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Decision Support System for Determining Recipients of Rewards (Bonuses) Based on Employee Performance with the Analytical Hierarchy Process (AHP) Method (Case Study: PT.BPR Perbaungan Hombar Makmur)

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ABSTRACT

The use of science and technology develops very quickly an produces new innovations that must be balanced with the ability to adapt to the technology. One of them is a decision support system that can assist in making decisions. Decision support system as a set of integrated computer tools that allow decision makers to interact directly with the computer. To create the information that is useful in making unanticipated semi structured and unstructured decisions. Rewards are received once a year, and usually employees get it in December, but there are often some problems in finding the employees who work diligently and responsible with their work. Decision support system is part of a computer based on information system commonly use to support decision making in an organization or company.

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1. INTRODUCTION

The rapid development of information technology is not only in hardware and software technology, but computational methods are also developing and one of the computational methods that are quite developed at this time is the method of Decision Support Systems (DSS) [1] [2]. Decision Support System (DSS) is used as a tool for decision makers to expand the capabilities of decision makers, but not to replace the judgment of decision makers [3] [4].

Company PT. BPR Perbaungan Hombar Makmur is a company engaged in banking services that annually provides rewards (bonuses) to employees who have a positive personality such as being diligent, disciplined, passionate about responsibility, ambitious in their work with the aim of making employees more creative and innovative as well as maintaining employee performance and to motivate employees.

In general, rewards (bonuses) are divided into two types, namely extrinsic rewards, which are employees who receive rewards (bonuses) in the form of external or tangible rewards, for example money and facilities, while intrinsic rewards are employees who receive rewards (bonuses) in the form of inner satisfaction, praise and appreciation [5] [6].

Selection of employees who will get rewards (bonuses) at PT. BPR Perbaungan Hombar Makmur was selected manually, namely by conducting deliberation so that the results obtained are still less effective and require a long time so that a system is needed that can help the leadership at PT. BPR Perbaungan Hombar Makmur in supporting decision making quickly and accurately with careful calculations in accordance with predetermined criteria.

The method used in this decision support system is the AHP (Analytical Hierarchy Process) method. AHP was developed at the Wharton School of Business by Thomas Saaty in the 1970s. AHP is a decision-making process using pairwise comparisons to explain evaluation factors and weighting factors in multi-factor conditions [7] [8]. Thus, AHP is used when the decisions taken involve many factors, where decision makers have difficulty in making the weights of each of these factors. By looking at the criteria used to make decisions, it will be very suitable to use the AHP method with multiple criteria [9] [10] [11].

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, and then organize them into a hierarchical form [12] [13] [14].

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 [15] [16] [17].

2. RESEARCH METHODS

2.1. Description of the AHP

Basically, the procedure or steps in the AHP method include [18]:

a. Define the problem and determine the desired solution, then arrange a hierarchy of the problems encountered.
b. Specifies the priority of the element.
   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 are synthesized to obtain overall priorities. 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, the result is called max.
e. Calculate Consistency Index (CI)
   with the formula:

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

   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

In the implementation of a decision support system for determining the recipients of rewards (bonuses) based on employee performance using the Analytical Hierarchy Process (AHP) method, it includes hardware requirements and software specifications.

The test carried out is testing the Analytical Hierarchy Process (AHP) method. The AHP method is a search for decisions that will produce rational decision results. A rational decision is defined as the best decision of the various objectives to be achieved by the decision maker. The main keys to rational decisions include alternatives and criteria that lead to the desired goals and are oriented to existing sources.

a. Login
This form is used so that the user can access the program if the name and password are correct, as shown in the following image:

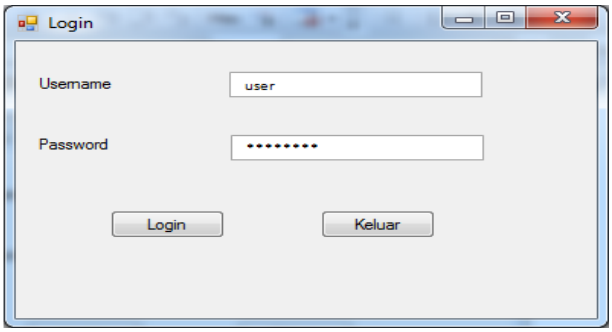

Figure 1. Login Form

b. Main Menu Form
This form is used as the main display of the program, it can be seen in the following picture;

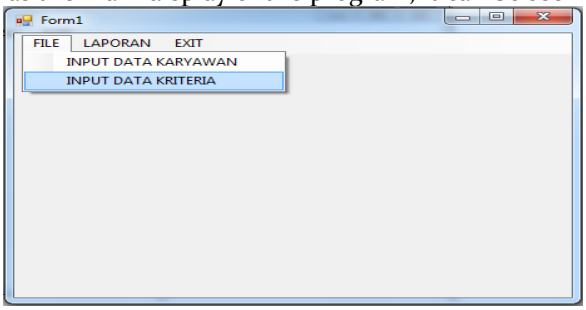

Figure 2. Main Menu Form

c. Employee data

This form is used to display employee data from the program, it can be seen in the following picture:

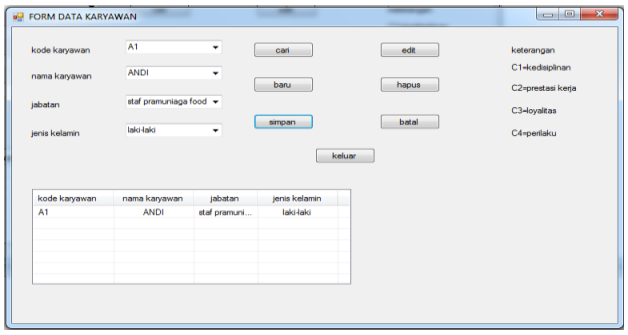

Figure 3. Employee Data Form

d. Criteria Form

This form is used to display the criteria of the program, it can be seen in the following picture;

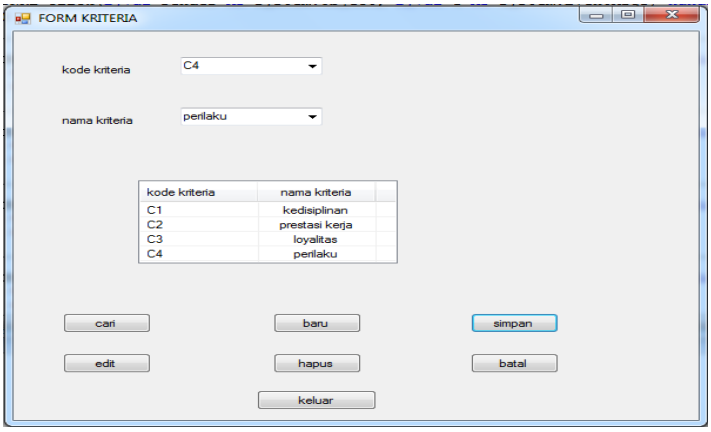

Figure 4. Criteria Form

e. Determination Result Form

This form is used to display the results of the determination of the program, it can be seen in the following picture:

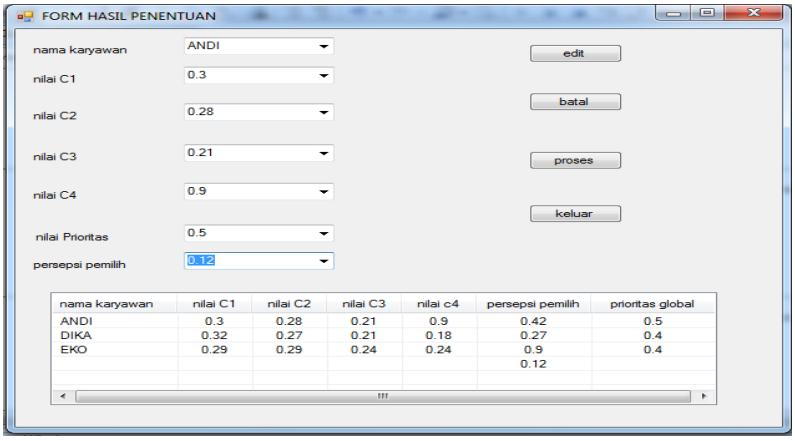

Figure 5. Determination Result Form

4. CONCLUSION

The conclusions from the results of this study are as follows; In determining employees who receive rewards (bonuses) at PT. BPR Perbaungan Hombar Makmur can be applied with the criteria of discipline, work performance, loyalty and behavior because based on these criteria can be used as material for determining employee performance. By applying the AHP method can be applied very well and in its implementation, AHP is able to show that one alternative is the priority of the decision. In designing a decision support system for determining the recipients of rewards (bonuses) based on the performance of employees at PT. BPR Perbaungan Hombar Makmur is very good at the Visual Basic 2008 programming language and this application can be applied in determining the recipients of rewards (bonuses) for employees.

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