Management of Road Traffic Accident in Adamawa State, North Eastern Nigeria: The State, the Trend and the Cost

Dauda Ikoti Ishaku
Basic Science Department, Taraba State College of Agriculture, P.M.B 1025 Jalingo

Husseni Bala Habu
Information and Communication Technology Department, Taraba State
Ministry of Science and Technology, Jalingo, Nigeria

Karma I. Magaji
General Studies Dept.
Taraba State, College of Agric.
P.M.B 1025 Jalingo

ABSTRACT
An avoidable incidence such as Road Traffic Accidents (RTA) which is on a steady decline in the developed world has come to stay and has even become a household name in Nigeria. Virtually all families are in one way or the other affected by it. It has become a vital part of the economy of the nation and that of the individuals in particular. Losses have been on the steady increase due population explosion and corresponding increase in number of automobiles available. It has continuously drained some vital economic components and cost losses which have never been or is scarcely evaluated to ascertain the true values of losses. This study adopts an economic costing model in collaboration with regression models to evaluate the cost and trend of RTA in Adamawa State, North Eastern, Nigeria. The human factor contributes most of the RTAs and the resultant losses due to huge death and incapacitation. This lack of knowledge or information as to the colossal amount of loss due to RTA was discovered to be the reason for laxity or levity of government towards RTA.

Keywords
Management, Road Traffic Accident (RTA), Human Capital Approach, Gross Output Approach

1. INTRODUCTION
A good and efficient transportation system is vital to the economic, industrial and social development of a nation [1]. [1] Also pointed out that transportation is one of the most important sectors of economy (perhaps others of equal importance are telecommunication and banking). He further states that transportation system provides a very large employment to literate and illiterate, the young and old, the poor and the so-called rich.

Transportation (road transport) is however, beset by several problems such as Road Traffic Accident (RTA), despite all the advances in technology. The severity of RTA is vividly seen in this quote: "the uncertainty and non – safety of roads and how it has degenerated to the extent that when a relation, colleague or anybody is set for a brief journey on our roads, it is not the destination or the mission of the trip modus – operandi to reach the destination. Our customary greeting of 'safe journey' is metaphorically reflective, and augmented by tremendous and powerful prayers for successful conclusion of the unknown destination" [2]. In like manner [3] asserted that "a traveler whose exclusive aim is to arrive his destination in the shortest possible time is in danger of missing the joy of his journey".

In developing countries, growth in urbanization and in the number of vehicles has led to increased traffic congestion in urban centers and increase in traffic accidents on road networks, which were never designed for the volumes and types of traffic that they are now to carry. There is also competition between different classes of road users coupled with poor road maintenance, bad and inadequate provision of road infrastructure. All these have contributed to the serious road safety problems in developing countries like Nigeria

According to [4], Road accidents are one of the most important problems being faced by modern societies. Apart from the humanitarian aspect of reducing road deaths and injuries in developing countries, a strong case can be made for reducing road crash deaths on economic grounds alone, as they consume massive financial resources that the countries can ill afford to lose. The deaths of persons and serious economic loss caused by road accidents demand a continuous attention in accordance with the spectacular growth in road transportation. It is now realised that better and more efficient techniques of accident information management system are required. The rapid population growth and increasing economic activities have resulted in the tremendous growth of motor vehicles. This is one of the primary factors responsible for road accidents in many metropolitan cities. The increasing number of road accidents is imposing considerable social and economic burdens on the victims which could be direct or indirect costs to individuals and government.

Road accidents cause injury, death, loss of property and damages to vehicles. All these involve a monetary loss to the economy. When roads are improved, road accident rate will reduce. This results in quantifiable benefits to the economy. Though the overall death rate has declined and expectation of life has gone up, the death risk on roads has considerably increased. It must of course be borne in mind that in developing and emerging nations, road safety is one of the many problems demanding its share of funding and other resources. Even within the boundaries of the transport and highway sector, hard decisions have to be taken on the resources that a country can devote to road safety. In order to assist in this decision-making process it is essential that a method be devised to determine the cost of road crashes and the value of preventing them.

In Nigeria, every year, tens of thousands of people either die or get injured in road accidents and properties worth millions of naira are lost. The menace of road traffic accident no doubt poses a serious challenge to the government and the entire people.

However, over the years several attempts have been made by government and private establishment to solve the problems of urban traffics, individual researchers have also proffered solutions to the crisis in various Nigerian cities. Many of the attempt have centered on the need to improve the road conditions, the provision of traffic signs and signals, and on traffic demand management techniques [5].

Many researchers have devoted their work to the area of road accidents and traffic safety aspects. Works have been undertaken on accident characteristics, accident forecasting and better roadway and vehicular design for the improvement of road safety in different traffic and roadway conditions. However, no significant studies have appeared on the accident trend and its cost analysis for states in Nigeria. In this article, an accident and costing model is built which is used to forecast the future number of different types of accidents and the accident cost. In the absence of accident cost data, many a time cost effectiveness technique is used instead of cost-benefit analysis. Nevertheless such analysis is not complete and can only be used in optimum allocation of safety budget and not in overall transport investment planning.

In Nigeria, fatality due to road traffic incidence is reported in the media [6] every day. There are however no report of accidents in Adamawa State's road despite the fact that they occur frequently [7].

The major concern of this article is to highlight the major causes of road traffic accidents in Adamawa state, Nigeria and determine scientifically its trends and its economic cost implication to Adamawa State. This is to awaken the State Government and the people of the state to the danger posed by RTA.

This article intends to analyze the road crash costs in Adamawa State, however with the limited available data; this paper can only apply the human capital method to determine the total crash costs. Furthermore, this article also attempts to determine the major contributing factors to RTA in the Adamawa State..

2. CAUSES OF RTA

The causes of road traffic accidents are multi-factorial. These factors can be divided broadly into driver factors (human factors), vehicle factors (mechanical factors) and roadway factors (road condition). Environmental factors such as those caused by rainfall, earth movement, strong wind etc. are also sources of accidents. Accidents can be caused by a combination of these factors. Driver factors solely contributes to about 57 per cent of road traffic accidents and 93 per cent either alone or in combination with other factors [8]

Human Factors

According to [9] stated that Driver factors in road traffic accidents are all factors related to drivers and other road users. This may include driver behaviour, visual and auditory acuity, decision making ability and reaction speed. Drug and alcohol use while driving is an obvious predictor of road traffic accident, road traffic injury and death.

The physiological and psychological factors influence accident risk through their influence on the road user behavior (see figure 1).

Figure 1: The causal relationship between human factors and risk of road accidents. Simplified method [10].

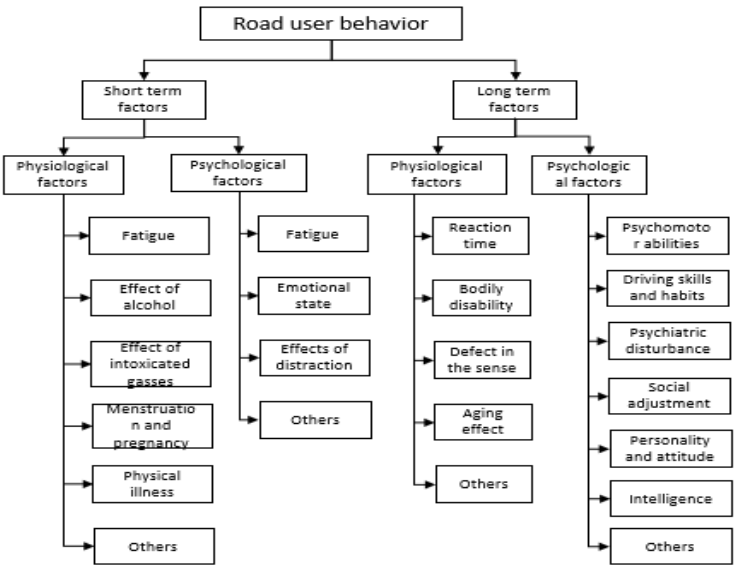

Figure 2: classification of factors within the person relevant to driving behavior [10] The classification of factors in figure 1 are also represented in detail in Figure 2

Mechanical Factors

According to [9] stressed that the vehicle itself is a key factor when analyzing the remote causes of a traffic accident and it is incorporated with gadgets like, the horn, side mirrors, wipers, braking system, trafficators, headlights and break-lights (to mention just a few) so as to avoid road accident.

Furthermore, stated that vehicle factors can be divided into vehicle design and vehicle maintenance. Some safety features of vehicles like seatbelts and airbags are likely to reduce the risk of death and serious injuries. A well-designed and maintained vehicle is less likely to be involved in accidents. If the brakes and tires are good and the suspension well-adjusted, the vehicle is more controllable in an emergency and thus, better equipped to avoid accidents.

Malfunction of any vehicle parts such as tyres, engines, braking systems, light systems can cause road traffic accidents. The reliability of the vehicle is itself a function of the condition of vehicle at every given time. Vehicle components and vehicle maintenance are the two main conditions which affect vehicle factors as it relates to causes of road traffic accidents.

Road Condition

Road design and maintenance is also a factor that contributes to road traffic accidents. The causes of road traffic accidents are not just human error or driver negligence [9]. Unfortunately, Nigerian highways are arguably one of the worst and most dangerous in the world [11]. [5], points out the following characteristics of Nigerian roads: inadequate or narrow roads, most road were built for early day's ox-drawn wheel cart, rapid growth of population of vehicle after independence resulting in pot-holes, dilapidation. He further stressed that some are poorly constructed and maintained while most are overdue for rehabilitation.

According to [5], road traffic ancillary facilities such as traffic signs and signals, sidewalk, pedestrian crossing, parking spaces, street light that would allow smooth flow of traffic is lacking. The roads are unevenly distributed due to poor design and highway associated engineering. Services on Nigerian roads are uneven as facilities such as restaurants, mechanical workshops, reserve emergency resort, road side telephone and patrol teams are lacking or inadequate

Other Factors

Environmental related conditions such as fog, sunrays, mist and rain in no small measure contributes greatly to the rate of road traffic accident in Nigeria today. Having stated earlier that most vehicles on Nigerian roads are poorly maintained, a poorly maintained vehicle for example on a rainy day is most likely to cause road traffic accident if the wipers are faulty and not functioning as the driver will be unable to see ahead

3. SOCIO-ECONOMIC EFFECTS OF RTA

Road traffic is made up of three components, which are operationally interrelated. These components are the vehicle, the road user and the road. Accidents occur during the interaction between these components when one or more are defective [12]. Accidents, when it occurs result to damage to one or more of the components thereby resulting in great socio-economic losses to not only the individual involved in the event but the nation at large [13]

Also [13], points out that "socio-economic losses due to RTA manifest in death or injuries to person (a vital components of nation's resources who would have contributed in one way or the other towards economic development). It may also involve the loss of motor vehicle which also translates into loss of nation's economic resources".

Furthermore, [13] stressed that the socio-economic effect of the above losses is enormous. A lot of families suffer losses of parents, children and relatives, which can never be replaced. This results in emotional grief and stresses, which usually cause permanent scars. The social vacuum created by accidents often results in untold hardship and economic distress to some families. The loss or physical incapacitation of such a high magnitude of human resources in road accidents, some of which were probably at their prime age or part of active labor force would mean a great economic loss to the nation

Component of Accident Cost

Medical Costs include emergency transport, medical, hospital, rehabilitation, mental health, pharmaceutical, ancillary, and related treatment costs, as well as funeral/coroner expenses for fatalities and administrative costs of processing medical payments to providers. Other Resource Costs include police, fire, legal/court, and victim services (e.g., foster care, child protective services), plus the costs of property damage or loss in injury incidents.

Work Loss Costs value productivity losses. They include victims lost wages and the replacement cost of lost household work, as well as fringe benefits and the administrative costs of processing compensation for lost earnings through litigation, insurance, or public welfare programs like food stamps and Supplemental Security Income [14]. [14], further stressed, that the victims work losses from death or permanent disability and from short-term disability. This category includes work losses by family and friends who care for sick children, travel delay for uninjured travelers that result from transportation crashes and the injuries they caused, and employer productivity losses caused by temporary or permanent worker absence. Quality of life includes the value of pain, suffering, and quality of life loss to victims and their families

4. ROAD ACCIDENT COST ESTIMATION

A number of alternative methodologies are available for accident cost estimation and accident reduction. A research by [15] summarized six different approaches which include; Gross output approach, quantifies the cost of a traffic accident as the sum of real resources cost such as vehicle damage, medical expenditure, police cost and the discounted present value of the victims future output. The Net Output approach subtracts the amount of the victim's future consumption from the gross output value. The Life insurance approach treats the cost of an accident or the value of accident prevention as the sum of real resource cost and the amount for which typical individuals are willing to insure their own lives or limbs. The Court award approach considers the amounts awarded by the court to the surviving dependents of those killed as indicative of the cost that society associates with the fatality or the value it would have placed on its prevention. The Implicit Public sector valuation approach is based on the costs and values that are implicitly placed on accident prevention in safety legislation or in public sector decisions taken either in favor of or against investment programmes involving traffic safety. The Values of risk-change approach assumes that a typical public

sector investment in traffic safety provides each individual affected with a very small reduction in the risk of involvement in a fatal accident.

The above methods substantially differ in approach and the resultant cost estimates vary to a great extent. In developed countries while the output approach generally provides moderate cost of accident, the life insurance and court award approaches provided slightly higher estimates. Implicit public sector valuation-based cost is quite low, whereas value of risk change approach gives quite high estimate of accident cost.

The estimation of accident cost is many times avoided on the grounds that it would be too difficult and controversial to determine the actual cost of an accident. Though it is agreed that precise estimation of an accident cost is quite tedious and involves elaborate procedures, it is necessary to arrive at a rough and reasonable estimate.

The important uses of accident cost are:

i. to gauge the problem of accident in economic terms.
ii. to work out safety standards keeping in view the cost of the facility- construction vis-a-vis the value of the accidents avoided.
iii. to calculate the optimum level of investment /expenditure on road safety management. to evaluate the impact of road safety improvements in economic terms.
iv. to include the accident cost as a part of road user cost in road project appraisal i.e., in cost / benefit analysis of road projects.
v. to work out the national loss due to accidents.

It is important to keep in view the source of cost i.e., to whom does the accident cost accrue. The cost of an accident to the victim, to the family of the victims, to the nation, to the national economy and to the society is all different. Death of a leader in an air crash may cost a future to the grieved family while the loss to the nation cannot be estimated at all. It may bring faster development, more democratic political set up or total disturbance, loss to public property and life [14].

Similarly the cost of social worker or a planner dying in an accident is a matter of great dispute. Dancers getting leg amputated in a road accident may lose their full career while the society may lose all the entertainment expected from the dancer.

The cost to the society is generally greater than the cost to the economy. In transportation, planning cost to the society is generally considered as a project appraisal and is carried out by using social cost-benefit analysis. The cost of accident would also differ from region to region, victim to victim and the types of the vehicles involved in the accident.

The main objective of this paper is to build an accident trend and its economic cost model. The accident model is built with multiple regression model (with the aid of SPSS Package) while the costing model adopts the gross output approach. This model is capable of calculating the accident rate and its costs for the future. The study area, Adamawa state is located in North Eastern part of Nigeria and has Yola as its capital city. Both primary and secondary data were collected and utilized for this study. Nigeria Police accident department, State Head Quarters, Yola and Federal road safety office Yola provided the secondary data while questionnaire (primary source) was administered in three metropolitan city's motor parks – Yola, Mubi and Numan. 100 questionnaires were returned for analysis.

5. MODEL FOMULATION

According to [16], the Gross Output methodology, employs the Human Capital Approach to costing, economic and social costs of accidents. Accident victims, costs are classified into three main components namely: victim related cost, property damage and administration cost. In [16], administration cost incurred by legal entities that oversee accident investigation, spot cleansing and also legal costs were considered. Property damages such as vehicle repair costs were also analyzed and were added up to the total resources lost. An amount for the pain grief and suffering of the victim and their dependents was also calculated by using standard practice.

This study adopts the human capital approach, albeit partially, to suit the Adamawa State accident data inadequacies to achieve the objectives of this study. The data collected from Nigerian Police, Adamawa State Headquarters, Yola is shown table 1.

Table 1: Road Traffic Accidents cases reported in Adamawa State, Nigeria, from 1990 to 2000

Year	Total no of accident cases reported	Nature of accidents			Number of persons	
		Fatal	Serious	Minor	Injured	Killed
1990	355	NA	NA	NA	NA	NA
1991	305	NA	NA	NA	NA	NA
1992	178	NA	NA	NA	NA	NA
1993	240	NA	NA	NA	NA	NA
1994	191	NA	NA	NA	NA	NA
1995	216	80	78	58	206	64
1996	274	59	211	4	199	105
1997	223	55	105	63	113	44
1998	352	80	195	77	234	90
1999	288	82	107	99	341	36
2000	498	102	286	110	83	82

In order to produce a reliable information and result for this study to achieve its objectives, primary data was solicited from persons who were at one time victims or witnesses to RTA. Table 2 shows the 5 – point ratings of respondent's opinions from the returned questionnaire.

Table 2: Five – point rating of the three causes of RTA in Adamawa State

S/No of Respondents	No of deaths	Human factors	Environmental Factors	Mechanical factors	S/No of Respondents	Number of deaths	Human factors	Environmental Factors	Mechanical factors
1	2	4.9	5.0	5.0	26	2	5.0	5.0	4.0
2	0	4.0	2.6	3.4	27	3	4.6	3.6	4.4
3	1	4.0	3.4	4.6	28	1	3.4	3.6	3.4
4	0	4.4	3.6	3.8	29	2	4.7	3.2	4.8
5	3	4.3	3.2	4.2	30	0	3.3	3.1	3.0
6	2	4.2	3.7	4.4	31	4	3.6	3.6	4.6
7	1	5.0	4.4	4.4	32	2	4.4	4.7	4.6
8	2	5.0	4.0	4.6	33	1	4.6	3.4	4.4
9	0	4.3	4.0	4.4	34	0	0.0	0.0	0.0
10	4	4.0	3.1	3.6	35	10	4.6	4.6	4.2
11	0	4.7	4.1	4.2	36	5	2.3	2.1	3.0
12	1	4.0	4.0	4.0	37	1	3.6	4.1	4.0
13	10	3.8	4.2	4.0	38	4	4.1	3.8	4.6
14	0	3.8	4.5	3.6	39	5	4.7	4.0	3.8
15	0	3.0	2.5	3.4	40	0	3.7	3.9	3.8
16	2	4.7	2.4	5.0	41	0	2.6	2.2	1.0

17	2	4.0	2.7	4.0	42	3	4.2	4.4	4.6
18	20	4.6	4.2	4.0	43	2	3.0	2.7	2.6
19	0	3.3	2.3	2.4	44	3	3.7	2.3	2.6
20	0	4.0	2.8	4.0	45	0	3.7	3.3	2.8
21	1	4.6	4.1	5.0	46	3	4.3	3.3	3.8
22	3	4.1	4.1	4.0	47	2	2.8	2.7	3.6
23	0	0.0	0.0	0.0	48	1	4.0	4.4	3.4
24	0	3.4	2.6	4.2	49	2	3.1	3.0	3.4
25	0	0.0	0.0	0.0	50	7	4.3	2.8	3.4

The Gross Output Approach

$$P = Y\left(1/i\right)\left\{1 - \frac{1}{(1+i)^t}\right\} \quad \ldots\ldots\ldots \quad \text{i}$$

per death output forgone due to RTA

$$P_N = Y\left(1/i\right)\left\{1 - \frac{1}{(1+i)^t}\right\} N \quad \ldots\ldots\ldots \quad \text{ii}$$

National output forgone due to death in RTA

$$P_{i/N} = Y\left(1/i\right)\left\{1 - \frac{1}{(1+i)^t}\right\} F \quad \ldots\ldots\ldots \quad \text{iii}$$

Output forgone per average fatality in RTA

Where Y = average (national) output per output

i = the social rate of discount

t = the number of working year lost per fatality or the average number of years of lost output defined as retirement age in public sector

N = number of deaths in road accident during a specific year

F = the average fatality rate in years defined in this paper as ratio of death per fatal accident within a specific year

Assumptions (empirical estimate)

The estimated cost of accidents are based on the following

1. The estimated cost are valued at 2013 price or value output
2. The national output per capital (Y) used is $ 2,710 – this represents the GNP per capital for 2013 (CBN, 2015). At N197 = US $1 (as at April 11, 2015), the Naira equals N 533,870.00
3. The total rate of discount used is 10%
4. The number of working years lost per road accident in this study 35 years – equivalent to average retirement age set by the Federal Republic of Nigeria for Nigerian civil servants.
5. This study values permanent disability or incapacitation resulting from fatal/serious accidents as equal to death. This implies that a death or permanent incapacitation weighs the same.

From the equation, the loss of one citizen to RTA based on the assumptions above is valued at $27,710.00 (N5,338,700.00). The table 9, table 10 and table 11 in result and discussion section shows the projection of death and its corresponding cost, the total cost and the total cost for 2011-2014/2015-2020 respectively

The Regression Model

The generalized regression model used in this study are for the following reason curled from Encyclopedia of statistical Sciences (1978):

i. To predict the responses from a given set of output
ii. To determine the effect of an input on the response
iii. To confirm, refute or suggest theoretical relations

The model is of the form

$$Y_t = \beta_0 + \beta_1 X_1$$

Or commonly of the form

$$Y_t = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 \ldots + \beta_t X_t + e_t$$

Based on the formula above the SPSS package was used to evaluate the data in tables 1 and 2 to have outputs discussed in section 7 below.

6. RESULT AND DISCUSSION

The projections of no. of accidents, no. of deaths, no. of fatal/serious accidents

The estimate of accident occurrence based on data in Table 1 is given by the equation 1 and graphically depicted in figure 1.

y = 11.073x – 21917 …….. 1

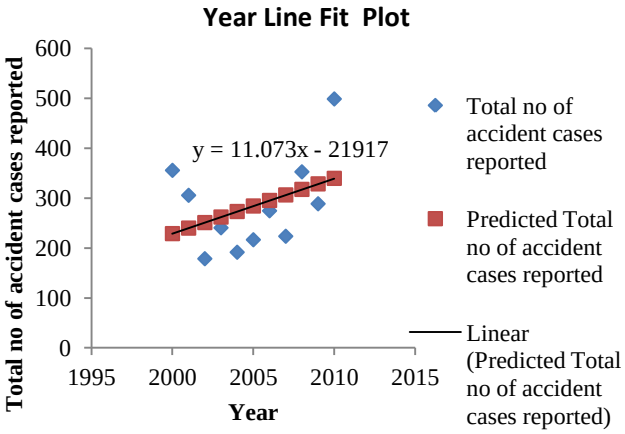

Figure 3: Graph of total number of accidents against year and the predicted or line fit plot

Further projection using equation 1, gives table 2.

Table 3: Projection of number of death using equation 1.

Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Predicted Death	351	362	373	384	395	406	417	428	439	450

From Table 1, the number of people killed in accident in relationship to the nature of accidents (fatal, serious, minor) and injuries is highly correlated (see table 4). This implies that over 90% of no of people killed results from these factors. Table 3 shows the trend (projected) of RTA from 2011 to 2020 i.e. if there is intervention to reduce RTA.

Table 4: Projection of number of fatal/serious accidents using equation 1.

Yrs	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
PFS	634	663	693	722	751	780	809	839	868	897

Table 5: Summary of correlation between people killed from fatal, serious, minor and injured in RTA

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.950[a]	.902	.510	18.88471	2.514

a. Predictors: (Constant), Injured, Minor, Serious, Fatal

b. Dependent Variable: Killed

The relationship between number of death and accident occurrence is given by the equation 2 below

Table 6: Projection of victim from Fatal/Serious accidents using equation 1.

Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Fatal/ Serious	634	663	693	722	751	780	809	839	868	897

The projection of number of victims of fatal/serious accident

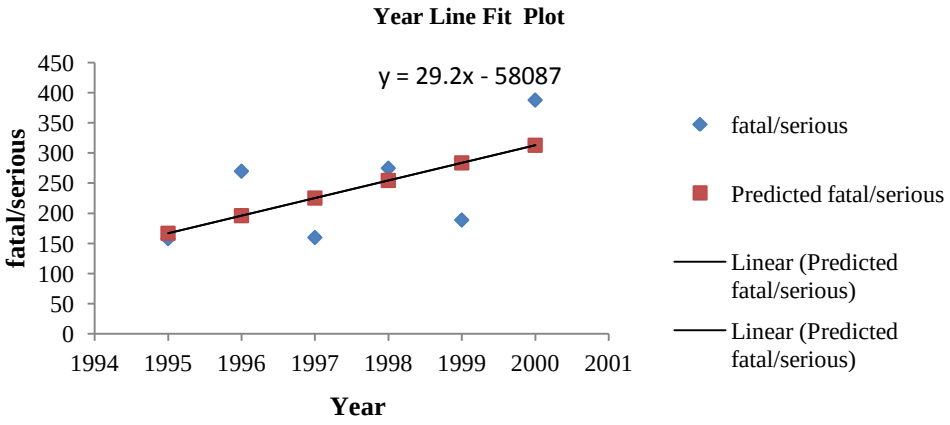

Figure 4: Fatal/serious and it predicted line fit for number of people affected.

The regression model for factors causing RTA

The relationship between accident death and the three causes (human, environment and mechanical factors) from table 2 is given by the following (regression) relationship:

$Y = 0.513x_1 + 0.618x_2 – 0.327x_3 – 0.447$

as obtained from table of coefficients (table 7)

Table 7: Summary of coefficients of number of people killed in relation to human, mechanical and environment factors in RTA

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.447	1.677		-.266	.791
	Human Factors	.513	1.073	.172	.478	.635
	Mechanical Factors	.618	.831	.204	.744	.460
	Environmental Factors	-.327	.921	-.114	-.356	.724

a. Dependent Variable: Deaths

Table 8: Summary of correlation between people killed that are associated with human, mechanical and environment factors in RTA

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.268[a]	.072	.011	3.41881

a. Predictors: (Constant), Environmental Factors, Mechanical Factors, Human Factors

b. Dependent Variable: Deaths

The low value of R^2 implies that there is little or no significant correlation between these three factors. In order word they all results to death accidents victims independent of each factor. **The economic cost**

Table 9: Projections of death and Fatal/serious accidents and their corresponding cost in US dollar and Naira calculated from equations ii and iii

Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Predicted Death	351	362	373	384	395	406	417	428	439	450
cost US $	9,512,100.00	9,810,200.00	10,108,300.00	10,406,400.00	10,704,500.00	11,002,600.00	11,300,700.00	11,598,800.00	11,896,900.00	12,195,000.00
cost NG N	1,873,883,700.00	1,932,609,400.00	1,991,335,100.00	2,050,060,800.00	2,108,786,500.00	2,167,512,200.00	2,226,237,900.00	2,284,963,600.00	2,343,689,300.00	2,402,415,000.00
Predicted Fatality/ Serious	634	663	693	722	751	780	809	839	868	897
cost US $	17,181,400.00	17,967,300.00	18,780,300.00	19,566,200.00	20,352,100.00	21,138,000.00	21,923,900.00	22,736,900.00	23,522,800.00	24,308,700.00
cost NG N	3,384,735,800.00	3,539,558,100.00	3,699,719,100.00	3,854,541,400.00	4,009,363,700.00	4,164,186,000.00	4,319,008,300.00	4,479,169,300.00	4,633,991,600.00	4,788,813,900.00

Table 10: Total cost for projected number of death and Fatal/serious accidents in US dollar and Naira derived from equations ii and iii.

Total Loss	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
cost US $	26,693,500.00	27,777,500.00	28,888,600.00	29,972,600.00	31,056,600.00	32,140,600.00	33,224,600.00	34,335,700.00	35,419,700.00	36,503,700.00
cost NG N	5,258,619,500.00	5,472,167,500.00	5,691,054,200.00	5,904,602,200.00	6,118,150,200.00	6,331,698,200.00	6,545,246,200.00	6,764,132,900.00	6,977,680,900.00	7,191,228,900.00

Table 11: Total cost for projected number of death and Fatal/serious accidents from 2011-2014 and 2015-2020 in US dollar and Naira derived from equations ii and iii.

Loss	2011-2014	2015-2020
cost US $	113,332,200.00	202,680,900.00
cost NG N	22,326,443,400.00	39,928,137,300.00

7. CONCLUSION AND RECOMMENDATIONS

Despite conceptual difficulties, the official accident evaluation policy of most western countries (e.g. Britain, USA) is currently based on human capital approach. This concluded [17], in these places the prevention of traffic accidents resulting from transport safety measures can be justified on the basis of the expected earning of individuals that would otherwise be lost to the society through death in an accident.

This paper has been able to outline a number of techniques in the analysis of accident data. It is worth noting here that, the researchers witnessed some data collection inadequacies, but, had to use the information contained in the data succinctly. The researchers were also aware that a model cannot be any better than the information that goes into it. Thus the work demonstrated that the rates of accidents were on the increase and human factors have the greater percentage, followed by mechanical and environmental factors respectively in terms of contribution to RTA.

Finally, it would be right to say that the economic cost incurred by the economy as a result of violent death or permanent incapacitation in RTA is colossal (about 22bn from 2011-2014) and if the trend continues (without intervention) over 36bn will be wasted from 2015-2020.

Over the past decades, there has been little effort in Nigeria to assess the costs of road crashes due to the lack of systematic road crash information and this has accounted for laxity or nonchalant attitude toward road safety issues. The authors of this study are of the opinion that if government is aware of the colossal amount lost due RTA, the may wake up to their responsibilities. This recommends actions from government, private organisations and road users especially those related to human conscience (for detail recommendation see [18]. RTA has complex connectivity and needs further research to fully comprehend it and Adamawa State Government must carry out annual extensive appraisal of cost implication on the economy, so that policy makers would stop treating road safety issues with levity, but instead advocate funding and regular monitoring.

8. REFERENCES

[1] Idama A. (1999). Operations Research Applications for Management Decisions – making, Paracelete Publishers, Yola, Nigeria.

[2] Nuhu A. (1995). "Accident reporting and investigation procedure in Nigeria" paper presentation at the 7th consultative assembly on road safety, Yola Nigeria.

[3] Yemi B. (1999). "Four hours interview in hell" Matso (Nig) enterprise, Lagos, Nigeria.

[4] Partheeban P., Arunbabu E. and R. H. Ranganathan (2008) Road accident cost prediction model using systems dynamics approach, Transport, 23:1, 59-66.

[5] Galtima (1999). Urban Traffic Flow Management as a strategy for environmental safety in Nigeria, Trainer: Journal of institute of transport technology (NITT), Zaria, Nigeria.

[6] Vanguard, (1996) Accident cases in Nigeria. Accident Mishap, Oct 12.

[7] Akogun O. B. and A Maigari (1997). "Public health perspectives of traffic accident in Adamawa state, Nigeria". Journal of applied science and management, Vol 1 pp48-50

[8] Lum H, Reagan JA. (1995) "Interactive Highway Safety Design Model: Accident Predictive Module". Public Roads, Federal Highway Administration, Washington, DC, winter; 59(2).

[9] Adogu, P.O, Ilika, A.L, Asuzu, A.L. (2009) Predictors of road traffic accident, road traffic injury and death among commercial motorcyclist in an urban area of Nigeria. Niger JMed, 2009; 18(4):393-397

[10] Global Traffic Safety Trust, India (1991) Strategy on reducing traffic injury, Global Traffic Safety Trust & Indian Institute of Tech, New Delhi, Feb. 1991

[11] Heal Nigeria blogspot. Http://healnigeria.blogspot.ca/2009/04/roadtraffic-accidents-in-nigeria.html

[12] Adamu S. O. and J. O. Iyaniwura (1981). A road traffic accident model in Onokomaye S. O. and N. F. (eds) Transportation in Nigerian National Development, NISER, Ibadan p422-431.

[13] Mala M. D. (1996). "socio-economic effect of road traffic accident: the role of the public" speech delivered on the occasion of 3rd end of year ECOWAS road safety campaign by FRSC Borno State command at Ramat Square Maiduguri 18th December, 1996

[14] Mohan, D. 2002. Social cost of road traffic crashes in India, in Proceedings First Safe Community Conference on Cost of Injury, Viborg, Denmark, 33–38.

[15] Jones-Lee, M. W. 1976. The value of life: an economic analysis. London: Martin Robertson and Co. Ltd., 41–65.

[16] Sanjay P. (2007). "An Estimation of Socio-economic costs of Road Traffic Accidents in Bangladesh." BSc thesis, Department of Civil Engineering, BUET

[17] Ogwude I. C. (1998). Valuation of reduction in traffic accident. Trainer: Journal of institute of transport technology (NITT), Zaria, Nigeria. Vol. 1 No. 5 pp22-27

[18] Habu, H. B (2001). Management of Road Traffic Accidents: a Case Study of Adamawa State. Unpublished B.Tech. Thesis, Federal University of Technology, Yola