Neutrosophic Analysis of the Violation of Rights of People Belonging to Priority Groups in Ecuador using Multicriteria Methods

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Abstract. The recognition of rights associated with members of society with special characteristics is a reality in the management of governments at a global level. Making these rights effective and respected is a permanent task for the states, among which is Ecuador. That is why the objective of this research is to identify the main factors that affect the violation of the rights of priority attention groups in Ecuador. To meet the proposed objective, methods such as PESTEL analysis, Pareto's technique, Promethee, and TOPSIS were used. As a result, the factors that favor the violation of rights in each area analyzed were identified. Once the most important ones were found, actions were proposed based on them, and the most appropriate actions to mitigate them were obtained.

Keywords: priority groups, violation of rights, PESTEL, neutrosophic TOPSIS, Promethee.

1 Introduction

The search for justice and the improvement of social operating mechanisms leads states to guarantee the protection of certain population groups because they are more prone to the violation of their rights. Priority attention groups are those individuals who are unable to join or rejoin society, regardless of their social, economic, political, and cultural status or condition, which makes it difficult or impossible for them to contribute to the development of society and prevents them from having a better life condition [1]. Priority attention groups are made up of a group of people regardless of their age, sex, or ethnic origin, united by a differentiating condition that may or may not include some of these factors. Within this group are people who are deprived of their liberty, children, adolescents, older adults, people with disabilities, pregnant women, and any other person who suffers from a catastrophic, terminal, or highly complex disease [2, 3].

In this regard, the Constitution of the Republic of Ecuador in its article 35 states that the priority care group comprises older adults, children and adolescents, pregnant women, people with disabilities, people deprived of liberty, and those suffering from catastrophic or highly complex illnesses, and assures that they will receive priority and specialized attention in the public and private spheres. The same priority attention will be given to people at risk, victims of domestic and sexual violence, child abuse, and natural or anthropogenic disasters. The State will provide special protection to people in a condition of double vulnerability [4].

It is understood as a violation of the rights that human beings have, this is due to the social and moral principles that society adopts during the trajectory of life. Another circumstance to overshadow the rights is the economic factor that may cause the fundamental rights to be violated. The analysis starts from the Constitution of the Republic of Ecuador that in its normative text establishes not only rights but also guarantees, which are mechanisms that ensure the effective protection of the rights contemplated in the same Magna Carta. Currently, there is great difficulty in finding a job in the labor market and this situation has a much greater impact on the most vulnerable groups who, due to their circumstances, have fewer resources: capacity, information, relationships, cultural barriers, etc., to access a job [5].

When addressing the issue of constitutionalized human and fundamental rights in the Ecuadorian regulatory framework, problems arise about the violation of the rights of priority attention groups in multiple circumstances. The case of pregnant women can be treated. Specifically, gynecological-obstetric violence is a violation of rights that infringes the physical and psychological integrity of pregnant women [6]. In the context of the improper and unequal treatment that, due to her state of pregnancy, she sometimes receives in some nursing homes. The unequal

labor treatment and sometimes non-compliance with what was agreed for women in this state. Permanence and inclusion in educational institutions, among others.

Due to their age and experience, older adults have a lot of rich knowledge to offer to society and to families who have the joy of having one of them in their homes, however, society does not see it this way, rather because of the fact of being an older adult is minimized by putting aside both in the social and family environment, for the same reason it is an echo of vulnerability because it has come to be idealized that they do not contribute to society with anything other than old age and fatigue [7]. The protection of the State and Society for the Elderly must be special. The constitution is clear and concise in detailing each of the rights, but it is specified that these rights should be reinforced since they are not sufficient to avoid a violation by an unconscious society, which allows the rights of the most vulnerable to be undervalued, making them feel useless before society [8].

The Fundamental Rights of the minor constitute a fundamental part of the legal system of the country, the rights of children are inalienable, and that is why they must be protected. In the same way, the State as a regulatory entity and guarantor of rights must ensure their correct application, a minor needs the love and care of his parents, that is to say, to have his right to a family and, from this first right, others are derived, it must be guaranteed by the State [9]. In relation to this group, there are vulnerabilities among children who are in the process of adoption or waiting for it so that they have a full life, framed in conditions that allow them to develop fully, that is, materially and emotionally. The protection of minors in relation to the workplace, as well as that associated with alimony [10].

Education serves to potentiate in this sense, it is a necessary condition for the development of personal skills, as well as tools to obtain other types of social goods, and this is related to personal satisfaction and citizen participation. The right to education is to access the different levels of education, therefore, various factors are required that are part of the learning process where it begins from the heart of the home in the teaching of values and is formed in school life, it is essential that when mentioning education it is universal in nature where everyone without any distinction can enter a training center such as schools, colleges, and universities for free [11].

In the supreme norm, the right to education is violated, due to non-compliance with all accessibility parameters due to the inefficiency of the educational apparatus, given that they do not adequately apply national legislation and the Convention on Persons with Disabilities, therefore It is urgently required that the state improve the quality of education because it violates a universal right, being the same Magna Carta that discriminates when classifying education as special and not providing due treatment in terms of accessibility, failing to comply with the transversal axes of Convention [12].

What has been analyzed so far shows that the issue of the violation of the rights of priority groups can be approached from multiple points of view, since several conditions can lead to this situation. That is why the objective of the research is to identify the main factors that affect the violation of the rights of priority attention groups in Ecuador.

2 Materials and methods

2.1 PESTEL Analysis

It is a strategic analysis technique to determine the external environment that affects the following factors, namely political, economic, sociocultural, technological, ecological, and legal. It consists of determining the forces that affect the specific environment: sector, employment market, target groups, and competition, among others. It is a technique to analyze businesses that allows and determines the context in which it moves, in turn, allows the design of strategies to defend, take advantage of or adapt to anything that affects the sector. Despite being developed for the business sector, it is also applicable to the social sciences as it offers a more general view of the factors that can influence a given situation [13].

2.2 Pareto Chart

The Pareto diagram was presented in 1930 by Juran in his Quality Control Manual based on what was described in 1909 by Vilfredo Pareto under the principle of "the vital few the trivial many". This diagram is based on the problem analysis and is used to present data, drawing attention to the main causes of the problem in question. Its objective is to determine the 20% of the causes that cause 80% of the problems. Its main advantages are:

- ✓ It allows you to focus on the aspects whose improvement will have the most impact, thus optimizing your efforts.

- ✓ Provides a quick and easy view of the relative importance of issues.

- ✓ It helps prevent some causes from getting worse while trying to solve other less significant ones.

    ✓ His graphical view of the analysis is easy to understand and encourages the team to continue improving.

For its elaboration, it executes the following algorithm:

1. Collect the data and tabulate it.

2. Calculate absolute and cumulative frequency, unitary and cumulative relative frequency.

Graph by locating all the causes along the axis of the coordinates ordered from highest to lowest incidence and corresponding to their percentages along the axis of the ordinates. Finally, the cumulative polygonal line is built, and the causes that are up to 80% will be the ones with the highest incidence [14].

2.3 PROMETHEE method

The PROMETHEE method is a non-compensatory method that handles classification problems by evaluating a set of alternatives under multiple, often conflicting, criteria [15]. The PROMETHEE I (partial classification) and PROMETHEE II (full classification) methods were developed and published by JP Brans in 1982 [16]. Its name refers to the acronym Preference Ranking Organization Method for Enrichment Evaluation, and it is included within the methods based on outranking relationships [17]. The modeling establishes a structural preference between the alternatives, considering a preference function, defined by the decision-maker for each criterion, where the global index allows partial and complete overcoming of the alternatives [18, 22, 23, 24].

A multicriteria problem responds to a structure of type $\max\{g_1(a), g_2(a) \dots g_j(a)/a{\in}A\}$ where A is a finite set of alternatives$\{a_1, a_2 \dots a_n\}$ and $\{g_1(.), g_2(.) \dots g_n(.)\}$ a set of evaluation criteria. In general, this problem will be poorly conditioned since no alternative will maximize all the criteria, so a compromise solution must be reached. The PROMETHEE method is based on pairwise comparisons, so the difference in value between two evaluations of two alternatives for a given criterion will be taken into account [16], [39], [40]. If this difference is small, a small preference or even indifference will be assigned if it is considered insignificant. The choice of a generalized criterion is reduced to the choice of the appropriate parameters, which can be considered a simple task [18]. In each problem, an alternative *a* is confronted with the (n-1) remaining alternatives that define A:

$$\phi^+(a) = \frac{1}{n-1}\sum_{x\in a}\pi(a,x) \tag{1}$$

$$\phi^-(a) = \frac{1}{n-1}\sum_{x\in a}\pi(a,x) \tag{2}$$

Positive Relevance Flow and Negative Relevance Flow. The first indicates as an alternative is relevant compared to the rest, it shows its dominating character. The higher, the better the alternative. The second shows its weakness, as it is dominated by the rest of the alternatives. The lower its value, the better the alternative [19].

- PROMETHEE I: The Partial Classification: In this method, the ranking is obtained using the positive and negative streams of relevance. It is important to realize that if we used both flows separately, the classifications would not be the same, therefore this method uses an intersection of both. The method is prudent and does not decide which alternative is better, leaving the final call to the decision-maker.
- PROMETHEE II: The complete classification: In this method, all the alternatives are comparable although, in turn, the information requires more study since when calculating the net flow as the subtraction of flows, a valuable amount of information is lost. In actual practice, both classifications should be used because although PROMETHEE II is easy to use, the incomparability analysis offered by PROMETHEE I can help make the appropriate decision.

Elaboration of the profiles of the alternatives: With the elaboration of the profiles of the alternatives, it is possible to appreciate the quality of an alternative according to the criteria and complete assessments, and to understand some of the results that can be obtained. Mathematically it is the cross-product of the vector of profiles of an alternative and the vector of weighted weights.

2.4 TOPSIS

The method provides a solution that is not only the closest to a hypothetically better solution but also the farthest from the hypothetically worse one [20]. The process is described below:

Determine the objective and identify the attributes to be evaluated.

Prepare a matrix based on the information available on the attributes. Each row corresponds to an alternative and each column to an attribute. The matrix element f_{ij} represents the non-normalized value of the j-th attribute for the i-th alternative [21, 25, 26].

The construction of the normalized matrix will be as follows:

$$r_{ij} = \frac{f_{ij}}{\sqrt{\sum_{j=1}^{n} f_{ij}^2}} \tag{3}$$

Where: r_{ij} is the normalized value for the rating of alternative i against criterion j and f_{ij} is the indicator of each alternative i against each indicator j.

The minimum distance to the positive ideal solution and maximum distance to the negative ideal solution, it is done according to the following equations.

$$A^+ = x_1^+, x_2^+, \dots x_{j+l}^+) \tag{4}$$

$$A^- = (x_1^-, x_2^-, \dots x_{j+l}^- \tag{5}$$

With the normalized values, we proceed to calculate the Euclidean distances of each of the alternatives to the positive ideal and negative ideal solutions, as stated in 6 and 7:

$$\rho(A^k, A^+) = \|w * (TA^k - TA^+)\| \tag{6}$$

$$\rho(A^k, A^-) = \|w * (TA^k - TA^-)\| \tag{7}$$

Finally, the Relative Proximity Index (Ri) is calculated as follows:

$$Ri(A^k, A^i) = \frac{\rho(A^k, A^+)}{\rho(A^k, A^+) + \rho(A^k, A^-)} \tag{8}$$

3 Results

From the study of the theoretical framework around the topic discussed, it is observed that multiple factors can influence the violation of rights, which is why a generalized analysis of this phenomenon is proposed to identify its main causes. It was carried out using the PESTEL analysis of causes as shown:

Dimension	Factor
Political	Compliance with what is stipulated in relation to the rights of people who belong to priority groups is not regularly controlled.
Economic	Prevalence of economic interests in decision-making regarding labor in relation to people belonging to priority groups.
	High budget is needed for subsidies.
	Difficulties in obtaining the necessary support for families that depend on people belonging to priority groups.
	Need for special resources to meet the specific needs of people belonging to priority groups.
Social	Damages associated with the social utility and lack of capacity of people who belong to priority groups.
	Discrimination against people who belong to priority groups.
	Visualization of people belonging to priority groups as a community independent of the social life of the nation.
	Absence of social programs aimed at identifying the needs and inclusion of people who belong to priority groups.

Technological	Improve the accessibility of the technological environment.
Ecological	Eliminate architectural barriers.
Legal	Implement a greater number of specific legal instruments for each situation, to comply with the provisions of the constitution on the protection of priority groups.

Table 1: Results using PESTEL. Source: own elaboration

The Application of the Pareto technique was carried out to determine the main causes, for which Judges of the Family Judicial Unit, of the Pastaza Canton, were consulted: 38 experts (jurists in professional practice and other experts in the subject).
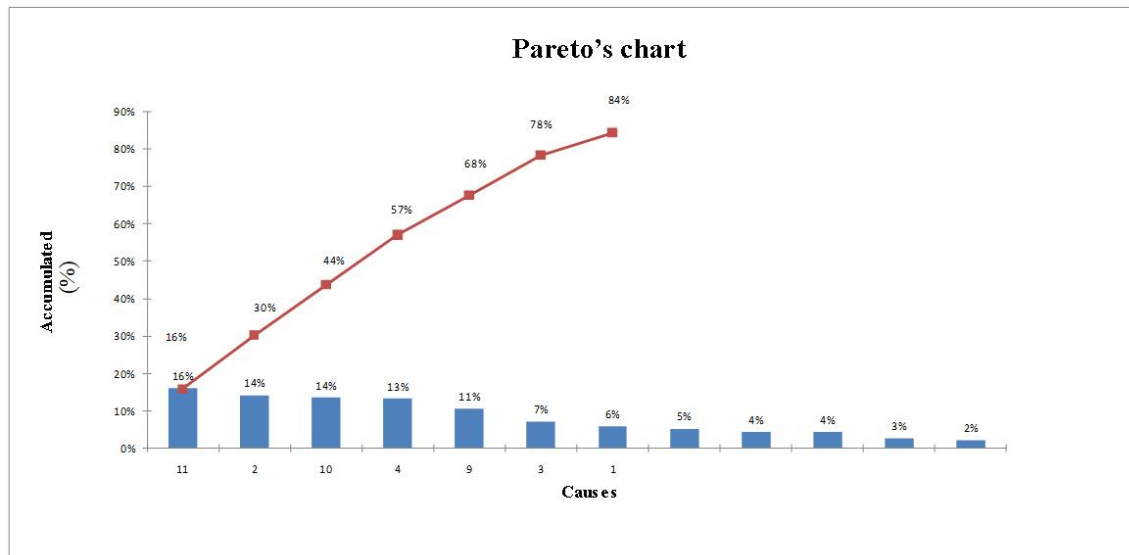

Figure 1: Pareto's chart. Source: own elaboration.

The actions associated with mitigating the most relevant causes, according to the experts consulted, applying Pareto's technique are:

1. Eliminate harm associated with social utility, lack of capacity, and discrimination against people who belong to priority groups.
2. Manage special resources to meet the specific needs of people who belong to priority groups and eliminate architectural barriers.
3. Implement a greater number of specific legal instruments for each situation, to comply with the provisions of the constitution on the protection of priority groups.
4. Avoid visualizing people who belong to priority groups as a community independent of the social life of the nation.

Reduce the prevalence of economic interests in decision-making regarding labor in relation to people belonging to priority groups.

3.1 Application of the Promethee method

For the application of the method, the Promethee software is used, and the data is entered as shown in (Figure 2). Five criteria were defined:

1. The political environment.

2. The economic environment.

3. The social environment.

4. The ecological environment.

5. The legal environment.

From the analysis carried out in the software, the following results can be seen:

Figure 3 shows the introduction of the data in the software, in this case, the weight of each criterion is found if it is a criterion to minimize or maximize, the preference functions, and the evaluation for each of the 5 alternatives presented, which are the proposed actions once the Pareto technique has been applied. [27, 28, 29, 30]
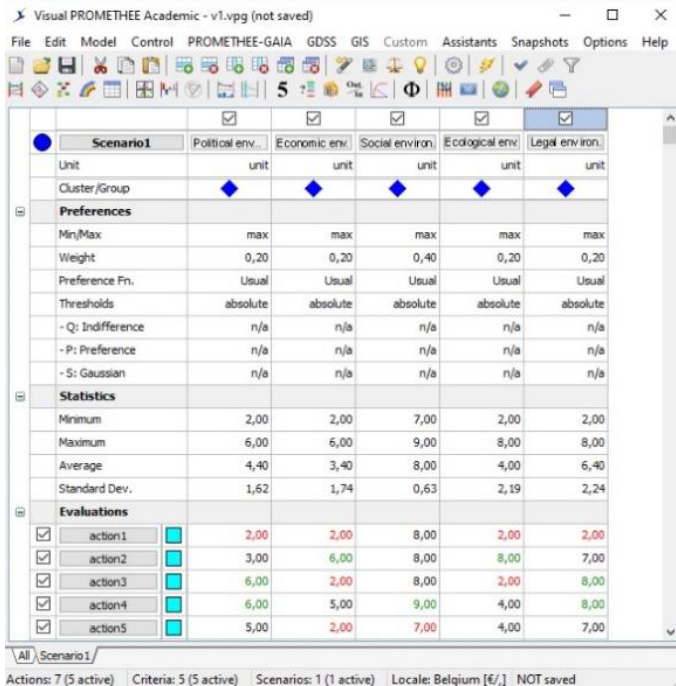

Figure 2: Entering the data in the software. Source: own elaboration

The Promethee I method, although it does not come to propose a decision, (Figure 3) shows that the most convenient actions are 4, 3, and 2, which adequately respond to a greater number of criteria, although in the case of alternative 3 it leaves a little of the acceptable range in one of the criteria. [35], [36], [37], [38]
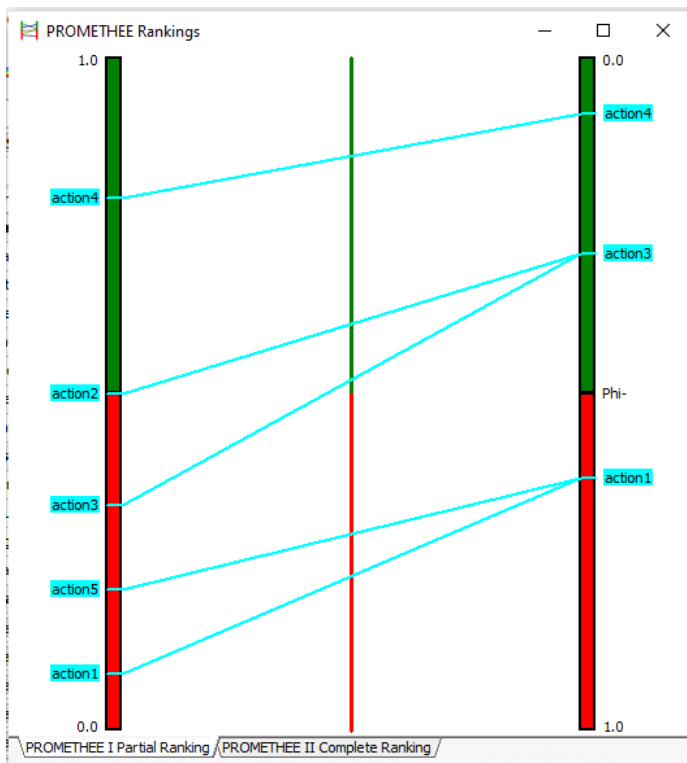

Figure 3: Results of the Promethee I method. Source: Own elaboration using the Promethee software.

For its part, the Promethee II method confirms that the best alternatives are 4, 2, and 3 in that classification order, and the least desirable is action 1. As can be seen in Figure 4. From the rainbow analysis (Figure 5), which is a mixture of the profiles of the alternatives, since it shows the impact of each of them on the 5 chosen criteria, it can be seen that the optimal result is achieved with action 4, in which In the case of action 2, it has a greater representation in the economic, ecological and social environment, but to a lesser extent in the legal and political area. In relation to action 3, it has a small impact on the political, legal, and social fields and to a lesser extent on the economic and ecological order. [31, 32, 33, 34]
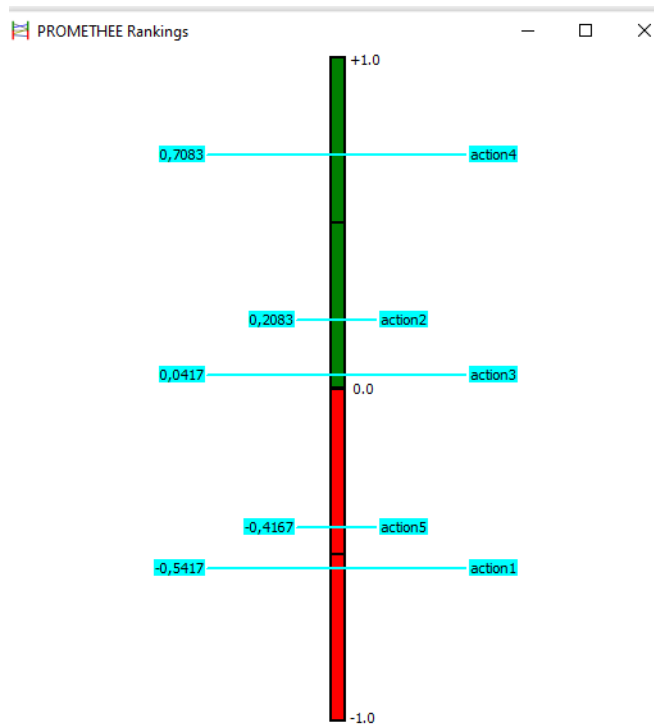

Figure 4: Results of the Promethee II method. Source: Own elaboration using Promethee software.
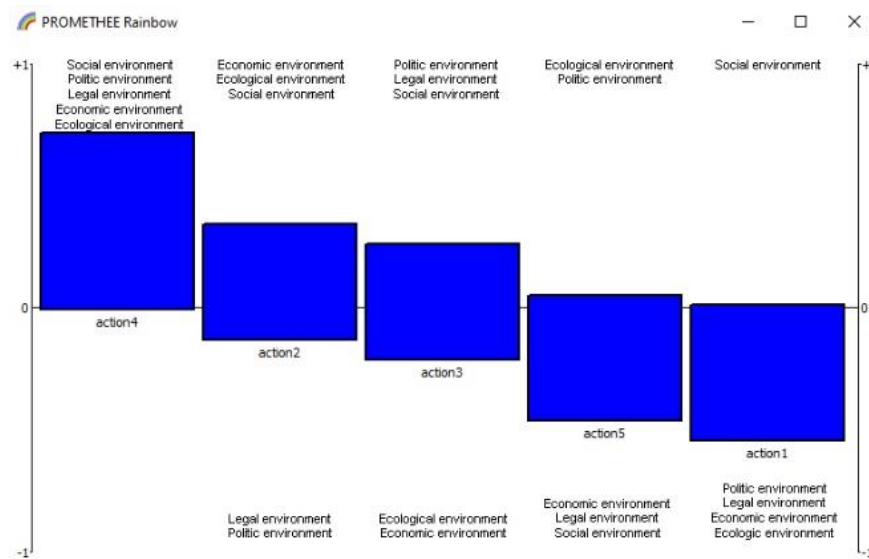

Figure 5: Rainbow analysis for each alternative. Source: Own elaboration using Promethee software.

3.2 Application of the TOPSIS method

Step 1*:* Create a decision matrix

In this study, 5 criteria and 5 alternatives are classified according to the Fuzzy TOPSIS method. The following table shows the type of criteria and the weight assigned to each criterion.

	Name	Type	Weight
1	Economic environment	+	(0.250,0.250,0.250)
2	Social environment	+	(0.250,0.250,0.250)
3	Ecological environment	+	(0.250,0.250,0.250)
4	Legal environment	+	(0.250,0.250,0.250)
5	Political environment	+	(0.250,0.250,0.250)

Table 2: Characteristics of the criteria. Source: own elaboration using online output software

The alternatives are evaluated in terms of various criteria and the results of the decision matrix are shown below. The following matrix represents the arithmetic mean of all the experts.

	Economic environment	Social environment	Ecological environment	Legal environment	Political environment
Alternative1	(1,000,2,333,4,333)	(4,333,6,333,8,333)	(1,000,2,333,4,333)	(3,000,5,000,7,000)	(1,000,1,000,3,000)
Alternative2	(1,000,3,000,5,000)	(3,667,5,667,7,667)	(4,333,6,333,8,333)	(3,000,5,000,7,000)	(3,000,5,000,7,000)
Alternative3	(5,000,7,000,9,000)	(3,667,5,667,7,667)	(1,000,3,000,5,000)	(1,000,3,000,5,000)	(5,000,7,000,9,000)
Alternative4	(2,333,4,333,6,333)	(5,667,7,667,9,000)	(2,333,4,333,6,333)	(4,333,6,333,8,333)	(2,333,4,333,6,333)
Alternative5	(1,000,3,000,5,000)	(3,667,5,667,7,667)	(3,000,5,000,7,000)	(5,000,7,000,9,000)	(4,333,6,333,8,333)

Table 3: Decision matrix. Source: own elaboration using online output software

2: Create the normalized decision matrix, based on the positive and negative ideal solutions.

	Economic environment	Social environment	Ecological environment	Legal environment	Political environment
Alternative1	(0.111,0.259,0.481)	(0.481,0.704,0.926)	(0.120,0.280,0.520)	(0.333,0.556,0.778)	(0.111,0.111,0.333)
Alternative2	(0.111,0.333,0.556)	(0.407,0.630,0.852)	(0.520,0.760,1.000)	(0.333,0.556,0.778)	(0.333,0.556,0.778)
Alternative3	(0.556,0.778,1.000)	(0.407,0.630,0.852)	(0.120,0.360,0.600)	(0.111,0.333,0.556)	(0.556,0.778,1.000)
Alternative4	(0.259,0.481,0.704)	(0.630,0.852,1.000)	(0.280,0.520,0.760)	(0.481,0.704,0.926)	(0.259,0.481,0.704)
Alternative5	(0.111,0.333,0.556)	(0.407,0.630,0.852)	(0.360,0.600,0.840)	(0.556,0.778,1.000)	(0.481,0.704,0.926)

Table 4. Normalized decision matrix. Source: Own elaboration using online output software.

Step 3: Create the weighted normalized decision matrix.

Considering the different weights of each criterion, the weighted normalized decision matrix can be calculated by multiplying the weight of each criterion in the normalized fuzzy decision matrix.

	Economic environment	Social environment	Ecological environment	Legal environment	Political environment
alternative1	(0.028,0.065,0.120)	(0.120,0.176,0.231)	(0.030,0.070,0.130)	(0.083,0.139,0.194)	(0.028,0.028,0.083)
alternative2	(0.028,0.083,0.139)	(0.102,0.157,0.213)	(0.130,0.190,0.250)	(0.083,0.139,0.194)	(0.083,0.139,0.194)
alternative3	(0.139,0.194,0.250)	(0.102,0.157,0.213)	(0.030,0.090,0.150)	(0.028,0.083,0.139)	(0.139,0.194,0.250)
alternative4	(0.065,0.120,0.176)	(0.157,0.213,0.250)	(0.070,0.130,0.190)	(0.120,0.176,0.231)	(0.065,0.120,0.176)
alternative5	(0.028,0.083,0.139)	(0.102,0.157,0.213)	(0.090,0.150,0.210)	(0.139,0.194,0.250)	(0.120,0.176,0.231)

Table 5. Weighted normalized decision matrix. Source: Own elaboration using online output software.

Step 4: Determine the fuzzy positive ideal solution (FPIS, A*), and the fuzzy negative ideal solution.

	Positive ideal	Negative ideal
Economic environment	(0.139,0.194,0.250)	(0.028,0.065,0.120)
Social environment	(0.157,0.213,0.250)	(0.102,0.157,0.213)
Ecological environment	(0.130,0.190,0.250)	(0.030,0.070,0.130)
Legal environment	(0.139,0.194,0.250)	(0.028,0.083,0.139)
Political environment	(0.139,0.194,0.250)	(0.028,0.028,0.083)

Table 6: Fuzzy positive ideal solution (FPIS, A*) and fuzzy negative ideal solution (FNIS, A-). Source: Own elaboration using online output software

Step 5: Calculate the distance between each alternative and the fuzzy positive ideal solution A^* and the distance between each alternative and the fuzzy negative ideal solution A^-

	Distance from the positive ideal	Distance from the negative ideal
Alternative1	0.476	0.074
Alternative2	0.272	0.281
Alternative3	0.261	0.291
Alternative4	0.227	0.326
Alternative5	0.22	0.332

Table 7: Distance from the positive and negative ideal alternatives. Source: Own elaboration using online output software.

Step 6: Compute the closeness coefficient and rank the alternatives.

The best alternative is the closest to the FPIS and the furthest from the FNIS. The closeness coefficient of each alternative and its ranking order is shown in the following table.

	Ci	Rank
Alternative1	0.135	5
Alternative2	0.507	4
Alternative3	0.527	3
Alternative4	0.59	2
Alternative5	0.602	1

Table 8: Closeness coefficient. Source: Own elaboration using online output software.
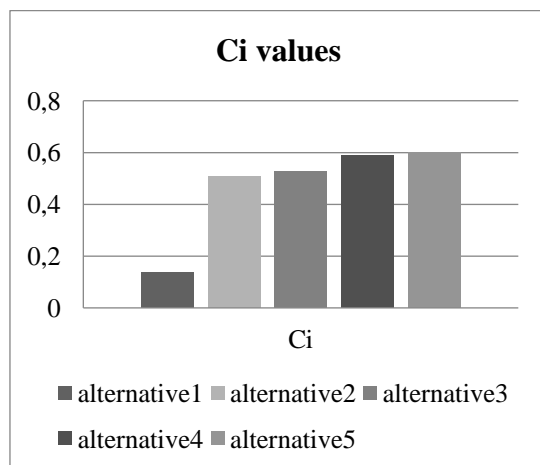

Figure 6. Representation of the proximity coefficients of the alternatives. Source: Own elaboration using online-output software.

Comparison of the results obtained between both methods:

In the case of the Promethee method, the eligible alternatives respond to orders 4, 2, 3, 5, and 1, with action 4 being the ideal. When applying the TOPSIS method, it is appreciated that the alternatives closest to the ideal solution respond to orders 5, 4, 3, 2, and 1. Therefore, certain similarities and some differences can be observed in relation to the order of the alternatives. However, considering the union of both methods, it could be said that the main actions to mitigate the violations of the rights of people who belong to priority groups should be:

- ✓ Avoid visualizing people who belong to priority groups as a community independent of the social life of the nation.
- ✓ Reduce the prevalence of economic interests in decision-making regarding labor in relation to people belonging to priority groups.
- ✓ Implement a greater number of specific legal instruments for each situation, to comply with the provisions of the constitution on the protection of priority groups.

Manage special resources to meet the specific needs of people who belong to priority groups and eliminate architectural barriers.

Conclusion

The recognition of rights associated with members of society with special characteristics is a reality in the management of governments at a global level. Making these rights effective and respected is a permanent task for the states, among which is Ecuador. In Ecuadorian legislation, groups of priority attention are recognized as the group of people who are united by a differentiating condition that makes special attention necessary. Within this group, there are people deprived of their liberty, children, adolescents, the elderly, people with disabilities, pregnant women, and any other person who suffers from a catastrophic, terminal, or highly complex disease.

There are factors associated with different areas of the political, economic, social, ecological, and legal order that favor the violation of the rights of people belonging to vulnerable groups, for their identification the PESTEL analysis was used, yielding a total of 12 factors. With the application of the Pareto technique, the main causes were identified and based on solving them, 5 actions were proposed aimed at mitigating the factors found. With the application of the Promethee and TOPSIS method, the most appropriate actions in relation to the priority groups are proposed: to avoid the visualization of the people who belong to these groups as an independent community in the social life of the nation, to reduce the prevalence of interests in decision-making regarding labor, implement a greater number of specific legal instruments for each situation, to comply with the provisions of the constitution on the protection of priority groups and manage resources to meet the specific needs of the people belonging to priority groups and remove architectural barriers.

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