Neutrosophic Sets and Systems, {Special Issue: Artificial Intelligence, Neutrosophy, and Latin American Worldviews: Toward a Sustainable Future (Workshop – March 18–21, 2025, Universidad Tecnológica de El Salvador, San Salvador, El Salvador)}, Vol. 84, 2025

University of New Mexico

Examining the causes of ineffectiveness in the legislative process of law in Ecuador using the Neutrosophic Analytic Hierarchy Process

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Abstract. This study addresses legislative inefficiency in Ecuador, which results in laws with poor technical quality and low legitimacy. Its goal is to assess and rank the factors causing this inefficiency—a key step toward improving the legal system and governance. The issue is critical because ineffective lawmaking erodes public trust and hinders national development. Unlike previous studies, this research applies an innovative approach: neutrosophic logic and the Analytic Hierarchy Process (NAHP) to handle uncertainty in complex political contexts. Through surveys of 4 constitutional law experts, 7 key factors were identified. The top causes were technical-legal deficiencies (33.65%) and excessive politicization (28.52%), together accounting for approximately 62% of legislative inefficiency. Findings show these factors interact, worsening ineffective lawmaking. The study contributes to the literature with a novel methodology for evaluating legislative systems and provides policy recommendations for Ecuador, such as enhanced technical advisory and depoliticized debates, to strengthen normative quality and legitimacy. This approach is particularly relevant in a context where political stability and institutional trust are urgent priorities. By addressing these inefficiencies, Ecuador can foster more effective governance and better serve its citizens' needs.

Keywords: Legislative ineffectiveness, technical-legal, politicization, planning, citizen participation, Analytic Hierarchy Process (AHP), Neutrosophic Analytic Hierarchy Process (NAHP).

1. Introduction

Ecuador's legislative process is central to creating a legal system that meets the growing socio-economic-political needs of the country. However, ineffective law-making through ambiguous and illegal norms discredits governance and public participation. Therefore, this project seeks to evaluate the factors of ineffectiveness of the legislative process in play in Ecuador. This is a pressing problem because without an effective consistent legal framework that advocates for efficaciousness within the major institutions, it will fail the stability of government and development endeavors down the line. Laws created with little technical merit complicate even the simplest implementation of any public policy and further alienate the already alienated citizens from the government. Thus, this article serves to solve the problem by assessing a process through which alternative approaches could be taken to ensure effective regulation [1]. Since 1979 when democracy returned to Ecuador, they have had a constantly ineffective legislative system to blame. Despite various institutional transformations throughout the composition over time, Ecuador still needs to be assessed because too much politicization without purposeful advancement fails to be understood. For example, over the last few decades, analyses of the workings of the National Assembly show that too many laws come out of that institution with various legal deficiencies that create conflicts of

regulations and prolonged implementation of more fundamental legislative law. Therefore, it would appear that a structural examination of why legislation does not work effectively is a key step in approaching the issue from more than just a political perspective but instead, a systemic course of action.

Yet Ecuador's legislative inefficiency is not an isolated case as Latin America experiences similar patterns where parliaments have institutional constraints and politically fragmented endeavors [4]. General obstacles from limited citizen participation to ineffective regulatory impact assessment [5] exist as proven by studies. Yet the nature of these assessments—non-general, subjective relative to actors involved per the situations—require a general assessment beyond empirical studies undertaken to fill this gap [3]. Thus, this study has the potential to do so through such a methodology. As it relates to this article, the main issue is that legislative inefficiency of the legislative process creates an highly inefficient and incoherent of an ineffective regulatory system. Only by prioritizing the necessary variables for legislative change can efficiencies be found. Thus, a research question emerges from the need to acknowledge the complicated relationship between these non-empirical realities as well as empirical realities which not only complicate but challenge the entire legitimacy of any political system. Relative to findings over time, incremental efforts to remedy legislative inefficiency have been unable to address concerns permanently [6]. Failure to create legislative unity compounded by legislative inefficiency yields an ineffective regulatory system that fails international expectations and national needs due to ineffective public participation and disassociated global standards. Such developments create unwarranted regulatory frictions when regulations must be enforced in application far more than what is intended by national legal systems.

Such an issue is so prevalent that citizens don't trust the Assembly, and many necessary laws go unpassed in due time. When laws are ineffective, unnecessary regulations may be of lower quality, weakening the State's power to implement effective public policy [2]. Therefore, this study forecasts the causes of such a phenomenon and hopes to offer an empirical basis for reform to fix the Ecuadorian legislative process, at least for stabilization and improved social legitimacy down the line. The methodology used will be the Neutrosophic Analytic Hierarchy Process (NAHP), which serves as a priority assessment method that allows for weighting under uncertain conditions. This study turns to experts in the field of Constitutional law to assess what causes the Assembly's legislative actions to be ineffective and ranks them accordingly with a causal relationship analysis. This is a novel approach because needs must foster such assessment methods to combat political culture uncertainty but still, provide defensible results. There are three purposes of this study: to determine ineffective causative agents in the Ecuadorian legislative process via the NAHP and prioritize them; 2. assess how these various factors interact with one another for a greater, systemic understanding; 3. Provide suggestions that inspire increased quality, integrity, and legitimacy of/in the legislative process. These purposes answer the research question and are intended to add to institutional strengthening efforts in Ecuador.

2. Preliminaries.

2.1. Analysis and Assessment of the Legislative Procedure in Ecuador.

Ecuador's legislative process, responsible for shaping the national regulatory framework, encounters significant structural challenges that undermine its effectiveness. Issues such as technical and legal deficiencies in drafting, excessive politicization of processes, and limited citizen participation often result in ambiguous and incoherent laws that lack broad social legitimacy [7]. The nation's legislative history, particularly since its democratic transition in 1979, reveals persistent tensions between political interests and essential technical requirements [8]. Despite various institutional reforms, systemic obstacles have remained. The National Assembly frequently faces criticism for enacting laws with legal loopholes, which contributes to a fragmented regulatory system and impedes the effective implementation of public policies [9]. This long-standing situation highlights the critical need for an accurate understanding of these underlying problems.

Furthermore, institutional weaknesses, such as the scarcity of adequate technical and administrative resources within the National Assembly, limit its capacity to produce clear and well-founded laws, thereby perpetuating technical and legal deficiencies [12]. Additionally, a lack of harmonization with international law can generate regulatory conflicts, complicating the application of laws within a globalized context. The overall magnitude of these challenges extends beyond technical concerns, impacting the very legitimacy of the Ecuadorian political system. Public distrust in the National Assembly, often fueled by poorly drafted legislation and highly politicized debates, erodes social cohesion and democratic governance. For instance, delays or failures in passing key legislation serve as clear examples of how legislative ineffectiveness can hinder national development. Addressing these deep-seated shortcomings is crucial to prevent the perpetuation of a cycle of institutional instability.

2.2. Neutrosophic Set.

Neutrosophic sets represent a significant advance in set theory, offering a trichotomous perspective that goes beyond the limitations of traditional binary logic. This theory not only enriches the mathematical and philosophical realms but also promotes a deeper understanding of ambiguity and uncertainty in decision-making and the representation of human knowledge. By integrating this perspective across diverse disciplines, we can move toward more flexible and adaptive approaches that better reflect the complexity of the real world and our limited capacities to fully understand it.

Definition 1 ([13-15]): The *neutrosophic set* N It is characterized by three membership functions, which are the truth membership function T_A, the indeterminacy membership function I_A and falsehood membership function F_A, where U is the Universe of Discourse and $\forall x \in U$, $T_A(x), I_A(x), F_A(x) \subseteq]\bar{}_A 0, 1^+[$, and $\bar{}_A 0 \leq \inf T_A(x) + \inf I_A(x) + \inf F_A(x) \leq \sup T_A(x) + \sup I_A(x) + \sup F_A(x) \leq 3^+$.

See that, by definition, $T_A(x), I_A(x)$ and $F_A(x)$ are standard or nonstandard real subsets of $]\bar{}0, 1^+[$ and, hence $T_A(x), I_A(x)$ and $F_A(x)$ can be subintervals of $[0, 1]$. $\bar{}_A 0$ and 1^+ They belong to the set of hyperreal numbers.

Definition 2 ([13-15] : The *single- valued neutrosophic set* (SVN S) A is U, $T_A: U \to [0, 1]$ where $A = \{< x, T_A(x), I_A(x), F_A(x) > : x \in U\}$ and $I_A: U \to [0, 1]$. $F_A: U \to [0, 1]$. $0 \leq T_A(x) + I_A(x) + F_A(x) \leq 3$

The single-valued neutrosophic number (SVN N) is symbolized by

$N = (t, i, f)$, such that $0 \leq t, i, f \leq 1$ and $0 \leq t + i + f \leq 3$.

Definition 3 ([13-15]): The *single -valued triangular neutrosophic number*, $\tilde{a} = \langle (a_1, a_2. a_3); \alpha_{\tilde{a}}, \beta_{\tilde{a}}, \gamma_{\tilde{a}} \rangle$, is a neutrosophic set in $\mathbb{R}$, whose truth, indeterminacy and falsity membership functions are defined as follows:

$$T_{\tilde{a}}(x) = \begin{cases} \alpha_{\tilde{a}}\left(\frac{x - a_1}{a_2 - a_1}\right), a_1 \leq x \leq a_2 \\ \alpha_{\tilde{a}, x = a_2} \\ \alpha_{\tilde{a}}\left(\frac{a_3 - x}{a_3 - a_2}\right), a_2 < x \leq a_3 \\ 0, \text{otherwise} \end{cases} \quad (1)$$

$$I_{\tilde{a}}(x) = \begin{cases} \frac{(a_2 - x + \beta_{\tilde{a}}(x - a_1))}{a_2 - a_1}, a_1 \leq x \leq a_2 \\ \beta_{\tilde{a},}\ x = a_2 \\ \frac{(x - a_2 + \beta_{\tilde{a}}(a_3 - x))}{a_3 - a_2},\ a_2 < x \leq a_3 \\ 1, \text{otherwise} \end{cases} \quad (2)$$

$$F_{\tilde{a}}(x) = \begin{cases} \frac{(a_2 - x + \gamma_{\tilde{a}}(x - a_1))}{a_2 - a_1}, a_1 \le x \le a_2 \\ \gamma_{\tilde{a}}, x = a_2 \\ \frac{(x - a_2 + \gamma_{\tilde{a}}(a_3 - x))}{a_3 - a_2}, \ a_2 < x \le a_3 \\ 1, \text{otherwise} \end{cases} \quad (3)$$

Where $\alpha_{\tilde{a}}, \beta_{\tilde{a}}, \gamma_{\tilde{a}} \in [0,1], a_1, \ a_2, a_3 \in \mathbb{R}$ and $a_1 \le a_2 \le a_3$.

Definition 4 ([13-15]) : Given$\tilde{a} = \langle (a_1, a_2, a_3); \alpha_{\tilde{a}}, \beta_{\tilde{a}}, \gamma_{\tilde{a}} \rangle$ and$\tilde{b} = \langle (b_1, b_2, b_3); \alpha_{\tilde{b}}, \beta_{\tilde{b}}, \gamma_{\tilde{b}} \rangle$ two single-valued triangular neutrosophic numbers andλ any non-zero number on the real line. Then, the following operations are defined:

1. Addition: $\tilde{a} + \tilde{b} = \langle (a_1 + b_1, a_2 + b_2, a_3 + b_3); \alpha_{\tilde{a}} \wedge \alpha_{\tilde{b}}, \beta_{\tilde{a}} \vee \beta_{\tilde{b}}, \gamma_{\tilde{a}} \vee \gamma_{\tilde{b}} \rangle$,
2. Subtraction: $\tilde{a} - \tilde{b} = \langle (a_1 - b_3, a_2 - b_2, a_3 - b_1); \alpha_{\tilde{a}} \wedge \alpha_{\tilde{b}}, \beta_{\tilde{a}} \vee \beta_{\tilde{b}}, \gamma_{\tilde{a}} \vee \gamma_{\tilde{b}} \rangle$,
3. Investment: $\tilde{a}^{-1} = \langle ({a_3}^{-1}, {a_2}^{-1}, {a_1}^{-1}); \alpha_{\tilde{a}}, \beta_{\tilde{a}}, \gamma_{\tilde{a}} \rangle$, where $a_1, a_2, a_3 \neq 0$.
4. Multiplication by a scalar number:

$$\lambda\tilde{a} = \begin{cases} \langle (\lambda a_1, \lambda a_2, \lambda a_3); \alpha_{\tilde{a}}, \beta_{\tilde{a}}, \gamma_{\tilde{a}} \rangle, \lambda > 0 \\ \langle (\lambda a_3, \lambda a_2, \lambda a_1); \alpha_{\tilde{a}}, \beta_{\tilde{a}}, \gamma_{\tilde{a}} \rangle, \lambda < 0 \end{cases}$$

5. Division of two triangular neutrosophic numbers:

$$\frac{\tilde{a}}{\tilde{b}} = \begin{cases} \langle \left(\frac{a_1}{b_3}, \frac{a_2}{b_2}, \frac{a_3}{b_1}\right); \alpha_{\tilde{a}} \wedge \alpha_{\tilde{b}}, \beta_{\tilde{a}} \vee \beta_{\tilde{b}}, \gamma_{\tilde{a}} \vee \gamma_{\tilde{b}} \rangle, a_3 > 0 \text{ and } b_3 > 0 \\ \langle \left(\frac{a_3}{b_3}, \frac{a_2}{b_2}, \frac{a_1}{b_1}\right); \alpha_{\tilde{a}} \wedge \alpha_{\tilde{b}}, \beta_{\tilde{a}} \vee \beta_{\tilde{b}}, \gamma_{\tilde{a}} \vee \gamma_{\tilde{b}} \rangle, a_3 < 0 \text{ and } b_3 > 0 \\ \langle \left(\frac{a_3}{b_1}, \frac{a_2}{b_2}, \frac{a_1}{b_3}\right); \alpha_{\tilde{a}} \wedge \alpha_{\tilde{b}}, \beta_{\tilde{a}} \vee \beta_{\tilde{b}}, \gamma_{\tilde{a}} \vee \gamma_{\tilde{b}} \rangle, a_3 < 0 \text{ and } b_3 < 0 \end{cases}$$

6. Multiplication of two triangular neutrosophic numbers:

$$\tilde{a}\tilde{b} = \begin{cases} \langle (a_1 b_1, a_2 b_2, a_3 b_3); \alpha_{\tilde{a}} \wedge \alpha_{\tilde{b}}, \beta_{\tilde{a}} \vee \beta_{\tilde{b}}, \gamma_{\tilde{a}} \vee \gamma_{\tilde{b}} \rangle, \ a_3 > 0 \text{ and } b_3 > 0 \\ \langle (a_1 b_3, a_2 b_2, a_3 b_1); \alpha_{\tilde{a}} \wedge \alpha_{\tilde{b}}, \beta_{\tilde{a}} \vee \beta_{\tilde{b}}, \gamma_{\tilde{a}} \vee \gamma_{\tilde{b}} \rangle, a_3 < 0 \text{ and } b_3 > 0 \\ \langle (a_3 b_3, a_2 b_2, a_1 b_1); \alpha_{\tilde{a}} \wedge \alpha_{\tilde{b}}, \beta_{\tilde{a}} \vee \beta_{\tilde{b}}, \gamma_{\tilde{a}} \vee \gamma_{\tilde{b}} \rangle, a_3 < 0 \text{ and } b_3 < 0 \end{cases}$$

Where,$\wedge$ it is a ty norm$\vee$ it is a conorm t.

The AHP technique begins with the designation of a hierarchical structure, where the elements at the top of the tree are more generic than those at the lower levels. The main leaf is unique and denotes the objective to be achieved in decision-making.

The level immediately below this contains the sheets representing the criteria. The sheets corresponding to the subcriteria appear immediately below this level, and so on. The level below this level represents the alternatives. See Figure 1.

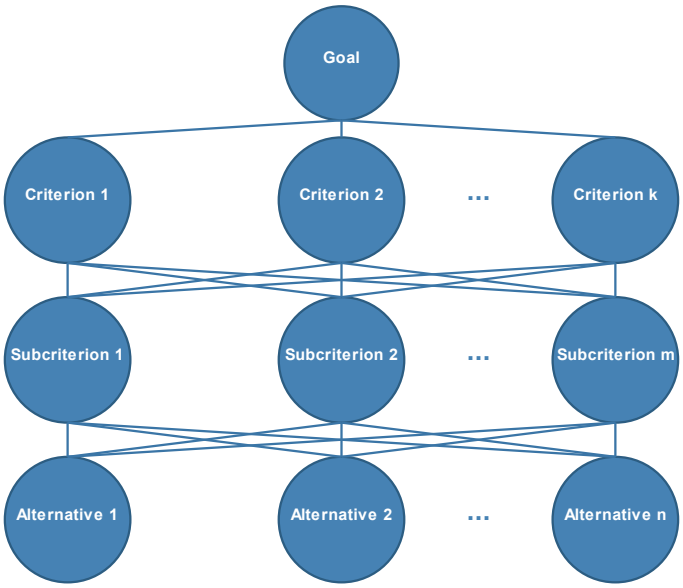

Figure 1: Schematic of a generic tree representing a Hierarchical Analytical Process. Source: [16].

A square matrix is then formed that represents the opinion of the expert or experts and contains the pairwise comparison of the assessments of the criteria, subcriteria, and alternatives.

TL Saaty, the founder of the original method, proposed a linguistic scale that appears in Table 1.

Table 1. Intensity of importance according to the classic AHP. Source [16-19].

Intensity of importance on an absolute scale	**Definition**	**Explanation**
1	Equal importance	Two activities contribute equally to the objective.
3	Moderate importance of one over the other	Experience and judgment strongly favor one activity over another.
5	Essential or strong importance	Experience and judgment strongly favor one activity over another.
7	very strong importance	The activity is strongly favored and its mastery is demonstrated in practice.
9	Extremely important	The evidence that favors one activity over another is of the highest order of affirmation possible.
2, 4, 6, 8	Intermediate values between the two adjacent judgments.	When understanding is needed
Reciprocals	If activity i has one of the above numbers assigned compared to activity j, then j has the reciprocal value compared to i.	

On the other hand, Saaty established that the *Consistency Index* (CI) must depend on λ_{max}, the maximum eigenvalue of the matrix. He defined the equation $CI = \frac{\lambda_{max}-n}{n-1}$, where n is the order of the matrix. He further defined the *Consistency Ratio* (CR) with the equation CR = CI/RI, where RI is given in Table 2.

Table 2. CR associated with each order.

Order (n)	1	2	3	4	5	6	7	8	9	10
CR	0	0	0.52	0.89	1.11	1.25	1.35	1.40	1.45	1.49

If $CR \leq 10\%$ we can consider that the experts' assessment is sufficiently consistent and therefore we can proceed to use AHP.

The objective of the AHP is to rank the criteria, subcriteria, and alternatives according to a score. It can also be used in group decision-making problems. If this is the purpose, Equations 4 and 5 should be taken into account, where the expert's weight is evaluated based on their authority, knowledge, experience, etc.

$$\bar{x} = \left(\prod_{i=1}^{n} x_i^{w_i}\right)^{1/\sum_{i=1}^{n} w_i} \quad (4)$$

If $\sum_{i=1}^{n} w_i = 1$, that is, when the expert's weights add up to one, Equation 4 becomes Equation 5,

$$\bar{x} = \prod_{i=1}^{n} x_i^{w_i} \quad (5)$$

The hybridization of AHP with neutrosophic set theory was used in [16]. This is a more flexible approach to modeling uncertainty in decision-making. Indeterminacy is an essential component that must be assumed in real-world organizational decisions.

Table 3 contains the adaptation of the Saaty scale to the neutrosophic field.

Table 3. The Saaty scale was translated into a neutrosophic triangular scale. Source [16].

Saty scale	**Definition**	**Neutrosophic Triangular Scale**
1	Equally influential	$\tilde{1} = \langle(1,1,1);0.50,0.50,0.50\rangle$
3	Slightly influential	$\tilde{3} = \langle(2,3,4);0.30,0.75,0.70\rangle$
5	Strongly influential	$\tilde{5} = \langle(4,5,6);0.80,0.15,0.20\rangle$
7	Very influential	$\tilde{7} = \langle(6,7,8);0.90,0.10,0.10\rangle$
9	Absolutely influential	$\tilde{9} = \langle(9,9,9);1.00,1.00,1.00\rangle$
2, 4, 6, 8	Sporadic values between two close scales	$\tilde{2} = \langle(1,2,3);0.40,0.65,0.60\rangle$ $\tilde{4} = \langle(3,4,5);0.60,0.35,0.40\rangle$ $\tilde{6} = \langle(5,6,7);0.70,0.25,0.30\rangle$ $\tilde{8} = \langle(7,8,9);0.85,0.10,0.15\rangle$

The pairwise neutrosophic comparison matrix is defined in Equation 6.

$$\tilde{A} = \begin{bmatrix} \tilde{1} & \tilde{a}_{12} & \cdots & \tilde{a}_{1n} \\ \vdots & & \ddots & \vdots \\ \tilde{a}_{n1} & \tilde{a}_{n2} & \cdots & \tilde{1} \end{bmatrix} \quad (6)$$

$\tilde{A}$ satisfies the condition $\tilde{a}_{ji} = \tilde{a}_{ij}^{-1}$, according to the inversion operator defined in Definition 4.

Two indices are defined to convert a neutrosophic triangular number into a sharp number. See Equation 7 for the *score* and Equation 8 for *accuracy* [20].

$$S(\tilde{a}) = \frac{1}{8}[a_1 + a_2 + a_3](2 + \alpha_{\tilde{a}} - \beta_{\tilde{a}} - \gamma_{\tilde{a}}) \quad (7)$$

$$A(\tilde{a}) = \frac{1}{8}[a_1 + a_2 + a_3](2 + \alpha_{\tilde{a}} - \beta_{\tilde{a}} + \gamma_{\tilde{a}}) \quad (8)$$

The algorithm to be applied to the NAHP is as follows:

Given the Criteria, subcriteria, and alternatives, the NAHP consists of the following steps:

1. Design an AHP tree. It contains the selected criteria, subcriteria, and alternatives.
2. Create the level matrices from the AHP tree, according to expert criteria expressed in neutrosophic triangular scales and respecting the matrix scheme of Equation 6.
3. To evaluate the consistency of these matrices, convert the elements of $\tilde{A}$ in a crisp matrix by applying Equation 7 or 8 and then testing the consistency of this new crisp matrix.
4. Follow the other steps of a classic AHP.
5. Equation 7 or 8 is applied to convert, $w_1, w_2, \ldots, w_n$ to crisp weights.
6. If more than one expert performs the assessment, then $w_1, w_2, \ldots, w_n$ are replaced by $\bar{w}_1, \bar{w}_2, \cdots, \bar{w}_n$, which are their corresponding weighted geometric mean values, see Equations 4 and 5 .

3. Results and Discussion.

This section contains an explanation of the factors that are relevant and cause ineffectiveness in the legislative process of law in Ecuador. For this purpose, opinions were obtained from four specialists in constitutional law and legislative procedure, who were selected for their expertise in this area. These factors causing ineffectiveness (CI) were the following:

- **CI1 > Technical and legal deficiencies:** Lack of quality in the drafting of legislative proposals, legal inconsistencies, terminological ambiguities, and regulatory gaps that affect the interpretation and application of laws.
- **CI2 > Excessive politicization of the process:** Predominance of political-partisan interests over technical criteria, which distorts the legislative debate and compromises the quality of the approved regulations.
- **CI3 > Inadequate legislative planning:** The absence of a planned and structured legislative agenda that responds to the country's real needs, which generates regulatory dispersion and a lack of coherence in the legal system.
- **CI4 > Limited effective citizen participation:** Despite existing mechanisms, citizen participation in the legislative process is limited or merely formal, with no real impact on decision-making.
- **CI5 > Deficiencies in ex-ante and ex-post evaluation:** Limited prior analysis of the regulatory impact and lack of monitoring mechanisms after the approval of laws to measure their effectiveness.

- **CI6 > Institutional weaknesses:** Limitations in resources, technical and administrative capacities of the legislative function to adequately fulfill its responsibilities.
- **CI7 > Lack of harmonization with international law:** Insufficient consideration of international standards and commitments in the development of national regulations, generating disparities and potential regulatory conflicts.

Each of the four specialists compared these seven factors according to Saaty's adapted neutrosophic scale. Each specialist was assigned the same weight or importance of opinion equal to $w_i = 1/4$.

Neutrosophic Comparison Matrices

The following steps were:

1. Each specialist evaluated the 7 factors according to their neutrosophic knowledge.
2. The neutrosophic matrices were converted to sharp matrices with the accuracy equation.
3. The CR (Consistency Ratio) of each of these matrices was determined.
4. It was verified that each expert met an adequate RC to proceed.
5. The weights assigned to each of the 7 factors by each expert were added.

Table 4. Neutrosophic pairwise comparison matrix obtained from expert 1

Variable	CI1	CI2	CI3	CI4	CI5	CI6	CI7
CI1	(0.50, 0.50, 0.50)	(0.70, 0.30, 0.30)	(0.90, 0.10, 0.10)	(0.80, 0.20, 0.20)	(0.90, 0.10, 0.10)	(0.97, 0.03, 0.03)	(0.95, 0.05, 0.05)
CI2	(0.70, 0.70, 0.30)	(0.50, 0.50, 0.50)	(0.70, 0.30, 0.30)	(0.90, 0.10, 0.10)	(0.80, 0.20, 0.20)	(0.90, 0.10, 0.10)	(0.70, 0.30, 0.30)
CI3	(0.90, 0.90, 0.10)	(0.70, 0.70, 0.30)	(0.50, 0.50, 0.50)	(0.60, 0.40, 0.40)	(0.70, 0.30, 0.30)	(0.80, 0.20, 0.20)	(0.60, 0.40, 0.40)
CI4	(0.80, 0.80, 0.20)	(0.90, 0.90, 0.10)	(0.60, 0.60, 0.40)	(0.50, 0.50, 0.50)	(0.60, 0.40, 0.40)	(0.70, 0.30, 0.30)	(0.50, 0.50, 0.50)
CI5	(0.90, 0.90, 0.10)	(0.80, 0.80, 0.20)	(0.70, 0.70, 0.30)	(0.60, 0.60, 0.40)	(0.50, 0.50, 0.50)	(0.60, 0.40, 0.40)	(0.50, 0.50, 0.50)
CI6	(0.97, 0.97, 0.03)	(0.90, 0.90, 0.10)	(0.80, 0.80, 0.20)	(0.70, 0.70, 0.30)	(0.60, 0.60, 0.40)	(0.50, 0.50, 0.50)	(0.60, 0.60, 0.40)
CI7	(0.95, 0.95, 0.05)	(0.70, 0.70, 0.30)	(0.60, 0.60, 0.40)	(0.50, 0.50, 0.50)	(0.50, 0.50, 0.50)	(0.60, 0.40, 0.40)	(0.50, 0.50, 0.50)

Table 5. Neutrosophic pairwise comparison matrix obtained from expert 2

Variable	CI1	CI2	CI3	CI4	CI5	CI6	CI7
CI1	(0.50, 0.50, 0.50)	(0.60, 0.40, 0.40)	(0.80, 0.20, 0.20)	(0.90, 0.10, 0.10)	(0.97, 0.03, 0.03)	(0.95, 0.05, 0.05)	(0.90, 0.10, 0.10)
CI2	(0.60, 0.60, 0.40)	(0.50, 0.50, 0.50)	(0.90, 0.10, 0.10)	(0.70, 0.30, 0.30)	(0.80, 0.20, 0.20)	(0.90, 0.10, 0.10)	(0.80, 0.20, 0.20)
CI3	(0.80, 0.80, 0.20)	(0.90, 0.90, 0.10)	(0.50, 0.50, 0.50)	(0.70, 0.30, 0.30)	(0.60, 0.40, 0.40)	(0.70, 0.30, 0.30)	(0.60, 0.40, 0.40)
CI4	(0.90, 0.90, 0.10)	(0.70, 0.70, 0.30)	(0.70, 0.70, 0.30)	(0.50, 0.50, 0.50)	(0.60, 0.40, 0.40)	(0.70, 0.30, 0.30)	(0.60, 0.40, 0.40)

Variable	CI1	CI2	CI3	CI4	CI5	CI6	CI7
CI5	(0.97, 0.97, 0.03)	(0.80, 0.80, 0.20)	(0.60, 0.60, 0.40)	(0.60, 0.60, 0.40)	(0.50, 0.50, 0.50)	(0.60, 0.40, 0.40)	(0.50, 0.50, 0.50)
CI6	(0.95, 0.95, 0.05)	(0.90, 0.90, 0.10)	(0.70, 0.70, 0.30)	(0.70, 0.70, 0.30)	(0.60, 0.60, 0.40)	(0.50, 0.50, 0.50)	(0.60, 0.60, 0.40)
CI7	(0.90, 0.90, 0.10)	(0.80, 0.80, 0.20)	(0.60, 0.60, 0.40)	(0.60, 0.60, 0.40)	(0.50, 0.50, 0.50)	(0.60, 0.40, 0.40)	(0.50, 0.50, 0.50)

Table 6. Neutrosophic pairwise comparison matrix obtained from expert 3

Variable	CI1	CI2	CI3	CI4	CI5	CI6	CI7
CI1	(0.50, 0.50, 0.50)	(0.50, 0.50, 0.50)	(0.70, 0.30, 0.30)	(0.80, 0.20, 0.20)	(0.90, 0.10, 0.10)	(0.97, 0.03, 0.03)	(0.80, 0.20, 0.20)
CI2	(0.50, 0.50, 0.50)	(0.50, 0.50, 0.50)	(0.90, 0.10, 0.10)	(0.95, 0.05, 0.05)	(0.80, 0.20, 0.20)	(0.90, 0.10, 0.10)	(0.70, 0.30, 0.30)
CI3	(0.70, 0.70, 0.30)	(0.90, 0.90, 0.10)	(0.50, 0.50, 0.50)	(0.60, 0.40, 0.40)	(0.70, 0.30, 0.30)	(0.80, 0.20, 0.20)	(0.60, 0.40, 0.40)
CI4	(0.80, 0.80, 0.20)	(0.95, 0.95, 0.05)	(0.60, 0.60, 0.40)	(0.50, 0.50, 0.50)	(0.60, 0.40, 0.40)	(0.70, 0.30, 0.30)	(0.50, 0.50, 0.50)
CI5	(0.90, 0.90, 0.10)	(0.80, 0.80, 0.20)	(0.70, 0.70, 0.30)	(0.60, 0.60, 0.40)	(0.50, 0.50, 0.50)	(0.60, 0.40, 0.40)	(0.50, 0.50, 0.50)
CI6	(0.97, 0.97, 0.03)	(0.90, 0.90, 0.10)	(0.80, 0.80, 0.20)	(0.70, 0.70, 0.30)	(0.60, 0.60, 0.40)	(0.50, 0.50, 0.50)	(0.60, 0.60, 0.40)
CI7	(0.80, 0.80, 0.20)	(0.70, 0.70, 0.30)	(0.60, 0.60, 0.40)	(0.50, 0.50, 0.50)	(0.50, 0.50, 0.50)	(0.60, 0.40, 0.40)	(0.50, 0.50, 0.50)

Table 7. Neutrosophic pairwise comparison matrix obtained from expert 4

Variable	CI1	CI2	CI3	CI4	CI5	CI6	CI7
CI1	(0.50, 0.50, 0.50)	(0.60, 0.60, 0.40)	(0.70, 0.30, 0.30)	(0.90, 0.10, 0.10)	(0.95, 0.05, 0.05)	(0.97, 0.03, 0.03)	(0.90, 0.10, 0.10)
CI2	(0.60, 0.40, 0.40)	(0.50, 0.50, 0.50)	(0.80, 0.20, 0.20)	(0.90, 0.10, 0.10)	(0.95, 0.05, 0.05)	(0.90, 0.10, 0.10)	(0.80, 0.20, 0.20)
CI3	(0.70, 0.70, 0.30)	(0.80, 0.80, 0.20)	(0.50, 0.50, 0.50)	(0.70, 0.30, 0.30)	(0.60, 0.40, 0.40)	(0.80, 0.20, 0.20)	(0.60, 0.40, 0.40)
CI4	(0.90, 0.90, 0.10)	(0.90, 0.90, 0.10)	(0.70, 0.70, 0.30)	(0.50, 0.50, 0.50)	(0.60, 0.40, 0.40)	(0.70, 0.30, 0.30)	(0.50, 0.50, 0.50)
CI5	(0.95, 0.95, 0.05)	(0.95, 0.95, 0.05)	(0.60, 0.60, 0.40)	(0.60, 0.60, 0.40)	(0.50, 0.50, 0.50)	(0.60, 0.40, 0.40)	(0.50, 0.50, 0.50)
CI6	(0.97, 0.97, 0.03)	(0.90, 0.90, 0.10)	(0.80, 0.80, 0.20)	(0.70, 0.70, 0.30)	(0.60, 0.60, 0.40)	(0.50, 0.50, 0.50)	(0.60, 0.60, 0.40)
CI7	(0.90, 0.90, 0.10)	(0.80, 0.80, 0.20)	(0.60, 0.60, 0.40)	(0.50, 0.50, 0.50)	(0.50, 0.50, 0.50)	(0.60, 0.40, 0.40)	(0.50, 0.50, 0.50)

The calculation of the CRs resulted in CR = 9.4213% for Expert 1, CR = 8.2573% for Expert 2, CR = 7.6529% for Expert 3, and CR = 9.1246% for Expert 4. In all cases CR≤10%, indicating that the evaluations are consistent.

Assigned Weights

The weights associated with each of the variables are shown in Table 8.

Table 8. Weights obtained for each of the variables by the experts

Expert/Variable	CI1	CI2	CI3	CI4	CI5	CI6	CI7
1	0.38952	0.22615	0.13247	0.08729	0.06934	0.03681	0.05842
2	0.36583	0.25942	0.13166	0.08492	0.06214	0.03428	0.06175
3	0.30521	0.31653	0.13478	0.08369	0.06235	0.03486	0.06258
4	0.28546	0.33871	0.14325	0.08163	0.05923	0.03429	0.05743

To obtain the weight vector for each variable according to each expert, we take the values provided in the table and organize them in the form of a vector for each variable.

Total weight vector (average of the four experts):

- CI1: 0.33651
- CI2: 0.28520
- CI3: 0.13554
- CI4: 0.08438
- CI5: 0.06327
- CI6: 0.03506
- CI7: 0.06004

Therefore, the order of importance of the factors that cause ineffectiveness in Ecuador's legislative procedure is:

CI1 > CI2 > CI3 > CI4 > CI5 > CI7 > CI6

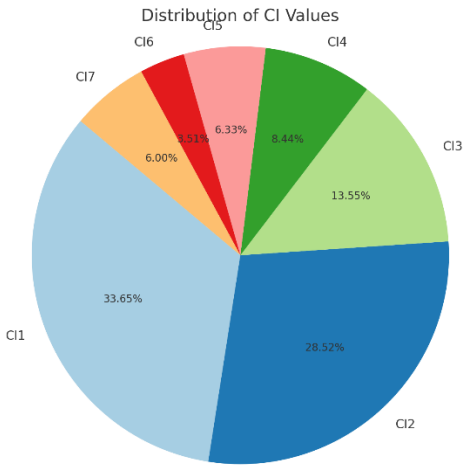

Figure 2. Total weight vector (average of the four experts).

Analysis of the Relationship Between Variables

The analysis of the results reveals important relationships between the factors that cause ineffectiveness in the Ecuadorian legislative process. First, a clear predominance of technical-legal deficiencies (CI1) and excessive politicization of the process (CI2) is observed, which together represent approximately 62% of the total weight assigned by the experts. This suggests a strong interrelationship between these two factors, where the subordination of technical criteria to political interests inevitably generates legislative products that are legally deficient.

Inadequate legislative planning (CI3) appears to be a factor of medium importance but with clear connections to both the major and minor factors. On the one hand, the lack of planning exacerbates technical deficiencies and facilitates the politicization of the process; on the other, it limits effective citizen participation and hinders both pre- and post-legislation evaluations.

Limited effective citizen participation (CI4) and deficiencies in ex-ante and ex-post evaluation (CI5) show a moderate correlation, suggesting that both represent shortcomings in mechanisms for monitoring and legitimizing the legislative process. The lack of substantive citizen participation reduces the capacity for social oversight over the production of regulations, while deficiencies in evaluation prevent a rigorous analysis of the real impact of laws.

Institutional weaknesses (CI6), although they appear to have the lowest individual weight, reveal a critical role as facilitators or amplifiers of the other factors of ineffectiveness. The lack of adequate resources and technical capacities in the legislative function exacerbates technical and legal deficiencies, hinders adequate planning, and limits the capacity to implement effective mechanisms for citizen participation and legislative evaluation.

Finally, the lack of harmonization with international law (CI7) presents an interesting relationship with technical and legal deficiencies, suggesting that the disconnection with international standards and commitments contributes to the creation of a fragmented and potentially contradictory regulatory framework.

Recommendations

Based on the analysis, the following recommendations are proposed to improve the effectiveness of the legislative process in Ecuador:

1. **Strengthen specialized technical and legal advice:** Implement a robust technical advisory system that accompanies the entire legislative cycle, from initial formulation to promulgation, ensuring that regulatory proposals meet appropriate legal standards.
2. **Establish mechanisms to depoliticize legislative debate:** Create spaces for technical dialogue prior to political debate that allow for the identification and resolution of legal, technical, and impact issues before partisan discussion.
3. **Develop a comprehensive legislative planning system:** Implement planning tools that establish multi-year legislative agendas aligned with national development goals and international commitments, prioritizing initiatives based on their potential impact.
4. **Strengthen mechanisms for effective citizen participation:** Reform the processes of prelegislative consultation and regulatory dissemination to ensure substantive citizen participation, especially among groups potentially affected by the regulations under discussion.
5. **Implement a mandatory regulatory impact assessment system:** Establish formal ex ante and ex post evaluation requirements for all significant legislative initiatives, with standardized methodologies and tracking metrics.
6. **Strengthen the institutional capacities of the legislative branch:** Invest in the professionalization of legislative staff, technological modernization, and organizational restructuring to enable greater efficiency and quality in the regulatory development process.

7. **Create a regulatory harmonization system with international standards:** Develop protocols and tools that facilitate the identification and application of international standards and commitments in the national regulatory development process.
8. **Implement an independent legislative observatory:** Establish an independent monitoring and evaluation mechanism that systematically analyzes the quality, coherence and effectiveness of legislative production.

The coordinated implementation of these recommendations could significantly contribute to improving the quality and effectiveness of Ecuador's legislative process, creating a more coherent, technically sound, and socially legitimate regulatory framework.

The study, conducted using the Neutrosophic Analytic Hierarchy Process, has allowed us to identify and assess the main factors contributing to the ineffectiveness of the legislative process in Ecuador. The results reveal that technical and legal deficiencies and excessive politicization of the process are the most determining factors, followed by inadequate legislative planning.

Neutrosophic methodology has proven particularly valuable in capturing the uncertainty and subjectivity inherent in the analysis of complex political processes such as the legislative process, allowing for a more nuanced and realistic assessment of the factors involved[21].

The resulting ranking provides a solid basis for prioritizing interventions aimed at improving legislative effectiveness. The proposed recommendations systematically address the identified factors, recognizing their interrelationships and proposing complementary measures to mitigate them.

Finally, this study constitutes a significant methodological contribution to the analysis of the legislative process, introducing neutrosophic tools that can be adapted to evaluate other aspects of the Ecuadorian legal-political system and that of the Latin American region.

4. Conclusion

The causes of ineffective legislation in Ecuador were discovered through this study, and the factors that most determine ineffective legislation at 62% overall, are technical problems and legal issues and high politicization. Through the Neutrosophic Analytic Hierarchy Process (NAHP), seven factors were prioritized; incrementalism and too political legislative debate interact with other findings, where technical problems are worsened by poor planning and minimal citizen involvement. Therefore, the results determined that ineffective legislation is not a relative issue to one factor but an issue that over time, has adverse effects on the quality of regulations and performance of institutions; therefore, a strong stance can be taken to address this further, structural concern in the Ecuadorian legislative process. The results have practical implications as they support potential future legislation. For instance, efforts to increase technical resources and decrease political debates will make legislation better, gaining more citizen trust. Also, a better-established planning system and regulatory impact analysis would ensure new regulations adhere to the goals of the country, creating viable public policies instead of redundant regulations. These discovered through comprehensive analysis are translatable to any progressive politician or regulator seeking institutional reform.

This study makes significant contributions to political science and constitutional studies. First, the NAHP application creates a new applied effort that considers uncertainty and fuzziness in its lawmaking process, as opposed to something more static and traditional. Such a process not only makes for better analysis of a complicated political system, but also a reproducible focal point for similar Latin American countries suffering from the same fate. The article addresses ineffectiveness considerations because it does the greatest good by rendering a decision of future expenditure/effect efforts. There are some flaws in the study, however. First, based on the assessments of only four experts, which is consistent (CR ≤ 10), but limits accuracy from perspectives not taken into account. Second, while the study applies to any Latin American country that has a similar governmental structure, generalizing findings to any other legislative

body that functions with different dynamics may fall flat. Third, while the NAHP is an excellent application to mitigate subjectivity, it does not make any conclusions foolproof for anyone anywhere to apply transparently. Therefore, these flaws neither negate nor undermine the study, but rather present future research opportunities. For future works, a greater pool of experts would be beneficial—actors such as legislators or representatives of groups feeling the legislation's impact may provide additional insights. Thus, alternative methodologies might be appealing; for example, assessing via network analysis or through machine learning techniques may render a more detailed understanding of the proposed factors' connection. Furthermore, assessing other countries in the region would allow findings to be compared against multicultural standards. Finally, over time, researchers may determine if their suggested alterations would make a difference. Ultimately, this study determines Ecuador's first-level causes of ineffective legislation and provides a transparent assessment with applicable means of change. The combination of its new methodological application and practical suggestions renders this study a standard bearer for institutional enhancement.

While the study's limited scope and inherent bias could be considered shortcomings, it creates an opportunity for future studies to delve into broader analysis. Ecuador's legislative reform is an urgent issue that this project's parts can address in a logical, timely fashion.

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Received: December 29, 2024. Accepted: April 10, 2025.