



# Multicriteria Study of the Violation of the Principle of Innocence in Traffic Accidents

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**Abstract.** In Ecuador, most traffic crimes are caused by drivers who do not have sufficient training on the rules that regulate transportation and road safety. Traffic crimes, also known as criminal offenses, are caused by actions of recklessness, incompetence, or non-compliance with legal norms. In traffic crimes, the principle of innocence is often violated due to the inadequate application of the constitutional principle of presumption of innocence. That is why the present work aims to determine the factors that violate the principle of innocence in traffic accidents and that violate the constitutional norm and propose potential strategies to mitigate its effect on society. For this, the AHPS and Vikor methods were used. It was obtained as a result that there is arbitrariness in jurisdictional actions and that constitutional precepts are violated, including the freedom of the individual. A reform project to the current regulations to change the misconception that justice operators have in constitutional law is proposed so that in this way they are not violated in judicial processes.

**Keywords:** traffic crimes, principle of innocence, freedom.

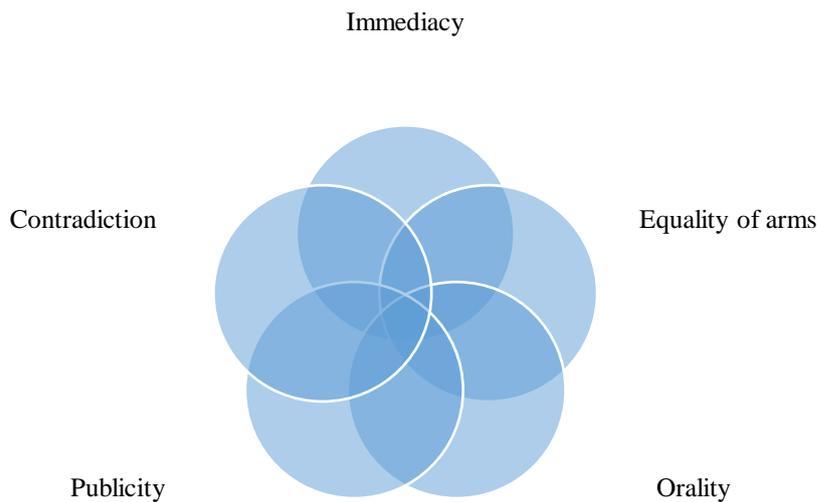
## 1 Introduction

In Ecuadorian society, most traffic crimes are caused by drivers who do not have sufficient training on the rules that regulate transportation and road safety. Drivers obtain driver's licenses without further requirements of experience and knowledge of basic driving rules. This happens not only in Ecuador. In many other countries, the failure rate of the driving test is very high, which leads to the occurrence of accidents on the road [1].

The nature of traffic crimes comes from guilt. They are caused by reckless, negligent, inexperienced actions, which cause unwanted damage, which is why the law punishes this type of action for not being careful when driving a vehicle [2]. The objective duty of care must be always maintained when driving a vehicle to avoid harming road users. Studies published by the WHO show that only 15% of countries have the full scope of legal regulations regarding speed limits, driving under the influence of alcohol, fastening of seat belts, the use of car seats child safety, and protective helmets [3].

Traffic crimes are caused by actions of recklessness or non-observance of legal norms, which leads to the violation of the objective duty of care. For some of these crimes when material damage has been caused to private property, only administrative sanctions are applicable, however, when damage to physical integrity and life is caused, they are sanctioned with imprisonment in addition to the administrative sanctions [4].

According to the Organic Integral Penal Code (COIP in Spanish), a crime is a criminal offense punishable by imprisonment for more than thirty days. On the other hand, Article 5, paragraph 4 guarantees that "every person maintains his legal status of innocence and must be treated as such until a sentence that determines the contrary is executed." Unfortunately, practice shows the opposite, since the defendant is treated as guilty from the very beginning of the process and the constitutional and regulatory principle of presumption of innocence is contravened [5].



**Figure 1:** Procedural guarantees. Source: own elaboration.

In terms of Law, the *presumption of innocence* supposes that every person to whom an act is imputed in a criminal proceeding retains his quality of innocence until proven guilty, which must be in a trial with all the guarantees established by law (Figure 1). The right to the presumption of innocence also supposes that the accused does not have the burden of proving his innocence from her, but that it is the prosecution who has the burden of proving the guilt of the person against whom the procedure is directed [6].

The right to the presumption of innocence can only be undermined when the judgment of guilt is based on evidence legally practiced. The purpose of the presumption of innocence is to establish whether the person who is the passive subject of the state action is responsible or not for the imputed infraction. From what has been discussed so far, traffic crimes are increasingly recurrent on the roads of the Republic of Ecuador. Therefore, the preparation of lawyers is required from their formation. That is why in this article this last idea is deepened.

The presumption of innocence is the right that all people must be considered a priori and that they act according to a right reason, behaving according to the values, principles, and rules of the legal system. They have this guarantee until the competent judge does not acquire the conviction, through the legal means of proof of their participation in the act, through a final sentence. Likewise, every one of the rules of due process must be respected, all of which require applying the precautionary measures provided for in criminal proceedings without affecting fundamental rights [7].

Due process “has frequently been interpreted as a limit to laws and legal procedures so that judges, not legislators, must define and guarantee the fundamental principles of impartiality, justice, and freedom[8]. It is a legal principle by which the State must respect all the legal rights that a person has under the law.”

The Constitution of the Republic recognizes and guarantees the principle of innocence in article 76.2: “The innocence of every person shall be presumed, and shall be treated as such, as long as their responsibility is not declared through a final resolution or judgment”.

Art. (...) Special cases of guilty traffic crimes. - Without prejudice to the penalty with which the infraction is sanctioned, the prosecutor may request preventive detention from the judge in flagrant traffic crimes only in the following cases:

1. To the driver who is under the influence of alcohol or narcotic or psychotropic substances, even in cases of material damage.
2. To the driver who does not have a driver's license, or it is canceled, suspended, or revoked, even in cases of material damage.
3. When only one vehicle participates in a traffic accident and results in the death or injury of one or more people or when the driver's responsibility is technically determined.

In all other cases, the prosecutor will ask the judge to order alternative measures such as the prohibition to leave the country, the obligation to appear periodically before the judge who knows the process or before the authority or institution that the judge designates, house arrest or use the electronic surveillance device.

The judge of criminal guarantees deems it necessary to guarantee the appearance of the defendant in the process

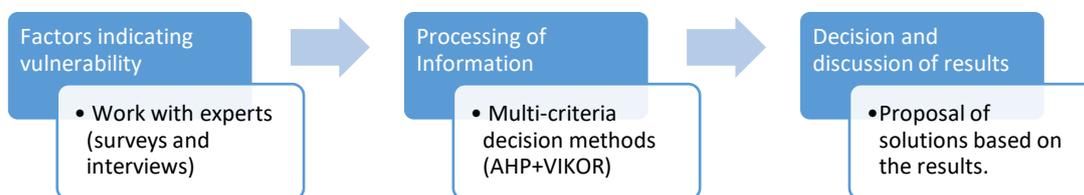
or to ensure compliance with the sentence, and may order preventive detention, provided that the following requirements are met:

1. Sufficient indications about the existence of a crime of public action;
2. Clear and precise indications that the accused is the author or accomplice of the crime;
3. That it is a crime punishable by imprisonment for more than one year;
4. Sufficient indications that it is necessary to deprive the defendant of his freedom to ensure his appearance at trial; and,
5. Sufficient indications that the non-custodial measures are insufficient to guarantee the presence of the defendant at the trial.

The presumption of innocence is an innate right of a person. The State recognizes this quality and that their condition of innocence can be distorted when there are mechanisms capable of establishing the responsibility and guilt of a citizen, to impose a sentence. However, the legal conception that preventive detention had in the previous criminal law has not changed at present, therefore, it has not evolved with the desired rigor over time. Thus, based on the analysis of the existing situation, this study intends to determine the factors that violate the principle of innocence in traffic accidents and that violate the constitutional norm to propose potential strategies to mitigate its effect on society.

- Risk factors that influence the presumption of innocence.
- Visualize the dimensions of violation in the right to freedom.
- Propose regulatory reforms of the laws that regulate this matter.

As illustrated in Figure 1, the processing of information will be as follows:



**Figure 2:** Diagram of the research processes. Source: own elaboration

## 2 Materials and methods

For the development of this research, empirical and theoretical methods will be used. the Analytic Hierarchy Process and VIKOR are used as empirical methods and methodologies are discussed later. Both methods are based on the criteria of experts exposed in the surveys and interviews to discern the factors of interest for the investigation. Which is based on the use of the following theoretical methods:

- Inductive: within the investigation, it is used above all to obtain particular conclusions regarding the investigation case.
- Deductive: based on scientific doctrine, it is used above all for the deduction and analysis of the situation from referential information. This together with the inductive allows generating the conclusions.
- Analytical-synthetic: it makes it possible to carry out a detailed analysis of the problem detected, especially the consequences that the violation of the principle of innocence entails.
- Descriptive: in the present investigation this method is used to describe the factors of interest for the investigation.
- Systemic: it serves to structure the analysis of the subject and the description of these aspects, through its decomposition into the elements that comprise it.

The Analytic Hierarchy Process (AHP Saaty) was proposed by Thomas Saaty in 1980 (see methodology in [9-11], which is summarized below:

1. Prioritization of the elements of the hierarchical model
2. Binary comparison of elements
3. Evaluation of elements by assigning weights
4. Ranking of the alternatives according to the given weights
5. Synthesis and sensitivity analysis

The VIKOR method was proposed by Serafin Opricovic in 1990 [12]. In this method, the obtained compromise

solution could be accepted by the decision-maker because it provides a maximum group utility (represented by the alternative with the min S) and a minimum individual regret (represented by the alternative with the min R). A summary of it is set out below [13,14, 15, 16, 17]:

1. Determine the weights of the criteria
2. Define the decision matrix
3. Obtain the compromise solution (or solutions) (calculation of  $f_i^*$ ,  $f_i^-$ , for criteria and values  $S_j$ ,  $R_j$ , and  $Q_j$  for each alternative)
4. Sort the alternatives. The alternatives are ordered, according to the values of  $S$ ,  $R$ , and  $Q$ .
5. Determine as a compromise solution the alternative  $A^{(1)}$  that is the best classified according to the value of  $Q$ , that is, with the minimum value of  $Q$ , if the following two conditions are satisfied:

- a. Condition 1: Acceptable Advantage

$$Q(A^{(2)}) - Q(A^{(1)}) \geq DQ,$$

Where  $A^{(2)}$  is the second alternative according to the ranking of the values of  $Q$ , and  $DQ = \frac{1}{N-1}$ , with  $N$  as the number of alternatives.

- b. Condition 2: Acceptable stability in the decision process

The alternative  $A^{(1)}$  must be the best ranked according to the list of values of  $S$  and/or  $R$ .

If one of the conditions is not satisfied, then a set of compromise solutions is proposed, which consists of:

- ✚ Alternatives  $A^{(1)}$  and  $A^{(2)}$  if condition 2 is not satisfied.
- ✚ Alternatives  $A^{(1)}, A^{(2)}, \dots, A^{(m)}$  and  $A^{(m)}$  if condition 1 is not satisfied; is determined by considering the relationship  $Q(A^{(2)}) - Q(A^{(1)}) \geq DQ$ . These alternatives are within the vicinity of the ideal solution

### 3 Results

To determine the factor that has the greatest incidence in the violation of the right to freedom, the modeling of the AHP Saaty method is carried out. Surveys were designed for the experts to determine the criteria on which to evaluate the excess of the power of the administrators of justice (alternatives). Next, the resulting table is presented with the weights after having carried out the pairwise comparison matrix of the AHP Saaty.

Criteria	a	b	c	d
Establish mechanisms that guarantee responsibility (a)	1	0.2	3.0	3.0
Correctly apply the principle of innocence (b)	5	1	5	7
Promote a true criminal transit system (c)	0.3	0.2	1	1
Defenselessness of the parties (d)	0.3	0.15	1	1
<b>Total</b>	<b>6.60</b>	<b>1.55</b>	<b>10.00</b>	<b>12.00</b>

**Table 1:** Matrix A of pairwise comparison of the criteria. Source: own elaboration.

Criteria	a	b	c	d	Weight
a	0.15	0.13	0.30	0.25	0.20764
b	0.76	0.65	0.50	0.58	0.62152
c	0.05	0.13	0.10	0.08	0.08946
d	0.05	0.10	0.10	0.08	0.08139

**Table 2:** Normalized matrix. Source: own elaboration

Criteria	W x Weight	Approx. eigenvalues
a	0.844477	4.067086447
b	2.676711	4.30673351
c	0.357440	3.995751946
d	0.326364	4.009855877

**Table 3:** Exercise consistency analysis. Source: own elaboration

Consistency analysis: Eigenvalue=4.2091764; CI=0.03, CR=0.04<0.10= Consistent.

Consistent to determine the key alternatives to enhance solutions and eliminate existing system failures, the following hierarchy must be followed: [18, 19, 20, 21, 22, 23]

b>a>c>d>, according to Saaty's AHP modeling.

The AHP Saaty modeling defines as a factor with the highest hierarchical level:

- *Correctly apply the principle of innocence*

To enhance the predominant dimension, the strategies with the best results must be evaluated, therefore, the experts determine 6 criteria to be evaluated in this dimension and determine the resulting weight. It is decided to repeat the AHP Saaty method to the following criteria:

Criteria to evaluate

- Reduce the procedural burden (C1),
- Sense of proportionality (C2),
- Training (C3),
- Obtain the correct preliminary report (C4)
- Compliance with due process (C5),
- Knowledge of traffic laws (6)
- Preparation of lawyers (7)
- proportionality principle (8)

Criteria	C1	C2	C3	C4	C5	C6	C7	C8	Weight
C1	0.07	0.18	0.15	0.04	0.06	0.14	0.12	0.13	0.11
C2	0.02	0.06	0.15	0.04	0.06	0.14	0.12	0.21	0.10
C3	0.02	0.02	0.05	0.04	0.06	0.14	0.12	0.04	0.06
C4	0.35	0.29	0.25	0.20	0.15	0.23	0.19	0.21	<b>0.24</b>
C5	0.49	0.41	0.36	0.60	0.44	0.23	0.27	0.29	<b>0.39</b>
C6	0.02	0.02	0.02	0.04	0.09	0.05	0.12	0.04	<b>0.05</b>
C7	0.02	0.02	0.02	0.04	0.06	0.02	0.04	0.02	<b>0.03</b>
C8	0.02	0.01	0.05	0.04	0.06	0.05	0.04	0.04	<b>0.04</b>

**Table 4:** Normalized matrix. Source: own elaboration

Criteria	Decision matrix by weights	Approximate eigenvalues
C1	1.05	9.532916435
C2	0.86	8.547793002

C3	0.51	8.221445498
C4	2.32	9.852565829
C5	3.73	9.628964804
C6	0.39	7.971787998
C7	0.28	9.549303069
C8	0.34	8.566059876

**Table 5:** Exercise consistency analysis. Source: own elaboration.

Consistency analysis: Eigenvalue= 8.98385; CI=0.14; CR=0.10=0.10. consistent

Consistent After obtaining the weight of each criterion, it is decided to evaluate the strategies with the best results against the violation of due process. For the modeling, it is decided to apply the VIKOR method to define the decision matrix and define the strategies with the greatest potential to ensure that the administration of justice makes an adequate application of the constitutional principles, in this case, the right to freedom. To process the information, a team (made up of an end user, an occasional user, and a technical advisor) analyzes the information obtained and models the method. [24, 25]

Code	Alternatives	Scope
A1	Research	<ul style="list-style-type: none"> <li>• Achieve a trial with sufficient evidence that cannot be easily distorted.</li> <li>• Get to the truth of the facts, through technical elements that manage to establish whether the defendant is to blame or not.</li> </ul>
A2	Reform regulations of the laws that define the presumption of innocence	<ul style="list-style-type: none"> <li>• Protect the rights of freedom,</li> <li>• Determine the methodological procedure for the application of the constitutional principle of presumption of innocence</li> <li>• Shape an effective reform that provides an improvement in the administration of justice</li> </ul>
A3	Transform objectivity on the part of the judges of the room	<ul style="list-style-type: none"> <li>• Carry out the scale of crimes according to their seriousness, for the application of the exceptional nature of preventive detention</li> </ul>
A4	Strengthen compliance with the legal norm	<ul style="list-style-type: none"> <li>• Review the excess of the power of justice administrators when dictating preventive detention.</li> </ul>
A5	Strengthen the legal system	<ul style="list-style-type: none"> <li>• Discriminate application of legal precepts.</li> <li>• Theoretically based on the application of the principle of presumption of innocence</li> <li>• Educational seminars for justice operators and officials of the Judiciary Council</li> </ul>

Code	Alternatives	Scope
A6	Reform the requirements for obtaining a driver's license	<ul style="list-style-type: none"> <li>• Guide and train drivers on the rules that regulate transportation and road safety.</li> <li>• Deepen the performance of tests for drivers.</li> </ul>

Table 6: Alternatives and scope. Source: own elaboration

Once the evaluation of each alternative for each criterion has been obtained (see Table 9) and the vector of weights of the AHP Saaty, the VIKOR method is applied to obtain the ranking of alternatives, and thus determine the compromise solution or solutions, which will be the most suitable alternatives.

For this, determine the  $f_i^*$ , and the worst  $f_i^-$ , values of the different alternatives for each criterion, so that through the VIKOR method it is established which solution is closest to the solution. In this sense, the values  $f_i^*$  and the worst  $f_i^-$ , are those values of each alternative that for each criterion would be closer and farther, respectively, from the ideal solution (Table 10). It includes the measures of utility  $S_j$  and regret  $R_j$  and the Index  $Q_j$  of each alternative (see Tables 11 and 12).

	C1	C2	C3	C4	C5	C6	C7	C8
Weight	<b>0.11</b>	<b>0.10</b>	<b>0.06</b>	<b>0.24</b>	<b>0.39</b>	<b>0.05</b>	<b>0.03</b>	<b>0.04</b>
fj	<b>Max</b>	<b>min</b>	<b>Max</b>	<b>Max</b>	<b>Max</b>	<b>Max</b>	<b>Max</b>	<b>Max</b>
A1	9	5	5	9	9	7	8	8
A2	9	1	7	9	9	3	9	9
A3	9	2	2	1	9	7	8	5
A4	9	2	7	2	9	7	8	8
A5	8	1	5	3	7	3	7	8
A6	8	8	7	3	7	3	8	9
Better $f_i^*$	<b>9</b>	<b>1</b>	<b>7</b>	<b>9</b>	<b>9</b>	<b>7</b>	<b>9</b>	<b>9</b>
Worse $f_i^-$	<b>8</b>	<b>8</b>	<b>2</b>	<b>1</b>	<b>7</b>	<b>3</b>	<b>7</b>	<b>5</b>

Table 7: Linear normalization of the decision matrix. Source: own elaboration

Alternatives	C1	C2	C3	C4	C5	C6	C7	C8	$S_j$	$R_j$
A1	0.00	0.06	0.02	0.00	0.00	0.00	0.01	0.01	<b>0.10</b>	<b>0.06</b>
A2	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	<b>0.05</b>	<b>0.05</b>
A3	0.00	0.01	0.06	0.24	0.00	0.00	0.01	0.00	<b>0.32</b>	<b>0.24</b>
A4	0.00	0.01	0.00	0.21	0.00	0.00	0.01	0.00	<b>0.23</b>	<b>0.21</b>
A5	0.11	0.00	0.02	0.18	0.39	0.05	0.03	0.00	<b>0.78</b>	<b>0.39</b>
A6	0.11	0.10	0.00	0.18	0.39	0.05	0.01	0.00	<b>0.84</b>	<b>0.39</b>

Table 8: Measure of utility and regret of each alternative. Source: own elaboration

For the classification of the alternatives, it is evaluated for  $av \sim 0.5$  (vote by consensus)

Alternatives	$S_j$	$R_j$	$v$	$Q_j$	Hierarchy
A1	0.10	0.06	0.5	0.05	2
A2	0.05	0.05		0.00	1
A3	0.32	0.24		0.45	4
A4	0.23	0.21		0.35	3

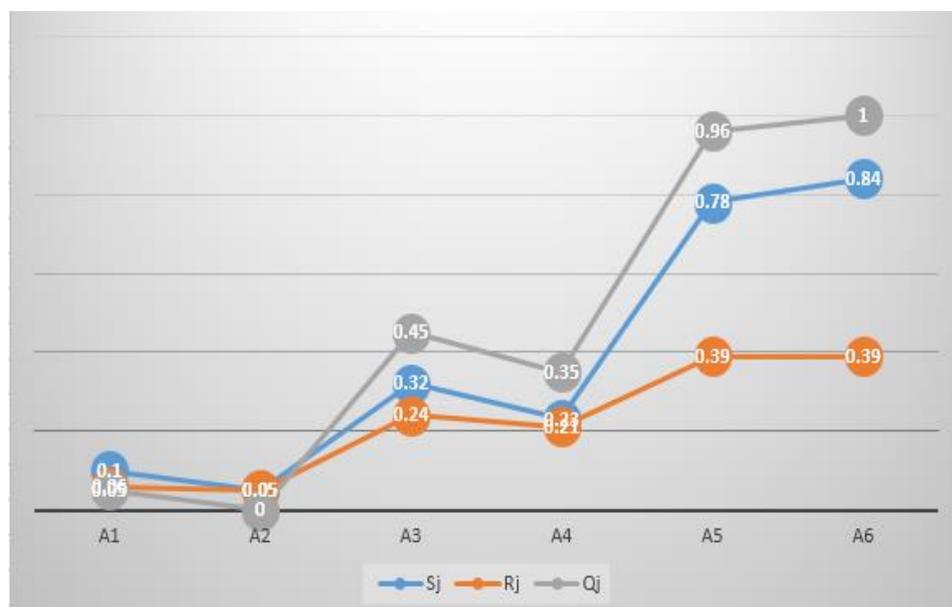
<b>A5</b>	0.78	0.39	0.96	5
<b>A6</b>	0.84	0.39	1.00	6

**Table 9:** Index of each alternative. Source: own elaboration

Alternatives	Q(a'')	Hierarchy	Q(a')	N	Q(a'') - Q(a')	DQ	Q(a'') - Q(a') ≥ DQ
A1	0.05	2	0.00	6	0.05	0.2	fails
A2	0.00	1	0.00		0.00		fails
A3	0.45	4			0.45		passes
A4	0.35	3			0.35		passes
A5	0.96	5			0.96		passes
A6	1.00	6			1.00		passes

**Table 10:** Acceptable lead condition. Source: own elaboration.

The condition of acceptable advantage in alternative A2 is met. It is decided to apply the condition of acceptable stability in the decision process (see Figure 3).



**Figure 3:** Graphic representation of the analysis of  $S_j, R_j$  and  $Q_j$ . Source: own elaboration

The graph shows a minimum of the values  $S_j, R_j$  and  $Q_j$ , in the case of alternative (A2) meets the condition of being best classified in  $Q_j$  and it is also best classified by  $R_j$  and  $S_j$  with a value of 0.05. It is defined as the best alternative to guarantee due process and to reform the regulations of laws that regulate the presumption of innocence. A2 meets the criteria:

- Institutionalize a true criminal traffic system,
- Train justice officials and administrators on traffic regulations,
- Theoretically based the application of the principle of presumption of innocence in traffic accident crimes.
- Propose a regulatory reform of this figure to adapt it to the constitutional postulates and avoid the violation of civil rights.

**Conclusion**

There is indeed a violation of the presumption of innocence and the right to freedom of those involved in traffic accidents. It has been shown that the administrators of justice do not make differences or distinctions in the norms for their application for this concept. In this sense, the administrators of justice in traffic matters, despite being guarantors of the rights of Ecuadorian citizens, indiscriminately apply the provisions of article 167 of the Code of

Criminal Procedure and the provisions of article 534 of the Organic Integral Penal Code.

Judges must define and guarantee the fundamental principles of impartiality, justice, and freedom since *due process* is a constitutional guarantee directly related to the country's peaceful coexistence and legal security. Guaranteeing a correct administration of justice, in addition to real validity and respect for human rights, is the mechanism for applying the principles and guarantees of constitutional, criminal, and procedural law.

Propose a reform project to the Organic Law of Land Transport, Traffic and Road Safety, and other regulations on the matter, which allow protecting the rights of freedom, the principle of proportionality, and the principle of legality. In addition to reviewing the regulations that apply in this class of hearings and correcting this and other shortcomings that are detected not to allow violations of rights granted by the supreme norm in force.

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