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DECISION SUPPORT SYSTEM FOR SELECTING THE BEST EMPLOYEE AT PT BANK DIGITAL BCA USING SAW METHOD

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Abstract

The selection of the best employees is a long and complicated process. A person's decision is bad because the employee selection process is based on subjectivity. Therefore, we need a decision support system for the employee selection process. This decision support system allows to determine the value of the calculation of all criteria. The method used is Simple Additive Weighting (SAW). This method is a method for finding the weighted sum. In the case study of determining the best employees at PT Bank Digital BCA, there are four criteria, namely attendance, performance, assignment discipline and approval. Each alternative (employee) will have these criteria. In this case, to determine the best employee, we add the weight of the performance score for each alternative to all the attributes. A larger value will indicate that the alternative is more selected. In this case, the SAW method can determine the best employee based on the highest score. Previously, PT Bank Digital BCA did not use the specified method and criteria, it was also uncertain, after being tested with the established method and determined criteria, the results were very good and appropriate. Thus this system is able to handle the calculation of the best employee assessment at PT Bank Digital BCA so that there will be no difficulty in determining the best employee.

Keywords: *First keyword, Second keyword, Third keyword, Fourth keyword, Fifth keyword*

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1. INTRODUCTION (UPPERCASE, 10pt, bold)

Employees are one of the human resources (HR) which is used as a guiding tool to advance the business. Employee performance can directly affect company profits. The employee performance evaluation process is a complex process that must be considered carefully. If HR can be well organized, the company can manage all of its business processes properly. Competition in an increasingly competitive work environment encourages PT Bank Digital BCA to redouble efforts to improve the quality of employee performance. One effort to improve the quality of work performance is to measure employee performance for the company through employee performance evaluation. Unfortunately, there is no application that can determine the selection of the best employees quickly, accurately and efficiently. In this regard, the authors created a decision support system application for selecting the best employees using the SAW (Simple Additive Weighting) method [1].

Decision support systems are computerized information systems containing domain-specific knowledge and analytical decision models to assist decision makers by providing information and explaining alternatives [2].

The simple additive weighting (SAW) method is also commonly known as the weighted sum or weighted sum method. The basic concept of the simple additive weighting (SAW) method is to find the weighted sum the performance scores of each alternative all attributes. The simple additive weighting (SAW) method requires normalizing the decision matrix (X) to the scale obtained for all available replacement symbols [3].

This method is widely used for various purposes to overcome the problems encountered, and many of them adopt this method. It is necessary to create a decision support system for selecting the best employees using Simple Additive Weighting for recommendations for selecting the best employees.

PT Bank Digital BCA was founded in 2020 which is centered at the main office in The City Tower building, the BCA Digital operational office located at Wisma BCA BSD selects the best employees and makes employees enthusiastic at work. As a form of appreciation for the achievements of employees who have carried out their duties well, this award in the form of allowances will also increase employee morale at work.

PT Bank Digital BCA currently has problems identifying its best employees, and that is subjective. The subjectivity in question arises when employees are assigned based on one criterion without considering other evaluation criteria. This subjectivity usually appears to reduce the complexity of the decision-making process, because there are many choices. To help identify the best employees, analysis can be used, especially determination analysis using the Simple Additive Weighting (SAW) method.

2. RESEARCH METHOD

The stages of the research include several stages of implementation from start to finish, while the stages are as follows:

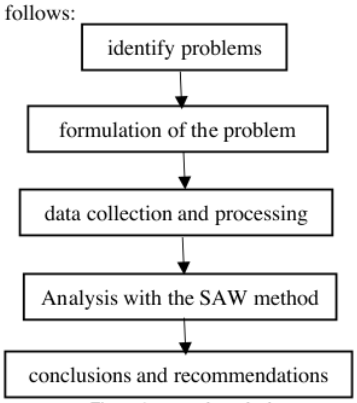

Figure 1. research methods

Each step of the research method is described in detail as follows:

Identifying problems is done to find out the problems that the author encountered when conducting research on selecting the best employees of PT Bank Digital BCA Wisma BCA BSD.

The next step is to formulate the problem that arises from the object of research and at the same time establish research objectives. The formulation of the problem was obtained from the results of the researcher's analysis during the field study period and data from interviews with Mr. Achmad Wirawan Aziz as Miroring at Wisma BCA BSD. The results of the problem formulation are also the objectives of the research conducted.

In the third step, any data collection is carried out as material to solve the problems that have been formed in the second stage. When the data has been collected, data processing is carried out for use in the analysis stage. In the analysis process, the existing data will be examined using the method.

At this stage, the analysis and classification of the results of the discussion of the problem is usually carried out using the Simple Additive Weighting method in general. The discussion of the problem includes the steps for calculating existing data using the valid formula of the Simple Additive Weighting method. Each stage is discussed optimally according to the steps contained in the Simple Additive Weighting method. The results of data processing from the previous step will be used as material for further analysis for solutions to problems.

At this stage the researcher draws conclusions from the results of research conducted based on the results of data processing using the simple additive weight method. These conclusions are presented as observations drawn from the calculations generated by the research method.

2.1 Data Analysis

The process of data analysis to identify the best employees in the company or agency, especially at PT Bank Digital BCA located at Wisma BCA BSD, to determine the author's criteria using the criteria for attendance, performance, assignment discipline, approval according to the criteria set by the company when the writer obtained data from the company, so this research uses the Simple Additive Weighting method, while the formula and steps for implementing the Simple Additive Weighting method are as follows:

1. Identify alternatives, namely Ai
2. Determine the criteria that will be used as a reference in the decision-making process, namely Cj
3. Determine the weight for each criterion Wj,J=1,2…m with the important note ∑Wj
4. Make a table for the suitability rating of each alternative for each criterion.
5. Create a decision matrix (X) which is formed from the suitability rating of each alternative for each criterion. The value of X for each alternative (Ai) per criterion (Cj) has been determined, where m, i=1,2,...m and j=1,2,...n.

$$r_{ij} = \begin{cases} \dfrac{x_{ij}}{\underset{i}{Max}\, x_{ij}} \\ \dfrac{\underset{i}{Min}\, x_{ij}}{x_{ij}} \end{cases}$$

6. Normalize the decision matrix by carrying out a comparison process on all existing alternative values, the normalization formula is if j is the

attribute advantage (benefit) if j is the attribute cost (cost).

Information

rij : Normalized performance rating
Maxij : maximum or largest value of each row and column Minij : minimum or smallest value of each row and column
Xij : row and column of the matrix

7. The results of normalizing the value of the performance rating (rij) form a normalized matrix (R)
8. Calculating the preference value for each alternative, Vi is given as a description:
Vi : the final value of the alternative
Wj : weight value that has been determined
The results of the calculation of the larger Vi value indicate that the alternative Ai is the best alternative.

3. RESULT AND DISCUSSION

Several steps in carrying out calculations to determine the best employee using the Simple Additive Weighting (SAW) method the author asks for employee data at PT. BCA Digital Bank, which is located at Wisma BCA BSD, this study aims to find the best prospective employees, the first step taken is to identify alternative data, namely Ai. The following is an alternative data that will be used in calculating this analysis. The number of samples in the study were 20 employees.

Table 1. Alternative Value of Employee Performance

No	Alternatif	Kriteria			
		Absensi (C1)	Kinerja (C2)	Disiplin Pengugasan(C3)	Approval(C4)
1	Ambar Tri Seto	75	80	95	90
2	Anang Sahroni	80	90	95	75
3	Angga Ariyanto	80	95	75	80
4	Apriyandi	85	80	70	80
5	Arif Rahman Hakim	95	95	95	95
6	Fery Firmansyah	85	95	90	65
7	Rian Rahardi	85	70	80	80
8	Agus Supriyadi	80	80	75	85
9	Ari Setiawan	95	75	60	90
10	Mario Purnama	90	85	75	95
11	Rosita	95	75	65	80
12	Sri Rejeki	90	85	70	95
13	Wahidin	85	70	70	85
14	Edward	70	85	60	95
15	Aditya	75	85	75	90
16	Dina Anastasya	95	80	70	80
17	Ufira	90	70	75	75
18	Lia Fransiska	85	80	75	85
19	Vivi Ananda	80	95	80	80
20	Riska Edi	95	80	70	70

In this procedure calculations are carried out using the Simple Additive Weighting (SAW) method to determine the alternative data after that by making a shuffle value of each alternative on each criterion, if the value is obtained then the weight value will be determined to be used in the next calculation. if the value and weight are then the value is calculated by finding the maximum value of each existing value and dividing it by the value obtained, the value that is distributed is ranked, the result of the shared value is multiplied by the existing weight, a ranking will be produced which will be the result.

Following are the criteria needed for decision making which is the second step after identifying alternative data, based on the requirements to determine the best employee selection, while the predetermined criteria are Absenteeism (C1), Performance (C2), Assignment Discipline (C3), Approval (C4).

Table 2. Criteria Table

Kode	Kriteria
C1	Absensi
C2	Kinerja
C3	Disiplin Penugasan
C4	Approval

Table 3. Determination of Criteria Weight Value

Kriteria (Cj)	Range (%)	Bobot (W)
C1	20	0.20
C2	30	0.30
C3	10	0.10
C4	40	0.40

Table 4. Match rating

No	Alternatif	Kriteria			
		Absensi (C1)	Kinerja (C2)	Disiplin Penugasan (C3)	Approval(C4)
1	Ambar Tri Seto	4	4	5	5
2	Anang Sahroni	4	5	5	4
3	Angga Ariyanto	4	5	4	4
4	Apriyandi	5	4	3	4
5	Arif Rahman Hakim	5	5	5	5
6	Fery Firmansyah	5	5	5	3
7	Rian Rahardian	5	3	4	4
8	Agus Supriyadi	4	4	4	5
9	Ari Setiawan	5	4	2	5
10	Mario Purnama	5	5	4	5
11	Rosita	5	4	3	4
12	Sri Rejeki	5	5	3	5
13	Wahidin	5	3	3	5
14	Edward	3	5	2	5
15	Aditya	4	5	4	5
16	Dina Anastasya	5	4	3	4
17	Ufira	5	3	4	4
18	Lia Fransiska	5	4	4	5
19	Vivi Ananda	4	5	4	4
20	Riska Edi	5	4	3	3

After the alternative rating values for each criteria have been determined the fourth step is to create a decision matrix (X) which is formed from the suitability rating table for each alternative criterion according to each criterion, the X value of each option (Ai) on each specified criterion.

After making the decision matrix (X) the author calculates the normalization of the matrix, using the formula Rii = (Xij/max/Xij), and if you look at columns C1, C2, C3, and C4 the maximum value is 5, then each row of columns C1, C2 , C3, and C4 divided by the maximum value contained in the value column.

The last step is to calculate the value of each alternative by multiplying the value of each column of criteria and adding up the results of the multiplication to rank and to choose the best alternative, enter each criterion and the weighted value that will be used in that category, namely W {0.20 0.30 0.10 0.40} then the ranking process is as follows with the formula:

Vi = Rangking untuk setiap alternatif

Wj = Nilai bobot dari setiap kriteria

Rij = Nilai rating kinerja ternormalisasi

V1 = (0.8)(0.20) + (0.8)(0.30) + (1)(0.10) + (1)(0.40)

= 0.16 + 0.24 + 0.1 + 0.4

= 0.9

V2 = (0.8)(0.20) + (1)(0.30) + (1)(0.10) + (0.8)(0.40)

= 0.16 + 0.3 + 0.1 + 0.32

= 0.88

V3 = (0.8)(0.20) + (1)(0.30) + (0.8)(0.10) + (0.8)(0.40)

= 0.16 + 0.3 + 0.08 + 0.32

= 0.86

V4 = (1)(0.20) + (0.8)(0.30) + (0.6)(0.10) + (0.8)(0.40)

= 0.2 + 0.24 + 0.06 + 0.32

= 0.82

V5 = (1)(0.20) + (1)(0.30) + (1)(0.10) + (1)(0.40)

= 0.2 + 0.3 + 0.1 + 0.4

= 1

V6 = (1)(0.20) + (1)(0.30) + (1)(0.10) + (0.6)(0.40)

= 0.2 + 0.3 + 0.1 + 0.24

= 0.84

30

V7 = (1)(0.20) + (0.6)(0.30) + (0.8)(0.10) + (0.8)(0.40) = 0.2 + 0.18 + 0.08 + 0.32

= 0.78

V8 = (0.8)(0.20) + (0.8)(0.30) + (0.8)(0.10) + (1)(0.40) = 0.16 + 0.24 + 0.08 + 0.4

= 0.88

V9 = (1)(0.20) + (0.8)(0.30) + (0.4)(0.10) + (1)(0.40) = 0.2 + 0.24 + 0.04 + 0.4

= 0.88

V10 = (1)(0.20) + (1)(0.30) + (0.8)(0.10) + (1)(0.40)

= 0.2 + 0.3 + 0.08 + 0.4

= 0.98

V11 = (1)(0.20) + (0.8)(0.30) + (0.6)(0.10) + (0.8)(0.40) = 0.2 + 0.24 + 0.06 + 0.32

= 0.82

V12 = (1)(0.20) + (1)(0.30) + (0.6)(0.10) + (1)(0.40)

= 0.2 + 0.3 + 0.06 + 0.4

= 0.96

V13 = (1)(0.20) + (0.6)(0.30) + (0.6)(0.10) + (1)(0.40) = 0.2 + 0.18 + 0.06 + 0.4

= 0.84

V14 = (0.6)(0.20) + (1)(0.30) + (0.4)(0.10) + (1)(0.40) = 0.12 + 0.3 + 0.04 + 0.4

= 0.86

V15 = (0.8)(0.20) + (1)(0.30) + (0.8)(0.10) + (1)(0.40) = 0.16 + 0.3 + 0.08 + 0.4

= 0.94

V16 = (1)(0.20) + (0.8)(0.30) + (0.6)(0.10) + (0.8)(0.40) = 0.2 + 0.24 + 0.06 + 0.32

= 0.82

31

V17 = (1)(0.20) + (0.6)(0.30) + (0.8)(0.10) + (0.8)(0.40) = 0.2 + 0.18 + 0.08 + 0.32

= 0.78

V18 = (0.8)(0.20) + (0.8)(0.30) + (0.8)(0.10) + (1)(0.40) = 0.16 + 0.24 + 0.08 + 0.4

= 0.88

V19 = (1)(0.20) + (1)(0.30) + (0.8)(0.10) + (0.8)(0.40) = 0.2 + 0.3 + 0.08 + 0.32

= 0.9

V20 = (0.8)(0.20) + (0.8)(0.30) + (0.6)(0.10) + (0.6)(0.40) = 0.16 + 0.24 + 0.06 + 0.24

= 0.7

Based on the results of the calculation above, sorted in descending order from the highest value to the lowest value, and the top 5 ranking results can be seen.

Table 5. Best employee data

No	Alternatif	Hasil Perangkingan
1	Arif Rahman Hakim	1
2	Mario Purnama	0.98
3	Sri Rejeki	0.96

Based on the table above it can be concluded that the best employees are selected by fulfilling all the requirements identified at PT. BCA Digital Bank with the highest score, especially on behalf of employee Arif Rahman Hakim, is ranked 1st with an average score of 5, with a value of 1.

4. CONCLUSION

From the results of research on decision support systems for selecting the best employees at PT Bank Digital BCA using the Simple Additive Weighting method, the authors draw the following conclusions:

1. With this research, the authors understand how the best procedure to meet the requirements for selecting the best employees.

2. After calculating using the Simple Additive Weighting method, Arif Rahman Hakim, who was selected as the best employee with the highest score at PT Bank Digital BCA, was ranked 1st with an average score of 5, with a value of 1.
3. The process of determining the best employee is carried out through calculations using the Simple Additive Weighting (SAW) method, we start by assigning a value to each criterion, weighting, rating, suitability, normalization, and ranking so as to produce a value for each criterion.

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