

Influence of Motor Vehicle Inspections on Road Safety Projects Performance in Kenya

Julius Mathenge Kabue

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Abstract

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. This study sought to examine the influence of motor vehicle inspections on road safety projects performance in Kenya. 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 $3.5 < \mu \leq 4.5$. 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. The study recommended that Motor Vehicle inspection should be enforced in order to improve on the roadworthiness of motor vehicles on the road.

Keywords: Motor Vehicle Inspections, Road Safety

I.INTRODUCTION

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 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.

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 road 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 motor vehicle inspections on public road safety projects in Nakuru County.

II. RESEARCH OBJECTIVE

To determine the influence of motor vehicle inspections on road safety projects performance

III. RESEARCH QUESTION

What is the influence of motor vehicle inspections on road safety projects performance?

IV. LITERATURE REVIEW

Theoretical Framework

This study utilized 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 (Ann, Zhang, Zhang, & Wang, 2014). 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. For this study, the most important elements of the study are the human and motor vehicle aspects of the Haddon's Matrix theory.

Table 1: Haddon's Matrix

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

Source: Yang (2012)

Empirical Literature

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.

V.RESEARCH METHODOLOGY

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. 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 (Saunders, Lewis, & 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. 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;

$$n = \frac{1.96^2 * 0.5 * 0.5}{0.05^2} = 384$$

Since the population was less than 10,000 then

$$n_f = \frac{n}{1 + n/N} = \frac{384}{1 + 384/4,500} = 353 \text{ respondents where}$$

n_f=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

VI. RESEARCH FINDINGS AND DISCUSSIONS

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 2: Response Rate

Sample Size	Returned Questionnaires	Analyzed questionnaires	Response Rate
353	344	293	83.0%

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.

Table 3: Distribution by Gender

	Frequency	Percentage
Male	186	63.5%
Female	107	36.5%
Total	293	100.0%

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.

Education Level Distribution

The education level of the respondents was examined using Table 4 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: Distribution by Education Level

	Frequency	Percentage
Primary School	39	13.3%
Secondary School	163	55.6%
Graduate School	61	20.8%
Post Graduate School	30	10.2%
Total	293	100.0%

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 5. 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.

Table 5: Frequency Distributions of Motor vehicle Inspection

	SA Freq. (%)	A Freq. (%)	U Freq. (%)	D Freq. (%)	SD Freq. (%)
State of Tyres	91 31.1%	140 47.8%	34 11.6%	20 6.8%	8 2.7%
Insurance	72 24.6%	102 34.8%	72 24.6%	47 16.0%	0 0.0%
Number of passengers ferried	94 32.1%	144 49.1%	23 7.8%	28 9.6%	4 1.4%
Roadworthiness of Motor vehicle	156 53.2%	76 25.9%	34 11.6%	27 9.2%	0 0.0%
Presence of Seat Belts	81 27.6%	137 46.8%	56 19.1%	15 5.1%	4 1.4%

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, μ , 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 licensed 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, σ_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 6: Means and Standard Deviation of Motor vehicle Inspection

	Mean	Std. Deviation
State of Tyres	3.976	0.974
Insurance	3.679	1.017
Number of passengers ferried	4.010	0.955
Roadworthiness of Motor vehicle	4.232	0.983
Presence of Seat Belts	3.942	0.891

VII.CONCLUSION OF THE STUDY

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.

VIII.RECOMMENDATIONS OF THE STUDY

Motor Vehicle inspection should be enforced in order to improve on the roadworthiness of motor vehicles on the road.

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