
DECISION SUPPORT SYSTEM IN GIVING BEST EMPLOYEE REWARD USING AHP (ANALYTICAL HIERARCHY PROCESS) METHOD CASE STUDY PT. SWASTIKA ANUGRAH PACK

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ABSTRACT

Article Info	In improving the performance of employees at the company PT. The Anugrah Swastika package is by giving rewards to employees so that their morale continues to increase and they are given awards for being the best employees.
Received, 01/08/22	One way to implement or implement it is to create a decision support system in giving awards to the best employees by making several criteria that will be considered. In this study, the method that will be applied is AHP (Analytical Hierarchy Process) by giving weighting to each criterion that will be assessed by each person. The criteria that will be assessed are quality of work, quantity of work, speed of work, mastery of fields, discipline, initiative and loyalty.
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1. INTRODUCTION

As we know, the development of science and technology today cannot be separated from the development of computers supported by various program design facilities. The development of this computer has put forward the human need for computers as a supporting need for both government agencies and companies. Government agencies need computer technology both in information systems, communication systems that can simplify the process of daily work. By using a computer as a tool, the completion of the work will be more effective and efficient.

Human resources are the most important part for the growth and development of a company. A company can develop well, of course, it is influenced by the quality of human resources, which in this case are employees who work in the company. Determination of the best employees is done not only by direct appointment by the leader or manager, but a company must evaluate the performance that has been carried out by its employees within a certain period of time, and of course there will be a reward for the success that has been achieved by its employees. This is intended to encourage every employee to always provide the best performance for the company in carrying out their duties and obligations in the company.

Employees are one of the most important assets owned by the company in its efforts to maintain survival, development, ability to compete and earn profits. Competition in the increasingly competitive business world has spurred companies to work harder in improving the quality of their companies. One of the efforts is to improve the quality of human resources because the quality of good human resources can increase the productivity and performance of a company. In order to maintain and improve the quality of employees, companies need to conduct an employee performance assessment in the form of determining the best employees. Determining the best employees is an important aspect in performance management. Determining the best employees will produce valid and useful information for employee administrative decisions such as promotions, training, transfers including the reward system and other decisions. The determination of the best employees currently running at the company under study is by way of representation due to limited time and the large number of employees, each department represents one employee to participate in the determination of

the best employees so that this method is not objective because it is not in accordance with employee data.

Based on the description above, the implementation of the assessment of determining employee achievements in a company. So we need a decision support system using the method AHP (Analytical Hierarchy Process). AHP (Analytical Hierarchy Process) is a decision support system model developed by Thomas L. Saaty. The decision support system model will describe a complex multi-factor or multi-criteria problem into a hierarchy, the hierarchy is defined as a representation of a complex problem in a goal structure, which is followed by the level of factors, criteria, and so on down to the last level. Every employee wants to get the title as the best employee. Everyone wants the title. Especially if the company you work for is a national or even international company. Receiving awards for achievements for their hard work is a matter of pride. It is undeniable that many people work hard to pursue achievements. Because with the achievements will pave the way to develop his career. On the other hand, every company does not turn a blind eye to giving rewards or prizes to employees who make positive contributions to their company.

2. METHOD

The analysis phase is carried out after collecting data obtained from literature studies and interviews regarding determining the best employees using the AHP method. The data obtained will be analyzed using the Analytical Hierarchy Process (AHP) method.

2.1 Design

The design process is the system workflow process, the stages of working on the system and the stages of the system running well. At the design stage, the researcher describes the system's framework through a flowchart.

2.2 Testing

The testing stage is needed to be a measure that the decision support system can be run according to the objectives, this test consists of black box testing and user acceptance test testing. This test is carried out in the following way:

a. Black Box Test

Black box testing is a test that aims to show software functions on how to operate, whether the data input (input) and data output (output) have been running as expected or not.

b. User Acceptance Test

User acceptance test is the final test carried out by potential users of the system that will be implemented or published later. This test is tested on users. If an error occurs or is not in accordance with the objectives to be achieved, then the system is analyzed again until no errors are found, and in accordance with the objectives to be achieved.

2.3 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. RESULTS AND DISCUSSION

3.1 Analysis of the Analytical Hierarchy Process (AHP) Method in Giving Rewards to the Best Employees PT. 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. Alex = Employee 1
2. Firman = Employee 2
3. Sifa = Employee 3
4. Sidiq = 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 4 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	Alex	Word	nature	Sidiq
Alex	1/1	3/1	2/1	1/1
Word	1/3	1/1	1/5	1/2
nature	1/2	5/1	1/1	3/1
Sidiq	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
Alex	0.344
Word	0.089
nature	0.365
Sidiq	0.203
CR = 0.134	

3.4 Alternative Comparison Matrix of Work Quantity Criteria

Table 7 Comparison of Alternative Work Quantity Criteria

Working Quantity	Alex	Word	nature	Sidiq
Alex	1/1	7/1	5/1	3/1
Word	1/7	1/1	1/3	1/2
nature	1/5	3/1	1/1	5/1
Sidiq	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 8 Eigen Vector Values

Criteria	Eigen Vector
Alex	0.554
Word	0.067
nature	0.257
Sidiq	0.122
CR = 0.236	

3.5 Alternative Comparison Matrix of Working Speed Criteria

Table 89 Comparison of Alternative Work Speed Criteria

Working Speed	Alex	Word	nature	Sidiq
Alex	1/1	1/3	1/2	1/4
Word	3/1	1/1	1/2	1/2
nature	2/1	2/1	1/1	1/5
Sidiq	4/1	2/1	5/1	1/1

Table 9 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 Eigen Vector Values

Criteria	Eigen Vector
Alex	0.090
Word	0.204
nature	0.205
Sidiq	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	Alex	Word	nature	Sidiq
Alex	1/1	1/1	1/4	1/3
Word	1/1	1/1	1/3	1/2
nature	4/1	3/1	1/1	2/1
Sidiq	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
Alex	0.115
Word	0.136
nature	0.469
Sidiq	0.280
CR = 0.013	

3.7 Discipline Criteria Alternative Comparison Matrix

Table 12 Comparison of Alternative Discipline Criteria

Discipline	Alex	Word	nature	Sidiq
Alex	1/1	1/3	1/2	1/4
Word	3/1	1/1	2/1	4/1
nature	2/1	1/2	1/1	1/5
Sidiq	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 Value Vector

Criteria	Eigen Vector
Alex	0.091
Word	0.437
nature	0.149
Sidiq	0.323
CR = 0.313	

3.8 Alternative Comparison Matrix of Initiative Criteria

Table. 14 Comparison of Alternative Criteria Initiative

Initiative	Alex	Word	nature	Sidiq
Alex	1/1	1/1	1/1	1/1
Word	1/1	1/1	1/3	1/1
nature	1/1	3/1	1/1	1/1
Sidiq	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
Alex	0.242
Word	0.192
nature	0.325
Sidiq	0.242
CR = 0.063	

3.9 Loyalty Criteria Alternative Comparison Matrix

Table 16 Comparison of Loyalty Criteria Alternatives

Loyalty	Alex	Word	nature	Sidiq
Alex	1/1	1/5	1/1	1/7
Word	5/1	1/1	1/2	1/5
nature	1/1	2/1	1/1	1/3
Sidiq	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
Alex	0.091
Word	0.172
nature	0.174
Sidiq	0.563
CR = 0.217	

3.10 Results of the Analytical Hierarchy Process (AHP) Method

Table 18 Table of Values for Each Criterion

Alternative	Criteria						
	QK	KK	SK	PB	DS	IS	LY
Alex	0.344	0.554	0.09	0.115	0.091	0.242	0.091
Word	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
Sidiq	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
Alex	0.289	1
nature	0.280	2
Sidiq	0.259	3
Word	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: $(0.344*0.392) + (0.554*0.195) + (0.09*0.095) + (0.115*0.041) + (0.091*0.195) + (0.242*0.041) + (0.091*0.041) = 0.289$. so from the final result of the matrix multiplication, it can be seen the criteria for Alex with a value of 0.289 or 29%, Sifa with a value of 0.28 or 28%, Sidiq with a value of 0.173 or 17%, and Firman with a value of 0.259 or 26%. The results of the analysis stated that the alternatives for the best category employees were: Alex (First Rank), Sifa (Second Rank), Sidiq (Third Rank) and Firman (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 topsis 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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