International Journal of Basic and Applied Science 9 (4) (2021) 116-123

Published by:IOCSCIENCE

International Journal of Basic and Applied Science

Journal homepage:www.ijobas.pelnus.ac.id

Decision Support System for Determining Contract Employees to Become Permanent Employees at PT. Timbang Deli with Analytical Hierarchy Process (AHP) Method

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Article Info

Article history:

Received Dec 23, 2020
Revised Jan 14, 2021
Accepted Feb 18, 2021

***Keywords*:**

Decision Support System;
Contract Employees;
AHP;
Visual studio 2010;
Ms. Access 2007.

ABSTRACT

Contract employees in a company are hired to help with the work in the company but it is not unusual to ascertain how the work continues in the company. Determination of contract employees to become permanent employees at PT. Timbang deli, it still looks less precise and takes time, because the assessment and calculation of the results of the determination of contract employees to become employees are still carried out in stages such as file selection, oral tests or written tests, interviews and so on , so that the possibility of errors in the final results from determining contract employees to permanent employees often does not meet the criteria required by the company and hampers the company's performance. This study aims to design a Decision Support System Determining contract employees to be permanent employees who can assist the company in choosing the right employees using Visual Basic 2008 programming language. The results of this study build a decision support system using the method of analytical hierarchy process (AHP) to calculate the results in determining contract employees to become permanent employees and using UML to design programs.

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1. INTRODUCTION

The development of Information Technology has enabled decision making to be done more quickly and accurately [1]. The use of computers has grown from just processing data and presenting information, to being able to provide choices as support for decision makers [2]. Decision Support Systems or what is often abbreviated as (DSS)) is a computer-based system that is used to help a decision maker to make decisions. Decision support systems are systems that provide support for solutions to semi-structured and structured problems, DSS supports various levels, for individuals and groups. Decision support systems are systems independent and sequential sequences, meaning that they provide interrelated and sequential decisions. DSS is easy to build and its use is

evolutionary, that is, it leads to system improvement (evolved), besides that it has various models and is also equipped with knowledge and knowledge [3] .

PT. Timbang Deli is a company engaged in rubber plantation management services located in Galang sub-district, Deli district, Serdang, North Sumatra. Each company needs employees as personnel who carry out every activity in the company organization, contract employees and permanent employees. Contract employees are employees who are only employed when the company requires additional workers, they operate manually, while permanent employees are employees who already have a contract or work agreement with the company for an indefinite period of time (permanent). Permanent employees usually tend to have far greater rights than non-permanent employees [4] [5] [6].

However, without employees the company will not be able to run at all. Contract employees are employees who are only hired when the company requires additional workers. Contract employees can usually be dismissed at any time by the company when the company no longer needs additional workers. Therefore, to make it easier, a Decision Support System was made using the Analytical Hierarchy Process (AHP) method.

The Analytical Hierarchy Process (AHP) method is often also known as a method for solving a complex unstructured situation into several components in a hierarchical arrangement, by assigning a subjective value to the relative importance of each variable, and determining which variable has the highest priority in order to influence results in the situation. The decision-making process usually chooses the best alternative. Such as structuring the problem, determining alternatives, determining possible values for alleatory variables, setting values, preference requirements for time, and specifications for risk [7] [8] [9].

Basically, the decision-making process is choosing an alternative. The main tool of AHP is a functional hierarchy with the main input being human perception. The existence of a hierarchy makes it possible to break down complex or unstructured problems into sub-problems, then arrange them into a hierarchical form. AHP has many advantages in explaining the decision-making process. One of them is that it can be described graphically so that it is easily understood by all parties involved in decision-making [10] [11] [12].

Visual Basic is one of the development tools for building applications in the Windows environment. In application development, Visual Basic uses a visual approach to design the user interface in the form of a form while using basic language dialogs which tend to be easy to learn [13] [14] [15].

2. RESEARCH METHODS

2.1 Description of the Analytical Hierarchy Process (AHP)

AHP is a comprehensive decision-making model. AHP has the ability to solve multi-objective and multi-criteria problems based on the comparison of preferences of each element in the hierarchy.

Basically, the procedure or steps in the AHP method include:

a. Define the problem and determine the desired solution, then arrange a hierarchy of the problems encountered.
b. Determines the priority of elements,The first step in determining the priority of elements is to make a pair comparison, which is to compare elements in pairs according to the given criteria. The pairwise comparison matrix is filled in using numbers to represent the relative importance of an element to other elements.
c. synthesis,The considerations for pairwise comparisons were synthesized to obtain the overall priority. The things that are done in this step are:
   Add up the values of each column in the matrix, divide each value from the column by the corresponding column total to obtain a normalized matrix, and add up the values from each row and divide by the number of elements to get the average value.

d. Measuring Consistency,In decision making, it is important to know how good the consistency is because we don't want a judgmental decision with low consistency. The things that are done in this step are: Multiply each value in the first column by the relative priority of the first element, the value in the second column by the relative priority of the second element, and so on, add up each row, the result of the row sum divided by the corresponding relative priority element. , and add the quotient above with the number of elements present, the result is called max.

e. Calculate Consistency Index (CI),with the formula:

$$CI = (\lambda \text{ max-n})/n \quad (1)$$

where : n = number of elements.

f. Calculate Consistency Ratio (CR), with the formula:

$$CR = CI/RC \quad (2)$$

where:
CR = Consistency Ratio
CI = Consistency Index
IR = Random Consistency Index

g. Check hierarchy consistency.
If the value is more than 10%, then the data judgment assessment must be corrected. However, if the consistency ratio (CI/RI) is less or equal to 0.1, then the calculation results can be declared correct.

3. RESULTS AND DISCUSSION

3.1 System Implementation

The following is the design of input from the decision support system for determining the appointment of contract employees to become permanent employees at PT. Weigh the deli.

a. Login Form

Figure 1. User Login Form Display

b. Main Menu Form
Guide:
1) Select the File menu to enter alternative employee criteria, and sub criteria.
2) Click the pairwise comparison configuration menu to enter the pairwise comparison priority value.
3) Click Process to perform the calculation of AHP calculation results from alternative employee criteria and sub criteria.
4) Click the report to print the results of employee alternative reports, criteria, sub-criteria, and AHP calculations from employees.

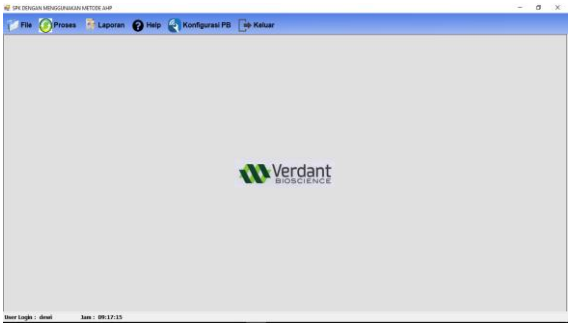

Figure 2. Main Menu Display

c. Criteria Input Form

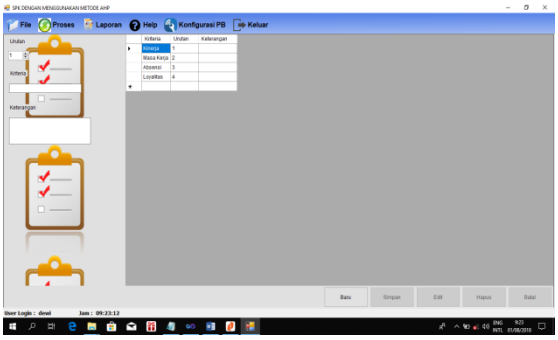

Figure 3. Criteria Input Form

Guide:

1) Enter the name of the criteria
2) Enter the order of criteria
3) Enter information
4) Click the new button to add new criteria
5) Click the save button to save the criteria
6) Highlight in the datagridview menu the criteria to be edited then click edit
7) Highlight in the datagridview menu the criteria to be deleted and then click delete
8) Click the cancel button to cancel the criteria to be saved

d. Sub-criteria input form

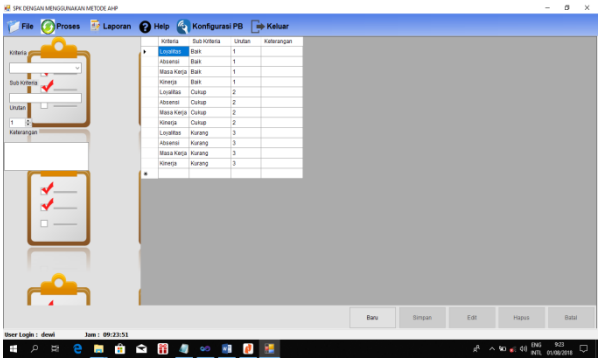

Figure 4. Sub-Criteria input form

Guide:

1) Select the name of the criteria that has been saved

2) Enter the name of the sub-criteria
3) Enter the order of sub criteria
4) Enter information
5) Click the new button to add a new sub-criteria
6) Click the save button to save the sub criteria
7) Highlight in the datagridview menu the sub-criteria that will be edited and then click edit
8) Highlight the sub-criteria datagridview menu that will be deleted and then click delete
9) Click the cancel button to cancel the sub-criteria to be saved

e. Employee data input form

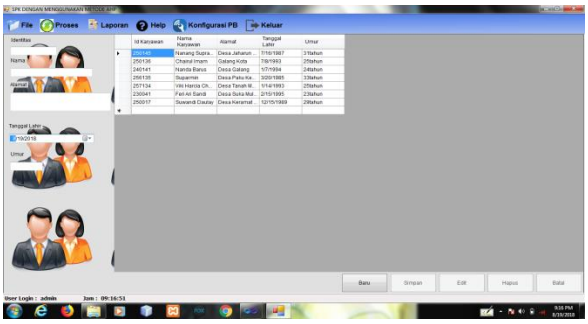

Figure 5. Employee input form

Guide:

1) Enter alternative identity number (employee)
2) Enter employee name
3) Enter employee address
4) Enter employee age
5) Click the new button to add new employee data
6) Click save button to save employee data
7) Highlight in the datagridview menu the employee data that you want to change and then click edit
8) Highlight in the datagridview menu the employee data that will be deleted and then click delete
9) Click the cancel button to cancel the employee data to be saved

f. Criteria Paired Comparison Form

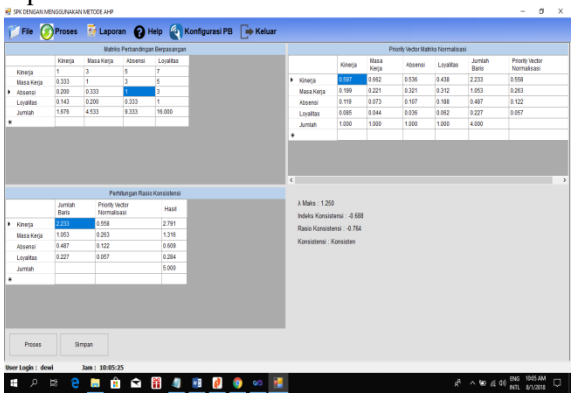

Figure 6. Criteria Paired Comparison Form

Guide:

1) Enter the priority value of the criteria in the pairwise comparison matrix
2) Then click process to process the AHP calculation and on the right side of the monitor will appear the value of max, the value of the consistency index, the value of the consistency ratio and a description of whether the AHP calculation value is consistent or not.
3) Click the save button to save the AHP calculation criteria value.

g. Sub-criteria Paired Comparison Form

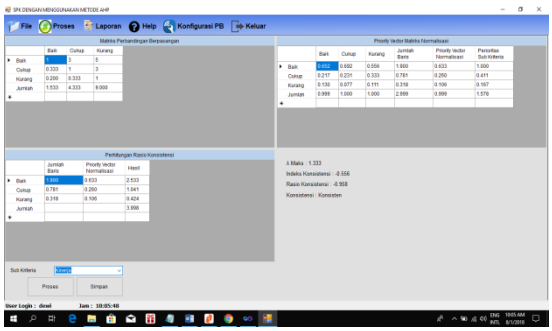

Figure 7. Sub-criteria Paired Comparison Form

Guide:

1) Enter the priority value of the sub-criteria in the pairwise comparison matrix
2) Then click process to process the AHP calculation and on the right side of the monitor will appear the value of max, the value of the consistency index, the value of the consistency ratio and a description of whether the AHP calculation value is consistent or not.
3) Click the save button to save the AHP sub-criteria calculation

h. Priority value information

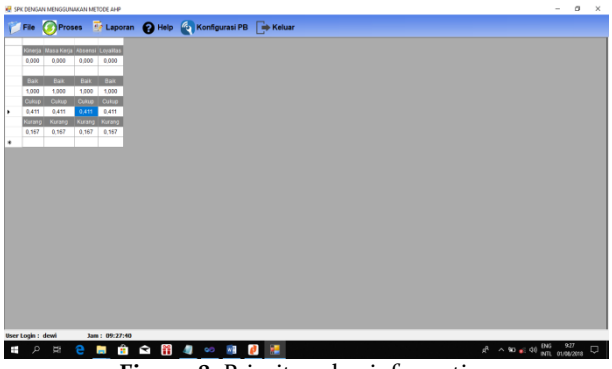

Figure 8. Priority value information

i. Alternative /Employee Assessment Form

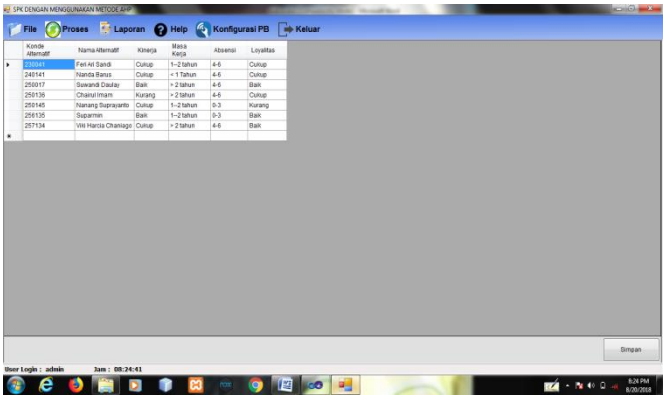

Figure 9. Alternative/Employee Assessment Form

Guide:

1) Select the sub-criteria that exist in the employee
2) Then click save to save the alternative assessment (employee)

j. AHP Calculation Form

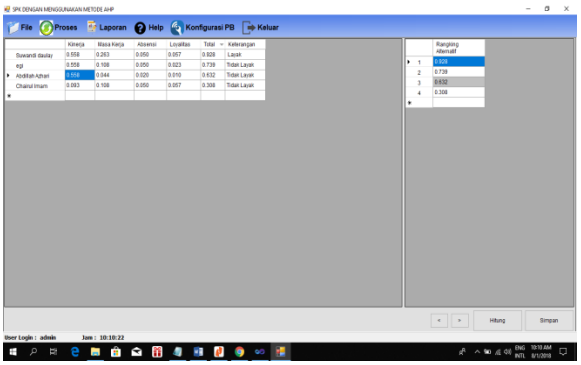

Figure 10. AHP Calculation Form

k. AHP decision assessment report form

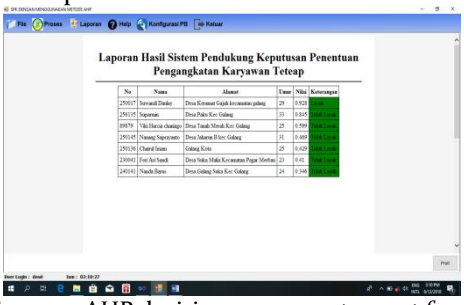

Figure 11.AHP decision assessment report form.

4. CONCLUSION

Recruitment decision support system at PT. Andhy Putra was designed with UML (Use Case Diagram, Activity Diagram and Class Diagram) modeling, using the PHP programming language and MySQL database. By applying the AHP (Analytical Hierarchy Process) method, it can be used to build a decision support system for evaluating employee performance using the AHP method at PT. Andhy is based on the criteria for evaluating employee performance that has been determined by the company, namely commitment to the company, desire for achievement, cooperation, leadership, and discipline. From the results of system testing, it is shown that the alternative A001 on behalf of Ir.

Maralus Silitonga as the first rank with a total result of 0.4805 and followed by the second rank with the alternative code A002 on behalf of Apri Lesmana Bukit, SH with a total score of 0. 2337, so that the best employee is the alternative A001 on behalf of Ir. Maralus Silitonga at PT. Andhy Putra for the period of 2021

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