

DECISION SUPPORT SYSTEM FOR EMPLOYEE PERFORMANCE ASSESSMENT AT PERUM LPPNPI MEDAN BRANCH OFFICE USING THE METHOD AHP (ANALYTICAL HIERARCHY PROCESS)

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ABSTRACT

Article Info	Employee performance appraisal is an important thing to do in order to improve employee competence so that a company can develop. Performance appraisals are also used for employees in promotions, positions, or company employees who are unable to comply with procedures. Perum LPPNPI is one of the offices that carries out employee performance appraisals. In conducting a performance assessment it is not appropriate because the system is still using a manual system. This problem causes performance appraisals to be a little difficult to determine the best employees based on established criteria. Decision support system is a suitable system for evaluating employee performance. The method used is the AHP (Analytical Hierarchy Process) method using the principle that the chosen alternative must have the closest distance from the positive ideal solution and the farthest from the negative ideal solution from a geometric point of view by using Euclidean distance to determine the closest distance from an alternative. to the optimal solution. By using a decision support system is expected to facilitate the company in assessing employee performance appropriately.
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1. INTRODUCTION

In a company, the company or agency requires employees who have good competence and performance as expected by the company. Performance is owned by employees individually because each employee has a different level of ability, therefore employee performance is one of the most important factors in every company in order to improve the quality of the company, so that employees can also be given an assessment. The results or work performance of employees also have an impact on the achievement of a company's goals. Employee performance is closely related to performance appraisal. Performance appraisal is needed to find out the results or the level of success of employees. Through performance appraisal, the results can be used for purposes that include human resource decisions, evaluation, and feedback (Rani & Mayasari, 2015).

Employee performance appraisal is one form of the company in providing an evaluation of the performance of its employees and can also be used as an award for employees who get the best value in the form of promotions, prizes or so on. By conducting an effective employee performance appraisal, the company is able to optimize the competence of its employees in order to achieve the company's goals. In addition, employee performance will also be optimal because employees will be motivated to perform even better from day to day (Evita et al., 2017).

Perum LPPNPI Medan Branch Office is a company that provides flight navigation services in accordance with applicable standards to achieve flight efficiency and effectiveness in the national and international scope. In determining the assessment of employee performance at the Perum LPPNPI Medan Branch Office it is less effective because it still uses a manual and simple system, so it often

makes inaccurate assessments that can lead to jealousy of each employee. Therefore we need a system that can perform employee performance appraisals automatically with the right results and can rank employees based on the highest value.

2. METHOD

The method used in the research to get data with the aim of data can be developed in terms of knowledge, theory, to understand, solve a problem.

2.1 Data collection technique

a. Observation

Collecting data through direct observation or review related to research or observations in this case research conducted at the LPPNPI Medan Branch Office.

b. Interview

Collecting data through face-to-face and direct questions and answers with resource persons, namely the leadership at the Medan Branch Office of Perum LPPNPI. responsible for evaluating employee performance. In the case of interviews, the interviewees also asked about the opinions of the informants regarding the criteria and alternatives or those relating to employee performance appraisals.

c. Literature review

By collecting data from books or written materials such as journals that have relevance to this thesis regarding the analysis of sales data to be made and also related to the methods that will be used to provide solutions to problems in accordance with this research.

2.2 Decision Support System

A Decision Support System (DSS) or commonly called a Decision Support System (DSS) is a system that is able to provide problem solving skills or communication skills in semi-structured and unstructured problems. What needs to be emphasized is that DSS is not a decision-making tool but a supporting tool. DSS is the implementation of decision-making theory that has been introduced by several sciences such as operations research and management science. The difference is that in the past the search or problem solving was carried out by calculating iterations manually, usually to find the minimum, maximum or optimum value. Whereas now computers offer the ability to solve the same problem in a relatively short time

3.RESULT AND DISCUSSION

3.1 Analysis of the Analytical Hierarchy Process (AHP) Method in Giving Rewards to the Best EmployeesPT. Swastika Anugrah Pack

The average value of the comparison is calculated using the Analytical Hierarchy Process (AHP) method to obtain the final weight of each criterion. In this case, the stages of performance appraisal using the AHP method can be shown. The steps taken are as follows:

a. Determination of Criteria

Criteria are attributes that support to decide on prospective employees according to the case being studied. The following are the criteria used in this study:

1. QK = Quality of Work
2. KK = Work Quantity
3. SK = Working Speed
4. PB = Field Mastery
5. DS = Discipline
6. IS = Initiative
7. LY = Loyalty

2. Alternative

Alternative is the object of research that will be processed for the determination of a case. The alternatives used in this study are:

1. Eka = Employee 1
2. Ali = Employee 2
3. Sifa = Employee 3
4. Supreme = Employee 4

3.2 Criteria Paired Comparison Matrix

AHP is done by using pairwise comparison. Decision making begins by loading a view of the entire decision network. For any pairwise comparison of matrices, 1 can be placed diagonally from the top left corner to the bottom right corner, because it means that the ratio of the same two things is 1.

Table 1 Results of Comparison of Paired Criteria

Criteria	QK	KK	SK	PB	DS	IS	LY
QK	1/1	3/1	5/1	7/1	3/1	7/1	7/1
KK	1/3	1/1	3/1	5/1	1/1	5/1	5/1
SK	1/5	1/3	1/1	3/1	1/3	3/1	3/1
PB	1/7	1/5	1/3	1/1	1/5	1/1	1/1
DS	1/3	1/1	3/1	5/1	1/1	5/1	5/1
IS	1/7	1/5	1/3	1/1	1/5	1/1	1/1
LY	1/7	1/5	1/3	1/1	1/5	1/1	1/1

The next process is to add each column. Addition uses 3 (three) digits behind the comma, this is useful for rounding calculations. The results can be seen in table 2

Table 2 Results of the Number of Columns for Each Criterion

Criteria	QK	KK	SK	PB	DS	IS	LY
QK	1	3	5	7	3	7	7
KK	0.333	1	3	5	1	5	5
SK	0.2	0.333	1	3	0.333	3	3
PB	0.143	0.2	0.333	1	0.2	1	1
DS	0.333	1	3	5	1	5	5
IS	0.143	0.2	0.333	1	0.2	1	1
LY	0.143	0.2	0.333	1	0.2	1	1
Total	2.295	5.933	13	23	5.933	23	23

Table 2 explains that there is a column sum for each criterion. For example, work performance criteria (PK): $1 + 0.333 + 0.2 + 0.143 + 0.333 + 0.143 + 0.143 = 2.295$. The next process is to add each row. Addition uses 3 (three) digits behind the comma, this is useful for rounding calculations. The results can be seen in table 3

Table 3 Results of the Number of Rows for Each Criterion

Criteria	QK	KK	SK	PB	DS	IS	LY	Total
QK	0.436	0.506	0.385	0.304	0.506	0.304	0.304	2.746
KK	0.145	0.169	0.231	0.217	0.169	0.217	0.217	1.365
SK	0.088	0.056	0.077	0.130	0.056	0.130	0.130	0.667
PB	0.062	0.034	0.026	0.044	0.034	0.044	0.044	0.288
DS	0.145	0.169	0.231	0.217	0.169	0.217	0.217	1.365
IS	0.062	0.034	0.026	0.044	0.034	0.044	0.044	0.288
LY	0.062	0.034	0.026	0.044	0.034	0.044	0.044	0.288

In the addition of rows, the value is divided against the results of the sum of the columns of each criterion. For example, the value of 0.436 is obtained from $1/2.295$, and so on. Next is the sum of the rows for each criterion. For example, work performance criteria (PK): $0.436 + 0.506 + 0.385 + 0.304 + 0.506 + 0.304 + 0.304 = 2.746$. After the addition of rows is obtained, then the next step is to

look for the eigenvector values. The eigenvector value is obtained from the sum of the rows divided by the number of criteria.

Table 4 Eigen Vector Values

Criteria	Jl. Baris	Many Criteria	Eigen Vector
Work quality	2,746	7	0.392
Work Quantity	1.365	7	0.195
Working Speed	0.667	7	0.095
Field Mastery	0.288	7	0.041
Discipline	1.365	7	0.195
Initiative	0.288	7	0.041
Loyalty	0.288	7	0.041

Table 4 explains that the eigenvector value is obtained by the value of the number of rows divided by the number of criteria. For example, the criteria for Quality of Work (QK): $2.746 / 7 = 0.392$.

3.3 Alternative Comparison Matrix on Work Quality Criteria

Table 5 Comparison of Alternative Work Achievement Criteria

Work quality	Eka	Ali	nature	great
Eka	1/1	3/1	2/1	1/1
Ali	1/3	1/1	1/5	1/2
nature	1/2	5/1	1/1	3/1
great	1/1	2/1	1/3	1/1

Table 5 shows the comparison between alternatives on the Quality of Work criteria. The determination of the value of the alternative comparison has been carried out, then the calculation of the number of columns and the number of rows is carried out. The method of calculation is as in the previous comparison of criteria. Then it will produce an eigenvector value.

Table 6 Eigen Vector Values

Criteria	Eigen Vector
Eka	0.344
Ali	0.089
nature	0.365
great	0.203
CR = 0.134	

3.4 Alternative Comparison Matrix of Work Quantity Criteria

Table 7 Comparison of Alternative Work Quantity Criteria

Working Quantity	Eka	Ali	nature	great
Eka	1/1	7/1	5/1	3/1
Ali	1/7	1/1	1/3	1/2
nature	1/5	3/1	1/1	5/1
great	1/3	2/1	1/5	1/1

Table 7 shows the comparison between alternatives on the Quantity of Work criteria. The determination of the value of the alternative comparison has been carried out, then the calculation of the number of columns and the number of rows is carried out. The method of calculation is as in the previous comparison of criteria. Then it will produce an eigenvector value.

Table 7 Eigen Vector Values

Criteria	Eigen Vector
Eka	0.554
Ali	0.067
nature	0.257
great	0.122
CR = 0.236	

3.5 Alternative Comparison Matrix of Working Speed Criteria

Table 8 Comparison of Alternative Work Speed Criteria

Working Speed	Eka	Ali	nature	great
Eka	1/1	1/3	1/2	1/4
Ali	3/1	1/1	1/2	1/2
nature	2/1	2/1	1/1	1/5
great	4/1	2/1	5/1	1/1

Table 8 shows the comparison between alternatives on the Speed of Work criteria. The determination of the value of the alternative comparison has been carried out, then the calculation of the number of columns and the number of rows is carried out. The method of calculation is as in the previous comparison of criteria. Then it will produce an eigenvector value.

Table 9 EigenVector Values

Criteria	Eigen Vector
Eka	0.090
Ali	0.204
nature	0.205
great	0.500
CR = 0.148	

3.6 Alternative Comparison Matrix of Field Mastery Criteria

Table. 10. Comparison of Alternative Criteria for Mastery of Fields

Field Mastery	Eka	Ali	nature	great
Eka	1/1	1/1	1/4	1/3
Ali	1/1	1/1	1/3	1/2
nature	4/1	3/1	1/1	2/1
great	3/1	2/1	1/2	1/1

Table 10 shows the comparison between alternatives on the Field Mastery criteria. The determination of the value of the alternative comparison has been carried out, then the calculation of the number of columns and the number of rows is carried out. The method of calculation is as in the previous comparison of criteria. Then it will produce an eigenvector value.

Table 11 Eigen Vector Values

Criteria	Eigen Vector
Eka	0.115
Ali	0.136
nature	0.469
great	0.280
CR = 0.013	

3.7 Discipline Criteria Alternative Comparison Matrix

Table 12 Comparison of Alternative Discipline Criteria

Discipline	Eka	Ali	nature	great
Eka	1/1	1/3	1/2	1/4
Ali	3/1	1/1	2/1	4/1
nature	2/1	1/2	1/1	1/5
great	4/1	1/4	5/1	1/1

Table 12 shows the comparison between alternatives on the Discipline criteria. The determination of the value of the alternative comparison has been carried out, then the calculation of the number of columns and the number of rows is carried out. The method of calculation is as in the previous comparison of criteria. Then it will produce an eigenvector value.

Table 13 Eigen Vector Values

Criteria	Eigen Vector
Eka	0.091
Ali	0.437
nature	0.149
great	0.323
CR = 0.313	

3.8 Alternative Comparison Matrix of Initiative Criteria

Table. 14 Comparison of Alternative Criteria Initiative

Initiative	Eka	Ali	nature	great
Eka	1/1	1/1	1/1	1/1
Ali	1/1	1/1	1/3	1/1
nature	1/1	3/1	1/1	1/1
great	1/1	1/1	1/1	1/1

Table 14 shows the comparison between alternatives on the Initiative criteria. The determination of the value of the alternative comparison has been carried out, then the calculation of the number of columns and the number of rows is carried out. The method of calculation is as in the previous comparison of criteria. Then it will produce an eigenvector value.

Table 15 EigenVector Values

Criteria	Eigen Vector
Eka	0.242
Ali	0.192
nature	0.325
great	0.242
CR = 0.063	

3.9 Loyalty Criteria Alternative Comparison Matrix

Table16Comparison of Loyalty Criteria Alternatives

Loyalty	Eka	Ali	nature	great
Eka	1/1	1/5	1/1	1/7
Ali	5/1	1/1	1/2	1/5
nature	1/1	2/1	1/1	1/3
great	7/1	5/1	3/1	1/1

Table 16 shows the comparison between alternatives on Loyalty criteria. The determination of the value of the alternative comparison has been carried out, then the calculation of the number of columns and the number of rows is carried out. The method of calculation is as in the previous comparison of criteria. Then it will produce an eigenvector value.

Table 17 EigenVector Values

Criteria	Eigen Vector
Eka	0.091
Ali	0.172
nature	0.174
great	0.563
CR = 0.217	

3.10 Results of the Analytical Hierarchy Process (AHP) Method

Table 18 Table of Values for Each Criterion

Alternativ e	Criteria						
	QK	KK	SK	PB	DS	IS	LY
Eka	0.344	0.554	0.09	0.115	0.091	0.242	0.091
Ali	0.089	0.067	0.204	0.136	0.437	0.192	0.172
nature	0.365	0.257	0.205	0.469	0.149	0.325	0.174
great	0.203	0.122	0.500	0.280	0.323	0.242	0.563

With the eigenvalue of the criterion vector is

Table 19 Weighting Criteria

Criteria	Eigen Vector
Work quality	0.392
Working Quantity	0.195
Speed	0.095
Field Mastery	0.041
Discipline	0.195
Initiative	0.041
Loyalty	0.041

Then the ranking results of the four alternatives are

Table 20 Ranking

Alternative	Results	Rank
Eka	0.289	1
nature	0.280	2
great	0.259	3
Ali	0.173	4

Table 20 shows the results of the matrix multiplication of the values against the criteria weights. For example in Sonya's alternative: $(0.344 \times 0.392) + (0.554 \times 0.195) + (0.09 \times 0.095) + (0.115 \times 0.041) + (0.091 \times 0.195) + (0.242 \times 0.041) + (0.091 \times 0.041) = 0.289$. so from the final result of the matrix multiplication, it can be seen the criteria for Eka with a value of 0.289 or 29%, Sifa with a value of 0.28 or 28%, Agung with a value of 0.173 or 17%, and Ali with a value of 0.259 or 26%. The results of the analysis stated that the alternatives for the best category employees were: Eka (First Rank), Sifa (Second Rank), Agung (Third Rank) and Ali (Fourth Rank).

4. CONCLUSION

From the results of the analysis of the decision support system for the selection of good quality used refrigerators with the AHP method, it can be concluded that. The SPK for selecting the best employees using the Analytical Hierarchy Process (AHP) method has been successfully built to produce a more objective decision in the form of a ranking list of the best employees. This DSS can handle if there are changes / additions to criteria and sub-criteria data because they are dynamic. The system provides the best employee recommendation solution to the user (user) according to the criteria and weights determined at the beginning before the calculation.

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