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Road Traffic Accident in Ethiopia from 2007/08-2017/18 (Since Ethiopia Millennium)

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ABSTRACT

Traffic accident increased periodically in alarming rate and it was a serious problem throughout the globe particularly in developing countries like Ethiopia. This research concerns on Analyzing Road Traffic Accident in Ethiopia from 2007/08-2017/18. The main objective of the study was to investigate the growth rate of road traffic accident, road network coverage and motorized vehicle, and relationship between them in the past eleven (11) year. In order to address the required objective the study use secondary data collected from Ethiopia federal police commission, Ethiopia road authority and Ethiopia federal transport authority. Basically, descriptive and inferential statistical analysis approach was used to analyze the data. The finding of the study revealed that; in the past eleven year more than 291577 Road traffic accident, 912956km road network and 681000 motorized vehicles were developed. Due to Road traffic accident Ethiopia loses around 36.3 billion birr (estimated 1.3 billion $ in current exchange rate of 28 birr for 1$) in the past eleven (11) year in Ethiopia. In average annually Ethiopia loses around 0.9% of budget due to traffic accident in the past eleven year. Average annual growth rate of road traffic accident, road network development and motorized vehicle were 9.16%, 10.81% and 13.34% respectively. In Ethiopia in the past eleven (11) years more than 276491 road traffic accidents, 912956km road network and 681000 number of motorized vehicle were newly introduced since 2007/08 in the study period. The variation on road traffic accident, road network coverage in km and motorized vehicle between commencement of study period (2007/08) or Ethiopia millennium (2000E.C) with end of the study period (2017/18) were estimated around 25914, 82414 and 563003 respectively. Finally, the study intends that road traffic accident had no direct or indirect relation with growth of motorized vehicle and road network coverage in Ethiopia. To curb the problem faced due to road traffic accident the government and other stakeholder must careful the issues to minimize road traffic accidents in Ethiopia.

Keywords: *Accident Severity Values, Motorized Vehicle, Growth Rate, Road Network Coverage, Road Traffic Accident, Traffic Accident Cost.*

INTRODUCTION

Different researchers define road traffic accident accordingly. Sonowal state that accident is an event occurring suddenly, unexpectedly and inadvertently under unforeseen circumstances. It further expressed that road traffic accidents can be defined as “An accident that occurred on a way or street open to public traffic; resulted in one or more persons being killed or injured, and at least one moving vehicle was involved to (Sonowal 2009). Accident is defined as an error in driver-vehicle-roadway system and it must be recognized that different types of accidents are caused due to different at any given location namely, rear-end, side-swipes, head-on, night-time, bad-weather, etc. Bad weather accidents can results due to a road pavement which becomes dangerously slippery when wet or it may be due to inadequate signs for inclement weather (Kamal and et.al 2008).

Generally, road accidents are analyzed by means of precisely defining the event involving damage to the property and/or injury to the road users, which are recorded first-hand by the police and/or emergency services (Bhat and et. al 2013). Road transport was a critical mode of transportation in the development of a country particularly in Ethiopia, in which there were different impacts related to it. The effects were related to road traffic accidents that are considered to be a major critical problem all over the world. Road traffic accidents usually

occur as a result of factors associated with traffic system. Each year an estimated 1.25 million peoples were killed in road traffic accident and up to 50 million people injured worldwide. Third world countries bear the brunt of the fatalities from road traffic accidents, accounting for more than 85% of the world's road fatalities. Thus road traffic accident was the most dangerous health problem all over the world (Ethiopian Road Authority (ERA) 2005). About 85% of annual road-traffic related deaths. Road traffic injuries are expecting to take third place in the rank order of disease burden by the year 2020 (World Health Organization (WHO), Brochure for World Health Day 2004). Road traffic accident would be the world's third leading cause of premature death by 2020" (Peden M 2004).

Africa has one of the highest road traffic death rates in the world, with little difference in rates between those countries categorized as low-income. Whereas the range of fatalities per 100,000 populations in countries of African region is not very wide, 70% of all the deaths occurred in ten countries that account for 70% of the regional population: Democratic Republic of Congo, Ethiopia, Ghana, Kenya, Madagascar, Mozambique, Nigeria, South Africa, and Tanzania (World Health Organization & World Bank, 1999).While, this incident were more affecting countries in sub-Saharan Africa.

The disparity between rich and poor nations in road traffic accident induced fatality and injury rates was quite significant. According to the Commission for Global Road Safety, in addition to the infrastructural and behavioral deficiencies cited above, the disparity also comes from the fact that the developed world has built a network of cooperation on road safety to guide and inform national actions while the developing countries by contrast operate in isolation, with limited access to knowledge sharing and mutual support" (Commission for Global Road Safety 2005). Therefore, it is suggested that developing countries adopt similar strategy of cooperation and knowledge sharing in order to unlock large-scale funding for road safety from the development banks"(World Bank 2011)]. Unless action was taken to improve road safety systems, poor countries will continue to bear the heavy toll of road traffic accident."(Giles L 2011) In developed countries, the rate of road traffic accident was decreasing as compared to developing country. While, low and middle income countries account for 54% of world's registered vehicles, every year about 90% of road traffic deaths occur in these countries showing that the countries bear an asymmetrical number of deaths corresponding to their level of motorization. Particularly, road traffic crashes are the worst in low and middle income countries which was responsible for about 5% loss of GDP, more than double of development assistance that they receive. As far as the African Region is concerned, the continent has the highest road fatality rates of all the world's regions that were 26.6 per 100,000 populations relative to global rate of 17.5 per 100,000 populations. While the Region owns only 2% of the world's vehicles, it contributes 16% to the worldwide deaths. The region will continue to have the highest road traffic death rates due to high rate of urbanization and motorization but lagging road infrastructural development as well as poor road and vehicles' safety (World Health Organization (WHO), Time for action 2009). Reports of the World Health Organization indicated that the economic costs of road crashes and injuries were estimated to be 1% of Gross Domestic Product (GDP) in low-income countries. Similar report on the road traffic crashes cost of developing countries reaches between 1–2% of their gross domestic product (William Eckersley and et. al, 2010). Ethiopia was one of developing country with high traffic accident costing the country around 0.8% - 0.9% of the GDP for the past consecutive years (Ethiopian Federal Police Commission, 2008). To curb the problem, strong interventions and strategies were expected to deal with the challenges so as to reduce its impact by 50% at the end of 2020 (the United Nations Global Plan for the Decade of Action for Road Safety 2011-2020). The United Nation Economic Commission for Africa reported that 15,086 road traffic crashes occurred in Ethiopia in 2008 resulting in a mortality rate of 95 deaths per 10,000 vehicles, and causing losses of over 82 million Ethiopian Birr ($7.3 million USD) (United Nations (UN) 2009). Studies have shown that speedy driving accounted for 13–50% of Road traffic causes in Ethiopia, Ghana, and Kenya (Jeffrey S 2009). Risk factors such as poor vehicle maintenance (including tires, brakes, and lights), choked roads, and driving old vehicles were identified in Ethiopia, India, and Libya (Akloweg Y 2011). According to the WHO's 2009 global status report on road safety, the road crash fatality rate in Ethiopia was at least 114 deaths per 10,000 vehicles per year, compared to only 10 in the UK and Ireland and 60 across 39 sub-Saharan African countries

(World Health Organization (WHO), Time for action 2009). Besides, the number of people injured or killed in one crash in Ethiopia is about 30 times higher than that in the US. According to Eckersley and et.al, in Ethiopia, "81% of the total accident was attributed to driver error" (Eckersley 2010). This not only shows the lack respect the drivers have to traffic rules but also puts the competency of the drivers in question. Although common traffic laws like seat belt, speed limit, and drinking while driving are in the books, they are neither strongly enforced nor followed. Factors contributing to the high incidence of RTAs in Ethiopia include rampant reckless driving behaviors, poor road Network, substandard road conditions, failure to enforce traffic laws and poor conditions of vehicles (Persson A. 2008). According to a World Health Organization report in 2015, Ethiopia is one of the 50 countries with the deadliest roads in the world (The Economist 2015). Principally, injured people have occupied 30 to 70 percent of orthopedic beds in developing countries hospitals (World Health Organization (WHO), Time for action 2009). Road traffic accident related causalities are extremely high in Ethiopia. Male young adults and vulnerable road users are at increased risk of RTAs. There is urgent need for bringing road safety to the country's public health agenda. Pedestrian death in Ethiopia was common and high. Accordingly; about 74% of the fatal, serious and slight injury accidents happened when pedestrians tried to cross streets (Teferi Abagaz 2018). In this regard, considering the importance of road safety, the Ethiopian government has requested the WB and its GRSF to review the road safety management capacity of the country. This review was used for the development of national decade strategy for road safety (Minister of Transport, Febrary 2011). Despite all these efforts the challenges of road traffic accedent still increasing from time to time. In addition, studies made on the sector are not sufficient to address the challenges. This research is, therefore, prepared to investigate road traffic accident in Ethiopia in the past eleven (11) year from 2007/08-2017/18 Ethiopia fiscal year using both descriptive and emperial assessments.

Overview of Road Traffic Accident in Ethiopia from 2007/08-2017/18

Since Ethiopia millennium the number of road traffic accident in Ethiopia was in alarming state. In the past eleven years the number of road traffic accident were estimated around 291577. From that traffic accident 36796, 54731, 58987 and 141063 road traffic accident were fatality, serious injuries, light injuries and property damage respectively. The road network development and motorized vehicles also in increasable way in the past eleven year. Even if; the government construct road and other infrastructure the severity of traffic accident in the country still in distressing stage. In the past eleven year the Ethiopia government also construct around 912956km road network in the country to reduce road traffic accident in the country for having mobile and accessible road for the user. In case; growth of motorized vehicle was another issues that causes traffic accident in respect to road network coverage. Similarly, in the past eleven year around 5592358 motorized vehicles were introduced in the country. Data collected from Ethiopia federal police commission since Ethiopia millennium were reported in the past eleven year depict that in average around 9.16% growth of road traffic accident were registered in the country yearly. Similarly; the road network coverage and motorized vehicle were grow in average around 10.4% and 9.34% respective yearly. The figure depict that the growth rate on road traffic accident, road network coverage and motorized vehicles were in parallel rate. As a result; the study indicated the growth of road network had no viable and significant impact in reduction of road traffic accident in the country. This implies that in the past eleven year road traffic accident were inversely proportional with road network coverage. While, the road network coverage directly related to the development of motorized vehicle in Ethiopia. Incase; the government and other stakeholder must concern on the issues to investigate the probable causes of accident in Ethiopia that affects the life of society daily and to curb the problem for last.

Materials and Methods

Data Type, Source and Method of Collection

To analysis the fact behind road traffic accident in Ethiopia in the past eleven (11) year since Ethiopia Millennium (2007/08 G.C or 2000 E.C) the study uses quantitative data. Yearly road traffic accident, road network coverage and motorized vehicle data that were collected from the Ethiopian federal police commission, Ethiopia road authority and Ethiopia federal transport authority were used for the study as a secondary data. Overall, the data covers a period of eleven (11) years (2007/08 to 2017/18 Ethiopia fiscal year), implying that the research

used all the data collected since Ethiopia Millennium was hosted. The data collected for the study was arranged in the ways that helps for analyses and investigations. There were around 291577 road traffic accidents, 912956km road network coverage and 681000 motorized vehicles were registered in Ethiopia during the study period. In order to acquire reliable data; a road traffic accident form was designed and used in the study. In addition to this; the study also concern road network coverage and motorized vehicles development in Ethiopia in the past eleven study period In this particular study, the intention of the research was to investigate growth rate of road traffic accident, road network coverage and motorized vehicle, and relationship between them in the past eleven (11) year from 2007/08-2017/18. The impact of road network development and motorized vehicle on road traffic accident in Ethiopia was a concerning issues. Also; the study emphasize on analyzing the current situation (2017/18) with the beginning study period (2007/08) on road traffic accident, road network coverage and motorized vehicles in Ethiopia. In addition to that; the study also investigates the total cost of traffic accident in the past eleven year since 2007/08 Ethiopia fiscal year to 2017/18. It also; defines the weighted severity values of road traffic accident based on eleven (11) year cost of road traffic accident using Rate – Quality – Control method.

Variables Definition

Depending on the objective of the study and types of data collected from Ethiopia federal police commission the study identified independent and dependent variables. Independent variables identified for this study includes Road network coverage and Motorized vehicles. In line with the objective of the research, the dependent variable was Accident. This variable can be expressed categorically in terms of variables like Fatality, Series Injuries, Light Injuries, and Property Damage.

Method of Analysis

Both descriptive and inferential statistical analyses were used to investigate growth and relationship between of road traffic accident, road network coverage and motorized vehicles. Descriptive analysis was used to examine the relationships between variables. It is expressed in terms of tables, charts etc. to support the findings and give logical meanings for the output. On the other hand, inferential statistical analysis was used to examine the cause and effect relationship between variables. Road traffic accidents and their severity were further analyzed using accident cost and accident severity. Methods of analysis and findings of the study are clearly described as stated below.

Accident Cost

In order to identify the weighted value for accident severity in Ethiopia, it is important to define the cost of accident. However, there was no cost of accident developed for country. As a result, based on accident cost developed by Murad Mohammed (2011), incorporating changes like inflation, which is 10% per annum, average increase in wages or real changes in GDP for the past eleven (11) years(2007/08-2017/18), etc. are used to estimate cost of severity. Accident Cost (AC) describes the combined effect of number and severity of accidents. Thus, annual Average Accident Cost (ACa) was expressed in terms of Birr/year or $/year, which is calculated using the following formula. On the basis of the above analysis, the estimated accident cost for each year was presented in the table below. Accordingly, the highest accident cost was assigned for fatalities and the lowest accident cost was attached for property damage. For more information see the table1. Where: A - Number of accident MCA Mean cost per accident - Period of time under review

$$ACa(F+SI+LI+PD)=(A(F)*MCA(F)+A(SI)*MCA(SI)+A(LI)*MCA(LI)+A(PD)*MCA(PD))/t$$

Table1. *Accident cost in Ethiopia for the past eleven (11) year (million birr)*

Accident Cost (Million Birr)				
Ethiopia Fiscal Year	**Fatality**	**Serious Injuries**	**Light Injuries**	**Property Damage**
2007/08 G.C (2000E.C)	0.219	0.122	0.045	0.0138
2008/09 G.C (2001E.C)	0.243	0.135	0.050	0.0153
2009/10 G.C (2002E.C)	0.270	0.150	0.055	0.0170
2010/11 G.C (2003E.C)	0.297	0.165	0.061	0.0187
2011/12 G.C (2004E.C)	0.327	0.182	0.067	0.0206
2012/13 G.C (2005E.C)	0.359	0.200	0.073	0.0226
2013/14 G.C (2006E.C)	0.395	0.220	0.081	0.0249
2014/15 G.C (2007E.C)	0.435	0.242	0.089	0.0274

2015/16 G.C (2008E.C)	0.478	0.266	0.097	0.0301
2016/17 G.C (2009E.C)	0.526	0.292	0.107	0.0331
2017/18 G.C (2010E.C)	0.579	0.322	0.118	0.0364

Source: *My own Calculation*

These values are used for estimating the weighted value for accident severity and the annual average accident cost of Ethiopia road network. Accordingly, Ethiopia road traffic accident cost for death, serious injuries, light injuries and property damage in the past eleven year estimated below:-

Table2. *Accident Costing of Ethiopia from 2007/08-2017/18 in Million birr*

Ethiopia Fiscal Year	Road Traffic Accident				Yearly Cost of Road Traffic Accident (Million Birr)				Total Cost
	F	SI	LI	PD	CF	CSI	CLI	CPD	
2007/08 G.C (2000E.C)	1802	2156	2123	9005	394.097	261.954	94.580	123.999	874.63
2008/09 G.C (2001E.C)	2211	2276	2221	8987	537.273	307.260	109.940	137.501	1091.974
2009/10 G.C (2002E.C)	2600	3494	4275	7098	702.000	524.100	235.125	120.666	1581.891
2010/11 G.C (2003E.C)	2541	3545	4570	12130	754.677	584.925	276.485	226.831	1842.918
2011/12 G.C (2004E.C)	3132	4333	4932	8444	1023.224	786.440	328.225	173.693	2311.582
2012/13 G.C (2005E.C)	3362	5042	6316	9117	1208.202	1006.635	462.363	206.290	2883.49
2013/14 G.C (2006E.C)	3331	6039	5888	13181	1316.768	1326.255	474.134	328.071	3445.228
2014/15 G.C (2007E.C)	4352	5918	6508	15639	1892.414	1429.650	576.466	428.175	4326.705
2015/16 G.C (2008E.C)	3847	6886	7071	17977	1840.103	1829.845	688.969	541.405	4900.322
2016/17 G.C (2009E.C)	4500	7288	7308	19132	2367.691	2130.338	783.267	633.809	5915.105
2017/18 G.C (2010E.C)	5118	7754	7775	20353	2962.140	2493.208	916.652	741.684	7113.684
TOTAL	**36796**	**54731**	**58987**	**141063**	**14998.59**	**12680.61**	**4946.205**	**3662.124**	**36287.529**

Source: *My own Calculation*

Where; F–fatality, SI–serious injuries, LI– light injuries, PD–property damage, CF–cost of fatality, CSI–cost of serious injuries, CLI–cost of light injuries, CPD–cost of property damage. On the basis of the above result depicted in table 2, the total accident cost of Ethiopia for the past eleven (11) year were around 36.3 billion birr (estimated 1.3 billion $ in current exchange rate of 28 birr for 1$); where 15 billion birr for fatality, 12.7 billion birr for serious injuries, 5 billion birr for light injuries, and 3.7 billion birr for property damage. Accordingly, the annual average accident cost of Ethiopia in the past eleven (11) year was estimated around 3.3 billion birr or 92.4 million dollar (estimated with current exchange rate of Birr 28.00 for $1).

This implies that Ethiopia cost around 3.3 billion birr per year due to the occurrences of road traffic accident. As a result; the number of accident was weighted by the accident severity as follow:

Table3. *Weighted value for Accident Severity for Ethiopia*

Accident	Fatality (F)	Serious Injuries (SI)	Slight Injuries (LI)	Property Damage only (PD)
Accident cost (billion) birr)	15	12.7	5	3.7
Weighting Value	4	3.4	1.4	1

Source: *My own Calculation*

The estimation result of the above analysis was used for black spot analysis using accident severity method as stated by Kent and et al. The section below shows how accident severity was estimated using the same method. Black spot analysis was made for traffic accident using rate quality control method (Kent Sjölinder and et.al, December 2001). To prioritize those black spots in Ethiopia, the ratios of accident costs to degree of severity were estimated using accident cost developed for Ethiopia. As a result, approximately the weight value for fatal accident is 4, for serious injury is 3.4, for slight injury and property damage are 1.4 and 1 respectively in Ethiopia. To come up easy identification of black spot, this research recommend to use severity value for each road section number j is calculated using:

$$S\_J = 4F\_j+3.4〖SI〗\_j+ 1.4〖LI〗\_ (j) + 〖PD〗\_ (j)\ldots \quad (1)$$

SJ = Severity Value

Fj = Number of Fatality (Death)
LIj = Number of Light Injuries
SIj = Number of Serious Injuries
PDj = Number of Property Damage

Table4. *Budget lose due to road traffic accident in Ethiopia from 2007/07-2017/18*

Ethiopia Fiscal Year	Total Cost Road Traffic Accident in billion birr	Ethiopia Budget in billion birr	Lose of Budget due to Road Traffic Accident in percent (%)
2007/08 G.C (2000E.C)	0.9	43.95	2.0
2008/09 G.C (2001E.C)	1.1	53.9	1.7
2009/10 G.C (2002E.C)	1.6	64.5	1.4
2010/11 G.C (2003E.C)	1.8	77.2	1.2
2011/12 G.C (2004E.C)	2.3	117.8	0.8
2012/13 G.C (2005E.C)	2.9	137.8	0.7
2013/14 G.C (2006E.C)	3.4	159.5	0.6
2014/15 G.C (2007E.C)	4.3	178.6	0.5
2015/16 G.C (2008E.C)	4.9	223.3	0.4
2016/17 G.C (2009E.C)	5.9	274.3	0.3
2017/18 G.C (2010E.C)	7.1	320.4	0.3
TOTAL	36.3	1651.25	9.8
Average	3.3	150.11	0.9

Source: *Ministry of Finance and Economic Cooperation*

The table above depicts that budget of Ethiopia from 2007/08-2017/18 and economic lose due to road traffic accident. From the above table Ethiopia loses from yearly budget in a range of 0.3% - 2% in the past eleven year. Annually, in the past eleven year in average Ethiopia loses around 0.9 % of budget due to road traffic accident. For more information see table 3.

Result and Discussion

Road Traffic accident and Growth Rate in Ethiopia from 2007/08-2017/18

In the past consecutive eleven year in Ethiopia more than 291577 traffic accidents were registered. From those 36796, 54731, 58987, 141063 were fatality, serious injuries, light injuries and property damage respectively. The table below depict that the yearly road traffic accident and growth rate of road traffic accident in Ethiopia in the past eleven year since Ethiopia millennium from 2007/08 to 2017/18. For more information see the table 5. From the above table in average annually around 26507 road traffic accidents were registered in the past eleven year from 2007/08-2017/18. From those; in average yearly around 3345, 4976, and 5362 and 12824 road traffic accident were registered as fatality, serious injuries, light injuries and property damage respectively.

Similarly; yearly average growth rate were depicted as 9.16 percent in the study period. Concomitantly, in average yearly around 9.28%, 11.39%, 10.76% and 5% growth rate were registered as fatality, serious injuries, light injuries and property damage respectively in past eleven year in Ethiopia. The study also insist the variation on road traffic accident between commencement of study period (2007/08) or Ethiopia millennium (2000E.C) with end of the study period (2017/18) around 25914 road traffic accident were recorded.

Table5. *Number and growth rate of road traffic accident in Ethiopia from 2007/08-2017/18*

EFY	F	GR (%)	SI	GR (%)	LI	GR (%)	PD	GR (%)	Total	GR (%)
2007/08	1802	-	2156	-	2123	-	9005	-	15086	-
2008/09	2211	18.50	2276	5.27	2221	4.41	8987	-0.20	15695	3.88
2009/10	2600	14.96	3494	34.86	4275	48.05	7098	-26.61	17467	10.14
2010/11	2541	-2.32	3545	1.44	4570	6.46	12130	41.48	22786	23.34
2011/12	3132	18.87	4333	18.19	4932	7.34	8444	-43.65	20841	-9.33
2012/13	3362	6.84	5042	14.06	6316	21.91	9117	7.38	23837	12.57
2013/14	3331	-0.93	6039	16.51	5888	-7.27	13181	30.83	28439	16.18
2014/15	4352	23.46	5918	-2.04	6508	9.53	15639	15.72	32417	12.27
2015/16	3847	-13.13	6886	14.06	7071	7.96	17977	13.01	35781	9.40
2016/17	4500	14.51	7288	5.52	7308	3.24	19132	6.04	38228	6.40
2017/18	5118	12.08	7754	6.01	7775	6.01	20353	6.00	41000	6.76
Sum	36796	92.84	54731	113.87	58987	107.64	141063	49.99	291577	91.62

Average	3345	9.28	4976	11.39	5362	10.76	12824	5.00	26507	9.16

Source: *Ethiopia Federal Police Commission*

Where; EFY- Ethiopian fiscal year, F- Fatality, SI- Serious injuries, LI- Light injuries, PD- Property Damage and GR (%) Growth rate in percent respectively.

Road Network Coverage in Km and Growth Rate in Ethiopia from 2007/08-2017/18

In the past eleven year since Ethiopia millennium around 912956km road were constructed. That includes asphalt, gravel and rural road. In average around 10.81 percent were registered as yearly growth rate in road network development.

From the total road coverage around 122546 were asphalt road. This depict that from the total percentage in past eleven year in the road network in Ethiopia covered only 13.4 percent by asphalt road. In average around 10.4 Percent were registered as yearly growth rate in asphalt road development. The table below describes that yearly road network coverage and growth rate in percent in Ethiopia from 2007/08-2017/18 fiscal year. Similarly; in average annually around 82996km of road network were constructed in Ethiopia in the past eleven year including asphalt, gravel and rural (earth) road. Whereas; mean annual asphalt road coverage in Ethiopia were 11141km.The study also insist the variation on road network coverage between the opening of study period (2007/08) or Ethiopia millennium (2000E.C) with end of the study period (2017/18) around 82414km of road network including asphalt, gravel and rural road were constructed. While; around 9820km of asphalt road were registered correspondingly. For more information see table below:

Table6. *Road Network Coverage and Growth Rate in Ethiopia from 2007/08-2017/18*

Ethiopia Fiscal Year	Asphalt Road Coverage (km)	Growth Rate (%)	Total Road Coverage (km)	Growth Rate (%)
2007/08 G.C (2000E.C)	6066	11.3	44359	4.5
2008/09 G.C (2001E.C)	6938	14.4	46812	5.5
2009/10 G.C (2002E.C)	7476	7.8	48793	4.2
2010/11 G.C (2003E.C)	8295	11	53997	10.7
2011/12 G.C (2004E.C)	9875	19	63083	16.8
2012/13 G.C (2005E.C)	11301	14.4	85966	36.3
2013/14 G.C (2006E.C)	12640	11.8	99522	15.8
2014/15 G.C (2007E.C)	13551	7.2	110414	10.9
2015/16 G.C (2008E.C)	14632	8	113066	2.4
2016/17 G.C (2009E.C)	15886	8.6	120171	6.3
2017/18 G.C (2010E.C)	15886	-	126773	5.5
Sum	122546	113.5	912956	119
Average	11141	10.4	82996	10.81

Source: *Ethiopia Road Authority*

Motorized Vehicles and Growth Rate in Ethiopia from 2007/08-2017/18

According to Ethiopia Federal Transport Authority2017/18 fiscal year, motorized vehicle in Ethiopia were estimated around 831000. In the past eleven year in from 2007/08-2017/18 in Ethiopia around 681000motorized vehicle were newly introduced. It was surprising that only around 150,000 were functional before 2007/08 fiscal year in Ethiopia since motorized vehicle was introduced (Ethiopia Federal Transport Authority 2018). In average annually growth rate of 13.34 percent of motorized vehicle were familiarized. This percent depict that around 61909 motorized vehicle were registered average annually in the past eleven consecutive years from 2007/08-2017/18.

The study also insist the variation on motorized vehicle between beginning of study period (2007/08) or Ethiopia millennium (2000E.C) with end of the study period (2017/18) around 67.75 percent of motorized traffic growth that accounts nearby 563003 motorized vehicles were depicted. The table below gives detail information about motorized vehicles and growth rate in the past eleven year since Ethiopia millennium. For more information see table below.

Table7. *Number of Motorized Vehicle and Growth Rate from 2007/08-2017/18*

Ethiopia Fiscal Year	Cumulative Motorized Vehicle	Growth Rate (%)

2007/08 G.C (2000E.C)	268002	44.03
2008/09 G.C (2001E.C)	272418	1.62
2009/10 G.C (2002E.C)	276794	1.58
2010/11 G.C (2003E.C)	376000	26.38
2011/12 G.C (2004E.C)	478244	21.38
2012/13 G.C (2005E.C)	486000	1.60
2013/14 G.C (2006E.C)	551900	11.94
2014/15 G.C (2007E.C)	572000	3.51
2015/16 G.C (2008E.C)	700000	18.29
2016/17 G.C (2009E.C)	780000	10.26
2017/18 G.C (2010E.C)	831000	6.14
Sum	681000	146.73
Average	61909	13.34

Source: *Ethiopia Federal Transport Authority*

Correlation between Road Traffic Accident, Road Network Coverage and Motorized Vehicle in Ethiopia from 2007/08-2017/18

The chart below shows the relationship between study variable and their growth rate in the past eleven year (since from 2007/2008 Ethiopia fiscal year). Even if, road traffic accident, road network coverage and motorized vehicle growth rate relatively maximum in 2010/11, 2012/13 and 2010/11 were at a maximum level in respectively. While, minimum growth rate of for road traffic accident, road network coverage and motorized vehicle were registered 2011/12, 2015/16 and 2009/10 consecutively. From this finding, the study revealed that as the growth rate of motorized vehicle increase the road traffic accident proportionally in 2010/11 fiscal year. Similarly, road network coverage had no any relation with road traffic accident. In case, the study depict that based on the past eleven year data road traffic accident cannot depend on the growth of road network in Ethiopia. In generally; the study deepen that road traffic accident had no direct or indirect relation with growth of motorized vehicle and road network coverage in Ethiopia. As a result further investigation was needed to analysis the probable causes that affects the growth of road traffic accident. For more information see the chart 1.

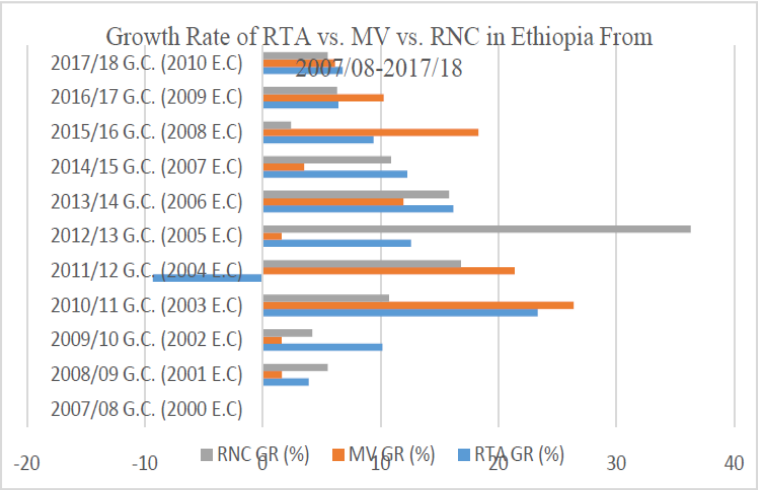

Chart 1. *Growth Rate of RTA vs. MV vs. RNC in Ethiopia from 2007/08-2017/18*

Whereas; RNC GR (%):- Road Network Converge Growth Rate in Percent, MV GR (%):- Motorized Road Traffic Accident Growth Rate in Percent vs.:- Verses

Conclusion

Road traffic crash was a probable cause of road traffic accident in world wide. Mostly; Ethiopia was an area where a large number of traffic accident were registered. The aim of the study was to investigate the growth rate of road traffic accident, road network coverage and motorized vehicle, and relationship between them in the past eleven (11) year from 2007/08-2017/18. Road traffic accident was probable causes for the loss of36796 life, 54731 serious injuries, 58987 light injuries and 141063 property damage in the past eleven (11) year.

Totally; around 291577 road traffic accidents were registered in Ethiopia in the past eleven year. In Ethiopia in the past eleven years more

than 276491 road traffic accidents, 912956km road network and 681000 number of motorized vehicle were newly introduced since 2007/08 in the study period. Due to Road traffic accident Ethiopia loses around 36.3 billion birr (estimated 1.3 billion $ in current exchange rate of 28 birr for 1$). From the total lost birr; where 15 billion birr for fatality, 12.7 billion birr for serious injuries, 5 billion birr for light injuries, and 3.7 billion birr for property damage in the past eleven (11) year in Ethiopia. In average annually Ethiopia loses around 0.9% of budget due to traffic accident in the past eleven year. The study also revealed that in the past eleven year the annual growth rate of road traffic accident, road network development and motorized vehicle were 9.16%, 10.81% and 13.34% respectively. The annual average growth rate prevailed that the growth rate between variable were corresponding. From the total road network development Asphalt road covers around 13.4% that accounts around 122546km. While; the remaining road network coverage were gravel and rural (earth) road. Growth rate of road traffic accident was direct relation with motorized vehicle in 2010/11 Ethiopia fiscal year. This implies that as road traffic accident increases in respect to motorized vehicle growth in this year except the remaining study period. Road network coverage and motorized vehicle had no as such significant impact for the occurrences of road traffic accident in Ethiopia. The variation on road traffic accident, road network coverage in km and motorized vehicle between commencement of study period (2007/08) or Ethiopia millennium (2000E.C) with end of the study period (2017/18) were estimated around 25914, 82414km and 563003 respectively. In general; road traffic accidents in Ethiopia were in alarming stage that grows yearly. The country loses huge economy due to road traffic accident year to year. Based on the annual growth rate road traffic accident, road network coverage and motorized vehicles during the study period road traffic accident were not direct or indirect relationship with road network coverage and motorized vehicle development in Ethiopia. As a result; the study revealed that road traffic accident grows from time to time due to other related factor except road network coverage and motorized vehicle development in Ethiopia in the past eleven year from 2007/08-2017/18.

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STATEMENT OF DECLARATION

I declare that the research entitled “Road traffic Accident in Ethiopia from 2007/08-2017/18” was my original work and it hasn’t been presented for the award of any other similar titles by other researchers.

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