

Decision Support System Application with Simple Additive Weighting

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Abstract

Development in meeting the needs of the community in order to create a welfare, the government must pay attention to the problem of poverty. So the government issued a policy, namely the Family Hope Program (FHP). FHP aims for intense social protection for underprivileged households. The government takes a long time to determine the selection of FHP, therefore a decision support system is needed to assist and speed up the process of determining the selection of FHP. In order for a decision support system to run well, a method is needed to facilitate the implementation of a decision support system. The recommended method is the simple additive weighting (SAW) method. The SAW method is used to find the weighted number of performance ratings on each alternative for all attributes. Slawi Wetan Village is a village where most of the population lacks clothing, food, and minimal income. So that there are often problems, including the criteria for the population being surveyed are not appropriate, the selection selection is still manual and still uses data from several years ago. The best solution for solving problems in the village of slawi wetan, with a decision support system using the SAW method which helps the process of managing FHP data so that in managing FHP data it becomes better, on target according to predetermined criteria. The decision support system can be used to determine the selection of FHP, find out population data, know the results of the FHP selection, and can provide a recap of the results of the selection report for determining the selection of FHP.

Keywords

Decision Support System, SAW, Application

1. Introduction

Development in meeting the needs of the community in order to create a welfare (Wiryomartono, 2015). This is to realize a community welfare, the government must pay attention to the problem of poverty (Najib & Kiminami, 2011). Because poverty that occurs in Indonesia is a problem that must be resolved immediately (Hasibuan et al., 2018). This problem is very important because the number of poor people in Indonesia has reached 25.99 million people, which is 9.84 percent of the total population of Indonesia (Badan Pusat Statistik Republik Indonesia, 2018). Realizing these problems, the government made efforts to reduce the poverty rate (Astradanta et al., 2016). Efforts made by the government are by issuing a policy related to empowering poor families, one of which is the government's policy in this case through the Family Hope Program (FHP) (Y. Nugroho, 2011). FHP or often called the

Family Hope Program is an intense social protection in providing assistance to households that meet FHP criteria (Hidayat, 2018). This is because the government takes a long time to determine the selection of FHP, therefore a decision support system is needed to assist and speed up the process of determining the selection of FHP. Decision Support System (DSS) is an interactive information system that provides information, modeling and manipulating data (Rusdiansyah, 2017).

In order for the decision support system to run well, a method is needed to facilitate the implementation of a decision support system in determining the selection of FHP (Y. Nugroho, 2011). The method used is the Simple Additive Weighting (SAW) method or commonly known as the weighted addition method (Roure & Keeley, 1990). The basic description of the Simple Additive Weighting method is to find the weighted number of performance appraisals on each alternative for all attributes (Widianto & Hidayat, 2018). Meanwhile, over time, problems often occur in surveying population data, one of which is Slawi Wetan Village. Slawi Wetan Village is a village where most of the population lacks clothing, food, and minimal income. So that there are often problems, including the criteria for the population being surveyed are not appropriate, the selection selection is still manual and still uses data from several years ago. Based on the above problems, how to make a decision support system using the Simple Additive Weighting method which helps in the process of managing the Family Hope Program (FHP) data so that the FHP data management becomes better and on target according to predetermined criteria.

2. Literature Review

2.1. Simple Additive Weighting (SAW)

The Simple Additive Weighting (SAW) method is one method that can used in solving Multiple Attribute Decision Making (MADM) problems. MADM itself is a decision-making method that takes a lot of criteria as a basis for decision making. Simple Additive Weighting Method This is known as the weighted addition method. The basic concept of the Simple Additive method Weighting is to find the weighted sum of the performance ratings on each alternative on all attributes. Simple Additive Weighting Method requires the process of normalizing the decision matrix (X) to a scale that can be compared with all existing alternative ratings (Kusumadewi & et al, 2006).

$r_{ij} = \frac{\frac{x_{ij}}{\max x_{ij}}}{\frac{\min x_{ij}}{x_{ij}}}$ is the normalized performance rating of alternative A_i , on attribute $X_i = 1, 2, \dots, m$ and $X_j = 1, 2, \dots, n$. The

preference value for each alternative (V_i) is given the formula:

$$V_i = \sum_{j=1}^n w_j r_{ij}$$

2.2. Weighted Product (WP)

Like the Simple Additive Weighting method, the Weighted Product method is one method that can be used to solve multiple problems Attribute Decision Making (MADM). The Weighted Product method uses multiplication to connect attribute ratings, in the process of connecting each rating attribute must be raised to the first power with the weight of the attribute in question (Kusumadewi & et al, 2006). This process is the same as the normalization process. Before carrying out the normalization process, there is a process of improving the weight of previously defined weights. The weight improvement process is given the following formula:

$$W_n = \frac{w_n}{\sum w_n}$$

Then to find the value of preference for each alternative A_i is given the formula as follows:

$$S_i = \prod_{j=1}^n x_{ij} w_j$$

3. Methods

Decision support system is an interactive information system that provides information, modeling and manipulating data. The system is used to assist decision making in semi-structured situations and unstructured situations where no

one knows for sure how decisions should be made (Lubis et al., 2017). The characteristics of the decision support system are as follows (Windarto, 2017):

- Supports decision making to address structured, semi-structured and unstructured issues.
- Outputs are intended for organizational personnel at all levels.
- Supports all phases of the decision-making process, intelligence, design, choice.
- The existence of a human or machine interface, where humans (users) still control the decision-making process.
- Using mathematical and statistical models in accordance with the discussion.
- Have the ability to dialogue to obtain information as needed.
- Having subsystems that are integrated in such a way that it can function as a unified system.
- Requires a comprehensive data structure that can serve the information needs of all levels of management.

Decision support systems also have stages in the decision-making process, including (Windarto, 2017):

- Identification of problems
- Method Selection
- Collecting the data needed to implement the decision model.
- Implement the model.
- Evaluate the positive side of each alternative.
- Implement the selected solution.

In this study, there are processes and stages until the results of the research data output. The following are the stages in the research process depicted in Fig. 1.

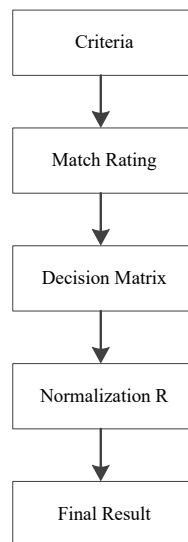


Fig. 1. Component of DSS

In Fig. 1 Making steps for the completion of the SAW method is to determine the criteria that will be used as a reference in decision making, then determine the suitability rating for each alternative on the criteria, make a decision matrix based on the criteria, and determine the normalized value of R and the last is the final result obtained of the ranking process.

The algorithm method in the decision support system used in this study is the Simple Additive Weighting (SAW) method. The Simple Additive Weighting method is often also known as the weighted addition method. The basic concept of the SAW method is to find the weighted sum of the performance ratings for each alternative on all attributes. The SAW method requires the process of normalizing the decision matrix (X) to a scale that can be compared with all existing alternative ratings (Firmandi et al., 2019). The formula used to perform normalization is as follows (Windarto, 2017):

$$R_{ij} = \begin{cases} \frac{X_{ij}}{\text{Max } X_{ij}} & \text{if } j \text{ is Benefit} \\ \frac{X_{ij}}{\text{Min } X_{ij}} & \text{if } j \text{ is Cost} \end{cases}$$

Keterangan:

R_{ij} = Normalized performance rating of alternative A_i on attributes C_{ij} :i=1,2,...,m and j = 1,2,..., n

Cij = Criteria Value

Ai = Alternative Value

Max Xij = The largest value of each criterion i

Min Xij = The smallest value of each criterion i

Xij = Attribute value of each criterion

Benefit = If the biggest value is the best

Cost = If the smallest value is the best

The preference value for each alternative (Vi) is given the following formula::

$$V_i = \sum_{j=1}^n w_j r_{ij}$$

Information:

J = Criteria j

N = Number of normalized values

Vi = Rank for each alternative

Wj = Rank weight value (from each alternative)

rij = Normalized performance rating value

A larger Vi value indicates that alternative Vi is preferred.

4. Results and Discussion

4.1 Manual Calculation of the Simple Additive Weighting Method

The following are the results of manual calculations for determining the selection of the family of hope program in the Slawi Wetan sub-district with the SAW method using 10 examples of data for underprivileged residents. In TABLE 1 and TABLE 2 are tables to determine the value of the size of the criteria. In TABLE 4 is a table to determine the value for each criterion. Furthermore, each criterion is given a preference weight value which is given as follows.

TABLE 1. FUZZY NUMBERS

No	Criteria of Fuzzy	Score
1	Very Small (SK)	5
2	Small (K)	4
3	Medium (S)	3
4	Big (B)	2
5	Very Big (SB)	1

TABLE 2. PREFERENCE WEIGHT

No	Criteria	Preference
1	K1	5
2	K2	5
3	K3	5
4	K4	3
5	K5	3
6	K6	2
7	K7	4
8	K8	4
9	K9	2
10	K10	5

TABLE 3. MATCH RATING VALUES

Respons	Alternative Score									
	K1	K2	K3	K4	K5	K6	K7	K8	K9	K10
Agus	5	3	5	2	3	1	3	4	3	4
Darti	5	5	3	5	5	5	4	5	1	5
Siti	3	4	3	2	3	3	2	3	3	3
Kalimah	2	1	1	2	1	1	1	2	3	1
Radi	4	4	3	5	5	3	3	1	1	1
Tarina	3	4	3	2	1	3	4	2	3	4
Yono	4	5	3	5	3	3	4	5	3	5
Sumi	4	5	5	5	3	3	2	4	2	4
Narto	5	3	2	3	5	3	2	2	4	2
Oti	4	3	2	3	1	1	3	3	2	2

TABLE 4. SCORING CRITERIA

No	Criteria	Sub Criteria	Weight
1	Building Are (K1)	1. <8 m ²	5
		2. 8-10 m ²	4
		3. 10-20 m ²	3
		4. 20-35 m ²	2
		5. >35 m ²	1
2	Floor Are (K4)	1. Soil	5
		2. Wood	4
		3. Tile	3
		4. Ceramic	2
		5. Granite	1
3	Wall Type (K3)	1. Bamboo	5
		2. Wood	3
		3. Wall	1
4	Toilet (K4)	1. No	5
		2. Yes	2
5	Source of Water (5)	1. River	5
		2. Well	3
		3. PDAM	1
6	Fuel (K6)	1. Wood	5
		2. Kerosene	3
		3. Gas	1
7	Education (K7)	1. No	5
		2. Primary School	4
		3. Secondary School	3
		4. High Shool	2
		5. D3/S1/S2	1
8	Income (K8)	1. No	5
		2. < Rp. 500.000	4
		3. Rp. 500.000 - Rp. 1.000.000	3
		4. Rp. 1.000.000 - Rp. 2.500.000	2
		5. > Rp. 2.500.000	1
9	Number of Family (K9)	1. 1-2 Peoples	1
		2. 3-5 Peoples	2
		3. 6-8 Peoples	3
		4. 8-10 Peoples	4
		5. > 10 Peoples	5
10	Jobs (K10)	1. Unemployment	5
		2. Labor	4
		3. Farmer	3
		4. Entrepreneur	2
		5. Goverment	1

In TABLE 3 is a table for determining and assigning value to each alternative, where there are several respondents who fill in the alternative value choices. Then the normalization formula is made and the following normalization is presented in the matrix equation.

$$R_{ij} = \begin{cases} \frac{X_{ij}}{\text{Max } X_{ij}} & \text{if } j \text{ is Benefit} \\ \frac{X_{ij}}{\text{Min } X_{ij}} & \text{if } j \text{ is Cost} \end{cases}$$

The matrix normalization of each alternative is presented with the following results.

- Normalization K1

$$R1.1 = 5 / (\text{Max } (5, 5, 3, 2, 4, 3, 4, 4, 5, 4)) = 5 / (5) = 1$$

$$R2.1 = 5 / (\text{Max } (5, 5, 3, 2, 4, 3, 4, 4, 5, 4)) = 5 / (5) = 1$$

$$R3.1 = 3 / (\text{Max } (5, 5, 3, 2, 4, 3, 4, 4, 5, 4)) = 3 / (5) = 0,6$$

$$R4.1 = 2 / (\text{Max } (5, 5, 3, 2, 4, 3, 4, 4, 5, 4)) = 2 / (5) = 0,4$$

$$\begin{aligned} R5.1 &= 4 / (\text{Max } (5,5,3,2,4,3,4,4,5,4)) = 4 / (5) = 0,8 \\ R6.1 &= 3 / (\text{Max } (5,5,3,2,4,3,4,4,5,4)) = 3 / (5) = 0,6 \\ R7.1 &= 4 / (\text{Max } (5,5,3,2,4,3,4,4,5,4)) = 4 / (5) = 0,8 \\ R8.1 &= 4 / (\text{Max } (5,5,3,2,4,3,4,4,5,4)) = 4 / (5) = 0,8 \\ R9.1 &= 5 / (\text{Max } (5,5,3,2,4,3,4,4,5,4)) = 5 / (5) = 1 \\ R10.1 &= 4 / (\text{Max } (5,5,3,2,4,3,4,4,5,4)) = 4 / (5) = 0,8 \end{aligned}$$

In the normalization of the K1 matrix, which is to calculate the attribute value owned from each 1st criterion divided by the maximum value of the 1st criterion in each column.

- Normalization K2

$$\begin{aligned} R1.2 &= 3 / (\text{Max } (3,5,4,1,4,4,5,5,3,3)) = 3 / (5) = 0,6 \\ R2.2 &= 5 / (\text{Max } (3,5,4,1,4,4,5,5,3,3)) = 5 / (5) = 1 \\ R3.2 &= 4 / (\text{Max } (3,5,4,1,4,4,5,5,3,3)) = 4 / (5) = 0,8 \\ R4.2 &= 1 / (\text{Max } (3,5,4,1,4,4,5,5,3,3)) = 1 / (5) = 0,2 \\ R5.2 &= 4 / (\text{Max } (3,5,4,1,4,4,5,5,3,3)) = 4 / (5) = 0,8 \\ R6.2 &= 4 / (\text{Max } (3,5,4,1,4,4,5,5,3,3)) = 4 / (5) = 0,8 \\ R7.2 &= 5 / (\text{Max } (3,5,4,1,4,4,5,5,3,3)) = 5 / (5) = 1 \\ R8.2 &= 5 / (\text{Max } (3,5,4,1,4,4,5,5,3,3)) = 5 / (5) = 1 \\ R9.2 &= 3 / (\text{Max } (3,5,4,1,4,4,5,5,3,3)) = 3 / (5) = 0,6 \\ R10.2 &= 3 / (\text{Max } (3,5,4,1,4,4,5,5,3,3)) = 3 / (5) = 0,6 \end{aligned}$$

In the normalization of the K2 matrix, which is to calculate the attribute value of each criterion 2 divided by the maximum value of the value in criterion 2 in each column.

- Normalization K3

$$\begin{aligned} R1.3 &= 5 / (\text{Max } (5,3,3,1,3,3,3,5,1,1)) = 5 / (5) = 1 \\ R2.3 &= 3 / (\text{Max } (5,3,3,1,3,3,3,5,1,1)) = 3 / (5) = 0,6 \\ R3.3 &= 3 / (\text{Max } (5,3,3,1,3,3,3,5,1,1)) = 3 / (5) = 0,6 \\ R4.3 &= 1 / (\text{Max } (5,3,3,1,3,3,3,5,1,1)) = 1 / (5) = 0,2 \\ R5.3 &= 3 / (\text{Max } (5,3,3,1,3,3,3,5,1,1)) = 3 / (5) = 0,6 \\ R6.3 &= 3 / (\text{Max } (5,3,3,1,3,3,3,5,1,1)) = 3 / (5) = 0,6 \\ R7.3 &= 3 / (\text{Max } (5,3,3,1,3,3,3,5,1,1)) = 3 / (5) = 0,6 \\ R8.3 &= 5 / (\text{Max } (5,3,3,1,3,3,3,5,1,1)) = 5 / (5) = 1 \\ R9.3 &= 1 / (\text{Max } (5,3,3,1,3,3,3,5,1,1)) = 1 / (5) = 0,2 \\ R10.3 &= 1 / (\text{Max } (5,3,3,1,3,3,3,5,1,1)) = 1 / (5) = 0,2 \end{aligned}$$

In the normalization of the K3 matrix, which is to calculate the attribute value owned from each of the 3rd criteria divided by the maximum value of the 3rd criterion in each column.

- Normalization K4

$$\begin{aligned} R1.4 &= 2 / (\text{Max } (2,5,2,2,5,2,5,5,2,2)) = 2 / (5) = 0,4 \\ R2.4 &= 5 / (\text{Max } (2,5,2,2,5,2,5,5,2,2)) = 5 / (5) = 1 \\ R3.4 &= 2 / (\text{Max } (2,5,2,2,5,2,5,5,2,2)) = 2 / (5) = 0,4 \\ R4.4 &= 2 / (\text{Max } (2,5,2,2,5,2,5,5,2,2)) = 2 / (5) = 0,4 \\ R5.4 &= 5 / (\text{Max } (2,5,2,2,5,2,5,5,2,2)) = 5 / (5) = 1 \\ R6.4 &= 2 / (\text{Max } (2,5,2,2,5,2,5,5,2,2)) = 2 / (5) = 0,4 \\ R7.4 &= 5 / (\text{Max } (2,5,2,2,5,2,5,5,2,2)) = 5 / (5) = 1 \\ R8.4 &= 5 / (\text{Max } (2,5,2,2,5,2,5,5,2,2)) = 5 / (5) = 1 \\ R9.4 &= 2 / (\text{Max } (2,5,2,2,5,2,5,5,2,2)) = 2 / (5) = 0,4 \\ R10.4 &= 2 / (\text{Max } (2,5,2,2,5,2,5,5,2,2)) = 2 / (5) = 0,4 \end{aligned}$$

In the normalization of the K3 matrix, which is to calculate the attribute values owned from each of the 4th criteria divided by the maximum value of the 4th criterion in each column.

- Normalization Matrix

From the results of the matrix normalization calculation, the normalized matrix R is obtained as follows:

$$R = \begin{bmatrix} 1 & 0,6 & 1 & 0,4 & 0,6 & 0,2 & 0,75 & 0,25 & 0,75 & 0,8 \\ 1 & 1 & 0,6 & 1 & 1 & 1 & 1 & 0,2 & 0,25 & 1 \\ 0,6 & 0,8 & 0,6 & 0,4 & 0,6 & 0,6 & 0,5 & 0,33 & 0,75 & 0,6 \\ 0,4 & 0,2 & 0,2 & 0,4 & 0,2 & 0,2 & 0,25 & 0,5 & 0,75 & 0,2 \\ 0,8 & 0,8 & 0,6 & 1 & 1 & 0,6 & 0,75 & 1 & 0,25 & 0,2 \\ 0,6 & 0,8 & 0,6 & 0,4 & 0,2 & 0,6 & 1 & 0,5 & 0,75 & 0,8 \\ 0,8 & 1 & 0,6 & 1 & 0,6 & 0,6 & 1 & 0,2 & 0,75 & 1 \\ 0,8 & 1 & 1 & 1 & 0,6 & 0,6 & 0,5 & 0,25 & 0,5 & 0,8 \\ 1 & 0,6 & 0,2 & 0,4 & 0,6 & 1 & 0,75 & 0,5 & 1 & 0,4 \\ 0,8 & 0,6 & 0,2 & 0,4 & 0,6 & 0,2 & 0,25 & 0,33 & 0,5 & 0,4 \end{bmatrix}$$

- Final Result V

The preference value formula for each alternative (V_i) is as follows:

$$V_i = \sum_{j=1}^n w_j r_{ij}$$

Then the final result calculation is:

$$\begin{aligned} V1 &= (5)(1) + (5)(0,6) + (5)(1) + (3)(0,4) + (3)(0,6) + (2)(0,2) + (4)(0,75) + (4)(0,25) + (2)(0,75) + (5)(0,8) \\ &= 5 + 3 + 5 + 1,2 + 1,8 + 0,4 + 3 + 1 + 1,5 + 4 \\ &= 25,9 \end{aligned}$$

$$\begin{aligned} V2 &= (5)(1) + (5)(1) + (5)(0,6) + (3)(1) + (3)(1) + (2)(1) + (4)(1) + (4)(0,2) + (2)(0,25) + (5)(1) \\ &= 5 + 5 + 3 + 3 + 3 + 2 + 4 + 0,8 + 0,5 + 5 \\ &= 31,3 \end{aligned}$$

$$\begin{aligned} V3 &= (5)(0,6) + (5)(0,8) + (5)(0,6) + (3)(0,4) + (3)(0,6) + (2)(0,6) + (4)(0,5) + (4)(0,33) + (2)(0,75) + (5)(0,6) \\ &= 3 + 4 + 3 + 1,2 + 1,8 + 1,2 + 2 + 1,32 + 1,5 + 3 \\ &= 22,02 \end{aligned}$$

$$\begin{aligned} V4 &= (5)(0,4) + (5)(0,2) + (5)(0,2) + (3)(0,4) + (3)(0,2) + (2)(0,2) + (4)(0,25) + (4)(0,5) + (2)(0,75) + (5)(0,2) \\ &= 2 + 1 + 1 + 1,2 + 0,6 + 0,4 + 1 + 2 + 1,5 + 1 \\ &= 11,7 \end{aligned}$$

$$\begin{aligned} V5 &= (5)(0,8) + (5)(0,8) + (5)(0,6) + (3)(1) + (3)(1) + (2)(0,6) + (4)(0,75) + (4)(1) + (2)(0,25) + (5)(0,2) \\ &= 4 + 4 + 3 + 3 + 3 + 1,2 + 3 + 4 + 0,5 + 1 \\ &= 26,7 \end{aligned}$$

$$\begin{aligned} V6 &= (5)(0,6) + (5)(0,8) + (5)(0,6) + (3)(0,4) + (3)(0,2) + (2)(0,6) + (4)(1) + (4)(0,5) + (2)(0,75) + (5)(0,9) \\ &= 3 + 4 + 3 + 1,2 + 0,6 + 1,2 + 4 + 2 + 1,5 + 4 \\ &= 24,5 \end{aligned}$$

$$\begin{aligned} V7 &= (5)(0,8) + (5)(1) + (5)(0,6) + (3)(1) + (3)(0,6) + (2)(0,6) + (4)(1) + (4)(0,2) + (2)(0,75) + (5)(1) \\ &= 4 + 5 + 3 + 3 + 1,8 + 1,2 + 4 + 0,8 + 1,5 + 5 \\ &= 29,3 \end{aligned}$$

$$\begin{aligned} V8 &= (5)(0,8) + (5)(1) + (5)(1) + (3)(1) + (3)(0,6) + (2)(0,6) + (4)(0,5) + (4)(0,25) + (2)(0,5) + (5)(0,8) \\ &= 4 + 5 + 5 + 3 + 1,8 + 1,2 + 2 + 1 + 1 + 4 \\ &= 28 \end{aligned}$$

$$\begin{aligned} V9 &= (5)(1) + (5)(0,8) + (5)(0,2) + (3)(0,4) + (3)(0,6) + (2)(1) + (4)(0,75) + (4)(0,5) + (2)(1) + (5)(0,4) \\ &= 5 + 3 + 1 + 1,2 + 1,8 + 2 + 3 + 2 + 2 + 2 \\ &= 23 \end{aligned}$$

$$\begin{aligned} V10 &= (5)(0,8) + (5)(0,6) + (5)(0,2) + (3)(0,4) + (3)(0,6) + (2)(0,2) + (4)(0,25) + (4)(0,33) + (2)(0,5) + (5)(0,4) \\ &= 4 + 3 + 1 + 1,2 + 1,8 + 0,4 + 1 + 1,32 + 1 + 2 \\ &= 16,72 \end{aligned}$$

There are ten alternative choices of matrix results that have been presented. The next stage is system development through the Unified Modeling Language (UML) approach.

4.2 Unified Modeling Language (UML)

In following UML, it starts with Entity Relationship Diagram (ERD), where ERD is a model that is widely used in database modeling (Imaniawan & Wati, 2017).

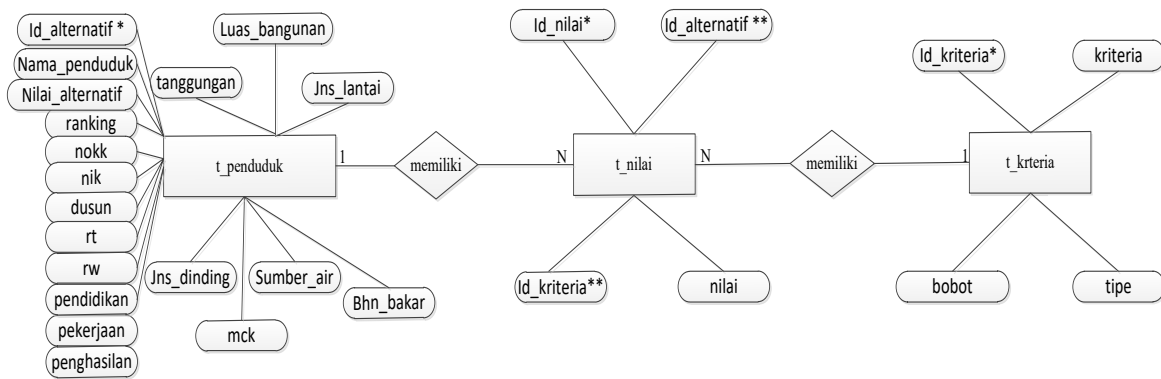


Fig. 2.ERD

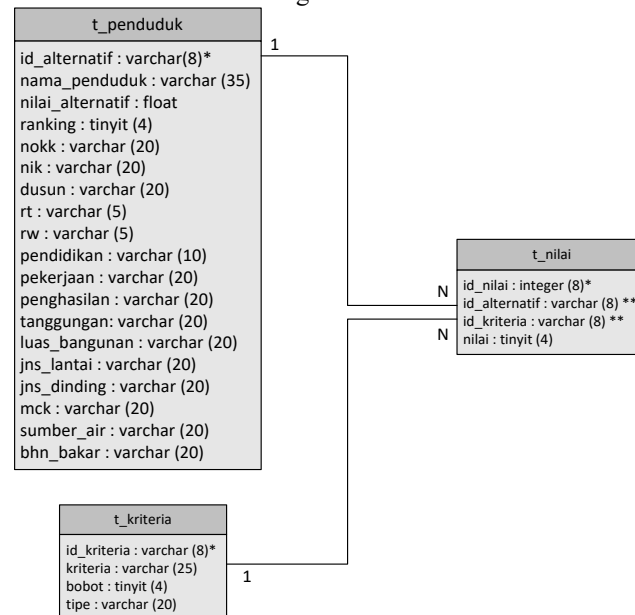


Fig. 3.LRS

In Fig. 2 the Entity Relationship Diagram shows the ERD of the PKH System, where there are three tables, namely t_penduduk, t_nilai, t_kriteria that have processes with each other. The next arrangement is the construction of a Logical Record Structure (LRS). LRS is a representation of the structure of the records in the tables that are formed from the results of relations between entity sets in the E-R diagram (Sudrajat et al., 2019). Fig 3 shows the Logical Record Structure of the Proposed Application System where there are three tables that are related to each other with normalization that is adjusted to the needs.

In principle, the Unified Modeling Language (UML) is a modeling language for systems or software that has an object-oriented paradigm (A. Nugroho, 2017). Here are some UML diagrams and tools.

1. Use Case Diagram

Use Case Diagram is a model for behavior (behavior). There are two main things in use cases, namely defining what is called an actor and use case (A.S & M, 2014). Actors are people, processes, or other systems that interact with information systems that will be created outside the information system. Use Cases are functionality that the system will provide as units that exchange messages between units or actors.

In the Use Case Diagram of the proposed application system, where the Head of PPM and LH can manage the overall data and the survey officer can only manage the population menu and values.

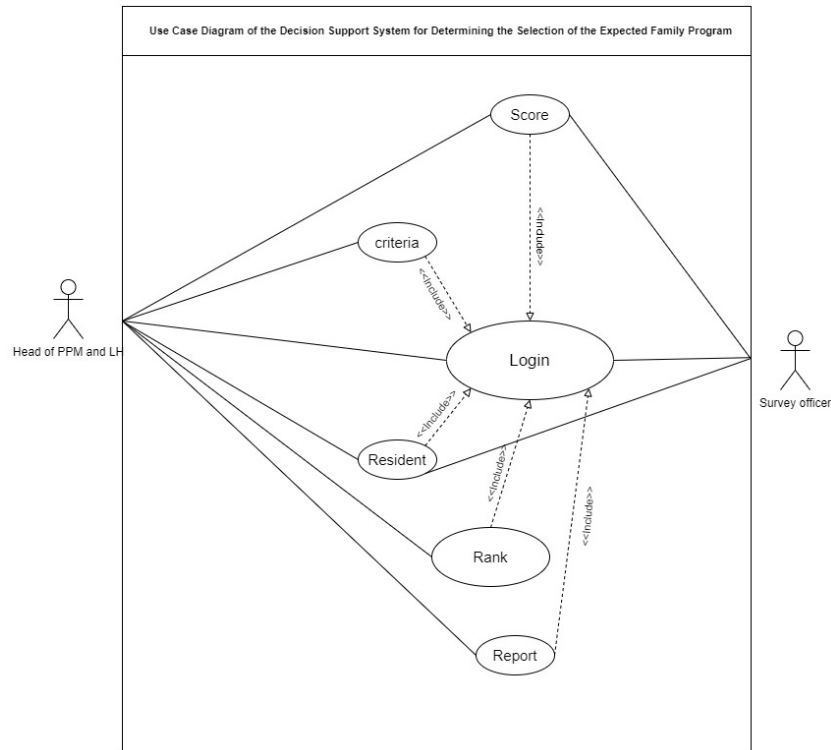


Fig. 4. Use Case of System

2. Activity Diagram

In Figure 5 Activity Diagram, it appears that values are a series of activities that can be performed on the application for the value menu. In it there are several options including to input new values, edit existing values and delete values.

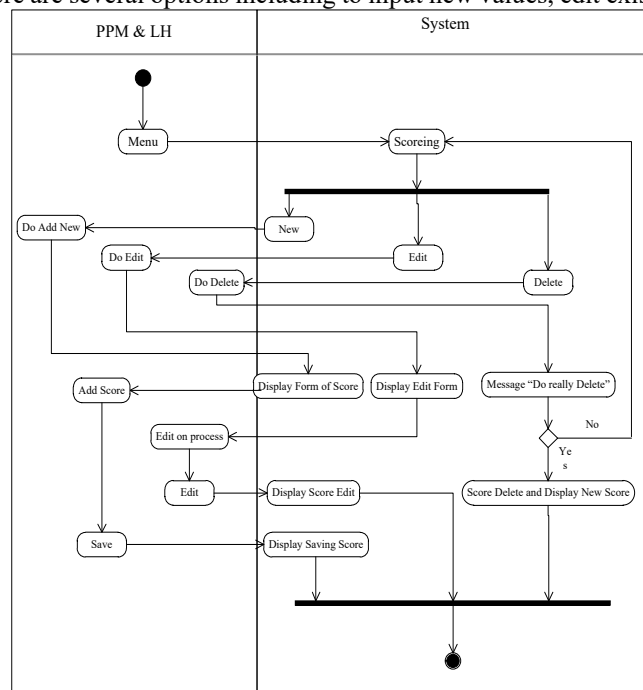


Fig. 5. Activity Diagram of System

4.3 DSS Calculation Results with SAW Method

From the results of the calculation of the Decision Support System Using the Simple Additive Weighting (SAW) Method in determining the selection of the Family Hope Program in Slawi Wetan Village. Then the order obtained for the Family Hope Program is as follows:

1. V2 = 31,3
2. V7 = 29,3
3. V8 = 28
4. V5 = 26,7
5. V1 = 25,9
6. V6 = 24,5
7. V9 = 23
8. V3 = 22,02
9. V10 = 16,72
10. V4 = 11,7

If from 10 (ten) population data selected, and the approved quota is only 5 (five) existing residents, then those who are entitled to the Family Hope Program are only numbers V2, V7, V8, V5 and V1. V2 is the value that gets the highest result from the other results, which is 31.3.

4.4 User Interface

The interface is one of the most important parts of the system designed to manage the input and output of data. User Interface if interpreted is a user interface display. User Interface is a communication mechanism between users (users) and the system. In Fig. 6 the value page is used to view the value data from the selection for the selection of the family hope program in the Slawi Wetan sub-district, these value data can be added, changed, or deleted. After the admin logs in, the admin or survey officer can open the value data contained in the system.

Data Nilai Preferensi

Search: [TAMBAH DATA](#)

Show 10 entries





















No	Id Alternatif	Id Kriteria	Nilai	Aksi
1	PKH0001	K1	5	 
		K2	3	 
		K3	5	 
4	PKH0001	K4	2	 
5	PKH0001	K5	3	 
6	PKH0001	K6	1	 
7	PKH0001	K7	3	 
8	PKH0001	K8	4	 
9	PKH0001	K9	3	 
10	PKH0001	K10	4	 
No	Id Alternatif	Id Kriteria	Nilai	Aksi

Fig. 6. User Interface of Scoring

5. Conclusion

The availability of a decision support system in Slawi Wetan Village can help and facilitate the village party, namely the Head of the Development, Community Empowerment and Environment Section (Kasi PPM & LH) in conducting the selection to determine the selection of the hopeful family program. With a decision support system in determining the selection of the hope family program, it will be more targeted to the poor who deserve to get it, so that the hope family program system is realized accordingly. A Decision Support System using the Simple Additive Weighting (SAW) method can make it easier to make decisions to determine the selection of FHP. This can be proven by the value of the criteria and the weight of the level of importance required in this study. And accurate results are obtained in accordance with the calculation of the decision support system using the SAW method, namely from existing calculations, only 5 people are entitled to be submitted in accordance with applicable regulations including Darti with a total value of 31.3, Yono with a total calculation of 29.3, Sumi with a total of 28, Radi with a total of 26.7 and Agus with a total calculation of 25.9. From the calculation obtained the value that gets the highest result from the other results is Darti with a total calculation of 31.3.

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