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A Model of Non-ASN Employee Performance Assessment Based on the ROC and MOORA Methods

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Abstract

This study aims to assess the performance of non-ASN employees at the Human Resources Development Agency (BPSDM), East Kalimantan Province, Indonesia in order to assist organizers in determining the feasibility of extending work contracts. The performance of 37 non-ASN employees has been assessed based on 12 criteria including honesty, discipline, loyalty, responsibility, courtesy, commitment, ability and skills, neatness, communication, achievement, absence, and violations. In this study, the Rank Order Centroid (ROC) and Multi-Objective Optimization on the Basis of Ratio Analysis (MOORA) methods have been implemented to obtain rankings. Meanwhile, the confusion matrix (CM) method has also been used to measure the accuracy of both methods. Based on the experiment, the ROC method has been used to achieve the criteria weight and the MOORA method has been utilized to rank all non-ASN employees based on the highest score. Where the CM suitability level of 81.1% has been gained so that the ranking of 37 non-ASN employees can be revealed. The study indicates that both methods can be implemented as alternative models in assessing the performance of non-ASN employees. Therefore, these methods are quite effective, efficient, and relatively easy to use.

Keywords: Non ASN employees, ROC, MOORA, Performance Appraisal, Confusion Matrix, Ranking

1. Introduction

Currently, the recruitment of PN-ASN or honorary or non-ASN employee is not allowed by the Government of Indonesia according to Government Regulations called PP No. 48/2005 because it does not indicate real necessities and is not in accordance with adding personnel or a merit system that is not followed by an increase in productivity so that the employee budget is increasing. Nevertheless, the Government still provides opportunities and limits until 2023 to resolve these problems which are regulated through Government Regulations including evaluating its performance within a certain period.

The Human Resources Development Agency or BPSDM has the main task of carrying out human resource development in the field of administering government affairs which are the authority of the Provincial and Regency/Municipal governments in accordance with the provisions of the applicable laws and regulations. Therefore, performance evaluation needs to be carried out as a reference by the leadership in order to get a non-ASN employee with good performance. In order to produce a professional, objective, effective and fair performance analysis, the use of technology is necessary.

Currently, artificial intelligence (AI) technology is widely used in various fields of human resources (HR) such as scheduling activities, identifying prospective employees, recommending work and education programs as well as performance analysis. Numerous studies related to HR using the MOORA method continue to be carried out and applied by researchers. Purba et al., (2019) have applied the MOORA method in performance appraisal so that it is feasible to be maintained with criteria and weights consisting of 35% attendance, 20% work quality, 20% work discipline, 20% service. The ranking results have determined that employee (A1) has the highest score of 0.4139 which is worth maintaining [1]. Furthermore, researchers Ahmad et al., (2021) have also applied the MOORA method in selecting the best employees for placement of work programs such as promotions, training, including the reward system. This study has determined 5 alternatives and 4 criteria, namely discipline with a weight of 0.25, teamwork 0.25, skill 0.30, work quality 0.20. The experimental results show that the MOORA method has obtained the highest ranking, namely A1

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with a value of 139.69. The results of this study have helped companies in selecting the best employees more effectively [2].

Researchers Sugiartawan et al., (2018) have also applied the MOORA method to assess the feasibility of an employee promotion based on 5 alternatives and 5 criteria, namely loyalty with 25% weight, 25% discipline, 15% knowledge, 20% professional, and 15% teamwork. The highest-ranking results with a value of 10,57264 against an employee. This study shows that the application of the MOORA method is quite easy to use because the completion steps are quite simple [3]. Likewise, Rahmadani et al., (2019) have applied the MOORA method on television purchase recommendations as a wise family solution based on 5 assessment criteria, namely model, quality, brand, size and price. There are 6 types of television alternatives that have been used, namely Polytron, Samsung, Panasonic, LG, Toshiba, and Philips. Based on the experiment, alternative A1 (Polytron) was obtained 0.1701 as ranking 1, alternative A5 (Philips) 0.1652 as ranking 2 and Alternative A2 (Toshiba) 0.0947 as ranking 3 [4].

Then, the MOORA method has also been applied by Putra et al., (2020) in evaluating the performance of PDAM Martapura Oku Timur employees based on 4 criteria and 3 alternatives. The criteria used in this study are attitudes and behavior with a weight of 25%, abilities and skills 30%, cooperation 20%, and responsibility 25%. With the application of the MOORA method, the Yi results were 0.3692 with the highest rating, namely A2 (very good) [5]. Ruskan (2020) has applied the MOORA method to the selection of foundation alumni scholarships using 8 criteria and 5 alternatives. Based on experiments, ranking with alternative 5 with a value of A5 = 0.2248 is the best alternative with a Qi value so that it has been declared a scholarship [6].

Meanwhile, Arista et al., (2020) also apply the MOORA method for assessing lecturer performance as a reference for receiving incentives at the Pancabudi Development University. Lecturer data processed by 20 people based on 4 criteria, namely the activeness of teaching lecturers, research, publication results and service results. The experimental results show that as many as 17 lecturers perform well and deserve incentives, and 3 lecturers perform poorly or poorly so they are not eligible to receive incentives with codes (M2), (M13), and (M17). The lowest Yi value was obtained with the M2 code, namely 0.1369 and the highest Yi value with the 0.2144 value with the M1 code [7].

Several studies have also combined the MOORA method as has been done by Primadasa & Alfiarini (2019) who applied the AHP and MOORA methods in assessing employee performance. The AHP method has been used to get the weight value of each criterion and MOORA to get the employee optimization value as the final value of the assessment based on 5 criteria consisting of work achievement, honesty, attendance, attitude, and responsibility. The results show that the AHP and MOORA methods have received a recommendation in the form of a reward to an employee with an optimization value of 0.070800827 [8]. Badaruddin (2019) a combination of ROC and SAW methods has been applied in evaluating employee performance based on the concept of a Decision Support System (DSS). This study has used 10 alternative assessments, namely work quality, discipline, cooperation, loyalty, and reprimand. The results showed that the combination of ROC and SAW methods in evaluating employee performance has obtained the result, namely A3 (very good) with a value of 0.8994 [9].

Researchers, Mesran et al., (2019) have applied a combination of ROC and Additive Ratio Assessments (ARAS) methods to assess employee performance. The combination of ROC methods has been used to get the weight calculation to be more specific. The ARAS method has been used to rank, there are 5 alternatives and 5 criteria, namely responsibility, cooperation, quality of work, discipline, and reporting. The results of the calculation of the ROC and ARAS methods have obtained an employee who performs well with a value of 0.97. The results of the study have been perceived as objective, effective and efficient for management in assessing employee performance [10]. Silvilestari (2019) has also used a combination of ROC and SAW methods in assessing prospective credit customers. Researchers have used 10 alternative data for prospective customers and 4 criteria, namely the guaranteed value with a weight value of 0.521, income 0.271, residence status 0.146, and business 0.063. Based on the experiment, it has been obtained that the A2 prospective customer has the highest score from the other potential customers with a value of 0.858. This study has provided a final score that can assist credit managers in making effective decisions in determining credit recipients [11].

In addition to the MOORA method, researchers also apply the TOPSIS method in assessing lecturer performance as was done by Surya (2018). Lecturer performance assessment is based on 5 alternatives and 7 criteria, namely teaching, research, dedication, responsibility, personality, loyalty, leadership. Based on the experiment, lecturer (2) has been determined to have the best performance with a preference value of 0.5341 [12].

Therefore, the ability of AI methods in analyzing decisions is very necessary [13]–[15]. This paper aims to apply the ROC and MOORA methods in providing an alternative rating for the performance appraisal of

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non-ASN employees at BPSDM Samarinda, East Kalimantan, Indonesia in providing services. This paper consists of the research background. The second is to explain the applied approach technique. Third, explain the analysis using ROC and MOORA approaches. Finally, conclusions and plans for further research.

2. Research Methods

In this section, we will briefly describe the performance appraisal, ROC and MOORA techniques, sample data, and analytical measures, which are applied.

2.1. Performance assessment

Performance appraisal is a way of measuring the contributions of individuals in the organization. The important value of performance appraisal is related to determining the level of individual contribution to the performance expressed in completing the tasks for which they are responsible [2][16], [17].

2.2. Rank Order Centroid (ROC) Method

To produce the right decision, it needs to be supported by an ideal weight with the level of importance of the criteria that have been set. The ROC method is one of several weighting methods that is quite simple and is a method that focuses on the priority of the criteria being the main [10], [11], [18]–[20][10]. In this study, the weights against the criteria have been generated by the ROC method. Meanwhile, the stages of the ROC method are by setting the highest priority to be compared from all priorities using formula 1 and formula 2.

$$Cr1 \geq Cr2 \geq Cr3 \geq ... \geq Cm \quad (1)$$

Thus producing

$$w1 \geq w2 \geq w3 \geq \ldots \geq wm \quad (2)$$

To get the value of Weight (W) use formula 3.

$$w1 \geq w2 \geq w3 \geq \ldots \geq wm \quad (3)$$

This method has been implemented by a ranking of importance or ranking that has been established from the interviews results as well as 12 criteria and weights. Second, calculate the weight based on formula (3). Finally, get a calculation for the weights in each criterion. In this study, the ROC method applied can be seen in Figure 1.

2.3. Multi-Objective Optimization on the Basis of Ratio Analysis (MOORA) Method

The MOORA method is a multi-objective system that optimizes two or more conflicting attributes simultaneously. This method has a degree of flexibility and ease of understanding in separating the subjective part of an evaluation process into decision weight criteria with several decision-making attributes. This method is used to solve problems with complex mathematical calculations [21]–[23]. The MOORA stages, first, create a decision matrix X_{ij}, where *i* is the index for the alternatives, *m* is the number of alternatives, *j* represents *n* in the number of attributes. Second, normalization of the decision matrix using formula 4.

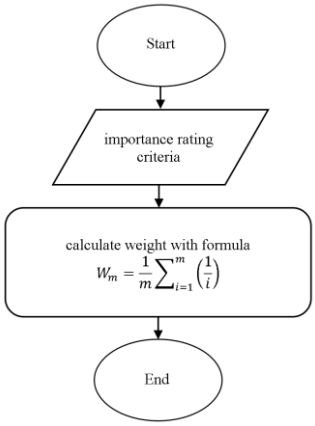

Figure 1. ROC Method Flowchart

$$x_{ij} = \frac{x_{ij}}{\sqrt{\sum_{i=1}^{m} x^2\ ij}} \quad (4)$$

Where, *i* is the alternative index, *j* is the attribute index, *m* is the number of alternatives.

Third, optimizing attributes using formula 5 and formula 6.

$$Y_i = \sum_{j=1}^{g} x^*\ ij - \sum_{j=g+1}^{n} x^*ij \quad (5)$$

$$Y_i = \sum_{j=1}^{g} = Wj\ X^*ij - \sum_{j=g+1}^{n} Wj\ X^*ij \quad (6)$$

Where, g is the maximum attribute, *(n-g)* is the minimum attribute and Y_i is the alternative normalization to *i* to all attributes, W_j is the attribute weight.

Fourth, sort the best alternative based on the value of Y_i [+ or -] in the decision matrix of the maximum (benefit) and minimal (cost) attribute. The ordinal ranking order of Y_i indicates the highest and lowest preference values.

In this study, the flow of the MOORA method can be seen in Figure 2.

2.4. Measurement Accuracy

In this study, the ROC and MOORA methods accuracy measurement has used the Confusion Matrix (CM) method then interview data has become a benchmark in determining whether the built DSS can make it easier for leaders in determining the performance ranking of non-ASN that is appropriate and as needed [24], [25]. In principle, the CM method is to state the amount of

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test data that is correctly classified and the amount of test data that is incorrectly classified using formula 7.

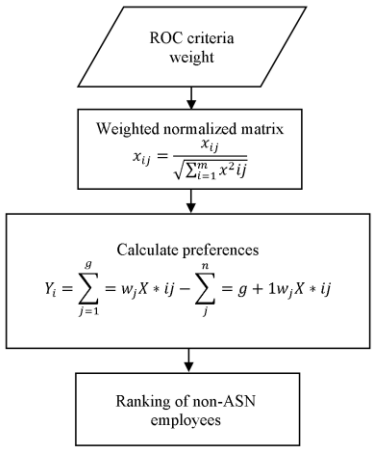

Figure 2. MOORA Method Flowchart

$$\text{Accuracy} = \frac{TP+TN}{TP+FN+FP+TN} \text{ X } 100\% \quad (7)$$

Where, True Positive (TP) is the correct number and classification of class 1 data; True Negative (TN) is the correct number and classification of class 0 data; False Positive (FP) is the number of class 0 data that is incorrectly classified as class 1; False Negative (FN) is the number of class 1 data that is incorrectly classified as class 0.

2.5. Data Sampling

In this study, non-ASN data consisted of 37 and 12 (twelve) criteria as the basis of analysis consisting of (C1) honesty, (C2) discipline, (C3) loyalty, (C4) responsibility, (C5) courtesy, (C6) commitment, (C7) ability and skills, (C8) neatness, (C9) communication, (C10) achievement, (C11) attendance, and (C12) violations. Data has been obtained from BPSDM, Samarinda City, East Kalimantan Province, Indonesia.

3. Results and Discussions

This section describes the results of the analysis of non-ASN performance appraisals by applying the ROC and MOORA methods. First, the ROC method has been applied by assigning a ranking of importance, criteria, weights, and types (benefit and cost). Then, calculate the weights based on formulas (2) and (3). The calculation results can be seen in Table 1.

Furthermore, the MOORA calculation has been carried out to get the ranking of non-ASN performance appraisals based on the best order. First, the decision matrix has been made and normalized using Equation (4) with the rating scale being used as a calculation for the assessment process. The formation of the matrix has been carried out based on alternatives and predetermined criteria. The decision matrix can be seen in Table 2.

Meanwhile, the weighted normalized matrix has been obtained from the result of multiplying the decision matrix with the weighted criteria. The results of the normalized decision matrix can be seen in Table 3.

Then, the determination of the preference value for each alternative has been obtained by adding up all the value of the criteria that are benefit and subtracting all the value of the criteria that are cost. Where, the alternative that has the greatest value has been used as consideration in determining the decision.

Table 1. The ROC calculation results

Criteria	Weight	Types
(C1) Honesty	0,25860	Benefit
(C2) Discipline	0,17527	Benefit
(C3) Loyalty	0,13360	Benefit
(C4) Responsibility	0,10582	Benefit
(C5) Courtesy	0,08499	Benefit
(C6) Commitment	0,06832	Benefit
(C7) Ability and Skills	0,05443	Benefit
(C8) Neatness	0,04253	Benefit
(C9) Communication	0,03211	Benefit
(C10) Achievement	0,02285	Benefit
(C11) Attendance	0,01452	Cost
(C12) Violations	0,00694	Cost

Second, calculating benefit and cost attribute preferences using formula (6) has been carried out. Thus, the value of Y_i has been obtained by reducing the benefits and costs. Based on the experiment, the highest Y_i value is the best performance appraisal ranking that has been obtained. Meanwhile, the results of calculations using the MOORA method have been able to get the highest ranking from the performance assessment of non-ASN, namely (P1) Umardin with a preference value of 0.181468388. The results of the calculation of preferences can be observed in Table 4.

Table 2. Decision Matrix non-ASN

PN-ASN	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12
P1	3	3	3	3	3	4	4	3	3	2	1	3
P2	3	3	4	4	4	3	3	4	4	2	2	3
P3	3	3	3	2	4	3	2	3	3	2	2	3
P4	3	3	3	4	3	2	4	3	3	2	1	3
P5	2	3	3	2	2	3	4	2	3	2	2	2
P6	3	3	3	3	2	4	3	3	4	2	2	3
P7	3	3	4	3	3	4	3	4	3	2	1	3
P8	3	3	3	4	2	3	3	2	4	2	1	3

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P9	3	3	3	4	3	3	4	2	4	2	2	3
P10	3	3	3	3	2	3	2	3	3	2	2	3
P11	3	3	3	3	3	2	3	3	3	2	2	3
P12	3	2	4	3	3	4	4	4	3	2	3	3
P13	3	2	3	2	2	4	3	4	4	2	2	3
P14	3	3	2	3	3	3	3	3	3	2	2	3
P15	3	3	2	3	3	3	2	3	2	1	2	3
P16	3	3	2	3	2	4	2	4	3	2	1	3
P17	3	3	3	4	3	4	3	3	4	2	1	3
P18	3	3	2	4	4	3	2	3	3	1	2	3
P19	3	3	2	3	3	4	3	4	4	2	2	3
P20	3	3	3	3	3	3	2	3	3	2	3	3
P21	3	3	2	4	4	2	3	3	3	2	2	3
P22	3	3	3	3	4	4	3	3	2	1	2	3
P23	3	3	2	3	3	2	2	4	4	1	2	3
P24	3	3	3	3	3	3	4	3	3	1	2	3
P25	3	3	2	4	4	4	2	4	4	2	2	3
P26	2	3	3	2	3	2	2	3	3	2	2	2
P27	3	3	2	2	4	2	3	3	4	2	1	3
P28	3	3	3	4	3	3	3	3	3	2	2	3
P29	3	3	4	4	4	4	4	4	3	2	3	3
P30	3	3	3	3	4	3	4	2	3	2	1	3
P31	3	3	3	2	4	4	4	3	3	2	1	3
P32	3	3	4	3	3	2	3	4	3	2	2	3
P33	3	3	3	4	3	4	3	4	2	2	3	3
P34	3	3	2	2	2	2	2	3	3	2	3	3
P35	3	3	2	3	2	2	2	3	4	2	2	3
P36	2	3	2	3	4	3	3	4	4	2	1	2
P37	2	3	3	2	4	3	4	3	4	2	2	2

Table 3. Normalized non-ASN Decision Matrix

PN-ASN	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12
P1	0,0438	0,0292	0,0228	0,0165	0,0131	0,0140	0,0116	0,0064	0,0047	0,0039	0,0012	0,0009
P2	0,0438	0,0292	0,0304	0,0220	0,0175	0,0105	0,0087	0,0085	0,0063	0,0040	0,0024	0,0009
P3	0,0438	0,0292	0,0228	0,0110	0,0175	0,0105	0,0058	0,0064	0,0048	0,0040	0,0024	0,0009
P4	0,0438	0,0292	0,0228	0,0220	0,0131	0,0070	0,0117	0,0064	0,0048	0,0040	0,0012	0,0009
P5	0,0292	0,0292	0,0228	0,0110	0,0088	0,0105	0,0117	0,0043	0,0048	0,0040	0,0024	0,0009
P6	0,0438	0,0292	0,0228	0,0165	0,0087	0,0140	0,0117	0,0043	0,0048	0,0040	0,0024	0,0009
P7	0,0438	0,0292	0,0304	0,0165	0,0131	0,0140	0,0087	0,0085	0,0048	0,0040	0,0012	0,0009
P8	0,0438	0,0292	0,0228	0,0220	0,0087	0,0105	0,0087	0,0043	0,0063	0,0040	0,0012	0,0009
P9	0,0438	0,0292	0,0228	0,0220	0,0131	0,0105	0,0116	0,0043	0,0063	0,0040	0,0024	0,0009
P10	0,0438	0,0292	0,0228	0,0165	0,0087	0,0105	0,0058	0,0064	0,0048	0,0040	0,0024	0,0009
P11	0,0438	0,0292	0,0228	0,0165	0,0131	0,0070	0,0087	0,0064	0,0048	0,0040	0,0024	0,0009
P12	0,0438	0,0195	0,0304	0,0165	0,0131	0,0140	0,0116	0,0085	0,0048	0,0040	0,0036	0,0009
P13	0,0438	0,0195	0,0228	0,0110	0,0087	0,0140	0,0087	0,0085	0,0063	0,0040	0,0024	0,0009
P14	0,0438	0,0292	0,0152	0,0165	0,0131	0,0105	0,0087	0,0064	0,0048	0,0040	0,0024	0,0009
P15	0,0438	0,0292	0,0152	0,0165	0,0131	0,0105	0,0058	0,0064	0,0032	0,0020	0,0024	0,0009
P16	0,0438	0,0292	0,0152	0,0165	0,0087	0,0140	0,0058	0,0085	0,0048	0,0040	0,0012	0,0009
P17	0,0438	0,0292	0,0228	0,0220	0,0131	0,0140	0,0087	0,0064	0,0063	0,0040	0,0012	0,0009
P18	0,0438	0,0292	0,0152	0,0220	0,0175	0,0105	0,0058	0,0064	0,0048	0,0020	0,0024	0,0019
P19	0,0438	0,0292	0,0152	0,0165	0,0131	0,0140	0,0087	0,0085	0,0063	0,0040	0,0024	0,0019
P20	0,0438	0,0292	0,0228	0,0165	0,0131	0,0100	0,0058	0,0064	0,0048	0,0040	0,0036	0,0019
P21	0,0438	0,0292	0,0152	0,0220	0,0175	0,0070	0,0087	0,0064	0,0047	0,0040	0,0024	0,0009
P22	0,0438	0,0292	0,0228	0,0165	0,0175	0,0140	0,0087	0,0064	0,0032	0,0020	0,0024	0,0019
P23	0,0438	0,0292	0,0152	0,0165	0,0131	0,0070	0,0058	0,0085	0,0063	0,0020	0,0024	0,0009
P24	0,0438	0,0292	0,0228	0,0165	0,0131	0,0105	0,0116	0,0064	0,0048	0,0020	0,0024	0,0009
P25	0,0438	0,0292	0,0152	0,0220	0,0175	0,0140	0,0058	0,0085	0,0063	0,0040	0,0024	0,0018
P26	0,0292	0,0292	0,0228	0,0110	0,0131	0,0070	0,0058	0,0064	0,0047	0,0040	0,0024	0,0009
P27	0,0438	0,0292	0,0152	0,0110	0,0175	0,0070	0,0087	0,0064	0,0063	0,0040	0,0012	0,0009
P28	0,0438	0,0292	0,0228	0,0220	0,0131	0,0105	0,0087	0,0064	0,0048	0,0040	0,0024	0,0009
P29	0,0438	0,0292	0,0304	0,0220	0,0175	0,0140	0,0117	0,0085	0,0048	0,0040	0,0036	0,0009
P30	0,0438	0,0292	0,0228	0,0165	0,0175	0,0105	0,0117	0,0043	0,0048	0,0040	0,0012	0,0009
P31	0,0438	0,0292	0,0220	0,0110	0,0175	0,0140	0,0117	0,0064	0,0048	0,0040	0,0012	0,0019
P32	0,0438	0,0292	0,0304	0,0165	0,0131	0,0070	0,0087	0,0085	0,0048	0,0040	0,0024	0,0009
P33	0,0438	0,0292	0,0228	0,0220	0,0131	0,0140	0,0087	0,0085	0,0032	0,0040	0,0036	0,0009
P34	0,0438	0,0292	0,0152	0,0110	0,0087	0,0070	0,0058	0,0064	0,0048	0,0040	0,0036	0,0009
P35	0,0438	0,0292	0,0152	0,0165	0,0087	0,0070	0,0058	0,0064	0,0063	0,0040	0,0024	0,0009
P36	0,0292	0,0292	0,0152	0,0165	0,0175	0,0105	0,0087	0,0085	0,0063	0,0040	0,0012	0,0009
P37	0,0292	0,0292	0,0228	0,0110	0,0175	0,0105	0,0116	0,0064	0,0063	0,0040	0,0024	0,0009

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Table 4. Preference Calculation Results

Rank	non-ASN	Values	Rank	non-ASN	Values
1	P1	0,1815	20	P20	0,1553
2	P2	0,1778	21	P21	0,1531
3	P3	0,1711	22	P22	0,1530
4	P4	0,1684	23	P23	0,1525
5	P5	0,1649	24	P24	0,1515
6	P6	0,1645	25	P25	0,1493
7	P7	0,1642	26	P26	0,1490
8	P8	0,1630	27	P27	0,1485
9	P9	0,1628	28	P28	0,1471
10	P10	0,1627	29	P29	0,1453
11	P11	0,1622	30	P30	0,1443
12	P12	0,1622	31	P31	0,1442
13	P13	0,1621	32	P32	0,1437
14	P14	0,1618	33	P33	0,1425
15	P15	0,1600	34	P34	0,1397
16	P16	0,1584	35	P35	0,1329
17	P17	0,1575	36	P36	0,1314
18	P18	0,1573	37	P37	0,1300
19	P19	0,1553			

Description:

(P1) Umardin, (P2) Rahmi, (P3) Jumry, (P4) Muhammad Jalaluddin, (P5) Zaira Adriani, (P6) Meryanto, (P7) Lisa Paramita, (P8) Herlinasari, (P9) Riska, (P10) Wahyudi Bayu, (P11) Dewi Wahyuni, (P12) Muhammad Istianto Yusuf, (P13) Muhammad Hidayat, (P14) Baderi Lamberie, (P15) Regina Apriani Saputri, (P16) H. Misran, (P17) Helda Rahmah, (P18) Aan Setiawan, (P19) Zulkufli Gazali, (P20) Sukirno, (P21) Arni, (P22) Samsul, (P23) Siti Zulaeha, (P24) Suratno, (P25) Alamsah, (P26) Erisandi Saputra, (P27) Hendra Asmara, (P28) Miftahul Arif Hidayah, (P29) Ahmad Muzakki, (P30) Yuda Aprilianto, (P31) Bagas Pangestu, (P32) Dini Saputri, (P33) Firdaus, (P34) Eva Indah Purnama, (P35) Windra Wijaya, (P36) Mochammad Ridwan, (P37) Fadil Hidayatu Fajri.

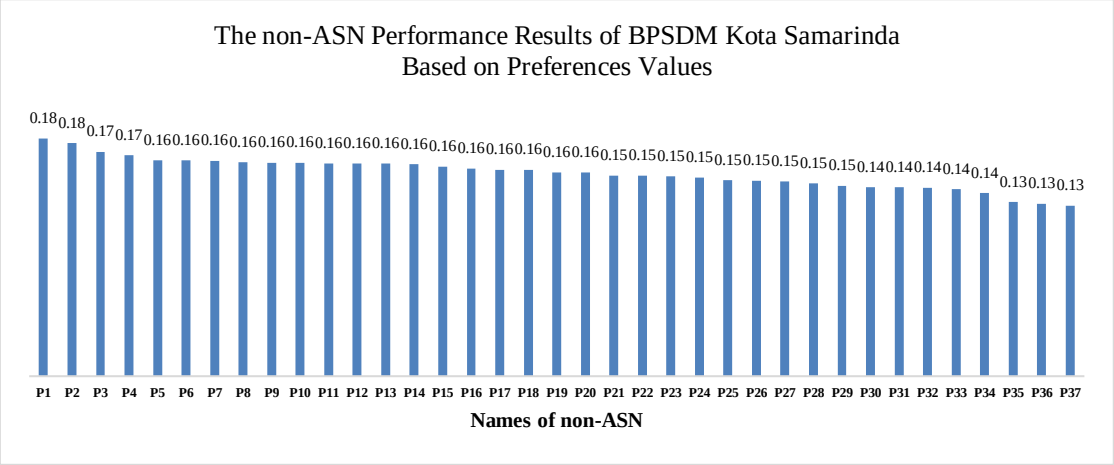

Figure 3. Non-ASN Performance Ranking

In this experiment, the accuracy of the ranking results of non-ASN performance assessments has been carried out using the CM method on all criteria that have been tested significant using the formula (7). Based on the calculation of the suitability level of 81.1%, it has been obtained which means that both methods can be used as an alternative in providing non-ASN performance ratings based on predetermined criteria. Based on the experimental results, from 37 non-ASN, there are 27 non-ASN in the TP category, 4 non-ASN including FN, 3 non-ASN including FP and 3 non-ASN including TN. Where, the results of the CM calculation are in Table 5.

Table 5. Confusion Matrix Results

		Class Prediction	
		Appropriate	Not Appropriate
Real Class	Appropriate	27	3
	Not Appropriate	3	4

In this study, to make it easier for leaders to determine the ranking of non-ASN, a website-based assessment system has been produced. Meanwhile, the system display in Figure 4 (a), (b), and (c).

Figure 4 (a) shows that users are required to register before using the system. In this study, the registration that has been used is the user's email. Figure 4 (b) the form containing data information and the weight of the criteria used as a reference for performance appraisal. Figure 4 (c) the ranking results of non-ASN based on criteria.

4. Conclusion

Non-ASN performance appraisal analysis using the Rank Order Centroid (ROC) method and Multi Objective Optimization on the Basis of Ratio Analysis (MOORA) has been implemented. 37 research data and 12 criteria have been obtained from BPSDM, Samarinda City, East Kalimantan Province, Indonesia. Measuring the accuracy of both methods using the confusion matrix (CM) has been applied. Based on the experiment, the ROC method has been able to get the weight value of each criterion. Meanwhile, the results of the calculation of the MOORA method have been able to get the highest ranking of non-ASN performance appraisals, namely Umardin with a preference value of 0.181468388. This means that both methods can be used as an alternative in providing a non-ASN performance appraisal rating.

Based on the results of this analysis, the leadership of the BPSDM of Samarinda City, East Kalimantan Province is expected to be able to make objective decisions in determining the extension of non-ASN

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contracts even though there are various other considerations that are not included in the alternatives and calculation criteria such as humanitarian considerations.

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