

IMPLEMENTATION OF THE MOORA METHOD IN DETERMINING CANDIDATES FOR VILLAGE HEAD

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Abstract

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One of the community democratization parties is the election of the village head, the election of the village head is carried out at the village level directly to determine the village leader or village head. Decision support system is an interactive alternative system that can assist in decision making through the use of data and decision models to solve semi-structured and unstructured problems. This system was built by applying the MOORA (Multi-Objective Optimization on the basis of Ratio Analysis) method where the basic concept of the MOORA method is to find the weighted sum of the performance ratings for each alternative on all attributes. In the calculation of the MOORA method, only the one that produces the largest value will be selected as the best alternative. Calculations will be in accordance with this method if the selected alternative meets the predetermined criteria. By using a decision support system for the selection of village head candidates using the Multi-Objective Optimization on the basis of Ratio Analysis (MOORA) method, it helps community members to find out the ranking of village head candidates from the results of the weighted criteria that have been determined, thus providing additional information when making decisions. determine choices in the democratic party of the citizens of the village of Sitnggaling..

Keywords: MOORA, Village Head Election, SPK.

1. Introduction

The Village Head is a leader of the government at the village level in the State of Indonesia. The village head is elected by voting at a democratic party. The term of office of the Village Head is 5 (five) years, and can be extended again for another one-time term[1].

People's confusion about choosing a village head is like choosing a cat in a sack, residents are confused to see leader untrustworthy. The community members were amazed to see those who prioritized the interests of themselves and their families over the people they lead. Often we are surprised to find out that people who are supposed to be role models and are responsible for leading and advancing the village actually commit acts that violate the law or moral norms which are strangely considered natural, so it is necessary to elect a candidate for the village head in accordance with the specified criteria.

Decision support system is an interactive alternative system to help make decisions through the use of data and decision models to solve semi-structured and unstructured problems.[2].

There are several models that can be used to build a Decision Support System, one of which is the Moora Method (Multi-Objective Optimization on the basis of Ratio Analysis). The Moora method is a multi-objective system that optimizes two or more conflicting attributes simultaneously, while for its advantages compared to other methods, the Moora method is very simple, stable and strong, even this method does not require an expert in the field of mathematics to use it and requires sophisticated mathematical calculations. simple and has more accurate and targeted results in decision making[3].

To find out whether the decision is accurate or not, an assessment must be made with predetermined criteria. So from the results of the assessment the office can make a decision as an evaluation material to determine the candidate for the village head.

2. Method

2.1 Decision Support System

A Decision Support System (DSS) is an interactive information system that provides information, modeling, and data manipulation. The system is used to assist decision making in semi-structured and unstructured situations, where no one knows for sure how the decision will be made. must be made[4].[5]

2.2 MOORA Method (*Multi Objective Optimization On The Basic Of Ratio Analysis*)

The MOORA method has a level 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 has a good level of selectivity because it can determine the objectives of conflicting criteria. Where the criteria can be profitable (benefit) or unfavorable (cost).[6][7]

The Moora method is a multi-objective system that optimizes two or more conflicting attributes simultaneously. This method is applied to solve problems with complex mathematical calculations[2].

2.3 Steps of the Moora Method

The steps for solving problems using the MOORA method, include:[8][9]

- a. Creating a Decision Matrix

$$X = \begin{bmatrix} X_{11} & X_{12} & \dots & X_{mn} \\ X_{21} & X_{22} & \dots & X_{mn} \\ \dots & \dots & \dots & \dots \\ X_{n1} & X_{n2} & \dots & X_{mn} \end{bmatrix} \quad (1)$$

- b. Normalize the x . matrix

$$X^*_{ij} = \frac{X_{ij}}{\sum_{i=1}^m X_{ij}^2} \quad (2)$$

- c. Determine the weighted normalization matrix

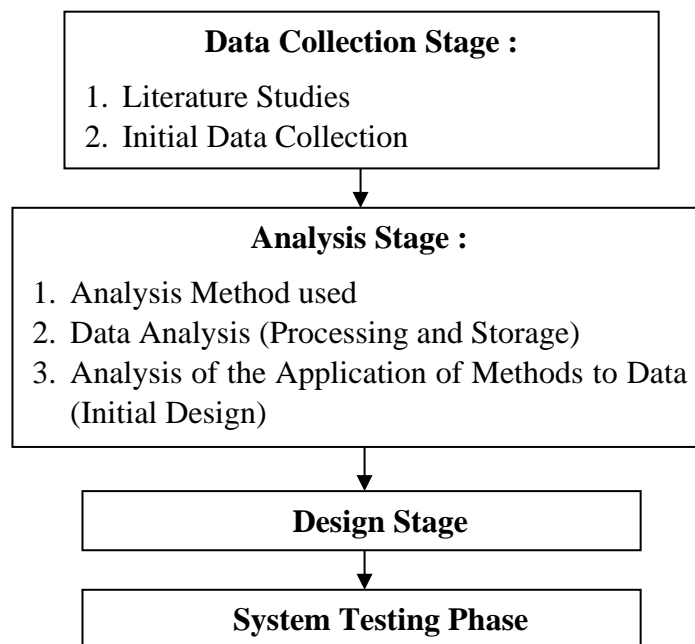
$$W_j * X_{ij} \quad (3)$$

- d. Determining Preference Results

$$Y_i = \sum_{j=1}^g w_j X^*_{ij} - \sum_{j=g+1}^n w_j X^*_{ij} \quad (4)$$

2.4 Research Framework

The research framework in question is a method used by researchers in collecting research data and comparing them with predetermined standards or measures.



3. Results and Discussion

3.1 Results

As an initial step taken in order to know the description of the problems faced in the village of Ujung Labuhan is to do a problem analysis (problem analysis).

By analyzing the problem, it is hoped that it can provide solutions according to the problems at hand. Problems with village head elections, it is necessary to need a decision-making system to help the apparatus to select village head candidates by applying the MOORA method in accordance with the requirements and criteria determined by law and based on Indonesian government regulation Number 72 of 2004 concerning village head elections.

Table 1 Criteria Data

Criteria	Information	Weight Value	Type
C1	Educational stage	20%	Benefits
C2	Experience	25%	Benefits
C3	Interview	25%	Benefits
C4	Psychotest Results	30%	Benefits

Criteria that use an assessment not a numerical value will be adjusted to the rating scale as below:

Table 2. Alternative values

Alternative value	Score
Very good	5
Well	4
Enough	3
Not enough	2

As for the data processed in this data, there are 30 samples but only 5 people tested, where the 5 people got their name, no_id, education level, experience, interview and psychotest that will be used in the moora method process.

Table 3. Data Criteria for Prospective Contract Workers

No	Educational stage	Experience	Interview	Psychotest
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1.	S1 = 5 (very good)	> 3 – 4 Years = 5 (Very Good)	Very Good = 5	Very Good = 5
2.	D3 = 4(good)	> 2 – 3 Years = 4 (Good)	Fine = 4	Fine = 4
3.	Vocational Vocational High School = 3 (enough)	> 1 – 2 Years = 3 (Enough)	Enough = 3	Enough = 3
4.	SMA = 2(Less)	< 1 month – 1 year = 2 (less)	Less = 2	Less = 2

The data used as sample data are as follows:

Table 4. Sample data used

No	No ID	Name	Educational stage	Experience	Interview	Psychot est
1.	K00001	Chandra	D3	2 yrs 6 months	5	4
2.	K00002	granny	S1	2 yrs 1 month	4	4
3.	K00003	Dina Panjaitan	S1	3 yrs 2 mths	4	5
4.	K00004	Tria S	SMK	1 year 3 months	5	4
5.	K00005	Santi Rahmadona	S1	3 yrs 1 month	4	3

The assessment on each criterion is of course based on the results of the selection and the provisions that have been set at the North Sumatra Police. Alternative Assessment Data based on the above criteria can be seen in the following table:

Table 6. Rating of Each Alternative

Alternative	C1	C2	C3	C4
Chandra	Well	Well	Very good	Well
granny	Very good	Well	Well	Well
Dina	Very good	Very good	Well	Very good
Tria S	Enough	Enough	Very good	Well
Santi	Very good	Very good	Well	Enough

Table 7. Changes in the Value of Each Alternative

Alternative	C1	C2	C3	C4
A1	4	4	5	4
A2	5	4	4	4
A3	5	5	4	5
A4	3	3	5	4
A5	5	5	4	3

Based on the data above, the decision matrix can be obtained in the following table:

Table 8. Decision Matrix

4	4	5	4
5	4	4	4
5	5	4	5
3	3	5	4
5	5	4	3

Step II:

Determining the Normalization Matrix

$$X_{ij}^* = \frac{X_{ij}}{\sum_{i=1}^m X_{ij}^2}$$

Where X_{ij} is the value of the dimension that has the interval [0,1] in the presentation of the normalized results of the i-th alternative on the jth attribute.

$$C1 = \sqrt{4^2 + 5^2 + 5^2 + 3^2 + 5^2} \\ = 10.00$$

$$A11 = 4/10.00 \\ = 0.400$$

$$A21 = 5/10.00 \\ = 0.500$$

$$A31 = 5/10.00 \\ = 0.500$$

$$A41 = 3/10.00 \\ = 0.300$$

$$A51 = 5/10.00 \\ = 0.500$$

$$C2 = \sqrt{4^2 + 4^2 + 5^2 + 3^2 + 5^2} \\ = 91.00$$

$$A11 = 4/91.00 \\ = 0.419$$

$$A21 = 4/91.00 \\ = 0.419$$

$$A31 = 5/91.00 \\ = 0.524$$

$$A41 = 3/91.00 \\ = 0.314$$

$$A51 = 5/91.00 \\ = 0.524$$

Then it can be seen the following normalized matrix, namely:

Table 9. Normalization Matrix

0.400	0.419	0.505	0.442
0.500	0.419	0.404	0.442
0.500	0.524	0.404	0.552
0.300	0.314	0.505	0.442
0.500	0.524	0.404	0.331

Step III: Determining the Weighted Normalization Matrix

$$W_j * X_{ij}$$

Where :

W_j = attribute weight j.

X_{ij} is a dimension value that has an interval of [0,1] in the presentation of the normalized results of the i-th alternative on the jth attribute

C1 = A11 : $0.20 \times 0.400 = 0.0800$
 A21 : $0.20 \times 0.500 = 0.1000$
 A31 : $0.20 \times 0.500 = 0.1000$
 A41 : $0.20 \times 0.300 = 0.0600$
 A51 : $0.20 \times 0.500 = 0.1000$

Then the results can be seen in the matrix below:

Table 10. Results of Weighted Normalized Matrix

0.0800	0.1048	0.1263	0.1326
0.1000	0.1048	0.1010	0.1326
0.1000	0.1310	0.1010	0.1656
0.0600	0.0785	0.1263	0.1326
0.1000	0.1310	0.1010	0.0993

Step IV: Determine the Preference Value with the following formula:

$$Y_i = \sum_{j=1}^g w_j X_{ij} - \sum_{j=g+1}^n w_j X_{ij}$$

Where g is the value of the criteria to be maximized, (ng) is the value of the minimized criteria, and Y_i is the value of the alternative normalization assessment of i for all attributes. In some cases, often observe some other more important criteria. order to give more importance to the attribute, it is carried out with the appropriate weight (significant coefficient).

To get the first Y_i value, add each criterion to the available alternatives.

A1 = $0.0800 + 0.1048 + 0.1263 + 0.1325$
 = 0.4437
 A2 = $0.1000 + 0.1048 + 0.1010 + 0.1325$
 = 0.4384

After the sum of each criterion is obtained, then look for the Y_i value, which can be seen in the following table:

Table 11. Finding the Y_i Value

Alternative	Max (C1+C2+C3+C4)	Min (0)	$Y_i = \text{Max} - \text{Min}$
A1	0.4437	0	0.4437
A2	0.4384	0	0.4384
A3	0.4976	0	0.4976
A4	0.3974	0	0.3974
A5	0.4313	0	0.4313

So that the results obtained using the moora method for the selection of village head candidates can be ranked as follows:

Table 11. Ranking

Alternative	Y_i	Rank
Chandra	0.4437	2
granny	0.4384	3

Dina	0.4976	1
Tria S	0.3974	5
Santi	0.4313	4

From this process, it can be concluded that Dina is the best alternative and is used as the selected contract employee based on the existing criteria.

3.3 Discussion

From this process, it can be concluded that Dina is the best alternative and is used as the selected contract employee based on the existing criteria.

4. Conclusions

Method implementation *Moora* on the decision support system for In determining the candidate for village head that has been completed, several conclusions can be drawn, including the Decision Support System. The selection of prospective village heads in the Ujung Labuhan sub-district was made by applying the *Moora* method where this method resulted in candidate decisions that met the requirements by ranking.

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