Investigating Workplace Challenges: A Neutrosophic Soft Set Analysis of Female Workers' Problems in Diverse Industries

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Abstract

This research proposes a novel approach to rank the problems faced by female employees in various sectors by utilizing the concept of the bipolar single-valued Neutrosophic soft set-in variable. The feature assessment used an enormous collection of multi-observer information as a basis for examining the issues encountered by women employed in a variety of sectors. An effective method for identifying the Neutrosophic domain's choice-making problem is the Neutrosophic Soft Set. The creation of similar tables has shaped the investigation into classification. In a Neutrosophic setting, grouping objects and persons according to their properties, capacities, the result, etc., is advantageous.

Keywords: Bipolar Neutrosophic soft sets; Progression table; Women's issues; Changeable sense; Score function

1. Introduction

Contemporary systems inherently contain unpredictability. Research is presenting numerous new techniques to handle unpredictably large data sets. A few different approaches include the sets of uncertainty that Zadeh (1965) introduced, the rough sets that Z. Pawlak (1982) created, and the intuitionistic fuzzy sets that K.T. Atanassov (1986) expanded. Each of the above models has advantages and disadvantages. Nonetheless, a significant issue concerning these mathematical models is that there are not enough variables to address inconsistency. In 1999, Molodtsov invented soft set theory to include a sufficient number of variables. Nonetheless, every theory's real-world implication must be sufficiently significant to warrant its utilization.

It can be difficult to establish and implement the notion of unpredictability, even though there are numerous situations that call for unreliable data that can be handled with traditional mathematical techniques. These fields can be described by a variety of methods, such as uncertain set theory [15], probability theory [16], and neutrosophic set theory [14]. Molodtsov [19, 20] presented a unique processing technique in 1999 called the soft set idea, which is useful for handling unpredictability.

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The preceding idea that ambiguous and undetermined sets had not been appropriate for managing uncertain attributes primarily motivated the approach. While fuzzy sets that are intuitionistic may handle imprecise and unclear data, they cannot handle imprecise knowledge. Nonetheless, because every variable is distinct and the uncertainty is made explicit, neutronosophic sets are capable of handling this kind of data. [20]. In addition, because neutrosophic sets can handle these variations in knowledge, Maji originally proposed a method that removed the various difficulties related to implementing this idea. Furthermore, Maji initially suggested a technique that eliminated the different challenges associated with putting this concept into practice, given that neutrosophic systems are capable of handling this kind of data. Neutrosophic soft sets were first used to address decision-making issues. While neutronosophic sets can accept a wide variety of data types, they can only be used in real-world applications if a summary for each operation and set is required [18].

To address ambiguity in complex decision-making, the neutrosophic soft set was devised. Mumtaz Ali created a system for making decisions that utilised bipolar neutrosophic soft sets [1]. This paper provides a quick overview of the several methods for the bipolar neutrosophic soft sets and their viability. In a different study, Irfan Deli presented an innovative approach to the interval-valued neutrosophic soft sets problem [2]. Numerous attributes of the different sets are examined. Broumi then introduced the idea of expanded neutrosophic soft sets. Based on this idea, particular traits and functions are identified [3]. A new type of single-valued neutrosophic (SVN) cover-based rough sets over each of the domains is proposed by utilizing Wang's single-valued neutrosophic, covered rough sets. Wang's perspective is reliant on only one domain of existence, whereas the proposed technique involves multiple domains; as a result, the unique method presents a new perspective for making decisions in unclear circumstances [4]. The fundamental concepts of neutrosophic soft p-closed sets and neutrosophic soft p-open sets were discussed by the speaker, along with a summary of their salient features. Additionally, the notions of neutrosophic soft p-neighborhood and neutrosophic soft p-separation principles are developed in neutrosophic soft topological domains. Important discoveries arediscussed in light of the most current ideas about soft areas. [5]. A new approach to selecting a mobile phone in an MCDM decision-making environment is proposed. Firstly, an extended fuzzy TOPSIS (GFT) method isproposed to address the problem initially called a neutrosophic soft set [6]. The single-valued decagonal Neutrosophic number is used while solving a problem. To evaluate students' performance, an assessment process is employed. The traits are derived from problems that affect both teachers and pupils. The properties are found by applying the single-valued decagonal Neutrosophic number [7]. In this study, a unique single-valued octagonal Neutrosophic number is used to solve the group replacement model. Using the area removal method, the equation to calculate the de-neutrosophication of the octagonal neutrosophic number is derived [8]. An enlarged Neutrosophic soft set is used in the resolution of problems.

Broumi [9] developed the idea of generalised neutrosophic soft sets. In a separate book, he put forth a novel approach to using the neutrosophic soft sets for the investigation of the murky conditions underlying the shareholder market. Moreover, Sudhan Jha developed a method to determine the most common issues pertaining to the market for stocks. [11]. Broumi has determined the connection among similar neutrosophic sets and neutrosophic soft sets [12]. The current study explains the relationship among soft neutrosophic sets and comparable ones with neutrosophic properties. Moreover, a methodology for drawing inferences just from the neutrosophic soft set is introduced. Moreover, properties of malleable sets are investigated. Ali goes on to describe the qualities of soft sets. He continued by going over the concepts of constrained variability and constrained convergence. Shuker Mahmood established the theory of the progressively incorrect soft point. [13]. Kandil determined properties of special soft components in numerous unstructured soft morphology spaces. [14].For contrasting the bipolar neutrosophic sets, score, certainty, and accuracy functions are devised. For combining the bipolar neutrosophic data, the bipolar neutrosophic weighted geometric operator (Gw) and bipolar neutrosophic weighted average operator (Aw) are designed. To illustrate the use and efficacy of the devised technique, an instance with numbers was provided. It is suggested to represent bipolar neutrosophic soft sets using an expression that blends bipolar neutrosophic

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sets and soft sets. We look at several facets of the bipolar neutrosophic set's algebraic procedures, including the complement, union, and intersection. A decision-making approach cent red on bipolar neutrosophic soft sets is created, as well as a compilation bipolar neutrosophic soft activator of a bipolar neutrosophic soft set. It is suggested to represent bipolar neutrosophic soft sets using a notation that blends bipolar neutrosophic sets and soft sets. We look at some of the bipolar neutrosophic set's algebraic procedures, including the complement, union, and intersection. A choice-making technique founded on bipolar neutrosophic soft sets is created, as well as a combination bipolar neutrosophic soft activator of a bipolar neutrosophic soft set. A novel, surpassing method for multi-attribute making decisions in a bipolar neutrosophic system is introduced. Several surpassing correlations that use ELECTRE for bipolar neutrosophic number are presented. The characteristics of the surpassing connections are presented. A bipolar neutrosophic number ranking system is devised, which depends on the surpassing connections.

Based on bipolar neutrosophic sets and hesitant fuzzy sets, a hesitant bipolar-valued neutrosophic set (HBVNS) is introduced. The hesitant bipolar-valued neutrosophic weighted geometric (HBVNWG) and the hesitant bipolar-valued neutrosophic weighted aggregating (HBVNWA) are two aggregate operations that are constructed according to HBVNS. After considering the suggested HBVNWA and HBVNWG operators as well as new sets, a process for making decisions is built.

Because of the bipolar neutrosophic soft set, bipolar neutrosophic soft topology is presented. We describe the conventional topological features with bipolar neutrosophic soft (BNS). A generalization of the fuzzy geometry is the BNS-topology. The presentation of some BNS-closure, BNS-interior, BNS-exterior, and BNS-frontier aspects of the BNS-topology is done using BNS points. Cubic bipolar neutrosophic sets, a groundbreaking architecture that considerably expanded the potential of bipolar neutrosophic sets (BNSs) to deal with vagueness and ambiguity throughout the analysis of information, were released. We present CBNSSs, or cubic bipolar neutrosophic soft sets, as a versatile parameterization option for CBNSs

2. Preliminaries

Definition 2.1: Within the discourse context Z, neutrosophic set D is described as $D = \{(z, T_D(z), I_D(z), F_D(z))/z \in Z\}$ where $T_D, I_D, F_D : Z \to [0,1^+]$

And $0^- \leq T_D(z) + I_D(z) + F_D(z) \leq 3^+$

Definition 2.2: We will now look at a non-empty set $T, T \subseteq V$, a collections (T, V) is known as a soft set on Z, with 'T' being the mapping provided by $T: V \to P(z)$

Definition 2.3: A collection graded expression through T to P(Z) is called a soft set T on Z. A collection of sequential pairs could be created with it.

$V = \{z, V(z)/\ z \in Z\}$

The component (t, V(t)) does not occur within V when V(t)=∅.

Definition 2.4: Z should be a entire collection. Let S be an array of variables. Let $R \subset S$. Let P(Z) be the set comprising all sets related to Z that are Neutrosophic. A representation of S:R→P(Z) is used to identify the set (S, R) as the soft Neutrosophic sets on Z.

Definition 2.5: Bipolar Neutrosophic set: A bipolar Neutrosophic set A in X is defined as an object of the form $A = \{< x, T_A^+(x), I_A^+(x), F_A^+(x), T_A^-(x), I_A^-(x), F_A^-(x) >: x \in X\}$ where the positive membership degree $T_A^+(x), I_A^+(x), F_A^+(x)$ denote the truth membership function, indeterminacy membership function, falsity membership function of an element

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$x \in X$. Corresponding to a bipolar Neutrosophic set A the negative membership degree $T_A^-(x), I_A^-(x), F_A^-(x)$ denote the truth membership, Indeterminacy membership, Falsity membership functions.

Definition 2.6: consider (X,G) & (Y,H) in the ordinary universe Y, there are two bipolar single-valued Neutrosophic soft sets. The intersection of these (X, G) & (Y, H) is expressed by

$$(X, G) \cap (Y, H) = \{\min\{T^+{}_{X(c)}(n), T^+{}_{Y(c)}(n)\}, \left\{\frac{I^+{}_{X(c)}(n), + I^+{}_{Y(c)}(n)}{2}\right\}, \max\{T^+{}_{X(c)}(n), T^+{}_{Y(c)}(n),\ \}$$

$$\{\max\{T^-{}_{X(c)}(n), T^-{}_{Y(c)}(n)\}, \left\{\frac{I^-{}_{X(c)}(n), + I^-{}_{Y(c)}(n)}{2}\right\}, \min\{T^-{}_{X(c)}(n), T^-{}_{Y(c)}(n),\ \}$$

Definition 2.7: The score function formula for Bipolar single valued Neutrosophic number is provided by

Let $\tilde{S} = (T^+, I^+, F^+, T^-, I^-, F^-)$ be a bipolar Single valued Neutrosophic number. Then the score function is as follows.

$$\tilde{S} = \frac{T^+ + (1 - I^+) + (1 - F^+) + (1 - T^-) - (I^- - F^-)}{6}$$

3. Bipolar single-valued neutrosophic soft set-in decision-making dilemma is used to evaluate issues facing women in the workforce

Consider $W = \{W_1, W_2, W_3, W_4, W_5, W_6\}$ be the group of women employed in sectors with varying issues, such as behavioral problem, physical problem, and psychological problem. The parameter set $D =$ {Anorexia, Alcoholism, under performance, Changes in close family relationships, Sore Head, Angina Pectoris, Muscle Soreness, Recurrent illness, Hypertension, Tetchiness, Sorrowfulness, Emotional imbalance, Despair}. The complete set of variables D is configured with three sections: C, H, and K,C represents the behavioral challenges that women in the field encounter.

H is an abbreviation for a physical condition that affects women employed in industry.

K represents the psychological problems that women in the field encounter.

The single-valued Neutrosophic Soft Set (M, C) describes the women with behavioral problems. The single-valued Neutrosophic soft set (M,H) describes the women who are having physical issues. The single-valued Neutrosophic Soft Set (M,K) describes the women with psychological problems. The bipolar single-valued Neutrosophic soft set (M,C) is obtained as follows:

Table [1]

W	Anorexia(c_1)	Alcoholism (c_2)	Under Performance (c_3)	Changes in close family relationships(c_4)
W_1	(0.8,0.4,0.3,-0.7,-0.6,-0.3)	(0.7,0.5,0.2,-0.8,-0.4,-0.2)	(0.6,0.5,0.4,-0.8,-0.5,-0.4)	(0.9,0.5,0.4,-0.7,-0.5,-0.2)
W_2	(0.9,0.6,0.4,-0.8,-0.7,-0.3)	(0.8,0.7,0.5,-0.7,-0.5,-0.4)	(0.9,0.4,0.1,-0.8,-0.5,-0.3)	(0.8,0.7,0.6,-0.7,-0.6,-0.5)
W_3	(0.8,0.5,0.3,-0.7,-0.5,-0.3)	(0.7,0.5,0.2,-0.3,-0.2,-0.1)	(0.9,0.6,0.2,-0.8,-0.6,-0.2)	(0.8,0.6,0.4,-0.5,-0.4,-0.2)

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W_4	(0.9,0.5,0.2,-0.5,-0.2,-0.1)	(0.8,0.6,0.4,-0.5,-0.4,-0.3)	(0.8,0.7,0.3,0.7,-0.6,-0.2)	(0.7,0.6,0.2,-0.6,-0.4,-0.2)
W_5	(0.8,0.5,0.2,-0.6,-0.5,-0.3)	(0.9,0.6,0.4,-0.6,-0.4,-0.3)	(0.7,0.3,0.2,-0.6,-0.4,-0.2)	(0.9,0.8,0.4,-0.8,-0.6,-0.2)
W_6	(0.9,0.5,0.4,-0.6,-0.5,-0.3)	(0.8,0.7,0.5,-0.4,-0.3,-0.2)	(0.9,0.6,0.4,-0.8,-0.7,-0.4)	(0.8,0.5,0.3,-0.7,-0.3,-0.2)

Bipolar single-valued Neutrosophic Soft Set (M, H):

Table [2]

W	Sore Head (h_1)	Angina Pectoris (h_2)	Muscle Soreness (h_3)	Recurrent illness (h_4)	Hypension (h_5)
W_1	(0.4,0.2,0.1,-0.7,-0.5,-0.2)	(0.8,0.7,0.4,-0.7,-0.5,-0.3)	(0.9,0.8,0.5,-0.7,-0.6,-0.5)	(0.9,0.8,0.7,-0.8,-0.7,-0.4)	(0.8,0.70.6,-0.5,-0.4,-0.3)
W_2	(0.7,0.5,0.4,-0.6,-0.4,-0.2)	(0.7,0.5,0.4,-0.6,-0.5,-0.3)	(0.8,0.4,0.2,,-0.7,-0.6,-0.3)	(0.8,0.7,0.5,-0.6,-0.5,-0.4)	(0.9,0.8,0.7,-0.4,-0.2,-0.1)
W_3	(0.8,0.4,0.2,-0.7,-0.4,-0.1)	(0.9,0.8,0.7,-0.5,-0.4,-0.2)	0.9,0.8,0.5,-0.7,-0.6,-0.4)	(0.9,0.8,0.7,-0.9,-0.8,-0.4)	(0.8,0.7,0.6,-0.7,-0.5,-0.4)
W_4	(0.7,0.5,0.1,-0.9,-0.8,-0.5)	(0.8,0.7,0.4,-0.8,-0.7,-0.5)	(0.8,0.7,0.6,-0.5,-0.4,-0.2)	(0.8,0.6,0.4,-0.4,-0.2,-0.1)	(0.9,0.5,0.3,-0.7,-0.6,-0.4)
W_5	(0.9,0.6,0.5,-0.9,-0.7,-0.4)	(0.7,0.6,0.4,-0.8,-0.5,-0.2)	(0.9,0.5,0.3,-0.8,-0.7,-0.5)	(0.7,0.6,0.2,-0.5,-0.4,-0.3)	(0.8,0.7,0.4,-0.7,-0.6,-0.4)
W_6	(0.8,0.6,0.5,-0.7,-0.6,-0.4)	(09,0.7,0.6,-0.5,-0.4,-0.2)	(0.8,0.5,0.4,-0.7,-0.6,-0.5)	(0.8,0.6,0.5,-0.5,-0.4,-0.3)	(0.7,0.4,0.3,-0.6,-0.4,-0.2)

Bipolar single-valued Neutrosophic soft set (M, K):

Table [3]

W	Tetchiness (k_1)	Sorrowfulness (k_2)	Emotional imbalance(k_3)	Despair(k_4)
W_1	(0.7,0.6,0.5,-0.6,-0.5,-0.3)	(0.8,0.7,0.4,-0.5,-0.4,-0.2)	(0.7,0.6,0.5,-0.5,-0.4,-0.2)	(0.8,0.7,0.6,-0.7,-0.6,-0.5)
W_2	(0.9,0.6,0.4,-0.5,-0.4,-0.3)	(0.9,0.8,0.7,-0.8,-0.7,-0.6)	(0.9,0.8,0.6,-0.8,-0.7,-0.5)	(0.9,0.5,0.3,-0.8,-0.7,-0.5)
W_3	(0.8,0.6,0.5,-0.7,-0.6,-0.5)	(0.8,0.7,0.6,-0.9,-0.8,-0.7)	(0.8,0.7,0.3,-0.5,-0.3,-0.2)	(0.8,0.7,0.6,-0.7,-0.5,-0.4)
W_4	(0.9,0.7,0.4,-0.7,-0.6,-0.5)	(0.9,0.6,0.5,-0.8,-0.7,-0.5)	(0.9,0.6,0.3,-0.5,-0.3,-0.2)	(0.9,0.8,0.7,-0.8,-0.7,-0.6)

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W_5	(0.8,0.7,0.4,-0.7,-0.5,-0.4)	(0.8,0.7,0.4,-0.7,-0.5,-0.4)	(0.8,0.7,0.4,-0.4,-0.3,-0.2)	(0.9,0.8,0.6,-0.5,-0.4,-0.3)
W_6	(0.7,0.6,0.4,-0.6,-0.5,-0.4)	(0.9,0.8,0.6,-0.7,-0.4,-0.2)	(0.9,0.7,0.6,-0.5,-0.4,-0.2)	(0.8,0.6,0.5,-0.7,-0.5,-0.4)

If we do, we will obtain twenty factors (M, C) ^ (M, H). For all i = 1,2,3,4 & j = 1,2,3,4,5, The specifications of the structure, $v_{ij} = c_i$^ h$_j$. The last example of the single-valued Neutrosophic soft set, which is composed of Neutrosophic sets, fulfils the prerequisites of the structure.(M, C) & (M, H), will be represented by (X, Z) (say) in order to determine the variables connected to the Neutrosophic soft set that is single-valued. $Z = \{v_{13}, v_{24}, v_{25}, v_{33}, v_{34}, v_{41}, v_{42}, v_{45}\}$

The table that follows will be the format in which a tabular illustration of the resulting bipolar single-valued Neutrosophic soft set is provided:

Table [4]

W	v_{13}	v_{24}	v_{25}	v_{33}	v_{34}	v_{41}	v_{42}	h_{45}
W_1	(0.8,0.6, 0.5, -0.7,-0.6, -0.5)	(0.7,0.65, 0.7, -0.8,-0.55, -0.4)	(0.7,0.6,0.6, -0.5,-0.4,-0.3)	(0.6,0.65, 0.5, -0.7,-0.55, -0.5)	(0.9,0.65, 0.7, -0.8,-0.65, -0.4)	0.4,0.35, 0.4, -0.7,-0.5, -0.2)	(0.8,0.6, 0.4, -0.7,-0.5, -0.3)	(0.8,0.6, 0.7 ,-0.5,-0.45, -0.3)
W_2	(0.8,0.1, 0.4,-0.7,-0.65, -0.4)	(0.8,0.7,0.5,-0.6,-0.5,-0.4)	(0.8,0.75,0.7,-0.4,-0.35,-0.4)	(0.8,0.4,0.2,-0.7,-0.55,-0.4)	(0.8,0.55,0.5,-0.6,-0.5,-0.4)	(0.7,0.6, 0.6-0.6, -0.5,-0.5)	(0.7,0.6, 0.6,-0.6,-0.55,-0.5)	(0.8,0.75, 0.7,-0.4, -0.4,-0.5)
W_3	(0.8,0.65, 0.5,-0.7,-0.55,-0.5)	(0.7,0.65,0.7,-0.3,-0.5,-0.4)	(0.7,0.6,0.6,-0.3,-0.5,-0.4)	(0.9,0.7,0.5,-0.7,-0.6,-0.5)	(0.9,0.6,0.7,-0.8,-0.65,-0.4)	(0.8,0.5,0.4,-0.5,-0.4,-0.2)	(0.8,0.7, 0.7,-0.5, -0.4,-0.2)	(0.8,0.65, 0.6,-0.5,-0.45,-0.4)
W_4	(0.8,0.6,0.6,-0.5,-03,-0.2)	(0.8,0.6,0.4,-0.4,-0.3,-0.3)	(0.8,0.65,0.4,-0.5,-0.5,-0.4)	(0.8,0.7,0.6,-0.5,-0.5,-0.2)	(0.8,0.65,0.4,-0.4,-0.4,-0.2)	(0.7,0.55, 0.2,-0.6,-0.6,-0.5)	(0.7,0.65,0.4,-0.6,-0.55,-0.5)	(0.7,0.55,0.3,-0.6,-0.5,-0.4)
W_5	(0.8,0.5,0.3,-0.6,-0.6,-0.3)	(0.8,0.65,0.4,-0.6,-0.5,-0.4)	(0.8,0.65,0.4,-0.6,-0.5,-0.4)	(0.7,0.45,0.3,-0.6,-0.4,-0.8)	(0.7,0.45,0.3,-0.6,-0.4,-0.8)	(0.9,0.7,0.5,-0.8,-0.65,-0.4)	(0.7,0.7,0.4,-0.8,-0.55,-0.2)	(0.8,0.75,0.4,-0.7,-0.6,-0.4)
W_6	(0.8,0.5,0.4,-0.6,-0.58,-0.5)	(0.8,0.6,0.5,-0.5,-0.4,-0.3)	(0.7,0.55,0.5,-0.4,-0.35,-0.2)	(0.8,0.55,0.4,-0.7,-0.65,-0.5)	(0.8,0.6,0.5,-0.5,-0.55,-0.4)	(0.8,0.55, 0.5,-0.7,-0.45,-0.4)	(0.8,0.6,0.6,-0.5,-0.35,-0.2)	(0.7,0.45,0.3,-0.6,-0.35,-0.2)

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4. Algorithm

Phase 1: Processing the supplied input sets (M, C), (M, H), and (M, K) in the relevant area using the bipolar single-valued Neutrosophic soft set constitutes the first phase.

Phase 2: The monitor will offer a report on the input variable set H.

Phase 3: After assessing bipolar Neutrosophic single-valued soft sets and arranging them in a tabular manner, determining how (M, C), (M, H, and (M, K) are computed results in the final bipolar single-valued Neutrosophic soft set (J, L).

Phase 4: Create an improvement table with a bipolar single-valued Neutrosophic soft set for each woman W_i

Phase 5: Tabular assessment will be used to assess the score for each W_i.

Phase 6: $W_k = Max\, W_i$. is the final outcome after using the previously indicated procedure. The result obtained by applying the aforementioned procedure is $W_k = Max\, W_i$.

Assume that the viewer's selected variables are equal to

$$P = \{v_{13} \wedge k_1, v_{24} \wedge k_2, v_{25} \wedge k_3, v_{33} \wedge k_4, v_{34} \wedge k_1, v_{41} \wedge k_2, v_{42} \wedge k_3, v_{45} \wedge k_4\}$$

We must use the previously mentioned parameters to choose one choice among the entire collection. The resulting single-valued Neutrosophic soft set is represented in the following arrangement of tables that is discussed as follows:

Table [5]

W	$v_{13} \wedge k_1$	$v_{24} \wedge k_2$	$v_{25} \wedge k_3$	$v_{33} \wedge k_4$	$v_{34} \wedge k_1$	$v_{41} \wedge k_2$	$v_{42} \wedge k_3$	$v_{45} \wedge k_4$
W_1	(0.7,0.6, 0.5,-0.7, -0.55,-0.5)	(0.7,0.68, 0.7,-04.5,-0.48,-0.4)	(0.7,06, 0.6,-0.5,-0.4,-0.2)	0.6,0.68, 0.6,-0.7,-0.61,-0.5)	(0.7,0.63, 0.7,-0.6,-0.58,-0.4)	(0.4,0.53, 0.4,-05,-0.45,-0.2)	(0.7,0.6, 0.5,-0.4,-0.45,-0.3)	(0.8 ,0.65, 0.7, -0.5, -0.53, -0.5)
W_2	(0.8,0.35,4,-0.5,-0.525,-0.4)	(0.8,0.75, 0.7,-0.6, -0.6,-0.4)	(0.8,0.75, 0.7,-0.4,-0.525,-0.5)	(0.8,0.75, 0.7,-0.4,-0.525,-0.5)	(0.8,0.58, 0.5,-0.6,-0.45,-0.4)	(0.7,0.7, 0.7,-0.6, -0.6,-0.25	(0.7,0.7, 0.6-0.6,-0.63,-0.5)	(0.8,0.63, 0.7,-0.4, -0.55,-0.5)
W_3	(0.8,0.625,0.5,-0.7,-0.525,-0.5)	(0.7,0.68, 0.7,-0.3,-0.65,-0.7)	(0.7,0.60, 0.6,-0.5, -0.33,-0.2)	(0.8,0.7, 0.6-0.7,-0.55,-0.4)	(0.8,0.6,0.7,-0.7,-0.55,-0.4)	(0.8,0.6, 0.6,-0.9,-0.6,-0.7)	(0.8,0.6,0.7,-0.5,-0.35,-0.2)	(0.8,0.68, 0.6,-0.5,-0.48,-0.4)
W_4	(0.8,0.65,0.6,-0.5,-0.45,-0.5)	(0.8,0.6, 0.5,-0.4, -0.5,-0.3)	(0.8,0.63,0.4,-0.5,-0.45, -0.4)	(0.8,0.73, 0.7,-0.5, -0.6,-0.6)	(0.8,0.68,0.4,-0.7,-0.4,-0.5)	(0.7,0.58, 0.5,-0.6,-0.65,-0.5)	(0.7,0.58, 0.4,-0.5,-0.48,-0.5)	(0.7,0.68, 0.7,-0.3, -0.65,-0.4)

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W_5	(0.8,0.6,0.4,-0.6,-0.55,-0.5)	(0.7,0.65,0.4,-0.5,-0.45,-0.4)	(0.8,0.625,0.4,-0.5,-0.45,-0.2)	(0.7,0.6,0.6,-0.6,-0.48,-0.5)	(0.7,0.58,0.4,-0.6,-0.45,-0.8)	(0.8,0.7,0.5,-0.7,-0.58,-0.4)	(0.7,0.7,0.4,-0.4,-0.43,-0.2)	(0.8,0.78,0.6,-0.5,-0.5,-0.3)
W_6	(0.7,0.55,0.4,-0.6,-0.54,-0.5)	(0.8,0.7,0.6,-0.5,-0.4,-0.3)	(0.7,0.63,0.6,-0.4,-0.43,-0.2)	(0.8,0.58,0.5,-0.7,-0.58,-0.5)	(0.7,0.6,0.5,-0.5,-0.53,-0.4)	(0.8,0.68,0.6,-0.7,-0.43,-0.4)	(0.8,0.65,0.6,-0.5,-0.38,-0.2)	(0.7,0.53,0.5,-0.6,-0.43,-0.2)

De-Neutrosophication, the bipolar single-valued Neutrosophic soft set:

Table [6]

W	$v_{13} \wedge k_1$	$v_{24} \wedge k_2$	$v_{25} \wedge k_3$	$v_{33} \wedge k_4$	$v_{34} \wedge k_1$	$v_{41} \wedge k_2$	$v_{42} \wedge k_3$	$v_{45} \wedge k_4$
W_1	0.558	0.323	0.533	0.52	0.525	0.5367	0.525	0.4967
W_2	0.6125	0.525	0.463	0.5617	0.5617	0.5	0.5217	0.4867
W_3	0.5667	0.428	0.5217	0.558	0.5583	0.5667	0.525	0.5167
W_4	0.5	0.55	0.553	0.4783	0.5533	0.5617	0.533	0.4783
W_5	0.575	0.533	0.5875	0.513	0.495	0.58	0.5383	0.52
W_6	0.565	0.5167	0.5167	0.583	0.5383	0.5417	0.5383	0.5867

The bipolar single-value Neutrosophic Soft Set that was created above has the progress table shown below:

Table [7]

	$\boldsymbol{W_1}$	$\boldsymbol{W_2}$	$\boldsymbol{W_3}$	$\boldsymbol{W_4}$	$\boldsymbol{W_5}$	$\boldsymbol{W_6}$
$\boldsymbol{W_1}$	8	4	2	4	3	1
$\boldsymbol{W_2}$	4	8	4	4	3	3
$\boldsymbol{W_3}$	7	4	8	5	3	4
$\boldsymbol{W_4}$	5	4	3	8	2	4
$\boldsymbol{W_5}$	6	5	6	6	8	5
$\boldsymbol{W_6}$	4	5	4	4	4	8

σ_i denotes a women's row total, this expression is utilized to estimate it.

$$\sigma_i = \sum_{j=1}^{n} S_{ij}$$

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The total amount of characteristics that have appeared when W_i leads all of W's components is showed by the representation σ_i.

γ_j represents a student's columns total, W_j.

$$\gamma_j = \sum_{i=1}^{n} S_{ij}$$

In this case, γ_j indicates the total amount of variables for which every element of W dominates W_j, Every Women's row aggregate, columns aggregate, and increasing rating is denoted as

$\rho_i = \sigma_i - \gamma_j$

Table [8]

	Aggregate, of Rows σ_i	**Aggregate, of Columns γ_j**	**Progressive ρ_i**
W_1	22	34	-12
W_2	26	30	-4
W_3	31	27	4
W_4	26	31	-5
W_5	36	23	13
W_6	29	25	4

5. Result

According to the offered progressive table, a higher percentage of scores occur around 13, which is achieved by W_5. As a result, the list of W_5 has the biggest progressive report.

6. Conclusion

In this study, we developed a bipolar single-valued neutrosophic soft set to systematically categorize and analyze the challenges faced by female workers across various sectors. Our findings highlighted that W_5 is the individual most significantly impacted by these issues, underscoring the need for targeted interventions. By employing a multi-viewer input element, we were able to gather comprehensive data that informed our subsequent action plan. The process allowed us to evaluate the balance of perspectives and experiences among the participants, resulting in a comparison table that effectively illustrates the single values derived from the neutrosophic soft set framework. This methodology not only provides a nuanced understanding of the problems encountered by female workers but also paves the way for developing tailored strategies to address these challenges. Moving forward, it will be essential to implement the proposed action plan and monitor its effectiveness in creating a more equitable work environment for women across sectors. Our approach demonstrates the value of integrating advanced mathematical frameworks with social research to enhance decision-making and foster positive change.

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