Decision Support System Selection of Best Employee At PT. Intiberkah Sinar Sejahtera Using Simple Additive weighting Method

Feri Sahputra¹, Fricles Ariwisanto Sianturi²

¹,² Informatics Engineering Study Program, STMIK Pelita Nusantara, Jl. St. Iskandar Muda No. 1 Medan, North Sumatera, Indonesia, 20154

E-mail: ferisyahputra742@gmail.com, sianturifricles@gmail.com

Abstract - The problem of PT. Sinar Sejahtera Intiberkah are still many employees of PT. Intiberkah Sinar Sejahtera especially the logistics employees who are critical to the company that should be worthy to obtain as the best employees but until now there has been no employees at the logistics become the best employee in the company of PT. Sinar Sejahtera Intiberkah tersebut. Therefore, in this study used a decision support system that can be used to help the PT. Intiberkah Sinar Sejahtera in determining the eligible employees in the selection of the best employees, there are four criteria taken in these elections is the first no ethical criteria, these criteria related to attitudes and ways of speaking with courtesy to superiors.

Keywords : Selection of Best Employee (PKT), Decision Support System (DSS), Simple Additive Weighting (SAW).

1. Introduction

PT. Intiberkah Sinar Sejahtera (SIS) is a company engaged in construction services in the manufacture of building manufacturing plant. Starting from business entities formed CV and then with diligence accompanied by hard work and commitment, in 1997 the company increased to make a PT, armed with a business license and the confidence of the government of the company continues to improve the quality of work, work effectiveness and efficiency as well as improve service standards work and along with advances in technology and the demands of customers and the competition is very competitive in competitions construction services with pioneering work as executor of buildings / factories. In a period of twenty years of age, PT. Intiberkah Sinar Sejahtera has completed more than 120 projects well. The problem of PT. Sinar Sejahtera Intiberkah are still many employees of PT. Intiberkah Sinar Sejahtera especially the logistics employees who are critical to the company that should be worthy to obtain as the best employees but until now there has been no employees at the logistics become the best employee in the company of PT. Sinar Sejahtera. Therefore, in this study used a decision support system that can be used to help the PT. Intiberkah Sinar Sejahtera in determining the eligible employees in the selection of the best employees, there are five criteria taken in these elections is the first no ethical criteria, these criteria related to attitudes and ways of speaking with courtesy to superiors,

2. Theory

2.1. Simple Additive weighting

Simple Additive weighting method (SAW) can be interpreted as a simple weighting method or weighted summation on solving problems in a decision support system. The concept of this method is to look for rating performance (priority) on each alternative on each attribute (Lita Asyriati Latif Mohamad Jamil, HI Abbas Said, 2018: 21-22).

The completion algorithm Simple Additive weighting method (SAW) are:
1) Define in advance the criteria that will be made as a benchmark for problem resolution.
2) Normalizing each alternative on each attribute value by calculating the value of rating performance.
3) Calculating the value of the preference weights on each alternative.
4) Doing coupling.
The formula used in the Simple Additive weighting method, namely:

a) Normalizing each alternative (to calculate the value performance rating).
3. Research methods

3.1. Algorithm Implementation Methods SAW best selection of employees at PT. Intiberkah Sinar Sejahtera

Implementation of algorithms with SAW method in selecting the best employees are the logical steps needed to solve the problem and preparation of program Algorithm used to analyze and explain the sequence and relationship between activities that will be pursued. The application of this algorithm is very important in designing a program to solve a problem to achieve a goal in the selection algorithm implementation metodetSimple karyawan terbaik dengan Weight in Additive (SAW). With predefined criteria, namely:

1) Ethics
2) Discipline
3) Skil (Expertise in Work)
4) Teamwork

3.2. System planning

In this study, there are several steps in designing a system include: shape / appearance of design is made in accordance with the needs of the study area.

3.3. Implementation

Are exercising their implementation or application of which will be based on the design of which has been compiled. Implementation should be done with a design that has been made so that the results achieved as expected.

3.4. Conclusions and suggestions

The conclusion is the end result of the execution and implementation of decision support systems using this SAW, and advice is a positive form of additional content or in the completion of this research.

4. Analysis

4.1. Problem analysis

Tearbaik employees in the electoral process is not an easy thing. And decisions are still taken manually and there is no system that helps companies in the selection of the best employees in tepat. Untuk it needed a system in selecting the best employees meentukan use of decision support systems with Simple Additive weighting method (SAW) that can later be used to help in decision-making.

4.2. Data analysis

There are also data obtained from the research study are as follows:

a) Data Criteria
   1) Ethics
   2) Discipline
   3) Skil (Expertise in Work)
   4) Teamwork

b) Alternative Data
   1) Hangga Setiawan
   2) ferie Sahputra
   3) Bintang Wahyu Utama
   4) T. Om Akbar

\[ R_{ij} = \frac{x_{ij}}{\max_{n} \min_{x} x_{ij}} \]

a) Calculating the value of the preference weights on each alternative:

\[ V_i = \sum_{j=1}^{n} w_j R_{ij} \]

Information:

\( V_i \) = Criteria ranking for each alternative
\( w_j \) = The weight of each criteria
\( R_{ij} \) = Values normalized performance rating

\( x_{ij} \) = Benefit
\( x_{ij} \) = Cost
4.3. Simple Method of Analysis Addetive Weighting (SAW)

Step 1: Determine criteria - the criteria that will be referred to as decision-making criteriaed as follows:

1) Ethics (K1)
2) Discipline (K2)
3) Skil (Expertise in Work) (K3)
4) Cooperation team (K4)

Step 2: Determine the normalization

\[
\frac{x_{ij}}{\max_j(x_{ij})}
\]

If \( j \) is an attribute benefit

\[
\frac{\min_j x_{ij}}{x_{ij}}
\]

If \( j \) is an attribute (cost) \( X_{ij} \)

1) Hangga Setiawan (A1)
2) Feri Sahputra (A2)
3) Bintang Wahyu Utama (A3)
4) T. Om Akbar (A4)
5) Dendi Sumanta (A5)

Step 3: Perform ranking

<table>
<thead>
<tr>
<th>No.</th>
<th>Criteria and Sub Criteria</th>
<th>Information</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ethics</td>
<td>Become a rolemodel.</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Very good</td>
<td>Very good</td>
<td>90</td>
</tr>
<tr>
<td></td>
<td>Well</td>
<td>Well</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td>need Fixing</td>
<td>need Fixing</td>
<td>60</td>
</tr>
<tr>
<td>2</td>
<td>Discipline</td>
<td>very Discipline</td>
<td>90</td>
</tr>
<tr>
<td></td>
<td>quite Discipline</td>
<td>quite Discipline</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td>Lack of Discipline</td>
<td>Lack of Discipline</td>
<td>50</td>
</tr>
<tr>
<td>3</td>
<td>Skil (Expertise in Work)</td>
<td>Very good</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Well</td>
<td>Well</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td>Pretty good</td>
<td>Pretty good</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td>Not good</td>
<td>Not good</td>
<td>40</td>
</tr>
<tr>
<td>4</td>
<td>Teamwork</td>
<td>Very compact</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td>compact</td>
<td>compact</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td>Compact enough</td>
<td>Compact enough</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td>Less Compact</td>
<td>Less Compact</td>
<td>50</td>
</tr>
</tbody>
</table>

Table 1. Best Logistick Employee Selection Criteria

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Symbol</th>
<th>Data Penentuan Karyawan Best Logistick</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethics</td>
<td>K1</td>
<td>Hangga Setiawan</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Feri Sahputra</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bintang Wahyu Utama</td>
</tr>
<tr>
<td></td>
<td></td>
<td>T, Om Akbar</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dendi Sumanta</td>
</tr>
</tbody>
</table>
Table 3. Alternative rating On Any Criteria

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Symbol</th>
<th>Hangga Setiawan</th>
<th>Feri Sahputra</th>
<th>Bintang Wahyu Utama</th>
<th>T. Om Akbar</th>
<th>Dedi Sumanta</th>
</tr>
</thead>
</table>

Table 4. Match rating

<table>
<thead>
<tr>
<th>Employee name</th>
<th>Match Rating Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hangga Setiawan</td>
<td>100 70 100 80</td>
</tr>
<tr>
<td>Feri Sahputra</td>
<td>90 90 80 80</td>
</tr>
<tr>
<td>Bintang Wahyu Utama</td>
<td>60 50 60 50</td>
</tr>
<tr>
<td>T. Om Akbar</td>
<td>80 90 40 70</td>
</tr>
<tr>
<td>Dendi Sumanta</td>
<td>80 50 60 60</td>
</tr>
</tbody>
</table>

1. Normalized matrix by calculating the normalized performance values by using the formula (if j is an attribute benefit):

\[
r_{ij} = \frac{x_{ij}}{\max_j x_{ij}}
\]

Normalization for K1

- \( r_{11} = \frac{100}{\max \{100; 90; 60; 80; 80\}} = \frac{100}{100} = 1 \)
- \( R_{21} = \frac{90}{\max \{70; 100; 60; 80; 80\}} = \frac{90}{100} = 0.9 \)
- \( R_{31} = \frac{60}{\max \{100; 90; 60; 80; 80\}} = \frac{60}{100} = 0.6 \)
- \( R_{41} = \frac{80}{\max \{100; 90; 60; 80; 80\}} = \frac{80}{100} = 0.8 \)
- \( R_{51} = \frac{80}{\max \{100; 90; 60; 80; 80\}} = \frac{80}{100} = 0.8 \)

Normalization for K2

- \( r_{12} = \frac{70}{\max \{70; 90; 50; 90; 50\}} = \frac{70}{90} = 0.78 \)
- \( R_{22} = \frac{90}{\max \{70; 90; 50; 90; 50\}} = \frac{90}{90} = 1 \)
- \( R_{32} = \frac{50}{\max \{70; 90; 50; 90; 50\}} = \frac{50}{90} = 0.55 \)
- \( R_{42} = \frac{90}{\max \{70; 90; 50; 90; 50\}} = \frac{90}{90} = 1 \)
From calculations made above, it gets the results of any existing calculation, the results of the above calculation is inserted into the matrix R, Therefore its results are:

\[
R = \begin{bmatrix}
1 & 0.78 & 1 & 1 \\
0.9 & 1 & 0.8 & 1 \\
0.6 & 0.55 & 0.6 & 0.62 \\
0.8 & 1 & 0.4 & 0.88 \\
0.8 & 0.55 & 0.6 & 0.75 \\
\end{bmatrix}
\]

The next step is to calculate the ranking for each alternative by the formula

\[V_i^n = \sum_{j=1}^{n} W_j R_{ij}\]

Wherein the weight to attribute (0.25%, 0.25%, 0.30% to 0.20%)

\[V_1 = (0.25\% \times 1) + (0.25\% \times 0.78) + (0.30\% \times 1) + (0.20\% \times 1) = 0.944\]
\[V_2 = (0.25\% \times 0.9) + (0.25\% \times 1) + (0.30\% \times 0.8) + (0.20\% \times 1) = 0.915\]
V3 = (0.25% x 0.6) + (0.25% x 0.55) + (0.30% x 0.6) + (0.20% x 0.62) = 0.668
V4 = (0.25% x 0.8) + (0.25% x 1) + (0.30% x 0.4) + (0.20% x 0.88) = 0.745
V5 = (0.25% x 0.8) + (0.25% x 0.55) + (0.30% x 0.6) + (0.20% x 0.75) = 0.668

Table 5. Best Employee Selection Calculation Results

<table>
<thead>
<tr>
<th>No.</th>
<th>Alternative</th>
<th>Name</th>
<th>Score</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>A1</td>
<td>Hangga Setiawan</td>
<td>0.945</td>
<td>1</td>
</tr>
<tr>
<td>2.</td>
<td>A2</td>
<td>Feri Sahputra</td>
<td>0.915</td>
<td>2</td>
</tr>
<tr>
<td>3.</td>
<td>A3</td>
<td>Bintang Wahyu Utama</td>
<td>0.668</td>
<td>4</td>
</tr>
<tr>
<td>4.</td>
<td>A4</td>
<td>T. Om Akbar</td>
<td>0.745</td>
<td>3</td>
</tr>
<tr>
<td>5.</td>
<td>A5</td>
<td>Dendi Sumanta</td>
<td>0.668</td>
<td>5</td>
</tr>
</tbody>
</table>

Conclusions from the above calculation can be seen from Table 4.4 that the candidate who was selected as the best logistic karaywan namely the alternative A1 with Hangga name Setiawan with the result value of 0.945.

5. Conclusion

Based on test results, the implementation of the system and conducting interviews, the conclusion of a thesis entitled Decision Support System for the selection of the best employees at PT. Intiberkah Sinar Sejahtera Using Simple Additive weighting method (SAW) is as follows:

a) Decision Support System Selection of Best Employee Simple Method Using Weighting In. The Prosperous Intiberkah rays.

b) Decision Support System using Simple Additive weighting method (SAW) can be applied to help make decisions that resulted in the selection of the best employees for the top priority in an election of the employee.

c) Decision Support System that the company can assist and facilitate the company in taking a decision in the selection of the best employees.

6. Reference

[4]. https://pengertiandefinisi.com, Diakses Tanggal 16 Maret 2019, Jam 21:30WIB