INFLUENCE OF NATIONAL TRANSPORT AND SAFETY AUTHORITY
STRATEGIES ON PERFORMANCE OF ZUSHA ROAD SAFETY PROJECTS IN
NAKURU COUNTY, KENYA

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MANAGEMENT OF THE UNIVERSITY OF NAIROBI

2017
DECLARATION
This research project report is my original work and has not been presented for a degree in any other University or any other award.

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This research project report has been submitted for examination with my approval as the University Supervisor.

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University of Nairobi.
DEDICATION

This work is dedicated to my son Joseph Horeri Mathenge who died in an accident in September, 2016 leaving behind a young family, his patients and medical students without a mentor.
ACKNOWLEDGEMENT

My gratitude and thanks to those who have participated in one way or another to make this study possible, my wife Roseline and entire family. I cannot fail to mention Dr. Naomi Gikonyo, my very able supervisor and Mr. Mumo Mueke who have always been there to answer to my concerns.
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ABSTRACT

This study examined the influence of the National Transport and Safety Authority Strategies on the performance of Zusha road safety projects with a reference to Zusha project in Nakuru, Kenya. The road safety in Kenyan roads and especially in relations to the public road safety continues to be of concern to the government and other diverse stakeholders. The number of road fatalities were 1, 344 pedestrians, 339 drivers, 668 passengers, 637 motor cycle fatalities, and 69 pedal cyclists in 2015. These numbers illustrates the state of road safety in Kenya. The country continues to face relatively high cases of accidents and fatalities despite the formation of NTSA. The study’s objectives were to determine the influence of motor vehicle inspections on road safety projects performance, to establish the influence of road regulations on performance of road safety projects, to examine the influence of road users’ safety awareness on performance of road safety projects, and to determine the influence of road safety audits on performance of road safety projects. The study utilized the descriptive research design. The target population of this study was the people with information on the road safety projects performance in Nakuru. These people included the drivers, pedestrians, motor cyclists, motor vehicle passengers, NTSA officials and traffic police officers. The sample size utilized for this study was 353 respondents. This research utilized the structured questionnaire to address the specific objectives of the study. The pilot study was undertaken in Naivasha Sub County using 10% of the respondents, that is, 10 respondents. The validity of the questionnaire was examined using the pilot study aspects. The reliability of the study was examined using the cronbach alpha coefficient of above 0.7. Both the descriptive and inferential data analysis was utilized for the study. The descriptive statistics involved the frequency distributions and the means while the inferential statistics involved the multiple linear regressions. The multiple regression coefficient (R) that resulted from the multiple linear regression was 0.687 which implied that there was a moderate positive correlation between the independent variables and the dependent variable. The coefficient of determination (R²) was 0.472 which implied that 47.2% effect on performance of Zusha road safety projects can be accounted to the road users’ safety audits, road regulations, motor vehicle inspection and road safety awareness. This therefore indicates that there are other factors which were not considered in this study which have a 52.8% influence on the performance of Zusha road safety projects. The analysis of variance (ANOVA) was undertaken to determine whether the regression model was reliable. The p value from the ANOVA was 0.000 which indicated that the regression model had no likelihood or probability (0.0%) of giving a wrong prediction. The threshold for reliability is 0.05 which was reached since the p value was 0.000 implying that the model was reliable. This regression model indicates that one-unit increase in road users’ safety audits while other factors are kept constant would result in a 0.889 increase in performance of Zusha road safety projects. A one-unit increase in road regulations and road safety awareness would result in a 0.073 and 0.047 increase in performance of Zusha road safety projects respectively with the other variables kept constant. A one-unit increase in motor vehicle inspection would result in a 0.200 decrease in performance of Zusha road safety projects. This indicates that safety audits, road regulations and road safety awareness have a positive influence on the performance of Zusha road safety projects. On the other hand, it indicates that motor vehicle inspection has a negative influence on performance of Zusha road safety projects.
CHAPTER ONE
INTRODUCTION

1.1 Background of the Study

Road safety remains a critical concern for governments and other stakeholders across the world since the first fatality caused by a motor vehicle in 1889 in New York, United States of America (Pooyan, 2012). Different authors have examined the conceptualization of the term road safety. King (2005) in a study on road safety in Thailand and Vietnam didn’t explicitly examine the concept of road safety but looked at road safety projects. The study noted that road safety projects as interventions that seek significant improvement in factors driving road safety situation. These factors include driver behaviour, motor vehicle standards, enforcement levels, legislation, road infrastructure quality and traffic engineering standards. On the other hand, Pooyan (2012) in a study on the incorporation of road safety into road management systems conceptualized road safety in terms of road crashes, severity of road crashes, and frequency of road crashes per road segment. The study defined the road crashes as a set of events that result in injury or property damage due to collisions of at least one motorized motor vehicle and may involve another motor vehicle or a non-motorized user such as a bicyclist, a pedestrian or an object. On the other hand, the road severity is defined according to three classifications that is Fatal, injury and Property Damage Only (PDO) accidents (Bagi & Kumar, 2012). On the other hand, the road crashes frequency is examined in terms of number of accidents per unit of time, per volume of traffic, per road section etc. (Geedipally, 2008).
Figure 1: Road Safety Representation

Source; Geedipally (2008)

Similar to Pooyan (2012), Heydari (2012) also examines road safety in terms of the number of accidents or accident consequences, kind and severity, that is expected to occur on a given section of the road. On the other hand, Gitagama (2014) examines road safety as the measures that a person using the road transport system in place needs to observe for their own personal safety and the safety of other road users. Finally, Al-Dah, (2010) in a study on the causes and consequences of road traffic crashes in Dubai notes that diverse measures can be used for road safety measurement. This includes crashes per motor vehicle kilometer of exposure, crashes per passenger kilometer of exposure, crashes per hour of exposure, crashes per number of trips, crashes per number of participants, crashes per population regardless of individual exposure, and fatal or injury crashes per total number of crashes (Al-Dah, 2010).
Road safety remains a global challenge due to the various lives lost in road accidents. In this context, Vigneshkumar & Vijay (2014) noted that in India the road accidents were approximately half a million with over 125,000 fatalities in 2009. In Namibia, the National Road Safety Council., (2009) indicated that there were 13,825 and 15,537 road crashes in 2008 and 2009 respectively. On the other hand, the numbers of road crashes fatalities were at 259 and 278 in 2008 and 2009 respectively. Finally, National Road Safety Council., (2009) noted that the number of casualties stood at 3,845 and 4,164 in 2008 and 2009 respectively. According to Kemeh (2010), road casualties are still relatively high in Ghana. In this context, Kemeh (2010) noted that in 2008, there were 11,214 road crashes, 16,455 road casualties and 1,938 fatalities. On the other hand, Remi, Adegoke, & Oluwaseun (2010) noted that the road crashes recorded over a five year period from 2000 to 2006 stood at 98,494 cases of traffic crashes of which 28,366 were fatal and resulted into 47,092 deaths. In Uganda, Friday, Tukamuhabwa, & Muhwezi (2012) indicated that road accidents were on the rise. To demonstrate this, the study noted that 14,390 accidents (1,438 fatalities and 12,946 injuries) were reported in year 2000, and had increased to 18,250 accidents (2,334 fatalities and 12,076 injuries) by the year 2008. This represented a 26.8% increase in accident levels over an eight year period.

There are diverse factors leading to the road safety challenges across the globe. These challenges range from human factors, infrastructure related factors, and motor vehicle related aspects (Chattaraj, 2013). The human factors include poor driver attitudes and road practices such as reckless driving, over speeding, incompetency of the driver, driving under influence of alcohol, inconsiderate road usage and lack of compliance to
road safety regulations (Jinadasa & Bishop, 2014). The human factors can also include the road practices of pedestrians on the road. The infrastructure related aspects include the conditions of the road in terms of the road width, speed bumps, and factors affecting visibility along the road (Remi et al., 2010). Finally, the motor vehicle related factors include the road worthiness of the motor vehicle. The diverse factors affecting the road safety aspects contribute differently to road safety compromises around the world. For example, Friday et al., (2012) in examination of road safety in Uganda notes that driver related factors, motor vehicle conditions and road infrastructure contribute to 80%, 10%, and 5% of the road crashes in Uganda respectively.

Diverse countries across the world have formed specialized authorities and regulatory bodies to deal with aspects of road safety. In Namibia, Iipinge & Owusu-afriyie (2014) notes that the National Road Safety Council of Namibia (NRSC) was formed under the Ministry of Works and Transport. The body’s objectives includes undertaking of research on road safety aspects, issuance of policy guidelines to law enforcement policies, and creating public awareness on the road safety issues. However, despite the presence of NRSC, challenges of road safety still persist in the county. According to National Road Safety Council (2009), there was an increase of 12.4%, 7.3%, and 7.6% increases in road crashes, road crashes fatalities and number of casualties respectively between 2008 and 2009.

In Ghana, the government formed the National Road Safety Commission (NRSC) in 1999 through an act 567 of parliament (Kemeh, 2010). In Nigeria, the Federal Road
Safety Corps (FRSC) was formulated as a specialized road safety organization (Ajibola, 2015). The Federal Road Safety Commission (FRSC) is a paramilitary organization formed in 1988 by the Federal Government of Nigeria with diverse functions. These functions include undertaking of road safety campaigns, clearing any obstructions on the highway, enforcing traffic rules, issuance of drivers’ licenses, advisory roles on road safety issues and taking care of the road accident victims. According to Federal Road Safety Commission., (2016) several measures have been undertaken to improve on the road safety have started to bear fruits. Amongst the aspects that they had undertaken included effective usage of mobile courts, renewed vigor in road safety campaigns especially around festivities, and updating of road signage across the country. The statistics in Nigeria therefore indicate decreasing trends in road safety challenges. In this context, Federal Road Safety Commission., (2016) notes that the road crashes stood at 10,380 and 9,734 in 2014 and 2015 respectively. Over the same period, the road fatalities stood at 5,996 and 5,440 respectively.

In Kenya, several measures, policies and institutional frameworks have been updated across the years. According to Magolo & Mitullah (2007) diverse institutional reforms have taken place in Kenya to address the aspects of road safety. The study noted that the Kenya Police introduced the highway patrol system between 1972 and 1974, formation of National Road Safety Council (NRSC) and Road Safety Unit (RSU) as a secretariat to the NRSC between 1981 and 1983. Magolo & Mitullah (2007) further noted that NRSC went into limbo between 1987 and 1989. The National Transport and Safety Authority (NTSA) was established by an act number 33 of Parliament in 2012 which was gazette on
26th October, 2012 (The National Transport and Safety Authority Act., 2012). The functions of NTSA are spelt under sections 4 (1) and 4 (2) of the National Transport and Safety Authority Act. These functions include advising and making recommendations to the Cabinet Secretary on matters relating to road transport and safety; implementing policies relating to road transport and safety; plan, manage and regulate the road transport system in accordance with the provisions of the NTSA Act and ensuring the provision of safe, reliable and efficient road transport services (The National Transport and Safety Authority Act., 2012). In order to undertake its functions, NTSA undertakes the following additional duties; registering and licensing motor vehicles; conducting motor vehicle inspections and certification; regulating public service motor vehicles; advising the Government on national policy with regard to road transport system; developing and implementing road safety strategies, and facilitating the education of the members of the public on road safety (The National Transport and Safety Authority Act., 2012). Other duties include conducting research and audits on road safety; Compiling inspection reports relating to traffic accidents; establishing systems and procedures for, and oversee the training, testing and licensing of drivers; formulate and review the curriculum of driving schools; and co-ordinate the activities' of persons and organizations dealing in matters relating to road safety (The National Transport and Safety Authority Act., 2012).

The Zusha National Road Safety is an initiative of diverse stakeholders including the University of Georgetown, and United States Agency for Development aiming at reduction of road accidents in Kenya. The road safety project has three components 1) Distribution of Zusha safety stickers in PSVs 2) Complementary messaging through
radio, billboards, social media, newspaper advertisements, editorials, and news articles and 3) National and regional stakeholder conferences to raise awareness. The stickers are placed in all the public service motor vehicles. The plan that was first initiated in Kenya is to be rolled in Tanzania, Uganda and Rwanda. The strategies that have been adopted by NTSA to operationalize the Zusha road safety program includes sensitization and empowerment of road users, road shows and safety awareness campaigns, structuring of informal public service motor vehicle sectors through registration of PSV Savings and Credit Co-operative Organizations (SACCOS) and companies, training and capacity building of the PSV stakeholders.

1.2 Statement of the Problem

The road safety in Kenyan roads and especially in relations to the public road safety continues to be of concern to the government and other diverse stakeholders. According to National Transport and Safety Authority, (2016) the number of road fatalities were 1,344 pedestrians, 339 drivers, 668 passengers, 637 motor cycle fatalities, and 69 pedal cyclists in 2015. These numbers illustrates the state of road safety in Kenya. The country continues to face relatively high cases of accidents and fatalities despite the formation of NTSA. The NTSA statistics shows that the public road safety is deteriorating in nature. In this context, the passenger fatalities increased from 1340 to 1344 between 2014 and 2015; the PSV drivers fatalities increased from 268 to 339 between 2014 and 2015 (National Transport and Safety Authority., 2016). The Nakuru-Nairobi highway enjoys a high vehicular traffic to both the vehicles terminating their journeys in major towns such as Naivasha and Nakuru as well to the vehicles accessing the western part of Kenya and
Uganda. However, the highway has been declared as one of the most unsafe roads around the world. The World Health Organization in a 2013 report on road safety declared the Nakuru-Nairobi highway as being ranked the second most dangerous road in Africa. The road was also declared as the fourth most dangerous road in the world. This was attributed to the high number of accidents and fatalities on the round compared to other major highways. The accidents were attributed to drink driving, overtaking, and speeding amongst other factors. This study sought to examine the influence of the national transport and safety authority in enhancing public road safety projects in Nakuru County.

1.3 Purpose of the Study
The purpose of the study is to examine the influence of national transport and safety authority strategies on performance of zusha road safety projects in Nakuru county, Kenya

1.4 Objectives of the Study
The study was based on the following objectives;

1. To determine the influence of motor vehicle inspections on road safety projects performance
2. To establish the influence of road regulations on performance of road safety projects
3. To examine the influence of road users’ safety sensitization on performance of road safety projects
4. To determine the influence of road safety audits on performance of road safety projects
1.5 Research Questions

The study was guided by the following research questions;

1. What is the influence of motor vehicle inspections on road safety projects performance?
2. How do road regulations influence performance of road safety projects?
3. What is the influence of road users’ safety awareness on performance of road safety projects?
4. How do road safety audits influence the performance of road safety projects?

1.6 Significance of the Study

The study was of significance to a diverse range of stakeholders including NTSA, County Governments, Matatu Owners, and researchers in the areas of road safety. The study helped highlight the concepts of road safety, road safety practices around the world and the effectiveness of the NTSA in enhancing the road safety aspects. This information was critical in assisting researchers in the area of road safety to conceptualize their literature review and gain in-depth understanding of the study. The Matatu owners gained an in-depth understanding on the role of motor vehicle and behaviors of their drivers in respect to the road safety aspects. This was critical the Matatu owners and public service motor vehicles place effective policies in respect to the operations of the Public Service Motor vehicles (PSVs). Finally, the NTSA gained from the study through an examination on how other bodies around the world enhance the road safety programs in their respective countries. The NTSA thus gained best practices from the study that they can implement in their study.
1.7 Delimitations of the Study

The geographical scope of the study was Nakuru County due to the limitations of time as well as the financial resources to undertake the study in larger geographical scope. However, the Nakuru County is sufficient enough for the study to collect the required information for the study. The time scope of the study is six months from January to June of 2017 as the study is meant for academic purposes only. The budget scope of the study was Ksh 60,000 as the study is self-funded.

1.8 Limitations of the Study

The study was limited in diverse ways. The study sought to undertake the study amongst the Matatu drivers and conductors within the Nakuru County. Some of these drivers and conductors may be semi illiterate which may compromise their ability to fill the questionnaire on their own. This was mitigated through use of research assistants to interpret the questionnaires in the local dialects that are understandable to the respondents.

1.9 Assumptions of the Study

The study was based on the assumptions that the respondents were truthful in their responses to the set questions on the study and they were willing to voluntary participate in the study.
1.10 Definitions of the Key Terms Used

Road Crashes; Events that result in injury or property damage due to collisions of at least one motorized motor vehicle and may involve another motor vehicle or a non-motorized user such as a bicyclist, a pedestrian or an object

Road Regulations; A set of rules that should be adhered to by the road users

Road Safety Audits; Formal procedure that is used for an independent assessment of an accident potential and likely safety performance of a specific design for a road or traffic scheme, whether new construction or an alteration to an existing road

Road Safety Projects; This is the projects that are undertaken in order to enhance safety aspects of the road

Road Users’ Safety Awareness; The knowledge of the road users on the risk free usage of the road

Motor vehicle Inspections; The checking on the motor vehicle on whether they adhere to a set rule of road regulations

Zusha Project; A road safety project to encourage road safety on public service motor vehicle

1.11 Organization of the Study

This study is organized in five chapters that is chapter one, two, three, four and five. Chapter one examined the introduction to the study and consisted of background to the study, statement of the problem, objectives of the study, significance of the study, limitations of the study and definitions of key terms.
Chapter two sought to examine the literature review of the study which examined the theoretical review literature and empirical review of the specific objectives. It also examined the conceptual framework and summary of reviewed literature.

Chapter three examined research design, target population, sample size and sampling procedure, data collection instrument, pilot study, data collection method, data analysis and presentation, ethical consideration, and operationalization of variables.

Chapter four examined the data presentation, analysis, interpretation and discussion. Finally, chapter five examined the summary, conclusions, recommendations of the study and suggestions for further studies.
CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

This chapter examined in detail the aspects of road safety project performance, and influences of motor vehicle inspection, road regulations, road users’ safety awareness, and road safety audits on road safety performance. The chapter also examined the theoretical and conceptual frameworks.

2.2 Performance of the Road Safety Projects

According to Al-Dah (2010) in a study on causes and consequences of road traffic crashes in Dubai, UAE notes that the country has undertaken diverse road safety measure projects. In this context, Dubai formed the Roads and Transport Authority (RTA) in 2005 with a view of centralizing the traffic matters in one authority for better coordination and effective intervention measures on road safety issues. Amongst the functions of RTA include development and maintenance or roads in Dubai as well as licensing of drivers and motor vehicles.

In Ethiopia, Taera (2014) in a study on the country notes that the country has two major challenges affecting effectiveness of road safety programmes. The first major challenge is the coordination challenges as well as overlapping mandates amongst the different organizations involved in road safety issues. The study notes that some of these organizations don’t have road safety issues as their primary objective hence leading to neglect on the road safety aspects.
In Uganda, Friday, Tukamuhabwa, & Muhwezi (2012) noted that there were diverse challenges that were facing road safety projects in the country. The study noted that there were inadequate professionally trained traffic officers as required by the Traffic and Road Safety Act. This means that the enforcement of road traffic rules in the country were hampered. The traffic officers also had inadequate access to road safety equipment such as speed guns and breathalyzers. The study further noted that there is an increasing number of bad motor vehicles in Ugandan roads due to abolition of mandatory motor vehicle inspection.

According to Oburu (2015) in a study on road safety messages in Kenya, one of the projects that Kenyan government has initiated in road safety is the formation of National Transport and Safety Authority (NTSA). According to National Transport and Safety Authority., (2016) the vision of the authority is to provide sustainable and safe road transport system with zero clashes. On the other hand, the mission of the authority is to facilitate the provision of safe, reliable, and efficient road transport services. However, despite the formation of NTSA, Oburu (2015) notes that there is still high prevalence of road safety challenges in the country.

2.3 Motor vehicle Inspection and Performance of Road Safety Projects

The motor vehicle inspection is a critical component of road safety performance aspects. Gitagama (2014) in a study on the public transport sector perception on television programming on road safety notes that motor vehicle inspection is key in enhancing road safety. In this context, the study notes that motor vehicles need regular inspections with a
view of guaranteeing that the components of the motor vehicles are safe to use and in good working conditions. The importance of the motor vehicle inspection to the road safety aspects is further emphasized by Friday, Tukamuhabwa, & Muhwezi (2012) in a study on road safety in Uganda. The study noted that the abolition of the mandatory motor vehicle inspection by the police in the mid-1990s led to an increase in motor vehicles in Dangerous Mechanical Conditions (DMC) on the roads (Friday et al., 2012). This has continually acted to undermine the road safety in the country.

The motor vehicle inspection is key in eliminating the unroadworthy motor vehicles and motor vehicles with DMC from the roads thus improving on the road safety conditions. In this context, commenting on the causes of accidents in Tanzania, Lewis (2013) indicated that the over 15% of the road accidents were caused by unroadworthy motor vehicles. The challenges that were noted in the motor vehicle roadworthiness lay with the fact that Tanzania imported second hand motor vehicles from developed countries. The mechanical conditions of some of these motor vehicles were blamed for the accidents in the Tanzanian roads. The existing mechanisms of motor vehicle inspections which were primarily visual in nature were noted to be unreliable in nature and lacking the comprehensiveness that is required. In emphasizing the role of motor vehicle conditions in road safety, Anini, (2011) further notes that there is a high likelihood of motor vehicles in worn out conditions to be involved in road accidents. In this context, King, (2005) therefore indicates that motor vehicles with adequate and working features such as seatbelts, adequate lights, brakes, steering wheel, tires as well as direction indicators among others and in good condition can help to reduce traffic accident.
In the rural parts of India, the lack of motor vehicle inspections has been blamed for increasing road accidents incidents. The lack of motor vehicle inspection has led to a large number of un-roadworthy motor vehicles that are characterized by faulty breaking system, faulty indicator lighting system, worn out tyres, loose wheels and overloaded axles (Khan, 2011). These aspects have contributed to the poor performance of the motor vehicles in the roads leading to increases cases of road accidents. In Nigeria, Motunrayo (2015) noted that the state of the motor vehicles had become a concern to the authorities leading to the creation of the Motor vehicle Inspection Office (VIO) which is concerned with the task of motor vehicle inspection within Nigeria. In Kenya, Sang (2009) in a study on assessment of the safety regulations noted that in 2009, the country had the Motor vehicle inspection Unit. This unit was responsible for the inspection of the public service motor vehicles before being licenced to operate as PSVs. The PSVs owners were required to pay an annual fee of Ksh 1,000 to the Motor vehicle Inspection Unit under the traffic police which ensured that the motor vehicle was compliant with all the required technical aspects to operate in the Kenyan roads. The owners were then issued with a certificate of inspection that allowed them to get a Transport and Licensing permit to operate as a PSV in Kenyan roads.

2.4 Road Regulation and Performance of Road Safety Projects

There are diverse regulations that have been enacted in relations to road usage with a view of improving on the road safety performance. In this context, Kim & Wagner (2014) noted that in the United States there regulations on alcohol consumption as well as speed limits in order to enhance road safety. In this context, the study noted that there was
appositive and highly significant influence of Blood Alcohol Consumption (BAC) in the US and the road safety levels. The alcohol regulation enhances the road safety aspects through ensuring that the driver has full control of the motor vehicle hence reducing the road crashes. The study also examined the role of speed limits regulations on road safety performance in the US. In this context, the study noted that over 40% of drivers violated speed limits in highways. The violation of speed limits is correlated with the less control of the motor vehicle as well as more severe injuries to the drivers and passengers in case of an accident.

Juma (2015) in a study on road users’ awareness strategies in Tanzania noted that diverse ways in which the adherence to set regulations can impact on road safety. The study noted that over 80% of the motorists in the study sample did not know of the speed requirements/ regulations. Amongst the aspects that were found to engage in over speeding was a result of drinking, drug use and inexperienced learner drivers. These factors were seen to compromise road safety in Tanzania. Friday et al., (2012) in a study on the Road Communication Technologies and Safety Regulation Enforcement on Roads in Uganda noted challenges related to regulations on road safety aspects. The study noted that in Uganda about 80% to 95% of the road accidents are caused by lack of adherence to diverse road safety regulations. Amongst the major road safety regulations in Uganda includes the Traffic and Road Safety Act of 2004 which imposed speed limits, prohibited use of mobile phones while driving, prescribed alcohol limits, and authorized the use of speed governance. The lack of adherence to this road safety regulations resulting in poor road safety performance is manifested in the driver behaviour in Ugandan roads including
reckless driving, over speeding, poor road ethics and drug abuse aspects. The study in the examination of the compliance levels of road safety noted that the mandatory as opposed to voluntary regulatory compliance were correlated positively with road safety performance.

In Kenya, diverse regulations have been historically formulated and implemented in relations to the PSV. The most famous in the recent times were the regulations that were gazette in October of 2003 with an implementation date of 1st February, 2004. These regulations were known as the “Michuki” rules after the then Cabinet Minister for transport, John Michuki. According to Sang (2009), the regulation requirements included; Compulsory fitting of speed governors in all PSV and commercial motor vehicles whose tare weight exceed 3,048 kg in order to limit speed to 80 kph; Fitting of safety belts and use of the same on all motor vehicles (public, commercial and private); Employment of drivers and conductors on permanent basis and they must be security vetted and Compulsory wearing of uniforms and badges by all PSV drivers and conductors. Others included reduction of carrying capacity in all PSVs and outlawing transportation of standing passengers; Painting of a yellow band, indication of route details and writing of owner’s details in all PSVs to facilitate PSV identification, compulsory retesting of all PSV drivers after every 2 years and every driver prominently displaying his or her photograph.

The regulations had diverse impacts on the road safety in Kenya. Amongst the profound impact of the regulations included reduction of the speed limits hence reducing on road...
fatalities involved as a result of speeding PSV. The PSVs also stopped having standing passengers as well as limiting the number of passengers that the PSVs could carry.

2.5 **Road Users’ Safety Awareness and Performance of Road Safety Projects**

The road safety awareness is critical in road safety performance across diverse road users including the drivers, passengers, and pedestrians. The driver’s conduct is of critical importance to the road safety. This is because driving is a complex task requiring auditory, visual, and tactile attention of drivers (Hurtado, 2015). The drivers must therefore stay away from distractions and be focused on the road due to the changing nature of the environment in which they drive the motor vehicles. According to Walker & Strathie (2015) distracted driving involves anything that removes the attention of the driver from the primary task of driving. These distractions could be entertainment systems in the motor vehicles, and hand held devices amongst other distractions. Distracted driving has the capacity to compromise the road safety. In this context, King (2005) indicates that hand held devices increases the probability of being involved in an accident four fold. There could be other distractions that are external to the motor vehicle that the driver must be conscious of. The drivers must therefore at all times maintain an understanding of their immediate environment including the motor vehicle speeds, neighbouring motor vehicles, pedestrians, landmarks, and road signage amongst other aspects. These items collectively contribute to the driver’s situation awareness which is critical for decision making while driving.
Pino, Baldari, Pelosi, & Giucastro (2014) in a study on Risk factors of road crash: An empirical analysis among an Italian drivers sample. The driver capacity to address the driving demands occasioned by driving conditions e.g. night driving or infrastructure demands e.g. roads with pot holes. The study notes that in the context where the driving task demands exceed the driver’s capabilities then the drive fails to be in control of the motor vehicle which may lead to collision. Therefore, Pino et al., (2014) notes that driving task difficulty is inversely proportional to the difference in task demands and driver capability.

Moraa (2006) undertook a study of road safety in Kenya: a study of knowledge, attitudes and practices of drivers of passenger service motor vehicles. The study used a sample size of 160 respondents drawn from public service motor vehicles with a view of investigating how the knowledge, attitudes and practices of public service motor vehicle drivers contribute to road crashes. The study noted that PSV drivers led to high number of road accidents due to negative attitudes towards road safety regulations, and negative attitude towards law enforcement agencies as well as their work. The study also noted that the driving of public service motor vehicles were not standardized across the country leading to poor road safety practices amongst the drivers.

In the context of pedestrians, Kim & Wagner (2014) examined pedestrian safety in the United States of America. The study noted that mobile phone usage reduced the situation awareness amongst pedestrians hence increasing unsafe road practices. The study noted that impact of cell-phone use on pedestrian collision risk, with the finding that talking on
the phone (69.5 percent) accounted for more dangerous behavior than texting (9.1 percent) for pedestrians. The study also noted that pedestrians listening to music on the headphones. Juma (2015) in a study on the road User's Awareness on Strategies for Controlling Road Traffic Accidents in Tanzania noted that lack of awareness of road safety rules among various road users leads to unsafe road user behavior and habits. The lack of awareness on road safety amongst passengers, pedestrians, motorists and cyclists make the road users vulnerable to road accidents. The lack of awareness of the road safety aspects is particularly manifested through bad road usage ethics and lack of adherence to set road regulations.

2.6 Road Safety Audits and Performance of Road Safety Projects

According to Bagi & Kumar (2012), the road safety audits started in the United Kingdom in the 1980s before spreading to Australia, New Zealand and United States in the mid-1990s. The road safety audit refers to a formal procedure that is used for an independent assessment of an accident potential and likely safety performance of a specific design for a road or traffic scheme, whether new construction or an alteration to an existing road (Sayed & Mhaske, 2013). The road safety audit is often used for the purposes of policy formulation in relations to the prevention of accidents within the road system.

European Transport Safety Council., (2007) indicates that there are diverse ways in which the road safety audits improves the road safety performance. These benefits include better planning aspects in transport infrastructure, creating of road safety awareness amongst policy makers, and reduction of unintended effects of transport
infrastructure designs. Therefore, the formal systematic safety audit procedures have been demonstrated to effective in the area of road safety. This is because the road safety audits should be in a position to reduce the number and severity of accidents in the roads, and enable good usage of the roads amongst road users.

Stephen (2001) in a study on the Safety analysis without the legal paralysis: The Road Safety Audit Program noted the diverse uses of road safety audits in enhancing road safety performance. The road safety audit is used for the purposes of proactively identifying and putting action plans for areas within the road network that compromises the road safety. The study noted that the ultimate aim of the safety audits is the minimization of the risks to pedestrians, motor vehicle passengers and drivers, and even people close to the roadways. Similarly, Lougheed (2006) indicates that there are five purposes of the road safety audits including the reduction of the likelihood of accidents, reduction of the severity of accidents, elevation of road safety amongst stakeholders, reduction of costly remedial work, and reduction of the overall cost of road accidents such as trauma, hospitalizations etc. In helping the road safety audit meet its objectives, there are diverse aspects that the safety auditor should illustrate including the roadside features, road surface markings, signing and delineation, intersections and approaches, and special road users.

Diverse countries across the world have formulated regulatory bodies that undertake the road safety audits. In the United Kingdom, the road safety audits started in the 1980s which was made mandatory in 1991 for all the national trunk roads and freeways. In
Australia, the guidelines for road safety audits were published in 1994 while in New Zealand the Transit New Zealand (TNZ) which is the road safety regulatory authority published the road safety audit guidelines in 1989. There has been diverse aspects of road safety that have been achieved as a result of road safety audits. Lougheed (2006) in a study on Road Safety Audits: Quantifying and Comparing the Benefits and Costs for Freeway Projects demonstrated tangible and practical benefits of safety audits. The study notes that benefits associated with road safety audits are often expressed in terms of collision frequencies reduction and or severities. Even when collisions occur, the road safety audits ensure that the severity of the collisions is not so severe in nature. The study in detailing the impact of road safety audit documented the comparative case of the old Trans-Canada Highway and a new highway that had been constructed. In recognition of the role of the road safety audits, the study noted that the new highway had a reduced collision rate of 0.259 collisions per million-motor vehicle-kilometers.

2.7 Theoretical Framework

The study was based on the systems theory and Haddon’s Matrix Theory.

2.7.1 Systems Theory

Systems theory proposes the existence of behavior of certain elements in their natural environments through interactions with each other forming a certain order of functioning (Griffith, 2013). Normally, the elements of the systems are interrelated and rely on a feedback mechanism between each other. Within the context of road use and road safety, there are several elements all diverging from human performance to ensure smooth-or the lack of it in the use of the roads. The interaction of human and non-human factors whose
interaction forms a system has an impact on the road performance. The elements of the road usage system include human behaviors of other motorists, mechanical condition of motor vehicles, traffic policies and road factors (Muvuringi, 2012). The theory focuses on the diverse ways in which the system actors and parties inter relate to ensure safe transportation of people and goods from point A to point B. Its richness in suggesting factors that negatively and positively influence road safety provide particular importance to this study (Friday et al., 2012). In addition, the paper examines challenges that impact on the different elements of road systems that in turn affect road safety, through the incorporation of the systems theory.

Figure 2: System’s Theory on Road Safety

Source: Gumah (2015)

2.7.2 Haddon’s Matrix Theory

Haddon’s Matrix Theory is a refinement of the systems theory, in that it specifically suggests elements in the road that have been proven to impact road safety (An, Zhang,
The matrix theory suggests motor vehicle and equipment factors, environmental factors, human factors, pre-crash phase and post-crash-phase, and human factors as the six most important contributors to road safety. Different areas of research on road safety would then further refine on these elements, and pick the most applicable ones for the study. For this study, the most important elements of the study are the human and motor vehicle aspects of the Haddon’s Matrix theory.

### Table 2.1: Haddon’s Matrix

<table>
<thead>
<tr>
<th>Phase</th>
<th>Human Factors</th>
<th>Vehicles and Equipment Factors</th>
<th>Environmental Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-crash</td>
<td>Information</td>
<td>Roadworthiness</td>
<td>Road design and road layout</td>
</tr>
<tr>
<td></td>
<td>Attitudes</td>
<td>Lighting</td>
<td>Speed limits</td>
</tr>
<tr>
<td></td>
<td>Impairment</td>
<td>Breaking</td>
<td>Pedestrian facilities</td>
</tr>
<tr>
<td></td>
<td>Police Enforcement</td>
<td>Speed Management</td>
<td></td>
</tr>
<tr>
<td>Crash</td>
<td>Use of restraints</td>
<td>Occupant restraints</td>
<td>Crash-protective roadside objects</td>
</tr>
<tr>
<td></td>
<td>Impairments</td>
<td>Other safety devices</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Crash-protective design</td>
<td></td>
</tr>
<tr>
<td>Post-Crash</td>
<td>First-aid skills</td>
<td>Ease of access</td>
<td>Rescue facilities</td>
</tr>
<tr>
<td></td>
<td>Access to medics</td>
<td>Fire risk</td>
<td>Congestion</td>
</tr>
</tbody>
</table>

Source: Yang (2012)

### 2.8 Conceptual Framework

The study is guided by four independent variables, a moderating variable and a dependent variable. The independent variables include motor vehicle inspections, road regulations, road users’ awareness, and road safety audits. The independent variables include the road safety project performance while the moderating variable is the judicial system and traffic laws.
Figure 3: Conceptual Framework

**Independent Variables**

**Motor vehicle Inspections**
- State of Tyres
- Insurance
- Number of passengers ferried
- Roadworthiness of Motor

**Road Regulations**
- Compulsory wearing of uniforms and badges
- Compulsory retesting of all PSV drivers after every 2 years
- Fitting of safety belts in the motor vehicles

**Road Users’ Safety Awareness**
- Safety Belts
- Responsible Drinking
- Speeding Campaigns
- Road Signage Adherence

**Road Safety Audits**
- Roadside Features
- Road Surface Markings
- Signing and Delineation
- Intersections and Approaches
- Special Road Users

**Dependent Variable**

- Judicial System & Traffic Laws

**Road Safety Project Performance**
- Number of road accidents
- Number of road fatalities
- Road worthiness of the motor vehicles
- Court cases on road accidents
2.9 Summary of Reviewed Literature and Research Gap

There were diverse challenges noted with the performance of road safety projects including challenges with implementation bodies of the road safety campaigns, inadequate access to road safety equipment such as speed guns and breathalyzers and financial support of the activities. In respect to motor vehicle inspections, there is need regular inspections with a view of guaranteeing that the components of the motor vehicles are safe to use and in good working conditions. The motor vehicle inspection is key in eliminating the unroadworthy motor vehicles and motor vehicles with DMC from the roads thus improving on the road safety conditions. The challenges faced in motor vehicle inspection included the existing mechanisms of motor vehicle inspections which were primarily visual in nature were noted to be unreliable in nature and lacking the comprehensiveness that is required. The motor vehicle with adequate and working features such as seatbelts, adequate lights, brakes, steering wheel, tires as well as direction indicators among others and in good condition can help to reduce traffic accident.

There are diverse regulations that have been enacted in relations to road usage with a view of improving on the road safety performance. These regulations include alcohol consumption as well as speed limits regulations in order to enhance road safety. Other measures taken around the world include imposition of speed limits, prohibition of use of mobile phones while driving, prescribed alcohol limits, and authorized the use of speed governance. In Kenya, amongst the road regulations included Compulsory fitting of speed governors in all PSV and commercial motor vehicles whose tare weight exceed
3,048 kg in order to limit speed to 80 kph; Fitting of safety belts and use of the same on all motor vehicles (public, commercial and private); Employment of drivers and conductors on permanent basis and they must be security vetted and Compulsory wearing of uniforms and badges by all PSV drivers and conductors. Others included reduction of carrying capacity in all PSVs and outlawing transportation of standing passengers; Painting of a yellow band, indication of route details and writing of owner’s details in all PSVs to facilitate PSV identification, compulsory retesting of all PSV drivers after every 2 years and every driver prominently displaying his or her photograph.

The road safety awareness is critical in road safety performance across diverse road users including the drivers, passengers, and pedestrians. The driver’s conduct is of critical importance to the road safety. This is because driving is a complex task requiring auditory, visual, and tactile attention of drivers. The drivers must therefore stay away from distractions and be focused on the road due to the changing nature of the environment in which they drive the motor vehicles. The road safety audits are key in road safety through an independent assessment of an accident potential and likely safety performance of a specific design for a road or traffic scheme, whether new construction or an alteration to an existing road.
CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction
This chapter examined the researcher methodology of the study. The research methodology has been defined as the systematic and theoretical analysis of the methods to be used in the field of the study. This chapter examined the research design, target population, sample size and sampling procedure, data collection instrument, pilot study, data collection procedure, and data analysis procedure.

3.2 Research Design
The research design refers to the framework on how data was collected to enable adequate answering of the objectives of the study (Cooper & Schindler, 2008). The study utilized the descriptive research design. The descriptive research design is used to describe the characteristics and traits of the research subject through answering aspects of what happened, who is involved, where did it take place, when did it take place, why did it place and how did it take place (Sekaran, 2003). The descriptive study always addresses the research subject as it is on the ground without any variable manipulation. The descriptive research design was ideal for this study as the study sought to examine the influence of the NTSA strategies on performance of Zusha Road Safety Projects in Nakuru Kenya. The researcher examined the strategies as they are on the ground without any manipulation but simply described the manner in which they influence road safety performance.
3.3 Target Population

Target population has been defined as a group of individuals with a certain desired characteristic who provide the sample members and with which the results of the analysis will be extrapolated (Saunder, Lews, & Thornhill, 2009). The target population of this study was the people with information on the road safety projects performance in Nakuru. These people include the drivers, pedestrians, motor cyclists, motor vehicle passengers, NTSA officials and traffic police officers.

3.4 Sample Size and Sampling Procedure

The process of including population members that have the desired characteristic into a smaller group that will be used to make inferences about the population is referred to as sampling (Kombo & Tromp, 2009). The appropriate number of these individuals in the smaller group (sample) is referred to as a sample size. This study utilized the Fisher formula in the calculation of the sample size as follows;

\[ n = \frac{z^2 pq}{d^2} \]

where \( n \) is the desired sample size if sample population is bigger than 10,000

\( z \) = standard normal deviation at the required confidence interval

\( q = 1 - p \)

\( d \) = level of statistical significant set

Therefore;

\[ n = \frac{1.96^2 \times 0.5 \times 0.5}{0.05^2} = 384 \]

Since the population was less than 10,000 then

\[ nf = \frac{n}{1 + n/N} = \frac{384}{1 + 384/4,500} = 353 \text{ respondents} \ 	ext{where} \]
nf=desired sample is sample size is less than 10,000
n= desired sample population if sample is more than 10,000
N=estimated population size

3.5 Data Collection Instrument

The data collection instrument involves the platform used for the purposes of collecting information from the sample members in order to address the objectives of the study. This research utilized the structured questionnaire to address the specific objectives of the study. The structured questionnaire involve a set of written questions that the respondents are given options in relations to the answers that they can provide. The structured questionnaire will be divided into six sections in which the first section will have characteristics of the respondents while the other five sections will address the specific objectives. The structured questionnaire has diverse advantages that influence their use in this study. These advantages include the ease of the respondents filling the questionnaires compared to unstructured questionnaire, ease of data analysis using the SPSS software, and ease of administration to a huge number of respondents.

3.6 Pilot Study

The pilot study of this research was undertaken. The pilot study is a small study aimed at testing the data collection procedures on a selected smaller number of sample with similar characteristics to the final sample that will be used but not in the same location (Sekaran & Bougie, 2011). This is to avoid the aspect of area for the final study from being contaminated or introducing an element of bias. The pilot study was also used for
testing aspects of data validity and reliability. The pilot study was undertaken in Naivasha sub county using 10% of the respondents that is 10 respondents.

3.6.1 Validity of Data Collection Instrument

Validity has been defined as the accuracy of the research instruments in measuring what the researchers claim the instruments measure (Jankowicz, 2005). Validity is important in order to not get misleading results. The validity of the questionnaire was examined using supervisor and expert opinions.

3.6.2 Reliability of Data Collection Instrument

The reliability of the questionnaires refers to the precision of the research instrument (Upagade & Shende, 2012). The precision of the research instrument refers to the ability of the research instruments to arrive at similar results after repeated trials. This researcher Used split half method to test reliability of the research instruments. The cronbach alpha test was used for checking the internal reliability of the study. The reliability of the study was calculated using the cronbach alpha coefficient which was above 0.7. The cronbach alpha coefficient of performance of road safety projects, motor vehicle inspection, road regulation, road users’ safety awareness, and road safety audits had cronbach alpha coefficients of 0.765, 0.832, 0.765, 0.746, and 0.798 respectively. These cronbach alpha coefficients were greater than 0.7 leading to a concussion that the data collection instrument was reliable.
3.7 Data Collection method

The data collection commenced after successful defense of the proposal document. The researcher first obtained a field work authorization letter from the University of Nairobi. The researcher then administered the consent statement and thereafter the questionnaire. The questionnaires were filled while we waited.

3.8 Data Analysis and Presentation

Data analysis is the process of using proven logical methods to interrogate data in order to gain insight on the objective requirements of the study. The collected data was first edited to remove any errors that may be associated with the data collection process. Data will then be coded to the SPSS software for the purposes of data analysis. Both the descriptive and inferential data analysis were utilized for the study. The descriptive statistics involved the frequency distributions and the means while the inferential statistics involved the multiple linear regression. The multiple linear regression that was used is as follows;

\[ y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \epsilon \]

Where; \( Y \)= Zusha Road Safety Projects

\( \beta_0 \) = constant

\( \beta_1,... \beta_4 \) = Coefficients of estimates

\( X_1 \) = Motor vehicle Inspections

\( X_2 \) = road regulations

\( X_3 \) = road users’ safety awareness

\( X_4 \) = road safety audits
3.9 Ethical Consideration

The ethical consideration of the study was considered through an administration of the consent statement that advised on the purpose of the study, confidentiality of the responses given by the respondents and anonymity of the respondents.
### 3.10 Operationalization of Variables

The operationalization of the dependent and independent variables was examined through an examination of objectives, variables, indicators, measurement, measurement scale, data collection instrument, data collection tool, type of analysis, and tool of analysis.

**Table 3.1: Operationalization of Variables**

<table>
<thead>
<tr>
<th>Objective</th>
<th>Variable</th>
<th>Indicator</th>
<th>Measurement</th>
<th>Measurement Scale</th>
<th>Data Collection Tool</th>
<th>Type of Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>To determine the influence of motor vehicle inspections on road safety projects performance</td>
<td>Motor vehicle Inspection</td>
<td>-State of Tyres -Insurance -Number of passengers ferried -Roadworthiness of Motor vehicle</td>
<td>-Likert Scale</td>
<td>-Ordinal</td>
<td>Questionnaire</td>
<td>-Descriptive Statistics (mean, frequency distributions, standard deviations) -Inferential Statistics (Regression analysis)</td>
</tr>
<tr>
<td>To establish the influence of road regulations on performance of road safety projects</td>
<td>Road Regulations</td>
<td>-Compulsory wearing of uniforms and badges -Compulsory retesting of all PSV drivers after every 2 years -Fitting of safety belts in the motor vehicles</td>
<td>Likert Scale</td>
<td>-Ordinal</td>
<td>Questionnaire</td>
<td>-Descriptive Statistics (mean, frequency distributions, standard deviations) -Inferential Statistics (Regression analysis)</td>
</tr>
<tr>
<td>‘To examine the</td>
<td>Road Users’</td>
<td>-Safety Belts</td>
<td>Likert Scale</td>
<td>-Ordinal</td>
<td>Questionnaire</td>
<td>-Descriptive Statistics (mean, frequency distributions, standard deviations) -Inferential Statistics (Regression analysis)</td>
</tr>
</tbody>
</table>

35
<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Influence of road users’ safety awareness on performance of road safety projects</strong></td>
<td><strong>Safety Awareness</strong></td>
<td><strong>-Responsible Drinking</strong>&lt;br&gt;<strong>-Speeding Campaigns</strong>&lt;br&gt;<strong>-Road Signage Adherence</strong></td>
<td><strong>-Responsible Drinking</strong>&lt;br&gt;<strong>-Speeding Campaigns</strong>&lt;br&gt;<strong>-Road Signage Adherence</strong></td>
</tr>
<tr>
<td><strong>To determine the influence of road safety audits on performance of road safety projects</strong></td>
<td><strong>Road Safety Audit</strong></td>
<td><strong>-Roadside Features</strong>&lt;br&gt;<strong>-Road Surface Markings</strong>&lt;br&gt;<strong>-Signing and Delineation</strong>&lt;br&gt;<strong>-Intersections and Approaches</strong>&lt;br&gt;<strong>-Special Road Users</strong></td>
<td><strong>-Likert Scale</strong>&lt;br&gt;<strong>-Ordinal</strong>&lt;br&gt;<strong>Questionnaire</strong>&lt;br&gt;<strong>-Descriptive Statistics (mean, frequency distributions, standard deviations)</strong>&lt;br&gt;<strong>-Inferential Statistics (Regression analysis)</strong></td>
</tr>
</tbody>
</table>


CHAPTER FOUR

DATA ANALYSIS, PRESENTATION, INTERPRETATION AND DISCUSSION

4.1 Introduction

This study sought to examine the influence of national transport and safety authority strategies on performance of Zusha road safety projects in Nakuru County, Kenya. The study was based on four objectives, that is, examination of influence of motor vehicle inspection, road regulations, road users’ safety awareness, and road safety audits on performance of Zusha road safety projects in Nakuru County.

4.2 Questionnaire Response Rate

The study utilized a sample size of 384 respondents who were the people with information on the road safety projects performance in Nakuru. These people include the drivers, pedestrians, motor cyclists, motor vehicle passengers, NTSA officials and traffic police officers. Out of the 353 questionnaires distributed, 344 questionnaires were returned. The incomplete questionnaires were rejected, that is, 51 questionnaires, which left 293 complete questionnaires. The 293 questionnaires were the ones used for data analysis purposes and formed the basis for the results of this study. The response rate was 83.0% which was deemed sufficient for the study as indicated by Kothari (2010).

Table 4.1: Response Rate

<table>
<thead>
<tr>
<th>Sample Size</th>
<th>Returned Questionnaires</th>
<th>Analyzed Questionnaires</th>
<th>Response Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>353</td>
<td>344</td>
<td>293</td>
<td>83.0%</td>
</tr>
</tbody>
</table>
4.3 Respondent’s Characteristics

The gender and education levels of the respondents were used to study the respondents’ characteristics.

4.3.1 Gender Distribution

The gender of the respondents is critical for this study because different genders have different perception of road safety. The characteristic of gender was examined using Table 4.2 below. Most of the respondents (63.5%) in this study were male, while the female were 36.5%. This could be attributed to the disposition of most drivers and motor cyclists being male.

Table 4.2: Distribution by Gender

<table>
<thead>
<tr>
<th>Gender</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>186</td>
<td>63.5%</td>
</tr>
<tr>
<td>Female</td>
<td>107</td>
<td>36.5%</td>
</tr>
<tr>
<td>Total</td>
<td>293</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

4.3.2 Education Level Distribution

The education level of the respondents was examined using Table 4.3 below. Most of the respondents, that is, 55.6% in the study having secondary level of education followed by those who had graduate, primary school and post graduate levels at 20.8%, 13.3%, and 10.2%.

Table 4.3: Distribution by Education Level

<table>
<thead>
<tr>
<th>Education Level</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary School</td>
<td>39</td>
<td>13.3%</td>
</tr>
<tr>
<td>Secondary School</td>
<td>163</td>
<td>55.6%</td>
</tr>
<tr>
<td>Graduate School</td>
<td>61</td>
<td>20.8%</td>
</tr>
<tr>
<td>Post Graduate School</td>
<td>30</td>
<td>10.2%</td>
</tr>
<tr>
<td>Total</td>
<td>293</td>
<td>100.0%</td>
</tr>
</tbody>
</table>
4.4 Influence of Motor vehicle Inspection of Road Safety Performance

The study utilized a Likert scale of 1-5 where 1-Strongly Disagree, 2-Disagree, 3-Uncertain, 4-Agree And 5-Strongly Agree. The study examined which motor vehicle inspection aspects played a significant role in road safety, that is, among state of tyres, insurance, number of passengers ferried, roadworthiness of motor vehicle, and presence of seat belts. The findings were presented in Table 4.4.

Table 4.4: Frequency Distributions of Motor vehicle Inspection

<table>
<thead>
<tr>
<th></th>
<th>SA Freq. (%)</th>
<th>A Freq. (%)</th>
<th>U Freq. (%)</th>
<th>D Freq. (%)</th>
<th>SD Freq. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>State of Tyres</td>
<td>91</td>
<td>140</td>
<td>34</td>
<td>20</td>
<td>8</td>
</tr>
<tr>
<td>Insurance</td>
<td>72</td>
<td>102</td>
<td>72</td>
<td>47</td>
<td>0</td>
</tr>
<tr>
<td>Number of passengers ferried</td>
<td>94</td>
<td>144</td>
<td>23</td>
<td>28</td>
<td>4</td>
</tr>
<tr>
<td>Roadworthiness of Motor vehicle</td>
<td>156</td>
<td>76</td>
<td>34</td>
<td>27</td>
<td>0</td>
</tr>
<tr>
<td>Presence of Seat Belts</td>
<td>81</td>
<td>137</td>
<td>56</td>
<td>15</td>
<td>4</td>
</tr>
</tbody>
</table>

In the context of state of tyres, 47.8% of the respondents responded with agree, while 31.1% chose strongly agreed. The least number of respondents in the aspect of state of tyres was 2.7% who responded with strongly disagreed, while those who were uncertain and disagreed were 11.6% and 6.8% respectively. There was no strongly disagreed response on roadworthiness of motor vehicle and insurance aspects of motor vehicle inspection and 53.2% of the respondents chose strongly agree and 25.9% chose agree in respect to roadworthiness of motor vehicle which meant that it was a major influence on road safety.
Insurance was also critical in road safety as a cumulative majority of 59.4% of the respondents affirmed it. Presence of seat belts and number of passengers ferried scored an equal number of respondents who strongly disagreed (1.4%) that it played a role in road safety. However most of the respondents affirmed that they both did with each getting strongly agreed responses from 27.6% and 32.1% of the respondents respectively and agree responses from 46.8% and 49.1% respectively. A few of the respondents (19.1% and 7.8% respectively) were uncertain whether presence of seat belts and number of passengers ferried played a part in road safety while (5.1% and 9.6% respectively) disagreed.

The means denoted by, $\mu$, in the study were grouped into five intervals with the interval $4.5 < \mu \leq 5$ interpreted as tendency to strongly agree, $3.5 < \mu < 4.5$ as tendency to agree, $(2.5 < \mu < 3.5)$ as tendency to be uncertain, $(2.5 < \mu < 1.5)$ as tendency to disagree, and $(1 \geq \mu < 1.5)$ as tendency to strongly disagree. The study examined which motor vehicle inspection aspects on average played a significant role in road safety, that is, among state of tyres, insurance, number of passengers ferried, roadworthiness of motor vehicle, and presence of seat belts. In this context, the mean of the various metrics was generated. In interrogating the influence of the motor vehicle inspection metrics on road safety, on average the respondents tended to agree that they all have an influence as the mean scores of all the metrics on motor vehicle inspection were in the range of $3.5 < \mu \leq 4.5$, that is, state of tyres (3.976), insurance (3.679), number of passengers ferried (4.010), roadworthiness of motor vehicle (4.232), and presence of seat belts (3.942). This implied that on average, the respondents were inclined to agree that the role of motor vehicle inspection was significant in performance of road safety.
The importance of the motor vehicle inspection to the road safety was consistent with a study by Friday, Tukamuhabwa, & Muhwezi (2012) on road safety in Uganda. The study noted that the abolition of the mandatory motor vehicle inspection by the police in the mid-1990s led to an increase in motor vehicles in Dangerous Mechanical Conditions (DMC) on the roads (Friday et al., 2012) which has continually acted to undermine the road safety in the country. Additionally in Nigeria, Motunrayo (2015) noted that the state of the motor vehicles had become a concern to the authorities leading to the creation of the Motor vehicle Inspection Office (VIO) which is concerned with the task of motor vehicle inspection within Nigeria. In Kenya, Sang (2009) in a study on assessment of the safety regulations noted that in 2009, the country had the Motor vehicle inspection Unit which was responsible for the inspection of the public service motor vehicles before being licenced to operate as PSVs.

Roadworthiness of the motor vehicle on average had a greater influence on road safety compared to the other metrics of the business skills matrix as it scored the highest mean. This was consistent with a study by Anini, (2011) which emphasized on the role of motor vehicle conditions in road safety noting that there is a high likelihood of motor vehicles in worn out conditions to be involved in road accidents. Additionally, lack of motor vehicle inspection has led to a large number of un-roadworthy motor vehicles that are characterized by faulty breaking system, faulty indicator lighting system, worn out tyres, loose wheels and overloaded axles (Khan, 2011). These aspects have contributed to the poor performance of the motor vehicles in the roads leading to increases cases of road accidents. In this context, King, (2005) therefore indicates that motor vehicles with
adequate and working features such as seatbelts, adequate lights, brakes, steering wheel, tires as well as direction indicators among others and in good condition can help to reduce traffic accident.

The standard deviations denoted by, $\sigma_X$, in this study were interpreted as high consensus for $\sigma_X \leq 0.5$, moderate consensus for $0.5 < \sigma_X \leq 1$ and no consensus $\sigma_X > 1$ among the respondents on the given metric. The standard deviation of state of tyres was 0.974, that of number of passengers ferried was 0.955, that of roadworthiness of motor vehicle was 0.983, and that of presence of seat belts was 0.89. These standard deviations were moderately distributed around the mean which implied that there was moderate consensus $0.5 < \sigma_X \leq 1$ among the respondents that state of tyres, number of passengers ferried, roadworthiness of motor vehicle, and presence of seat belts each had an influence on road safety. The standard deviation of insurance was 1.017 meaning the responses were widely distributed around the mean which indicated there was no consensus ($\sigma_X > 1$) on whether the insurance aspect of motor vehicle inspection had an influence on road safety.

<table>
<thead>
<tr>
<th>Table 4.5: Means and Standard Deviation of Motor vehicle Inspection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
</tr>
<tr>
<td>State of Tyres</td>
</tr>
<tr>
<td>Insurance</td>
</tr>
<tr>
<td>Number of passengers ferried</td>
</tr>
<tr>
<td>Roadworthiness of Motor vehicle</td>
</tr>
<tr>
<td>Presence of Seat Belts</td>
</tr>
</tbody>
</table>

4.5 Influence of Road Regulations on Road Safety Projects Performance

The respondents were asked which road regulations aspects have played a significant role in road safety aspects among compulsory wearing of uniforms and badges, compulsory
retesting of all PSV drivers after every 2 years, fitting of safety belts in the motor vehicles, drivers’ having driving license, and maintenance of the recommended speed levels. The results were presented in Table 4.6 below.

| Table 4.6: Frequency Distributions of Road Regulations |
|-------------------------------|---|---|---|---|---|
|                              | SA Freq. (%) | A Freq. (%) | U Freq. (%) | D Freq. (%) | SD Freq. (%) |
| Compulsory wearing of uniforms and badges | 141 | 84 | 48 | 19 | 1 |
| Compulsory retesting of all PSV drivers after every 2 years | 132 | 83 | 49 | 29 | 0 |
| Fitting of safety belts in the motor vehicles | 85 | 125 | 82 | 1 | 0 |
| Drivers’ having driving license | 54 | 104 | 111 | 24 | 0 |
| Maintenance of the recommended speed levels | 53 | 97 | 93 | 50 | 0 |

Most of the respondents who chose strongly agree did so in respect to the aspect of compulsory wearing of uniforms and badges (48.1%) followed by compulsory retesting of all PSV drivers after every 2 years (45.1%) which means they are the road regulation’s aspects which the respondents feel mostly play a role in road safety. Further affirmation on the same metrics was from the respondents who chose agree, that is, 28.7% and 28.3% respectively. Only a negligible number of respondents chose to respond with strongly disagreed (0.3%) on whether compulsory wearing of uniforms and badges has played a significant role in road safety, with no similar responses on all the other metrics. Additionally the disagree prompt received the least number of responses on each of the aspects of road regulations, that is, 6.5%, 9.9%, 3.0%, 8.2%, 17.1% further supporting the importance of the role played by road regulations on road safety.
On average, the study sought to examine which road regulations aspects have played a significant role in road safety among compulsory wearing of uniforms and badges, compulsory retesting of all PSV drivers after every 2 years, fitting of safety belts in the motor vehicles, drivers’ having driving license, and maintenance of the recommended speed levels. Compulsory wearing of uniforms and badges had a mean score of 4.178, compulsory retesting of all PSV drivers after every 2 years had a mean score of 4.085 while fitting of safety belts in the motor vehicles had a mean score of 4.003. The drivers having driving license scored a mean of 3.642, and maintenance of the recommended speed levels scored a mean 3.522. On average, compulsory wearing of uniform was the road regulation aspect that played a greater significant role in road safety than the others as it had the highest mean score (4.178) among the metrics on road regulations.

Maintenance of the recommended speed levels played the least significant role on average of all the metrics on road regulations as it had the least mean score (3.522). This was contrary to a study on the Road Communication Technologies and Safety Regulation Enforcement on Roads in Uganda by Friday et al., (2012). The study found that amongst the major road safety regulations in Uganda is the Traffic and Road Safety Act of 2004 which imposed speed limits, prohibited use of mobile phones while driving, prescribed alcohol limits, and authorized the use of speed governance. Kim & Wagner (2014) noted that in the United States there are regulations on alcohol consumption as well as speed limits in order to enhance road safety. The study also examined the role of speed limits regulations on road safety performance in the US.
In this context, the study noted that over 40% of drivers violated speed limits in highways. The violation of speed limits is correlated with less control of the motor vehicle as well as more severe injuries to the drivers and passengers in case of an accident. Friday et al., (2012) in a study on the Road Communication Technologies and Safety Regulation Enforcement on Roads in Uganda noted that amongst the major road safety regulations in Uganda includes the Traffic and Road Safety Act of 2004 which imposed speed limits, prohibited use of mobile phones while driving, prescribed alcohol limits, and authorized the use of speed governance. The lack of adherence to this road safety regulations resulting in poor road safety performance is manifested in the driver behaviour in Ugandan roads including reckless driving, over speeding, poor road ethics and drug abuse aspects. In Kenya, regulations known as the “Michuki” rules were formulated and implemented in relations to the PSV. According to Sang (2009), amongst the profound impact of the regulations included reduction of the speed limits hence reducing on road fatalities involved as a result of speeding PSV.

<table>
<thead>
<tr>
<th>Table 4.7: Means and Standard Deviation of Road Regulations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
</tr>
<tr>
<td>Compulsory wearing of uniforms and badges</td>
</tr>
<tr>
<td>Compulsory retesting of all PSV drivers after every 2 years</td>
</tr>
<tr>
<td>Fitting of safety belts in the motor vehicles</td>
</tr>
<tr>
<td>Drivers’ having driving license</td>
</tr>
<tr>
<td>Maintenance of the recommended speed levels</td>
</tr>
</tbody>
</table>

There was no consensus among the respondents on whether the road regulation aspect of compulsory retesting of all PSV drivers after every 2 years played a significant role in road safety as it has a standard deviation of 1.005 ($\sigma_x \geq 1$). The responses on compulsory wearing of uniforms and badges were moderately distributed around the mean with a
standard deviation of 0.952 implying that there was moderate consensus (0.5<σ_X<1) that it played a significant role in road safety. The same was implied on fitting of safety belts in the motor vehicles which had a standard deviation of 0.765, drivers’ having driving license which had a standard deviation of 0.875, and maintenance of the recommended speed levels which had a standard deviation of 0.978.

4.6 Influence of Road Users’ Safety Awareness and Performance of Road Safety Projects

The study sought to know whether road users’ safety awareness aspects have played a significant role in road safety. The metrics which were used to examine this were safety belts, responsible drinking, speeding campaigns, road signage adherence, and presence of black spots. The results were presented in Table 4.8 below.

<table>
<thead>
<tr>
<th>Table 4.8: Frequency Distributions of Road Users’ Safety Awareness</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SA</strong></td>
</tr>
<tr>
<td><strong>Freq. (%)</strong></td>
</tr>
<tr>
<td>Safety Belts</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Responsible Drinking</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Speeding Campaigns</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Road Signage Adherence</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Presence of black spots</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

Presence of black spots had no disagree or strongly disagree responses and a cumulative majority of 73.7% affirmed that it has played a significant role in road safety, with only 26.3% unsure. There was no strongly disagreed response on all the aspects road users’ safety awareness and most of the respondents chose agree in response to whether
responsible drinking, speeding campaigns, road signage adherence have played a significant role in road safety, that is, 52.9%, 35.5% and 48.8% respectively.

The study used mean scores of safety belts, responsible drinking, speeding campaigns, road signage adherence, and presence of black spots to know whether on average road users’ safety awareness aspects have played a significant role in road safety. The mean scores from highest scored to lowest were responsible drinking (4.102), safety belts (4.065), presence of black spots (4.027), road signage adherence (3.785), and speeding campaigns (3.594). On average, the respondents tended to agree that all the metrics on road users’ safety awareness played a significant role in road safety (3.5< μ < 4.5). This was consistent with a study on the road User's Awareness on Strategies for Controlling Road Traffic Accidents in Tanzania by Juma (2015) which noted that lack of awareness of road safety rules among various road users leads to unsafe road user behavior and habits. Additionally, the study found that lack of awareness on road safety amongst passengers, pedestrians, motorists and cyclists make the road users vulnerable to road accidents. The drivers must therefore at all times maintain an understanding of their immediate environment including the motor vehicle speeds, neighbouring motor vehicles, pedestrians, landmarks, and road signage amongst other aspects (King, 2005). These items collectively contribute to the driver's situation awareness which is critical for decision making while driving.

On average, responsible drinking was perceived to have played a greater significant role than the other metrics on road users’ safety awareness as it had the highest mean score. This was consistent with a study by Kim & Wagner (2014) where they noted that there
was a positive and highly significant influence of Blood Alcohol Consumption (BAC) in the US and the road safety levels. The alcohol regulation enhances the road safety aspects through ensuring that the driver has full control of the motor vehicle hence reducing the road crashes. Also, a study by Juma (2015) noted that amongst the aspects that were found to engage in over speeding was a result of drinking, drug use and inexperienced learner drivers.

In the context of speeding campaigns, the respondents perception on average was that they have played a significant role in road safety. This was also noted in a study in Tanzania by Juma (2015) . The study noted that over 80% of the motorists in the study sample did not know of the speed requirements/ regulations. These factors were seen to compromise road safety in Tanzania.

The standard deviations of the various metrics were used to examine whether there was consensus whether the various metrics on road users’ safety awareness played a significant role in road safety. The standard deviation for safety belts was 0.910, standard deviation for responsible drinking was 0.680, and standard deviation for speeding campaigns was 0.987. Road signage adherence and presence of black spots had standard deviations of 0.943 and 0.744 respectively. There was moderate consensus among the respondents that each metric on average road users’ safety awareness aspects had played a significant role in road safety ($\sigma_X \geq 1$).
### Table 4.9: Means and Standard Deviation of Road Users’ Awareness

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety Belts</td>
<td>4.065</td>
<td>0.910</td>
</tr>
<tr>
<td>Responsible Drinking</td>
<td>4.102</td>
<td>0.680</td>
</tr>
<tr>
<td>Speeding Campaigns</td>
<td>3.594</td>
<td>0.987</td>
</tr>
<tr>
<td>Road Signage Adherence</td>
<td>3.785</td>
<td>0.943</td>
</tr>
<tr>
<td>Presence of black spots</td>
<td>4.027</td>
<td>0.744</td>
</tr>
</tbody>
</table>

#### 4.7 Influence of Road Safety Audits and Performance of Road Safety Projects

The study examined whether road safety audits aspects have played a significant role in road safety through the aspects of roadside features, road surface markings, signing and delineation, intersections and approaches, and traffic policies adherence. The results were presented on table 4.10 below.

### Table 4.10: Frequency Distributions of Road Safety Audits

<table>
<thead>
<tr>
<th></th>
<th>SA Freq. (%)</th>
<th>A Freq. (%)</th>
<th>U Freq. (%)</th>
<th>D Freq. (%)</th>
<th>SD Freq. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roadside Features</td>
<td>74</td>
<td>144</td>
<td>39</td>
<td>28</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>25.3%</td>
<td>49.1%</td>
<td>13.3%</td>
<td>9.6%</td>
<td>2.7%</td>
</tr>
<tr>
<td>Road Surface Markings</td>
<td>70</td>
<td>123</td>
<td>72</td>
<td>16</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>23.9%</td>
<td>42.0%</td>
<td>24.6%</td>
<td>5.5%</td>
<td>4.1%</td>
</tr>
<tr>
<td>Signing and Delineation</td>
<td>28</td>
<td>139</td>
<td>84</td>
<td>38</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>9.6%</td>
<td>47.4%</td>
<td>28.7%</td>
<td>13.0%</td>
<td>1.4%</td>
</tr>
<tr>
<td>Intersections and Approaches</td>
<td>76</td>
<td>140</td>
<td>26</td>
<td>43</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>25.9%</td>
<td>47.8%</td>
<td>8.9%</td>
<td>14.7%</td>
<td>2.7%</td>
</tr>
<tr>
<td>Traffic Policies Adherence</td>
<td>151</td>
<td>115</td>
<td>11</td>
<td>12</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>51.5%</td>
<td>39.2%</td>
<td>3.8%</td>
<td>4.1%</td>
<td>1.4%</td>
</tr>
</tbody>
</table>

In the context of roadside features, 49.1% and 25.3% of the respondents who chose agree and strongly agreed affirmed that roadside features played a significant role in road safety. 13.3% of the respondents were uncertain while 9.6% and 2.7% disagreed and strongly disagreed with the metric. In the context of road surface markings, a cumulative
majority of 65.9% felt they played a significant role in road safety while 9.6% were of the contrary opinion.

Signing and delineation had the highest number of unsure respondents (28.7%) in comparison to the other metrics on road safety audit, but had an equivalent number of respondents who strongly disagreed as traffic policies adherence. Intersections and approaches had agree and strongly agreed responses from 47.8% and 25.9% respectively while traffic policies adherence had 51.5% of the respondents choosing strongly agree implying that most of the respondents felt it was a very critical aspect of road safety audit and had a very significant role in road safety.

The means of various road safety audit aspects were examined to find out whether on average they have played a significant role in road safety. These aspects included roadside features, road surface markings, signing and delineation, intersections and approaches, and traffic policies adherence. The mean scores for road surface markings, intersections and approaches, and traffic policies adherence were 3.761, 3.846, and 3.795 respectively. The respondents tended to agree that all the metrics on road safety audits played a significant role in road safety with all mean scores being in the interval $3.5 < \mu < 4.5$. This implied that road safety audits was a critical aspect in road safety projects performance. The European Transport Safety Council, (2007) indicates that there are diverse ways in which the road safety audits improves the road safety performance. These benefits include better planning aspects in transport infrastructure, creating of road safety awareness amongst policy makers, and reduction of unintended effects of transport.
infrastructure designs. Therefore, the formal systematic safety audit procedures have been demonstrated to effective in the area of road safety. This is because the road safety audits should be in a position to reduce the number and severity of accidents in the roads, and enable good usage of the roads amongst road users.

Stephen (2001) in a study on the Safety analysis without the legal paralysis: The Road Safety Audit Program noted the diverse uses of road safety audits in enhancing road safety performance. The road safety audit is used for the purposes of proactively identifying and putting action plans for areas within the road network that compromises the road safety. The study noted that the ultimate aim of the safety audits is the minimization of the risks to pedestrians, motor vehicle passengers and drivers, and even people close to the roadways. The respondents tended to agree that on average roadside features with a mean score of 4.355 played a greater significant role than the other aspects on road safety audit as it was the highest mean score while signing and delineation played the least significant role on average with the least mean score of 3.509.

The standard deviations for road surface markings and traffic policies adherence were 1.009 and 1.069 respectively indicating that the responses were widely distributed around the mean which implied there was no consensus ($\sigma_x \geq 1$) among the respondents whether both aspects of road safety audit played a significant role in road safety. Roadside features, signing and delineation, and intersections and approaches had standard deviations of 0.846, 0.886 and 0.997 indicating the responses were moderately distributed
around the mean implying there was moderate consensus (0.5<σ_X<1) that each of the metrics played a significant role in road safety.

**Table 4.11: Means and Standard Deviation of Road Safety Audits**

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roadside Features</td>
<td>4.355</td>
<td>0.846</td>
</tr>
<tr>
<td>Road Surface Markings</td>
<td>3.761</td>
<td>1.009</td>
</tr>
<tr>
<td>Signing and Delineation</td>
<td>3.509</td>
<td>0.886</td>
</tr>
<tr>
<td>Intersections and Approaches</td>
<td>3.846</td>
<td>0.997</td>
</tr>
<tr>
<td>Traffic Policies adherence</td>
<td>3.795</td>
<td>1.069</td>
</tr>
</tbody>
</table>

**4.8 Road Safety Projects Performance**

Within the context of road use and road safety, there are several elements all diverging from human performance to ensure smooth-or the lack of it in the use of the roads. Systems theory proposes the existence of behavior of certain elements in their natural environments through interactions with each other forming a certain order of functioning (Griffith, 2013). The elements of the road usage system include human behaviors of other motorists, mechanical condition of motor vehicles, traffic policies and road factors (Muvuringi, 2012). The study sought to examine whether motor vehicle inspection, road regulations, road users’ safety awareness, and road safety audits have impacted road safety projects using various metrics. These included reduction on number of road accidents, reduction of road fatalities, improvement in road worthiness of the motor vehicles, and reduction of court cases on road accidents. Most of the respondents agreed that the number of road accidents (64.5%) reduced same as road fatalities (63.5%) as a result of motor vehicle inspection, road regulations, road safety awareness, and road safety audits with those who chose strongly agreed (17.7%) further supporting this. The respondents, who were unsure, disagreed and strongly disagreed were 10.9%, 5.5% and
1.4% respectively in respect to reduction on number of road accidents, and 2.4%, 6.8% and 4.1% respectively in respect to reduction of road fatalities.

Table 4.12: Frequency Distributions of Road Safety Projects Performance

<table>
<thead>
<tr>
<th></th>
<th>SA Freq. (%)</th>
<th>A Freq. (%)</th>
<th>U Freq. (%)</th>
<th>D Freq. (%)</th>
<th>SD Freq. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduction on number of road accidents</td>
<td>52 17.7%</td>
<td>189 64.5%</td>
<td>32 10.9%</td>
<td>16 5.5%</td>
<td>4 1.4%</td>
</tr>
<tr>
<td>Reduction of road fatalities</td>
<td>68 23.2%</td>
<td>186 63.5%</td>
<td>7 2.4%</td>
<td>20 6.8%</td>
<td>12 4.1%</td>
</tr>
<tr>
<td>Improvement in road worthiness of the motor vehicles</td>
<td>31 10.6%</td>
<td>179 61.1%</td>
<td>43 14.7%</td>
<td>40 13.7%</td>
<td>0 0.0%</td>
</tr>
<tr>
<td>Reduction of court cases on road accidents</td>
<td>52 17.7%</td>
<td>143 48.8%</td>
<td>47 16.0%</td>
<td>35 11.9%</td>
<td>16 5.5%</td>
</tr>
</tbody>
</table>

While no respondent chose the strongly agree prompt in response to whether improvement in road worthiness of the motor vehicles impacted road safety projects, 61.1% of the respondents who agreed and 10.6% who strongly agreed affirmed that improvement in road worthiness of the motor vehicles impacted road safety projects, as shown in Table 4.12. Reduction of court cases on road accidents had a cumulative majority of respondents (66.5%) who asserted that it had impacted road safety projects.

The study sought to examine whether on average motor vehicle inspection, road regulations, road users’ safety awareness, and road safety audits have impacted road safety projects using the mean scores of various metrics. These included mean scores of reduction on number of road accidents, reduction of road fatalities, improvement in road worthiness of the motor vehicles, and reduction of court cases on road accidents. The mean score from the highest scored mean to the lowest were on reduction on number of
road accidents (3.949), reduction of road fatalities (3.918), improvement in road
worthiness of the motor vehicles (3.686) and reduction of court cases on road accidents
(3.614). On average, the respondents tended to agree (3.5< μ < 4.5) that each of the
metrics on road safety projects have been impacted on by motor vehicle inspection, road
regulations, road users’ safety awareness, and road safety audits.

Reduction on number of road accidents has been impacted on the most on average as it
scored the highest mean. Lougheed (2006) indicates that road safety audits help in
reduction of the likelihood of accidents, reduction of the severity of accidents, elevation
of road safety amongst stakeholders, reduction of costly remedial work , and reduction of
the overall cost of road accidents such as trauma, hospitalizations etc. The respondents on
average were inclined to agree that of road fatalities have reduced. This was consistent
with Sang (2009), who noted that amongst the profound impact of the regulations known
as “Michuki” rules in Kenya included reduction of the speed limits hence reducing on
road fatalities involved as a result of speeding PSV.

The respondents were inclined to agree that there has been an improvement on road
worthiness of the motor vehicles as a result of the various road safety aspects that have
been undertaken. Sang (2009) in a study on assessment of the safety regulations in Kenya
also noted that noted that in 2009, the country had the Motor vehicle inspection Unit
which was responsible for the inspection of the public service motor vehicles before
being licenced to operate as PSVs. The PSVs owners were required to pay an annual fee
of Ksh 1,000 to the Motor vehicle Inspection Unit under the traffic police which ensured
that the motor vehicle was compliant with all the required technical aspects to operate in the Kenyan roads. The owners were then issued with a certificate of inspection that allowed them to get a Transport and Licensing permit to operate as a PSV in Kenyan roads.

The standard deviation was used to examine the distribution of responses on the various aspects of road safety projects around the mean. The standard deviations of reduction on number of road accidents (0.948), reduction of road fatalities (0.790), and improvement in road worthiness of the motor vehicles (0.838) indicated that responses were moderately distributed around the mean implying that there was moderate consensus (0.5<σX<1) that these aspects of road safety projects had been impacted by motor vehicle inspection, road regulations, road users’ safety awareness, and road safety audits.

On the other hand, reduction in court cases on road accidents had responses widely distributed around the mean which implied that there was no consensus (σX≥1) on whether it had been impacted by motor vehicle inspection, road regulations, road users’ safety awareness, and road safety audits.

| Table 4.13: Means and Standard Deviation of Road Safety Projects Performance |
|---------------------------------|---------|-----------|
| Reduction on number of road accidents | 3.949   | 0.948     |
| Reduction of road fatalities       | 3.918   | 0.790     |
| Improvement in road worthiness of the motor vehicles | 3.686   | 0.838     |
| Reduction of court cases on road accidents | 3.614   | 1.078     |
4.9 Multiple Linear Regression

A multiple linear regression analysis is a statistical process that estimates the effect of the predictor variables (independent variables) on the outcome variable (dependent variable). In this context, the effect of the independent variables (road users’ safety audits, road regulations, motor vehicle inspection and road safety awareness) on the dependent variable (performance of Zusha road safety projects) was examined. The multiple regression coefficient (R) that resulted from the multiple linear regression was 0.687 which implied that there was a moderate positive correlation between the independent variables and the dependent variable.

Table 4.14: Model Summary

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.687</td>
<td>.472</td>
<td>.464</td>
<td>.54674</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), Safety Audits, Road Regulations, Motor vehicle Inspection, Safety Awareness

The coefficient of determination ($R^2$) was 0.472 which implied that 47.2% effect on performance of Zusha road safety projects can be accounted to the road users’ safety audits, road regulations, motor vehicle inspection and road safety awareness. This therefore indicates that there are other factors which were not considered in this study which have a 52.8% influence on the performance of Zusha road safety projects.

The analysis of variance (ANOVA) was undertaken to determine whether the regression model was reliable. The p value from the ANOVA was 0.000 which indicated that the regression model had no likelihood or probability (0.0%) of giving a wrong prediction. The threshold for reliability is 0.05 which was reached since the p value was 0.000 implying that the model was reliable.
The coefficients of the individual independent variables (road users’safety audits, road regulations, motor vehicle inspection and road safety awareness) were examined. This gave the following regression model:

\[
\text{Performance of Zusha Road Safety Projects} = 0.691 + 0.889 (\text{Road Users’ Safety Audits}) + 0.073 (\text{Road Regulations}) - 0.200 (\text{Motor vehicle Inspection}) + 0.047 (\text{Road Safety Awareness})
\]

This regression model indicates that one-unit increase in road users’ safety audits while other factors are kept constant would result in a 0.889 increase in performance of Zusha road safety projects. A one-unit increase in road regulations and road safety awareness would result in a 0.073 and 0.047 increase in performance of Zusha road safety projects respectively with the other variables kept constant. A one-unit increase in motor vehicle inspection would result in a 0.200 decrease in performance of Zusha road safety projects. This indicates that safety audits, road regulations and road safety awareness have a positive influence on the performance of Zusha road safety projects. On the other hand, it indicates that motor vehicle inspection has a negative influence on performance of Zusha road safety projects.
Table 4.16: Coefficients

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
</tr>
<tr>
<td>(Constant)</td>
<td>.691</td>
<td>.411</td>
<td></td>
<td>1.681</td>
</tr>
<tr>
<td>Motor vehicle Inspection</td>
<td>-.200</td>
<td>.061</td>
<td>-.147</td>
<td>-3.271</td>
</tr>
<tr>
<td>Road Regulations</td>
<td>.073</td>
<td>.070</td>
<td>.050</td>
<td>1.048</td>
</tr>
<tr>
<td>Safety Awareness</td>
<td>.047</td>
<td>.086</td>
<td>.026</td>
<td>.549</td>
</tr>
<tr>
<td>Safety Audits</td>
<td>.889</td>
<td>.056</td>
<td>.709</td>
<td>15.748</td>
</tr>
</tbody>
</table>

a. Dependent Variable: Performance
CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This study examined influence of the National Transport and Safety Authority Strategies on the performance of Zusha road safety projects with a reference to Zusha project in Nakuru, Kenya. The specific objectives were to determine the influence of road users’ safety audits, road regulations, motor vehicle inspection, and road safety awareness on the performance of Zusha road safety projects in Nakuru, Kenya. The study utilized the descriptive research design with a sample size of 293 respondents who included the drivers, pedestrians, motor cyclists, motor vehicle passengers, NTSA officials and traffic police. Most of the respondents (63.5%) in this study were male, while the female were 36.5%. The education level of the respondents was examined with most of the respondents (55.6%) in the study having secondary level of education followed by those who had graduate, primary school and post graduate levels at 20.8%, 13.3%, and 10.2%.

5.2 Summary of the Findings

The summary of the findings of the study are as follows;

5.2.1 Motor vehicle Inspection and Performance of Road Safety Project

The study examined which motor vehicle inspection aspects on average played a significant role in road safety projects, that is, among state of tyres, insurance, number of passengers ferried, roadworthiness of motor vehicle, and presence of seat belts. In this context, the mean of the various metrics was generated. In interrogating the influence of the motor vehicle inspection metrics on road safety, on average the respondents tended to
agree that they all have an influence as the mean scores of all the metrics on motor vehicle inspection were in the range of $3.5 < \mu \leq 4.5$. This implied that on average, the respondents were inclined to agree that the role of motor vehicle inspection was significant in performance of road safety projects. Roadworthiness of the motor vehicle on average had a greater influence on road safety projects compared to the other metrics of the business skills matrix as it scored the highest mean.

The standard deviations for state of tyres, number of passengers ferried, roadworthiness of motor vehicle, and presence of seat were moderately distributed around the mean which implied that there was moderate consensus $0.5 < \sigma_x \leq 1$ among the respondents each had an influence on road safety projects. The standard deviation of insurance was 1.017 meaning the responses were widely distributed around the mean which indicated there was no consensus ($\sigma_x > 1$) on whether the insurance aspect of motor vehicle inspection had an influence on performance of road safety projects.

### 5.2.2 Road Regulations and Performance of Road Safety Project

On average, the study sought to examine which road regulations aspects have played a significant role in road safety projects among compulsory wearing of uniforms and badges, compulsory retesting of all PSV drivers after every 2 years, fitting of safety belts in the motor vehicles, drivers’ having driving license, and maintenance of the recommended speed levels. On average, all metrics of the road regulations matrix had an influence on the performance of road safety projects (mean scores $3.5 < \mu \leq 4.5$). On average, compulsory wearing of uniform was the road regulation aspect that played a
greater significant role in road safety projects than the others as it had the highest mean score (4.178) among the metrics on road regulations. On the other hand, maintenance of the recommended speed levels played the least significant role in road safety projects performance on average of all the metrics on road regulations as it had the least mean score (3.522).

There was no consensus among the respondents on whether the road regulation aspect of compulsory retesting of all PSV drivers after every 2 years played a significant role in road safety projects as it has a standard deviation of 1.005 ($\sigma_x \geq 1$). The responses on compulsory wearing of uniforms and badges, fitting of safety belts in the motor vehicles, drivers’ having driving license, and maintenance of the recommended speed levels were moderately distributed around the mean with a standard deviation implying that there was moderate consensus ($0.5 < \sigma_x < 1$) that they played a significant role in road safety projects.

### 5.2.3 Road Users’ Safety Awareness and Performance of Road Safety Project

The study used mean scores of safety belts, responsible drinking, speeding campaigns, road signage adherence, and presence of black spots to know whether on average road users’ safety awareness aspects have played a significant role in performance of road safety projects. On average, the respondents tended to agree that all the metrics on road users’ safety awareness played a significant role in performance of road safety projects ($3.5 < \mu < 4.5$). This was consistent with a study on the road User's Awareness on Strategies for Controlling Road Traffic Accidents in Tanzania by Juma (2015) which
noted that lack of awareness of road safety rules among various road users leads to unsafe road user behavior and habits.

On average, responsible drinking was perceived to have played a greater significant role than the other metrics on road users’ safety awareness as it had the highest mean score. This was consistent with a study by Kim & Wagner (2014) where they noted that there was a positive and highly significant influence of Blood Alcohol Consumption (BAC) in the US and the road safety levels. In the context of speeding campaigns, the respondents’ perception on average was that they have played a significant role in performance of road safety projects. This was also noted in a study in Tanzania by Juma (2015). The study noted that over 80% of the motorists in the study sample did not know of the speed requirements/ regulations. These factors were seen to compromise road safety in Tanzania.

The standard deviations of the various metrics were used to examine whether there was consensus whether the various metrics on road users’ safety awareness played a significant role in performance of road safety projects. There was moderate consensus among the respondents that each metric on average road users’ safety awareness aspects had played a significant role in performance of road safety projects ($\sigma_x \geq 1$).

### 5.2.4 Road Safety Audits and Performance of Road Safety Project

The means of various road safety audit aspects were examined to find out whether on average they have played a significant role in performance of road safety projects. These
aspects included roadside features, road surface markings, signing and delineation, intersections and approaches, and traffic policies adherence. The respondents tended to agree that all the metrics on road safety audits played a significant role in performance of road safety projects with all mean scores being in the interval $3.5< \mu < 4.5$. This implied that road safety audits was a critical aspect in road safety projects performance. The respondents tended to agree that on average roadside features with a mean score of 4.355 played a greater significant role than the other aspects on road safety audit as it was the highest mean score while signing and delineation played the least significant role on average with the least mean score of 3.509.

The standard deviations for road surface markings and traffic policies adherence were 1.009 and 1.069 respectively indicating that the responses were widely distributed around the mean which implied there was no consensus ($\sigma_X \geq 1$) among the respondents whether both aspects of road safety audit played a significant role in performance of road safety projects. Roadside features, signing and delineation, and intersections and approaches had responses that were moderately distributed around the mean implying there was moderate consensus ($0.5<\sigma_X <1$) that each of the metrics played a significant role in performance of road safety projects.

5.3 Conclusion of the Study

It can therefore be concluded that road regulations, road users’ safety awareness, and road safety audits have positively influenced the performance of road safety projects. On the other hand, motor vehicle inspection has negatively influenced the performance of
road safety projects. The findings on the ground are that although vehicle inspection is mandatory each and every year, the results on the road safety improvement are not achieved. This is because most vehicles are given stickers of inspection without even being visually seen by the vehicle inspectors. The unit of motor vehicle inspection is highly corrupt and in most cases only a few vehicles are inspected.

5.4  Recommendations of the Study

The study made the following recommendations;

1. Motor Vehicle inspection should be enforced in order to improve on the roadworthiness of motor vehicles on the road
2. More road safety awareness efforts should be undertaken in order for the road users to utilize the road responsibly
3. The road safety audits should be undertaken more regularly to gain insights into the emerging road safety concerns
4. The results of the road safety audits should be fully implemented.

5.5  Suggestions for Further Studies

The study made the following suggestions for further studies;

1. An examination on the reasons behind lack of effectiveness of motor vehicle inspection has not been effective in road safety projects.
2. An examination on the influence of insurance uptake on the road safety performance
3. An examination of the compulsory retesting of all PSV drivers after every two years on the road safety performance
REFERENCES


INTRODUCTION LETTER

TO WHOM IT MAY CONCERN

REF: REQUEST FOR PARTICIPATION IN THE RESEARCH STUDY

I am writing to request your participation in the provision of responses to enable me undertake a study on “Influence of National Transport and Safety Authority Strategies on Performance of Zusha Road Safety Projects in Nakuru County, Kenya”. This is a requirement for my study in Masters of Arts in Project Planning and Management at the University of Nairobi. I assure that your responses and identity will be kept confidential. Should you wish to access the complete report, the same will be availed to you.

Yours’ Sincerely,

Julius Kabue
APPENDIX B

INFLUENCE OF NATIONAL TRANSPORT AND SAFETY AUTHORITY
STRATEGIES ON PERFORMANCE OF ZUSHA ROAD SAFETY PROJECTS IN
NAKURU COUNTY, KENYA

QUESTIONNAIRE FOR DRIVERS AND TOUTS

Instructions: Please complete the following questionnaire appropriately.
Confidentiality: The responses you provide will be strictly confidential. No reference will be made to any individual(s) in the report of the study.
Please tick or answer appropriately for each of the Question provided.

PART A: BACKGROUND INFORMATION

1) What is your gender? Male [ ] Female [ ]
2) What is your education level? Primary School [ ] Secondary School [ ] Graduate [ ] Post Graduate [ ]

PART B: MOTOR VEHICLE INSPECTION

For each of the following parts, please tick where applicable to the extent to which you agree using the following likert scale.
SA= Strongly Agree A=agree U=Uncertain D=Disagree SD=Strongly

<table>
<thead>
<tr>
<th>The following motor vehicle inspection aspects have played a significant role in road safety aspects;</th>
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</tr>
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<tbody>
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<td>5) State of Tyres</td>
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<td>6) Insurance</td>
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<td>7) Number of passengers ferried</td>
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<td>8) Roadworthiness of Motor vehicle</td>
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<td>9) Presence of Seat Belts</td>
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70
PART C: ROAD REGULATIONS
For each of the following parts, please tick where applicable to the extent to which you agree using the following likert scale.
SA= Strongly Agree     A=agree     U=Uncertain     D=Disagree     SD=Strongly

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<th>D</th>
<th>SD</th>
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</thead>
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<td>10) Compulsory wearing of uniforms and badges</td>
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<td>11) Compulsory retesting of all PSV drivers after every 2 years</td>
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<tr>
<td>12) Fitting of safety belts in the motor vehicles</td>
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<td>13) Drivers’ having driving licence</td>
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<tr>
<td>14) Maintenance of the recommended speed levels</td>
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</table>

PART D: ROAD USERS' SAFETY AWARENESS
For each of the following parts, please tick where applicable to the extent to which you agree using the following likert scale.
SA= Strongly Agree     A=agree     U=Uncertain     D=Disagree     SD=Strongly

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<tr>
<th>The following road users’ safety awareness aspects have played a significant role in road safety aspects;</th>
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<th>A</th>
<th>U</th>
<th>D</th>
<th>SD</th>
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<tbody>
<tr>
<td>15) Safety Belts</td>
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<tr>
<td>16) Responsible Drinking</td>
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<td>17) Speeding Campaigns</td>
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<td>18) Road Signage Adherence</td>
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<tr>
<td>19) Presence of black spots</td>
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PART E: ROAD SAFETY AUDITS
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<td>20) Roadside Features</td>
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<tr>
<td>21) Road Surface Markings</td>
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<tr>
<td>22) Signing and Delineation</td>
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<tr>
<td>23) Intersections and Approaches</td>
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<tr>
<td>24) Traffic Policies adherence</td>
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</table>
PART F: PERFORMANCE OF ROAD SAFETY PROJECTS

For each of the following parts, please tick where applicable to the extent to which you agree using the following likert scale.

SA= Strongly Agree   A=agree   U=Uncertain   D=Disagree   SD=Strongly

<table>
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<th>The motor vehicle inspection, road regulations, road safety audits, and road safety audits have impacted on the following road safety projects;</th>
<th>SA</th>
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<th>U</th>
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<tr>
<td>25) Reduction on number of road accidents</td>
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<td>26) Reduction of road fatalities</td>
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<tr>
<td>27) Improvement in road worthiness of the motor vehicles</td>
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<td></td>
</tr>
<tr>
<td>28) Reduction of court cases on road accidents</td>
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</tr>
</tbody>
</table>
APPENDIX C

NACOSTI AUTHORIZATION

THIS IS TO CERTIFY THAT:

MR. JULIUS MATHENGE KABUE
of UNIVERSITY OF NAIROBI, D-20100
NAKURU, has been permitted to conduct
research in Nakuru County

on the topic: INFLUENCE OF NATIONAL
TRANSPORT AND SAFETY AUTHORITY
STRATEGIES ON PERFORMANCE OF
ZUSAHA ROAD SAFETY PROJECTS IN
NAKURU COUNTY, KENYA

for the period ending:
15th June, 2018

Applicant’s
Signature

Director General
National Commission for Science,
Technology & Innovation

CONDITIONS

1. You must report to the County Commissioner and
the County Education Officer of the area before
embarking on your research. Failure to do that
may lead to the cancellation of your permit.
2. Governmental Officer will not be interviewed
without prior appointment.
3. No questionnaire will be used unless it has been
approved.
4. Excavation, filming and collection of biological
specimens are subject to further permission from
the relevant Government Ministries.
5. You are required to submit at least two (2) hard
copies and one (1) soft copy of your final report.
6. The Government of Kenya reserves the right to
modify the conditions of this permit including its
cancellation without notice.

Serial No. 04407

CONDITIONS: see back page
APPENDIX D
COUNTY GOVERNMENT AUTHORIZATION

THE PRESIDENCY
MINISTRY OF INTERIOR AND
CO-ORDINATION OF NATIONAL GOVERNMENT

Telegram: “DISTRICTER” Nakuru
Telephone: Nakuru 051 221 545
When replying please quote

Ref No. EDU.12/10 VOL.V/175 23rd June 2017

TO WHOM IT MAY CONCERN

RE:- RESEARCH AUTHORIZATION
JULIUS MATHENGE KABUE

The above named person has been authorized to carry out research on
“influence of National Transport and Safety Authority strategies on
performance of Susha Road safety projects” in Nakuru County for the
period ending 15th June, 2018

Please accord the necessary support.

EDITH KOECH
FOR DEPUTY COUNTY COMMISSIONER
NAKURU EAST SUB COUNTY
APPENDIX E

MINISTRY OF EDUCATION AUTHORIZATION

MINISTRY OF EDUCATION
State Department of Basic Education

Telegram: "EDUCATION",
Telephone: 051-2216917
Fax: 051-2217308
Email: cdenakurucounty@yahoo.com
When replying please quote
Ref. NO.
CDE/NKU/GEN/4/1/21 VOL.V/87

COUNTY DIRECTOR OF EDUCATION
NAKURU COUNTY
P. O. BOX 255,
NAKURU.

22ND JUNE, 2017

TO WHOM IT MAY CONCERN

RE: RESEARCH AUTHORIZATION:
JULIUS MATHENGE KABUE
NACOSTI PERMIT NO/P/17/75091/17499

Reference is made to letter ref. NACOSTI permit

Authority is hereby given to the above named to carry out research
on "Influence of National Transport and Safety Authority strategies on
performance of Zusha Road safety projects in Nakuru County

Kindly accord him the necessary assistance.

MOSES KIARIE
FOR: COUNTY DIRECTOR OF EDUCATION
NAKURU COUNTY

Copy to:

University OF Nairobi
P.O. Box 30197 - 00100
NAIROBI.
Influence of National Transport and Safety Authority Strategies on Performance of Zusha Road Safety Projects in Nakuru County, Kenya by Julius M. Kabue

From Influence of National Transport and Safety Authority Strategies on Performance of Zusha Road Safety Projects in Nakuru County, Kenya (Innovative resources)

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<td>&lt; 1% match (student papers from 21-Jun-2016) Submitted to Saint Paul University on 2016-06-21</td>
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<td>10</td>
<td>&lt; 1% match (student papers from 30-Nov-2015) Submitted to International Health Sciences University on 2015-11-30</td>
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<td>11</td>
<td>&lt; 1% match (student papers from 19-Nov-2013) Submitted to Queen Mary and Westfield College on 2013-11-19</td>
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<td>13</td>
<td>&lt; 1% match (Internet from 21-Apr-2016) <a href="http://zusharoadsafety.org/about-zusha/">http://zusharoadsafety.org/about-zusha/</a></td>
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