



Decision Support System for Supervisor Promotion Using Simple Additive Weighting at Weng Coffee Reformasi

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Abstract

Decision Support System (DSS) is important to assist management in making decisions regarding employee job promotions. Therefore, this study uses SAW method to assist management in making more objective and measurable decisions by assigning weight values to each relevant criterion. The criteria used in this study are discipline, experience, skills, and performance. The aim of this study is to determine the weight of the criteria applied in the decision support system for promotion and to assess the results of the promotion decision-making process using the SAW method for promoting a coffee employee to supervisor at Weng Coffee Reformasi. The results of the weight values assigned to each criterion are: discipline 20%, experience 20%, skills 20%, and performance 40%. The calculation results using the SAW method show that A2 is recommended to be promoted as a supervisor at Weng Coffee, with the highest final preference value (V) of 1.0, was ranked first.

Keywords: *decision support system, job promotion, criteria, SAW.*

Sistem Pendukung Keputusan Promosi Kenaikan Jabatan Supervisor dengan Metode Simple Additive Weighting di Weng Coffee Reformasi

Abstrak

Sistem pendukung keputusan penting untuk membantu manajemen dalam pengambilan keputusan promosi jabatan karyawan. Penelitian ini menggunakan metode *Simple Additive Weighting* (SAW) yang dapat membantu manajemen dalam membuat keputusan yang lebih objektif dan terukur. Dengan memberikan nilai bobot kepada setiap kriteria yang relevan. Kriteria yang digunakan dalam penelitian ini yaitu kriteria disiplin, pengalaman, keahlian dan kinerja. Penelitian ini bertujuan untuk mengetahui bobot kriteria yang diberikan dalam sistem pendukung keputusan promosi kenaikan jabatan di Weng Coffee Reformasi dan mengetahui hasil dari Sistem Pendukung Keputusan (SPK) promosi kenaikan jabatan menggunakan metode *Simple Additive Weighting* (SAW) pada karyawan *coffee* menjadi supervisor di Weng Coffee Reformasi. Hasil dari nilai bobot kriteria yang diberikan yaitu kriteria disiplin 20%, pengalaman 20%, keahlian 20% dan kinerja 40%. Hasil perhitungan dengan metode *Simple Additive Weighting* (SAW) yaitu A2 yang direkomendasi untuk menjadi supervisor di Weng Coffee dengan nilai akhir preferensi (V) tertinggi yaitu 1.0, yang menempati ranking 1.

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

Introduction

The coffee business, often referred to as coffee shops or coffee houses, provides a space where customers can order various types of coffee, hot or cold beverages, and food (Sukarno et

al., 2016). The growing number of businesses in the coffee sector has indirectly created competition within the same industry. This competition includes efforts to maintain company performance, which refers to a company's ability to manage its resources to achieve positive results. One of the company's primary resources is its employees.

Adriansyah (2017) emphasized that employees are a crucial resource within a company, playing a key role in every activity. Employee performance varies depending on individual skills, making it a significant factor for companies. High-quality employees enable a company to achieve its goals more efficiently. Employees with exceptional abilities are often given career opportunities through promotions to higher positions. Promotion plays a vital role for employees and is often eagerly anticipated. It signifies trust and recognition of an employee's competence and skills to assume a higher position. Promotion brings increased social status, authority, responsibility, and income for employees (Hasibuan, 2017). Promoting employees to higher positions is essential for motivating and encouraging them to consistently improve their performance, which, in turn, benefits the company positively.

A supervisor is a key role within the organizational structure of a company, responsible for organizing and ensuring efficient employee performance to meet company targets. Supervisors are supported by coffee shop employees to perform day-to-day operations. They are tasked with managing on-site workers and leading coffee shop staff to serve customers effectively. According to Sukarno et al. (2016), coffee shop employees are the most critical component of a coffee shop's operations. However, challenges often arise when promotions are based solely on recommendations from supervisors or work units, relying on criteria such as tenure and current position. These assessments, conducted using simple principles of fairness, may lead to errors in decision-making (Frieyadie, 2016). Inaccurate decisions can have adverse effects on the company, including decreasing employee morale (Supiandi et al., 2022). Therefore, it is crucial for companies to adopt a more accurate decision-making system to identify which employees should be promoted to supervisory roles. A decision support system (DSS) employing the Simple Additive Weighting (SAW) method can address this issue by providing a structured approach.

The Simple Additive Weighting (SAW) method has been widely applied in various studies related to decision-making. Frieyadi et al. (2016) utilized the SAW method in a DSS for determining job promotion. Similarly, Setiadi et al. (2018) applied SAW for selecting the best students based on criteria such as behavior, class participation, grades, attendance, and responsibility. Furthermore, Pratama et al. (2024) employed the SAW method to determine preferences for green tea extract products using relay control systems based on organoleptic characteristics of brewed results.

Employee promotion to supervisory positions at Weng Coffee Reformasi, facilitated by the SAW method, can assist management in making more objective and measurable decisions. By assigning weights to relevant criteria, a DSS using the SAW method can identify candidates who meet the qualifications and performance standards required for higher positions. However, it is essential to note that SAW is just one of many approaches available for DSS. The final decision should also consider human evaluation, candidate aspirations, and company policies. Therefore, this study aims to determine the weight of criteria used in the DSS for employee promotion at Weng Coffee Reformasi and to analyze the outcomes of the DSS using the SAW method to promote coffee shop employees to supervisor roles at Weng Coffee Reformasi.

Method

Research Variables and Data

Sugiyono (2018) defines research variables as everything determined by researchers to be studied and analyzed to obtain information that leads to conclusions. The variables in this research are as follows:

1. Alternative

The alternatives in this study are coffee shop employees considered for promotion to supervisor positions.

2. Coffee

The focus of this research is Weng Coffee, located on Reformasi street.

3. Criteria

The criteria used to promote coffee shop employees to supervisor positions are discipline, experience, skills, and performance, which were set by the company.

4. Criteria Weighting

The criteria weights assigned by the company are used for ranking purposes.

Sugiyono (2018) further defines the population as a generalization area consisting of objects or subjects with specific characteristics determined by researchers for study, from which conclusions are drawn. The population in this study consists of all coffee shop employees working at Weng Coffee Reformasi. Moreover, a sample is a subset of the population with specific characteristics. Sampling techniques refer to methods used for selecting samples. This study employs a census or total sampling technique, where every member of the population is included as a sample. This approach ensures that all data is randomly collected to reduce bias and improve objectivity. The sample includes all coffee shop employees at Weng Coffee Reformasi. The types and sources of data used in this study at Weng Coffee are as follows:

1. Primary Data

Primary data is obtained through questionnaires and in-depth interviews (Sugiyono, 2018). This data includes criteria such as discipline, experience, skills, and performance. The information is filled out by respondents (employees) and verified by supervisors to assess each criterion. Additionally, the weighting of criteria is obtained through questionnaires completed by managers as decision-makers to determine the importance of each criterion.

2. Secondary Data

Secondary data includes information already available within the company, such as the company profile, organizational map, vision and mission, organizational structure, and promotional phenomena for job advancement. These data are collected through observations.

Data Analysis

Data analysis is the process of processing available data to address the research problem. This method has a significant impact on the research outcomes. The purpose of this study is to determine the maximum value for each criterion evaluated. In this research, the Likert scale is employed, with the highest value of 5 and the lowest value of 1. The distribution of data based on the Likert scale is presented in Table 1.

Table 1. Likert scale

Description	Weight
Strongly Agree	5
Agree	4
Neutral	3
Disagree	2
Strongly Disagree	1

The analysis in this study utilizes the Likert scale to measure each criterion, employing the Simple Additive Weighting (SAW) method. The SAW method calculates weighted sums and ratings for each alternative based on all attributes. According to Kusumadewi in Dimas et al. (2019), the stages of the SAW method are as follows:

1. Defining Alternatives (A_i)

The alternatives in this study are three employees at Weng Coffee.

2. Defining Criteria (C_i)

Identifying criteria used in the research, each assigned with specific weights.

3. Assigning Preference Weights (W_i)

Setting preference weights based on the importance level of each criterion.

4. Determining Suitability Ratings (A_i) for Each Criterion (W_i)

Assigning ratings for each alternative against the specified criteria.

5. Constructing the Decision Matrix (X)

Developing a decision matrix based on the Suitability Ratings of alternatives.

6. Normalizing the Decision Matrix (X)

Converting the decision matrix to a normalized matrix (R_{ij}) for benefit attributes using the formula:

$$R_{ij} = \frac{x_{ij}}{\max(x_{ij})} \quad (1)$$

where x_{ij} is the value of the criterion and $\max(x_{ij})$ is the maximum value in each column.

7. Creating the Normalized Matrix

Tabulating the normalized values obtained for all alternatives.

8. Calculating Final Preference Values (V)

The final preference value (V) is obtained by summing the product of each normalized matrix value (R) with its corresponding preference weight (W):

$$V_i = \sum_{j=1}^n W_j r_{ij} \quad (2)$$

The final results are obtained through a ranking process, which involves summing the products of the normalized matrix (R) and the weight vector (W). The highest value obtained is then selected as the best alternative (A) and considered the optimal solution.

Results and Discussion

Alternative and Criteria Data

The alternative data in this study consists of all coffee shop employees with a minimum tenure of one year. Based on the questionnaire results, three employees met the one-year tenure requirement, as shown in Table 6. For the criteria data, the information collected from the questionnaires was matched with the assessment data for each criterion concerning the alternatives—specifically the coffee shop staff being considered for promotion to supervisor. The assessment of each criterion is described as follows:

1. Discipline

Discipline data was obtained through questionnaires filled out by coffee shop employees. The evaluation results for the discipline criterion are presented in Table 2.

Table 2. Scoring scale for discipline criterion

Description	Weight	Score Range
Strongly Agree	5	21-25
Agree	4	16-20
Neutral	3	11-15
Disagree	2	6-10
Strongly Disagree	1	1-5

2. Experience

Experience data was obtained through questionnaires filled out by Weng Coffee employees. The score for the experience criterion is shown in Table 3.

Table 3. Scoring scale for experience criterion

Description	Weight	Score Range
Strongly Agree	5	21-25
Agree	4	16-20
Neutral	3	11-15
Disagree	2	6-10
Strongly Disagree	1	1-5

3. Skills

Skills data was obtained through questionnaires filled out by coffee shop employees. The score for the skills criterion is shown in Table 4.

Table 4. Scoring scale for skills criterion

Description	Weight	Score Range
Strongly Agree	5	17-20
Agree	4	13-16
Neutral	3	9-12
Disagree	2	5-8
Strongly Disagree	1	1-4

4. Performance

Performance data was obtained through questionnaires filled out by coffee shop employees. The score for the performance criterion is shown in Table 5.

Table 5. Scoring scale for performance criterion

Description	Weight	Score Range
Strongly Agree	5	17-20
Agree	4	13-16
Neutral	3	9-12
Disagree	2	5-8
Strongly Disagree	1	1-4

5. Criteria Weighting Data

The criteria weights were assigned by the manager as the decision-maker at Weng Coffee. Weighting was based on the level of importance of each criterion, as shown in Table 6.

Table 6. Criteria preference weights

Code	Criterion	Weight
C1	Discipline	20%
C2	Experience	20%
C3	Skills	20%
C4	Performance	40%

Simple Additive Weighting (SAW) Calculation

The decision support system employs the Simple Additive Weighting (SAW) method. In the initial step, the results from each alternative for each criterion are compiled and matched into a suitability table, as shown in Table 7.

Table 7. Alternative suitability

Alternative (A)	Discipline (C1)	Experience (C2)	Skills (C3)	Performance (C4)
A1	5	4	4	5
A2	5	5	5	5
A3	4	5	5	5

The next step involves constructing a decision matrix based on the criteria (C) obtained from each alternative, yielding the decision matrix (X) as follows:

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

The process continues by normalizing the decision matrix (X) into a normalized matrix (R) using the benefit attribute as follows:

1. Discipline Criterion Normalization

$$R_{11} = \frac{5}{\max(5,5,4)} = \frac{5}{5} = 1.0$$

$$R_{12} = \frac{5}{\max(5,5,4)} = \frac{5}{5} = 1.0$$

$$R_{13} = \frac{4}{\max(5,5,4)} = \frac{4}{5} = 0.8$$

2. Experience Criterion Normalization

$$R_{21} = \frac{4}{\max(4,5,5)} = \frac{4}{5} = 0.8$$

$$R_{22} = \frac{5}{\max(4,5,5)} = \frac{5}{5} = 1.0$$

$$R_{23} = \frac{5}{\max(4,5,5)} = \frac{5}{5} = 1.0$$

3. Skills Criterion Normalization

$$R_{31} = \frac{4}{\max(4,5,5)} = \frac{4}{5} = 0.8$$

$$R_{32} = \frac{5}{\max(4,5,5)} = \frac{5}{5} = 1.0$$

$$R_{33} = \frac{5}{\max(4,5,5)} = \frac{5}{5} = 1.0$$

4. Performance Criterion Normalization

$$R_{41} = \frac{5}{\max(5,5,5)} = \frac{5}{5} = 1.0$$

$$R_{42} = \frac{5}{\max(5,5,5)} = \frac{5}{5} = 1.0$$

$$R_{43} = \frac{5}{\max(5,5,5)} = \frac{5}{5} = 1.0$$

Thus, the normalized matrix obtained from the decision matrix normalization is as follows:

$$R = \begin{bmatrix} 1.0 & 0.8 & 0.8 & 1.0 \\ 1.0 & 1.0 & 1.0 & 1.0 \\ 0.8 & 1.0 & 1.0 & 1.0 \end{bmatrix}$$

The final step is to calculate the final preference value (V) by summing the product of each normalized matrix (R) with the preference weight (W) in Table 6. The given weights are:

$$W = [0,20 \quad 0,20 \quad 0,20 \quad 0,40]$$

The preference value (V) for each alternative is calculated as follows:

$$V_1 = (1.0 \cdot 0.20) + (0.8 \cdot 0.20) + (0.8 \cdot 0.20) + (1.0 \cdot 0.40) = 0.92$$

$$V_2 = (1.0 \cdot 0.20) + (1.0 \cdot 0.20) + (1.0 \cdot 0.20) + (1.0 \cdot 0.40) = 1.00$$

$$V_3 = (0.8 \cdot 0.20) + (1.0 \cdot 0.20) + (1.0 \cdot 0.20) + (1.0 \cdot 0.40) = 0.96$$

The preference calculation results are presented in Table 8. Ranking is performed based on the highest preference value obtained by each alternative. Based on the Simple Additive Weighting (SAW) method calculation, the best-ranked alternative is A2, Nikolas Aduhit, who is recommended for promotion to supervisor. A2 has a work tenure of 1.6 years and a high school education. According to the operational manager's evaluation, A2 excels in experience, expertise, and performance and demonstrates leadership qualities and the ability to meet the company's targets.

Table 8. Final preference calculation results

Alternative (A)	Variable (V)	Final Preference Value	Ranking
A1	V1	0.92	1
A2	V2	1.00	2
A3	V3	0.96	3

Conclusion and Recommendations

In this study, the Simple Additive Weighting (SAW) method was successfully applied in a decision support system to recommend employee promotions. The weighting values assigned for the decision support system at Weng Coffee using the SAW method are as follows: discipline (20%), experience (20%), expertise (20%), and performance (40%). The employee recommended for promotion to the supervisor position at Weng Coffee is A2, Nikolas Aduhit, who achieved the highest final preference value (V) of 1.00, securing the first rank.

Future research should focus on developing a web-based decision support system to facilitate faster decision-making processes for stakeholders (managers) when considering employee promotions. Moreover, upcoming studies could explore sensitivity analyses of the SAW method by comparing it with other decision-making approaches, such as the Technique for Order Preference by Similarity to Ideal Solution (TOPSIS). This approach aims to identify the most optimal Multi-Attribute Decision-Making (MADM) method for resolving analytical problems, as previously examined by Suyanti and Roestam (2015).

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