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Decision Support System for Assistant Plantation Promotion Using SAW Method at PT. PSP

Desvianti Dina[(1)], Th Candra Wasis Agung Sutignya[(1)]*, Dody Radiansah[(1)]
[(1)] Department of Agricultural Technology, Politeknik Negeri Pontianak, Indonesia
*E-mail: thomascandra2207@gmail.com

Abstract
Decision Support Systems (DSS) are essential for ensuring fairness and wisdom in the promotion process for the plantation assistant position. This study applies the Simple Additive Weighting (SAW) method to evaluate and select the most suitable leader foreman candidates based on three criteria: performance assessment, responsibility, and work behavior. The objectives of this research are: (1) to determine the weight assigned by the company to each criterion and (2) to select the most qualified leader foreman for promotion to the plantation assistant position. This study was conducted at PT. PSP, a company engaged in oil palm plantation. The survey involved all eight leader foremen from eight different divisions. The weighting results for each criterion are as follows: performance assessment (35%), responsibility (40%), and work behavior (25%). Based on the SAW method, the recommended candidate for promotion from leader foreman to assistant Afdeling is A8 from Afdeling VIII.

Keywords: *promotion, position, saw, criteria, decision support system*.

Sistem Pendukung Keputusan untuk Promosi Jabatan Asisten Kebun Menggunakan Metode SAW di PT. PSP

Abstrak
Sistem pendukung keputusan sangat diperlukan untuk memudahkan pihak perusahaan dalam membuat keputusan promosi jabatan asisten kebun yang adil dan bijak. Penggunaan metode Simple Additive Weigthing (SAW) diharapkan mampu menyelesaikan pemilihan mandor kepala sebagai alternatif dengan menggunakan kriteria yang berlaku di perusahaan meliputi: penilaian kinerja, tanggung jawab, dan perilaku kerja. Tujuan penelitian ini adalah: 1) menentukan bobot yang diberikan oleh perusahaan dari setiap kriteria dan 2) menentukan alternatif yang terpilih sehingga dapat dipromosikan menjadi asisten kebun. Penelitian ini dilaksanakan di PT. PSP yang bergerak di bidang perkebunan kelapa sawit. Survei dilakukan pada seluruh anggota populasi mandor kepala yang berjumlah 8 orang mandor kepala dari 8 afdeling. Bobot kriteria yang diperoleh adalah penilaian kinerja 35%, tanggung jawab 40%, dan perilaku kerja 25%. Alternatif yang direkomendasikan untuk dipromosikan jabatannya dari mandor kepala ke asisten Afdeling adalah A8 dari Afdeling VIII.

Kata Kunci: *promosi, jabatan, saw, kriteria, sistem pendukung keputusan.*

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Introduction
The roles of Plantation Assistant, Division Head, or Afdeling Manager are crucial in managing specific units or areas within a palm oil plantation. These positions require

competencies in attitude, knowledge, and skills that meet established standards (Sutignya et al., 2023). In the hierarchical structure of a palm oil plantation company, the position of Plantation Assistant is directly above the Head Foreman. Job promotions play a key role in designing employees' career development while refreshing the position by appointing individuals who meet the required criteria. Promotions are also a form of recognition for employees' performance in the company.

According to Setiyaningsih (2015), a Decision Support System (DSS) is a specific information system designed to assist management in making decisions related to semi-structured problems effectively and efficiently without replacing decision-makers' role. DSS uses available information to generate models for semi-structured and unstructured decision-making within the functions, goals, and specific scopes of management (Sutignya, 2024). In job promotion decisions, DSS can assist all phases of the decision-making process, including problem identification, selection of relevant data, determination of decision-making approaches, and evaluation of alternative choices.

One common problem faced by companies during employee performance evaluation for promotions is that the process is often done manually. Performance assessments are typically based only on general criteria, such as performance and tenure, without using scientifically valid methods. Simplistic assessments may lead to errors in decision-making. Therefore, research on job promotion in palm oil plantation companies is essential. Selecting employees for promotions often presents challenges, as many employees may demonstrate good performance, but available positions are limited. Errors in data input are also possible due to the large number of employees involved, and the process can be time-consuming. Thus, a method capable of producing accurate promotion decisions is necessary.

The SAW method is a weighted summation approach used for problem-solving. This method requires the normalization of a decision matrix (X) to a comparable scale for all alternative ratings. The fundamental concept of the SAW method involves calculating the total weighted performance rating for each alternative across all attributes (Fishburn, 1967 & Mac Crimmon, 1968, in Sutignya, 2024). Compared to other decision support models, the advantage of the SAW method lies in its ability to provide more accurate evaluations based on predetermined criteria values and preference weights. SAW can also select the best alternative through a ranking process after determining the weight for each attribute (Sari, 2019). The SAW algorithm excels due to its significant capability to assess more accurately by aligning with predefined criteria and weightings (Zurmaniansyah et al., 2021).

The use of the SAW method can reduce errors in determining reward allocation and support strategic decision-making, both in private and public sectors. The method is widely employed in decision support systems for employee awards. It is particularly suitable for promotion decisions by facilitating weight assignments for required criteria and ranking alternatives to select the best option efficiently (Nurlela et al., 2019). Previously, Frieyadie (2016) applied the SAW method to test decision-making for job promotions based on criteria such as tenure, performance assessment, and behavior. Tugiyono (2024) also used SAW for employee performance and promotion evaluations. Additionally, Pratama et al. (2024) applied the SAW method to assess preferences for green tea extract products utilizing relay control systems, focusing on the organoleptic properties of the brewed outcomes.

Comparative studies between SAW and other methods, such as the Technique for Order Preference by Similarity to Ideal Solution (TOPSIS), have been conducted for job promotion decisions, including criteria such as tenure, target achievement, discipline, and academic qualifications (Hidayatulloh et al., 2024). Other comparisons have been carried out by Gultom and Isnanto (2024), who examined employee promotion decisions using the SAW and Weighted Product methods with criteria such as absenteeism, loyalty, attitude, teamwork, and tardiness. These studies highlight the importance of selecting appropriate criteria for decision support methods. Therefore, research on job promotions for plantation assistants using the SAW method based on company policies is necessary. This study aims to (1) identify the criteria and weights used for plantation assistant promotions and (2) determine the Head Foreman candidates eligible for promotion to plantation assistant at PT. PSP.

Method

Data Collection and Processing Using the SAW Method

This study is a descriptive quantitative research approach utilizing numerical data to analyze information systematically. The research findings will be interpreted based on relevant theories and literature. A survey was conducted at PT. PSP from April to May 2024. According to Sugiyono (2018), a population refers to a generalized area comprising objects or subjects with specific characteristics defined by the researcher. The population in this study consists of eight head foremen employed by PT. PSP, a company engaged in oil palm plantations. Since all head foremen are part of the population, a saturated sampling technique was applied.

Primary data were obtained through interviews and questionnaires administered to competent personnel involved in the decision-making process for job promotions. Secondary data included information already available within the company, such as records and phenomena surrounding the promotion practices implemented by the company. The Simple Additive Weighting (SAW) analysis was conducted following the steps outlined by Kusumadewi (2006) and Darmastuti (2013) in Sutignya (2024):

1. Defining alternatives (A_i) by identifying the potential candidates for promotion.
2. Defining criteria (C_j) used for decision-making
3. Determining preference weights (W) for each criterion.
4. Creating a rating table for each alternative on each criterion.
5. Building a decision matrix (r_{ij})
6. Calculating the normalized performance ratings (r_{ij}) of alternatives (A_i) for each criterion (C_j).
7. Constructing the normalized matrix (R) from the previously normalized performance ratings (r_{ij}).
8. Calculating Preference Values (V_i).

Results and Discussion

All employees holding the position of head foreman at PT. PSP were considered as alternatives. The total of eight head foremen from eight divisions (Afdeling) is presented in Table 1. The assessment criteria used in the study include performance evaluation (C1), responsibility (C2), and work behavior (C3). Performance evaluation serves as a method to measure the contributions made by each individual within an organization. It is essential to determine how well an individual has contributed and fulfilled their duties. In this context, the performance of head foremen in executing their daily tasks needs to be evaluated as a criterion for promotion to assistant Afdeling.

Table 1. Alternative data

Code	Alternative	Afdeling
A1	Head Foreman	I
A2	Head Foreman	II
A3	Head Foreman	III
A4	Head Foreman	IV
A5	Head Foreman	V
A6	Head Foreman	VI
A7	Head Foreman	VII
A8	Head Foreman	VIII

The weight of each criterion was assigned directly by the manager, who holds the highest decision-making authority in the company. The weights were determined based on the importance of each criterion, as shown in Table 2.

Table 2. Criteria weights

Code	Criterion	Weight
C1	Performance Evaluation	35%
C2	Responsibility	40%
C3	Work Behaviour	25%

The decision support system utilized the SAW (Simple Additive Weighting) method, following several stages. The alternative matching process is presented in Table 3.

Table 3. Alternative matching

Alternative (A)	Performance (C1)	Responsibility (C2)	Work Behavior (C3)
A1	5	5	4
A2	4	4	5
A3	5	4	5
A4	5	4	5
A5	4	5	4
A6	4	5	4
A7	5	4	4
A8	5	5	5

A decision matrix based on the criteria (C) was generated for each alternative, resulting in the decision matrix (X) as follows:

$$Xij = \begin{bmatrix} 5 & 5 & 4 \\ 4 & 4 & 5 \\ 5 & 4 & 5 \\ 5 & 4 & 5 \\ 4 & 5 & 4 \\ 4 & 5 & 4 \\ 5 & 4 & 4 \\ 5 & 5 & 5 \end{bmatrix}$$

The decision matrix (X) was normalized into a normalized matrix (R) by using a benefit attribute. The normalized matrix was then used to calculate the preference values (V_i) by summing the products of the normalized matrix and the preference weights for each criterion. The results of the preference values (V_i) are shown in Table 4.

Table 4. Final preference values (Vi)

Alternative	Preference Values (Vi)
A1	0.95
A2	0.85
A3	0.92
A4	0.92
A5	0.88
A6	0.88
A7	0.87
A8	1.00

The final preference values were ranked, as shown in Table 5.

Table 5. Ranking results

Alternative	Preference Values (Vi)
A8	1.00
A1	95
A3, A4	92
A5, A6	88
A7	87
A2	85

Based on the rankings in Table 5, the top-ranked candidate (A8) was selected for promotion to assistant Afdeling. This candidate is from Afdeling 8, chosen based on the final preference value obtained using the agreed-upon criteria. Other positions are A1 in second place, A3 and A4 in third, A5 and A6 in fourth, A7 in fifth, and A2 in last place. The application of a decision support system using the SAW method to promote employee positions significantly aids the company in evaluating candidates for promotion to assistant Afdeling at PT. PSP.

Conclusion and Recommendations

The application of the Simple Additive Weighting (SAW) method in the decision support system for the promotion of Assistant Plantation positions at PT. PSP yielded the following conclusions. First, the criteria used for evaluating promotions included performance assessment, responsibility, and work behavior, with respective weights of 35%, 40%, and 25%. Second, based on the analysis using the SAW method, the Head Foreman from Division 8 (A8) emerged as the most eligible candidate for promotion to Assistant Plantation. For future research, it is recommended to explore the sensitivity of the method by comparing it with various decision-making techniques to identify the most effective approach for addressing similar issues (Suyanti and Roestam, 2018).

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