EFFECT OF MOTOR VEHICLE CONGESTION ON THE ECONOMIC PERFORMANCE OF KENYA: A CASE OF NAIROBI CITY COUNTY

RAJESH GEOFREY MOSOTI

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Mosoti, R., Jomo Kenyatta University of Agriculture and Technology (JKUAT), Kenya

Moronge, M., Jomo Kenyatta University of Agriculture and Technology (JKUAT), Kenya

ABSTRACT

Transport is a key variable in the growth of the Kenyan economy. With such a rapid increase in urban population, there has been an increase in demand for mobility, and with it, an increase in motorized vehicle ownership. Much of the developing world is experiencing rapid economic growth. Motor vehicle fleet is increasing at a rapid pace in many cities around the world creating an infrastructure backlog and imposing constraint on economic development. The general objective of this study was to assess the effect of the motor vehicle congestion on the economy of Kenya. A case study was made of Nairobi City County. The objectives of the study was to establish the effect of transport infrastructure and Government Policy on the economy as influenced by traffic congestion in Nairobi County. The study was limited to the residents of Nairobi County. The study targeted city county planners, city county traffic office and city economic and finance office. The study was targeting the years between 2011 and 2013.The Study used the descriptive research design.The study population were respondents from city county planner's office, city county traffic office and city economic and finance office which had 108 respondents and sample size of 54 which is 50% of the total target population. Stratified random sampling was used as a sampling design then simple random sampling to ensure that all the subgroups were included in the study. The data collection instrumentused was the questionnaire. Then data wasanalysed by use of the tables, and pie charts, that are qualitative in nature.The study concluded that motor vehicle congestion has a direct effect on the economy of Kenya. The research concluded that the lost man-hours due to people sitting in traffic was causing a slowdown in the economy's growth and that investors are relocating because of the high cost of labour in Kenya. The study re affirmed the importance on public transport to the Kenyan economy and that it is the nerve center that holds it together, however it is poorly managed and governed and thus the stakeholders need to come up with better strategies to make it viable.

Key Words: *Motor Vehicle, Congestion, Economic Performance*

INTRODUCTION

Cities and traffic are inevitable and have been since the earliest large human settlements. The same pull forces of inhabitants to large urban areas also lead to sometimes intolerable levels of traffic congestion on urban streets. Effective urban governance requires a careful balancing between the benefits of agglomeration and the dis-benefits of excessive congestion and urban transport policy management offers the best way through which urban residents can reap the benefits of the urban economy (Managing urban traffic congestion, 2007).

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). Traffic congestion is a condition on road networks that occurs as use increases, and is characterized by slower speeds, longer trip times, and increased vehicular queuing. Congestion is caused when there are more vehicles than available space on the road, or, stated differently, when traffic demand approaches or exceeds the available capacity of the highway system (Kerner, 2009). Traffic demands vary significantly depending on the season of the year, the day of the week, and even the time of day. Also, the capacity, often mistaken as constant, can change because of weather, work zones, or traffic incidents.

With such a rapid increase in urban population, there has been an increase in demand for mobility, and with it, an increase in motorized vehicle ownership (Parry, 2009). Much of the developing world is experiencing rapid economic growth. Motor vehicle fleet is increasing at a rapid pace in many cities around the world creating an infrastructure backlog and imposing constraint on economic development.

The existing debate about the cost of traffic congestion in cities has been limited to estimating the value of time lost by people sitting in traffic. However, there are broader costs of congestion that should be taken into account (Dachis, 2013). Mostly the existing studies provide underestimates of the costs of congestion since they ignore the positive effects of relationships among firms and people that are among the main benefits of urban living. These urban 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, in turn, benefit other people (Dachis, 2013) When congestion makes urban interactions too costly to pursue, these benefits are foregone, adding significantly to the net costs of congestion(Dachis, 2013). Thus there need to be found an alternative that will ease the pressure of the congestion and make traffic flow well and this can only be found in the public transport system.

Vehicles volumes in operation worldwide surpassed the 1 billion-unit mark in 2010.According to *Ward's* research (2014), which looked at government-reported registrations and historical vehicle-population trends, global registrations jumped from 980 million units in 2009 to 1.015 billion in 2010. Mackett (2012) conducted a research in London that tried to find ways of reducing private car use and in turn reduce congestion in the streets of London which had led to significant loss in the economy. The buses as an alternative was floated as a possible solution to the problem INRIX (2013) studyof the Economic and Environmental Costs of US Traffic Reveals the Necessity of Intelligent Transportation Solutions with people in Europe and the US currently wasting on average 111 hours annually in gridlock, the impact of traffic congestion on individual driver's time is well understood. However, new research shows traffic congestion actually does much more than test our

patience. It's a significant drain on our wallets as well our economies. INRIX (2013) in collaboration with one of the world's leading economic think tanks, the Centre for Economics and Business Research (CEBR), quantifies the cost of traffic congestion on individual households and national economies in the U.S., U.K., France and Germany. This is the first study of its kind to forecast the projected increases in these costs in these countries and their most congested cities between 2013 and 2030. Driven by urbanization and increased GDP per capita over the next 17 years, a few of the key findings include: The combined annual cost of gridlock to these countries is expected to soar to $293.1 billion by 2030, almost a 50% increase from 2013.

Statement of the Problem
Traffic congestion in Nairobi city costs the economy an estimated Sh37 billion annually (Transport and Urban De-Congestion Committee report, 2013). The report attributed this to poor planning of the city that did not factor in steady increase in population and vehicles. "Nairobi's population has increased from 350,000 in 1963 to 3.3 million today with an estimated 300,000 vehicles without a corresponding increase of the road network," the report reads in part, adding that Outer Ring has the highest traffic volumes of over 87,000 vehicles daily. This, the survey shows, has contributed to a majority of commuters getting caught in traffic jam daily. (Transport and Urban De-Congestion Committee report, 2013).

According to International Business Machines Corp.'s Commuter Pain survey (2011) the Nairobi city's roads were the world's fourth-most congested. The World Health Organization estimates road accidents kill as many as 13,000 Kenyans a year. The government estimates that traffic jams cost 50 million shillings ($578,000) a day in lost

productivity in the city. Since the road network has not been expanded in the longest time, and more private vehicles are being utilized causing jam, the best alternative is to see how the public bus services can ease the congestion in the road network.

According to Global Commuter Pain survey (2011) Population growth, urbanization and globalization are placing great strains on the world's transportation systems - impacting citizens personally, economically and environmentally. It's estimated that up to $30 trillion will be spent on transportation infrastructure globally over the next 20 years yet improving physical infrastructure only goes so far, especially with the ever-present debate on the best ways to maintain roads, rails and terminals in the face of strained budgets and resources(Global Commuter Pain survey, 2011)

The Texas Transportation Institute estimated that, in 2000, the 75 largest metropolitan areas globally experienced 3.6 billion vehicle-hours of delay, resulting in 5.7 billion U.S. gallons (21.6 billion liters) in wasted fuel and $67.5 billion in lost productivity, or about 0.7% of the nation's GDP. It also estimated that the annual cost of congestion for each driver was approximately $1,000 in very large cities and $200 in small cities. Traffic congestion is increasing in major cities all over the world and delays are becoming more frequent in smaller cities and rural areas.

Objectives of the study

The key Objective was to establish the effect of motor vehicle congestion on the economic performance of Kenya. This was supported by the specific objectives which are; to find out how transport infrastructure and Government Policy affect the economy of Kenya.

Research Questions
1. What is the effect of the transport infrastructure on the economy of Kenya?

2. What is the effect of Government policy on the economy of Kenya?

Scope of the study

The study was limited to the residents of Nairobi County. The study targeted city county planners, city county traffic office and city economic and finance office. The study targeted the years between 2011 and 2013. The main study aimed at establishing the economic effect of motor vehicle congestion on the economy of Kenya. A case of Nairobi City County

THEORETICAL FRAMEWORK

There are many theories that explain urban bus transport contribution to the economy. These include traffic flow theory, queuing theory and the tragedy of the commons model.

a) Traffic flow theory

According to Kerner (2009) this theory entails knowledge of fundamental characteristics of the traffic flow and the associated analytical methods. One of the results of the interplay between people's and shippers' needs and desires, the locations of activities and the transport resistance factors is a certain volume of road traffic. Road traffic can be described by using flow variables such as speed and density. The density of traffic is the number of vehicles that are present on a roadway per unit distance. Road traffic` flows on certain road stretches during certain time periods can be either free or congested and/or the flows can be unreliable. The more vehicles there are in the road the more dense the traffic is and the more slow the traffic will move making most productive people spend more time on the road which contributes to unproductivity of those people thus lost personal revenue and a slowed economic growth.

Kerner (2009) has placed road congestion solely on the interplay of shippers and people's needs and desires yet when one looks at the situation practically, lack of proper infrastructure and an efficient regulatory framework to control traffic has contributed more to the congestion (wards research, 2014). In Nairobi, the chaos on the road are a shock to anyone who visits the city for the first time, one is treated to an endless flow of people and mass transit buses that never seem to end and ward's research (2014) through its publication commented on the fact that to that due the limited nature of Nairobi's infrastructure, efficient policies have to be formulated that will try to bring sanity in Kenyan roads.

The theory has been criticized for two primary reasons. First, the theory is almost completely based on measurements on the Bundesautobahn 5 in Germany. It may be that this road has this pattern, but other roads in other countries have other characteristics. Future research must show the validity of the theory on other roads in other countries around the world

b) Queuing theory

According to Sundarapandia (2009) Queuing theory is the mathematical study of waiting lines, or queues. In queueing theory a model is constructed so that queue lengths and waiting times can be predicted. Queueing theory describes traffic flow especially during peak hours when the density is high. High density due to more vehicles on the roads causes congestion in the road bottlenecks slowing traffic and in many instances causing jams.

This jam has been known to slow the rate of economic growth down due to lost time resources sitting in traffic. With increase in public transport services more people will use public transport which will reduce the amount of vehicles on the road thus decreasing jams which will translate to faster and cheaper transport which will have a positive impact on the economy (Dachis, 2013). Instead of the traditional solution of making the "pipe" large enough to accommodate the total demand for

peak-hour vehicle travel (a supply-side solution), either by widening roadways or increasing "flow pressure" via automated highway systems, Downs advocates greater use of road pricing to reduce congestion (a demand-side solution, effectively rationing demand), in turn plowing the revenues generated therefrom into public transportation projects. Moreover, Braess's paradox states that adding extra capacity to a network when the moving entities selfishly choose their route can in some cases reduce overall performance. This shows that adding road capacity might make congestion worse even if demand does not increase.

### c) Tragedy of the commons theory.

The tragedy of the commons is an economics theory by Garrett Hardin (1968), according to which individuals, acting independently and rationally according to each one's self-interest, behave contrary to the whole group's long-term best interests by depleting some common resource. "Commons" can include the atmosphere, oceans, roads and any other shared resource. Because roads in most places are free at the point of usage, there is little incentive for drivers not to over-use them, up to the point where traffic collapses into a jam, when demand becomes limited by opportunity cost thus in such a situation the public may pool into a common mode of mass transit where congestion could be reduced and flow of resources could be faster thus resulting in better prospects for economic development.

The American Economic Review (2011) indicates that there may be a "fundamental law of road congestion. The Study determined that more vehicles were driven as more lines were constructed thus building new roads and widening existing ones only resulted in additional traffic that continued to rise until peak congestion returned to the previous level. This revealed further the tragedy of the

commons that by making 'free' the high ways and the road network traffic congestion will still be there unless a new nonstructural solution is found.

Conceptual Framework
Figure 1. Conceptual framework

Independent variable   **Dependent variable**
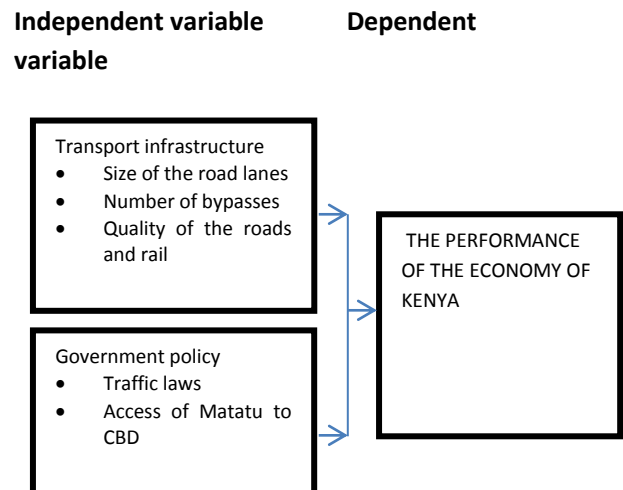
Empirical review

a) Transport infrastructure

Nairobi County has the best traffic infrastructure in Kenya and the whole of east Africa (Transport and Urban De-Congestion Committee report, 2013) and yet Nairobi city has the most severe traffic congestion in the region (Ward's research, 2014). According to the research this was because of the quality of road infrastructure which does not match the demand. Nairobi County is the focal point of all traffic within the country and outside including Uganda, Rwanda, Burundi and Congo. Thishas been one of major issues that most metropolises are facing. The identification of congestion is the first step to selecting appropriate mitigation measures(Rao&Rao, 2012). Congestion impacts the movement of people, wastes time, energy and causes pollution. There are broadly two factors, which effect the congestion; (a) micro-level factors (b) macro-level factors that relate to overall demand for road use. Congestion is 'triggered' at the

'micro' level (e.g. on the road), and 'driven' at the 'macro' level. The micro level factors are, for example, many people want to move at the same time, too many vehicles for limited road space. On the other side, macro level factors are e.g. land-use patterns, car ownership trends, regional economic dynamics, etc. measures (Rao&Rao, 2012)

Duranton and Turner (2009) investigated the relationship between interstate highways and highway vehicle kilometers traveled (VKT) in US cities. They found out that VKT increased proportionately to highways and identified three important sources for this extra VKT: an increased driving by current residents; an increase in transportation intensive production activity; and an inflow of new residents. The provision of public transportation had no impact on VKT. Thus they concluded that an increased provision of roads or public transit was unlikely to relieve congestion.

However according to a report by Organisation for Economic Co-operation and Development (OECD) on Managing urban traffic congestion (2007) Dynamic, affordable, livable and attractive urban regions will never be free of congestion. Road transport policies, however, should seek to manage congestion on a cost-effective basis with the aim of reducing the burden that excessive congestion imposes upon travellers and urban dwellers throughout the urban road network. Integrated land use and transport planning and coordinated transport development involving all transport modes - including appropriate levels of public transport – are fundamentally important to the high quality access needed in large urban areas.

b) Government Policy
There are several policies that have been put in place to control congestion. At the beginning, most authorities simply increase the number of lanes; however, widening of

motorways requires huge construction costs and long periods which sometimes the economy may not sustain.(Murashige,1995) thus to alleviate traffic congestion, comparatively costless innovative attempts have been introduced; however, those could not eradicate traffic congestion completely and foster faster transfer of people, these includes traffic information system providing location of the traffic bottleneck to drivers to activate them to gain speed on the upgrade, using the variable message signs, or traffic demand management disseminating real-time traffic information (e.g., travel time, length of the queue) to drivers, resulting in mitigation of traffic congestion on motorways. In recent years, toll discount has been introduced on motorways

The Kenyan government has a policy of outlawing the 14 seater vans because they cannot deal with the growing commuter needs for the city residents and the fact that they are rowdy and a menace to city residents. As of December 2010, Kenyan Government policy was to phase out minibus Matatu in favor of larger, 25+ seat buses.

c) Performance of the economy of Kenya
The capital, Nairobi, is a regional commercial hub. The economy of Kenya is the largest by GDP in Southeast and Central Africa. Agriculture is a major employer; the country traditionally exports tea and coffee and has more recently begun to export fresh flowers to Europe. The service industry is also a major economic driver. Kenya is a member of the East African Community. Compared to other African countries, Kenya enjoys relatively high political and social stability and this has been made possible by the transport infrastructure which with the current economic performance needs more improvement. The Kenya Uganda railway and the LAPPSET program have been initiated to facilitate further economic growth. Even the flagship

project for vision 2030, an economic development programme that will put the country in the same league as the Asian Economic Tigers by the year 2030, has been in the infrastructure most notably the Thika road project. (vision 2030)

East and Central Africa's biggest economy has posted tremendous growth in the service sector, boosted by rapid expansion in telecommunication and financial activity over the last decade, and now contributes 62% of GDP. 22% of GDP still comes from the unreliable agricultural sector which employs 75% of the labour The service, industry and manufacturing sectors only employ 25% of the labour force but contribute 75% of GDP. As of August 2014, economic prospects are positive with 4– 5% GDP growth expected, largely because of expansions in tourism, telecommunications, transport, construction and a recovery in agriculture(Kenya bureau of statistics, 2014)

Critique of literature
Most writers and theorists have concentrated in unraveling works that have tried to shed light as to the causes of congestion but they have not clearly linked congestion to the drop in the GDP of a country or come up with measures on how traffic congestion can be mitigated (Dachis, 2013). Kerner's traffic flow theory has tried to attribute traffic congestion to the density of traffic and its rate of flow. This is however disputed by Hardin (1968) who attributed traffic congestion mostly to the irresponsible use of the road (commons) by the road users who do so due to self-interest.

Most of the studies have been carried in industrialized world thus there is need to carry out studies in the third world since road dynamics are different (Kerner, 2009). Kerner further critics the traffic theories for being too mathematical yet his theory can barely be understood by the laymen because of the dynamics and the methods he employs. And

since in the industrialized world public bus systems are not preferred there is a gap in that sector in that Study in the western world and thus future Study in the third world should try and find out the impact of the bus transport services to the economy and the role it plays in easing congestion. (Sundarapandian, 2009)

Most of the theories deal with the mathematics of congestion i.e. how congestions forms but they do not clearly bring out the real causes of congestion and how these causes can be eliminated to ensure smooth flow of traffic which will guarantee smoother movement of goods and services thus a robust economy.(Dimitriou, 2011).

Research gaps
Most studies have concentrated in the causes of traffic congestion and have ignored how these causes can be mitigated (Dachis, 2013). Most of the solutions proposed have been implemented for years. But the traffic congestion has continued to be chronic without any relieve in sight.New research should concentrate on formulating better lasting solution to traffic congestion. Studies should also try to find more direct linkages between traffic congestion and a decreased economic productivity. This because from empirical evidence cities with the worst traffic congestion problem are also the most productive like New york, Shanghai, London. (Commuter pain index, 2011) Few Studies have delved into the role of public transport in boosting the economies of countries and this is an area that this research will be looking at.The government policies have also not addressed the issue in question and this research will try to determine why.

RESEARCH METHODOLOGY

Research Design
This research adopted a descriptive research design. The descriptive research design was

suitable to describe the effects of traffic congestion on the economy of Nairobi County. Its purpose was to portray the state of affairs as it is.

Target Population

In this research the study population was 108 respondents from city county planner's office, city county traffic office and city economic and finance office.

Sampling Design and Procedure

The study adopted purposive sampling. Purposive sampling was used for the officers from the Nairobi county management involved with traffic and economic issues. The sample population was 54 respondents

Table 1 Sample size

Category of Staff	Target Population	Sample Size	Percentage of Population
city county planners office	20	10	22
city county traffic office	44	22	34
city economic and finance office	44	22	34
Total	108	54	100

Data Collection Instruments

Data was collected using open and closed ended questionnaires. The questionnaires consisted of questions, which were both multiple choice and structured questions.

The Study personally administered the questionnaires to ensure a high return rate. The major purpose of the questionnaire is data collection. The Study used questionnaires as the basic data collection instrument.

Data collection procedure

Data used was obtained from primary and secondary sources. The traffic and economic records were the secondary data. The main research instrument used to collect primary data was the questionnaires. The Study administered the questionnaires to the selected respondents.

Data Analysis

All data was analyzed by use of computers for efficiency and high speed. Data was collected and analyzed using quantitative and qualitative method which improved the validity and reliability of the research study. The data was then presented using statistical tools such as tables, percentages and graphs. Data collected through the questionnaires was edited and coded for analysis. Quantitative data was analyzed though the use of descriptive statistics. Tables, charts and percentages were used for data presentation through the help of SPSS 21. Qualitative data was analyzed through content analysis. It was then formulated according to the objectives of the study.

A multivariate regression model was applied to determine the relative importance of each of the four variables with respect to the influence Student's academic performance. This was done to establish the extent to which each independent variable affect the dependent variable as shown by the size of the beta coefficients. The regression model is as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \varepsilon$$
Where:
Y = Economic performance of Kenya
β_0= Constant Term
β_1= Beta coefficients
X_1=Transport infrastructure
X_2= Government Policy
ε = Error Term

FINDINGS AND DISCUSSIONS

Response Rate
Table 4.1 Response rate

The study targeted a sample size of 54 respondents from which 44 filled in and returned the questionnaires making a response rate of 81.4%.

Reliability Analysis

Table 2 Reliability Analysis

Scale	Cronbach's Alpha	Number of Items
Transport infrastructure	0.715	5
Government polices	0.815	5

A pilot study was carried out to determine reliability of the questionnaires. Reliability analysis was subsequently done using Cronbach's Alpha which measured the internal consistency by establishing if certain item within a scale measures the same construct. Gliem and Gliem (2003) established the Alpha value threshold at 0.6, thus forming the study's benchmark. Cronbach Alpha was established for every objective which formed a scale. The table 1 shows that government policy (α=0. 815) and transport infrastructure (α=0. 715). This illustrates that all the two variables were reliable as their reliability values exceeded the prescribed threshold of 0.6.

Demographic Information of Respondents
Gender of Respondents
The study sought to establish the gender of the respondents. As such, the issue of gender cannot be ignored. The study findings indicate that majority 117 (70.9%) of the respondents were male. The statistics above implies that there are more men working in city county planners, city county traffic and city economic and finance offices compared to women. This is bearing in mind the fact that the sampling was simple random sampling and therefore

did not prefer male respondents. It could also imply that women are shying away from the county offices.

Age of the Respondents
The study findings indicate that majority 17 (39%) of the respondents were aged between 36-30 years. This is because the county offices are newly constituted and majority of the workers are young. Further, the analysis indicates that only 5 (11%) were aged above 40 years and they were mostly the directors to give experienced leadership and 12 (27%) were aged between 31 to 40 years. The latter case can be pegged to the fact that the county offices require energetic, outspoken and flexible workers to sometimes meet strict deadlines for the clients. The study also found out that the county mostly requires up to college level of education such as Diploma or degree and hence one may get employed still when young.

Level of Education of Respondents
The study in this section sought to find out the level of education of the respondents. The study findings indicate that 100 (60.6%) of the respondents possess up to college level of education. This can be interpreted to imply that the county office requires high levels of education when recruiting its personnel. The Study found out that what mattered in the workings of the county offices is having a highly analytical mind, good education and the general initiative by the worker to go the extra mile. This can be supported by the fact that a significant 34 (77.3%) of the respondents possessed a bachelors degree level of education and over.

Distribution of respondents by length of service
In order to determine the experience of the respondents in their area of work, the study sought information on the length of service they had worked in the current organization as well as the length of time they had worked

in the current capacity. The analysis indicates that 21 (47.7%) of the respondents had worked in the current position for more less than 5 years. This implies that the organization must have a good working scheme and conditions going by the rate of staff work-service. It could also emphasize the delicate nature of the county office where experience is core and so the organization is committed to retaining productive employees. In addition, the analysis shows that 11 (25%) of the respondents had worked for below 5 years in the current organization because counties came into existence less than five years ago.

Study Variables

a) Transport infrastructure
Table 3 Extent to which the transport infrastructure affects the economy of Kenya

Rating	Frequency	Percent
To a very large extent	40	91
To a large extent	4	9
To a moderate extent	-	-
To a little extent	-	-
Total	**44**	**100.0**

The main purpose of this study was to investigate the effect of motor vehicle congestion on the economic performance of Kenya. As such, one of the objectives of this study was to find out to what extent does the Transport infrastructure in Nairobi affect the economy. First, the study sought to establish the extent to which the infrastructure affected the economy, how it affected the economy and how infrastructure can be improved to impact positively on the economy. The results from the field study indicate that majority 40 (91%) of the respondents argued infrastructure impacted on the economy to a very large extent as shown in table 3. This implies that the respondents recognize the utmost importance

of infrastructure and the role it plays in the growth of the Kenyan economy. This provided a good ground for the study to establish the effect of motor vehicle congestion on the economic performance of Kenya. This emphasizes the important role that the respondents have pegged on infrastructure playing on the economy.

Further, the study sought to find out how infrastructure impacted on the economy. A likert scale was conducted on seven items regarding which impacts the economy the most. The analysis indicates that 44 (100%) of the respondents argued that ease of transportation of people and goods make infrastructure central to the economy as shown in table 3.

Table 4 Infrastructure factors impacting on the economy

infrastructural factors	Very low extent	Low extent	Undecided	High extent	Very high extent	Total
Ease of transport of people	-	-	-	-	44 100%	44 100%
Ease of transport of goods	-	-	-	-	44 100%	44 100%
Size of driving lanes	-	10 22.7%	14 31.8%	20 45.5%	-	44 100%
Number of driving lanes	-	-	-	20 45.5%	24 54.5%	44 100%
Number of by-passes	-	-	-	14 31.8%	30 68.2%	44 100%

From table 4, many respondents put emphasis on the quality of road infrastructure as a major factor in the economic performance of Kenya. Increased number of driving lanes and by passes will ease transport of both people and goods which will end up speeding the

growth and development of the economy. This implies that people value infrastructure development as a way of easing traffic and increasing the performance of the Kenyan economy.

b) Government polices

The second objective of the study was to investigate how government traffic polices affect the economy. To address this objective, various perspectives were considered. First, the Study sought to establish the respondents rating on the effectiveness of government traffic polices. Secondly, the research sought to establish which factors are considered when legislating the traffic policies. To establish the factors, the Study investigated the extent to which population, number of vehicles, status of the city and the cost of implementing the legislation were considered. Thirdly, the research sought to establish how government traffic polices affect the Kenyan economy and lastly which additional policies would further ease traffic congestion in the city.

First, the study sought to establish the respondents rating on the effectiveness of government traffic polices.

Table 5 Rating on the effectiveness of government traffic policies

Rating	Frequency	Percent
Very effective	-	-
Effective	5	11.4
Ineffective	5	11.4
Very ineffective	34	77.2
Total	**44**	**100.0**

The study findings indicate that the majority 34 (77.3%) of the respondents rated very ineffective government traffic policesFrom the table above, the findings show that a majority of respondents indicated that the current traffic laws were ineffective. This implies that the government and other policy making agencies should make an effort and formulate better policies. Secondly, the research sought to establish which factors are considered when legislating the traffic policies. To establish the factors, the Study investigated the extent to which population; number of vehicles, status of the city and the cost of implementing the legislation were considered

Table 6 Factors considered when legislating the traffic policies

Determinants	Very low extent	Low extent	Undecided	High extent	Very high extent	Total
population				1 1%	43 99%	44 100%
number of vehicles					44 100%	44 100%
status of the city			10 22.7%	23 52.3%	11 25%	44 100%
the cost of implementing the legislation				4 9%	40 91%	165 100%

This indicates that legislating the traffic policies takes all the two factors into consideration. The Study found out that all the respondents indicated that the number of vehicles was to a very high extent, 44 (100%) considered when legislating traffic policies. This is evident from the number of reactive policies that the Nairobi county government enacts every time the motor population rises and the roads are clogged. It is also important to note that 43 (99%) cited population, 40 (91%) the cost of implementing the legislation and 11 (25%) cited status of the city. Thirdly, the research sought to establish how government traffic polices affect the Kenyan economy

Table 7 The extent that government traffic affects the Kenyan economy

Rating	Frequency	Percent
To a very large extent	40	91
To a large extent	4	9
To a moderate extent	-	-
To a little extent	-	-
Total	**44**	**100.0**

This clearly indicates that traffic policies affect the performance of the Kenyan economy to a very large extent and it's up to the government to ensure that policies address the question of traffic congestion effectively

Statements showing additional policies that would ease traffic congestion in the city

Table 8 Additional policies that would ease traffic congestion in the city

Additional policies	Frequency	Percent
Establishing public transport lanes	40	91
Banning public transport vehicles from the CBD	20	45.5
Banning private vehicles from the CBD	15	34.1
Introducing rail trams to serve city estates	36	81.8
Relocating government offices from the CBD	28	63.6
Changing Nairobi status from capital city	18	41
Total	44	100.0

Many respondents said that there should be better traffic policies legislated to ease the traffic congestion in the city. Majority 40 (91%)suggested that establishing public transport lanes in the city streets would go to a great length in easing traffic congestion and increasing the performance of the Kenyan economy. These study findings clearly indicate the dissatisfaction that people have towards the current traffic polies in force. The emphasis is on the government to further

expand the existing infrastructure since a majority 40 (91%) said that Establishing public transport lanes and 36 (81.8%) said Introducing rail trams to serve city estates would be enough to ease the traffic congestion in the city and further grow the economy.

c) The economic performance of Kenya.

The respondents were asked to give a General discussion on the Economic effect of motor vehicle congestion on the economy of Kenya and all of them said that motor vehicle congestion was a big problem and it needs to be solved without delay.

Table 9 The effect of motor vehicle congestion on the economy of Kenya

Rating	Frequency	Percent
To a very large extent	**44**	**100**
To a large extent	-	-
To a moderate extent	-	-
To a little extent	-	-
Total	**44**	**100.0**

The table above clearly indicates that all the respondents said that motor vehicle congestion was a problem and needed to be solved. They further said that the congestion was also an indication that our economy is growing fast and thus there is need to improve on the infrastructure to accommodate the new growth.

Regression analysis

In this study, a multiple regression analysis was conducted to test the influence among predictor variables. The research used statistical package for social sciences (SPSS V 21.0) to code, enter and compute the measurements of the multiple regressions. The model summary is presented in the table below:

Table 10 Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.861[a]	0.741	0.723	0.12425

Adjusted R squared is coefficient of determination which tells us the variation in the dependent variable due to changes in the independent variable. From the findings in the table above the value of adjusted R squared was 0.723 an indication that there was variation of 72.3% on the performance of the Kenyan economy due to changes in holding government policies, Transport infrastructure, Man-hours lost in traffic and Public transport at 95% confidence interval. This shows that 72.3 % changes in economic performance could be accounted to changes in holding government policies, Transport infrastructure, Man-hours lost in traffic and Public transport. R is the correlation coefficient which shows the relationship between the study variables, from the findings shown in the table above there was a strong positive relationship between the study variables as shown by 0.861.

The study further tested the significance of the model by use of ANOVA technique. The findings are tabulated in table below

Table 11 ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	39.488	2	9.872	4.485	0.001[b]
	Residual	85.839	41	2.201		
	Total	125.327	43			

The study sought to test the following hypothesis

H_0= Government policies, Transport infrastructure, does not affect economic performance.

H_1= Government policies, Transport infrastructure does not affect economic performance

From the ANOVA statistics in table 11, the processed data, which is the population parameters, had a significance level of 0.001% which shows that the data is ideal for making a conclusion on the population parameters as the value of significance (p-value) is less than 5%. The calculated value was greater than the critical value (4.185>2.5252) an indication that there were significant difference between economic performance andGovernment policies, Transport infrastructure, Man-hours lost in traffic and Public transport. The significance value was less than 0.05 indicating that the model was significant.

In addition, the study used the coefficient table to determine the study model. The findings are presented in the table below.

Table 12 Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.878	.357		2.459	.016
	Transport infrastructure	.305	.127	.292	3.145	.002
	Government polices	.375	.117	.222	3.205	.010

The established regression equation was

$Y = 0.878 + 0.305 X_1 + (-.375 X_2)$

From the regression equation, it was revealed that holding Government policies and Transport infrastructure, to a constant zero, economic performance would stand at 0.878, a unit increase in Transport infrastructure would lead to increased economic performance by a factor of 0.305. A unit increase in Government polices would lead to increase in economic performance by factors of 0.375. The study further revealed that Government policies and Transport

infrastructure, were statistically significant to affect economic performance, as all the p value (sig) were less than 0.05%. The study also found that there was a positive relationship between economic performance and Government policies and Transport infrastructure.

The analysis was undertaken at 5% significance level. The criteria for comparing whether the predictor variables were significant in the model was through comparing the obtained probability value and $\alpha=0.05$. If the probability value was less than α, then the predictor variable was significant otherwise it wasn't. All the predictor variables were significant in the model as their probability values were less than $\alpha=0.05$.

SUMMARY OF THE FINDINGS
The general objective of this study was to assess the effect of the motor vehicle congestion on the economy of Kenya. A case study was made of Nairobi City County. The objectives of the study was to establish the effect of transport infrastructureand Government Policy on the economy as influenced by traffic congestion in Nairobi County.

Discussion of Findings
From the research question the Study sought to establish the extent to which the Transport infrastructure in Nairobi affect the economy. It was indicated that the respondents recognize the utmost importance of infrastructure and the role it plays in the growth of the Kenyan economy. This provided a good ground for the study to establish the effect of motor vehicle congestion on the economic performance of Kenya. Further the research showed that ease of transportation of people and goods make infrastructure central to the economy because of the quick movement of factors of production.

From the research, many respondents put emphasis on the quality of road infrastructure

as a major factor in the economic performance of Kenya. Increased number of driving lanes and by passes will ease transport of both people and goods which will end up speeding the growth and development of the economy. This implies that people value infrastructure development as a way of easing traffic and increasing the performance of the Kenyan economy.

The second objective of the study was to investigate how government traffic policies affect the economy. The findings show that a majority of respondents indicated that the current traffic laws were ineffective. This implies that the government and other policy making agencies should make an effort and formulate better policies. The Study found out that all the respondents indicated that the number of vehicles was to a very high extent considered when legislating traffic policies. This is evident from the number of reactive policies that the Nairobi county government enacts every time the motor population rises and the roads are clogged.

It is also important to note that respondents also cited population, the cost of implementing the legislation and status of the city as other factors. This clearly indicates that traffic policies affect the performance of the Kenyan economy to a very large extent and it's up to the government to ensure that policies address the question of traffic congestion effectively. These study findings clearly indicate the dissatisfaction that people have towards the current traffic polies in force. The emphasis is on the government to establish public transport lanes, ban public transport vehicles from the CBD, ban private vehicles from the CBD, introduce rail trams to serve city estates, relocate government offices from the CBD and change Nairobi status from a capital city.

Conclusions
The study concluded that motor vehicle congestion has a direct effect on the economy

of Kenya. The study also clearly indicated that without proper infrastructure the traffic congestion problem will persist which will negatively affect the economy of Kenya. The study also affirmed that traffic laws in Kenya are inadequate and poorly enforced and that this contributed to the clogging in our road networks and thus more need to be done in order to improve laws and policy formulation to ease congestion and grow our economy.

Recommendations
a) Transport infrastructure

The quality of road infrastructure is a major factor in the economic performance of Kenya and thus the government need to Increase the number of driving lanes and by passes so as ease transport of both people and goods which will end up speeding the growth and development of the economy. This implies that the transport infrastructure should be designed to meet the transporters expectation and ensure that they should be maintained over time so that they continue serving the public efficiently and effectively.

b) Traffic polices

The government and other policy making agencies should make an effort and formulate better policies and that they should not be reactive in their formulation and enforcement. The government should take time and expertise and use facts when formulating traffic laws and policies and they should continually revise these laws and policy and affect change in them if the situations call for it. The study further recommends that wider consultation with other transport stakeholders should be done before new laws and policies are enacted.

Suggestions for further studies
This research would not be termed as conclusive concerning the effect of motor vehicle congestion on the economic performance of Kenya. Rather it should open for more research to be conducted on the specific effects of corruption in the transport sector, insecurity and lack of road networks on the economic performance of Kenya. The research should establish more recommendations on strategies that can be applied to boost economic performance of Kenya.

References

Brockmeyer, E. (1948).The life and works of A.K. Erlang.København: Akademiet for de TekniskeVidenskaber.

Calhoun, C. (2002). Dictionary of the social sciences. New York: Oxford University Press.

Cosgrove, D., & Gargett, D. (2007). Estimating urban traffic and congestion cost trends for Australian cities. Canberra, ACT: Bureau of Transport and Regional Economics.

Dachis, B. (2013). Cars, congestion and costs: A new approach to evaluating government infrastructure investment. Toronto, ON: C.D. Howe Institute.

Dimitriou, H. (2011). Urban transport in the developing world: A handbook of policy and practice. Cheltenham, UK: Edward Elgar.

Duranton G., and TurnerM. 2009. The fundamental law of road congestion: evidence form U.S. cities. NBER Working paper 15376

Fundamental law of road congestion. (2011). The American Economic Review.

Hardin, G. (1968). The tragedy of the commons

Henley, Jon (2005-03-15). "Paris drive to cut traffic in centre by 75%". The Guardian(London: Guardian Media Group) (closing off areas to other users except public transport)

Kant Rao, William L. Grenoble IV, (1991) "Modelling the Effects of Traffic Congestion on JIT", International Journal of Physical Distribution & Logistics Management, Vol. 21 Iss: 2, pp.3 – 9

Kenya Gazette Notice No. 720, Transport and Urban De-Congestion Committee . Retrieved September 12, 2014:

Kerner, B. (2009). Introduction to modern traffic flow theory and control the long road to three-phase traffic theory. Heidelberg: Springer.

Kothari C. (2009). *Research Methodology: An Introduction.* New Age International Publishers New Delhi.

Litman T (2014) Smart Congestion Relief: Comprehensive Analysis Of Traffic Congestion Costs and Congestion Reduction Strategies: Victoria Transport Policy Institute

Lomax, T. (2011).Real-timing the 2010 Urban Mobility Report. College Station, TX: University Transportation Center for Mobility, Texas Transportation Institute, Texas A&M University System.

Macmillan, H., & Schumacher, S. (2006). *Research in education: evidence-based inquiry*. 6th Edition. Boston: Pearson Education Inc.

Managing urban traffic congestion. (2007). Paris: OECD :.

Mugenda, A. & O. Mugenda (1999). Research Methods: Qualitative and Quantitative Approaches. Nairobi: Acts Press.

Mugenda, M.O. (2003) *Research methods, qualitative and Quantitative* Aprroaches. Africa Center for technology Nairobi-Kenya.

Murashige, Y. (1995). Drivers' evaluation of advanced traveller information systems for inter-city expressways in Japan

Neuman, W.L (2000). Social Research Methods: Qualitative and Quantitative Approaches. Boston: Allyn and Bacon Publishers.

News Archive: Top News from March 25, 2014. (n.d.).Retrieved September 16, 2014.

Parkinson, T., & Phillips, M. (2006). Kenya (6th ed.). Footscray, Vic.: Lonely Planet.

Parry, I., &Timilsina, G. (2009). Pricing externalities from passenger transportation in Mexico city. Washington, D.C.: World Bank

Rao, A., &Rao, K. (2012).MEASURING URBAN TRAFFIC CONGESTION.International Journal for Traffic and Transport Engineering, 2(4), 286 – 305-286 – 305.

Roger L. Mackett (2012), Reducing Car Use in Urban Areas, in Roger L. Mackett, Anthony D. May, Masanobu Kii, Haixiao Pan (ed.) Sustainable Transport for Chinese Cities (Transport and Sustainability, Volume 3)Emerald Group Publishing Limited, pp.211 – 230

Sundarapandian, V. (2009). Probability, statistics and queuing theory (Eastern economy ed.). New Delhi: PHI Learning.

Traffic clogs emerging economies 2011 commuter pain index finds technolgy might help alleviate the problem. (2011, september 27). States News Service. Retrieved September 12, 2014, from http://www.highbeam.com/doc/1G1-268195989.html?

WardsAuto | Automotive Industry News, Data and Statistics.(n.d.).Retrieved September 13, 2014.

Winston, C., & Langer, A. (2006). The effect of government highway spending on road users' congestion costs. Washington, D.C.: AEI-Brookings Joint Center for Regulatory Studies.

www.inrix.com/economic-environment-cost-congestion/, accessed on November 5th 2014

www.Kenya national bureau of statistics.Org, accessed on November 5th 2014

www.vision2030.go.ke, accessed on November 5th 2014