Neutrosophic Sets and Systems, {Special Issue: Advances in SuperHyperStructures and Applied Neutrosophic Theories)}, Vol. 74, 2024

University of New Mexico

Media Pressure and Pretrial Detention Requirements in Ucayali, Peru: A Study Based on Neutrosophic Measures

Alan Christian López Castillo[1], Edward Usaqui Barbaran[2], Miguel Oscar López Orellana[3], Aníbal Campos Barreto[4], Llesica Soria Ramirez[5], Wilmer Ortega Chávez[6], Víctor Tedy López Panaifo[7], and Alex Davis Astohuaman Huaranga[8]

[1]National University of Ucayali, Pucallpa. Peru; a.christiancito@gmail.com

[2]National University of Ucayali, Pucallpa. Peru; consultoria_usaqui@hotmail.com

[3]National University of Ucayali, Pucallpa. Peru; ml472442@gmail.com

[4]National University of Ucayali, Pucallpa. Peru; anibal_campos@unu.edu.pe

[5]National University of Ucayali, Pucallpa. Peru; llesica_soria@unu.edu.pe

[6]National University of Ucayali, Pucallpa. Peru; wortega1978@gmail.com

[7]National University of Ucayali, Pucallpa. Peru; victor_lopez@unu.edu.pe

[8]National University of Ucayali, Pucallpa. Peru; alex_astohuaman@unu.edu.pe

Abstract. This study is based on a qualitative approach and analyses the influence of media pressure on judicial decisions regarding pretrial detention in Peruvian criminal proceedings. Four media cases were selected as a sample and documentary analysis techniques were used. The results reveal that media pressure plays an important role in judicial decisions, acting through various mechanisms such as exposure to information, public pressure, and social legitimation. In some cases, media pressure has been a determining factor, while in others it has had a more subtle influence. Judges must be aware of this influence and take measures to prevent it from affecting their independence and impartiality. Structural reforms are required to ensure responsible journalism and protect the independence of the judiciary. Neutrosophic Measure theory is used and the neutrosophic belief function for a group of three experts, to express their opinion on the four cases based on a group of five criteria. This theory, which is based on neutrosophic sets, allows us to obtain more accurate but less precise results. Due to the absence of a statistically significant sample size, with the selected tool the experts can express their opinions using subjective probabilistic measures based on their experiences.

Keywords: Pressure media, prison preventive, decisions judicial, criminal procedure, neutrosophic measure theory, neutrosophic probability measure, neutrosophic belief function.

1 Introduction

One of the challenges of globalization and universalization of computer communication systems as a worldwide phenomenon is the excessive use of psychosocial advertising, to induce and condition human groups to the interests of particular ideological sectors. These are social, political, religious, economic, or legal, based on private interests or well-defined state sectors.

It is through the use of media pressure in our country, Peru (press and social networks), that interest groups have directed behavior, social reaction, and collective interest, to a clear selective conditioning, where the rational man acts under the influence of what is previously graphed by the media. This fact is suggested both by the position induced by the press media, as well as social networks, without omitting the internal pressure due to fear, reactions, or repercussions that these media could exert against those who act differently than previously conditioned. Frustration also influences the social, work, and family repercussions, due to alleged scandals for not acting as the media had previously directed.

Although globalization as a worldwide phenomenon has benefited us in terms of the universalization of knowledge, where what happens in Peru is known on the other side of the globe in a fraction of a second, everything that happens in society is public knowledge. Therefore, we can see that this sociocultural phenomenon that has benefited everyone in terms of access to public information has also contributed to broadening the direction of the population's thinking. That is why society today goes where the media directs it.

We can easily see that in this social evolution, with its positive and negative implications, the media and social networks have led the population to a greater interest in Law and judicial decisions, determining the position of the population in the approach that proliferates the front pages of newspapers, television, radio and publications on social networks. Likewise, it is with this socio-legal approach that the Judge tends to be influenced when imparting Justice.

It is in the context of motivation and influence that, in our country, the Judiciary has issued resolutions granting requests for preventive detention. However, these resolutions have been issued under an apparent motivation, supporting the fiscal requests for preventive detention, under the magnifying glass of the intensity with which the media and social networks exert media pressure.

The purpose of this study is to analyze how media pressure influences judicial decisions on the application of pretrial detention in Peruvian criminal proceedings. The research is based on a qualitative approach. Four media cases of pretrial detention requests were selected as a study sample.

We support the theory of Neutrosophic Measures that has been used in the mathematical modeling of problems within the field of legality theory [1]. The aforementioned model combines the theories of neutrosophic measure theory, neutrosophic probability measure, and neutrosophic belief function [2-4].

As we intend to study in depth four judicial cases in Peru over the last two years, we consulted a group of three experts on the subject. As the number of cases is not statistically significant, it is necessary to work with the degree of evidence that exists of compliance with certain aspects to be measured. For this reason, the experts offer measures of satisfaction with the criteria based on certain subjective probabilities, according to the experience and evidence of the experts to evaluate each of the cases.

The neutrosophic measure theory extends classical measure theory to the field of neutrosophy, which allows us to take into account measurements on a set A, and additionally measurements of non-A and the indeterminacy of A [5-10]. Therefore, there is greater precision when dealing with measurements of sets. These measurements are the basis of neutrosophic probability measures and the neutrosophic belief functions [11-17].

The study confirms that media pressure is a factor that can influence judicial decisions on pretrial detention. It is important that judges are aware of this influence and take measures to prevent media pressure from affecting their independence and impartiality. Structural reforms are required to ensure that the media report responsibly on court cases and to protect the independence of the judiciary.

This paper begins with a Preliminaries section, where the basic notions of neutrosophic measure theory are recalled and the other concepts we discuss in the article. The following section presents the results of the study. The article ends with the conclusions.

2 Preliminaries

This section contains the essential ideas of the theories used in this paper to carry out the proposed study. What we present here is based on the article in [1].

2.1 Neutrosophic Measures

Let <A> be an item. <A> can be a notion, an attribute, an idea, a proposition, a theorem, a theory, etc. And let <antiA> be the opposite of <A>; while <neutA> be neither <A> nor <antiA> but the neutral (or indeterminacy, unknown) related to <A>.

Let X be a neutrosophic space, and Σ be a σ-neutrosophic algebra over X. A *neutrosophic measure* ν

is defined for neutrosophic set $A \in \Sigma$ by $\nu: X \to \mathbb{R}^3$, such that:

$$\nu(A) = (\mathrm{m(A)}, \mathrm{m(neutA)}, \mathrm{m(antiA)}) \qquad (1)$$

With antiA:= the opposite of A, and neutA:= the neutral (indeterminacy) neither A nor antiA.

For $A \subseteq X$ and any $A \in \Sigma$:

1. $m(A)$ means *the measure of the determinate* part of A;
2. $m(neutA)$ means *the measure of the indeterminate* part of A; and
3. $m(antiA)$ means a *measure of the determinate part* of antiA.

Where ν is a function that satisfies the following two properties:

a) Null empty set: $\nu(\emptyset) = (0,0,0)$.
b) Countable additivity (or σ-additivity): For all countable collections $\{A_n\}_{n\in L}$ of disjoint neutrosophic sets in Σ, we have seen :

$$\nu(\cup_{n\in L} A_n) = \left(\sum_{n\in L} \mathrm{m}(A_n), \sum_{n\in L} \mathrm{m}(neutA_n), \sum_{n\in L} \mathrm{m}(antiA_n) - (\mathrm{n}-1)\mathrm{m}(X)\right)$$

Where X is the whole neutrosophic space, and

$$\sum_{n\in L} \mathrm{m}(antiA_n) - (\mathrm{n}-1)\mathrm{m}(X) = \mathrm{m}(X) - \sum_{n\in L} \mathrm{m}(A_n) = \mathrm{m}\big((\cap_{n\in L} antiA_n)\big) \qquad (2)$$

A *neutrosophic measure space* is a triple (X, Σ, ν).

A *neutrosophic normalized measure* is $NN = (m(X), m(neutX), m(antiX))$, where $m(X), m(neutX), m(antiX) \geq 0$ and $m(X) + m(neutX) + m(antiX) = 1$.

Where X is the whole neutrosophic measure space.

A neutrosophic measure space (X, Σ, ν) is called *finite* if $\nu(X) = (a, b, c)$ such that all a, b, and c are finite (rather than infinite).

A neutrosophic measure is called *σ-finite* if X can be decomposed into a countable union of neutrosophically measurable sets of finite neutrosophic measures.

Analogously, a set A in X is said to have a *σ-finite neutrosophic measure* if it is a countable union of sets with finite neutrosophic measure.

The neutrosophic measure ν satisfies the *axiom of non-negativity* if $\forall A \in \Sigma$,

$$\nu(A) = (\mathrm{a}_1, \mathrm{a}_2, \mathrm{a}_3) \geq 0 \qquad (3)$$

If $\mathrm{a}_1, \mathrm{a}_2, \mathrm{a}_3 \geq 0$.

While a neutrosophic measure ν, which satisfies only the null empty set and countable additivity axioms (hence not the non-negativity axiom), takes on at most one of the $\pm\infty$ values.

The members of Σ are called *measurable neutrosophic sets,* while (X, Σ) is called a *measurable neutrosophic space*.

A function $f: (X, \Sigma_X) \to (Y, \Sigma_Y)$, that is a mapping between two measurable neutrosophic spaces, is called *neutrosophic measurable function* $\forall B \in \Sigma_Y, f^{-1}(B) \in \Sigma_X$ (the inverse image of a neutrosophic Y-measurable set is a neutrosophic X-measurable set).

The properties of neutrosophic measures are the following:

a) Monotonicity:

If A_1 and A_2 are neutrosophically measurable, with $A_1 \subseteq A_2$, where $\nu(A_1) = (\mathrm{m}(A_1), \mathrm{m}(\mathrm{neut}A_1), \mathrm{m}(\mathrm{anti}A_1))$ and $\nu(A_2) = (\mathrm{m}(A_2), \mathrm{m}(\mathrm{neut}A_2), \mathrm{m}(\mathrm{anti}A_2))$, then $\mathrm{m}(A_1) \leq \mathrm{m}(A_2)$, $\mathrm{m}(\mathrm{neut}A_1) \leq \mathrm{m}(\mathrm{neut}A_2)$, $\mathrm{m}(\mathrm{anti}A_1) \geq \mathrm{m}(\mathrm{anti}A_2)$.

b) Additivity:

If $A_1 \cap A_2 = \emptyset$, then $\nu(A_1 \cup A_2) = \nu(A_1) + \nu(A_2)$, Where the sum of two measures is defined as follows:

$$(\mathrm{a}_1, \mathrm{a}_2, \mathrm{a}_3) + (\mathrm{b}_1, \mathrm{b}_2, \mathrm{b}_3) = \left(\mathrm{a}_1 + \mathrm{b}_1, \mathrm{a}_2 + \mathrm{b}_2, \mathrm{a}_3 + \mathrm{b}_3 - \mathrm{m}(X)\right) \quad (4)$$

Where X is the whole neutrosophic space and $\mathrm{a}_3 + \mathrm{b}_3 - \mathrm{m}(X) = \mathrm{m}(X) - \mathrm{m}(A) - \mathrm{m}(B) = \mathrm{m}(X) - \mathrm{a}_1 - \mathrm{a}_2 = \mathrm{m}(\mathrm{antiA} \cap \mathrm{antiB})$.

The *neutrosophic probability measure* is a mapping:

$$\mathcal{NP}: X \to [0,1]^3 \quad (5)$$

Where X is a neutrosophic sample space (i.e. X contains some indeterminacy),

$$\mathcal{NP}(\mathrm{A}) = (\mathrm{ch}(\mathrm{A}), \mathrm{ch}(indeterm\mathrm{A}), \mathrm{ch}(\overline{\mathrm{A}})) \quad (6)$$

That is to say, it is decomposed into three components, the chance that A occurs, the chance that A is indeterminate, and the chance that A does not occur.

By using another notation we have:

$$\mathcal{NP}(\mathrm{A}) = (\mathrm{ch}(\mathrm{A}), \mathrm{ch}(Neut\mathrm{A}), \mathrm{ch}(\mathrm{AntiA})) \quad (7)$$

Which satisfies the condition, $^-0 \leq \mathrm{ch}(\mathrm{A}), \mathrm{ch}(indeterm\mathrm{A}), \mathrm{ch}(\overline{\mathrm{A}}) \leq 3^+$, that is to say, there exist probabilities such that $\mathrm{ch}(\mathrm{A}) + \mathrm{ch}(indeterm\mathrm{A}) + \mathrm{ch}(\overline{\mathrm{A}})$ are equal to 1, <1, or >1.

The extension of the Kolmogorov axioms to the neutrosophic space is the following:

Let $(\mathcal{N}\Omega, \mathcal{NF}, \mathcal{NP})$ be a neutrosophic probability space, where $\mathcal{N}\Omega$ is a neutrosophic sample space, $\mathcal{NF}$ is a neutrosophic event space, and $\mathcal{NP}$ is a neutrosophic probability measure.

1. The neutrosophic probability of an event A is non-negative.
2. The neutrosophic probability of the sample space is between $^-0$ and 3^+.
3. Neutrosophic σ- additivity:

$$NP(A_1 \cup A_2 \cup \cdots) = \left(\sum_{\mathrm{j}=1}^{\infty} \mathrm{ch}(\mathrm{A_j}), \mathrm{ch}(\mathrm{indeterm}A_1 \cup A_2 \cup \cdots), \mathrm{ch}(\overline{A_1 \cup A_2 \cup \cdots})\right) \quad (8)$$

Where $A_1, A_2, \cdots$is a countable sequence of disjoint (or mutually exclusive) neutrosophic events.

If we relax the third axiom we get a *neutrosophic quasi-probability* distribution.

2.2 Neutrosophic Evidence model

This subsection presented here sets out the definitions concerning the method introduced in [1].

Definition 1 (*Neutrosophic mass assignment*) ([1]): A *neutrosophic mass assignment* is $m(\cdot) = \left(m_t(\cdot), m_i(\cdot), m_f(\cdot)\right)$; $m_t(\cdot), m_i(\cdot), m_f(\cdot): 2^\Theta \to\,]^-0, 1^+[^3$ satisfying the following axioms for each dimension of the neutrosophic space:

$$\sum_{A \subset \Theta} \sup\left(m_t(\mathrm{A})\right) \geq 1 \quad (9)$$

$$\sum_{A \subset \Theta} inf\left(m_f(\mathrm{A})\right) \geq |\Theta| - 1 \quad (10)$$

Where $|\Theta|$ represents the cardinality of the frame of discernment Θ.

Definition 2 ([1]): A *neutrosophic belief function* for all $A \subset \Theta$, $Bel(\cdot) = \left(Bel_T(\cdot), Bel_I(\cdot), Bel_F(\cdot)\right)$ is defined as:

$$Bel_T(\mathrm{A}) = \sum_{\mathrm{B} \subset \mathrm{A}} m_t(\mathrm{B}) \quad (11)$$

$$Bel_I(\mathrm{A}) = \sum_{\mathrm{B} \subset \mathrm{A}} m_i(\mathrm{B})$$

$$Bel_F(\mathrm{A}) = \sum_{\mathrm{B} \subset \mathrm{A}} m_f(\mathrm{B})$$

Definition 3 ([1]): A *neutrosophic disbelief function* for all $A \subset \Theta$, $d(\cdot) = \left(d_T(\cdot), d_I(\cdot), d_F(\cdot)\right)$ is defined as:

$$d_T(\mathrm{A}) = \sum_{\mathrm{A} \cap \mathrm{B} = \emptyset} m_t(\mathrm{B}) \quad (12)$$

$d_I(\mathrm{A}) = \sum_{\mathrm{A}\cap\mathrm{B}=\emptyset} m_i(\mathrm{B})$

$d_F(\mathrm{A}) = \sum_{\mathrm{A}\cap\mathrm{B}=\emptyset} m_f(\mathrm{B})$

Definition 4 ([1]): A *neutrosophic uncertainty function* for all $A \subset \Theta$, $u(\cdot) = \big(u_T(\cdot), u_I(\cdot), u_F(\cdot)\big)$ is defined as:

$$u_T(\mathrm{A}) = \sum_{\substack{\mathrm{A}\cap\mathrm{B}\neq\emptyset \\ \mathrm{B}\not\subseteq\mathrm{A}}} m_t(\mathrm{B}) \quad (13)$$

$$u_I(\mathrm{A}) = \sum_{\substack{\mathrm{A}\cap\mathrm{B}\neq\emptyset \\ \mathrm{B}\not\subseteq\mathrm{A}}} m_i(\mathrm{B})$$

$$u_F(\mathrm{A}) = \sum_{\substack{\mathrm{A}\cap\mathrm{B}\neq\emptyset \\ \mathrm{B}\not\subseteq\mathrm{A}}} m_f(\mathrm{B})$$

Definition 5 ([1]): Let Θ be a frame of discernment and let $A, B \in 2^{\Theta}$. Then the *relative atomicity* of A to B is the function $a: 2^{\Theta} \to \,]^{-}0, 1^{+}[$ defined by:

$$a(A/B) = \frac{|A\cap B|}{|B|} \quad (14)$$

$A, B \in 2^{\Theta}$.

Let us observe that $\mathrm{A} \cap \mathrm{B} = \emptyset$ implies $a(A/B) = 0$, whereas $\mathrm{B} \subseteq \mathrm{A}$ implies $a(A/B) = 1$. $a(\cdot)$ measures the degree of overlap between A and B.

Definition 6 ([1]): (*Neutrosophic Probability Expectation*) Let Θ be a frame of discernment with $m(\cdot)$ be the neutrosophic mass assignment, then the *neutrosophic probability expectation function* corresponding with $m(\cdot)$ is the function $\mathrm{E}: 2^{\Theta} \to \,]^{-}0, 1^{+}[^{3}$ defined by:

$$\mathrm{E_T}(A) = \sum_{\mathrm{B}} \mathrm{m_t}(\mathrm{B})\, a(A/B) \quad (15)$$

$$\mathrm{E_I}(A) = \sum_{\mathrm{B}} \mathrm{m_i}(\mathrm{B}) a(A/B)\,(1 - a(A/B))$$

$$\mathrm{E_F}(A) = \sum_{\mathrm{B}} \mathrm{m_f}(\mathrm{B})\,(1 - a(A/B))$$

$A, B \in 2^{\Theta}$.

Theorem 1 ([1]): Given a frame of discernment Θ with $m(\cdot)$ be the neutrosophic mass assignment, the probability expectation function $\mathrm{E}(\cdot)$ with domain 2^{Θ} satisfies:

1. $\mathrm{E(A)} \geq 0$ for all $A \in 2^{\Theta}$,
2. If $\mathrm{A_1}, \mathrm{A_2}, \cdots, \mathrm{A_n} \in 2^{\Theta}$ are pairwise disjoint then $\mathrm{E}(\bigcup_{i=1}^{n} A_i) = \sum_{\mathrm{i}=1}^{\mathrm{n}} \mathrm{E}(A_i)$.

Definition 7 (Opinion) ([1]): Let Θ be a binary frame of discernment with 2 atomic states A and $\neg A$, and let $m(\cdot)$ be a Neutrosophic mass assignment on Θ, where $b(A)$, $d(A)$, $u(A)$, and $a(A)$ (i.e., $B = \Theta$ in $a(A) = a(\mathrm{A}/\Theta)$) represent the belief, disbelief, uncertainty and relative atomicity functions on A in Θ, respectively.

Then the opinion about A, denoted by ω_A, is the quadruple defined by:

$$\omega_A \equiv (b(A), d(A), u(A), a(A)) \quad (16)$$

The expectation of the opinion ω_A is defined by using the following Equations:

$$\mathrm{E_T}(\omega_A) = b_T(A) + u_T(A)a(A) \quad (17)$$

$$\mathrm{E_I}(\omega_A) = b_I(A) + u_I(A)a(A)(1 - a(A))$$

$$\mathrm{E_F}(\omega_A) = b_F(A) + u_F(A)(1 - a(A))$$

Definition 8 (Ordering of Opinions) ([1]): Let ω_A and ω_B be two opinions. They can be ordered according to the following criteria by priority:

1. The greatest probability expectation gives the greatest opinion.
2. The least uncertainty gives the greatest opinion.

3. The least relative atomicity gives the greatest opinion.

Let us note that the order we referred to above is the neutrosophic order.

Definition 9 ([1]): Let Θ_A and Θ_B be two distinct binary frames of discernment and let A and B be propositions about states in Θ_A and Θ_B, respectively. Let $\omega_A = (b(A), d(A), u(A), a(A))$ and $\omega_B = (b(B), d(B), u(B), a(B))$ be an agent's opinions about A and B, respectively. Let $\omega_{A \wedge B} = (b(A \wedge B), d(A \wedge B), u(A \wedge B), a(A \wedge B))$ be the opinion such that:

1. $b(A \wedge B) = b(A) \wedge_N b(B)$,
2. $d(A \wedge B) = d(A) \vee_N d(B)$,
3. $u(A \wedge B) = u(A) \vee_N u(B)$,
4. $a(A \wedge B) = a(A) a(B)$.

Where $\wedge_N$ is a neutrosophic norm or n-norm, and $\vee_N$ is a neutrosophic conorm or n-conorm [18, 19]. This is called the *Propositional Conjunction*.

Definition 10 ([1]): Let Θ_A and Θ_B be two distinct binary frames of discernment and let A and B be propositions about states in Θ_A and Θ_B, respectively. Let $\omega_A = (b(A), d(A), u(A), a(A))$ and $\omega_B = (b(B), d(B), u(B), a(B))$ be an agent's opinions about A and B, respectively. Let $\omega_{A \vee B} = (b(A \vee B), d(A \vee B), u(A \vee B), a(A \vee B))$ be the opinion such that:

1. $b(A \vee B) = b(A) \vee_N b(B)$,
2. $d(A \vee B) = d(A) \wedge_N d(B)$,
3. $u(A \vee B) = u(A) \wedge_N u(B)$,
4. $a(A \vee B) = a(A) + a(B) - a(A) \cdot a(B)$.

This is called the *Propositional Disjunction*, which means the agent's opinion about A or B.

Definition 11 ([1]): Let Θ_A and Θ_B be two distinct binary frames of discernment and let A and B be propositions about states in Θ_A and Θ_B, respectively. Let $\omega_A = (b(A), d(A), u(A), a(A))$ and $\omega_B = (b(B), d(B), u(B), a(B))$ be an agent's opinions about A and B, respectively. Let us define:

1. $\mathrm{E}(\omega_{A \wedge B}) = E(\omega_A) \wedge_N E(\omega_B)$,
2. $\mathrm{E}(\omega_{A \vee B}) = E(\omega_A) \vee_N E(\omega_B)$.

The denial of an opinion about proposition A represents the agent's opinion about A being false. It is defined as follows:

Definition 12 ([1]): Let $\omega_A = (b(A), d(A), u(A), a(A))$ be an opinion about the proposition A. Then, $\omega_{\neg A} = (b(\neg A), d(\neg A), u(\neg A), a(\neg A))$ is the negation of A, defined as:

1. $b(\neg A) = d(A)$,
2. $d(\neg A) = b(A)$,
3. $u(\neg A) = u(A)$,
4. $a(\neg A) = 1 - a(A)$.

Definition 13 ([1]): Let $\omega_A^\alpha = (b^\alpha(A), d^\alpha(A), u^\alpha(A), a^\alpha(A))$ and $\omega_A^\beta = \left(b^\beta(A), d^\beta(A), u^\beta(A), a^\beta(A)\right)$, α\`s and β\`s opinion about the same proposition A, respectively. $\omega_A^{\alpha,\beta} = \left(b^{\alpha,\beta}(A), d^{\alpha,\beta}(A), u^{\alpha,\beta}(A), a^{\alpha,\beta}(A)\right)$ is the joint opinion and it is defined as follows:

1. $b^{\alpha,\beta}(A) = b^\alpha(A) \wedge_N b^\beta(A)$,
2. $d^{\alpha,\beta}(A) = d^\alpha(A) \vee_N d^\beta(A)$,
3. $u^{\alpha,\beta}(A) = u^\alpha(A) \vee_N u^\beta(A)$,
4. $a^{\alpha,\beta}(A) = a^\alpha(A) a^\beta(B)$.

3 Results

This section presents the results of the study carried out. The paradigm of this research is given by the belief that media pressure does not influence judicial decisions, in this specific case linked to preventive detentions. However, we will try to demonstrate that this paradigm is not real because the media will influence the granting of preventive detention requested by prosecutors despite lacking the necessary elements for its application.

For this reason, we will study the paradigm of our research in the qualitative approach that will help us understand in detail the cases that we selected for this research, these are:

1. Identify the media cases, crimes, and accused persons that were the subject of media coverage in Ucayali during the period 2021-2022.
2. Analyze the elements of conviction, prognosis of punishment, procedural danger, and duration of the sentence presented in the requests for preventive detention in media cases.
3. To examine the nature and level of pressure exerted by the media on the justice system during pretrial detention processes in high-profile cases.
4. To determine whether judges approved or denied pretrial detention requests in the media cases analyzed and how this relates to the pressure exerted by the media.
5. Understanding the dynamics between media coverage, pretrial detention requirements, and court decisions in the selected cases.

For these purposes, the files of the four media cases are analyzed. These cases are the following:

Case 1

This is a media case related to alleged collusion and criminal organization, involving several defendants. It is a case of corruption of public officials in the District Municipality of Yarinacocha.

The judge denied the prosecutor's request for pretrial detention and instead ordered him to appear with restrictions. This suggests that the elements of conviction, procedural danger, and other factors did not seem to justify pretrial detention at that time.

Case 2

This is an investigation into the crime of rape. There are testimonies from the victim, and results of medical examinations, among other evidence. It is not explicitly mentioned, but the crime of rape carries a high penalty. It is a media case because the news has been spread through different media. The judge declared the prosecutor's request for preventive detention against the perpetrator to be well-founded.

Case 3

The document refers to the media case of an alleged commission of the crime of aggravated collusion against the State-Regional Health Directorate of Ucayali (DIRESA Ucayali in Spanish). The document contains information on the evidence presented by the Public Prosecutor's Office to request preventive detention of the accused. The arguments on the procedural danger and the possible length of the sentence, if preventive detention is ordered, are discussed. It has been shown that the news has been disseminated by different media. It is known that it is a media case. The document does not include the judge's final decision on the request for preventive detention.

Case 4

The media case is related to an investigation into alleged aggravated collusion against the Regional Health Directorate of Ucayali. The document indicates that the request for preventive detention by the prosecutor was denied. The judge considered that there were no sufficiently strong suspicions (strong suspicions) of the commission of a serious crime to justify preventive detention.

The judge pointed out that mere weak probabilities, simple indications, or generic suspicions are not sufficient, since the presumption of innocence accompanies the accused throughout the entire process until a final conviction.

The document does not indicate any direct relationship between the court decision and media pressure. According to the information provided in this document, it appears that the judge made the decision to deny pretrial detention based on a careful legal analysis of the evidence and the required legal standards, rather than being directly influenced by media coverage.

The study carried out took into account the following aspects to measure the impact of media pressure on the outcome of the procedural measures applied in the convictions of the cases, as previously indicated.

A1. Identification of media cases, crimes, and defendants: This category refers to the delimitation of the media case in question, specifying the crime investigated and the persons charged. It is essential to contextualize the analysis and understand the specific circumstances in which media pressure is developed.

A2. Analysis of the elements of conviction, prognosis of sentence, procedural danger, and duration of sentence in requests for preventive detention: This category examines the arguments presented by the Public Prosecutor's Office to request pretrial detention, including the evidence supporting the accusation, the possible penalty that would be imposed in the event of a conviction, and the risk that the accused will obstruct the investigation or flee. This analysis is crucial to assess the strength of the request and its potential impact on the court's decision.

A3. Examination of the nature and level of media pressure on the judicial system during pretrial detention proceedings: This category explores media coverage of the case and its potential influence on public opinion and perception of the judicial system. It is important to consider the tone, intensity, and scope of media coverage, as well as the possible strategies used by the media to influence public opinion.

A4. Determining whether the judges approved or denied the requests for pretrial detention and how this relates to media pressure: This category analyses judicial decisions on requests for pretrial detention, considering the arguments presented by the parties and the legal criteria underlying the decision. It is essential to assess whether media pressure has played a role in the judge's decision, either explicitly or implicitly.

A5. Understanding the dynamics between media coverage, requests for pretrial detention, and court decisions in the selected cases: This category seeks to understand the complex interaction between media pressure, requests for pretrial detention, and court decisions, considering the different factors that may influence the judge's decisions. It is important to analyze the different perspectives of the actors involved, such as judges, prosecutors, defenders, journalists, and civil society representatives, to obtain a more complete view of the dynamics at play.

To do this, the steps defined below were followed:

The evaluation procedure followed in this research

1. Three specialists were requested to provide their opinions on each of the cases in relation to the aspects mentioned above.

   Let us call $E = \{e_1, e_2, e_3\}$ the set of specialists who are going to be consulted.

2. Let be $a_{ijk} = (T_{ijk}, I_{ijk}, F_{ijk})$ the opinion issued by the k-th specialist (k = 1, 2, 3) on the satisfaction of the j-th case (j = 1, 2, 3, 4) of the i-th criterion (i = 1, 2, 3, 4, 5).

   Where T_{ijk} is the k-th expert's confidence percentage that the j-th case adequately satisfies the i-th criterion. Similarly, I_{ijk} is the indeterminacy percentage and F_{ijk} is the non-satisfiability percentage. It is preferred for convenience that $T_{ijk} + I_{ijk} + F_{ijk} = 1$.

3. The measure is then calculated for each case and each expert, using the formula:

   $$(T_x, I_x, F_x) \otimes (T_y, I_y, F_y) = (T_x T_y, I_x + I_y - I_x I_y, F_x + F_y - F_x F_y) \quad (18)$$

   This formula is repeated by setting an expert $\hat{k}$-th and a case $\hat{\imath}$-th to obtain:

$a_{\hat{i}\hat{k}} = \otimes_{j=1}^{5} a_{\hat{i}j\hat{k}}$ (19)

4. It is taken $m_{ik} = a_{ik}$ as the neutrosophic measure of the evaluation of the i-th case evaluated by the k-th expert.

For each expert k, the neutrosophic belief function is calculated for each case with the help of Equation 11 and all the other functions. Let us denote by b_{1k}, b_{2k}, b_{3k}, and b_{4k} these functions for the cases. It should be noted that for non-singleton sets the neutrosophic measure functions are calculated by formula 20. For example, $m_{\{1,2\}k} = a_{1k} \oplus a_{2k}$, which is the measure of whether cases 1 and 2 meet the stated criteria, and so on.

$(T_x, I_x, F_x) \oplus (T_y, I_y, F_y) = (T_x + T_y - T_xT_y,\ I_xI_y,\ F_xF_y)$ (20)

5. Finally, we obtain the neutrosophic belief function for each case for all experts, which is calculated as:

$b_i = \wedge_n{}_{k=1}^{3} b_{ik}$ where $\wedge_n$ is shown in Equation 1 of Definition 9, calculated for all experts.

Remark 1: This procedure can be repeated for the rest of the neutrosophic functions in addition to the neutrosophic belief function.

The results of the three experts' evaluations of the cases regarding the criteria were as follows as shown in Tables 1-3:

Table 1: Evaluation given by Expert 1 on the cases for the attributes.

Case/Attribute	**A1**	**A2**	**A3**	**A4**	**A5**
C1	(0.1,0.8,0.1)	(0.8,0.1,0.1)	(0.1,0.8,0.1)	(0.1,0.8,0.1)	(0.1,0.8,0.1)
C2	(0.6,0.1,0.3)	(0.7,0.2,0.1)	(0.6,0.1,0.3)	(0.8,0.1,0.1)	(0.1,0.8,0.1)
C3	(0.1,0.8,0.1)	(0.8,0.1,0.1)	(0.1,0.8,0.1)	(0.1,0.8,0.1)	(0.1,0.8,0.1)
C4	(0.1,0.8,0.1)	(0.8,0.1,0.1)	(0.1,0.8,0.1)	(0.8,0.1,0.1)	(0.1,0.8,0.1)

Table 2: Evaluation given by Expert 2 on the cases for the attributes.

Case/Attribute	**A1**	**A2**	**A3**	**A4**	**A5**
C1	(0.2,0.7,0.1)	(0.7,0.1,0.2)	(0.1,0.8,0.1)	(0.2,0.7,0.1)	(0.1,0.8,0.1)
C2	(0.7,0.1,0.2)	(0.6,0.2,0.2)	(0.7,0.1,0.2)	(0.6,0.2,0.2)	(0.2,0.7,0.1)
C3	(0.2,0.7,0.1)	(0.7,0.1,0.2)	(0.2,0.7,0.1)	(0.2,0.7,0.1)	(0.1,0.8,0.1)
C4	(0.3,0.5,0.2)	(0.7,0.1,0.2)	(0.2,0.7,0.1)	(0.6,0.2,0.2)	(0.2,0.7,0.1)

Table 3: Evaluation given by Expert 3 on the cases for the attributes.

Case/Attribute	**A1**	**A2**	**A3**	**A4**	**A5**
C1	(0.2,0.6,0.2)	(0.9,0.1,0)	(0.2,0.6,0.2)	(0.2,0.6,0.2)	(0.1,0.9,0)
C2	(0.7,0.2,0.1)	(0.7,0.2,0.1)	(0.5,0.4,0.1)	(0.9,0.1,0)	(0.1,0.9,0)
C3	(0.2,0.6,0.2)	(0.9,0.1,0)	(0.2,0.6,0.2)	(0.2,0.6,0.2)	(0.1,0.9,0)
C4	(0.2,0.6,0.2)	(0.9,0.1,0)	(0.2,0.6,0.2)	(0.9,0.1,0)	(0.1,0.9,0)

Table 4 contains the results obtained from applying step 3 of the procedure. Triple values are calculated for each case and each expert.

Table 4: Evaluation given by each expert on the cases for all attributes.

Case/Expert	e_1	e_2	e_3
C_1	($8.0e^{-5}$, 0.99856, 0.40951)	(0.00028, 0.99676, 0.47512)	(0.00072, 0.99424, 0.488)
C_2	(0.02016, 0.88336, 0.64279)	(0.03528, 0.84448, 0.63136)	(0.02205, 0.95626, 0.424)
C_3	($8.0e^{-5}$, 0.99856, 0.40951)	(0.00056, 0.99514, 0.47512)	(0.00072, 0.99424, 0.488)
C_4	(0.00064, 0.99352, 0.40951)	(0.00504, 0.9676, 0.58528)	(0.00324, 0.98704, 0.36)

The Neutrosophic belief function according to Expert 1 is $Bel_1(\{C_1, C_2, C_3, C_4\}) = (0.167615083, 13.996445, 3.6003033)$, according to Expert 2 is $Bel_2(\{C_1, C_2, C_3, C_4\}) = (0.328432823, 13.45806, 4.6274346)$ and according to Expert 3 is $Bel_3(\{C_1, C_2, C_3, C_4\}) = (0.21340664, 14.459237, 3.2879997)$. The conjoint neutrosophic belief function is $Bel(\{C_1, C_2, C_3, C_4\}) = (0.167615083, 14.459237, 4.6274346)$. This means that jointly we can identify a very low certainty that there is no media pressure on judicial decisions, compared to a very high uncertainty (approximately 86 times higher) and a very high lack of certainty as well (approximately 28 times higher).

4 Conclusion

Media pressure is a factor that can influence judicial decisions, but it is not the only determining factor. In some of the cases analyzed, media pressure seems to have been a factor that judges took into account when deciding on pretrial detention. However, a direct correlation is not observed in all cases, and in some others, the judges based their decisions mainly on legal criteria. Judges must base their decisions on solid evidence and legal arguments, regardless of the media pressure that may exist. To reach these conclusions, we calculated the coefficient of the neutrosophic belief function obtained from the opinion of three experts, who evaluated the four cases according to five criteria. The use of neutrosophic measures allowed for obtaining greater accuracy.

The main limitation of this study is the sample size. Future research with larger and more diverse samples is recommended to obtain more generalizable results. In addition, qualitative studies are recommended to better understand the experiences and perspectives of judges, prosecutors, defense attorneys, and journalists in relation to media pressure and judicial decisions on pretrial detention.

References

[1] Ramos, E. L. H., Almache, F. A. G., Kairuz, A. R. P., and Riofrio, C. A. M. (2021). A New Model based on Subjective Logic and Neutrosophic Measure for Legal Reasoning. Neutrosophic Sets and Systems, 44, 456-463.

[2] Smarandache, F. (2013). Introduction to neutrosophic measure, neutrosophic integral, and neutrosophic probability. Infinite Study.

[3] Zeina, M. B., and Hatip, A. (2021). Neutrosophic random variables. Neutrosophic Sets and Systems, 39, 44-52.

[4] Leonita, D. and Hepzibah, I. (2021). A framework of neutrosophic evidence theory based on probability estimation, Malaya Journal of Matematik, S, 181-184.

[5] Hatip, A. (2020). The special neutrosophic functions. International Journal of Neutrosophic Science, 4, 104-116.

[6] Al-Sharqi, F., and Al-Quran, A. (2022). Similarity measures on interval-complex neutrosophic soft sets with applications to decision making and medical diagnosis under uncertainty. Neutrosophic Sets and Systems, 51, 495-515.

[7] Granados, C. (2023). Quadripartitioned single-valued neutrosophic properties and their application to factors affecting energy prices. Process Integration and Optimization for Sustainability, 7, 575-582.

[8] Syah, M. Y. A. H., Sanjaya, M. R., Lestari, E., and Putra, B. W. (2023). Sistem Pendukung Keputusan Dengan Menerapkan Metode TOPSIS Untuk Menentukan Siswa Terbaik. Jurnal Teknologi Dan Sistem Informasi Bisnis, 5, 149-154.

[9] Salama, A. A., Mobarez, O. M., Elfar, M. H., and Alhabib, R. (2024). Neutrosophic Model for Measuring and

Evaluating the Role of Digital Transformation in Improving Sustainable Performance Using the Balanced Scorecard in Egyptian Universities. Neutrosophic Systems with Applications, 21, 1-24.

[10] Khan, Z., and Krebs, K. L. (2025). Enhancing Neutrosophic Data Analysis: A Review of Neutrosophic Measures and Applications with Neutrostat. Neutrosophic Sets and Systems, 78, 181-190.

[11] Granados, C. (2021). On independence neutrosophic random variables. Neutrosophic Sets and Systems, 47, 541-557.

[12] Zeina, M. B., and Hatip, A. (2021). Neutrosophic random variables. Neutrosophic Sets and Systems, 39, 44-52.

[13] Granados, C., Das, A. K., and Das, B. (2022). Some continuous neutrosophic distributions with neutrosophic parameters based on neutrosophic random variables. Advances in the Theory of Nonlinear Analysis and its Application, 6, 380-389.

[14] Granados, C. (2022). Some discrete neutrosophic distributions with neutrosophic parameters based on neutrosophic random variables. Hacettepe Journal of Mathematics and Statistics, 51, 1442-1457.

[15] Nouri, A. M., Zeitouny, O., and Alabdallah, S. (2022). Neutrosophic stable random variables. Neutrosophic Sets and Systems, 50, 420-430.

[16] Granados, C. (2023). Convergence of Neutrosophic Random Variables. Advances in the Theory of Nonlinear Analysis and its Application, 7, 178-188.

[17] Hepzibah, R.I., and Leonita, D. (2022). Application of Neutrosophic Basic Probability Assignment in Water Analysis Process, Advances and Applications in Mathematical Sciences, 21, 1861-1868.

[18] González-Caballero, E., Leyva-Vázquez, M., and Smarandache, F. (2021). On neutrosophic uninorms. Neutrosophic sets and systems, 45, 340-348.

[19] Luo, M., Sun, Z., and Wu, L. (2024). Fuzzy inference quintuple implication method based on single valued neutrosophic t-representable t-norm. Neutrosophic Optimization and Intelligent Systems, 3, 8-22.

Received: July 31, 2024. Accepted: September 31, 2024