e-ISSN: 2614-8404
p-ISSN: 2776-3234

Application of the Simple Additive Weighting Method in the Decision Support System for Determining the Best Village Officials

Baiq Ainurrahmi Imanda Qubro[1], Saikin[2*], Hairul Fahmi[3]
[1,2]Department of Information Systems, STMIK Lombok, Praya, Indonesia
[3]Department of Informatics Engineering, STMIK Lombok, Praya, Indonesia
Email: [1]imandaqubro@gmail.com, [2]eken.apache@gmail.com, [3]iroel.ami@gmail.com

Abstract - Performance evaluation of village officials in Bunut Baok Village is still carried out manually using assessment sheets, which often leads to subjectivity, unclear assessment aspects, and slow decision-making. These issues indicate the need for a Decision Support System (DSS) capable of providing objective and transparent evaluations based on measurable criteria. This study aims to develop a DSS using the Simple Additive Weighting (SAW) method to determine the best-performing village officials. Data were collected through observation and interviews with the Village Head and Village Secretary, involving 13 village officials as evaluation subjects. The dataset consists of five assessment criteria attendance, daily activity reports, output of activities, discipline, and service each represented through a linguistic scale (excellent, good, fairly good, poor) which was then converted into numerical weights for SAW processing. The results show that alternative A1 (Head of Gelogor Mapong Region) achieved the highest preference score of 0.938, indicating superior performance based on all evaluated criteria. The findings demonstrate that the SAW method effectively supports structured and transparent decision-making at the village governance level and can serve as a reference framework for future DSS implementations in local government environments.

Keywords: Decision Support System, Simple Additive Weighting, village officials, performance evaluation, multicriteria decision-making.

I. INTRODUCTION

A village is a legal entity consisting of a local community with a clear territory, which has the authority to regulate and manage governmental affairs and local interests [1]. This is based on the initiative and traditional rights of the community, which are recognized in the Indonesian governmental system. In carrying out governance at the local level, support from competent and professional government officials is needed, who have a deep understanding of local conditions and are capable of competing globally [2]. Therefore, local governments are responsible for accelerating development and the welfare of village communities by effectively managing the human resources available in their area [3]. This indicates that managing internal village affairs, such as community development and the local economy, must be carried out by professional village officials [4]. This research was conducted in Bunut Baok Village, located in the Praya Subdistrict of Central Lombok Regency, West Nusa Tenggara Province, Indonesia. The village is administratively led by the Village Head and supported by 13 village officials responsible for public service delivery and local governance. The need for objective and transparent performance evaluation in this region underlies the relevance of implementing a Decision Support System.

Currently, rural communities have experienced significant development, requiring the presence of trained government officials. Due to the increasing complexity of community needs, efficient, fast, and accurate services are crucial. Village apparatus, as part of the community, must be able to provide services that meet the needs of the people [5]. They play a role as a subsystem within the government structure, having the authority to effectively manage and regulate internal village affairs in accordance with the evolving dynamics of governance [4].

Bunut Baok Village, which serves as the focus of this study, is located in the Praya Subdistrict of Central Lombok Regency, West Nusa Tenggara Province, Indonesia. The village government is supported by 13 village officials who are responsible for carrying out administrative and public service functions, consisting of the Village Head and Village Officials. To achieve a better and more advanced village governance, it is important for all village apparatus to provide services that are fast, simple, and transparent, so that the needs of the community can be well met and are free from corruption, collusion, and nepotism (KKN) [6]. Therefore, the governance in Bunut Baok Village must comply with the applicable government regulations. The Village Head and all village apparatus are expected to carry out their duties and functions according to established provisions. A village head must possess the ability to lead and guide the apparatus in providing quality government services.

One of the strategies that can be used by village heads to improve service quality is to evaluate the performance of village government officials. This approach aims to assess the level of quality of performance of the officials at the Bunut Baok Village Office conducts routine performance assessments during the morning assembly held every Monday and during coordination meetings. Additional evaluations are also carried out through the Annual Work Program (PKT), in which each of the 13 village officials submits a monthly activity journal documenting their tasks and responsibilities. These journals are collected by the Village Secretary and subsequently evaluated by the

e-ISSN: 2614-8404
p-ISSN: 2776-3234

Village Head. The performance evaluation process focuses on five key criteria, namely attendance, daily activity reports, output of activities, discipline, and service. These criteria constitute the primary data used in this study and serve as the input variables for the Decision Support System (DSS) developed using the Simple Additive Weighting (SAW) method. From each stage of the assessment mentioned, it still uses manual methods using assessment sheets and tends to be subjective. This is due to the lack of clearly defined assessment aspects in evaluating the performance of village officials. As a result, the assessment process is slow and less accurate [7]. To overcome the problems of performance appraisal at the Bunut Baok Village Office, a system update is needed by utilizing computer applications [8]. Thus, the assessment process can be done more quickly and accurately [9]. One system that can be applied is a decision support system, which helps in the decision-making process related to various problems that arise [10]. It is hoped that with this system, the decisions taken can meet the predetermined limits better.

Decision Support System (DSS) is a computer-based information system, which combines models and data to provide support to decision makers in solving structured problems [11]. The DSS in question will be designed using the PHP programming language and MySQL Server database [12]. This application basically consists of data about village officials, assessment criteria, assessment alternatives, assessment results, and other components. The method used in this decision support system is the Simple Additive Weighting (SAW) method. The SAW method is a multicriteria decision-making technique that evaluates alternatives based on weighted criteria. In this study, the SAW method was applied using five validated performance criteria: attendance, daily activity reports, output of activities, discipline, and service. These criteria were determined through interviews with the Village Head and Village Secretary, who confirmed that the five indicators represent the official performance standards used in the village's existing evaluation system. The candidate data consist of 13 village officials, each assessed using linguistic ratings (excellent, good, fairly good, and poor) that were subsequently converted into numerical values to ensure consistency and suitability for SAW computation.

In the SAW method, the evaluated alternatives are compared with each other for each criterion and compared as a whole to determine the best alternative [13] [14]. The SAW method can eliminate unfavorable alternatives so that the dominating alternative can be selected as a suitable alternative [15]. Researcher [16] stated that the system with the SAW method eliminates poor alternatives and produces a dominant alternative from other alternatives in recommending Islamic boarding schools in Semarang. Further research [17] provides a statement that the SAW method is useful for selecting the best alternative from several existing alternatives. Then from research [18], the SAW Method is used to classify recommended alternative data, where unrecommended data will be eliminated [19].

This can help in determining the best village apparatus that best fits the predetermined criteria. In addition, this method can also consider different preferences or weights on each criterion so that it can produce more accurate and effective results [20]. The title of the research that the author designed, "Application of the SAW Method to the Decision Support System for Determining the Best Village Apparatus (Case Study: Bunut Baok Village)", is very relevant to the context of the problems described earlier. With the new system based on the SAW method, it is hoped that this research can make a significant contribution in helping the village government in the process of assessing the performance of village officials with 5 criteria, including Attendance, Daily Activity Reports, Outputs of Activities, Discipline, and Service.

II. RESEARCH METHODOLOGY

A. Research Stages

The stages conducted to achieve the objectives of the research in the decision support system for Determining the Best Village Device (Case Study: Bunut Baok Village) as shown in the following figure 1:

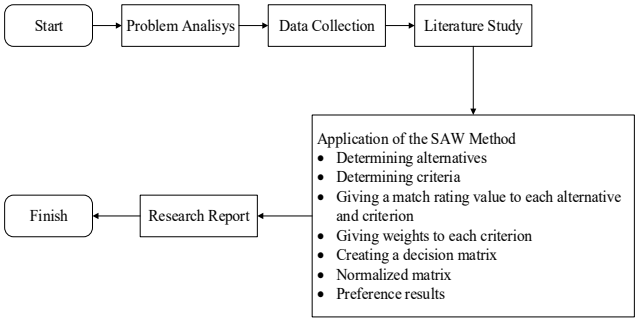

Figure 1. Research Stages.

Based on the research stages depicted in Figure 1, here is an explanation of those research stages:

1. Problem Analysis
   The problem analysis is used to solve a problem and analyze data in conducting a study before making designs or calculations.
2. Data Collection
   In conducting research, data collection is one of the essential things that must be done to resolve and achieve the desired results by the author. Data collection is done in 2 ways: observation and interviews.
3. Literature Study
   To enhance the researcher's knowledge concerning Decision Support Systems (DSS) and the methods used, namely the SAW method, as well as reading journals or other references related to the research.
4. Application of the Method
   The initial stage of this research starts by analyzing the problems that occurred in determining the best village apparatus. It begins by analyzing the calculations of the old system that is still in operation, then it is followed by analyzing using new calculations with the method used, which is the SAW Method.
5. Research Report
   In this stage, a report is made of the entire research to see whether the results of this research are in line with

e-ISSN: 2614-8404
p-ISSN: 2776-3234

expectations and then followed by drawing a conclusion from the research.

B. *Village Officials*

Village officials are staff elements that assist the Village Head in formulating policies and coordination housed in the Village Secretariat, as well as supporting elements for the Village Head's tasks in implementing policies in the form of technical implementers and regional elements. Village officials are part of the government apparatus found in the village and have the duty to assist a village head in carrying out the duties and authority of the village head in administering the village government and meeting the needs of the community in the village where they serve. According to Law Number 06 of 2014 concerning Villages, it is explained that the authority to appoint and dismiss a member of the village government is the authority of the village head; however, in carrying out that authority, the village head must still comply with the regulations set forth in the applicable laws or regulations [3]. With the aim that the served community feels comfortable and satisfied with the services provided by the village apparatus, thus being able to offer solutions to all the problems present in the village.

C. *Decision Support System (DSS)*

Decision Support System (DSS) was first introduced by Michael S. Scott in the early 1970s [3]. DSS, or known as Decision Support System, is a computer-based system that can present the capabilities of a problem as well as the ability to combine problems with semi-structured and unstructured situations [21]. The purpose of DSS is to assist decision-makers in making decisions [22]. DSS is an interactive system that helps decision-makers through the use of data and decision models to solve problems that are semi-structured and unstructured in nature [17].

D. *Simple Additive Weighting (SAW) Method*

The SAW method is a method also known as a weighted summation method. This means that each combination of alternatives and criteria will be calculated mathematically to produce a value. This value will then be multiplied by the weight of each criterion. The result of this value will form a ranking value, and the result will be used to make a decision. The Simple Additive Weighting (SAW) method requires a normalization process of the decision matrix (X) to a scale that can be compared with all existing alternative ratings [21]. The steps in SAW are as follows [22]: Create a decision matrix (X) from the compatibility rating table (each alternative (Ai) and each criterion (Cj)) that has been determined, where i=1,2,...m and j=1,2,...n.

$$X_{ij} = \begin{bmatrix} X_{11} & X_{12} & \cdots & X_{1n} \\ X_{21} & X_{22} & \cdots & X_{2n} \\ \cdots & \cdots & \cdots & \cdots \\ X_{m1} & X_{m2} & \cdots & X_{mn} \end{bmatrix} \quad (1)$$

Description: Xij = Decision matrix i = Alternatives (rows) j = Attributes or criteria (columns) n = Number of attributes m = Number of alternatives The normalization process involves calculating the normalized performance rating value (Rij) of alternative Ai on criterion Cj, using the following formula [19]:

If j is a benefit, then Rij = Xij / (Max * Xij) (2)

If j is a cost, then Rij = Min * Xij / (Xij) (3)

Where: Rij = normalized performance rating value. The results from the calculations above will form a normalized matrix (R) Calculating the preference value. In this stage, which is the main stage, all attributes are multiplied by the criterion weights for each alternative using the following equation:

$$Vi = \sum_{j=1}^{n} WjRij \quad (4)$$

III. RESULTS AND DISCUSSION

In determining the best Village Apparatus, there are several criteria with specific weight values that must be possessed by a Village Apparatus who will be selected. The criteria that must be met by the village apparatus include Attendance, Daily Activity Reports, Daily Activity Outputs, Discipline, and Service.

a. Establishment of Alternatives and CriteriaThe following are 13 alternative data as shown in Table 1.

Table 1. Alternative Data.

Kode	Alternatif
A1	Gelogor Mapong
A2	Paok Tawah
A3	Sekunyit
A4	Bunut Baok
A5	Bunut Baok Daye
A6	Betu Belek
A7	Bunut Baok Lauk
A8	Lendang Bile
A9	Marung
A10	Marung Bat
A11	Begak
A12	Montong Semaye
A13	Perandap

Table 2 below presents the criteria data for the candidates of village staff to be selected. Each criterion has been assigned a Weight directly by the Head of the Selebung Rembiga Village. For criteria C1 to C3, it is based on research [1], while criteria C4 and C5 are additional from the Head of the Village.

Table 2. Criteria Data.

Code	Criteria	Weight	Description
C1	Attendance	25	Benefit
C2	Daily Activity Report	25	Benefit
C3	Output of Activities	25	Benefit
C4	Discipline	15	Benefit
C5	Service	10	Benefit

b. Establishing Compatibility Rating of Alternative Data and Criterion DataIn performing calculations using any method in the decision support system, compatibility rating data for each alternative and criterion is required. The following is the compatibility rating data between alternatives and criterion data.

e-ISSN: 2614-8404
p-ISSN: 2776-3234

Table 3. Alternative Data and Village Apparatus Criteria.

Alternatif	Attendance (C1)	Daily Activity Report (C2)
A1	Excellent	Good
A2	Fairly Good	Good
A3	Good	Excellent
A4	Good	Excellent
A5	Excellent	Good
A6	Good	Good
A7	Fairly Good	Excellent
A8	Excellent	Good
A9	Good	Fairly Good
A10	Good	Good
A11	Fairly Good	Excellent
A12	Excellent	Fairly Good
A13	Fairly Good	Good

Table 3A. Alternative Data and Village Apparatus Criteria (2).

Output of Activities (C3)	Discipline (C4)	Service (C5)
Excellent	Good	Excellent
Excellent	Good	Good
Excellent	Kurang Good	Excellent
Good	Good	Excellent
Good	Fairly Good	Excellent
Excellent	Good	Good
Fairly Good	Fairly Good	Good
Fairly Good	Good	Fairly Good
Kurang Good	Fairly Good	Good
Fairly Good	Fairly Good	Fairly Good
Good	Fairly Good	Good
Fairly Good	Kurang Good	Good
Good	Good	Fairly Good

In Table 3,3A, there are several linguistic data such as excellent, good, fairly good, and poor. This data is weighted to obtain values from the alternatives that can be calculated using the SAW method. The following is the result data that has been filled in.

Table 4. Criteria Weight Values.

Criteria	Description	Values
C1, C2, C3, C4, C5	Excellent	4
	Good	3
	Fairly Good	2
	Poor	1

The criteria after weighting appear as shown in Table 5.

Table 5. Rating Score of Criteria Compatibility.

Alternatif	(C1)	(C2)	(C3)	(C4)	(C5)
A1	4	3	4	3	4
A2	2	3	4	3	3
A3	3	4	4	1	4
A4	3	4	3	3	4
A5	4	3	3	2	4
A6	3	3	4	3	3
A7	2	4	2	2	3
A8	4	3	2	3	2
A9	3	2	1	2	3
A10	3	3	2	2	2
A11	2	4	3	2	3
A12	4	2	2	1	3
A13	2	3	3	3	2
Max	4	4	4	3	4
Min	2	3	3	1	3

Based on the information listed in table 5, there is data about the match rating, including the maximum and minimum values for each match rating between choices and criteria. The steps for calculating data on the match rating with the SAW method.

c. Application of the Simple Additive Weighting (SAW) Method

The steps of calculating data on the suitability rating with the SAW method are as follows:

1. Create a Decision Matrix (Xij)

$$Xij = \begin{bmatrix} 4 & 3 & 4 & 3 & 4 \\ 2 & 3 & 4 & 3 & 3 \\ 3 & 4 & 4 & 1 & 4 \\ 3 & 4 & 3 & 3 & 4 \\ 4 & 3 & 3 & 2 & 4 \\ 3 & 3 & 4 & 3 & 3 \\ 2 & 4 & 2 & 2 & 3 \\ 4 & 3 & 2 & 3 & 2 \\ 3 & 2 & 1 & 2 & 3 \\ 3 & 3 & 2 & 2 & 2 \\ 2 & 4 & 3 & 2 & 3 \\ 4 & 2 & 2 & 1 & 3 \\ 2 & 3 & 3 & 3 & 2 \end{bmatrix}$$

2. Calculating the normalization matrix (Rij)

To obtain the normalized matrix, this can be done using a mathematical formula, which involves dividing the value of each criterion and alternative weight. The value of the compatibility rating for each alternative and criterion is divided by the minimum value of each criterion's values. The steps are as follows:

Attendance Criteria (C1)

$R_{1.1} = \frac{4}{4} = 1$
$R_{2.1} = \frac{2}{4} = 0{,}5$
$R_{3.1} = \frac{3}{4} = 0{,}75$
$R_{4.1} = \frac{3}{4} = 0{,}75$
$R_{5.1} = \frac{4}{4} = 1$
$R_{6.1} = \frac{3}{4} = 0{,}75$
$R_{7.1} = \frac{2}{4} = 0{,}5$
$R_{8.1} = \frac{4}{4} = 1$
$R_{9.1} = \frac{3}{4} = 0{,}75$
$R_{10.1} = \frac{3}{4} = 0{,}75$
$R_{11.1} = \frac{2}{4} = 0{,}5$
$R_{12.1} = \frac{4}{4} = 1$
$R_{13.1} = \frac{2}{4} = 0{,}5$

Daily Activity Report Criteria (C2)

$R_{1.2} = \frac{3}{4} = 0.75$
$R_{2.2} = \frac{3}{4} = 0{,}75$

e-ISSN: 2614-8404
p-ISSN: 2776-3234

$R_{3.2} = \frac{4}{4} = 1$
$R_{4.2} = \frac{4}{4} = 1$
$R_{5.2} = \frac{3}{4} = 0{,}75$
$R_{6.2} = \frac{3}{4} = 0{,}75$
$R_{7.2} = \frac{4}{4} = 1$
$R_{8.2} = \frac{3}{4} = 0{,}75$
$R_{9.2} = \frac{2}{4} = 0{,}5$
$R_{10.2} = \frac{3}{4} = 0{,}75$
$R_{11.2} = \frac{4}{4} = 1$
$R_{12.2} = \frac{2}{4} = 0{,}5$
$R_{13.2} = \frac{3}{4} = 0{,}75$

Daily Activity Output Criteria (C3)
$R_{1.3} = \frac{4}{4} = 1$
$R_{2.3} = \frac{4}{4} = 1$
$R_{3.3} = \frac{4}{4} = 1$
$R_{4.3} = \frac{3}{4} = 0{,}75$
$R_{5.3} = \frac{3}{4} = 0{,}75$
$R_{6.3} = \frac{4}{4} = 1$
$R_{7.3} = \frac{2}{4} = 0{,}5$
$R_{8.3} = \frac{2}{4} = 0{,}5$
$R_{9.3} = \frac{1}{4} = 0{,}25$
$R_{10.3} = \frac{2}{4} = 0{,}5$
$R_{11.3} = \frac{3}{4} = 0{,}75$
$R_{12.3} = \frac{2}{4} = 0{,}5$
$R_{13.3} = \frac{3}{4} = 0{,}75$

Discipline Criteria (C4)
$R_{1.4} = \frac{3}{3} = 1$
$R_{2.4} = \frac{3}{3} = 1$
$R_{3.4} = \frac{1}{3} = 0{,}33$
$R_{4.4} = \frac{3}{3} = 1$
$R_{5.4} = \frac{2}{3} = 0{,}66$
$R_{6.4} = \frac{3}{3} = 1$
$R_{7.4} = \frac{2}{3} = 0{,}66$
$R_{8.4} = \frac{3}{3} = 1$
$R_{9.4} = \frac{2}{3} = 0{,}66$
$R_{10.4} = \frac{2}{3} = 0{,}66$
$R_{11.4} = \frac{2}{3} = 0{,}66$
$R_{12.4} = \frac{1}{3} = 0{,}33$
$R_{13.4} = \frac{3}{3} = 1$

Service Criteria (C5)
$R_{1.5} = \frac{4}{4} = 1$
$R_{2.5} = \frac{3}{4} = 0{,}75$
$R_{3.5} = \frac{4}{4} = 1$
$R_{4.5} = \frac{4}{4} = 1$
$R_{5.5} = \frac{4}{4} = 1$
$R_{6.5} = \frac{3}{4} = 0{,}75$
$R_{7.5} = \frac{3}{4} = 0{,}75$
$R_{8.5} = \frac{2}{4} = 0{,}5$
$R_{9.5} = \frac{3}{4} = 0{,}75$
$R_{10.5} = \frac{2}{4} = 0{,}5$
$R_{11.5} = \frac{3}{4} = 0{,}75$
$R_{12.5} = \frac{3}{4} = 0{,}75$
$R_{13.5} = \frac{2}{4} = 0{,}5$

From the results of the calculations that have been carried out, the normalized matrix value (Rij) is obtained as follows:

$$R_{ij} = \begin{bmatrix} 1 & 0{,}75 & 1 & 1 & 1 \\ 0{,}5 & 0{,}75 & 1 & 1 & 0{,}75 \\ 0{,}75 & 1 & 1 & 0{,}33 & 1 \\ 0{,}75 & 1 & 0{,}75 & 1 & 1 \\ 1 & 0{,}75 & 0{,}75 & 0{,}66 & 1 \\ 0{,}75 & 0{,}75 & 1 & 1 & 0{,}75 \\ 0{,}5 & 1 & 0{,}5 & 0{,}66 & 0{,}75 \\ 1 & 0{,}75 & 0{,}5 & 1 & 0{,}5 \\ 0{,}75 & 0{,}5 & 0{,}25 & 0{,}66 & 0{,}75 \\ 0{,}75 & 0{,}75 & 0{,}5 & 0{,}66 & 0{,}5 \\ 0{,}5 & 1 & 0{,}75 & 0{,}66 & 0{,}75 \\ 1 & 0{,}5 & 0{,}5 & 0{,}33 & 0{,}75 \\ 0{,}5 & 0{,}75 & 0{,}75 & 1 & 0{,}5 \end{bmatrix}$$

3. Calculating Preference Value (Vi)

The search for the preference value can be done using a mathematical formula by summing the product of the value from each normalized matrix with the weight value of each criterion.

V_1 = $\sum[(0{,}25 \times 1) + (0{,}25 \times 0{,}75) + (0{,}25 \times 1) + (0{,}15 \times 1) + (0{,}10 \times 1)$
= 0,938

V_2 = $\sum[(0{,}25 \times 0{,}5) + (0{,}25 \times 0{,}75) + (0{,}25 \times 1) + (0{,}15 \times 1) + (0{,}10 \times 0{,}75)$
= 0,788

V_3 = $\sum[(0{,}25 \times 0{,}75) + (0{,}25 \times 1) + (0{,}25 \times 1) + (0{,}15 \times 0{,}33) + (0{,}10 \times 1)$
= 0,838

V_4 = $\sum[(0{,}25 \times 0{,}75) + (0{,}25 \times 1) + (0{,}25 \times 0{,}75) + (0{,}15 \times 1) + (0{,}10 \times 1)$
= 0,875

V_5 = $\sum[(0{,}25 \times 1) + (0{,}25 \times 0{,}75) + (0{,}25 \times 0{,}75) + (0{,}15 \times 0{,}66) + (0{,}10 \times 1)$
= 0,825

e-ISSN: 2614-8404
p-ISSN: 2776-3234

$V_6 = \sum[(0{,}25 \times 0{,}75) + (0{,}25 \times 0{,}75) + (0{,}25 \times 1) + (0{,}15 \times 1) + (0{,}10 \times 0{,}75)$
$= 0{,}675$

$V_7 = \sum[(0{,}25 \times 0{,}5) + (0{,}25 \times 1) + (0{,}25 \times 0{,}5) + (0{,}15 \times 0{,}66) + (0{,}10 \times 0{,}75)$
$= 0{,}675$

$V_8 = \sum[(0{,}25 \times 1) + (0{,}25 \times 0{,}75) + (0{,}25 \times 0{,}5) + (0{,}15 \times 1) + (0{,}10 \times 0{,}5)$
$= 0{,}763$

$V_9 = \sum[(0{,}25 \times 0{,}75) + (0{,}25 \times 0{,}5) + (0{,}25 \times 0{,}25) + (0{,}15 \times 0{,}66) + (0{,}10 \times 0{,}75)$
$= 0{,}550$

$V_{10} = \sum[(0{,}25 \times 0{,}75) + (0{,}25 \times 0{,}75) + (0{,}25 \times 0{,}5) + (0{,}15 \times 0{,}66) + (0{,}10 \times 0{,}5)$
$= 0{,}650$

$V_{11} = \sum[(0{,}25 \times 0{,}5) + (0{,}25 \times 1) + (0{,}25 \times 0{,}75) + (0{,}15 \times 0{,}66) + (0{,}10 \times 0{,}75)$
$= 0{,}738$

$V_{12} = \sum[(0{,}25 \times 1) + (0{,}25 \times 0{,}5) + (0{,}25 \times 0{,}5) + (0{,}15 \times 0{,}33) + (0{,}10 \times 0{,}75)$
$= 0{,}500$

$V_{13} = \sum[(0{,}25 \times 0{,}5) + (0{,}25 \times 0{,}75) + (0{,}25 \times 0{,}75) + (0{,}15 \times 1) + (0{,}10 \times 0{,}5)$
$= 0{,}700$

The results of the preference score calculation will produce a ranking table. This table is the final result of the calculation process and ranks the values from the highest to the lowest, serving as the rank score for each alternative.

Table 6. Ranking results of each alternative.

Alternatif	Nama Aparatur Desa	Nilai Preferensi	Ranking
A1	Gelogor Mapong	0.938	1
A2	Paok Tawah	0.788	5
A3	Sekunyit	0.838	3
A4	Bunut Baok	0.875	2
A5	Bunut Baok Daye	0.825	4
A6	Betu Belek	0.675	9
A7	Bunut Baok Lauk	0.675	9
A8	Lendang Bile	0.763	6
A9	Marung	0.550	12
A10	Marung Bat	0.650	11
A11	Begak	0.738	7
A12	Montong Semaye	0.500	13
A13	Perandap	0.700	8

Based on the results of the calculation of table 6 using the SAW method, which produces the highest value of 0.938, it can be concluded that alternative A1 on behalf of the Head of Gelogor Mapong Region is the best Bunut Baok Village Apparatus.

4. Application deployment

a. Home Page

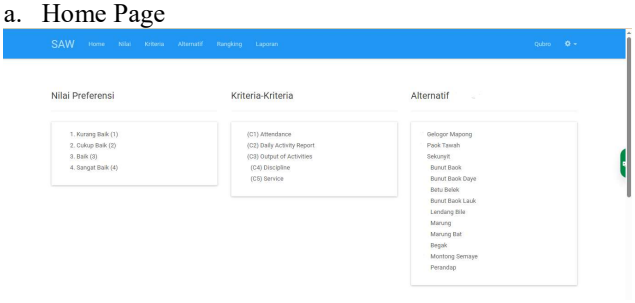

Figure 2. Home Page

The home page presents the final results generated from the Simple Additive Weighting computation and is structured into several essential components, including the Preference Values, which display the evaluation scale used in the system namely Poor (1), Fair (2), Good (3), and Very Good (4) as well as the section containing the assessment criteria and the alternatives representing the village officials evaluated in the decision-making process.

b. Graphics Page

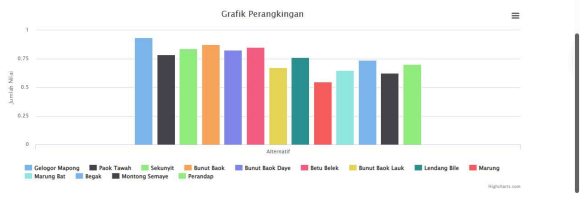

Figure 3. Graphics Page

The ranking chart page displays the calculation results in the form of a bar chart, illustrating the total score obtained by each alternative. This visualization enables users to easily identify which village official achieves the highest score and is therefore ranked as the best candidate according to the SAW method. Overall, this page functions as an analytical dashboard that visually presents the decision-making results, allowing users to clearly understand the computed outcomes and compare the performance of all alternatives with ease.

c. Criteria Page

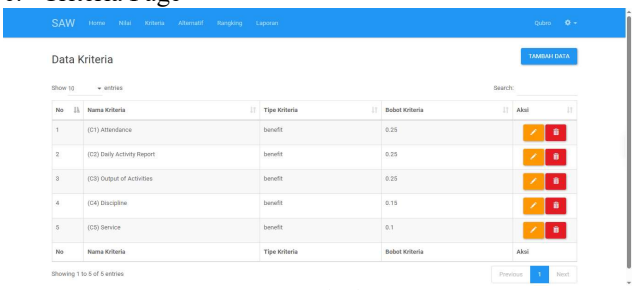

Figure 4. Criteria Page

The criteria page serves as the interface for managing the assessment criteria used in the decision-making process. This page allows users to display, add, modify, and delete criteria data, all of which play a crucial role in the Simple Additive Weighting (SAW) method. By providing full control over the criteria configuration, this page ensures that the decision-making system remains flexible, accurate, and aligned with the evaluation requirements of the village officials.

e-ISSN: 2614-8404
p-ISSN: 2776-3234

d. Preference Value Page

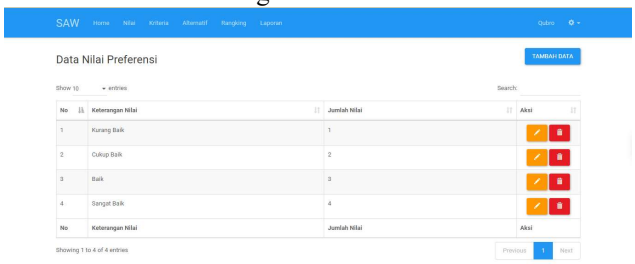

Figure 5. Preference Value Page

The data on this page serve as the foundation for assigning scores to each evaluation criterion displayed on the Ranking page. The system converts qualitative assessments into quantitative values, which are then used in the normalization process and the final calculation of the Simple Additive Weighting (SAW) method.

e. Alternative Page

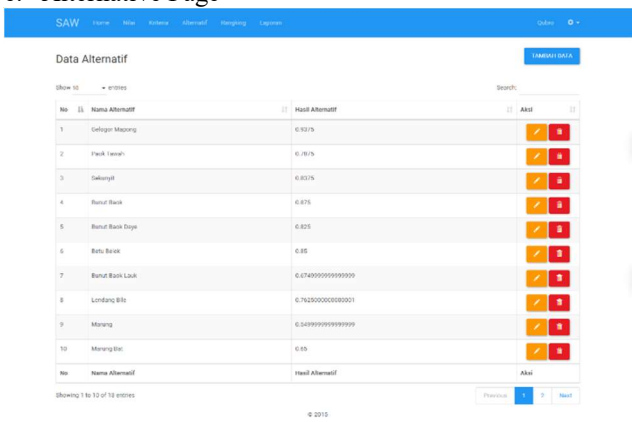

Figure 6. Alternative Page

This page is used to display the list of all alternatives that will be assessed and ranked using the Simple Additive Weighting (SAW) method. It serves as a monitoring interface for reviewing the final calculation results, allowing users to identify which alternative achieves the highest score and is therefore positioned as the best-ranked candidate.

f. Alternative criteria value page

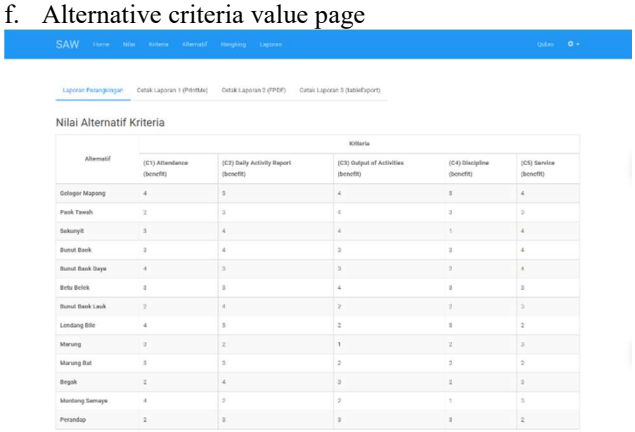

Figure 7. Alternative criteria value page

This page displays the complete results of the SAW calculation process, beginning with the initial values, followed by the normalization stage, and concluding with the final ranking of employees. The feature consists of several sections, the first of which is the Alternative Criteria Values section. This section presents a table containing the initial scores assigned to each alternative (employee) based on the evaluation criteria. The columns represent the criteria (C1-C5) along with their respective types (benefit or cost), while the rows list the alternatives along with their assigned scores. These data constitute the fundamental input used prior to the normalization process.

g. R Normalization Page

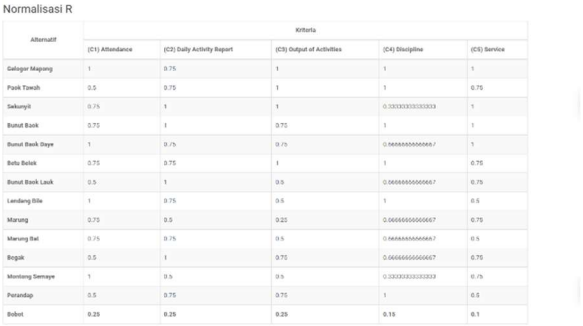

Figure 8. R Normalization Page

Normalization (R): This section displays the normalization results of each alternative's values across all criteria. The normalization process is conducted to standardize the scores so that each criterion is measured on a comparable scale.

h. Final Calculation Results Page

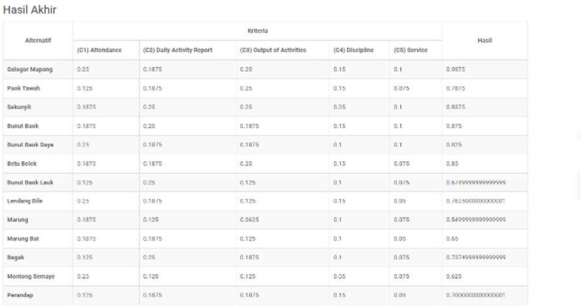

Figure 9. Final Calculation Results Page

This section presents the final results of the SAW method, calculated based on the criterion weights and the normalized values. Each alternative receives a final score obtained by summing the products of its normalized values and the corresponding criterion weights. The "Result" column displays the total final score for each alternative, where the highest score indicates the best-performing alternative.

i. Print Report Feature

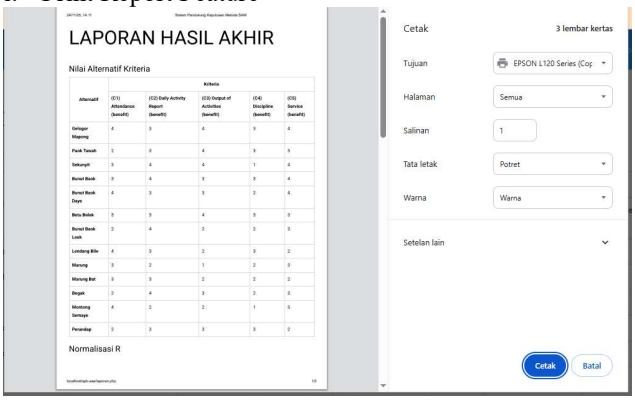

Figure 10. Alternative criteria value page

e-ISSN: 2614-8404
p-ISSN: 2776-3234

This page serves as the central output of the employee performance evaluation based on the predetermined criteria. From this page, users can review the calculation process transparently, compare the results across alternatives, and generate a printed ranking report for documentation purposes.

IV. CONCLUSION

This research successfully implemented a Decision Support System (DSS) using the Simple Additive Weighting (SAW) method to determine the best village apparatus based on five criteria: attendance, daily activity reports, output of activities, discipline, and service, where alternative A1 (Head of Mekar Sari Region) received the highest preference score of 0.938 and was selected as the best village apparatus. For future research, it is suggested to add criteria such as leadership skills and community feedback, use more dynamic weighting methods such as AHP or entropy weight, validate results with other methods such as TOPSIS or ELECTRE, develop a web/application-based system to improve transparency, and conduct field studies and interviews to obtain qualitative data to refine the evaluation.

REFERENCES

[1] R. Timotius, "Revitalisasi Desa Dalam Konstelasi Desentralisasi Menurut Undang-Undang Nomor 6 Tahun 2014 Tentang Desa," *Jurnal Hukum & Pembangunan,* vol. 48, no. 2, pp. 323-344, 2018.

[2] K. A. K. Saputra, A. K. Jayawarsa, and P. B. Anggiriawan, "Dukungan pemerintah daerah, optimalisasi asset dan profesionalisme untuk meningkatkan pendapatan asli daerah (PAD)," *Jurnal Riset Akuntansi dan Bisnis Airlangga Vol,* vol. 4, no. 1, pp. 607-622, 2019.

[3] A. Soleh, "Strategi pengembangan potensi desa," *Jurnal Sungkai,* vol. 5, no. 1, pp. 32-52, 2017.

[4] N. K. Hariani, L. K. Merawati, and I. A. N. Yuliastuti, "Kompetensi dan Peran Partisipasi Masyarakat dalam Mewujudkan Akuntabilitas Pengelolaan Dana Desa," *Substansi: Sumber Artikel Akuntansi Auditing Dan Keuangan Vokasi,* vol. 6, no. 1, pp. 78-99, 2022.

[5] B. P. Gautama, A. K. Yuliawati, N. S. Nurhayati, E. Fitriyani, and I. I. Pratiwi, "Pengembangan desa wisata melalui pendekatan pemberdayaan masyarakat," *BERNAS: Jurnal Pengabdian Kepada Masyarakat,* vol. 1, no. 4, pp. 355-369, 2020.

[6] D. R. Sari, "Implementasi Pelayanan Publik Berbasis Aplikasi Smart Netizen Pada Kabupaten Lampung Tengah (Studi Kasus Desa Buyut Udik Kecamatan Gunung Sugih)," UIN Raden Intan Lampung, 2018.

[7] H. E. Sutrisno, *Budaya organisasi*. Prenada Media, 2019.

[8] A. Suryadi, "Pemanfaatan ICT dalam pembelajaran," *Jurnal Pendidikan Terbuka dan Jarak Jauh,* vol. 8, no. 2, pp. 83-98, 2007.

[9] J. Junaidi, L. Anugrah, and A. D. Pancasakti, "Model Aplikasi Monitoring Sistem Absensi Sidik Jari Sebagai Pendukung Keputusan Untuk Penilaian Kinerja Pegawai," in *Konferensi Nasional Sistem Dan Informatika 2015*, 2015: STMIK STIKOM Bali.

[10] H. Hamria and A. Azwar, "Sistem Pendukung Keputusan Penilaian Kinerja Aparatur Desa Menggunakan Metode Additive Ratio Assessment (Aras) Pada Kantor Desa Kotaraja," *Simtek: jurnal sistem informasi dan teknik komputer,* vol. 6, no. 1, pp. 61-69, 2021.

[11] Q. P. Ningrum and S. Fadli, "Sistem Pendukung Keputusan Pemberian Sanksi Pelanggaran Kedisiplinan Siswa Menggunakan Metode SMART," *Jurnal Penelitian Sistem Informasi (JPSI),* vol. 1, no. 4, pp. 168-180, 2023.

[12] S. Fadli, M. Ashari, and S. Saikin, "Sistem Pendukung Keputusan Penentuan Keluarga Miskin Menggunakan Metode Fuzzy Tsukamoto," *Journal of Information System Research (JOSH),* vol. 4, no. 1, pp. 300-308, 2022.

[13] F. A. Sianturi and A. S. Sitio, "Implementasi Metode Electre Dalam Penentuan Kepala Laboratorium Rumah Sakit," *MEANS (Media Informasi Analisa dan Sistem),* pp. 118-123, 2023.

[14] V. M. B. Ginting and F. A. Sianturi, "Sistem Pendukung Keputusan Pemilihan Kepala Laboratorium Dengan Menggunakan Metode Simple Additive Weighting (Saw) Di Rumah Sakit Granmed," *Journal Of Informatic Pelita Nusantara,* vol. 4, no. 2, pp. 1-7, 2019.

[15] L. Bei, F. L. Witi, and L. F. Mando, "Perancangan Sistem Pendukung Keputusan Pemilihan Aparat Desa Kebirangga Selatan Menggunakan Metode Simple Additive Weighting (Saw)," *JUPITER: Jurnal Penelitian Ilmu dan Teknologi Komputer,* vol. 15, no. 1a, pp. 93-104, 2023.

[16] R. D. Aringga, "Sistem Pendukung Keputusan Menggunakan Metode Simple Additive Weighting Dalam Pengolahan Seleksi Perangkat Desa Baru (Studi Kasus: Kecamatan Mojo–Kabupaten Kediri)," *JATI (Jurnal Mahasiswa Teknik Informatika),* vol. 1, no. 1, pp. 238-289, 2017.

[17] R. A. Nandes, "Sistem Pendukung Keputusan terhadap Jenis dan Penerima dalam Penentuan Bantuan Desa Menggunakan Metode Simple Additive Weighting," *Jurnal Informatika Ekonomi Bisnis,* pp. 115-120, 2021.

e-ISSN: 2614-8404
p-ISSN: 2776-3234

[18] S. Prahesti, D. E. Ratnawati, and H. Nurwasito, "Sistem Rekomendasi Pemilihan Sekolah Menengah Atas (SMA) Sederajat Kota Malang Menggunakan Metode AHP-ELECTRE Dan SAW," *Jurnal Teknologi Informasi dan Ilmu Komputer (JTIIK) p-ISSN,* vol. 2355, p. 7699, 2017.

[19] P. Sakinah, N. Hayati, and A. E. Syaputra, "Sistem Penunjang Keputusan Pemilihan Laptop Menggunakan Metode Simple Additive Weighting," *Jurnal Sistim Informasi dan Teknologi,* pp. 130-138, 2023.

[20] M. Maskhur and W. Hadikurniawati, "Penerapan Metode ELECTRE untuk Pemilihan Pengajar Terbaik," *Jurnal Informasi dan Komputer,* vol. 10, no. 1, pp. 80-88, 2022.

[21] B. E. Pratiwi, S. Fadli, W. Murniati, and D. Sudyana, "Komparasi Metode WASPAS dan SAW Dalam Evaluasi Kinerja Guru Di Pondok Pesantren Darul Kamilin," *Decode: Jurnal Pendidikan Teknologi Informasi,* vol. 4, no. 2, pp. 466-477, 2024.

[22] T. Panggabean, M. Mesran, and Y. F. Manalu, "Penerapan Metode Simple Additive Weighting (SAW) dalam Pemberian Reward Bagi Pegawai Honorer Menggunakan Pembobotan Rank Order Centroid," *Jurnal Media Informatika Budidarma,* vol. 5, no. 4, pp. 1667-1673, 2021.