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POPULATION GROWTH AND TRANSPORT SERVICES: THE CHALLENGE OF TRAFFIC JAMS IN NAIROBI CITY COUNTY, KENYA

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Abstract: *The traffic situation in Nairobi presents a growing challenge to road user and workers. This leads to low productivity, retarded growth of GDP, Fatigues and stress related challenges to city dwellers. Most of the trips generated in the suburbs and beyond seem to be directed to or through the CBD of Nairobi. The study was carried out in Nairobi Central Business District (CBD). This study set out to investigate how traffic jams in Nairobi cause lost hours of work. The objective of the study was: to investigate population growth variables and how they affect road transport in Nairobi leading to lost man hours in traffic jams. This study focused on matatu mode of public transport in Nairobi and specifically registered SACCOS operating in Nairobi. This study was anchored on the Central Place Theory, Utility theory and the Theory of Urban Fabric. The study used the cross-sectional research design with a qualitative survey approach. A sample of 56 Matatu SACCOS operating in Nairobi was used for the study. Mixed methods were used in the analysis where, content analysis was used to analyze qualitative verbal responses while SPSS was used to analyze quantitative data. The sample was computed as a percentage of the total population where 30% was used. This study discussed the Matatu systems challenges and potential solutions focusing on the problem of lost hours of work due traffic congestion. The research concluded that there psychosocial effects of traffic congestion which included loss of revenue, wastage of fuel on traffic, fatigue, lawlessness, lonely families members due to absentism of other members, lack of mentored children among others. All these are the consequences of inadequate traffic management systems in the CBD of Nairobi. This study makes various suggestions concerning the future of Nairobi's public transport system and the future role of Matatus. It notes that some of the positive quality attributes of status such as the introduction of BRT and light trains should be taken into account in planning for the future.*

Key words: *traffic, population, jams, congestion, transport, urban*.

1.1 Background of the Study

Transport is the backbone of urban life and is crucial for sustainable development of any city. Demand for transport services in Nairobi has gone up due to rapid population growth and dilapidated state of roads and railway systems. Global human population is rapidly growing leading to congestion in major cities, towns and urban Centre. China with a population of 1.379 billion people is the most densely populated country in the world. The main mode of transport used in China is Rail. This is because they have an elaborate railway system and a distributed industrial and housing set up. 6% of the world's railway system is in China. This system carries about 24% of the world's transport volume owing to the high human population in China.
India with a population of 1.324 Billion people is the second most populated country in the world. India has several different modes of transport including cable transport system, road rail, water and air. India has the world's most used road transport system in the world. Netherlands with a total human populace of 17.02 million people has designed its road network in a way that reserves a lane dedicated to cyclists. This has made bicycles the most common means of transport in Netherlands. Human settlements are also fairly distributed to discourage congestion, (Kenya Economic Report 2017).

Lupala (2012), in his study about urban planning strategies, observed that one of the challenges confronting cities in non-industrialized countries today is the fact that cities are growing at unprecedented rates, size and densities. Growth trends in these cities are largely unregulated. In our modern society, mobility is a driving force of human development. (Cools, 2017). Global research estimates show that approximately 1.2 billion humans rely on public transport to commute to their places of work. In Kenya it is estimated that 18.9 million people use public transport to their places of work. Another 10.1 million people walk on foot to their places of work, some because of high fares, others because of close proximity to their places of work and others due to health and fitness reasons, (Omwenga, 2016).

Urbanization in Kenya is explained in large and measure by the growth pole theory. Further, the urban development policies in the country are founded on the theory. Kenyan urban hierarchy is characterized with one metropole (Nairobi city) together with a limited number of major urban centres. (UN-HABITAT, 2015). The estimated population of Kenyans is approximated at 45 million people. Nairobi alone has a total population of 6 million residents up from 3 million in the year 2006. Road transport is the main mode of transport for Nairobi residents followed by rail transports. On average, an hour is lost on traffic every day in Nairobi as a result of Traffic Jam. This translates to 365 hours a year (KNBS 2017). Due to regular traffic jams, Nairobi loses approximately $600,000 in lost manhours. A survey study in 2017 revealed that Nairobi is affected due to traffic jams. (Friedberg& Hunt 2015).

A study conducted in Kenya by UK-based dry cleaning and laundry service Zipjet (2017) lists Nairobi as the most stressful city to live in. The study listed the world's most and least stressful cities of 2017. The report considered factors such as traffic levels, infrastructure, public transport, and percentage of green spaces. According to the study, Nairobi ranked 113, indicating a higher level of stress, with traffic remaining as one of the worst. Stress-free cities, according to the Zipjet report (2017), are Stuttgart, Hanover, Munich and Hamburg, all located in Germany. Availability of reliable transport services is universally recognized as a pillar for economic development. Yet

millions of people in the developing world do not have reliable roads and transport infrastructure. The situation is often worsened by long queues of traffic jam often leading to delays in transportation. Only about one-quarter of the households in Nairobi have their own private transport. Thus the majority of Nairobi residents rely on transport. An additional 6 percent are even worse off; as they can hardly afford the cost of transport services**.** Transport service providers perceive service provision in Nairobi as commercially attractive leading high fares and the emergence of informal providers of transport who are organized in cartels, profiting from their monopoly power by distorting competition and creating artificial shortage, (Republic of Kenya 2017).

According the National Census of 2009 conducted by KNBS, Nairobi City County has an approximate population of 3.375 million people but the population continues to grow at an estimated annual rate of 3% each year Nairobi had a total population of million people. As at November 2018, the estimated population was 4,132,094, (County Government of Nairobi Planning Report, 2018). This increase in population has led to high demand for transport services, (KNBS Demographic Survey 2009). Elimination of traffic congestion is one of the pillars of Nairobi integrated urban development plan. Light trains and bus rapid transport systems were some of the proposals put forward by proponents of the documents. (www.nairobi.go.ke). Underlying all these problems, however, is the acute shortage of resources in the provision of a long life urban transportation infrastructure sufficient enough to match the large additions of population and the emerging patterns of population distribution and demands for public transport services. (NUSG, 2010). According to Scar (2012), rapid population growth without proper planning for transport services contributes to jams. The outcome is loss of work hours, fatigue and psychosocial effects. Nairobi currently loses $240 million in revenue annually due to lost working hours on traffic jams. If not controlled, the figures are projected to double by the year 2030, (Scar, 2012). Other effects economic effects include stagnation of GDP, (Omwenga 2016).

This study seeks to analyze the challenge of traffic jams in Nairobi within the context of showing the impact on productivity of the work force. It attempts to measure these especially as relates to issues such as traffic jams and its outcomes on the citizens as a result of the time wasted and the psychosocial effects on passenger, drivers and stewards. The study basically seeks to establish the impact that population growth has on transport services in terms of lost man hours that would have otherwise been spent productively at work. Some of the many popular criticisms levelled at Nairobi's public transport system and the Matatus in particular are not warranted since they are not based on empirical findings. This study offers an analysis to Nairobi's urban transportation situation in that it provides a systematic framework for the description, analysis and explanation of this urban public transportation phenomenon. It intends to investigate causes and possible solutions to traffic jams in the city.

1.2 Study objectives

The general objective of this study is to investigate the influence of urban population growth on transport services in Nairobi City County.

a) To investigate population growth variables and how they affect road transport in Nairobi.
b) To identify the major causes of traffic jam in Nairobi
c) To explore how transportation regulations affect Road transport in Nairobi.
d) To identify the challenges of the huge workforce on transport services in Nairobi

1.3 Literature Review

The transport industry is a highly contestable market in the absence of government regulations. The common argument for the need to regulate transport is based on the supposed danger of chronic instability due to inherent tendencies to create unnecessary congestion due to flouting of traffic rules (Renardet 2016). That is, the industry is highly vulnerable to chaos, which lead to rampant traffic jams (Fink et al. 2011)**.** New Zealand has one of the most noteworthy extents of individuals living in towns and urban communities on the planet, with around 86% living in urban zones (Henderson, 2015). It is along these lines key to have a proficient and successful open transport arrange with the goal that individuals can settle on keen decisions about how they travel. Public transport services must be adequate, efficient and reliable. This requires minimal travel time at affordable costs, (Renardet 2016).

According to the International Transport Forum (2010) New Zealand had very high road deaths by developed countries standards, having been ranked number 25 out of 33 of the surveyed countries. This could be attributed to forceful driving, inadequate driver preparing, old and risky autos, sub-par street outline and development, and an absence of energy about the expertise and duty required to securely work an engine vehicle. There is also the fact that New Zealand receives many visiting drivers of tourists, students, immigrants and people who visit for business. This is according to the New Zealand Press Association (NZPA).

To solve its transport problems, New Zealand invested a lot of time and resources in integrated planning. Kenya can do the same if it wishes to achieve its long term development plan (Vision 2030). Success in achieving vision 2030 goals relies on public transport being a part of one integrated transport network, so all travel modes work together To do this there is need to recognize the importance of joined up decision making with stakeholders on land use, transport planning, and investment. Public means of transport is a core part of the mobility network and influences land use and urban design, and wider transport planning. Public transport also helps get the most value from investment in the transport network.

It is also worth noting that Tanzania has a robust transport system that works for her. Prior to the year 2016, traffic congestion had for a long time been a perennial problem in Tanzania as a result of the rapid growth of the vehicle fleet in the country. Government records indicate that the number of fatalities increased by 150% from 1998 to 2001. During the same period, the number of recorded wounds expanded from 11,380 to 20,800 (Transport and ICT Department, 2013). Right now, little exertion is being made to decrease the quantity of street crashes by the legislature or different organizations

The success of Tanzania transport system was mainly brought about by regulation of public transport. Tanzania's National Transport Policy sets goals and objectives for each of the major transportation services in the country. As part of the enforcement procedures, SUMATRA places officers on the roads who conduct roadside inspections to monitor compliance with licensing conditions. Measurements demonstrate that Tanzania as of now has a grave street wellbeing issue considering that it has a moderately little vehicle armada. With the quick development of armada, the quantity of passings and wounds on its street organize is probably going to increment. There is in this manner a justifiable reason purpose behind the nation to put higher accentuation on tending to its street security issues (Transport & ICT Department, 2013).

Despite the stringent measures being well known by Matatu operators, majority of them keep breaking the law thus endangering the lives of the passengers. The traffic legislations seem not to be taken seriously by the Matatu operators. They continue to break the rules and members of the public continue to lose their lives in road carnages. Accidents are to a great extent because of poor driving and vehicle conditions, while on-street driver conduct is forceful and frequently unsafe (Behrens, et. al, 2016). Koster, et. al. (2016) takes note of that the last time Kenyans utilizing open transport vehicles considered utilization of seat straps important was in the year 2002-03 amid the rule of Hon. John Michuki as the clergyman of Transport. Logical research has prompted confirm appearing if there should arise an occurrence of a mishap, wearing a safety belt decreases the danger of being catapulted from a vehicle and in this manner enduring genuine or deadly damage by between 40-65%. It is therefore sad that Kenyans will not adhere to this simple life-saving practice until it is forced on them.

The specific issues encountered by the authorities responsible for enforcing whatever regulatory framework may be in place relate to matters primarily of policy coherence, signaled by a policy framework which gives clear and consistent direction to what public intervention in the sector is intended to achieve, and adequate enforcement capacity demonstrated by the ability to enforce compliance by operators with these regulatory directives. In the case of the former, policy coherence is often lacking as a consequence of institutional fragmentation between and within the organs of state involved in governing the public transport sector, while in the case of the latter, a lack of enforcement reflects a lack of appropriate organizational resources such as funding and appropriately skilled personnel (Geyer, 2011).

Only about one-quarter of the households in Nairobi have their own private means of transport. Thus the majority of Nairobi residents rely on public means of transport. Six percent of households in Nairobi can hardly afford the cost of public transport services and are therefore forced to walk long distances to their place of work**.** Providers of public transport services in Nairobi find the business commercially attractive leading high returns. As a result there has been emergence of informal providers of transport who take advantage of commuters and charge exorbitant fares by creating artificial shortage of busses during peak hours, (Martin, 2016).

The rapid expansion of industrial and commercial activities has directly contributed to the rapid migration and increase in human population and consequent shortage of transport services leading degradation of the available transport infrastructure. Based on the above situation, the County of Nairobi is faced with the challenging task of road maintenance and transport facilitation. With the limited resources at their disposal, it has become increasingly difficult for the County Government of Nairobi to cater for transport needs of the whole population, (Jara-Diaz, 2014). There are several solutions that have been offered in line as a solution to this problem of traffic congestion, (Scar, 2012). The new challenge emerging is the number of hours spent on the road while travelling between home and work. Each worker loses approximately one hour on the road daily. If the time was cut, there would be an increase to economy of over kshs. 72 million daily income. This clearly shows that there is a demand for better transport infrastructure and more efficient transport services to meet the demand for over 2.7 million people living and working in Nairobi. (Kenya Economic Report, 2017).

Khayesi, et. al. (2015) describes a vicious cycle that seems to have evolved at the national level with respect to the road accidents in Kenya. The cycle is as follows; several persons perish in a tragic road accident, the government issues warnings on how there will be tough measures on those who break the law, implementation officers are put on the road to monitor the operators, Matatu operators obey the rules for a while, enforcement officers are withdrawn from the roads or if they are present, they take bribes and allow unroad worthy vehicles and rogue drivers on the roads, another fatal accident happens. Members of the public mostly blame the government for leniency in handling offenders. The question lingering on the mind of many Kenyans is whether the government talks tough or it is serious with implementing these laws. There is public outcry for the government to move from empty words to action. The laws and regulations should move from being just on paper to being implemented on those who break them. This way, the lives of many Kenyans will be saved. There is likewise irreconcilable circumstance emerging from government's inability to restrict invested individuals in people in general division from owning and working Matatus.

1.4 Methodology

The study adopted a cross-sectional research design with a qualitative survey approach. SACCOS had makeshift offices within the CBD hence data collection was easy. The study population is drawn from all the registered Matatu SACCOS in Nairobi City County. The number of Matatu SACCOS operating within Nairobi City County is 186, this is according to the National Transport and safety Authority (2018). Thus, 186 Matatu SACCOS formed the target population. A systematic sample of 56 SACCOS was selected and used in the study. Mixed methods were used in this study. Mixed methods are useful in collecting data from varied categories of respondents with different literacy levels and communication modes. Data was collected using an interview guide with open ended questions and an in-depth questionnaire for quantitative data

1.5 Findings

This study set out to discuss the Matatu systems challenges and potential solutions focusing on the problem of lost hours of work due traffic congestion.

Table 1: Response Rate

	Frequency	Percentage
Accepted interview	42	75%
Declined interviews	14	25%
Total	56	100%

Source: Research data (2019)

The researcher targeted a sample of 56 Matatu (14 – 25) seater buses that carry passengers over short distances in and out of town) SACCOS operation in Nairobi. Out of the 56 target respondents from the SACCOS, 42 gave sufficient data. However, 14 respondents declined the interview giving a non-response of 25%. Subsequently, the survey achieved a response rate of 75% as appeared in Table 4.1. As indicated by Kothari (2008) a response rate of 50 % is sufficient, 60 % is great or more 70% is great. The response rate derived in the examination was great.

Population Growth Factors

Three factors directly related to population growth were examined. The factors are Migration, urbanization and increasing motor vehicle population

Migration - migration was measured using indicators comprising search for rural-urban migration cross border migration and involuntary migration. The outcomes are shown in the table below.

Table 2: Migration

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Rural-Urban Migration	42	1	5	4.17	.985
Cross Border Migration	42	1	5	3.71	1.178
Involuntary Migration (Displacement)	42	2	5	3.89	.993
Valid N (list wise)	42			**3.75**	**1.135**

Source: Author (2019)

Results in Table 2 indicate an overall mean score of 3.75. This implies that the respondents are in agreement that rural- urban migration leads to congestion in urban centres. The aggregate score for indicators: Cross Border Migration, (M=4.17; S.D=0.985), Business (M=3.71; SD1.178) and Involuntary Migration (Displacement) M=3.89; S.D=0.993 were above 3.4, and the standard deviation above 0.80, indicating that the respondents generally agreed to the statements. The range for the mean responses as shown in the table was 0.77. The mean response for all the indicators for rural-urban migration was 3.75. All responses were generally clustered within the mean response of (3.75) and the general standard deviation of (1.135). The findings of this study support the argument by Awino, Muchara, Ogutu & Oeba (2012) that rural-urban migration is the main course of overpopulation in urban centres. For this reason it is evident that the population growth in Nairobi is as a result of rural urban migration.

Cross-border migration was reviewed as the second aspect of population growth in this study. Cross border migration was broadly measured in terms of Kenyans in foreign countries, foreigners in Nairobi and other immigrants. Mean and standard deviations of all indicators of cross-border migration are described in the table above. Matatu driver Kanji plies route Githurai is one of the people affected by the traffic situation in Nairobi He spends 3 hours in jam daily. Instead of 12 rounds making him 30'000 per day he can only make half. It is not enough to pay his loan, pay employees. This is what he said.

> *"I wake up at 4 am so that l can make 2 rounds before 8 am. From 8 am going to city I might take 1 hour in jam and arrive at 9 am. If there was decongestion I could work until 2 pm, go home 2 rest then plan next day 4 am."*

Urbanization - Under urbanization, the researcher focused on nine main issues comprising of; industries, housing, markets, public utilities and infrastructure. In total five questions represented

the variable of urbanization. The outcome is shown in table 3.

Table 3: Urbanization

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Industries	42	1	5	4.00	1.188
Housing	42	1	5	3.37	1.031
Markets	42	1	5	3.31	.963
Public Utilities	42	2	5	3.00	1.037
Infrastructure	42	1	5	3.57	1.170
Valid N (list wise)	42			**3.58**	**1.098**

Source: Author (2019)

From the above table 3, the aggregate score associated with the aspect of industries M=4.00; S.D=1.188. The aspect of housing had M=3.37; S.D=1.031. Aspect of market centres M=3.31; S.D=0.963, public utilities M=3.57; S.D=1.037 and infrastructure M=3.57; S.D=1.170. The respondents understand that even within Nairobi population densities are high where there are industries. For this reason, industries had the highest aggregate mean compared to all the other items related to urbanization. This indicates that people prefer to settle where there is some economic activities. In terms of market centres, it is evident that market centres attracted human population leading to congested transport system. As shown in table 4.5, the respondents were neutral to the question of whether public utilities and other amenities attract large population. This was presented with a neutral mean of 3.00.

One of the following was quoted saying:

> Respondent: *"Idadi ya watu imeongezeka maradufu na jam pia ikawa nyingi, sana sana jogoo road. Hii Thika super-highway haiwezei serve kila mtu. Wanafaa kutengeneza ma-superhighway nyingi ndiyo hata sisi tusaiidike." (The number of people in Nairobi has grown and traffic congestion is on the rise. Thika Superhighway cannot serve all of us. The government needs to build more superhighways so that we can also find help)*

The respondents were further asked asked to give their opinion on population growth variables and how they affect road transport. Most of them said that housing was on one of the key variables of population growth. Areas with affordable housing were more densely populated that posh high end estates. They also stated that mores superhighways and bypasses should be constructed to ease movement in and around the city. Matatus also had developed an organizational strength in form of associations which were recently banned. Their past history had shown that if these organizations were well organized they could play an important role. On a national level the most active of these organizations was the Matatu Vehicle Owners Association (MVOA) which had a registered membership of 3,000 branches affiliated to it. It was formed in order to restore order and discipline within the Matatu operations and also to represent the owners and operators to the authorities as a united body. Their operations were mainly concentrated in Nairobi where their function basically was to provide assistance to their members in dealing with the CGON and the Police and to streamline parking at the terminals set aside for them by the CGON. Another respondents had this to say:

> Respondent*" Mimi nimekaa Nairobi tangu 1965. Zamani tulikua wachache, laking sababu ya kazi watu ni wengi. Nasema zerikali iangalie Matatu, treni, na hata cable buses kwa hewa" (Some year back the population was low, however due to search for jobs in the city, the population has grown. The government should therefore address the transport and*

traffic congestion problem or even bring cable buses in the air.)

Increasing Motor Vehicle Population – The trade relations between Kenya and Japn have opened avenues for importation of affordable vehicles into the country. Due to rapid increase in number of people joining the middle class, ownership of motor vehicles in Nairobi has gone up by at least 50 percent since the year 2000. Nairobi county along had a motor vehicle population of 700,000 in the year 2008 up from 400,000 in the year 2000. This number has since increased to 1 million in the year 2018. 50 per cent of the total national vehicle population is found in the capital city, Nairobi. The high number of private cars poses a great challenge to the traffic situation in the city.

Table 4: Master Plan for Urban Transport in the Nairobi Metropolitan Area, 2006

YEAR	2004	2010	2015	2025
Number of Private Cars	207,339	327,366	486,207	716,138

Source: (Adopted) Study on Master Plan for Urban Transport in the Nairobi Metropolitan Area, 2006

Jams in nairobi - some of the causes mentioned were: matatus, personal cars, pedestrians crossing, corrupt traffic cops and motor cycles. The charts below illustrates the percentage of traffic causes by each of the mentioned causes.

Table 5: percentage of traffic causes by each of the mentioned causes

Descriptive Statistics					
	N	Mean		Std. Deviation	Variance
	Statistic	Statistic	Std. Error	Statistic	Statistic
Personal cars	42	2.55	.055	.884	.781
Matatus	42	3.41	.050	.802	.644
Dilapidated state of the roads	42	2.40	.061	.983	.966
Traffic cops	42	2.90	.068	1.087	1.181
Motor cycles	42	2.28	.063	1.014	1.027
Pedestrian crossing	42	2.81	.065	1.047	1.096
Valid N (listwise)	42				

Source: Field data, 2019

Table 6: Causes Of Traffic Jam In Nairobi

CAUSE	PERCENTAGE
Personal cars	47%
Matatus	25%
Dilapidated state of the roads	16%
Traffic cops	8%
Motor cycles	3%
Pedestrian crossing	1%

Source: Field data, 2019

According to one of the respondents the BRT system will ultimately solve the traffic jams problem and reduce unnecessary delays. Find his comments below:

"Mimi kwa upande wangu naonelea kama hizo BRT zitatatua shida zote za watu wa nairobi

zinazohusiana na traffic jams. Ningependelea waharakishe kutekeleza hiyo mambo ya BRT." (In my opinion, I think proposed BRT system will completely solve the problems of the people of Nairobi as far as traffic jams are concerned. I would therefore urge those concerned to speed it up.)

Regarding the causes of traffic jam, one of the respondents made these remarks:

"Hawa polisi wa traffic ndio wanasababisha jam. Wanafunigia pande zingine sana huku wengine wakikaa tu kwa jam". (Police officers are the major causes of traffic jams in the city. They block some lanes for long hours leading to congestion in other lanes)

From the verbal responses analysed, a noticeable problem however, been the lack of terminal facilities or parking spaces for the buses in the city centre. One Matatu driver made the following comments during our data collection.

"Mimi hupoteza masaa mawili kila siku kwa jam ninapoelekea na kutoka kazini." (I waste at least two hours on traffic daily on my way to or from work.)

None the less all these traffic congestion was mainly caused by four issues some of which can be avoided. These causes include: corrupt traffic police officers delaying other lanes or stopping motorists to collect bribes, Narrow roads that cannot accommodate the high numbers of vehicles, portholes and dilapidated conditions of the roads, bottlenecks at the round –about.

Transport Regulations

The transport sector in Kenya is highly regulated and controlled. There are laws that govern the formation and operation of transport services in Kenya. There are also city bylaws that affect how transports services are carried out in Nairobi. Recently, the county government of Nairobi banned all motor cycles from entering the CBD. This study sought to find out how each of the following regulations affect transport services in Nairobi. Below is an analysis of the responses.

Table 7: Transport Regulations

	N	Mean		Std. Deviation	Variance
	Statistic	Statistic	Std. Error	Statistic	Statistic
County Government by laws	42	3.43	.050	.806	.649
Traffic Offenses act enforced by traffic police	42	3.02	.066	1.065	1.135
Public transport policy enforcement	42	2.50	.057	.920	.846
Valid N (listwise)	42				

Source: Field data, 2019

The table above shows that county government plays a major role in regulating transport activities within the city (M=3.4) followed by public transport policy enforcement (M=3.02)and finaly the public transport policy enforcement (2.07)

One of the respondents had this to say:

"Hizo magari za BRT sio suluhu. Kwanza hizi Matatu zetu ambazo wanasema zisiingie town, wanatakatupark wapi? Muthurwa terminus ni ndogo sana haiwezi toshea magari zote za jogoo road na industrial area. Kwanza wangetengeneza parking za Matatu ndio walete hiyo ban."(Those BRT busses are not the solution. Where will we park these matatus

of ours that have been banned from accessing the CBD? Muthurwa bust terminus is not big enough to accommodate all Matatus plying the Eastlands and industrial area route. They need to build adequate terminus and parking areas before implementing the ban

Another commuter made the following comments:

"*Wizara ya uchukuzi ikishirikiana na NTSA pamoja na county government wanafaaa kuangalia hii mambo ya traffic jam na itafute suluhisho la kudumu." (The ministry of transport together with NTSA and the county government of Nairobi should look into this issue of traffic jams and find a lasting solution)*

Challenges of the huge workforce on transport services in Nairobi

Four challenges were adversely mentioned by the respondents: High demand for public transport at peak hours, Heavy traffic jams on week days, High transport charges at peak hours and high population at CBD on weekdays. The table below summarizes the mean responses by each of the indicators.

Table 8: Challenges of the huge workforce on transport services in Nairobi

	N	Mean		Std. Deviation	Variance
	Statistic	Statistic	Std. Error	Statistic	Statistic
High demand for public transport at peak hours	42	3.43	.050	.806	.649
Heavy traffic jams on week days enforcement	42	3.02	.066	1.065	1.135
High transport charges at peak hours	42	2.50	.057	.920	.846
high population in town on weekdays	42	2.50	.057	.920	.846
Valid N (listwise)	42				

Sources: Researcher (2019)

Many other divers expressed similar frustrations with the general theme being delays and loss of revenue. The reaction of the touts towards the situation exerted greater stress and strain to the operators. During the interviews, it was revealed that the county government was not making any efforts to address the problem. One of the member of Matatu owners association "Mr Waweru" had the following to say:

Question: What efforts has the county government of Nairobi taken to address the problem of traffic jams in the CBD?

"*Miaka ya 1990s Matatu hazikukuwa nyingi kama vile tunaona sasa. Kwa hivyo jam haikukuwa. Lakini siku hizi Matatu zimekuwa nyingi sana. Kwa hivyo barabara zinatstahli kupanuliwa. Ni jukuma la county government kupanua barabara za county ili kupunguza msongamano. Ajabu ni kwamba county government haifanyi chochote kutataua janga hili." (In the 1990s the number of Matatus were not as high as witnessed today. So there was no traffic congestion on our roads. However, today there are so many Matatus on the road. In essence, there is need to expand our roads so as to address the traffic situation. Ironically, the county government is not doing anything to address the situation)*

Fatigue and family breakdown was also mentioned as one of the health and social effects of long hours on the road. Most of those interviewed said they spend at least two hours on traffic every day. Family breakdown was caused by long absence of parents from home especially by Matatu operators with families. The validity of this finding with regard to family breakdown was confirmed by a statement from one of the respondents Mr Maina who stated;

Question: How has long working ours affected your social and family life?

> *"Mimi mke wangu alitoroka kwa sababu nilikuwa narudi kwa nyumba late sana. Tena nikirudi huwa nimechoka sana na siwezi ata kuketi chini na kuzungumza nayeye. Mara nyingi alikuwa amelala. Aliona kana kwamba sina muda wake." (My wife left me because I used to come home very late. The again I was usually very tired that I could not even sit down to talk to her. I most cases she was already deep asleep. She thought I have no time for her*.

While some drivers, touts and operators numbed their feelings, others openly expressed the difficulties they had to contend with, and the adjustments they had to make in their lives in order to earn a living.

One respondent from Rongao Sacco revealed the difficulties of getting to work. This was in response to the question: How do you manage to get commuters to the CBD on time especially those who have to go to work in the morning? He said;

> *"Most commuters are forced to get to town as early as 5.00am before traffic begins. However after 7,00am we change routes and take shortcuts and estate/ residential roads to avoid traffic and get people to work on time. However not all busses do this. Only the modernized Matatus commonly known as Manyanga take shortcuts"*

During the interview, a Matatu driver with Umoinner Sacco was asked the following question:

> Question: On a typical day, how many hours do you work? He made the following comments:
>
> Response: "*We work for long hours these days. We make fewer trips because we spend long hours in traffic. I would like to go home early but l cannot because l need to reach target. I work until 9 pm then go home...too late for my children to see me...how do we improve transport and reduce decongestion? My thoughts and most of us drivers is to create more roads on top of each other, create lanes for buses only and... l do not like it, but trams on all routes....'*Date 7/1/2019

1.6. Conclusions

The inadequacies of Nairobi's urban passenger transport services can be accounted for by a variety of factors some of which are out of the scope of this study in the sense that they include cabs, motorbikes and the railway commuter services, the lack of accessibility to certain parts of the city, and the inadequate street layout and road space. Apart from these, other problems scam from the inability of the city authorities to implement policy recommendations which have been made to solve the inherent problems. These include the failure to implement efforts geared towards the creation of public transport priority lanes and roads, and to reduce the uniform work schedule which has created a concentration of trips during the morning and evening rush hours.

There are also problems associated with the continuous concentration of activities in the CBD which ensures that most trips are made to this point, apart from the problem of inadequate resources to repair the city's roads and to provide other modern urban transportation facilities. These inadequacies are serious but not impossible to remedy. The following broad recommendations may help in solving the current urban transport problems which the city faces, especially with regards to the future role of the Matatus.

The research concluded that there psychosocial effects of traffic congestion which included loss of revenue, wastage of fuel on traffic, fatigue, lawlessness, lonely families members due to absentism of other members, lack of mentored children among others.. All these are the consequences of unethical human behaviour coupled by poor urban traffic management with laxity

and inadequate traffic management policy enforcement in the city enhanced by obsolete and inadequate transport systems in the CBD of Nairobi (Martin 2016).

1.7 Recommendations.

This study recommends replacement of traffic police offices from the CBD with feedback depend traffic lights systems. There traffic light systems rely on technology and sensors to automatically detect heavy traffic within a lane on the round-about and allocate more time to the lane to ease traffic. There is need to acquire and use light train and BRT buses to ferry commuters in and out of the CBD. There is need to strengthen the programme and improve the working and living conditions of people in Nairobi. This will improve the general standard of living of the people and check the drift of people to their places of work and back home.

There is need for the county government together with the national government to expand roads and extend road networks by building bypasses to allow smooth movement in, out and around the city. There is also need to redesign the road networks to include; underpasses, flyovers, and overpasses to ease movement of people within the CBD. While it is recognized that urban growth is an inevitable process of socio-economic change, the pace of growth of Nairobi could be reduced. The shift of the administrative and county services to other urban centre could go a long way in reducing population pressure in Nairobi. The District Focus Policy for Rural Development (DFPRD) which was recently employed by the GOK could go a long way in ensuring the success of this re-allocation process (Obudho et al, 2016).

The county government should set aside and build Matatu terminus in designated areas outside the CBD to be used as drop off and pick up points for commuters working and commuting to and from town. Within Nairobi, a deliberate de-concentration process should be initiated to remove pressure on the CBD. The relocation of employment and other activities from the CBD to the outskirts need to be given immediate and practical attention so that some traffic flow can be attracted from the CBD to the other zones. So far, such zones have been identified and mapped out. In looking at the past and current planning responses to the city's public transport situation, this study has also identified the practical measures which have been employed especially in response to the Matatus and notes that these are not enough. More needs to be done especially in implementing some of the recommendations which have already been suggested as well as those that this study aims to make.

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