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The Influence of Road Regulations on Road Safety Projects Performance in Kenya

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Abstract

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. This study sought to find the role of road regulations on performance of road safety projects in Kenya. 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. 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. The study recommended that the government of Kenya should place emphasis on the fitting of safety belts in the motor vehicles and the divers having driving licenses as the aspects with the highest levels of consensus amongst the respondents

Keywords: Road Regulations, Road Safety Projects

I.INTRODUCTION

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).

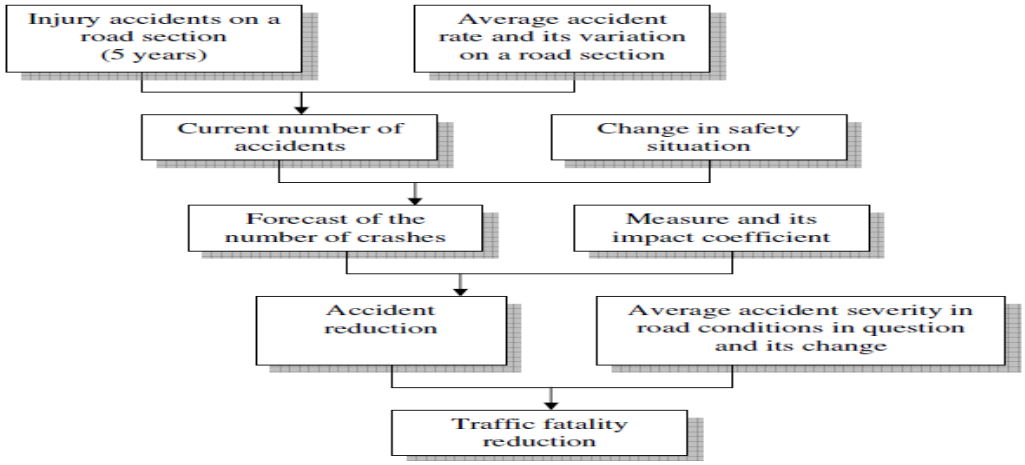

Figure 1: Road Safety Representation
Source; Geedipally (2008)

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).

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. This study seeks to find the role of road regulations on performance of road safety projects in Kenya.

II.RESEARCH OBJECTIVE

To establish the influence of road regulations on performance of road safety projects

III.RESEARCH QUESTION

How do road regulations influence performance of road safety projects?

IV.THEORETICAL FRAMEWORK

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, Tukamuhabwa, & Muhwezi, 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.

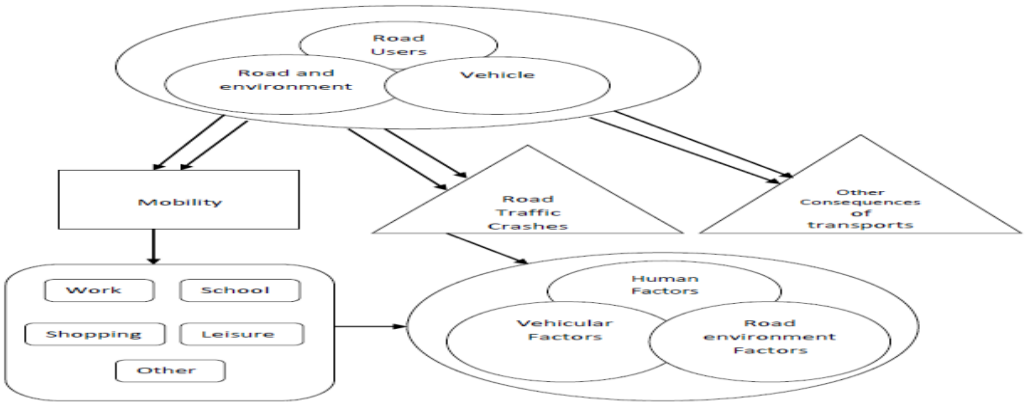

Figure 2: System's Theory on Road Safety
Source: Gumah (2015)

V.EMPIRICAL LITERATURE

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.

VI.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 (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. 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;

$n=\frac{z^2pq}{d^2}$

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

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

VII. RESEARCH FINDINGS AND DISCUSSIONS

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 1 below.

Table 1: Frequency Distributions of Road Regulations

	SA Freq. (%)	A Freq. (%)	U Freq. (%)	D Freq. (%)	SD Freq. (%)
Compulsory wearing of uniforms and badges	141 48.1%	84 28.7%	48 16.4%	19 6.5%	1 0.3%
Compulsory retesting of all PSV drivers after every 2 years	132 45.1%	83 28.3%	49 16.7%	29 9.9%	0 0.0%
Fitting of safety belts in the motor vehicles	85 29.%	125 42.7%	82 28.0%	1 3.0%	0 0.0%
Drivers' having driving license	54 18.4%	104 35.5%	111 37.9%	24 8.2%	0 0.0%
Maintenance of the recommended speed levels	53 18.1%	97 33.1%	93 31.7%	50 17.1%	0 0.0%

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.

Table 2: Means and Standard Deviation of Road Regulations

	Mean	Std. Deviation
Compulsory wearing of uniforms and badges	4.178	0.952
Compulsory retesting of all PSV drivers after every 2 years	4.085	1.005
Fitting of safety belts in the motor vehicles	4.003	0.765
Drivers' having driving license	3.642	0.875
Maintenance of the recommended speed levels	3.522	0.978

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.

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 ($0.5<\sigma_X<1$) 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.

VIII.CONCLUSION OF THE STUDY

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.

IX.RECOMMENDATIONS OF THE STUDY

The study recommended that the government of Kenya should place emphasis on the fitting of safety belts in the motor vehicles and the divers having driving licenses as the aspects with the highest levels of consensus amongst the respondents.

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