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IMPLEMENTATION OF PERFORMANCE ASSESSMENT OF INDRAGIRI INSTITUTE OF TECHNOLOGY AND BUSINESS USING THE SIMPLE ADDITIVE WEIGHTING (SAW) METHOD

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Abstrack

Employee performance appraisal system is a system used to assess the best performance of its employees. Institutions or institutions conduct the best performance appraisal of their employees to evaluate, verify, motivate to improve its performance. The results of this performance are used to find out or help make decisions, which results of these decisions have an impact on the employees themselves, such as promotions, demotions, dismissals, bonuses and deductions for employees. In the assessment of *research* conducted using 6 criteria: Presence, Attitude , *Craft* , Creativity, quality and quantity using the Simple *Additive Weighting (SAW) method* . The basic concept of the *Simple Additive Weighting* (SAW) method is to find the weighted sum of the performance ratings for each alternative on all attributes. The *Simple Additive Weighting (SAW)* method can help decision makers to produce the greatest value as *the* best alternative . In this study, testing was carried out on 75 respondent data. From calculations and testing, data accuracy of 100% is obtained, that is, the amount of data that is suitable is divided by the amount of data being tested multiplied by 100%.

Keywords : **Rating System, SAW Method**

INTRODUCTION

Employee performance appraisal is one of the tools used to evaluate the results of each employee's work that has met predetermined performance standards. This performance appraisal system is one of the systems for assessing the success of the Indragiri Institute of Technology and Business in carrying out promotions, demotions, transfers and also dismissal of employees.

The Indragiri Institute of Technology and Business has a performance appraisal standard. Assessment is carried out with predetermined criteria. In the assessment there are 6 criteria that will affect the performance of employees at the Indragiri Institute of Technology and Business. The 6 criteria are: 1). Daily Attendance, 2). Attitude is the most important assessment in 6 criteria, 3) . Craft Criteria (This criterion can be assessed based on the level of discipline both when the presence enters or attendance goes home, whether the employee is in accordance with what has been determined or not), 4). Creativity Criteria (This criterion can be assessed in terms of the creativity of an employee in building the Indragiri Institute of Technology and Business), 5). Quality Criteria (This criterion is an assessment of the results

of work whether the results of the work are good or bad), 6). Quantity Criteria (this criterion is the result of work achievements/targets in each division).
The method to be used to obtain the best employee performance at the Indragiri Institute of Technology and Business is to use *Simple Additive Weighting* (SAW). This method is known as the weighted addition method. Assessment is carried out with the 6 assessment criteria above using the SAW method to produce the highest value that is selected as the best alternative.

RESEARCH METHODOLOGY

There are several steps taken in this research method:

a) Data collection

Data collection was carried out by means of literature study and observation. The data collected is criterion data with the number of weights and crips data. (Andinata 2004). Criteria data is data obtained from various divisions in the form of: attendance, attitude, craftsmanship, creativity, quality and quantity. Weight data is data weighting criteria for evaluating employee performance which is used as a reference in ranking employee performance ratings with a total weight of 100. Crips data is data that is limiting of a criterion value.

b) Data analysis

After collecting data, the next step is data analysis. Data analysis was carried out on the problems found from the procedures found. The procedure that runs in conducting employee assessments is taken from two sources , namely the source of recapitulation of absenteeism calculations and direct assessment from superiors whose level is higher than the employee.

c) Data processing

Data processing was carried out using the *Simple Additive Weighting* (SAW) method. The concept of this method is to find a weighted sum rating of performance on each alternative on all attributes.

d) Testing

Tests were conducted to see the results of the implementation of the Simple Additive method *Weight in g* (SAW).

THEORETICAL BASIS

A. *Simple Additive Weighting* (SAW) Method

According to (KUS06) in (Susilowati, 2018), *Simple Additive Weighting* (SAW) is a weighted addition method . The basic concept of the SAW method is to find the weighted sum of the performance ratings for each alternative across all criteria.
The Simple Additive Weighting (SAW) method is carried out through several stages, namely:

1. Determining criteria and alternatives Criteria data is the data needed in making decisions on selecting the best employee performance.
2. Give preference weight for each criterion.
3. Normalize the decision matrix.
4. Make the final result a preference value (ranking).

Vol. 12, No. 1, June 2023, pp. 78-85
https://doi.org/10.34006/jmbi.v12i1.597

B. Performance

According to (Mangkunegara, 2014) Performance is the willingness of a person or group of people to carry out activities or perfect them in accordance with their responsibilities with the expected results , through a comparison between the results real work with established work standards.

Performance is influenced by ability and motivation factors. Several methods can be used to assess performance , namely *rating scales, critical incidents, essays, work standards, rankings, forced distributions, and Behaviorally Anchored Rating Scales* (BARS).

C. Decision Support System

According to (Nofriansyah, 2014) a decision support system is a computer-based system consisting of three interacting components, a language system (a mechanism for providing communication between users and other decision support system components), knowledge (domain knowledge repository problems that exist in decision support systems or as data or as procedures), and problem processing systems one or more general problem manipulation capabilities required for decision making).

RESULTS AND DISCUSSION

Simple Additive Weighting (SAW) method is used to assist in determining employee performance appraisals. In using the SAW method, the step is to compare each alternative against certain criteria. In the SAW method the calculation is carried out in several stages, namely:

a. Determine criteria data, weight data, crips data, and initial data
b. Calculating alternative outcome data,
c. normalize,
d. Do ranking.

The steps above can be seen further as follows:

A. Determining Criteria Data, Crips Data and Initial Data

1. Criteria data and weight data

Criteria data needed in making decisions on selecting the best employee performance. In the criteria data there is a weight attribute. Where each criterion has its own weight value.

Table 1. Criteria Data

Criteria	Code	Information	Weight
Presence	K1	Benefits	25%
Attitude _	K2	Benefits	15%
Craft	K3	cost	10%
Creativity	K4	cost	10%
Quality	K5	Benefits	20%
Quantity	K6	Benefits	20%

Vol. 12, No. 1, June 2023, pp. 78-85
https://doi.org/10.34006/jmbi.v12i1.597

The criteria for assessing employee performance include:

a. Attendance criteria
   This criterion is obtained from employee presence using a card as identity and also location and selfie photos, this attendance is carried out every day.
b. Attitude Criteria / *Attitude*
   This criterion is obtained from warning letters (SP)/sanctions received by employees.
c. Craft Criteria
   This criterion is a criterion regarding employee discipline when attending and also going home.
d. Creativity criteria
   This criterion is a supporting criterion obtained from employees who have creativity in carrying out their duties or obligations.
e. Quality criteria
   Assessed based on the results of the work assigned by the employee, the assessment can be seen in table 2.
f. Quantity criteria
   Obtained from the work of employees with targets that have been determined by each division and given directly by each superior.

Table 2. Parameter table for assessing quantity and quality criteria

Evaluation	Mark
Good	90-100
Enough	80-100
Not enough	10-70

2. Data Crips

Crips data is limiting data from a criterion, in table 3.3 you can see the crips value for each criterion which will be processed using the *Simple Additive Weighting* (SAW) method.

Table 3. Data Crips

Criteria	Crips	Mark
Presence	<=60%	1
Presence	>60% and <=70%	2
Presence	>70% and <=80%	3
Presence	>80%	4
Attitude _	SP 3	1
Attitude _	SP 2	2
Attitude _	SP 1	3
Attitude _	No SPs	4

Vol. 12, No. 1, June 2023, pp. 78-85
https://doi.org/10.34006/jmbi.v12i1.597

Craft/Discipline	<=20%	1
Craft/Discipline	>20% and <40%	2
Craft/Discipline	>=40% and <60%	3
Craft/Discipline	>60%	4
Creativity	<60%	1
Creativity	>=60% and <=70%	2
Creativity	>=70% and <=80%	3
Creativity	>80%	4
Quantity	Not enough	1
Quantity	Enough	2
Quantity	Good	3
Quantity	Very good	4
Quality	Not enough	1
Quality	Enough	2
Quality	Good	3
Quality	Very good	4

The value that will be used for the SAW method is the value that has been determined by the *crips value* .

The following is the initial data that will be used in the SAW calculation. This data was obtained from the Quality Assurance Center (PPM) of the Indragiri Institute of Technology and Business division of the Development and Competency Center Technical Service Unit (UPT P2K) as shown in table 4.

Table 4. Preliminary data

Name	K1	K2	K3	K4	K5	K6
DN	80%	T.SP	60%	80%	Good	Good
Y.N	70%	T.SP	50%	60%	Good	Good
DRN	90%	T.SP	40%	30%	Good	Good
NY	80%	T.SP	30%	40%	Good	Good

B. Calculating Alternative Result Data

At this stage, change the alternative values according to the weights on the alternative crips, so that data will be obtained as in table 5.

Vol. 12, No. 1, June 2023, pp. 78-85
https://doi.org/10.34006/jmbi.v12i1.597

Table 5. Alternative Results

Name	K1	K2	K3	K4	K5	K6
DN	3	4	4	3	3	3
Y.N	2	4	3	2	3	3
DRN	4	4	3	1	3	3
NY	4	4	2	1	3	3

C. Perform Normalization

For K1 criteria because of benefits, we look for the max value (3,2,4,4) = 4. Then obtained:

$$A1= \frac{3}{Max\ (3,2,4,4)}= \frac{3}{4}= 0.75$$

$$A2= \frac{2}{Max\ (3,2,4,4)}= \frac{2}{4}= 0.5$$

$$A3= \frac{4}{Max\ (3,2,4,4)}= \frac{4}{4}= 1$$

$$A4= \frac{4}{Max\ (3,2,4,4)}= \frac{4}{4}= 1$$

For K2 criteria because of benefits, we look for the max value (4,4,4,4) = 4, so we get:

$$A1= \frac{4}{Max\ (4,4,4,4)}= \frac{4}{4}= 1$$

$$A2= \frac{4}{Max\ (4,4,4,4)}= \frac{4}{4}= 1$$

$$A3= \frac{4}{Max\ (4,4,4,4)}= \frac{4}{4}= 1$$

$$A4= \frac{4}{Max\ (4,4,4,4)}= \frac{4}{4}= 1$$

For K3 criteria because of cost, we look for the min value (4,3,3,2) = 2, so we get:

$$A1= \frac{2}{Max\ (4,3,3,2)}= \frac{4}{2}= 2$$

$$A2= \frac{2}{Max\ (4,3,3,2)}= \frac{3}{2}= 1.5$$

$$A3= \frac{2}{Max\ (4,3,3,2)}= \frac{3}{2}= 1.5$$

$$A4= \frac{2}{Max\ (4,3,3,2)}= \frac{2}{2}= 1$$

For K4 criteria because of cost, we look for the min value (3,2,1,1) = 1, so we get :

$$A1= \frac{3}{Max\ (3,2,1,1)}= \frac{3}{1}= 3$$

Vol. 12, No. 1, June 2023, pp. 78-85
https://doi.org/10.34006/jmbi.v12i1.597

$$A2 = \frac{2}{Max\,(3,2,1,1)} = \frac{2}{1} = 2$$

$$A3 = \frac{1}{Max\,(3,2,1,1)} = \frac{1}{1} = 1$$

$$A4 = \frac{1}{Max\,(3,2,1,1)} = \frac{1}{1} = 1$$

For K5 criteria because of benefits, we look for the max value (3,3,3,3) = 3, so we get:

$$A1 = \frac{3}{Max\,(3,3,3,3)} = \frac{3}{3} = 1$$

$$A2 = \frac{3}{Max\,(3,3,3,3)} = \frac{3}{3} = 1$$

$$A3 = \frac{3}{Max\,(3,3,3,3)} = \frac{3}{3} = 1$$

$$A4 = \frac{3}{Max\,(3,3,3,3)} = \frac{3}{3} = 1$$

For K6 criteria because of the benefits, we look for the max value (3,3,3,3) = 3, so we get:

$$A1 = \frac{3}{Max\,(3,3,3,3)} = \frac{3}{3} = 1$$

$$A2 = \frac{3}{Max\,(3,3,3,3)} = \frac{3}{3} = 1$$

$$A3 = \frac{3}{Max\,(3,3,3,3)} = \frac{3}{3} = 1$$

$$A4 = \frac{3}{Max\,(3,3,3,3)} = \frac{3}{3} = 1$$

The results of normalization can be seen in table 6 below.

Table 6. Normalized Data

Name	K1	K2	K3	K4	K5	K6
DN	0.75	1	2	2	1	1
Y.N	0.5	1	1.5	1	1	1
DRN	1	1	1	1	1	1
NY	1	1	1.5	1	1	1

D. Do Ranking

The formula for SAW ranking is

$$Vi = \sum_{i=0}^{n} Wj\ rij$$

Information :

Vi = Ranking for each alternative

Wj = Weight value of each criterion

rij = Result of normalized value

A larger value of Vi indicates that alternative Ai is more selected.
in the ranking stage, multiplication between the criteria weights and each row of the

Vol. 12, No. 1, June 2023, pp. 78-85
https://doi.org/10.34006/jmbi.v12i1.597

normalized value matrix in the previous stage is carried out:

$A1 = (0.75*25)+(1*15)+(2*10)+(2*10)+(1*20)+(1*20)=113.75$
$A2 = (0.5*25)+(1*15)+(1.5*10)+(1*10)+(1*20)+(1*20)=92.5$
$A3 = (1*25)+(1*15)+(1*10)+(1*10)+(1*20)+(1*20)=100$
$A4 = (1*25)+(1*15)+(1.5*10)+(1*10)+(1*20)+(1*20)=105$

The ranking results can be seen in table 7.

Table 7. Ranking Results

Name	K1	K2	K3		K4	K5	K6	Total	ranking
DN	0.75	1	2		2	1	1	113.75	1
NY	1	1	1.5		1	1	1	105	2
DRN	1	1	1		1	1	1	100	3
Y.N	0.5	1	1.5		1	1	1	92.5	4

From the table above, the results of the performance appraisal ranking from 1st to 4th are as follows: DN, NY and YN.

Conclusion

In the discussion above, it can be concluded as follows:

1. The Simple Additive Weighting (SAW) method can be implemented to measure the performance appraisal of Indragiri Institute of Technology and Business employees with 6 criteria of Attendance, Attitude, *Craft* , Creativity, Quality and Quantity of work.
2. On the results of the employee performance appraisal trial, from all the criteria that have been determined will produce a ranking number to see the employee's performance.
3. Calculation accuracy using the Simple Additive Weighting method which is implemented manually reaches a value of 100%.
4. The SAW method is quite easy to use in determining employee performance rankings.

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