EXTENSION OF EMPLOYEE CONTRACTS BASED ON PERFORMANCE APPRAISAL AT BNN LAMPUNG PROVINCE USING THE VIKOR METHOD

Cindy Naulina Cahyani; Rani Irma Handayani; Normah

Information Systems
STMIK Nusa Mandiri, Jakarta, Indonesia
www.nusamandiri.ac.id
cindynaulina@gmail.com; rani.irh@nusamandiri.ac.id; normah.nor@nusamandiri.ac.id

Abstract—The process of an employee contract extension at BNNP Lampung was previously carried out when the contract employee had completed his work contract for one year and during the work process. This results in good work progress and is still needed by the Lampung BNNP, so a report will be made on which employees will be extended their work contract after which the report is given to the Head of the Lampung BNNP to approve the employee contract extension decision letter, for that an appropriate decision support system is needed and efficient so that it can assist in making decisions on employee contract extensions. This decision support system is made based on performance appraisal by predetermined criteria, namely attitude, workability, attendance, period of employment, and age, if all these criteria are met, the work contract will be extended. This decision support system is created using the Vikor method to obtain the best ranking results taken from alternatives on each criterion that is close to the ideal solution. To produce the best solution in the decision support system for employee contract extension based on the performance appraisal at BNN Lampung Province. The calculation of the Vikor method in this study produces the smallest Q value as the first rank with a value of 0.025 in alternative 6 and the largest Q value as the last rank with a value of 0.8333 in alternative 8.

Keywords: Decision Support System, Employee Contract, Vikor Method.

INTRODUCTION

Human resource is one of the parts that must be owned for the sustainability of a company (Meidawati, 2015). The human resources in question are employees who work for the company. Employees play a very important role in achieving the operational success of a company, to achieve this success the company must have employees who are competent according to their areas of expertise. For this reason, the company must select prospective employees according to the criteria set by the company and be carried out appropriately and efficiently.

Contract employees are employees who work in a company with a predetermined working period by the work contract agreement that has been mutually agreed upon. If the contract employee produces good work progress during the work contract and meets several criteria in the performance appraisal that is a consideration for the employee work contract extension. By conducting a performance appraisal of employees,
it will provide an overview of the company as to what employee behavior is related to work as well as information regarding compensation, training and development, employee promotion, and others (Evita et al., 2017).

The National Narcotics Agency of Lampung Province has been carrying out the decision-making process by selecting one by one the performance data files of contract employees during the working period, if the results of one year of work produce good work and as long as the employee is still needed to work at the Lampung Province BNN which employee data will be extended to work contracts for one year by the Personnel Development Officer chaired by the Head of General Affairs after which the report is submitted to the Head of the Lampung Province BNN to approve the employee contract extension decision letter so that in this case it takes a longer time to make decisions on employee contract renewals. For that we need an appropriate and fast system, a decision support system is needed as a solution to the existing problems. The decision support system is known as the Decision Support System (DSS). As the name implies, the purpose of this system is to support decision making in choosing decision alternatives which are the results of processing information obtained using decision-making models, and to solve problems that are of nature, structured, semi-structured, and unstructured (Ainun, 2019).

Based on the existing problems, the authors provide a solution to create a decision support system for an employee contract extension at BNN Lampung Province using the VIKOR method to simplify and speed up the decision-making process (Thabrani et al., 2019). With this decision support system, it is hoped that it can be the right choice for making decisions on employee contract extensions.

In previous research conducted by Wina Yusnaeni, Marlina (2019) in assessing employee performance through the AHP and VIKOR methods with several criteria including attendance, sales results, attitude, length of work, educational background. Then a ranking is obtained using the VIKOR method (Yusnaeni & Marlina, 2019). Subsequent research on decision support systems using the VIKOR method (Vise Kriterijumska Optimizacija I Kompromisno Resenje) for the election of the best branch head. VIKOR is a multi-criteria optimization and compromise solution (multi-criteria optimization and compromise solutions) used in multi-criteria decision-making problems (Hutapea et al., 2018; Shumaiza et al., 2019). Subsequent research on the application of the AHP and VIKOR methods in selecting outstanding employees. Making improper decisions will result in employees being elected sometimes not by the real facts (Wijaya & Mesran, 2019).

Subsequent research applies the VIKOR method in selecting experts at the Ministry of Communication and Information, the VIKOR method focuses on ranking between alternatives and interrelated criteria (Harahap et al., 2018).

Further research regarding the selection of the best pharmacist by applying the VIKOR method, the company can develop properly, of course, is influenced by the quality of its employees (Kusuma & Ginting, 2020). Subsequent research is the application of the Vikor method in decision making for candidate recipients of the Bidikmisni scholarship with academic and achievement criteria, economic ability, commitment, school quality order, school representation, and regional origin (Suniantara & Suwardika, 2018). Further research in improving the quality of human resources can be carried out by organizing high school level quiz, implementing decision support in the selection of quiz candidate participants using the VIKOR method (Subrikanti et al., 2018).

The selection of outstanding school principals is carried out to improve quality and management in school education by implementing the VIKOR method, which is expected to make it easier to make decisions (Wulan et al., 2018). Subsequent research was carried out to determine the feasibility of providing life insurance to fishermen using the VIKOR method by determining the level of importance of each criterion (Nasution & Ulfa, 2020). Subsequent research applies the VIKOR method in the selection of bonus receipts for Indihome salesmen with a selection-ranking profit decision support system (Primadasa & Juliansa, 2019). Decision support systems are an effective way to test the eligibility of new employees by applying the VIKOR and MOORA methods (Sarumaha et al., 2018). The determination of outstanding employees can be calculated based on the calculation of the weight of the respective criteria by applying the VIKOR method (Trisnani et al., 2018). This study aims to facilitate decision-making in determining the extension of existing employee contracts at BNNP Lampung to be more accurate and fast.

MATERIALS AND METHODS

A. Research Stages

1. Problems
The initial stage was carried out by the author by making observations to find out and find problems that exist in BNNP Lampung.
Primary data is conducting literature studies obtained from journals, e-books, and others related to the Decision Support System for Determining Employee Contract Extensions Based on Performance Appraisal at BNNP Lampung Using the Vikor Method.

C. Data Analysis

In the data analysis method, the process stages are carried out in determining the extension of the employment contract at BNNP Lampung as follows:
1. Determine and create a criteria table
2. Create alternative tables and match the criteria table
3. Values to the weight of criteria
4. Assign value the beginning of the criteria for attitude, attendance, workability, years of service, and age using fuzzy numbers.

The data calculation uses the Vikor method to rank each alternative for which the work contract extension will be extended.

The steps for solving problems using the VIKOR method (Ainun, 2019) are as follows:
1. Normalizing the Matrix

\[ R_{ij} = \left( \frac{X_{ij}^u - X_{ij}^l}{X_{ij}^u - X_{ij}^c} \right) \text{ } \text{ } \text{ (1)} \]

Description:
\( X_{ij}^u = \text{Sample data value in criteria } j \)
\( i = \text{A, B, C, D, E} \)
\( j = 5 \text{ criteria} \)
\( X_{ij}^l = \text{the best score in one criteria} \)
\( X_{ij}^c = \text{the worst score in one criteria} \)

2. Calculating the value of \( S \) and \( R \)

\[ S_i = \sum_{j=1}^{n} w_j \times (R_{ij}) \text{ } \text{ } \text{ (2)} \]

Description:
\( w_j = \text{The weight of criterion} \)
\( S_i = \text{value of } S \) is obtained from the sum of the multiplication results of the criteria weights with the data in each sample.

\[ R_i = \max_j \{w_j \times R_{ij}\} \text{ } \text{ } \text{ (3)} \]

3. Calculating the Vikor Index

\[ Q = \left( \frac{S_i - S}{\overline{S} - \overline{S}} \right) \times V + \left( \frac{R_i - R}{\overline{R} - \overline{R}} \right) \times (1 - V) \text{ } \text{ } \text{ (4)} \]

Description:
\( S_i = \text{Min } S_i \)
\( S^* = \text{Max } S_i \)
\( R_i = \text{Min } R_i \)
\( R^* = \text{Max } R_i \)

Sample with smallest \( Q \) Value is the best sample.
D. Data Criteria and Weights

In the process of determining employee contract extensions, criteria are needed as an initial stage before proceeding to the data calculation stage in this research. The head of the Subdivision of Administration as one of the experts in decision making at BNNP Lampung gives the scoring of the criteria weight. The criteria and weights can be seen in Table 1.

Table 1. Criteria

| Criteria | Description |
|----------|-------------|
| C1       | Attitude    |
| C2       | Work Ability|
| C3       | Attendance  |
| C4       | Age         |
| C5       | Period of Employment |

Table 2. Criteria Weights

| No  | Criteria | Description         | Weight (%) |
|-----|----------|---------------------|------------|
| 1   | C1       | Attitude            | 30         |
| 2   | C2       | Work Ability        | 25         |
| 3   | C3       | Attendance          | 20         |
| 4   | C4       | Age                 | 15         |
| 5   | C5       | Period of Employment| 10         |

Source: (Cahyani, 2020)

The results of scoring for the weighting of the criteria can be seen in Table 2.

Data on the Lampung BNNP Honorary Employees used in this research, which can be seen in Table 3.

Table 3. Data of Honorary BNNP Lampung

| No  | Name              | Attitude | Work Ability | Attendance | Age | Period of Employment |
|-----|-------------------|----------|--------------|------------|-----|----------------------|
| 1   | Ahmad Subari      | Good     | Very Good    | 80         | 43  | >10                  |
| 2   | Doni Saputra      | Very Good| Good        | 77         | 34  | >10                  |
| 3   | Eko Budiyono      | Good     | Good        | 93         | 36  | >10                  |
| 4   | Melinawati        | Good     | Good        | 74         | 36  | >10                  |
| 5   | Erik Firmasayah   | Very Good| Very Good   | 78         | 35  | >10                  |
| 6   | Eko Kusdarwanto   | Good     | Good        | 89         | 31  | >10                  |
| 7   | Junakdi           | Very Good| Enough      | 81         | 41  | 8                    |
| 8   | R. M. Andi Zohari | Good     | Enough      | 76         | 56  | 9                    |
| 9   | Sumbardi          | Enough   | Enough      | 88         | 40  | >10                  |
| 10  | Ernani            | Very Good| Good        | 79         | 47  | >10                  |
| 11  | Desi Komalasari   | Good     | Good        | 91         | 40  | >10                  |
| 12  | Nanib Saptarina   | Good     | Good        | 87         | 38  | 10                   |
| 13  | Ayef Priasep      | Enough   | Very Good   | 73         | 34  | >10                  |
| 14  | Samuel Pengindoan Napitupulu | Very Good | Good | 85 | 33 | 8 |
| 15  | Elikia Mutia Sari | Good     | Very Good   | 89         | 34  | >10                  |
| 16  | Julianto          | Good     | Good        | 96         | 42  | >10                  |
| 17  | Dedi Supriyadi    | Very Good| Good        | 87         | 35  | 10                   |
| 18  | Octa Marelina, S.SI | Good    | Good        | 90         | 31  | 10                   |
| 19  | Halley Putra Perdana | Good | Good | 84 | 34 | 8 |
| 20  | Andi Swastani     | Good     | Enough      | 90         | 33  | 8                    |

Source: (BNN Lampung, 2020)

E. Assigning Initial Values to Criteria Using Fuzzy Numbers

This initial value assignment consists of three fuzzy numbers by the level of importance, which is in Table 4 below.

Table 4. Fuzzy Number Value

| Fuzzy Numbers | Value |
|---------------|-------|
| Very Good (SB)| 30    |
| Good (B)      | 20    |
| Enough (C)    | 10    |

Source: (Cahyani, 2020)

The results of giving fuzzy number values on attitude criteria can be seen in Table 5.

Table 5. Numbers value Fuzzy on Attitude Criteria

| Attitude | Fuzzy Number | Value |
|----------|--------------|-------|
| Very Good| Very Good    | 30    |
| Good     | Good         | 20    |
| Enough   | Enough       | 10    |

Source: (Cahyani, 2020)

Values for fuzzy numbers on the criteria of workability can be seen in Table 6.

Table 6. Numbers Value Fuzzy on Work Ability Criteria

| Work Ability | Fuzzy Number | Value |
|--------------|--------------|-------|
| Very Good    | Very Good    | 30    |
| Good         | Good         | 20    |
| Enough       | Enough       | 10    |

Source: (Cahyani, 2020)
The results of giving fuzzy number values on the Attendance criteria can be seen in Table 7.

Table 7. Numbers Value Fuzzy on Attendance Criteria

| Attendance | Fuzzy Number | Value |
|------------|--------------|-------|
| 90-100     | Very Good    | 30    |
| 80-89      | Good         | 20    |
| 70-79      | Enough       | 10    |

Source: (Cahyani, 2020)

The results of giving fuzzy number values for age criteria can be seen in table 8.

Table 8. Numbers Value Fuzzy on Age Criteria

| Age                  | Fuzzy Number | Value |
|----------------------|--------------|-------|
| 21 - 26 years        | Very Good    | 30    |
| 27 - 32 years        | Good         | 20    |
| >33 years            | Enough       | 10    |

Source: (Cahyani, 2020)

The results of assigning fuzzy number values for a period of employment criteria can be seen in table 9.

Table 9. Numbers Value Fuzzy on Period of Employment Criteria

| Period of Employment | Fuzzy Number | Value |
|----------------------|--------------|-------|
| >10 years            | Very Good    | 30    |
| 5 – 10 years         | Good         | 20    |
| 1 - 4 years          | Enough       | 10    |

Source: (Cahyani, 2020)

RESULTS AND DISCUSSION

The results of giving the initial value of fuzzy numbers on each criterion that has been matched with the contract employee data at BNNP Lampung can be seen in table 10.

Table 10. Compatibility Rating for Alternatives

| Alternative | C1  | C2  | C3  | C4  | C5  |
|-------------|-----|-----|-----|-----|-----|
| A1          | 20  | 30  | 20  | 10  | 30  |
| A2          | 30  | 20  | 10  | 30  | 20  |
| A3          | 20  | 20  | 30  | 10  | 30  |
| A4          | 20  | 20  | 10  | 10  | 30  |
| A5          | 30  | 30  | 10  | 10  | 30  |
| A6          | 20  | 20  | 20  | 20  | 30  |
| A7          | 30  | 10  | 20  | 10  | 20  |
| A8          | 20  | 10  | 10  | 10  | 20  |
| A9          | 10  | 20  | 20  | 10  | 20  |
| A10         | 30  | 30  | 10  | 10  | 30  |
| A11         | 20  | 20  | 30  | 10  | 30  |
| A12         | 10  | 30  | 20  | 10  | 20  |
| A13         | 20  | 30  | 10  | 10  | 20  |
| A14         | 30  | 20  | 20  | 10  | 20  |
| A15         | 20  | 30  | 10  | 10  | 30  |
| A16         | 10  | 20  | 30  | 10  | 30  |

Source: (Cahyani, 2020)

A. Matrix Normalization Data

The suitability rating data will be continued by creating a matrix normalization data from each criterion obtained from the calculation with the matrix normalization formula. The following is the calculation of normalization data for each criterion.

Data Normalization For C1

\[ R(A1), C1 = \frac{(20 - 30)}{(30 - 10)} = \frac{10}{20} = 0,5 \]

Data Normalization For C2

\[ R(A1), C2 = \frac{(30 - 30)}{(30 - 10)} = \frac{0}{20} = 0 \]

Data Normalization For C3

\[ R(A1), C3 = \frac{(20 - 20)}{(30 - 10)} = \frac{10}{20} = 0,5 \]

Data Normalization For C4

\[ R(A1), C4 = \frac{(20 - 30)}{(30 - 10)} = \frac{10}{20} = 1 \]

Data Normalization For C5

\[ R(A1), C5 = \frac{(30 - 30)}{(30 - 20)} = \frac{10}{30} = 0 \]

The calculation results of the matrix normalization data can be seen in Table 11.

Table 11. Matrix Normalization Data

| No | Alternative | C1  | C2  | C3  | C4  | C5  |
|----|-------------|-----|-----|-----|-----|-----|
| 1  | A1          | 0,5 | 0   | 0,5 | 1   | 0   |
| 2  | A2          | 0   | 0,5 | 1   | 1   | 0   |
| 3  | A3          | 0,5 | 0   | 0   | 1   | 0   |
| 4  | A4          | 0,5 | 0,5 | 1   | 1   | 0   |
| 5  | A5          | 0   | 0   | 1   | 1   | 0   |
| 6  | A6          | 0,5 | 0,5 | 0   | 0   | 0   |
| 7  | A7          | 0   | 1   | 0,5 | 1   | 1   |
| 8  | A8          | 0,5 | 1   | 1   | 1   | 1   |
| 9  | A9          | 1   | 0,5 | 0,5 | 1   | 0   |
| 10 | A10         | 0   | 0   | 1   | 1   | 0   |
| 11 | A11         | 0,5 | 0   | 0,5 | 1   | 1   |
| 12 | A12         | 1   | 0   | 0,5 | 1   | 1   |
| 13 | A13         | 0,5 | 0   | 1   | 1   | 0   |
| 14 | A14         | 0   | 0,5 | 0,5 | 1   | 1   |
| 15 | A15         | 0,5 | 0   | 0,5 | 1   | 0   |
| 16 | A16         | 1   | 0,5 | 0   | 1   | 0   |
| 17 | A17         | 0   | 0,5 | 0,5 | 1   | 1   |
| 18 | A18         | 0,5 | 0   | 0,5 | 1   | 1   |
| 19 | A19         | 0,5 | 0,5 | 0,5 | 1   | 1   |
| 20 | A20         | 0,5 | 1   | 0   | 1   | 1   |

Source: (Cahyani, 2020)

Furthermore, the results of the normalized data will be multiplied by the weight value for each criterion.
The results of the multiplication can be seen in Table 12.

Table 12. Results of Normalized Data x Weight Value

| No | Alternative | CRITERIA |
|----|-------------|----------|
|    |             | C1 | C2 | C3 | C4 | C5 |
| 1  | A1          | 0,15 | 0 | 0,1 | 0,15 | 0 |
| 2  | A2          | 0 | 0,125 | 0,2 | 0,15 | 0 |
| 3  | A3          | 0,15 | 0,125 | 0 | 0,15 | 0 |
| 4  | A4          | 0,15 | 0,125 | 0,2 | 0,15 | 0 |
| 5  | A5          | 0 | 0 | 0,2 | 0,15 | 0 |
| 6  | A6          | 0,15 | 0,125 | 0,1 | 0 | 0 |
| 7  | A7          | 0 | 0,25 | 0,1 | 0,15 | 0,1 |
| 8  | A8          | 0,15 | 0,25 | 0,2 | 0,15 | 0,1 |
| 9  | A9          | 0,3 | 0,125 | 0,1 | 0,15 | 0 |
| 10 | A10         | 0 | 0 | 0,2 | 0,15 | 0 |
| 11 | A11         | 0,15 | 0,125 | 0 | 0,15 | 0 |
| 12 | A12         | 0,3 | 0 | 0,1 | 0,15 | 0,1 |
| 13 | A13         | 0,15 | 0 | 0,2 | 0,15 | 0 |
| 14 | A14         | 0 | 0,125 | 0,1 | 0,15 | 0,1 |
| 15 | A15         | 0,15 | 0 | 0,1 | 0,15 | 0 |
| 16 | A16         | 0,3 | 0,125 | 0 | 0,15 | 0 |
| 17 | A17         | 0 | 0,125 | 0,1 | 0,15 | 0,1 |
| 18 | A18         | 0,15 | 0,125 | 0 | 0 | 0,1 |
| 19 | A19         | 0,15 | 0,125 | 0,1 | 0,15 | 0,1 |
| 20 | 20          | 0,15 | 0,25 | 0 | 0,15 | 0,1 |

Source: (Cahyani, 2020)

B. Calculate Values of S dan R

Values S values are obtained by adding the results of multiplying data normalization with the weights in each sample. For the R-value, the R-value is obtained from the largest value, the result of multiplying the normalized data with the criterion weight for each sample. The following are the results of the calculation looking for the values of S and R which can be seen in Table 13.

Table 13. Results of the Values of S and R

| Alternative | S Value | R Value |
|-------------|---------|---------|
| A1          | 0,4     | 0,15    |
| A2          | 0,475   | 0,2     |
| A3          | 0,425   | 0,15    |
| A4          | 0,625   | 0,2     |
| A5          | 0,35    | 0,2     |
| A6          | 0,375   | 0,15    |
| A7          | 0,6     | 0,25    |
| A8          | 0,85    | 0,25    |
| A9          | 0,675   | 0,3     |
| A10         | 0,35    | 0,2     |
| A11         | 0,425   | 0,15    |
| A12         | 0,65    | 0,3     |
| A13         | 0,5     | 0,2     |
| A14         | 0,475   | 0,15    |
| A15         | 0,4     | 0,15    |
| A16         | 0,575   | 0,3     |
| A17         | 0,475   | 0,15    |
| A18         | 0,375   | 0,15    |
| A19         | 0,625   | 0,15    |

Source: (Cahyani, 2020)

C. Calculating the Vikor Index (Q)

The sample that gets the smallest Q value is called the sample with the best value. The following is the calculation to find the Vikor index value (Q):

\[ Q(A1) = \frac{0.4 - 0.35}{0.05} + \frac{0.15 - 0.15}{0.3 - 0.15} \times (1 - 0.5) \]

following are the results of the Vikor Index (Q) calculation which can be seen in Table 14.

Table 14. Vikor Index

| Alternative | Q Value | Ranking |
|-------------|---------|---------|
| A6          | 0,025   | 1       |
| A18         | 0,025   | 2       |
| A1          | 0,05    | 3       |
| A15         | 0,05    | 4       |
| A3          | 0,075   | 5       |
| A11         | 0,075   | 6       |
| A14         | 0,125   | 7       |
| A17         | 0,125   | 8       |
| A5          | 0,1666  | 9       |
| A10         | 0,1666  | 10      |
| A19         | 0,275   | 11      |
| A2          | 0,2916  | 12      |
| A13         | 0,3166  | 13      |
| A4          | 0,4416  | 14      |
| A7          | 0,5833  | 15      |
| A20         | 0,6333  | 16      |
| A16         | 0,725   | 17      |
| A12         | 0,8     | 18      |
| A9          | 0,825   | 19      |
| A8          | 0,8333  | 20      |

VICOR Index Results From the results of the calculation in the table above, it is obtained that the sample from alternative 6 is obtained the smallest value index value in this study so that it occupies an in the first rank, alternatives 6 and 18 produce the same Q value but when multiplying the matrix normalization data with the criteria weight on C3, alternative 6 produces a value of 0.1 while alternative 18 produces a value of 0 because the value produced by alternative 6 is greater than the alternative. 18 then alternative 6 becomes the first rank in this research.

CONCLUSION

This Vikor method can assist in the process of selecting and making decisions from several alternatives for an employee contract extension.
based on predetermined criteria, namely: attitude, work ability, attendance, age, and period of employment. This study produces the smallest Q value with a value of 0.025 in alternative 6 as the first rank, and the largest Q value with a value of 0.8333 in alternative 8 as the last rank. Further research can be developed by applying different methods or by combining methods such as the AHP and VIKOR methods so that the expected results are better. And it can also be developed by applying different criteria and weight values according to the company where the research is conducted, such as adding criteria for education level, work performance to get better results in decision making. This research is intended to be used to facilitate the decision-making process for employee contract extensions at BNNP Lampung to produce the right decision.

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