ROAD TRANSPORT CRASHES AND SOCIO-ECONOMIC INDICATORS: A CASE OF NIGERIA

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ABSTRACT

The aim of this study is to provide basis for the understanding of transport crashes as affected by socio-economic indicators with a view to providing basis for road safety policies for transport management and control in Nigeria. The objectives were to (i) examine the trend of road transport crashes in Nigeria from 1960 to 2010, (ii) identify the socio-economic development indicators and incidences that are related to road transport crashes in Nigeria, (iii) examine the road transport safety measures aimed at reducing road transport crashes and (iv) assess the contributions and challenges of road safety related agencies in the reduction of road transport crashes. Except for annual life expectancy, other socio-economic development indicators had relationship with road transport crashes in Nigeria ($R2 = 0,956$, $p = 0.000$, $P<0.05$). The model of this study was defined as follows: RTC= 8047.7 + 0.041(GDP) - 0.000000812 (FDI) + 0.0006 (population) - 0.0005 (vehicle) + 0.199 (telecom) − 0.388 (road length) + 0.016 (wages) − 0.001 (goods by road). The road transport safety counter measures have reduced transport crashes by these percentages: use of seat belt (35 percent), standard speed limit signs (18 percent), speed limiters/governors (14.4 percent), use of child restraints (12.9 percent), issuance of standard licence (12 percent) and reflective pavement marking (7.7 percent). Insufficient funding (34 percent), political challenges/interferences (26 percent), lack of modern equipment and logistics (16 percent), poor training and retraining of road safety personnel (10 percent), and security challenges (8 percent) constituted the challenges of road transport crash related agencies in the reduction of road transport crashes. The study concluded that national socio-economic development indicators (Gross Domestic Product, Foreign Direct Investment, Population, Vehicle, Telecommunication, Wages, Road Length and Tonnage of Goods) have a significant relationship with road transport crashes except the annual life expectancy.

Keywords: Transport, Crashes, Socio-Economic and Indicators.

1. INTRODUCTION

Road transportation safety is a very strong instrument and an inalienable part of social and economic development. It is also an essential part of human activities and in many ways form the basis of all socio-economic interactions. Indeed, no two locations will interact effectively without a viable means of movement. However, the development of road system as an engine of growth is always associated with the menace of road traffic crashes. There are at least two major schools of thought on road transport crashes which are the direct and indirect viewpoints. The former perhaps championed by the World Health Organisation (WHO) stress common causes of road transport crashes to be drunk driving, wrong over taking and loss of control whereas the latter viewpoint propagated by Khair (1990), Kopits and Copper (2005), Koornstra (2007), Grimm and Treibich (2010) and Tay (2011), lay more emphasis on increasing road networks and the effect of socio-economic factors. On road transport crashes, the second scenarios are those scholars that lead emphasis on the effects of variety of socio-economic indicators on road transport crashes. Tay, (2011) noted that road transport crashes

are leading cause of deaths and injuries in many developed and developing countries with strong influence on economic activities and business environment.

The menace of road transport crashes is increasing at a fast rate in developing countries due to rapid motorization, increase population and other factors such as length of the road, tonnage of goods by road. The World Health Organization (WHO, 2004) revealed that road transport crashes will increase by 65 percent between the year 2000 and 2020 in developed countries and 80 percent in low- and middle-income countries. This, therefore, requires concerted efforts for effective and sustainable prevention. Furthermore, it was estimated that the number of people killed in Road Transport Crashes each year worldwide is almost 1.2 million and the number injured could be as high as 50 million, (WHO, 2004). This is the combined population of five of the world's largest city.

The African Union's (2008) found that road transport crashes are the leading causes of morbidity and mortality accounting for over one million deaths per year in Africa. It was also revealed that 59,000 people lost their lives in road crashes in 1990 and this will increase to 144,000 people indicating 144 percent increase in 2020, Kopits and Cropper (2005). This tragic loss of lives is more than the total losses resulting from all the wars and terror attacks combined, Tay (2011). For this reason, the state of road networks is very important, and it contributes largely to the socio-economic development, safe movement of people, goods and services. Therefore, the reduction in the risk of travelling population is expected to be of importance to government and other stakeholders.

There is need to focus on providing solutions to the problems associated with road transport crashes and increasing urban population. The developed and developing economies of the world have suffered from varying degrees of road crashes. Nigeria is among the developing countries having one of the highest rates as denoted by the high number of deaths per 10,000 vehicles, Sheriff (2009). Nigeria has one of the highest rates of crashes among 181 countries being ranked 176th with estimated death rate of 33.7 per 100,000 population (WHO, 2010). Recently, in Nigeria 10,350 road transport crashes were recorded in the year 2014, killing 5,996 people (FRSC Annual Report, 2014). However, hardly a day goes by without the occurrence of a road transport crash which is leading to increasing incidence of deaths as well as socio-economic consequence that are involved. This trend of increasing carnage on roads in Nigeria has become a scene with trauma, groaning and tears. One may be made to believe that if this rate continues, road transport crashes and deaths becomes "tears we cannot stop" since the invariable road system which is the nature of motorization generated by economic growth is responsible for the high rate of road transport crashes in Nigeria.

1.1   Goal and Objectives
The goal of this research is to provide basis for the understanding of traffic crashes as affected by socio-economic indicators with a view to providing basis for road safety policies for traffic management and control in Nigeria. The objectives of this research are to:
   i.   examine the trend in the rate of road transport crashes in Nigeria from 1960 to 2010;
   ii.   identify the socio-economic indicators and incidences that are related to road transport crashes in Nigeria;
   iii. examine the road transport safety measures (standard driver's license, provision of road shoulders, reflective pavement markings, speed limit and signs and enforcement of use of seatbelt) aimed at reducing road transport crashes;
   iv.   assess the contributions and challenges of road safety related agencies (Nigeria Army, Nigeria Police, Nigerian Security and Civil Defence Corps, Vehicle Inspection Office, National Emergency Management Agency and Federal Road Maintenance Agency) in the reduction of Road Transport Crashes; and
   v.   make recommendations on policy planning options.

1.2   Theoretical Framework

The challenges and consequences of road transport crashes on national economies are very significant yet scientific studies into the causes and probable socio-economic factors leading to road carnages are few. For the purpose of this research, Economic and Traffic Safety Concept have been examined.

1.2.1   *Economic Activities and Traffic Safety Concepts*

Tay (2004), states that there is a relationship between the level of economic activities and traffic safety. However, as a country becomes developed, the rate of motorisation is likely to slow down. In addition, the demand for safety increases and becomes increasingly important. This shift will often lead to more investment in road safety, thereby resulting in fewer traffic crashes and deaths. (Tay, 2011). This is as shown in Figure 1.
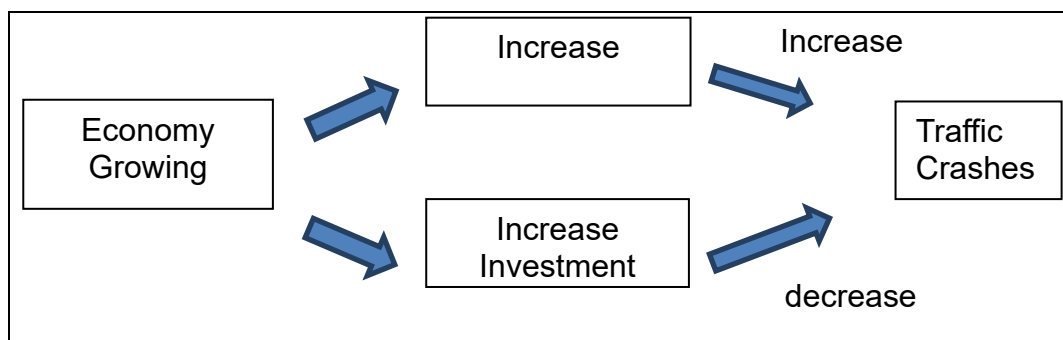

Figure 1: Growing economy and traffic crashes
Source: Richard Tay (2011)

Many developing countries are going through these cycles of development and transport crashes. According to Tay (2011), as motorisation in developing countries increases, there is an increase in the likelihood of collisions between motor vehicles and vulnerable road users like cyclists, pedestrians and other motorised road users who are not well protected. Moreover, unlike developed countries, much of the initial increase in motorisation often results an increase in motorised two wheelers that are also not well protected.

Another key aspect of economic activities and transport fatalities in developing countries that is not often seen in developed countries is the overloading of heavy vehicles. Overloaded converted pick-up trucks and minibuses are often the only affordable means of motorised transport for many of the poorer members of the society Tay (2011). The researcher further indicated in a study; trends in leading index and serious crashes in Australia that a variety of economic indicators have been used in the literature, this includes employment, retail index, new car sales and unemployment rate. Overall, there appears to be an inverse relationship between economic activities and road safety in developed countries. The impact of transport crashes on economic activities depends on factors such as the effect of a disruption in labour supply that is unemployment and the substitutability of labour (for example, death and injury to the skilled operator of expensive and highly specialised equipment versus an unskilled labour).

The effect of a disruption in transport as a result of crash will also depend on how critical delays in transportation service are to the particular sector of the economy (for example, just-in-time production, perishable items and fragile goods). It is very difficult to disentangle the various causes and effects between economic growth and transport crashes. This is as shown in Figure 2.
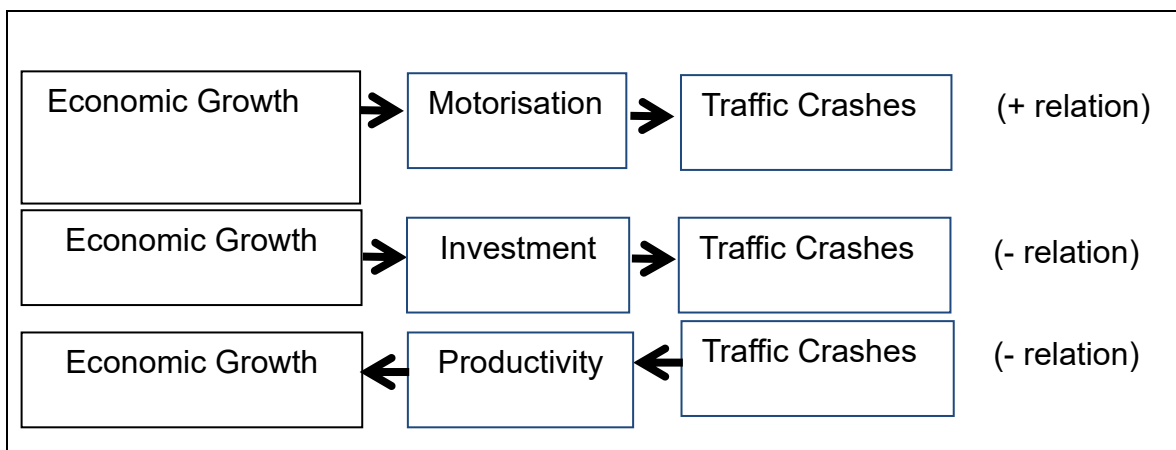
Figure 2: Relationship between economic factors and transport crashes
Source: Richard Tay (2011)

However, studies have simply assumed a one-way cause-and-effect relationship from economic activities to transport crashes through motorization. Tay (2011) without economic activities, living standards may decline as the population grows overtime.

2.   LITERATURE REVIEW

This literature review is discussed in five different parts. The first part examines the trends in road transport crashes. The second part discusses socio-economic indicators and responses to crashes. The third part examines the measures directed at reducing road transport crashes while the fourth part examines the contributions and challenges of road transport safety related agencies and the last part discusses the view of geographical and regional planning approaches to road transport crashes.

2.1   Trends in Road Transport Crashes

Road transport and safety remains the pivot of growth and development in most parts of the world. In Africa, it plays a vital role in the socio-economic development of the continent particularly in facilitating movement of goods and services. However, while all parts of the world are vulnerable to road transport crashes, some regions are particularly very serious and alarming. This is the case with developing countries generally and those of the sub-Saharan African countries in particular. Moreover, while the developed countries that have attained advanced stages in their socio-economic and technological development have been able over the years to control the number of fatal crashes through a variety of counter measures, the developing countries are still facing the developmental challenges that impact on their abilities to develop counter measures. According to Kopits and Cropper (2005) the burden of transport casualties rises in developing countries in the early stages of economic development which witnessed increased motorization of the economy.

It is noteworthy that out of the estimated 1.2 million people killed in road transport crashes in 2002 throughout the world, 90 percent occurred in low- and middle-income countries. Peden et al. (2004) and Chen (2010) have shown that Africa has the highest fatality rate in relation to their population. Chen (2010) particularly posited that Africa with about 4 percent of the world's motor vehicles has the highest fatality rate.

The trend is still very alarming, and the crashes are increasing relatively in Nigeria. More recently for example in 2012, at least 473 persons were killed from a total of 1,115 vehicular crashes nationwide. However, in 2013, the month of April is likely to down as the worst month in terms of road transport crashes in Nigeria. According to reported cases,

(FRSC annual report 2013) April 3, 2013: A luxury bus and a smaller bus crashed on the Abuja-Lokoja Road, 18 people were killed. April 6, 2013: At Dazigan, 11 kilometers from Potiskum, Yobe State, 20 were killed in a crash. April 11, 2013: 10 were killed on the Damaturu-Gashua Road also in Yobe State. April 14, 2013: 7 people were killed on the Abuja-Lokoja road a car ran into an articulated vehicle. April 15, 2013: A petrol tanker set luxury bus and articulated vehicle ablaze at Ugbogui-village on Ore-Benin Expressway, 80 people were burnt beyond recognition. April 7, 2013: 5 people were killed on the Asaba-Onitsha Expressway. By the middle of April, 142 people have been killed from reported road transport crashes, 30 percent of the 473 deaths recorded in 2012 had been covered in only 15 days.

2.2   Socio-Economic Indicators and Responses to Road Transport Crashes
The growing road transport safety problems in low-income countries have been studied and discussed by a number of scholars. For example, Nantulya and Reich (2002) Largarde (2007), Grimm and Treibich (2010), and Chen (2010) have shown that the socio-economic implication of the impact of road transport crashes have continued to rise, and have been threatening the economic and human development initiatives of most countries.

In Nigeria few scholars have partially analysed the socio-economic implications of road transport crashes on the local economy. Some of these scholars include Onakomaiya (1977, 1988, 1991, 1992), Akpoghomeh (1996, 2000, and 2003); Badejo (1998) and Gbadamosi (2000). These scholars have all noted the negative socio-economic impacts of the crashes on the economy. Akpoghomeh (2003) in particular confirmed that almost 60 percent of road transport crashes in Nigeria involved the loss of at least one life in the last 10 years. More specifically, Bishai et al (2006) observed that transport fatalities increase with GDP per capita in lower-income countries and decrease with GDP per capita in wealthy countries. This is an alarming finding. It implies therefore, that as lower-income countries become richer, transport fatalities are expected to increase and indeed the WHO predicts that the current number of 1.3 million global road fatalities per year may rise to 1.9 million by 2020, WHO (2011).

However, there exists a noticeable gap in knowledge that needs to be filled through research, especially in the area of examining the National data of socio-economic development indicators on road transport crashes in Nigeria such as Gross Domestic Product, Foreign Direct Investment, Annual life expectancy, National Population growth, Number of motor vehicles registered, Number of telephone usage (Telecommunication and Post), Road Length, Agricultural output, Minimum Wage, Tonnage of Goods moved by road.

2.3   Measures Directed at Reducing Road Transport Crashes
In order to minimize exposure to high-risk transport scenarios that occasion injuries and fatalities, most counter measures are usually directed at planning and designing roads for safety, providing visible, crashworthy smart vehicles, setting road safety rules and securing compliance, delivering care after crashes and exploring extensive research activities on salient issues on road safety crashes.

2.4   Contributions and Challenges of Road Safety Related Agencies
Road transportation by the use of motor vehicle is one of the most flexible, as it accommodates the wide range of differences of its users and capacity making it the main carrier of the economy. It is the most important and dominant mode in the country. However, there are issues and challenges militating against the effectiveness of this mode as well as that of road safety related agencies.

The challenges of road transport safety related agencies should be viewed as appreciating that road safety is a shared responsibility. Reducing risk of road transport systems requires commitment and informed decision-making by governments at all levels,

non-governmental organizations, international agencies and individuals. It also needs the full participation of people from many different disciplines, which include road engineers, health professionals, educationists, motor vehicle manufacturers, law enforcement officers and community groups. As regards contributions to road transport crashes reduction by road safety related agencies, the developed economy has established great efforts at reducing crash risk on the roads.

2.5   Geographical and Regional Approach

Despite using various bodies of theories and models in social and behavioural sciences the study will also use a geographical and regional planning approach basing on geographical and regional matters such as Place, Time, Environment and Road Transport Crash as an additional conceptual implication in understanding land use, road element, width of the road, hilly area, topography and regional distribution in occurrence of road transport crashes in Nigeria. According to Cutter (1993), geographic scale is important in understanding technological hazards, their distribution, impacts and its reduction. Hence, the dictionary of human geography provides us with the application of graphical perspective and methods to the study of health, disease and health care Johnston (2000).

Road Transport Crashes bear strong elements of man-environment adjustments and maladjustment a well-known approach in geography Muhlrad and Lassarre (2005). Based on the logic of a modified human ecological model of a disease the approach can be transferred to studies of road transport crash. A model for transport crash as inspired by the ecological model of a disease was developed by Jorgensen and Abane (1999) who made a heuristic adjustment of this basic model to suit road transport crash analysis.

3.   RESEARCH METHODOLOGY AND PROCEDURES

This research focused on methods adopted in data collection, handling and analysis. It also deals with the statistical methods used in the analysis of the data. In the same vein, sample size and sampling techniques as well as description of the statistical tools and instruments used for data collection and presentation are considered. Key variables used for the validation of the hypotheses were presented.

3.1   Sources of Data

Two major sources of data used for this study are secondary and primary sources of data. The secondary data and their sources used in this study: They are classified into published and unpublished. The published data include: (a) the reported national road transport crashes from 1960 -2010. Data were obtained from the Federal Road Safety Corps and the Nigeria Police Force (2010); (b) data on the countries' length of roads and Foreign Direct Investment were sourced from Central Bank of Nigeria (CBN) newsletter, 2011 and Federal Ministry of Works newsletter, 2011; (c) data on the countries' GDP, Life Expectancy, Agricultural Output, number of motor vehicles registered and number of telephone subscribers for 1990 – 2010 were sourced from the National Bureau of Statistics, (2011) and the Nigeria Communication Commission (NCC), Abuja; (d) other Economic Development information and data, such as population figures and Minimum wages were obtained from National Population Commission and National Salaries Wages and Income Commission; (e) data on the countermeasures adopted in this country were sourced from the Federal Road Safety Corps. The unpublished data are list of commercial drivers that had plied the selected routes (highways) across the six geopolitical zones of the country obtained from the National Union of Road Transport Workers (NURTW).

The primary sources required an extensive use of the following instruments of data collection. Two sets of questionnaires were prepared and were administered on the selected target population. The first set of the questionnaire was given to drivers (commercial and

private) plying the selected routes in Nigeria and the second set to the operational staff of Transport Administrators/Road Safety Management Related Agencies in Nigeria. The researcher carried out general observation on the Road Networks in Nigeria and that helped in determining the role of some drivers and other road users on the causes of road transport crashes. At the Road Transport Crash scene, thorough observations were carried out to determine causes of the crash. Photograph of specific road transport crashes were taken to showcase the physical effect of road transport crash on the immediate environment and items of various economic values.

In-Depth Interviews (IDIs) based on structured Interview guides were developed these were administered on the following; transport industry, road traffic management and the nation's economic handlers: (a) Head of Federal Highway Patrol, Nigeria Police Force (NPF); (b) Deputy Corps Marshal Operations, Federal Road Safety Corps (In charge of Highway Patrol and Rescue Operation) (FRSC); (c) Director, Land Transport, Federal Ministry of Transport (FMT); (d) Director, Fiscal Planning and Economic Development, Federal Ministry of Finance (FMF); (e) Director, Planning and Research, Central Bank of Nigeria (CBN); (f) Director, Research and Planning, Automotive Council of Nigeria. (NAC); (g) Director, Statistics and Demography, National Population Commission (NPC); (h) Director, ICT, National Bureau of Statistics (NBS); (i) Director, Planning and Evaluation, National Planning Commission (NPLC); (j) National President or National Secretary, National Union of Road Transport Workers (NURTW); (k) National President or National Secretary, National Association of Road Transport Owners (NARTO); and (l) National President, Road Transport Employer Association of Nigeria (RTEAN).

3.2   Sample Population and Sampling Technique

Drivers (private and commercial) that had plied the selected routes within three years (2008 – 2010) and operational staff of various road safety related agencies (Federal Road Safety Corps, Nigeria Police Force, Nigeria Security and Civil Defence Corps, Vehicle Inspection Officers, Federal Road Management Agency, National Emergency Management Agency, and, Non-governmental Organizations with road safety related activities in Nigeria) made up the sample population. The sample frame for the registered commercial drivers numbered 8,560 (Motor parks/terminals Reports of FRSC, 2012). Again, the private drivers that had plied the route, numbered 8293 (this was obtained from traffic count). Finally, the sample frame for the operational staff of road safety and traffic related agencies totaled 2,776 personnel. The operational staff are those staff that had direct link with road safety operations on the road aside the administrative staff. However, the total number of in these road safety and traffic related agencies totaled 644,104.

The sample size of this study was determined using two sampling size determination formula- Williams (1978) and Taro Yemane formula. The Williams (1978) formula as was adopted by Kerlinger and Lee (2000) was used to determine the sample size for the commercial drivers, while the Taro Yemane formula was used for the operational staff of road safety and traffic related agencies. The Williams (1978) formula is given as:

$$S = \frac{n}{1 + (n/N)} \tag{1}$$

Where:
S = the sample size
n = the proportion of population that was sampled (0.1 percent).
N = the total number of people (commercial drivers).

3.3   Sampling Technique

Two sampling techniques were used in this study and these include: Multi-stage sampling and Simple random sampling technique. Using multi-stage sampling techniques, Nigeria, the study area was divided into the six major geo-political zones of the country (south-east, south-south, north-east, north west, north-central and south-west). Two states were randomly selected in each of the geo-political zone and two major road networks were considered in each of the zones. The following criteria were used to select the sample of roads for the purpose of this study:

    a) Major city of regional influence per zones;
    b) Oldest state capital territory as regards first state creation in 1976; and
    c) Regional economic and administrative influence right from the colonial era.

In order to get the survey point in each of the selected major roads across the study areas, the busiest and the largest motor parks that service these roads were simple randomly selected and the names of these parks were obtained from unpublished document of the FRSC that shows the list of major parks in Nigeria. Table 1 gives detail of the presentation.

Table 1: Shows the Sample Size of the Road Traffic Related Agencies

	Agencies	Total number of staff	Number of operational staff	Sample size
1	Nigeria Army	184,000	304	171
2	Nigeria Police Force	371,800	487	210
3	Directorate of Road Traffic Services (Vehicle Inspection Officer)	750 (FCT)	210	101
4	Federal Road Safety Corps	17,949	563	302
5	Federal Road Maintenance Agency	5,453	354	164
6	Nigeria Security and Civil Defence Corps	60,245	407	195
7	NEMA	2,442	333	189
8	Non-Governmental Organizations on road safety related activities.	1465	118	79
Total		644,104	2776	1411

Source: Official website of each of the agencies

RESULT

Hypothesis One

H0:   The trend of Road Transport Crashes does not differ significantly within the period (1960-2010) in Nigeria.

The result from the ANOVA statistics suggests that the trend of road transport crashes significantly different within the period (1960-2010) in Nigeria (F = 25.666, P-sig at 0.000, P< 0.05 significant level). The trends were decade 1 $(1960-69)$, decade 2 $(1970-79)$, decade 3 $(1980-89)$, decade 4 $(1990-99)$ and decade 5 $(2000-10)$. The null hypothesis was therefore rejected. The details of this result were shown in Table 2 below. The test of homogeneity of variance shows a significant value of 0.128. This indicates that the ANOVA assumption was not violated.

Table 2: One-way Anova testing the trend of road transport crashes within the period (1960-2010) in Nigeria

Descriptives

crashes

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
decade1	10	15123.70	2313.82521	731.69578	13468.4892	16778.9108	12163.00	19835.00
decade2	10	27660.00	7976.81543	2522.491	21953.7300	33366.2700	16666.00	40881.00
decade3	10	29717.00	4139.80340	1309.121	26755.5630	32678.4370	23987.00	37094.00
decade4	10	18997.00	2858.18225	903.83659	16952.3796	21041.6204	15865.00	22864.00
decade5	10	12916.60	3857.54750	1219.864	10157.0768	15676.1232	8477.00	20530.00
Total	50	20882.86	8111.61232	1147.155	18577.5653	23188.1547	8477.00	40881.00

Hypothesis Two

H0: There is no significant relationship between Road Traffic Crashes and socio-economic development indicators as measured by the Gross Domestic Product, Annual Life Expectancy, Population Growth, Number of registered vehicles, Road Length, Minimum Annual Wage, Foreign Direct Investment, Agricultural Output, Telecommunications and Post and Tonnage of Goods moved by road in Nigeria.

The result of the second hypothesis suggests that there is a strong significant relationship between road traffic crashes and socio-economic development indicators as measured by the Gross Domestic Product, Population Growth, Number of registered vehicles, Road Length, Minimum Annual Wage, Foreign Direct Investment, Agricultural Output, Telecommunications and Post and Tonnage of Goods moved by road in Nigeria. (R^2 = .956, Adjusted R^2 = .937, Standard Error = 20.9387, F=50.892, P-sig = 0.000, $P < 0.05$ significant level). The null hypothesis was therefore rejected as detailed in Table 3.

Table 3: Regression Testing Relationship Between Road Traffic Crashes And Socio-Economic Development Indicators

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	8047.761	54695.756		.147	.884
	population	.000	.000	-.887	-3.674	.012
	vehicle	-.005	.034	-.155	-2.156	.029
	GDP	.041	.042	.928	4.970	.000
	FDI	8.12E-007	.000	.235	2.601	.022
	wages	.016	.036	.117	3.448	.013
	telecom	.199	.265	.239	3.077	.019
	goods	-.001	.001	-.076	-2.044	.034
	lifexpantan	874.035	1223.719	.222	.714	.483
	roadlengt	-.388	.160	-1.543	-2.432	.024

a. Dependent Variable: crashes

Hypothesis Three

H0: The road traffic safety measure does not differ significantly in relation to the reduction of road traffic crashes.

Result

The result of the third hypothesis suggests that the road traffic safety measure does differ significantly in relation to the reduction of road traffic crashes. (KW value =153.9, P = 0.000,

P < 0.05 significant value). The null hypothesis was rejected. The detail of this result was shown in Table 4.

Table 4: Kruskal-Wallis Test Testing the road transport safety measure in relation to the reduction of Road Transport Crashes

Ranks

	scores	N	Mean Rank
countermeasure	shoulders	2494	48.45
	pavements	2494	65.55
	speed limit signs	2494	49.02
	road signs	2494	37.27
	seat belt	2494	94.61
	speed breakers	2494	63.55
	child restraints	2494	57.63
	enlightenment	2494	72.63
	traffic laws	2494	57.96
	drivers licence	2494	51.66
	Total	24940	

Hypothesis four

H0: There is no significant difference in the mean rating of the contributions and challenges of the road safety related agencies in the reduction of road traffic crashes among the various categories of respondents.

The result of the fourth hypothesis suggests that there was a significant difference in the mean rating of the contributions and challenges of the road safety related agencies in the reduction of road traffic crashes. ($X2$ value = 8.552, P = 0.023, P < 0.05 significant value). The null hypothesis was rejected. The detail of this result is shown in Table 5.

Table 5: Chi-square tests testing the mean rating of the Contributions and Challenges of the road safety related agencies in the reduction of road transport crashes

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	8.552(a)	1410	.023
Likelihood Ratio	8.466	1410	.639
Linear-by-Linear Association	.414	1	.520
N of Valid Cases	390		

a.   7 cells (58.3%) have expected count less than 5. The minimum expected count is .10.

4.   DISCUSSION OF FINDINGS

The findings of the study are discussed under ten socio-economic indicators and incidences that are related to road transport crashes.

4.1   Socio-economic indicators and incidences that are related to road traffic crashes in Nigeria

In this study, ten (10) Socio-economic indicators were used and discussed. The indicators are as follows: (i) Gross Domestic Product; (ii) Foreign Direct Investment; (iii) Annual Life Expectancy; (iv) National population; (v) Number of motor vehicle registered; (vi) Number of telephone usage; (vii) Road length; (viii) Minimum wages; (ix) Tonnage of goods moved by road; and (x) Agricultural output. The discussions in this section were based on the regression results of hypothesis two. The result tables show the coefficient interpretation of

each of the socio-economic indicators. Table 5 below depict the regression description and the coefficient.

Table 5: Regression Results and its Coefficients

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	8047.761	54695.756		.147	.884
	population	.000	.000	-.887	-3.674	.012
	vehicle	-.005	.034	-.155	-2.156	.029
	GDP	.041	.042	.928	4.970	.000
	FDI	8.12E-007	.000	.235	2.601	.022
	wages	.016	.036	.117	3.448	.013
	telecom	.199	.265	.239	3.077	.019
	goods	-.001	.001	-.076	-2.044	.034
	lifexpantan	874.035	1223.719	.222	.714	.483
	roadlengt	-.388	.160	-1.543	-2.432	.024

a. Dependent Variable: crashes

The study revealed the estimates for these b-values and these values indicate the individual contribution of each predictor to the model. If we replace the b-values from the values in the regression result.

The model of this study is defined as follows:

Road Traffic Crashes = 8047.7 + 0.041(GDP) - 0.000000812 (FDI) + 0.0006 (population) - 0.0005 (vehicle) + 0.199 (telecom) – 0.388 (road length) + 0.016 (wages) – 0.001 (goods by road)

The b-values tell about the relationship between road transport crashes and each predictor. If the value is positive, it shows that there is a positive relationship between the predictor (socio-economic variables) and vice versa. So as these socio-economic variable increases, the road transport crashes rate increases. The (b-coefficient values) highlights more than this. It gives the degree each of the independent variable affects the outcome of the effects of other variables which are held constant.

Table 2; Socio-Economic Characteristics of Pedestrians

	Distribution by Gender		Distribution by Age					Distribution by Occupation			
	Male	Female	1-15	16-30	31-45	46-60	61+	Student	Traders	Self-Employed	Govt. Employed
No. of Respondent	81	54	6	72	39	12	6	60	30	21	24
Percent	60	40	4.4	53.3	28.9	8.9	4.4	44.4	22.2	15.6	17.8

(Source: Field survey, 2016)

5. CONCLUSIONS

In conclusion therefore, several policy implications and new areas of knowledge emerged from this study. From the forgoing, available records and information revealed that the trend and pattern of road traffic crashes is reducing relatively socio-economic development indicators in Nigeria. This reduction in crash is still very unacceptable and its effect on socio-economic development indicators and incidences. The study has carefully outlined some socio-economic variables and it revealed for example that only one (1) out of the ten (10) variables is not significant (annul life expectancy), which shows that road traffic crashes has created great negative consequences while positive relationship shows that for every one

percent increase in the country's GDP, there is 41 percent increase in road traffic crashes. It is clear from this study and other related research work that new research frontiers may be embarked upon. This may include variables like educational facilities, its location, industrial facilities, its location and the component of demography (e.g. household population, household size, income, sex and literacy rate) using the national census database. All these variables and components can be used to establish their relationships with road traffic crashes in Nigeria.

The study also reveals that the issues of road traffic crashes and its effect on socio-economic environment require serious attention and approach towards ensuring effective preventive measures and efficient practice in a holistic manner. Therefore, government established the FRSC as the lead agency on road safety administration and traffic management in Nigeria. It was to handle the increasing and complexity situation on the rate of road traffic crashes and its attendance destruction of life and property. The agency introduced various measures, countermeasures, strategic policies and programmes with a view to bringing this trend to a barest minimum. Hence, relevant agencies such as NPF, VIO, NSCDC and the Army amongst others should synergise with the FRSC towards achieving safe motoring environment. This will create an interface, with very high degree of coordination that will bring about genuine solutions, effective implementation of programmes at reducing crashes and improving socio-economic development in Nigeria.

Finally, the study will provide information to policy decision makers as well as transportation planners and engineers on the socio-economic indicators affecting crashes at the national level. Moreover, the study reveals which of the indicators will increase the crashes. Based on this, information and guidelines to proper countermeasures can be developed for the reduction of road traffic crashes. The study is beneficial to developing countries, which are experiencing a significant number of road traffic crashes in recent times because of increase in population, motorization, improved foreign investment, less development in the road and highway sector of the economy.

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