



Neutrosophic Analysis of Equity in the Justice System

Bolívar David Narváez Montenegro¹, Oscar Fabian Silva Montoya², Julián Rodolfo Santillan Andrade³, and Christian Fernando Tantaleán Odar⁴

¹Universidad Regional Autónoma de Los Andes, Ambato, Ecuador. E-mail: ua.bolivarnarvaez@uniandes.edu.ec

²Universidad Regional Autónoma de Los Andes, Puyo, Ecuador. E-mail: up.oscarsilva@uniandes.edu.ec

³Universidad Regional Autónoma de Los Andes, Santo Domingo, Ecuador. E-mail: us.juliansantillan@uniandes.edu.ec

⁴Universidad Nacional Mayor de San Marcos, Perú. E-mail: christian.tantalean@unmsm.edu

Abstract. Equity in the justice system is a fundamental principle of law that seeks to ensure fair and impartial treatment for all individuals, regardless of their characteristics. The Ecuadorian justice system faces challenges regarding its equity and efficiency, including concerns about access to justice, impartiality in decision-making, corruption, and the lack of independence in the judicial system. Neutrosophy, as a philosophical theory that promotes neutrality and impartiality, is useful in the analysis of equity in the justice system. It helps identify systematic inequalities and discrimination in the justice system, which is essential for finding fair and equitable solutions. Evaluating equity in the Ecuadorian justice system involves considering multiple aspects and factors. Six study alternatives were identified and the most significant elements for the analysis of equity in the Ecuadorian justice system were analyzed using neutrosophic techniques. This contributes to improving equity in the justice system and ensuring fair and equitable treatment for all Ecuadorian citizens.

Keywords: Equity, Law, justice system, neutrosophy, philosophical theory.

1. Introduction

Equity in the justice system is a fundamental principle of law. It involves treating all people fairly and impartially, regardless of their ethnicity, gender, religion, sexual orientation, socioeconomic status, or other personal characteristics [1]. Equity seeks to ensure that all individuals have equal opportunity and access to a fair legal process. Some fundamental aspects of equity in the justice system are listed below:

1. Equality before the law: All individuals, regardless of their social status or personal characteristics, must be treated equally under the law. This means that laws and legal procedures apply uniformly to everyone.
2. Equal access to justice: Equity implies that all people have equal access to legal resources and legal representation. This ensures that people are not excluded from justice due to economic or social limitations.
3. Protection of human rights: Fairness in the justice system involves the protection of the fundamental human rights of all people, including the right to a fair trial, the right to a defense attorney, and the right to an impartial legal process.
4. Elimination of prejudice and discrimination: To achieve equity, it is essential to eliminate prejudice and discrimination at all stages of the legal process, from police investigation to trial and sentencing.
5. Education and awareness: Promoting education and awareness about equity in the justice system is essential to ensure that both legal professionals and the general public understand the importance of treating everyone fairly and equitably.
6. Legal and policy reforms: Legal and policy reforms need to be implemented to promote equity in the justice system, such as reviewing laws and practices that may have a disproportionate impact on marginalized communities.
7. Supervision and accountability: Supervision and accountability are essential to ensure that the justice system meets fairness standards. This involves reviewing cases, investigating allegations of misconduct, and sanctioning those who violate principles of fairness.

Equity in the justice system is a fundamental goal for society. It ensures that all individuals have the opportunity to seek justice in a fair and equitable manner, regardless of their background or personal circumstances. Achieving

this goal is a constant challenge that requires the commitment of legal institutions, legal professionals, and society as a whole. [2]

The Ecuadorian justice system faces challenges and concerns regarding its equity and efficiency. Over the years, there have been issues related to access to justice, impartiality in decision-making, and the protection of human rights. One of the fundamental concerns is equal access because disparities in access to legal representation and judicial resources often exist, which can disadvantage individuals with low incomes and marginalized communities. Additionally, problems of corruption and a lack of independence in the judicial system have been pointed out, raising questions about impartiality in decision-making. The need to improve transparency and accountability in the justice system is also evident [3].

In the Ecuadorian context, it is important to highlight specific challenges related to ethnic and racial equity. Indigenous and Afro-Ecuadorian populations often face obstacles in the justice system and can be victims of discrimination. Ensuring genuine equity in the justice system requires addressing these inequalities and ensuring that all individuals, regardless of their ethnic background, are treated fairly and with respect for their cultural rights.[4]

The prison system in Ecuador is also under scrutiny. Prison overcrowding and detention conditions are concerning. The rehabilitation of inmates often faces challenges as well. Implementing effective rehabilitation policies and reducing recidivism are fundamental issues for improving equity in the justice system.

In recent years, the Ecuadorian government has taken some measures to promote equity in the justice system. For example, a public defender system has been established to provide free legal assistance to people who cannot afford a lawyer. Programs have also been implemented to increase the participation of women and minorities in the judicial system.

While efforts have been made in Ecuador to address these challenges and improve equity in the justice system, there are still areas that require ongoing attention and reforms. It is essential to maintain an open and collaborative dialogue among authorities, civil society, and affected communities. They will be responsible for addressing these issues effectively and achieving a more equitable and accessible justice system for all Ecuadorians.

To achieve equity in the justice system in Ecuador, a concerted effort is needed from all stakeholders, including the government, civil society, and the private sector. To promote equity in the Ecuadorian justice system, some actions as described below would be necessary.

- Strengthen the public defender system: The public defender system should be strengthened to provide free and quality legal assistance to people who cannot afford a lawyer. This can be achieved by increasing the budget of the system and providing training to public defenders.
- Promote the participation of women and minorities in the judicial system: The government should promote the participation of women and minorities in the judicial system through recruitment and training programs. This will help ensure that the judicial system reflects the diversity of Ecuadorian society.
- Implement procedural reforms: Procedural reforms should be implemented to streamline the judicial system and reduce corruption. This can be done, for example, by automating processes and establishing internal control mechanisms.
- Promote human rights education: It is necessary to promote human rights education so that people are aware of their rights and how to defend them. This can be achieved through educational programs in schools and within the community.

Equity in the justice system is a fundamental human right. By promoting equity in the justice system in Ecuador, a fair and equitable society for everyone is potentiated.

Neutrosophy is a philosophical theory that focuses on the idea of neutrality and the search for an impartial perspective. In the context of evaluating equity in the justice system, neutrosophy could be used as an approach to examine this concept from a neutral and unbiased standpoint. This is crucial because biases can distort the perception of equity and lead to inaccurate conclusions.

Neutrosophy encourages analysts to adopt a neutral perspective and examine facts and data impartially. This helps in assessing whether the principles of equity are being applied in the justice system fairly. It promotes objectivity in analysis, which involves relying on concrete data and evidence rather than subjective opinions. In the context of justice, this is essential for evaluating whether the rights of all individuals are being respected equitably.

It can help identify systematic inequalities and discrimination in the justice system, as it focuses on an impartial assessment of data and policies. Once issues related to equity in the justice system have been identified, neutrosophy can guide the search for solutions that are fair and equitable for all parties involved.

It advocates for an ongoing and continuous review of policies and practices to ensure that equity in the justice system is maintained over time. By adopting a neutral and impartial approach, neutrosophy promotes transparency in the analysis of equity in the justice system. This can help make the analysis process more reliable and credible. In summary, neutrosophy can be useful in analyzing equity in the justice system by providing a framework that

encourages neutrality, impartiality, and objectivity. These are essential elements for understanding, evaluating, and improving equity in the justice system, which in turn contributes to a fair and equitable system for all citizens.

The present research aims to assess the equity of judicial decisions and the functioning of the justice system in Ecuador. The study will be conducted using neutrosophic correlation coefficients.

2 Preliminaries

Definition 1. Consider a set X , comprising various points (objects), with a typical element labeled as x . A neutrosophic set A within X is defined by three core functions [5], [6]: the truth-membership function, $T_A(x)$, the indeterminacy-membership function, $I_A(x)$, and the falsity-membership function, $F_A(x)$. These functions, $T_A(x)$, $I_A(x)$, and $F_A(x)$, represent real, standard, or nonstandard subsets of the range between -0 and 1 (exclusive). In mathematical terms, $T_A(x): X \rightarrow]-0, 1+[$, $I_A(x): X \rightarrow]-0, 1+[$, and $F_A(x): X \rightarrow]-0, 1+[$. Importantly, there are no restrictions on the sum of $T_A(x)$, $I_A(x)$, and $F_A(x)$, allowing $-0 \leq \sup T_A(x) + \sup I_A(x) + \sup F_A(x) \leq 3+$.

The practical application of neutrosophic sets to real-world problems is inherently challenging. Hence, an innovative concept, known as a Single Valued Neutrosophic Set (SVNS), was introduced to facilitate its use in scientific and engineering contexts. It will now delve into the definition of an SVNS [7], [8-13-14-15].

Definition 2. Within a set X , consisting of various points (objects), denoted as x , an SVNS A is characterized by a truth-membership function, $T_A(x)$, an indeterminacy-membership function, $I_A(x)$, and a falsity-membership function, $F_A(x)$, for each point x in X . These functions, $T_A(x)$, $I_A(x)$, and $F_A(x)$, are bounded within the range of $[0, 1]$. Therefore, an SVNS A can be represented as follows [9-16-17]:

$$A = \{x, T_A(x), I_A(x), F_A(x) \mid x \in X\}$$

Then, the sum of $T_A(x)$, $I_A(x)$, and $F_A(x)$ satisfies the condition $0 \leq T_A(x) + I_A(x) + F_A(x) \leq 3$.

Definition 3. The complement of an SVNS A is denoted by A_c and is defined as

$$A_c = \{x, F_A(x), 1 - I_A(x), T_A(x) \mid x \in X\}$$

Definition 4. A SVNS A is contained in the other SVNS B , $A \subseteq B$ if and only if $T_A(x) \leq T_B(x)$, $I_A(x) \geq I_B(x)$, and $F_A(x) \geq F_B(x)$ for every x in X .

Definition 5. Two SVNSs A and B are equal, written as $A = B$, if and only if $A \subseteq B$ and $B \subseteq A$

2.1 Correlation coefficient of SVNSs

Definition 6. For any two SVNSs A and B in the universe of discourse $X = \{x_1, x_2, \dots, x_n\}$, the correlation coefficient between two SVNSs A and B is defined as follows [10]:

$$M(A, B) = \frac{1}{3n} \sum_{i=1}^n [\phi_i(1 - \Delta T_i) + \varphi_i(1 - \Delta I_i) + \psi_i(1 - \Delta F_i)] \quad (1)$$

Where

$$\phi_i = \frac{3 - \Delta T_i - \Delta T_{max}}{3 - \Delta T_{min} - \Delta T_{max}},$$

$$\varphi_i = \frac{3 - \Delta I_i - \Delta I_{max}}{3 - \Delta I_{min} - \Delta I_{max}},$$

$$\psi_i = \frac{3 - \Delta F_i - \Delta F_{max}}{3 - \Delta F_{min} - \Delta F_{max}},$$

$$\Delta T_i = |T_A(x_i) - T_B(x_i)|,$$

$$\Delta I_i = |I_A(x_i) - I_B(x_i)|,$$

$$\Delta F_i = |F_A(x_i) - F_B(x_i)|,$$

$$\Delta T_{min} = \min_i |T_A(x_i) - T_B(x_i)|,$$

$$\Delta I_{min} = \min_i |I_A(x_i) - I_B(x_i)|,$$

$$\Delta F_{min} = \min_i |F_A(x_i) - F_B(x_i)|,$$

$$\Delta T_{max} = \max_i |T_A(x_i) - T_B(x_i)|,$$

$$\Delta I_{max} = \max_i |I_A(x_i) - I_B(x_i)|,$$

$$\Delta F_{max} = \max_i |F_A(x_i) - F_B(x_i)|,$$

for all $x_i \in X$ and $i = 1, 2, \dots, n$

Definition 7. In the context of weights for individual elements x_i (where $i = 1, 2, \dots, n$) with values in the interval $[0, 1]$, and the sum of all the values w_i from $i = 1$ to n is equal to 1, the weighted correlation coefficient between SVN S s A and B is obtained as follows:

$$M_w(A, B) = \frac{1}{3} \sum_{i=1}^n w_i [\phi_i(1 - \Delta T_i) + \varphi_i(1 - \Delta I_i) + \psi_i(1 - \Delta F_i)] \quad (2)$$

2.1.1 Decision-making method using the correlation coefficient of SVN S s.

For each element x_i ($i = 1, 2, \dots, n$), a weight w_i is assigned, which varies in the interval $[0, 1]$, and the sum of all the weights $\sum_{i=1}^n w_i$ is equal to 1. Consequently, the weighted correlation coefficient between the standard normal random variables A and B is obtained:

$A_i = \{C_j, T_{A_i}(C_j), I_{A_i}(C_j), F_{A_i}(C_j) | C_j \in C, j = 1, 2, \dots, n\}$
where $T_{A_i}(C_j), I_{A_i}(C_j), F_{A_i}(C_j) \in [0, 1]$ and $0 \leq T_{A_i}(C_j) + I_{A_i}(C_j) + F_{A_i}(C_j) \leq 3$ for $C_j \in C, j = 1, 2, \dots, n$, and $i = 1, 2, \dots, m$.

For the sake of convenience, the values of the three functions $T_{A_i}(C_j), I_{A_i}(C_j)$, and $F_{A_i}(C_j)$ are represented using a single-valued neutrosophic values (SVNV) $d_{ij} = \langle t_{ij}, i_{ij}, f_{ij} \rangle$ ($i = 1, 2, \dots, m; j = 1, 2, \dots, n$). Typically, this SVNV is derived through the evaluation of an alternative A_i concerning a criterion C_j by an expert or decision-maker. As a result, we can extract a single-valued neutrosophic decision matrix $D = (d_{ij})_{m \times n}$ [11].

In the context of problems involving multiple-attribute decision-making, the concept of an ideal point has been employed to facilitate the identification of the best alternative within the decision set. While it's important to note that an ideal alternative doesn't have a real-world existence, it serves as a valuable theoretical framework for the evaluation of alternatives.

Within the decision-making methodology, we can define an ideal SVNV as $d_j^* = \langle t_j^*, i_j^*, f_j^* \rangle = \langle 1, 0, 0 \rangle$ ($j = 1, 2, \dots, n$) for the ideal alternative A^* [12]. Consequently, by applying Equation (2), the weighted correlation coefficient between an alternative A_i ($i = 1, 2, \dots, m$) and the ideal alternative A^* can be calculated by:

$$M_w(A_i, A^*) = \frac{1}{3} \sum_{j=1}^n w_j [\phi_{ij}(1 - \Delta t_{ij}) + \varphi_{ij}(1 - \Delta i_{ij}) + \psi_{ij}(1 - \Delta f_{ij})] \quad (3)$$

Where

$$\phi_{ij} = \frac{3 - \Delta t_{ij} - \Delta t_{i \max}}{3 - \Delta t_{i \min} - \Delta t_{i \max}},$$

$$\varphi_{ij} = \frac{3 - \Delta i_{ij} - \Delta i_{i \max}}{3 - \Delta i_{i \min} - \Delta i_{i \max}},$$

$$\psi_{ij} = \frac{3 - \Delta f_{ij} - \Delta f_{i \max}}{3 - \Delta f_{i \min} - \Delta f_{i \max}},$$

$$\Delta t_{ij} = |t_{ij} - t_j^*|,$$

$$\Delta i_{ij} = |i_{ij} - i_j^*|,$$

$$\Delta f_{ij} = |f_{ij} - f_j^*|,$$

$$\Delta t_{i \min} = \min_j |t_{ij} - t_j^*|,$$

$$\Delta i_{i \min} = \min_j |i_{ij} - i_j^*|,$$

$$\Delta f_{i \min} = \min_j |f_{ij} - f_j^*|,$$

$$\Delta t_{i \max} = \max_j |t_{ij} - t_j^*|,$$

$$\Delta i_{i \max} = \max_j |i_{ij} - i_j^*|,$$

$$\Delta f_{i \max} = \max_j |f_{ij} - f_j^*|,$$

for $i = 1, 2, \dots, m$ and $j = 1, 2, \dots, n$. By the correlation coefficient $M_w(A_i, A^*)$ ($i = 1, 2, \dots, m$), the ranking order of all alternatives and the best one(s) can be obtained.

2.2 Methods

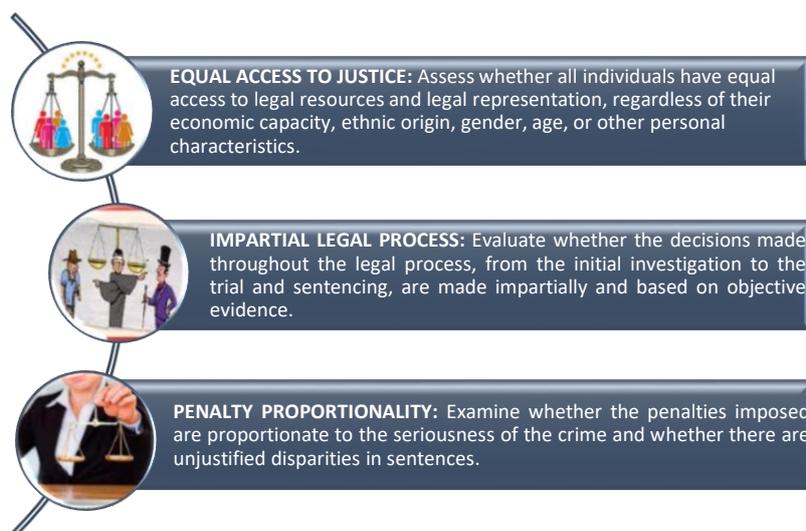
A literature review was conducted, involving the analysis of original articles and systematic reviews published in the last five years related to the topic of interest. The search was performed by querying specialized databases using Google Scholar as the search engine.

The scientific data collected were compiled and subsequently subjected to a scientific review process. This process was conducted by a team of three experts in the field, each with a minimum of eight years of experience in the subject matter. To streamline the work process and data analysis, it was decided to synthesize the gathered information. As a result of the preliminary analysis, a sample of alternatives for conducting the study was selected. The following are the alternatives that will be evaluated:

- A1. Evaluation of Crime Prevention Policies: Examine the policies and strategies used by law enforcement and judicial authorities to prevent crime and promote public safety. This could include reviewing crime prevention programs and their impact on reducing criminality.
- A2. Evaluation of Restorative Justice: Analyze the implementation of restorative justice practices in the justice system, such as mediation and dialogue between the parties involved in a crime. Evaluate their effectiveness in conflict resolution and damage repairation.
- A3. Review of Victim Protection Policies: Examine policies and practices related to the protection of crime victims. Evaluate whether adequate support is provided to victims throughout the legal process and whether their rights are respected.
- A4. Examination of Environmental Justice: In the Ecuadorian context, it might be relevant to evaluate policies and practices related to environmental justice. This would include reviewing cases of environmental crimes and the effective application of sanctions to offenders.
- A5. Evaluation of the Implementation of Technology in the Justice System: Assess how technology has been integrated into the justice system, from case management to online trial proceedings, and how it has affected equity and efficiency.
- A6. Analysis of Alternative Sentencing: Investigate the application of non-custodial sentences, such as probation programs, community service, or treatment programs. Evaluate their effectiveness in rehabilitating offenders and reducing prison overcrowding.

The evaluation of equity in the justice system is a complex process that involves considering multiple aspects and factors. In Figure 1, some criteria and their key considerations are presented for the study that will be conducted in the assessment of equity in the Ecuadorian justice system. They were coded for better management as C_1 , C_2 , and C_3 , according to their appearance order.

Figure 1: Analysis criteria for the study. Source: own elaboration.



The criteria were subjected to evaluation by experts, comparing them with each of the alternatives based on equity in the Ecuadorian justice system. To this end, the evaluations to be granted must specify to what extent the expert considers that alternative A_i is good (T_x), bad (F_x), or is not entirely sure (I_x) with respect to criterion C_j . It is considered that the evaluated criteria have the same weight $w_j=0.33$.

3 Results

The results obtained from the assessments of all experts are considered equally important, and the average of the results is calculated for processing and obtaining the information. In this way, the resulting decision matrix D is shown below (Figure 2).

Figure 2: Decision matrix D. Source: own elaboration.

$$D = \begin{bmatrix} \langle 0.5; 0.3; 0.2 \rangle & \langle 0.4; 0.2; 0.3 \rangle & \langle 0.2; 0.2; 0.5 \rangle \\ \langle 0.6; 0.1; 0.2 \rangle & \langle 0.6; 0.1; 0.2 \rangle & \langle 0.4; 0.2; 0.3 \rangle \\ \langle 0.5; 0.3; 0.2 \rangle & \langle 0.5; 0.2; 0.3 \rangle & \langle 0.6; 0.1; 0.2 \rangle \\ \langle 0.7; 0.1; 0.1 \rangle & \langle 0.2; 0.2; 0.5 \rangle & \langle 0.4; 0.2; 0.2 \rangle \\ \langle 0.3; 0.2; 0.3 \rangle & \langle 0.6; 0.1; 0.2 \rangle & \langle 0.3; 0.2; 0.3 \rangle \\ \langle 0.6; 0.1; 0.2 \rangle & \langle 0.5; 0.2; 0.3 \rangle & \langle 0.6; 0.1; 0.2 \rangle \end{bmatrix}$$

Following the logic of the method used, the values of the operators necessary to determine each correlation coefficient are determined, as shown in Tables 1 and 2.

Table 1: Values of ϕ , μ , and ψ for each alternative. Source: own elaboration.

	$\phi C1$	$\phi C2$	$\phi C3$	$\mu C1$	$\mu C2$	$\mu C3$	$\psi C1$	$\psi C2$	$\psi C3$
A1	1	0.94	0.82	1	0.96	0.87	0.96	1	1
A2	1	1	0.9	1	1	0.96	1	1	1
A3	0.95	0.95	1	1	0.96	1	0.92	0.96	1
A4	1	0.74	0.84	1	0.83	0.96	1	0.96	1
A5	0.84	1	0.84	0.96	1	0.96	0.96	1	1
A6	1	0.95	1	1	0.96	1	1	0.96	1

Table 2: Minimum and maximum values of variation in the membership functions of truth, falsity, and indeterminacy. Source: own elaboration.

	A1	A2	A3	A4	A5	A6
ΔT_{min}	0.5	0.4	0.4	0.3	0.4	0.4
ΔI_{min}	0.2	0.2	0.2	0.1	0.2	0.2
ΔF_{min}	0.2	0.1	0.1	0.1	0.1	0.1
ΔT_{max}	0.8	0.6	0.5	0.8	0.7	0.5
ΔI_{max}	0.5	0.3	0.3	0.5	0.3	0.3
ΔF_{max}	0.3	0.2	0.3	0.2	0.2	0.2

In this way, by using equation (3) the values of the correlation coefficients $M_w(A_i, A^*)$ are obtained. Table 3 shows the values obtained and their ranking accordingly.

Table 3: Weighted correlation coefficients. Source: own elaboration.

	A6	A2	A3	A4	A5	A1
M_w	0.7243	0.7147	0.6862	0.6338	0.6318	0.5797

In this way, it is valid to point out that, according to the analysis conducted, the assessment of the implementation of alternative penalties is the most preferred among all those evaluated. In second place is the assessment of restorative justice. Therefore, it can be concluded that these elements are the most observed and analyzed when providing a solution for the cracks in the Ecuadorian legal system in the quest for equity in the administration of justice.

The results show that the evaluation of the implementation of alternative penalties and the assessment of restorative justice are the preferred alternatives in terms of equity in the Ecuadorian justice system. This suggests that addressing these areas can have a significant impact on improving equity in the justice system.

4 Discussion

The research focused on evaluating equity in the Ecuadorian justice system using neutrosophic set correlation coefficients. Throughout the research, several key concepts were defined, and weighted evaluation techniques were applied to determine the preference for different alternatives concerning equity in the justice system.

Neutrosophic definitions are crucial for understanding how the alternatives were assessed in relation to equity in the Ecuadorian justice system. The analysis of alternatives provided a ranking based on weighted correlation coefficients. The results indicated that "Alternative Sentencing" obtained the highest correlation coefficient (0.7243), suggesting that this alternative is considered the most favorable in terms of equity in the Ecuadorian justice system. It was closely followed by "Restorative Justice Evaluation" with a correlation coefficient of 0.7147. These two alternatives stand out as the main areas of interest for improving equity in the system.

The results of this research have several important implications. Firstly, it provides a solid foundation for prioritizing focus areas in the Ecuadorian justice system. Alternative sentencing and the promotion of restorative justice emerge as key strategies to address equity concerns in the system.

The high ranking of "Alternative Sentencing" suggests a strong interest in considering more rehabilitation and reintegration-oriented approaches in the justice system. This can help reduce prison overcrowding and provide better reintegration opportunities for offenders.

The Evaluation of Restorative Justice is also considered a valuable strategy. This form of justice focuses on conflict resolution and damage reparation, which can contribute to greater equity in the legal process.

The study used a weighted evaluation that considered expert opinions and the relative importance of different criteria. This approach is valuable for making informed, data-driven decisions in the justice system. The overall research results highlight the importance of addressing equity issues in the Ecuadorian justice system. This analysis offers an initial insight into areas that require further attention and improvement.

Finally, equity in the justice system is a fundamental goal that requires a concerted effort from all stakeholders. The government, civil society, and the private sector must work together to strengthen the public defender system, promote the participation of women and minorities in the judicial system, implement procedural reforms, promote human rights education, and address specific challenges related to ethnic and racial equity. Continuous evaluation and the adoption of impartial approaches, such as neutrosophy, are essential to achieve a fairer and more equitable justice system in Ecuador.

Conclusions

Equity in the justice system is a fundamental principle of law that seeks to ensure fair and impartial treatment for all individuals, regardless of their characteristics. To achieve equity, it is essential to promote equality before the law, equal access to justice, the protection of human rights, the elimination of biases and discrimination, education and awareness, legal and policy reforms, and oversight and accountability.

The Ecuadorian justice system faces challenges in terms of equity and efficiency. Concerns have been raised regarding access to justice, impartiality in decision-making, corruption, and the lack of independence in the judicial system. Additionally, there are specific challenges related to ethnic and racial equity, as well as issues in the prison system.

Neutrosophy, a philosophical theory that promotes neutrality and impartiality, can be useful in analyzing equity in the justice system. It provides a framework that encourages objectivity and impartiality when examining data and policies. It helps identify systematic inequalities and discrimination in the justice system, which is essential for finding fair and equitable solutions.

The evaluation of equity in the Ecuadorian justice system involves considering multiple aspects and factors. Six study alternatives have been identified, including the evaluation of crime prevention policies, restorative justice, victim protection, environmental justice, technology implementation, and alternative sentencing.

The evaluation of these alternatives was based on specific criteria, using a method involving weighted neutrosophic correlation coefficients. The results indicate that the evaluation of alternative sentencing is the preferred alternative, followed by the evaluation of restorative justice.

Equity in the Ecuadorian justice system is an ongoing challenge that requires the collaboration of legal institutions, legal professionals, and society at large. The application of approaches like neutrosophy and the evaluation of specific alternatives can contribute to improving equity in the justice system and ensuring fair and equitable treatment for all Ecuadorian citizens.

References

- [1] F. Silva Hernández and G. Martínez Prats, "La justicia alternativa como derecho humano," *Jurídicas Cuc*, vol. 15, no. 1, pp. 263–284, 2019.
- [2] I. Ruiz Gallardón, "LA EQUIDAD: UNA JUSTICIA MÁS JUSTA.," *FORO. Rev. Ciencias Jurídicas y Bolívar D. Narváez M, Oscar F. Silva M, Julián R. Santillan A, Christian F. Tantaleán O. Neutrosophic Analysis of Equity in the Justice System.*

- Soc. Nueva Epoca*, vol. 20, no. 2, pp. 173–192, 2017.
- [3] J. A. Bejarano Lizano, S. J. Páliz Ibarra, W. R. Rodríguez Romero, and N. N. Cáceres Sánchez, “Visto Bueno en el Ecuador: ¿acto administrativo o proceso cuasi Jurisdiccional? Desafíos al Principio de Unidad Jurisdiccional,” *Cienc. Lat. Rev. Científica Multidiscip.*, vol. 7, no. 4, pp. 7236–7253, 2023.
- [4] J. D. Abadie Aguilera, “Perspectivas futuras de la democracia en Ecuador: retos para la educación,” *Rev. Conrado*, vol. 19, no. 92, pp. 569–577, 2023.
- [5] M. N. Mosquera Maldonado, “Estrategias gerenciales y la gestión del talento humano; Neutrosophia en los modelos de formación continua,” *Rev. Asoc. Latinoam. Ciencias Neutrosóficas. ISSN 2574-1101*, vol. 18, pp. 33–41, 2021.
- [6] R. Şahin and P. Liu, “Correlation coefficient of single-valued neutrosophic hesitant fuzzy sets and its applications in decision making,” *Neural Comput. Appl.*, vol. 28, pp. 1387–1395, 2017.
- [7] J. M. Puetate Paucar, L. A. Cevallos Castillo, and D. F. Coka Flores, “Evaluación de delitos en redes sociales mediante coeficientes de correlación neutrosóficos,” *Rev. Asoc. Latinoam. Ciencias Neutrosóficas. ISSN 2574-1101*, vol. 22, pp. 223–230, 2022.
- [8] M. R. Hidalgo Ruiz, “Análisis neutrosófico sobre la mediación como estrategia en la resolución de conflictos y en el desarrollo de una cultura de paz,” *Rev. Asoc. Latinoam. Ciencias Neutrosóficas. ISSN 2574-1101*, vol. 28, pp. 137–145, 2023.
- [9] F. Karaşlan, “Correlation coefficient of neutrosophic sets and its applications in decision-making,” *Fuzzy Multi-criteria Decis. Using Neutrosophic Sets*, pp. 327–360, 2019.
- [10] J. Ye, J. Song, and S. Du, “Correlation coefficients of consistency neutrosophic sets regarding neutrosophic multi-valued sets and their multi-attribute decision-making method,” *Int. J. Fuzzy Syst.*, pp. 1–8, 2022.
- [11] L. Shi and J. Ye, “Multiple attribute group decision-making method using correlation coefficients between linguistic neutrosophic numbers,” *J. Intell. Fuzzy Syst.*, vol. 35, no. 1, pp. 917–925, 2018.
- [12] R. Jansi, K. Mohana, and F. Smarandache, “Correlation Measure for Pythagorean Neutrosophic Fuzzy Sets with T and F as Dependent Neutrosophic Components,” *Neutrosophic Sets Syst.*, vol. 30, no. 1, p. 16, 2019.
- [13] Falcón, V. V., Quinapanta, M. D. R. A., Villacís, M. M. Y., & Ricardo, J. E. “Medición del capital intelectual: Caso hotelero”. *Dilemas Contemporáneos: Educación, Política y Valores*, 2019
- [14] Vázquez, M. Y. L., Ricardo, J. E., & Vega-Falcón, V. “La inteligencia artificial y su aplicación en la enseñanza del Derecho”. *Estudios del Desarrollo Social: Cuba y América Latina*, vol 10, pp 368-380, 2022
- [15] Mandour , S. “An Exhaustive Review of Neutrosophic Logic in Addressing Image Processing Issues”. *Neutrosophic Systems With Applications*, vol 12, pp 36–55, 2023. <https://doi.org/10.61356/j.nswa.2023.110>
- [16] Smarandache, F. “SuperHyperFunction, SuperHyperStructure, Neutrosophic SuperHyperFunction and Neutrosophic SuperHyperStructure: Current understanding and future directions”. *Neutrosophic Systems With Applications*, vol 12, pp 68–76, 2023. <https://doi.org/10.61356/j.nswa.2023.115>
- [17] Kandasamy, I., Divakar Arumugam, Aryan Rathore, Ateeth Arun, Manan Jain, Vasantha .W.B, & Smarandache, F. “NCMPy: A Modelling Software for Neutrosophic Cognitive Maps based on [Python Package]”. *Neutrosophic Systems With Applications*, vol 13, pp 1–22, 2023. <https://doi.org/10.61356/j.nswa.2024.114>

Received: October 30, 2023. **Accepted:** December 18, 2023