access, opening up to bus rapid transport systems, encouraging citizens to avoid rush hours, road design automated highways, integrated development to curb rural urban migration and legalizing congestion fees. All these directed in a struggle to harmonize traffic flows with in Kampala capital city authority that in the long run will boost the country's sustainable development.

KEYWORDS:

Congestion, Modal, Road, Stakeholders, Traffic, Transport, Urban.

CHAPTER ONE

1.1 INTRODUCTION

This paper examines the vital causes and effects of traffic flow in Uganda digesting further the rationale for increased traffic jams in Kampala, and stresses the likely outcomes, while attempting to offer remedies and policy recommendations to curb the stagnation. The narrative review describes and critically analyses the key issues from related literature and documentations to cast the relevance of this section which presents the introduction, background, and theoretical framework, reality of traffic, its causes and consequences, conclusions and recommendations.

Traffic flow refers to the study of interactions between travelers (including pedestrians, cyclists, drivers and their vehicles) and infrastructure (including highways, signage and traffic control devices), with the aim of understanding and developing an optimal transport network with efficient movement of traffic and minimal traffic congestion problems.

Consequently, traffic congestion refers to the incremental delay caused by interactions among vehicles on a roadway, particularly as traffic volumes approach a roadway's capacity (Litman, 2014). Flow conditions are considered free when less than 12 vehicles per mile are on a road. Stable is sometimes described as 12 – 30 vehicles per mile per lane. As the density reaches the maximum flux and exceed the optimum density (above 30 vehicles per mile), traffic flow becomes unstable, and even a minor incident can result it in persistent stop and go driving conditions. A breakdown condition occurs when traffic becomes unstable and exceeds 67 vehicles per mile (Rijn, John 2014). Jam density relates to intense traffic density where traffic flow stagnates evenly in a range of 185 to 250 vehicles per mile per lane variable speed limits seek to harmonize speed and stabilizing constant flow (Xu, Wang 2016).

According to Ward's research (2014), vehicles volumes in operation worldwide surpassed the 1 billion unit mark in 2010. In addition Mackett (2012) in his London study to find means of diminishing private vehicle usage to reduce congestion in the streets evidenced attributed loss in the economy. For which the buses floated as a remedy (INRIX, 2013). They applause the cost of traffic jam on individual households and national economies in the U.S, UK, France and Germany as a first study to predict the increase in costs between 2013 and 2030 associated with rapid urbanization and rise in income per capita.

1.2 CONTEXT AND PROBLEM

1.2.1 Reality of traffic flow in Kampala

Uganda is experiencing high levels of rural – urban migration, making mobility in the capital city challenging (UN Habitat, 2013). With transport facilities in the city taking care of less than 10% of the urban people and 90% who walk and cycle lack sustainable facilities with flooding vendors and open man halls. Furthermore, there is poor road usage and a mismatch in enforcement of traffic regulations whereas her infrastructures are of very low capacity, a deficiency of an integrated and affordable public transport means, less concern for pedestrian and cyclist facilities with poor traffic and parking management (UN Habitat, 2013), highly flooded streets with Boda-bodas Kampala's traffic jams delays people to arrive at their destinations, and costs the economy about shs 500M (150,000 euro) every day (National Road Safety Report, 2010).

Urbanization in Uganda is one of the causes as revealed by the 2014 National population and Housing Census, estimated at 7.4million up from 1.7 million in 1991. This is a result of increase in the creation of urban centers. By March 2016, towns were 259 in Uganda including 33 Municipalities, 163 Town Councils and 62 Town Boards. The growth of Mukono, Nansana and

Kiira Municipalities has imposed pressure on researches in Kampala (UBOS, 2014). Surprisingly, there is a continued deviation in integrated planning yet they are interdependent.

In addition, during an African meeting on urbanization and creating resilient cities in Dar-ES-Salam, the Executive Director of Kampala City Jennifer Musisi asserted that urbanization and the flooding of people to the cities is erratic than the pace at which authorities plan and when affected, they receive threats from the politicians. This was justified by Uganda Bureau of Statistics as of 2014, which the day time population of Kampala city exceeds 2.5 million and at night it is around 1.5 million people.

Whereas an existing transport strategy emphasizes that need to provide quality, quantity, cost – effectiveness, efficiency and sustainable transport infrastructure and services (vision, 2025). Conversely, to a surprise the Ugandan transport atmosphere is surrounded by challenges on access, development and sustainability thus blocking the state to live above a fully developed and sustainable national transport mechanism for all by 2050.

Although since independence, Kampala City has been under gradual progress as far as road infrastructure is concerned. The creation of various government agencies to improve the transport sector is crucial. Headed by the Ministry of Works and Roads, several institutions including Uganda Roads Authority; National safety Council; others include Kampala City Council Authority and the Uganda Police among other sector institutions So various structures such as in the ministry of works and transport; the strategic plan; and related policies are in place to facilitate the progress made to this date.

Kampala City has approximately 2110km of roads of which 459km (38%) are paved and 750km (62%) are unpaved. A significant portion of the unpaved network is heavily trafficked with over 300 vehicles per day (www.kcca.go.ug/news/281). With the ever-increasing traffic volumes, it is

becoming very expensive and unsustainable to maintain unpaved roads. Almost 80% of the paved roads and 99% of the unpaved roads are in fair – to – poor conditions due to a heavy maintenance backlog. The roads are featured with potholes, distortions, cracks and of a low service. Despite the efforts by the government to construct more roads to curb this traffic issue, the reality is more people are getting vehicles, and the population continues to grow. This means the problem is static, thus deems solution (KCCA Report 2017). Traffic jams are inevitable but **they do not always have to buy you.**

1.2 OBJECTIVES

The aim of this study is to determine challenges facing the implementation of the existing framework which has resulted to traffic congestion in Kampala. In all the objective of the study will include; determining the causes and consequences of traffic congestion in Kampala. It is hoped that the findings will enable the researcher to draw conclusions and recommendations that help stakeholders to address the causes and consequences of traffic flow in metropolitan Kampala City to improve business, government and so on. The findings will be shared with academia, governments and all interested parties with overall objective of improving traffic flow in Kampala.

2.0 LITERATURE REVIEW AND THEORY

This section presents the review of literature pertaining to the condition of traffic flow in KCCA. It begins with the theoretical review of traffic flow, then the causes of traffic flow in the city and concludes with the consequences of the traffic pandemic in KCCA.

2.1 THE TRAFFIC FLOW THEORY

This paper is guided by the traffic flow theory which operationalized the concept of traffic flow on public roads. While Kerner (2009) concentrates on knowledge of fundamental features of the traffic flow and the associated analytical techniques favored by the desires, geography of tasks, and the mobility issues in road traffic using density and speed, road traffic is categorized as an interplay of shippers and people's needs and desires examining inadequate infrastructure and the legal framework as key determinants in traffic flow and congestion (Wards research, 2014).

Whereas Sundarapandia (2009) established that queuing theory describes traffic flow during peak hours when the density is high due to more vehicles on the roads, breeding road bottlenecks and jam. Public transport means reduces the number of vehicles on the road, decreases jam, and translates into faster and cheaper transport for economic sustainability (Dachis, 2013). The law on congestion is vital other than widening existing and building new roads (The American Economic Review, 2011). Yet congestion impacts on the mobility of people and factors of production, wastes time, energy and spreads pollution at micro and macro level (Rao & Rao, 2012). This theory is paramount for it will provide a better explanation of the phenomenon at hand. This paper therefore seeks to answer the question as to why there is a slow traffic flow in Kampala despite government interventions.

Attempts to produce a mathematical theory of traffic flow dates back to the 1920s, when Frank Knight first produced an analysis of traffic equilibrium which was refined into War drop's first and second principles of equilibrium in 1952. However, since then, there is no empirically general theory that can be validly applied to real flow conditions. Current models use a mixture of empirical and theoretical techniques that predict traffic, vehicle usage, land use changes and signaling zones of congestion. Road traffic congestion refers to the deviation between the inflow

and the outflow of vehicles into and out of a particular geographical space (Olagunju, 2011), thus a scenario where urban road network can no longer sustain the volume and density on it.

A free-flowing network, the traffic stream varies with speed, flow and concentration. There is uninterrupted traffic flow, on freeways (Henry Lieu, 1999). The application of microscopic theory is seen to be successful in that it emphasizes behavioral change in driving discipline. The major advantage to this theory is that individual car owners are encouraged to abandon private car usage in favor of public transport for an offer of incentives (Laffont and Tirole 1993). Thus the adoption of the above approaches has been the main success factor in reducing traffic congestion across cities in the world. Hence in attempt to assess the causes of traffic congestion, the researcher will use the transport demand management strategies as the conceptual framework for this study.

The researcher will adopt a thematic approach by reviewing policy guidelines of the institutions to be studied under this research with a focus on traffic accidents, the value of time and uncivil driving behavior, mass transport system, pedestrian traffic, bicycle traffic, restriction of shopping hours etc. as being factors for traffic congestion, and how these institutions deal with the various phenomena. Whereas under macroscopic congestion, the study will look at the technical aspects of roads such as intersection congestion; queuing; parking congestion; congestion interaction between cars; buses; trucks; bicycles; pedestrians; wheel-barrows.

According to the state of Environment Report for Uganda 2008, the jam in the Metropolitan city is arising from huge increase in motorization that is not matched proportionately with infrastructure facilities. Traffic management has been quite poor in many developing countries, despite the growth in transport demand and supply (Odeleye, 208).

Kampala Capital city Authority, Created by KCCA Act, 2010 and to be supervised by the central government the city covers the provision of services that enables operating businesses that support development; to plan, implement, and monitor the delivery of public services, and control city development (Government of Uganda 2011). This KCCA does this mandate by implementing programmes supported by central government; own revenue and development partners support (Ministry of Works & Transport 2015/2016). Considering the above mandate it is questionable as to why there is slow and poor roads maintenance in Kampala city so that congestion is improved. However a report by KCCA states that policy challenges in Urban Transport & Infrastructure are enormous (KCCA 2nd Annual IGC; Cities Research Conference; London). In Uganda, traffic Police has limited capacity compared to Costa Rica, the government is considering the need for a separate traffic police to influence proper management of this sector (National Road Safety Policy, 2017). Many police senior officers reveal that in an attempt to avert the traffic congestion, police conducts community sensitization programmers for the public regardless of whether one is a driver or not.

A review of Uganda Roads Authority Act is very clear, Article 2 ``Declaration of road reserve`` states; the Minister may by statutory instrument declare an area bounded by imaginary lines parallel to and distant`` not more than fifty feet from the center line of any road to be a road reserve. Whereas ``Article 3.``Road reserves to be kept clear.' states subject to any order which may be made under section 4, no person shall, except with the written permission of the road authority, erect any building or plant any *tree or permanent crops within a road reserve.*`` Furthermore, *Article 6.``Road authority may dig and take a*way materials in road reserve.`` A road authority may dig and take away materials required for the construction and maintenance of roads in any part of a road reserve approved by the district commissioner without payment to any person (`National Road Safety Policy, 2017).

From the above articles it is clear that although policies are clear, there is a mismatch with its implementation hence prompting further investigation in a bid to improve traffic congestion in Kampala. In general documentary analysis revealed that the Ministry Roads & Transport; National Road Safety Policy; has established sound policies across specific areas including drivers; traffic regulations; legal framework, regulations for institutions in road safety and their implementation are likely to improve congestion on Kampala roads.

2.2 CAUSES OF TRAFFIC FLOW IN KAMPALA CAPITAL CITY

Sanders (2015) contended that the effects of congestion in the United States of America entailed 87,606 crashes in work hours, 1,200 deaths, 37,476 injuries, 482 million hours lost in driver delay and $ 6.5 billion lost moment. Followed by destructed property and medical costs singling out that the cost worldwide especially in the developing countries is better dispersed with Lagos, Nigeria, Dar Es Salaam, Tanzania, Kampala – Uganda, Gaborone, Botswana, Lusaka, Zambia, Khartoum, Sudan, Nairobi, Kenya, Johannesburg, South Africa, Cairo, Egypt, Addis Ababa, Ethiopia, Kinshasa, Democratic Republic of Congo and Luanda, Angola with heavy congestion costs (World Bank, 2010).

Justified by the Global Commuter pain survey (2011), rapid growth in population, urbanization and globalization cause a lot of pressure elasticity on the transport networks worldwide thus affecting citizenry social, economic and environmental sustainability with over estimate of up to $30 trillion spent on infrastructure in the sector with large budget votes and resources directed on transport (Global Commuter Pain Survey, 2011). According to the state of Environment Report for Uganda 2008, the jam in the Metropolitan city is arising from huge increase in motorization that is not matched proportionately with infrastructure facilities. Traffic management has been

quite poor in many developing countries, despite the growth in transport demand and supply (Odeleye, 208).

Further, Oyeyemi (2015) contended that driver indiscipline is a classical cause of traffic crises in major cities, thus called for strictly enforcing traffic laws, rules and regulations without fear or favor to enhance the livability of the metropolitans. He also called for coordination and collaborative planning among all mandated agencies and other actors for synergy. Dominance of low capacity minibus Taxi and overreliance and road mode poses massive challenges like traffic congestion, air pollution and frequent traffic accidents (Pabst, 2014). Consequently since drive behavior has roughly diminished yet roads are congested, the widening size of Boda-Bodas overwhelm the traffic jams, accelerate accidents through open flouting traffic laws, and ignore speed limits whereas pedestrian facilities are disastrous with little or no pavements and crossing facilities (National Transport Master Plan 2008 – 2013). In addition the enforcement is laxity bending on inadequate budgetary allocations.

According to the National Transport Master Plan (2008 – 2023), although the system of paying for parking by pre-paid vouchers work moderately, most parking yards within Kampala are covered for long hours, widening illegal double parking, city streets are increasingly jammed for traffic flow is obstructed on major running lanes. Moreover, many buildings are built with inadequate parking zones yielding into high stagnated flow. It is attributed to inadequate funding while dwindling on unsustainable physical planning, substandard engineering practices and inadequate collaborative institutional planning for the rapid population growth. Relying on Jain et al., (2012) traffic congestion is a challenge in many cities in the World, and forecasted to worsen in future and it is here to stay. Moreover poor transport infrastructure condition and lack of maintenance and investment in capacity is the main cause of poor state of Kampala roads (World Bank, 2010) while inadequate maintenance constant.

Excessive rise in vehicle population developing countries like Uganda have witnessed an explosive growth in their vehicular population resulting into failure of conventional traffic management strategies. It is indeed a culture that driving is associated with modernization and civilization as opposed to other modes of transports such as walking, cycling; and use of public transport. This belief is the influence behind the kind of competition seen in the population in a city like Kampala scarifying funds that would have invested in viable programmes than purchase of motor vehicles that have resulted in congestion of Kampala city (Interview Uganda Police, 2017). Justification is drawing on the new vision, Monday, July 09, 2018, were it was established that as of 2014, Uganda's vehicle population was put at over 500,000 and motorcycles increased from 11,000 to over 100,000, whereas cars and station wagons increased from 11,000 in 2002 to over 27,000 in 2009. Thus serious traffic congestion is resulting in prolonged travel times, high vehicle operation costs and environmental hazards and continuously frustrates investment.

A World Bank study revealed that traffic jams cost Uganda over US$800m (over shs 2.8 million) in lost Gross Domestic Product that is equivalent to combined budgets for the ministry of Health, Agriculture and ICT, plus a well equipped secondary school and a probable primary school. As if that is not enough, heavy good trailers are a nightmare on Kampala's narrow and traffic congested roads and cause accidents. Justified by the 2014 police annual crime report showing more than 21.2% of road accidents in Uganda involved heavy duty vehicles, 13.2% of them for trailers and semi trailers, 44.6 for fuel trucks, 24.2% involved medium goods vehicles whereas 0.3% involved dual purpose vehicles. All summed on their larger dimensions and inferior performance on the road compared with an average automobile. As if that is not enough, they slow down traffic flow and damage roads, hence increasing the cost of road infrastructure/maintenance while environmentalists claim their accompaniment by increase in

congestion, pollutant emissions and energy use as well as road infrastructure thus impending social sustainability (The New Vision Tuesday, July 10, 2018).

The Daily Monitor, Thursday August 4, 2016, established that failure to observe lanes, amounts to traffic congestion in the city and ignorance regarding alternative roads poses threats on crowded Kampala roads yet the number of vehicles has also increased as more roads were constructed more than 20 years ago. While unplanned stoppage / parking space the city does not have any planned parking facilities. That is why vehicle operators stop their vehicles in any place where they need most of the building in Kampala do not have parking yards which causes traffic jam. As the case should be, urban planning for road infrastructure should have provided designs that include stoppage and parking space for all roads in the city. This is a requirement for efficient traffic movement and a means of accident reduction (Interview Uganda Police, 2017).

With the current urban population growth rate standing at 5.2%, the projected population is 10 million by 2040 (KPDP). Traffic flow has direct economic and social costs which in turn impose heavy costs on the National economy. These sometimes hidden costs, damage the competitiveness of our cities in the region market, the attractiveness of the city as both a tourist destination and a place to live such costs are; reduced productive time, unpredictable journey times, increased risk and costs to motorists, pedestrians, green house gas emissions polluting the air, stress, anger, tiredness as a result of road rage violence exhibited by drivers in traffic jam.

On the other hand, the development of Kampala traffic flow still grapples with low local revenue(4%) as much grants and loans (20%) which explains a deficiency in ownership of the sector development yet the entity requires over USD 1.5Bn to upgrade the road network (KCCA, 2016).

Poor road networks, unplanned cities, roads in developing countries like Uganda tend to be narrow and poorly built; thus resulting in poor traffic which in turn results in traffic congestion. In the case of Kampala city, it was built decades ago to suit the colonial interests of the British. There was no focus on future growth of the city let alone urbanization with its results such rise in population as a result of convergence of development programmes to link the central business centre and the residential and other commercial or industrial units (KCCA, 2016).

Limited road spaces a result of unplanned parking and construction materials, much of the work remains to be in progress, hence with the low available road space allocation it is common that very few vehicles will get the chance to use some parts of roads resulting in incomplete roads projects thus causing potholes all over Kampala city which in turn results into traffic jam in Kampala city. The challenge of road space is related to how the city was developed without a genuine master plan. Thus the challenges are related to compensation if any space is to be expanded to improve road space (URA, 2016).

Growth of a city in an ad-hoc manner the case of Kampala city; this is where there is no provision made towards proper town planning that involves proper design including design of road, water and most especially the sewage system management where by most of the sewage septic channels are constructed in middle of the roads yet they always get blocked which affects the transport system, thus resulting into various roads challenges as experience all over Kampala city. This is indication of poor land policy which is necessary in the redesign of the city as far as compensation issues are concerned (KCCA, 2016). The lack of mapping that needed to have been done to allocate city infrastructure is an issue of concern in the current status that has resulted in poor roads in Kampala City. The city is suffering traffic jam as an outcome of unplanned city. Engineers and urban city planners are responsible for forecasting and planning the management of traffic in cities. Planners always think of long term projects while engineers

opt for short term solutions and aim at profit making. The administrative and technical conflict between planners and engineers is a challenge in roads infrastructure development. The clashes between these actors' interests' amounts to slower progress leading to incompletion of projects hence causing traffic congestion (KCCA. 2016).

2.3 CONSEQUENCES OF TRAFFIC FLOW IN KAMPALA CAPITAL CITY

The city agglomeration benefits range from people accessing jobs that better match their skills, sharing knowledge face – to face and creating demand for more business, entertainment and cultural opportunities which spills into benefiting other people (Dachis, 2013). However there are wide costs of congestion that should be taken into account like **time lost** (Dachis, 2013). Congestion in Kampala city has increased journey time from 24 minutes per kilometer in 2014 to 2.9 minutes per kilometer today; road facilities still hooves around 3,500 persons per year, one of the highest in Africa.

Exaggerated unit cost of infrastructure including roads causes a hemorrhaged of about $ 300 per year through under pricing of utilities and mismanagement of projects. The 2016 commission of inquiry into Uganda National Roads Authority reported value loss of up to shs 4 trillion in 7 years on account of abuse of resources. Moreover, the road user satisfaction survey (2016) by the Uganda Road fund revealed a marked decline in satisfaction level from 51.7% in 2015 to 4.5 % in 2016, all sighted on narrow, dusty, accident prone, congested roads. Yet up to $50 million per year is being invested in Kampala and other urban roads joining to Kampala City. According to KCCA statistics, only 500 km out of Kampala's 2,100km road network is tarmacked which leaves the others with potholes that delay and are wasteful of fuel. Every time a vehicle stops and starts in traffic congestion, it uses more fuel than it would if there was no congestion. It makes drivers dig deeper into their pockets to cater for more fuel yet the current fuel prices in Uganda

have sky-rocketed consequently, vehicle used for commercial relevance fall short at realizing optimum profits yet personal usage is ditched for cheaper means.

Low productivity ate the work place: Once one is trapped up in traffic in the morning, it becomes hard for him or her to get to work in good time, tend to lie their employers on late distractions, gets home late, sleep late and arise early to try and beat the morning traffic a deprive that dwindles productivity. (Edmund, J. 1996) Enumerated the following as negative effects of traffic congestion; Time Delays, It leads to time wastage thus has negative effect in social economic development of the country. The effects caused by delays are more critical in private sector employment, health and education in public sector thus, resulting in loss of business, disciplinary measures. For instance in the education sector it leads to delays for both pupils and teachers to arrive at in time. In the health sector delays in timely arrival may affect things like attendance to patience which can lead to loss of lives.

Health hazards: Besides consuming liters of fuel, vehicles in traffic congestion emit harmful gases that could cause major health complications to people that inhale them. Literature reveals that this can lead to brain damage, lung diseases and high blood pressure among others. Majorly those regions are faced by global – warming due to air pollution and sitting in traffic deprives people a chance to exercise and release the pent-up stress. Also is pollution of the Environment, due to congestion a lot of fuel is wasted as a car`s engine is kept functioning thus leading to air pollution due to excessive release of carbon dioxide in the air. Of course the effects of pollution are a serious concern to environment as far as air pollution and related air-borne diseases are concerned. Increased in environmental pollution has long term effects to the natural environment on which human existence is based.

Frustration and Stress, as need to be known frustration and stress is a result of traffic congestion is a source of various diseases such as heart disease to most motorists. Frustrated and stressed drivers are prone to accidents thus resulting to the destruction of the limited road infrastructure such as traffic lights; bridges; sign-posts etc. This in turn slows down the needed improvement in road infrastructure aimed at reducing traffic congestion in Kampala.

Slow Response to Emergencies, emergencies such as fire; theft or burglary; maternity and others may not be responded to with ease e.g. police response; delivery of patients in hospitals etc. thus endangering lives of citizens. With well planned roads congestion is reduced thus response to emergencies can be undertaken swiftly.

3.0 METHODOLOGY

The researcher used explanatory mixed research methods with qualitative and quantitative approaches to mind data from the following sources of information for this study; the researcher gathered such data through documentary reviews. The methodology of this paper sets a narrative review of literature comprised in articles, journals, public gazettes, books, reports and papers that draw explanations of the viral causes and effects of traffic flow in Kampala while excavating facts from the published provisions from regulatory authorities such as the Kampala Capital City Authority (KCCA); the Uganda Traffic Police Act; Uganda Roads Authority; Ministry of Roads & Transport; and Uganda Driving Standard Agency (UDSA). Furthermore, key informant interviews were conducted on KCCA staff and clients in the major divisions. On the other hand, self administered questionnaires and focus group discussions were used to allow ease at the respondents to track historic and narrative data.

The study determined the mandate of each stakeholder in question hence determine the extent of their roles and involvement in solving the causes of traffic congestion in Kampala.

4.0 FINDINGS, CONCLUSION AND RECOMMENDATIONS

4.1 FINDINGS

KCCA has over years devised mechanisms to curb traffic jams through strict laws, increased number of traffic control units and personnel, lane design, increased road capacity, introduced the services of Pioneer Easy buses, made restrictions and one way lane designs while decongesting the road way sellers (hawkers) to create space for traffic flows. However, this process is still unpleasant for it has attracted multi-stakeholder criticisms due to politicizing the struggle by the authority to de-congest Kampala, less aligned stakeholder interests, limited funds, limited institutional capacity, mismatch between law and regulatory framework draft and implementation(KCCA 2014).

On average, 24,000 man hours are lost each day by commuters in Kampala due to traffic jam (UNHABITAT 2013). Of the 1200 km of roads in the city, only 115 km have street lights fitted, with only 9.2 functional, 170 kilometers of roads have been constructed out of an estimated road network of 1200 km. The road network was constructed in the 1960s to accommodate 100,000 vehicles yet with little improvement, the current number of vehicles is estimated at 400,000. Under the new strategic plan 2014 – 2019, KCCA plans to mobilize and invest US $ 1.55 billion over the five year plan period Kampala has been ranked as East Africa's best city to live in. The city has been decongested, reorganized and brought to order (Kyohairwe, S. 2012).

> *On time wastage, most taxis drive over like 12 trips in and around Kampala City and in the rush hours between 5-8 pm compared to early morning periods, many drivers fee frustrated after spending excess hours and minutes on the roads, however, the situation is worse when it rains where rain flooding and poor driver discipline that makes the trend of traffic uncontrollable with a few or no guides and*

> *traffic officers present at the road spheres. This is mostly in the junctions. These make many drivers waste at least 15 minutes in traffic jam for a minor trip and averaging to 2.5 hours wasted a single day. (Key informant's interview No.1 Oct 2018)*

Furthermore, if not urgently fixed, it will spill over into time wastage, less productive labour force, pollution, low direct investments that might make Uganda underscore on sustainable development agenda and vision 2040.

By around 2016, Uganda had over 500,000 cars but every month the URA clears anywhere between 1000-2000 new or second hand cars that transcend the Ugandan roads. Evidently the cash streams in KCCA show that about 120,000 UGX is gathered from Taxis that approximate to 1.5 billion every month from about 12,500 taxis that locomotion in the proximity of Kampala. This evidences hyper rates of traffic.

> *Worse still, the city being a focal administrative and enterprise center for the state, it nodes the other regions and traps an even sun light population of an estimate of 2.5 million people and about 1.5 million at moonlight. Thus, justification of over one million travelers making a return journey to Kampala City on a normal working day, these accrue to the city using public taxis or private vehicles. (Key informant's interview No.2 Oct 2018)*

Another key informant consented that the transport charges to and from Kampala City ranges between 500-3000 shillings representing an average of one million people that use 700 shillings per trip spilling to over 1,500 shillings every day in transport. Positively this amounts to over 1.5 billion shillings collected by the transport sector on a daily basis rather this is threatened by traffic jam thus, stagnating economic growth and development.

> *Equally important, many drivers complain of increased losses due to wasteful fuel consumption. They claim a loss of about 1.2 liters of fuel per rush hour idling in jam yet for old vehicles this can be doubled thus leaving many citizens crumbed to poverty. Findings show that taxis waste about 10,000 shillings in fuel due to traffic sluggishness. (Key informant's interview No.3 Oct 2018)*

Singling out the changing driver behaviors, key informants applauded the work of traffic wardens and police with government policy for having cracked down reckless driving in and around the city (Fika Saalama) operationalized on charges or payments of fines instantly when one falls victim of bad driving, they are taken to court within one hours time and otherwise, many pay fines that accrue to the consolidated fund. More so, others appreciated the struggles by key stakeholders and the media role in educating and sensitizing the drivers on how to effectively use the road with little or no traffic. Most radio stations locally guide drivers on the no go zone or traffic junctions with offering alternative routes for timeliness.

> *Centering on the effects of traffic jam, in Kampala most of the Boda-Boda drivers have fallen victims and ascertained injuries related to traffic jam caused accidents. According to statistics, not less than 1,000 and 10,000 victims were killed and injured respectively due to road traffic incidents in Uganda between 2010 and 2014 (Annual Traffic and Crime Report of Uganda Police Force). All grounded on extroverted road use culture, unprofessional driving; lack of drivers experience; neglect and sluggishness adoption of road traffic laws and vehicle road worthiness; load infrastructure deficiencies and drug abuse. (Annual Traffic and Crime Report of Uganda Police Force 2014)*

Most of the roads in Kampala City are surrounded and covered with a number of potholes yet their size and design spans back to a car or user population of the 19th century of which even one

way roads are carelessly used by Boda-Bodas and mushrooming traders who conduct business on political linage. This has caused extensive traffic jam.

The KCCA estimates that 24,000 hours a day are lost by commuters due to traffic jams. Yet by standards of the World Bank, it's an equivalent to a loss of $800 million every year. Further, findings by the state of environment Report conducted by the National Environment Authority, Uganda loses approximately 500 million shillings every day through excess fuel used to navigate traffic jams.

> *Although Kampala is lagging behind in the provision of most infrastructure and services, poor mobility is particularly challenging. The spatial growth of Kampala and the efficiency of its economy are negatively impacted by congestion, and the challenges posed by congestion are compounded by the proliferation of public transport modes in Uganda dominated by 14-seat private mini buses and the rapid growth in motorbike taxi services - and an explosion in private motor vehicle ownership (estimated at 11 percent per year).8 Traffic jams are a regular feature of day time travel in Kampala, which involves one million commuters daily.*

A better urban transport system is essential to reduce congestion and improve connectivity, facilitate the movement of people, move products to markets, and stimulate job creation.

Improving urban mobility will have a significant impact on the poor and ensure inclusive growth. In addition to those who use public transport systems in their daily means, approximately 70 percent of work trips are on foot in Kampala, primarily by the urban poor. (KCCA 2015)

> *The largest number of road accident casualties is pedestrians. In 2013, of a total of 640 fatalities, 291 were pedestrians. Therefore, improvements in the*

> *urban transport sector and enhanced accessibility can yield great benefits to the poor. In particular, better road designs with pedestrian walkways, streetlights, signaled junctions and pedestrian crossings could greatly reduce pedestrian fatalities and benefit a majority of the population. (KCCA 2014)*

Given the inter-linkages between roads, drainage and traffic flow, the 2003 Kampala Urban Transport Improvement Plan (KUTIP) provided a framework for addressing these issues in a coherent and coordinated manner. KUTIP proposed urgent traffic improvement and road maintenance intervention requirements for the short term investment. The proposed interventions were aligned with the long term Transport Master Plan Study and the third update of the Road Sector Development Program just completed by the Ministry of Works and Transport (MoWT).

> *Also the Greater Kampala Metropolitan Area (GKMA) Transportation Master Plan 2009, Japan International Corporation Agency (JICA) Study 2010 and Bus Rapid Transit Study 2010 indicate that improvement of all the junctions in the city are long overdue given the current increased traffic loads. Traffic improvement plans from the KUTIP study have been developed for the central business district (CBD) and elsewhere in the city in order to reduce congestion and improve road safety10. The plans include changes in traffic circulation and introduction of one-way streets to improve flow at major junctions and road widening schemes to remove traffic bottlenecks. However, these interventions are a small subset of overall urban investment requirements. The scope and scale of investments will need to be expanded to include other critical infrastructure proposed in other*

studies prepared for Kampala, such as drainage, non-motorized transport and bus rapid transit. (KCCA 2016)

Improving the effectiveness of all interventions will require integrated planning, coordination and management of infrastructure and services within the city and GKMA. This will prepare Kampala to play its proper role as the economic capital of Uganda, and as a regional hub.

The problems of traffic congestion and accidents have been registered on a number of roads and road junctions in the city. Consequently, the Government in general and road users in particular lose a lot in time, costs for fuel and spares, lives, environmental hazards, and psychological tortures. (Key informant's interview No.4 Oct 2018)

4.2 RECOMMENDATION

However, since traffic congestion or jam as the case may be is a classic demand and supply issue, it can be remedied by increasing road capacity or reducing traffic (Shopade, 2010). Installing traffic sensors to alert agencies on abnormal flow or obstructions could aid prompt remedy pro-actively before congestion (Shopade, 2010).

According to Sanders (2015), motorists, motorcyclists, bicyclists and pedestrians require total guidance all through rapid zones to eliminate confusion that can result into collusion and increase jam. His submission was supported by Heydt (2015) who emphasized proper and regular traffic control at construction zones in the cities and on major corridors where road rehabilitation activities are in progress by deploying traffic personnel to remedy jams and for safety purposes.

Avoid rush hours: Majority of people leave their homes for work at six O'clock in the morning and close business eleven or twelve hours later, at five or six O'clock in the evening, these people will be heading back home. It's obvious that the mass movement will lead to traffic jams

at these peak hours. Logic dictates that you either leave early in the morning or later in the evening lest you will end up spending time in traffic.

According to (Pabst, 2014), institutional and regulatory issues are of relevance because private sector capital has shown little inclination to invest in areas of passenger transport other than second hand imported minibuses or single –passenger Boda-Bodas, thus displaying all the classic symptoms of "short – termism". This demands investment by government to revitalize wide spread operationalization of larger buses that are efficient and reduce travel cost on the other end, licensing of public transport operations calls for a unified review with strict controls and licensing Boda-Boda for hire.

Hit the gym: While the rest of the city yolks are stuck in traffic, get those abs you have always wanted to flex those muscles. Cut the weight, sweat out the day's stresses, and tone that body. Take time to look good by hitting the gym and you will have yourself to thank later. You accomplish very little by idling in a vehicle that can barely move only to get home and feel exhausted. Work schedules take up large chunks of the day and it's easy to get caught up in them and forget the importance of keeping fit.

Design Related Aspects, the need for junction improvements; by use of bridges; tunnels thus giving space to pedestrians and motorists. There is need to improve road space to facilitate introduction of highways with reversible lanes in most part of the city. There is need to redesign city roads to tally specific user groups such as cyclists, pedestrians etc. The need to improve urban planning and design practices which can have a negative impact on levels of future traffic congestion, thus such should improvise for future roads expansions (Ministry of Roads and Transport, 2015/2016).

Introduction of Automated Highway systems, the need for installation of traffic lights in all round-about in the city, hence the need for power supply to facilitate the functioning of the system. The best future idea which could improve traffic management is the need to introduce automated highway systems such as CCTV in Kampala city; under this system vehicles are monitored for irregularities such as speeding, drunk driving etc (Uganda Police, 2017).

Improvement of park and ride facility, Kampala city council Authority should begin considering the introduction of park and ride facilities to reduce on traffic congestion in a few central parks of Kampala city where by parking locations should be put out side Kampala city in order to reduce on the number of vehicle entering the city. The government should also put more emphasis and efforts on the owners of arcades to parking yards for their tenants hence reducing on traffic congestion inside Kampala city'

Integrated development strategy, which leads to reduction in distances between residential, commercial, retail, and recreational destinations hence encourages cycling and walking instead of driving. Proper city or proper provision of city lighting can reduce the need to travel by car for most inhabitants. Establishment of bus / rail or metro transit zones in residential and commercial areas designed to maximize access to public transport by providing a transit station (UNRA, 2017).

Congestion can be reduced by either increasing road capacity (supply), or by reducing traffic (demand), in well planned cities creating of new routes is one simple recommendation to solving traffic congestion in a city like Kampala. Introduction of Congestion Pricing; under this method is where a certain area, such as the inner part of a congested city, is surrounded hence entry with a car requires payment. Introduction of Road Pricing; for instance; Entebbe road is one of the

busiest, thus charging money for access onto specific area at certain times, reduces congestion levels for road users such as government officials (Kiwanuka, M. 2017).

Parking Restrictions and Park and Ride Facilities, reduction of demand can include: making motor vehicle use less attractive by charging higher parking costs. This is because free parking distorts spacing of parking space in a city like Kampala. KCCA should begin considering introduction of park and ride facilities to reduce traffic congestion in a few central parks. This means parking locations will be introduced outside the city (Kiwanuka, M. 2017).

Introduction of public transport, the government should encourage as well as sensitizing the citizens to use public means like buses, train heading to major routes outside Kampala city thus reducing traffic congestion in the city for example Nairobi city has introduced this mechanism following the upgrading of its routes to major outside Nairobi city. This helps in reducing on the number of vehicles inside Kampala city because citizens will be using public means instead of their personal vehicles while travelling to the city thus solving the problem of traffic congestion as well as reducing air pollution which is caused by gases produced by vehicles. Introduction of Public Transport, the government should encourage introduction of public buses that carry big capacity instead of taxis to reduce congestion in the city, Nairobi city has introduced this mechanism following the upgrading of its routes to major locations out of Nairobi city (Kiwanuka, M. 2017). This will also require a policy for phasing out taxis. The use of public transport reduces accidents and pollution because the buses are speedy and rely on high ways, which government has to redesign to meet the needed change. Introduction of Ride Sharing, this is a mechanism where residents in a locality share transport instead of individual vehicle use as a means of reducing transport congestion in cities such as Kampala. Through the same method,

employees in a particular institution can as well share transport with the aim of traffic congestion reduction. Such measures need to be put in place in our transport legislation.

Introduction of Restrictions, Days of the week restrictions this is done by restricting number plates say during working days in profiting for instance use of certain locations. Permits Restrictions is another method; under this method only certain types of vehicles e.g. residents are permitted to enter a certain area (Kiwanuka, M. 2017). All this is done with the aim of improving traffic congestion. Promotion of Cycling the use of cycling is one of the best way of reducing traffic congestion for example in Uganda today if someone does not want to be caught up in traffic jam he or she hires a motor cycle (Boda-boda) in order to reach work in time yet the cycling space is limited however if the government gets involved in the promotion of cycling traffic congestion problem will be solved (Kiwanuka, M. 2017). This could be done through legislation in which an offer of subsidies to cyclers is to be affected. This will require roads modification to allow cycling space etc. The Netherland leads in friendly cycling policies.

Uganda Driving Standard Agency (UDSA), with a vision "to become a leading driving and road safety agency in the world" and a mission statement "safe driving for life" Findings from (USDSA) revealed that since its establishment in 2009; (USDA); has a team of experts in driving and road safety. Aware of the fact that there was a rampant rate of road accidents in Uganda; UDSA has a team of highly qualified and experienced instructors and drivers mainly trained in Britain. Their role is the provision of advisory support to driving training schools in Uganda. Above all (UDSA) is associated with a number of Ugandan and International organizations to enhance its capacity in addressing safe driving and road safety gaps in Kampala and Uganda in general. What is not clear is how (UDSA) will work closely with driving training schools in Uganda to monitor and ensure that quality drivers are produced in order to ensure

driving rules and regulations are adhered to and how it provides technical support to improve road safety in Uganda.

Others relate to resumption of passenger rail services, Boda Boda free zones, regulation of heavy vehicle CBD access; revive the bus rapid transport system and charging congestion fees. I am optimistic that these in addition to periodic sensitization campaigns to all road users on the good of respecting the traffic and road users Act, laws, rules and guidelines, will enable KCCA operate a flexible traffic flow with ease.

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