Supply chain efficiency transformation: analysis of raw material staff selection based on preference selection index

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ABSTRACT

In the era of intense business globalization, supply chain management is becoming a vital key to improving the efficiency and competitiveness of enterprises. The selection of raw material supply staff is an important aspect of supply chain management, affecting smooth supply, efficiency and cost control. This research focuses on using the preference selection index (PSI) method in the selection of raw material supply staff. PSI is a tool that integrates data from multiple criteria in the selection process. The results show that PSI provides an effective evaluation in staff selection, identifies key variables that affect selection success and analyzes the impact of using PSI on supply chain efficiency and company productivity. This research fills the knowledge gap in the application of PSI in the context of raw material supply staff selection and contributes to the understanding of efficient and sustainable supply chain management. The results provide valuable insights for industries and organizations that depend on reliable raw material supply and demonstrate the potential to improve the overall staff selection process. The outcome of this study found that Muliyono received a PSI score of 0.9643 and was ranked first, while Ramli received a PSI score of 0.9548 and was ranked second.

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1. INTRODUCTION

In the era of globalization and increasingly fierce business competition, supply chain management has become a key element in ensuring the efficiency and competitiveness of companies. An integral part of supply chain management is the selection of the right workforce, especially in the context of raw material supply which is the foundation for the company's production and operations [1]–[3]. The selection of raw material supply staff is a critical challenge in supply chain management. Proper selection decisions ensure smooth supply, operating efficiency, and optimal cost control. Therefore, it is important to develop an effective selection method, which is able to consider a wide array of candidate variables, such as technical ability, industry knowledge, communication, personality aspects, and skills and initiative [4]–[9].

A decision support system (DSS) is a system that can perform problem-solving capabilities. The concept of a DSS was first proposed by Michael Scott Morton in 1971 and the term was management decision system

[10]–[16]. Then many companies, research institutes and universities began to conduct research and form DSS so that it can be concluded from the final production of the system, namely a computer-based system designed to assist decision making in using certain systems and data and models to solve various unstructured problems.

One of the methods in the DSS is the preference selection index (PSI) method developed by Maniya and Bhatt for multi-criteria decision making (MCDM) [17]–[21]. In the proposed method there is no need to establish the relative importance among the attributes. In fact, this method does not need to calculate the weights of the attributes involved in decision making. This method is useful when conflicts occur when determining relative attributes. In the PSI method, the results are obtained through minimal and simple calculations as it is based on statistical concepts without attribute weights. PSI is one of the methods used for candidate selection. PSI is a tool that integrates data from multiple criteria in the selection process. Although PSI has been used in various contexts, including employee selection, this approach has not been fully explored in the context of raw material supply staff selection.

This research aims to fill the gap by analyzing the use of PSI in raw material supply staff selection. By utilizing PSI, this research can also achieve several objectives including evaluating the effectiveness of PSI in raw material supply staff selection, identifying key variables that affect the success of supply staff selection, analyzing the impact of using PSI on supply chain efficiency and company productivity, and providing practical guidance for organizations that want to adopt PSI in raw material supply staff selection. By bridging this knowledge gap and analyzing the application of PSI in raw material supply staff selection, this research contributes to the practical and theoretical understanding of efficient and sustainable supply chain management. As such, the results of this study are expected to provide valuable insights to industries and organizations that depend on a reliable supply of raw materials.

2. RESEARCH METHOD

2.1. Research stages

Because this research uses the concept of an experimental approach. Figure 1 explains how to do this research. The first thing that is done starts from the data collection stage, problem analysis, problem formulation, and PSI algorithm calculation method with the results of the analysis which then results in conclusions in determining raw material staff selection. The following can be seen in Figure 1 the stages in the research.

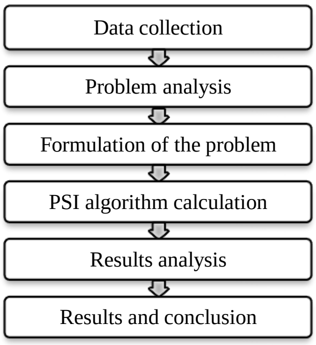

Figure 1. Research stages

2.2. Method preference selection index

Method PSI is a method that at the stage of calculating the criteria weight index is determined by the information contained in the decision matrix, with the standard deviation or entropy method it will be able to identify the criteria weights objectively. The PSI method considers both the relative importance of criteria and the variability in the data, allowing decision-makers to make informed and unbiased decisions. By using the standard deviation or entropy method, the PSI method quantifies the dispersion or uncertainty in the data, providing a more objective and reliable assessment of the criteria weights. This approach helps to avoid potential biases that can arise from subjective judgments in the decision-making process, ultimately leading to more robust and fair outcomes. Additionally, the PSI method provides a systematic framework for decision analysis, making it a valuable tool in various fields, including business, engineering, and public policy. The following are the calculation steps applying the PSI method [22]–[28], namely:

– Determine the problem: determine the objectives and identify the attributes and alternatives involved in the decision-making problem.

- Formulate a decision matrix: this step involves constructing a matrix based on all available information that describes the attributes of the problem. Each decision matrix series is allocated to one alternative and each column to one attribute. Therefore. the X_{ij} elements of the X decision matrix assign attribute values to the original values. So, if the number of alternatives is M and the number of attributes is N then the decision matrix as an NM matrix can be represented as (1).

$$X_{ij} = \begin{bmatrix} X11 & X12 & \dots & X1n \\ X21 & X22 & \dots & X2n \\ \vdots & \vdots & \vdots & \vdots \\ xm1 & xm2 & \dots & xmn \end{bmatrix} \quad (1)$$

- Normalization of the decision matrix: if attribute is typebenefits then a larger value is desired which can be normalized as (2):

$$N_{ij} = \frac{x_{ij}}{x_j{}^{max}} \quad (2)$$

If the attribute is typecost then a smaller value is desired which can be normalized as (3).

$$N_{ij} = \frac{x_j{}^{min}}{x_{ij}} \quad (3)$$

Where X_{ij} is the attribute size (i=1, 2, ... N and j=1, 2, ... M).

- Calculate value mean from normalized data: in this step, the value of the normal data for each attribute is calculated by the (4).

$$N = \frac{1}{n} \sum_{i=1}^{n} N_{ij} \quad (4)$$

- Calculate the value of the variation in perception: in this step, the preference variation value between the values of each attribute is calculated using the (5).

$$\emptyset_j = \sum_{i=1}^{n} [N_{11} - N]^2 \quad (5)$$

- Determine the deviation in the preference value

$$\Omega_j = 1 - \emptyset_j \quad (6)$$

- Determines the weight of the criteria

$$W_j = \frac{\Omega_j}{\sum_{j=1}^{m} \Omega_j} \quad (7)$$

The total value of all the criteria for the weight of all attributes should be one, for example $\sum_{j=1}^{m} \Omega_j$.

- Calculate PSI: to select index preferences for each alternative, use the (8).

$$\theta_i = \sum_{j=1}^{m} X_{ij} \quad w_j \quad (8)$$

- Select the appropriate alternative for the given application

2.3. System analysis

The system analysis in this research is carried out by applying the PSI for the selection of raw material supplier staff. The sample data used in this study comes from certain criteria that play an important role in the process of selecting raw material supplier staff [29], [30]. Table 1 shows the criteria used in this study. The applied criteria have been identified as key determinants in assessing and selecting suitable candidates for the position and this research focuses on analyzing data based on the criteria to ease the decision-making process in the selection of raw material supply staff. After that, in Table 2, the data that has been obtained from the research sources will be processed into data which is then converted into a Likert scale with a value range of 1 to 5. Next in Figure 2 can be seen the preliminary results scheme that can be summarized temporarily from each candidate candidate raw material supplier staff by determining the average value achieved.

Table 1. Table of criteria

No	Criteria code	Criteria name	Type
1	C1	Technical ability	Benefit
2	C2	Industry knowledge	Benefit
3	C3	Communication	Benefit
4	C4	Personality aspects	Benefit
5	C5	Skills and Initiative	Benefit

Table 2. Value of alternative conversion results

ID	Name	C1	C2	C3	C4	C5	Average
A01	Suriadi	3	3	3	4	3	3.2
A02	Azman	4	5	5	4	4	4.4
A03	Reza	5	5	4	4	4	4.4
A04	Yusri	4	5	4	5	5	4.6
A05	Indra	5	5	3	5	4	4.4
A06	Heri	5	3	5	5	4	4.2
A07	Danuri	3	3	3	5	3	3.6
A08	Hendra	4	5	4	4	4	4.2
A09	Andrian	4	5	5	5	4	4.6
A10	Ramli	5	5	5	5	4	4.8
A11	Zainal	4	5	5	5	4	4.6
A12	Nanang	3	5	4	5	5	4.4
A13	Wahyu	4	5	3	4	3	3.8
A14	Ayu	4	5	4	3	5	4.2
A15	Marissa	4	5	5	3	5	4.4
A16	Erwin	5	3	5	3	4	4
A17	Dudi	4	4	5	4	5	4.4
A18	Andre	4	4	5	4	5	4.4
A19	Jimmy	3	4	5	4	4	4
A20	Muliyono	5	4	5	5	5	4.8
A21	Frensky	5	4	4	4	4	4.2
A22	Rizky	5	4	3	4	5	4.2
A23	Suandika	4	5	5	4	5	4.6

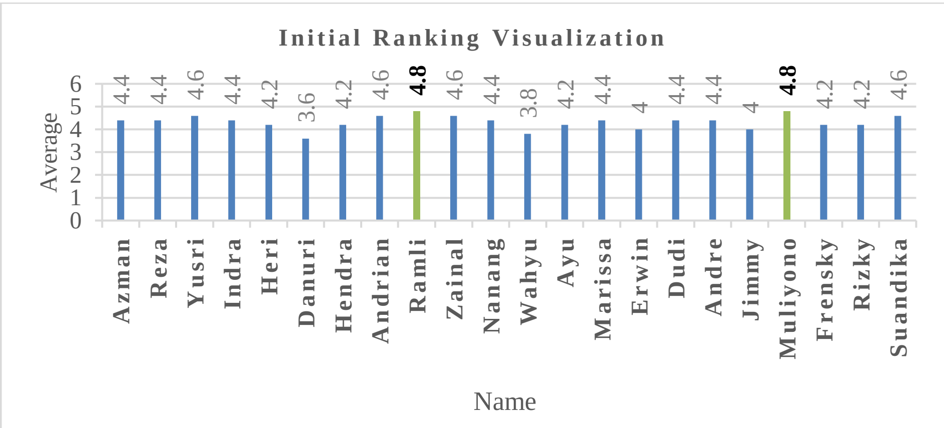

Figure 2. Initial ranking visualization

From the criteria that have been known and the data that has been successfully converted into a Likert scale with a value range of 1 to 5, it should be that if you look at this data which has determined the average value obtained by each candidate for raw material supply staff, it can be concluded directly who will be selected as raw material supply staff, namely Ramli and Muliyono with an average value of 4.8 who get the highest score, but in the selection decision it is not allowed for 2 or more candidates who have the same value and position because it is certain that only 1 candidate will be selected to occupy that position. Therefore, this research will solve the problems that often occur in the case of selecting raw material supplier staff and will also be applied to other cases and from this research we will also understand how PSI works in depth. The PSI method here has its own uniqueness from other methods, namely in the process of weighting the value of the criteria will be determined directly from the PSI calculation process where for other methods the weighting of the criteria is usually determined at the beginning with a scale of 0-1 or 0-100.

3. RESULTS AND DISCUSSION
3.1. Results of application of PSI method
Completion with the PSI method refers to the process of making a decision or selection based on the calculated PSI score of the candidate. After the data is collected, and the PSI method is applied to assess the suitability of each candidate, the finalization stage begins. During the finalization phase, the decision maker analyzes the candidate's PSI score and considers various factors to make an informed decision. These factors may include specific requirements that apply to a given criterion.

Completion with the PSI method allows decision makers to streamline the selection process by taking into account the objective PSI score and the subjective factors that influence the final decision. By using the PSI method, companies can ensure a fair and systematic approach to selecting candidates for the settlement process, avoiding bias and subjectivity. In the end the settlement with the PSI method helps companies make optimal decisions by considering objective data and criteria. This allows decision makers to identify candidates with the highest PSI scores, indicating their suitability to complete the role based on the data analyzed. Using this method, companies can increase the effectiveness and efficiency of their completion processes, leading to better results and successful completions.

The following are the results of applying the PSI method to the data:

– Create decision matrix: the decision matrix based on the results of conversion of alternative values as in (9).

$$\text{Matrix } X_{ij} = \begin{bmatrix} 3 & 3 & 3 & 4 & 3 \\ 4 & 5 & 5 & 4 & 4 \\ 5 & 5 & 4 & 4 & 4 \\ 4 & 5 & 4 & 5 & 5 \\ 5 & 5 & 3 & 5 & 4 \\ 5 & 3 & 5 & 5 & 4 \\ 3 & 3 & 3 & 5 & 3 \\ 4 & 5 & 4 & 4 & 4 \\ 4 & 5 & 5 & 5 & 4 \\ 5 & 5 & 5 & 5 & 4 \\ 4 & 5 & 5 & 5 & 4 \\ 3 & 5 & 5 & 5 & 4 \\ 4 & 5 & 5 & 3 & 3 \\ 4 & 5 & 4 & 3 & 5 \\ 4 & 5 & 5 & 3 & 5 \\ 5 & 3 & 5 & 3 & 4 \\ 4 & 4 & 5 & 4 & 5 \\ 4 & 4 & 5 & 4 & 5 \\ 3 & 4 & 5 & 4 & 4 \\ 5 & 4 & 5 & 5 & 5 \\ 5 & 4 & 4 & 4 & 4 \\ 5 & 4 & 3 & 4 & 5 \\ 4 & 5 & 5 & 4 & 5 \end{bmatrix} \quad (9)$$

– Find the maximum and minimum of each alternative: the following is a Table 3 of maximum and minimum values for each alternative.

Table 3. Maximum and minimum values

Maximum value	Minimum value
5	3
5	3
5	3
5	3
5	3

– Normalizing the decision matrix: in the (10)-(30) is a matrix normalization of alternative values according to type. Normalization for criterion I:

$$R_{ij} = \frac{x_{ij}}{x_{j\,max}} \quad (10)$$

$$R_{11} = \frac{X_{11}}{X_1\,max} = \frac{3}{5} = 0.60 \tag{11}$$

$$R_{21} = \frac{X_{21}}{X_1\,max} = \frac{4}{5} = 0.80 \tag{12}$$

$$R_{31} = \frac{X_{31}}{X_1 max} = \frac{5}{5} = 1 \tag{13}$$

$$R_{231} = \frac{X_{231}}{X_1 max} = \frac{4}{5} = 0.80 \tag{14}$$

Normalization for criterion II:

$$R_{12} = \frac{X_{12}}{X_2 max} = \frac{3}{5} = 0.60 \tag{15}$$

$$R_{22} = \frac{X_{22}}{X_2 max} = \frac{5}{5} = 1 \tag{16}$$

$$R_{32} = \frac{X_{32}}{X_2 max} = \frac{5}{5} = 1 \tag{17}$$

$$R_{232} = \frac{X_{232}}{X_2 max} = \frac{5}{5} = 1 \tag{18}$$

Normalization for criterion III:

$$R_{13} = \frac{X_{13}}{X_3 max} = \frac{3}{5} = 0.60 \tag{19}$$

$$R_{23} = \frac{X_{23}}{X_3 max} = \frac{5}{5} = 1 \tag{20}$$

$$R_{33} = \frac{X_{33}}{X_3 max} = \frac{4}{5} = 0.80 \tag{21}$$

$$R_{233} = \frac{X_{233}}{X_3 max} = \frac{5}{5} = 1 \tag{22}$$

Normalization for criterion IV:

$$R_{14} = \frac{X_{14}}{X_4 max} = \frac{4}{5} = 0.80 \tag{23}$$

$$R_{24} = \frac{X_{24}}{X_4 max} = \frac{4}{5} = 0.80 \tag{24}$$

$$R_{34} = \frac{X_{34}}{X_4 max} = \frac{4}{5} = 0.80 \tag{25}$$

$$R_{234} = \frac{X_{234}}{X_4 max} = \frac{4}{5} = 0.80 \tag{26}$$

Normalization for criterion V:

$$R_{15} = \frac{X_{15}}{X_5 max} = \frac{3}{5} = 0.60 \tag{27}$$

$$R_{25} = \frac{X_{25}}{X_5 max} = \frac{4}{5} = 0.80 \tag{28}$$

$$R_{35} = \frac{X_{35}}{X_5 max} = \frac{4}{5} = 0.80 \tag{29}$$

$$R_{235} = \frac{X_{235}}{X_5 max} = \frac{5}{5} = 1 \tag{30}$$

The (31) is the overall decision matrix normalization result.

$$\text{Matrix } R_{ij} = \begin{bmatrix} 0.60 & 0.60 & 0.60 & 0.80 & 0.60 \\ 0.80 & 1 & 1 & 0.80 & 0.80 \\ 1 & 1 & 0.80 & 0.80 & 0.80 \\ 0.80 & 1 & 0.80 & 1 & 1 \\ 1 & 1 & 0.60 & 1 & 0.80 \\ 1 & 0.60 & 1 & 1 & 0.60 \\ 0.60 & 0.60 & 0.60 & 1 & 0.80 \\ 0.80 & 1 & 0.80 & 0.80 & 0.80 \\ 0.80 & 1 & 1 & 1 & 0.80 \\ 1 & 1 & 1 & 1 & 0.80 \\ 0.80 & 1 & 1 & 1 & 0.80 \\ 0.60 & 1 & 0.80 & 1 & 1 \\ 0.80 & 1 & 0.60 & 0.80 & 0.60 \\ 0.80 & 1 & 0.80 & 0.60 & 1 \\ 0.80 & 1 & 1 & 0.60 & 1 \\ 1 & 0.60 & 1 & 0.60 & 0.80 \\ 0.80 & 0.80 & 1 & 0.80 & 1 \\ 0.80 & 0.80 & 1 & 0.80 & 1 \\ 0.60 & 0.80 & 1 & 0.80 & 0.80 \\ 1 & 0.80 & 1 & 1 & 1 \\ 1 & 0.80 & 0.80 & 0.80 & 0.80 \\ 1 & 0.80 & 0.60 & 0.80 & 1 \\ 0.80 & 1 & 1 & 0.80 & 1 \end{bmatrix} \tag{31}$$

– Calculating the average value of matrix: do the sum of matrix average values of each attribute as in (32).

$$N = \frac{1}{N}\sum_{i=1}^{n} Rij = [19.20\ 20.20\ 19.80\ 19.60\ 19.60] \tag{32}$$

Calculating the mean value of the results obtained above, namely:

$$N = \frac{1}{N}\sum_{i=1}^{n} Rij = \frac{1}{23} \times 19.20 = 0.834783 \tag{33}$$

$$N = \frac{1}{N}\sum_{i=1}^{n} Rij = \frac{1}{23} \times 20.20 = 0.878261 \tag{34}$$

$$N = \frac{1}{N}\sum_{i=1}^{n} Rij = \frac{1}{23} \times 19.80 = 0.860870 \tag{35}$$

$$N = \frac{1}{N}\sum_{i=1}^{n} Rij = \frac{1}{23} \times 19.60 = 0.852174 \tag{36}$$

$$N = \frac{1}{N}\sum_{i=1}^{n} Rij = \frac{1}{23} \times 19.60 = 0.852174 \tag{37}$$

– Calculating preference variation values: determine the preference variation value in relation to each criterion using the (38). Here are the preference variation values ($\emptyset_j$) as in (38).

$$\emptyset_j = \begin{bmatrix} 0.055123 & 0.077429 & 0.068053 & 0.002722 & 0.063592 \\ 0.001210 & 0.014820 & 0.019357 & 0.002722 & 0.002722 \\ 0.027297 & 0.014820 & 0.003705 & 0.002722 & 0.002722 \\ 0.001210 & 0.014820 & 0.003705 & 0.021853 & 0.021853 \\ 0.027297 & 0.014820 & 0.068053 & 0.021853 & 0.002722 \\ 0.027297 & 0.077429 & 0.019357 & 0.021853 & 0.063592 \\ 0.055123 & 0.077429 & 0.068053 & 0.021853 & 0.002722 \\ 0.001210 & 0.014820 & 0.003705 & 0.002722 & 0.002722 \\ 0.001210 & 0.014820 & 0.019357 & 0.021853 & 0.002722 \\ 0.027297 & 0.014820 & 0.019357 & 0.021853 & 0.002722 \\ 0.001210 & 0.014820 & 0.019357 & 0.021853 & 0.002722 \\ 0.055123 & 0.014820 & 0.003705 & 0.021853 & 0.021853 \\ 0.001210 & 0.014820 & 0.068053 & 0.002722 & 0.063592 \\ 0.001210 & 0.014820 & 0.003705 & 0.063592 & 0.021853 \\ 0.001210 & 0.024499 & 0.019357 & 0.063592 & 0.021853 \\ 0.027297 & 0.014820 & 0.019357 & 0.063592 & 0.002722 \\ 0.001210 & 0.077429 & 0.019357 & 0.002722 & 0.021853 \\ 0.001210 & 0.006125 & 0.019357 & 0.002722 & 0.021853 \\ 0.055123 & 0.006125 & 0.019357 & 0.002722 & 0.002722 \\ 0.027297 & 0.006125 & 0.019357 & 0.021853 & 0.021853 \\ 0.027297 & 0.006125 & 0.003705 & 0.002722 & 0.002722 \\ 0.027297 & 0.006125 & 0.068053 & 0.002722 & 0.021853 \\ 0.001210 & 0.014820 & 0.019357 & 0.002722 & 0.021853 \end{bmatrix} \tag{38}$$

Then add up the results of the rank values in the preference variation matrix ($\emptyset_j$). The result of the sum of the preference variation matrices is as in (39):

$$\emptyset_j = [0.452174\ 0.539130\ 0.594783\ 0.417391\ 0.417391] \tag{39}$$

– Defining the value of deviation in preference: here the value of deviation in preference is as in (40)-(44):

$$\Omega_j = 1 - 0.452174 = 0.547826 \quad (40)$$

$$\Omega_j = 1 - 0.539130 = 0.460870 \quad (41)$$

$$\Omega_j = 1 - 0.594783 = 0.405217 \quad (42)$$

$$\Omega_j = 1 - 0.417391 = 0.582609 \quad (43)$$

$$\Omega_j = 1 - 0.417391 = 0.582609 \quad (44)$$

In the (45) is the result of reducing the value in preferences consisting of:

$$\Omega_j = [0.547826\ 0.460870\ 0.405217\ 0.582609\ 0.582609] \quad (45)$$

Calculating the total value as in (46):

$$\sum \Omega_j = 0.547826 + 0.460870 + 0.405217 + 0.582609 + 0.582609 = 2.579130 \quad (46)$$

– Determine the weight criteria: the formula to be used in calculating the weight criteria is as in (47)-(51):

$$W_j = \frac{\Omega_j}{\sum_{j=1}^{m} \Omega_j} = \frac{0.547826}{2.579130} = 0.21240728 \quad (47)$$

$$W_j = \frac{\Omega_j}{\sum_{j=1}^{m} \Omega_j} = \frac{0.460870}{2.579130} = 0.17869184 \quad (48)$$

$$W_j = \frac{\Omega_j}{\sum_{j=1}^{m} \Omega_j} = \frac{0.405217}{2.579130} = 0.15711396 \quad (49)$$

$$W_j = \frac{\Omega_j}{\sum_{j=1}^{m} \Omega_j} = \frac{0.582609}{2.579130} = 0.22589346 \quad (50)$$

$$W_j = \frac{\Omega_j}{\sum_{j=1}^{m} \Omega_j} = \frac{0.582609}{2.579130} = 0.22589346 \quad (51)$$

The results of calculating the overall value of the W_j weighting criteria are as in (52):

$$W_j = [0.21240728\ 0.17869184\ 0.15711396\ 0.22589346\ 0.22589346] = 1.000000 \quad (52)$$

– Calculate the PSI value: to get the largest preference index value is to use the (53). The results of multiplication calculations on the $\emptyset_i$ matrix are as in (53):

$$\emptyset_i = \begin{bmatrix} 0.127444 & 0.107215 & 0.094268 & 0.180715 & 0.135536 \\ 0.169926 & 0.178692 & 0.157114 & 0.180715 & 0.180715 \\ 0.212407 & 0.178692 & 0.125691 & 0.180715 & 0.180715 \\ 0.169926 & 0.178692 & 0.125691 & 0.225893 & 0.225893 \\ 0.212407 & 0.178692 & 0.094268 & 0.225893 & 0.180715 \\ 0.212407 & 0.107215 & 0.157114 & 0.225893 & 0.135536 \\ 0.127444 & 0.107215 & 0.094268 & 0.225893 & 0.180715 \\ 0.169926 & 0.178692 & 0.125691 & 0.180715 & 0.180715 \\ 0.169926 & 0.178692 & 0.157114 & 0.225893 & 0.180715 \\ 0.212407 & 0.178692 & 0.157114 & 0.225893 & 0.180715 \\ 0.169926 & 0.178692 & 0.157114 & 0.225893 & 0.180715 \\ 0.127444 & 0.178692 & 0.125691 & 0.225893 & 0.225893 \\ 0.169926 & 0.178692 & 0.094268 & 0.180715 & 0.135536 \\ 0.169926 & 0.178692 & 0.125691 & 0.135536 & 0.225893 \\ 0.169926 & 0.178692 & 0.157114 & 0.135536 & 0.225893 \\ 0.212407 & 0.107215 & 0.157114 & 0.135536 & 0.180715 \\ 0.169926 & 0.142953 & 0.157114 & 0.180715 & 0.225893 \\ 0.169926 & 0.142953 & 0.157114 & 0.180715 & 0.225893 \\ 0.127444 & 0.142953 & 0.157114 & 0.180715 & 0.180715 \\ 0.212407 & 0.142953 & 0.157114 & 0.225893 & 0.225893 \\ 0.212407 & 0.142953 & 0.125691 & 0.180715 & 0.180715 \\ 0.212407 & 0.142953 & 0.094268 & 0.180715 & 0.225893 \\ 0.169926 & 0.178692 & 0.157114 & 0.180715 & 0.225893 \end{bmatrix} \quad (53)$$

– Select the appropriate alternative for the given application: the final step is to look for the ranking values in Table 4. To more clearly see the results of the rankings that have been achieved using the PSI can be seen in Figure 3 in the form of visualization.

Table 4. Ranking results

No	ID	Name	The value of $\emptyset_i$	Decision
1	A01	Suriadi	0.6452	Rank 23
2	A02	Azman	0.8672	Rank 12
3	A03	Reza	0.8782	Rank 9
4	A04	Yusri	0.9261	Rank 3
5	A05	Indra	0.8920	Rank 7
6	A06	Heri	0.8382	Rank 16
7	A07	Danuri	0.7355	Rank 22
8	A08	Hendra	0.8357	Rank 17
9	A09	Andrian	0.9123	Rank 4
10	**A10**	**Ramli**	**0.9548**	**Rank 2**
11	A11	Zainal	0.9123	Rank 5
12	A12	Nanang	0.8836	Rank 8
13	A13	Wahyu	0.7591	Rank 21
14	A14	Ayu	0.8357	Rank 18
15	A15	Marissa	0.8672	Rank 13
16	A16	Erwin	0.7930	Rank 19
17	A17	Dudi	0.8766	Rank 10
18	A18	Andre	0.8766	Rank 11
19	A19	Jimmy	0.7889	Rank 20
20	**A20**	**Muliyono**	**0.9643**	**Rank 1**
21	A21	Frensky	0.8425	Rank 15
22	A22	Rizky	0.8562	Rank 14
23	A23	Suandika	0.9123	Rank 6

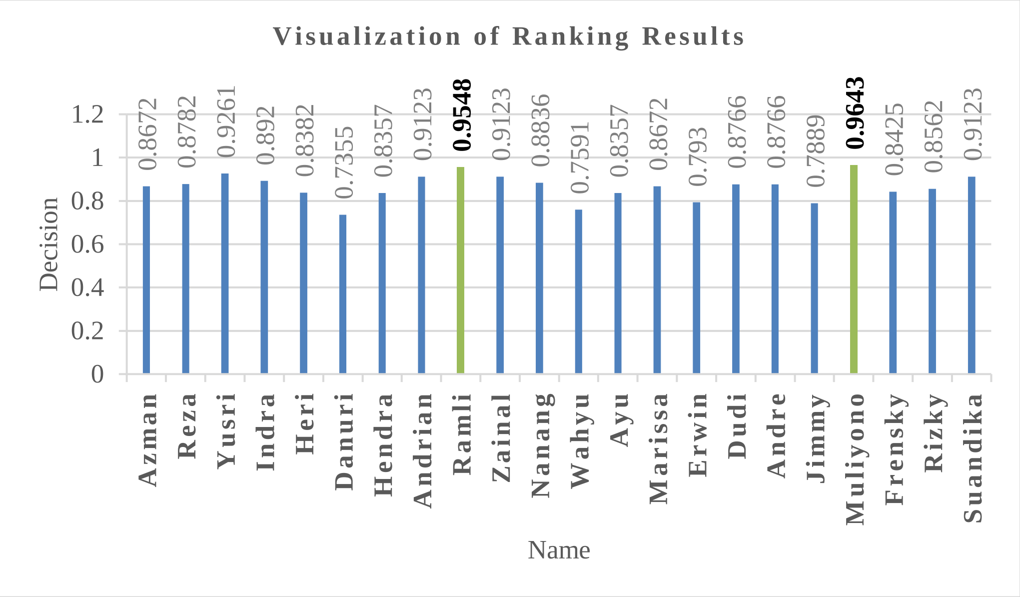

Figure 3. Visualization of ranking results

4. CONCLUSION

From the research that has been completed, it can be concluded that this research aims to fill the knowledge gap by analyzing the application of the PSI method in the selection of raw material supply staff. The results of this research provide valuable insights. In the initial evaluation based on the average candidate score, it was shown that Ramli and Muliyono received an average score of 4.8, ranking the highest. However, it should be noted that in cases where there are candidates with the same score, further decision-making is necessary. Therefore, in this study, the application of the PSI method was implemented, which yielded interesting results in that Muliyono received a PSI score of 0.9643 and was ranked first, while Ramli received a PSI score of 0.9548 and was ranked second. The PSI method has helped consider a wide range of relevant factors and provided an objective view of decision-making. These results show that in the context of selecting raw material supply staff, the PSI method resulted in rankings that differed from the initial evaluation results based on the average score. Therefore, the use of the PSI method helps improve the objectivity and effectiveness of the selection process. This research makes a significant contribution to understanding efficient supply chain management. The use of the PSI method in the selection of raw material supply staff has proven effective and opens up future development opportunities. These results provide valuable insights for industries and organizations that depend on a reliable supply of raw materials and demonstrate the potential to improve the overall staff selection process.

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AUTHOR CONTRIBUTIONS STATEMENT

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C : **C**onceptualization
M : **M**ethodology
So : **So**ftware
Va : **Va**lidation
Fo : **Fo**rmal analysis
I : **I**nvestigation
R : **R**esources
D : **D**ata Curation
O : Writing - **O**riginal Draft
E : Writing - Review & **E**diting
Vi : **Vi**sualization
Su : **Su**pervision
P : **P**roject administration
Fu : **Fu**nding acquisition

CONFLICT OF INTEREST STATEMENT

The authors declare that none have competing financial interests or personal relationships that could influence the work reported in this paper.

INFORMED CONSENT

We have obtained informed consent from all individuals included in the research.

ETHICAL APPROVAL

This study related to the use of human data has complied with all relevant national regulations and institutional policies in accordance with the principles of the Declaration of Helsinki and has been approved by the authors' institutional review board or equivalent committee.

DATA AVAILABILITY

The data supporting the findings of this study are available from material staff. Restrictions apply to the availability of these data, which were used under license for this study with permission from material staff.

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