TEMPORAL AND GEOGRAPHICAL ANALYSIS OF ROAD ACCIDENTS IN ALGERIA BETWEEN 2013 & 2014 AND THEIR CAUSES

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Abstract

A road accident involves significant losses for the state, the insurance companies and the victims. the continuous rise in the number of traffic accidents is an alarming phenomenon which has been the subject of several sociological but also statistical studies.

Given the increasing number of road accidents in Algeria, it is important to study and analyze the statistics of road deaths on our roads. This study will be spread over the years 2013 and 2014, knowing that it is the only years where the National Center for Prevention and Road Safety and the Ministry of Transport have summarized information on the national component.

Keywords : Road accident, geographical analysis, temporal analysis

1. INTRODUCTION

Road accidents remain an alarming phenomenon. The damaged vehicles cause enormous losses for the insurance companies because the premiums collected do not cover the compensations. Therefore, we have proposed in this article to highlight the various factors grouped in three categories related to: the user, the vehicle and of course the environment.

Most of the information collected comes from the Ministry of Transport; unfortunately, our chronology will not exceed the year 2014, which includes all necessary information related to traffic accidents that occurred on the Algerian territory.

The article is divided into two parts. The first is dedicated to the presentation of temporal and geographical statistics of road accidents in Algeria. While through the second we will seek to highlight the various factors affecting the rise in loss experience (Humans, Vehicle, and Environment)

2. TEMPORAL DISTRIBUTION AND DRAWERS OF ROAD ACCIDENTS.

Given the number of road accident in perpetual increase in Algeria, we felt it appropriate to dedicate this part for the exhibition of the statistics relating to road mortality register our roads. This study will span the years 2013 and 2014, knowing that this is the only ' or the CNPSR and the Ministry of transport made a synthesis of information on the national component.

In what follows, we will proceed to a geographical analysis of road accidents accompanied by a temporal comparison for the years ***2013 & 2014.***

2.1 Distribution Geographic Of the Traffic Accidents

The road accidents are a distribution quite variant and this according to the geographical area. The fact that each region has its own characteristics in terms of weather, geographical, but also in terms of mentalities of the inhabitants (drivers & pedestrians).

The following table shows the distribution in number of accidents injury in Algeria by area:

Table 1: Breakdown of the number of injuries by area

	Urban area	**Rural**	**Total**
2013	17 363	25 483	42 846
2014	17 383	22 718	40 101
Change (%)	0.12%	- 10.85%	-6.41%

Source : Annual report of the Department of transport

Table 2: Breakdown of the number of injuries by area (daily)

Year	**Urban area**	**Rural**	**Total**
2013	48	70	117
2014	48	62	110

Source: Annual report of the Department of transport

Through the previous figures shows that the number of injuries is quite big nonetheless that a slight decline was registered between the year **2013** and **2014**.

If our analysis is done by areas that have saved the number highest accident, then the rural area has the lion's share, which can already be explained by the difference in road infrastructure that characterize both areas.

The same thing is clear if you do an analysis of daily personal injury accidents, where the rural area saves **70** injuries daily in **2013**, against a slight decline in the order of **62** for 2014.

2.2 Distribution of the Traffic Accidents.

We proposed in this part to analyze the temporal effect and its impact on the variation in the number of accident personal injury.

Table 3: Global Distribution of injuries by quarter

Year	**Quarter 1**	**Quarter 2**	**Quarter 3**	**Quarter 4**	**Total**
2013	8 880	11 215	11 568	8 438	**40 101**
2014	8 733	11 583	12 746	9 784	**42 848**

Source: Annual report of the Department of transport

We see that the third quarter knows a significant cadence accident, which can be explained by the fact that during this period it is the summer season when our roads are undergoing a significant road flow (Residents and emigrants).

It was necessary to make an analysis geotemporelle of accidents through the following tables:

Table 4: Distribution of injuries in the urban area by quarter

Year	**Quarter 1**	**Quarter 2**	**Quarter 3**	**Quarter 4**	**Total**
2013	3 805	4 744	4 710	4 104	**17 363**
2014	4 189	5 136	4 354	3 704	**17 383**

Table 5: Distribution of injuries the rural area by quarter.

Year	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total
2013	4 928	6 839	8 036	5 680	**25 483**
2014	4 691	6 079	7 214	4 734	**22 718**

Source: Annual report of the Department of transport

The rural area recorded a high number of accidents compared to the urban, but also that the third quarter remains the most impressive accident (an increase of almost 2000 accidents nothing as compared to the previous quarter).

2. 3. Distribution of the Number of Accidents by Regions

According to the mapping of our country can opt for a share in four major areas, namely: **Center, South, West and East.**

The graph below illustrates the share of accidents by region; where we see that region it***is*** displayed the highest percentage compared to the other three regions of the country, with a rate of **39%** for the year **2014**

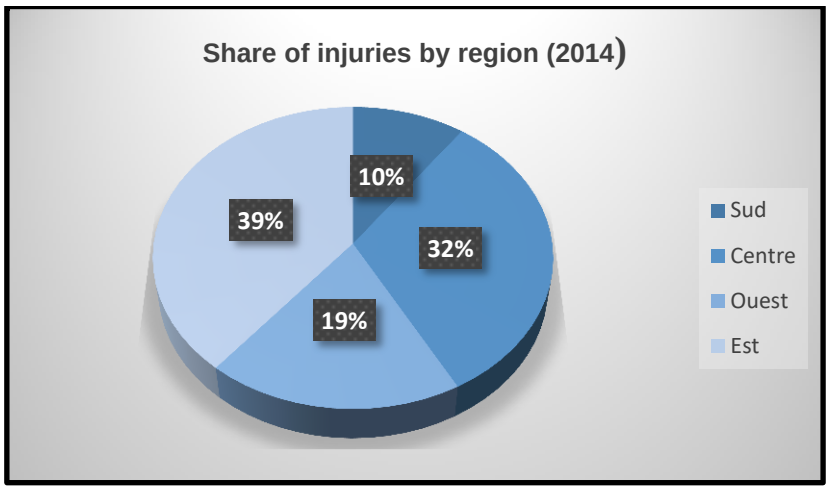

Fig1. Share of injuries by region (2014).

Based on statistics on the numbers of accidents between ***2013*** and ***2014***, by region, shown in the table below, we see that the ***Center*** region has posted an increase in the order of ***3.54%.***

Table 6: Distribution of the number of accidents between 2013 and 2014 by region

Regions	Number of accident in 2013	Number of accident in 2014	Rate of change
East	16 684	15 661	-6.13%
Center	12 496	12 938	+ 3.54%
West	9 596	7 756	-19.17%
South	4 070	3 746	-7.96%
Total	**42 846**	**40 101**	**-6.41%**

Source: Annual report of the Department of transport

2. 4. Statistics of Injured Personal Injury

In this part, we will look at injuries that caused injuries. As for the point above, we will do a comparative study of temporal geographical study.

The table - after divided the number of casualties for the two years (2013 & 2014) in areas (urban & rural areas).

Table 7: Distribution of the number of injured.

Year	Urban area	Rural area	Total
2013	20 462	49 120	69 582
2014	20 717	44 546	65 263
Variation	1.25%	-9.31%	-6.21%
Injured 2013 / day	56	135	191
Injured 2014 / day	57	122	179

Source: Annual report of the Department of transport

We see that even when wounded, the result is scary when the daily number is in the order of **191** injured (**179** injured for 2014).

Now if we go to a vertical analysis, we reach the same conclusion from the previous game; where the rural area shows a high rate of claims in terms of wounded also.

This is because the mountainous structure area on the one hand, but also of the meteorology of the region on the other.

After the calamitous figures of a daily road loss experience, we will in what follows try to analyze the factors influential the rise of the accidents.

3. FACTORS INFLUENTIAL THE RISE OF THE SINSITRALITE

We will move to another part where we will try to highlight the various causes of accidents.

The perpetual increase of the road pushes us to sound the alarm to work out the causes of this phenomenon, which has negative consequences on the demographics as well as on the country's economy.

3.1 Causes of the Road Accidents

The following figure, which bring out three factors related to the occurrence of accidents.

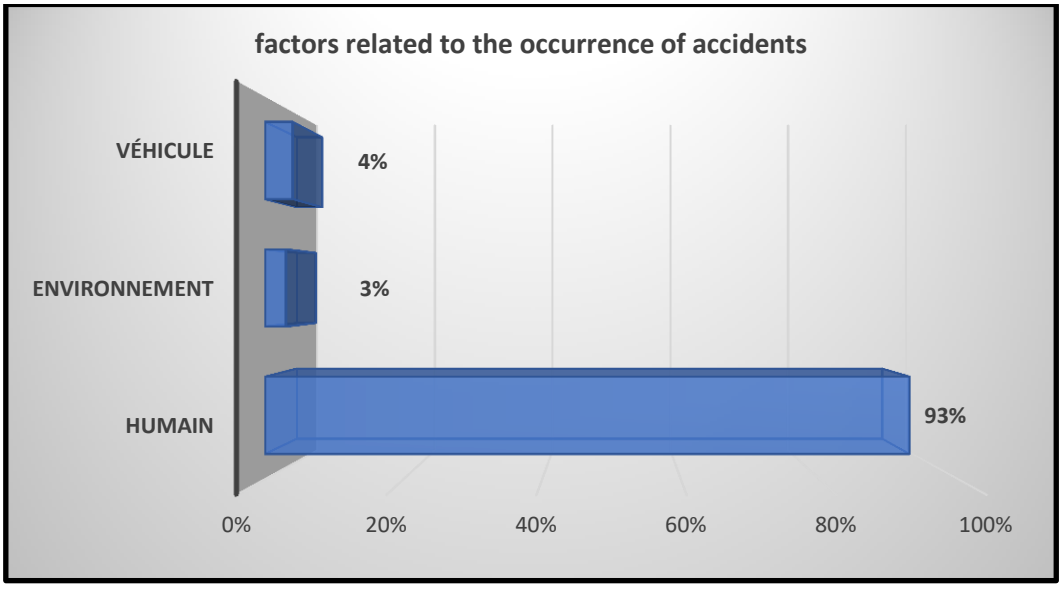

Fig2. Distribution of factors related to the occurrence of accidents.

Of after the graph; the main finding is that the human factor contributes to 93 percent of the road accidents; we talk about the psychology of the driver of the vehicle. The environmental factor is specific to the area of the accident, its road infrastructure, climate and region.

For the factor related to the vehicle, we analyze the characteristics like brand, Type and power.

3.2. Causes Related to the Human Factor

The human "Drivers" is the source of several traffic accidents that is what we will demonstrate in what follows.

3.2.1. Distribution of Accidents by Age Group

In what follows we will try to highlight the age group of responsible more of accident than others do.

The following table is dedicated to this analysis where the different age groups of drivers are affected the number of accidents caused.

Table 8: Distribution of accidents by age of drivers

Age group	**Number of accident**
-18 years	1 010
18-24 years	7 127
25 to 29 years	7 641
30 to 39 years	10 929
40-49 years	6 545
50-59 years	4 001
+ 59 years	2 260
Unknown	5 88
Total	**40 101**

Source: Annual report of the Department of transport

We see that the age groups involved in the occurrence of accidents extends from 18 to 40 years.

We can explain that by the fact that the young age group is reckless driving that does not respect the signs, the traffic code, but especially loves speed.

We must note that insurance companies take the age of the driver that may not be the insured himself into consideration during the subscription of the contract (increase of about 25% of the award-winning RC applied for less than 25 years).

3.2.2. Distribution of Accidents According to the Seniority of the Driver's License

One of the other variables to consider in our analysis is the age of the driving license (rather seniority of the latter).

We will present in the following table the number of accident related to the year 2014, distributed by age of driving license.

Table 9: Distribution of accidents according to the age of the driver's license

Age range of the permit	**Number of accident**
-2 years	12 978
2 to 5 years	10 114
From 5 to 10 years	8 309
+ 10 years	3 805
Unknown	8 85
Without a permit	4 010
Total	**40 101**

Source: Annual report of the Department of transport

The figures presented in the table gives us an idea on the permit age group which has caused the number of accidents the highest during the year 2014; where we can confirm the correctness of the regulatory markup applied insurance for drivers with permits of less than two years (32% of accidents in 2014 was caused by

novice drivers).

We conclude that the main causes related to the human factor are the young driver's age and his inexperience at the wheel.

Let us go now to the exhibition of the causes of traffic accidents, related to the vehicle.

3.3. Causes Related to the Factor of "Vehicle"

The vehicle object of insurance is not to exclude causes of road accidents, according to several elements.

3.3.1. Causes in Relation to the Vehicle Types

The roads are full of various types of vehicles ranging from light to heavy. In this part, we will expose the number of accident caused in 2014 compared to the type of vehicle

Table 10: Distribution of accidents according to the type of vehicle

Category of vehicle	Number of accident
Light vehicles	30 271
Trucks	3 754
Motorcycle	3 877
Transport for Traveler	1 490
Motorcycle	271
Agricultural machinery	236
Trains	78
Construction equipment	53
Unknown	71
Total	**40101**

Source: Annual report of the Department of transport

We deduct that is the significant dispersion of traffic accidents compared to the type of vehicle, where we notice that light vehicles have the lion's share with 76% of total accidents caused in 2014.

light vehicles are tops the list with close to 31 000 accidents recorded during the year 2014; This is in support of the differentiation that operate insurance pricing so that the variable " ***class* of vehicle** " is taken into consideration during the development of the award-winning **Public Liability.**

In what follows, we will try to classify injuries by origin of occurrence; first the dependent origins of the *behavior of users* of roads; After those related with the *sinister vehicle*, finally we'll talk of causes independent of the will of the insured that are related to the*' environment* in which the accident occurred.

3.3.2. Distribution Of The Accidents Over The Origin Of The Occurrence.

An accident can have several origins of occurrence, we will expose through the above - after.

3.3.3 Causes Related To The Road Users.

In what follows we will expose statistics related to road accidents caused by users and from the origin of the occurrence of the latter.

Table 11: Repair of the number of accident according to the origin of the occurrence (*human factor*)

Origin of the occurrence	Number of accident
Speeding	10 956
Dangerous overtaking	3 696
Inattention in built-up areas	2 382
No pedestrian crossings use	2 119
Failure to comply with the safety distance	2 026
Dangerous manoeuvres	1 962
Refusal of priority	1 705

Failure to comply with traffic signs	2 070
Carelessness of pedestrians	1 266
Left-hand traffic	1 230
Fish tail	1 177
Loss of control	1 168
Change of direction	1 056
Intoxicated	639
Unlicensed drivers	529
Refusal of priority	420
Traffic to against sense	416
Inattention to the exit of parking	761
Stop dangerous	296
Hit and run	211
Use the phone	102
Other	1 222
Total	37 409

3.3.4. Causes Related To Vehicles.

As explained previously, an accident has several origins, one of which is the vehicle itself, in this part will be a distribution on the vehicle, the table below provides us with the statistics in question.

Table 12: The number of accident according to the origin of the occurrence (*factor vehicle*)

Origin of the occurrence	Number of accident
Explosions of the wheels	693
Mechanical imbalance	293
Brake failure	260
Overload	72
Steering problem	65
Lack of fire	55
Illegal lighting	50
Other	36
Total	**1 524**

Source: Annual report of the Department of transport

One of the variables used by the insurance companies to calculate the Public Liability premium is the vehicle, in terms of fiscal power and use. The table above we indicates the various origins that may have caused the accidents for the year 2014. In addition, we notice that there are three main causes: a possible explosion of the tires (lack of vehicle maintenance, overload, State of the road), imbalance mechanics and a brake failure. That's insurance companies should be required during the subscription of the contract, the technical control of the vehicle but also a visit from expert to increase the Public Liability premium.

We have the presentation of the environment as a cause of occurrence of accident statistics. Environment means all space where a vehicle combined with a regional weather and a specific road infrastructure is moving.

3.4. CAUSES RELATED TO THE ENVIRONMENT

Finally, we will expose statistics related to the origins of accident related to the environment; shown in the following table:

Table 13: The number of accident according to the origin of the occurrence (*environmental factor*)

Origin of the occurrence	Number of accident
No road	439
Passage of animals	175
Weather	172
Slippery road	138
Lack of signage	81
Holes in the road	45
Road distortion	29
Unimproved road	28
Absence of lighting	24
Sun	15
Road barriers	02
Other	20
Total	**1 168**

Source: Annual report of the Department of transport

The last table that represents the causes related to the environment tells us that the State of the roads is the leading cause of accidents with **38%** of total accidents for the year **2014**, and despite the efforts of the State for the development of the road infrastructure of the country.

4. CONCLUSION

We proceeded to a description of the road accidents in Algeria between **2013** & **2014** in order to highlight the factors influencing this strong claim. We arrived at the existence of three major factors: the man, the vehicle and the environment. The man remains the main cause of road accidents.

The perpetual rise in the rate of traffic accidents is an alarming phenomenon. Several sociological but also statistical-economic studies that generate enough losses for the state but also for insurance companies covering drivers.

An accident is primarily a human loss but also an expensive consequence that the insurance companies bear when compensating for insured persons' claims

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