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DECISION SUPPORT SYSTEM FOR EMPLOYEE BONUS DETERMINATION WITH WEB-BASED SIMPLE ADDITIVE WEIGHTING (SAW) METHOD IN PT. MAYATAMA SOLUSINDO

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Yuda Irawan
STMIK Hang Tuah Pekanbaru
yudairawan89@gmail.com

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4 **ABSTRACT**

Decision Support System is a computerized system designed to increase effectiveness in decision making to solve 9 semi-structured and unstructured problems so that the decision-making process can be of higher quality. One method of solving MADM problems is by using the Simple Additive Weighting method. The SAW method is to find the weighted sum of the performance ratings for each alternative of all attributes. This study aims to design and create a system to determine which employees are entitled to receive bonuses, for that we need a decision support for giving employee bonuses decisions. In this study using the Simple Additive Weighting 8 method. The system development model used is a waterfall. Waterfall has several stages, namely needs analysis, system design, writing program 17 code, program testing, program implementation and maintenance. The results showed the benefits of the SAW method as a decision support system for determining employee bonuses based on the employee performance of PT. Mayatama Solusindo can assist administrators in determining employee bonuses quickly and effectively. So the bonus that employees get using the SAW method is the basic salary times the percentage of the ranking value.

Keywords : Decision Support Systems, Employee Bonuses, Simple Additive Weighting (SAW)

1. Introduction

Decision Support System is a computerized system designed to increase effectiveness in decision making to solve semi-structured and unstructured problems so that in the decision-making process can be done more quality. Decision Support Systems are widely used by companies for the continuation of the company's business in the future. Determining and taking the right decisions by the company can benefit all stakeholders in the company. Decision Support Systems are part of computer-based information systems including knowledge-based systems or knowledge management that are used to support decision making in an organization or company. It can also be said to be a computer system that processes data into information to make decisions from specific semi-structured problems (Fauzan et al, 2017).

The system for determining the giving of bonuses to employees at PT. Mayatama Solusindo is still done manually. The number of bonuses so far has not been in accordance with the employee's performance and predetermined criteria. So far, the employee performance appraisal process for bonus recipients has been carried out by the Administration and Managers. Administrative staff and managers check one by one the criteria that are used as basic guidelines in making decisions to determine which employees receive a bonus each year. The current appraisal process takes a long time, starting from selecting, weighing and deciding which employees are eligible for bonuses for one year of work. Therefore we need a computerized system in order to overcome all these problems and be able to ease the duties of administrative employees and managers (Fauzi, et. al, 2016).

Decision Support System is a system that can provide solutions, especially in decision making and PT. Mayatama Solusindo can implement a Decision Support System as a tool for PT. Mayatama Solusindo in making decisions about giving bonuses to employees in accordance with the existing assessment criteria in the company. So that the goals of the decision support system can be achieved properly, it is assisted by using one of the methods in decision making, namely the Simple Additive Weighting (SAW) method (Jaberidoost, et. al., 2015).

11 One method of solving the MADM (Multiple Attribute Decision Making) problem is by using the Simple Additive Weighting (SAW) method. The SAW method is often also known as a weighted addition method. The basic concept of the SAW method is to find a weighted sum of the performance ratings for each alternative of all attributes. The SAW method requires a decision matrix normalization process (X) on a scale that can be compared with all existing alternative ratings (Meta, 2018). This method is the most well-known and most widely used method in dealing with Multiple Attribute Decision Making (MADM) situations. MADM itself is a method used to find optimal alternatives from a number of alternatives with certain criteria. This SAW method requires the decision maker to determine the weight for each attribute. The total score for the alternatives is obtained by adding up all the multiplication results between the rating (which can be compared across attributes) and the weight of each attribute. The rating of each attribute must be dimension-free in the sense that it has passed the previous matrix normalization process (Adianto et al, 2017).

2. Literature Review

Decision Support System is a system that is used as a problem solving tool to assist decision makers (managers) in making decisions but not to replace the capacity of managers to fully provide consideration. Turban states that a decision support system is intended for decisions that require judgment or decisions that cannot be supported by an algorithm at all. This definition does not yet provide a specific description that a computer-based decision support system will operate interactive online, therefore various definitions of decision support systems emerge (Yazdani, et. al., 2017).

Types of Wage Payment in Indonesia according to Rokulyati is the amount of wages is based on the length of time a person has worked. The unit of time is calculated per hour, per day, per week or per month. For example, construction workers are paid per day or per week. Wages According to Unit Results is the amount of wages is based on the number of goods produced by a person (Ikbal & Rahma, 2016).. The unit of yield is calculated per piece of goods, per unit length, or per unit weight. For example, the wages for picking tea leaves are calculated per kilogram. Wholesale Wages is the payment of wages is based on a mutual agreement between the job provider and recipient. For example, wages for repairing damaged cars, building houses, etc. This wage model must be clear, not only the amount of the agreed wage, but also how long it will take for the work assigned to piece-holders to be completed (Brata & Whidyanto, 2017).

According to Hasibuan, defining incentive wages is remuneration given to certain employees whose performance is above standard performance. The bonus system is an additional payment beyond wages or salaries which is intended to stimulate (provide incentives) so that workers can carry out their duties better and with full responsibility, with the expectation of higher profits. The higher the profit, the greater the bonus given to workers (Ichniowski & Shaw 2003).

Simple Additive Weighting (SAW) is often known as the weighted addition method. The basic concept of the SAW method is to find a weighted sum of performance ratings for each alternative on all attributes. the SAW method is a method used to find optimal alternatives from a number of alternatives with certain criteria (Irawan, 2019).

This Simple Additive Weighting (SAW) method requires the decision maker to determine the weight for each attribute. The total score for the alternatives is obtained by adding up all the multiplication results between the rating (which can be compared across attributes) and the weight of each attribute. The rating of each attribute must be dimension-free in the sense that it has passed the previous matrix normalization process (Joni, 2017).

3. Research Methods

8 The Waterfall method has steps in system development, namely requirements analysis, system design, writing program code, program testing, and program implementation and maintenance. The methodology for system development is a standard process used to link all the steps needed to analyze, design, implement and maintain information systems (Wahyuni, 2019). The trial process is carried out by conducting experiments and proving the

features of the system that have been built. The trial aims to prove whether the system is in accordance with the needs or there are still deficiencies. The method can be seen in Figure below :

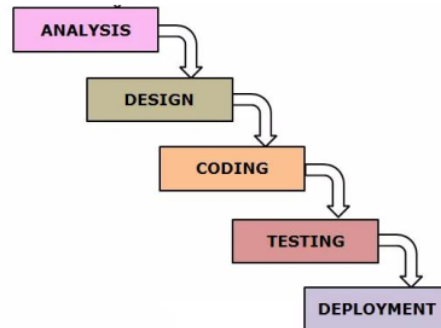


Figure 1. System Development

Analysis

The requirements analysis used in the development of this system are as follows:

1. In building a decision support system for determining employee bonuses using the Simple Additive Weighting (SAW) method, information is needed in the form of employee data which is an alternative object to the employee bonus determination system.
2. In addition to employee data, the employee bonus determination system using the Simple Additive Weighting (SAW) method also requires input in the form of criteria and criteria weights used to determine employee bonuses.
3. Determination of criteria and weight criteria in the employee bonus determination system at PT. Mayatama Solusindo.

Design

After conducting a needs analysis, the next stage is system design and software. From the requirements analysis stage, user needs have been obtained which will then be designed so that they can be understood by the software before writing the program. System design has five stages, namely: Use Case Diagrams, Activity Diagrams, Class Diagrams, Database Design and User Interface Design.

Coding

The stage of translating data or solving problems that have been designed into a specific programming language. In this study, coding was carried out using the PHP programming language and the database using Xampp.

Testing

Tests carried out on the development of this information system are testing with the black box method. If after testing there are still errors in the system, the system needs to be repaired again to meet the existing criteria. Therefore, the release of the system is carried out if the system meets the desired criteria.

Deployment

The program is implemented at PT. Mayatama Solusindo is located at Duri, Riau Province, and maintenance is carried out.

4. Results and Discussions

Result Display

The following describes the display of results from the decision support system for giving bonuses to employees using the Simple Additive Weighting (SAW) method at PT. Mayatama Solusindo.

Form Splash Screen

The Splash Screen Form is the initial display form of the program, to run the form by logging into the program we have. This form is information from the owner of the program which can be seen in Figure 2. following:



SELAMAT DATANG DI SPK
Figure 2. Splash Screen Form Display

Login Form

The login form is a form for entering a username and password so that the main menu in the program can be opened and this form protects data and programs as in Figure 2. below:

Figure 3. Display Login Form

Dashboard Form

This form serves to display a menu of user data, employee data, criteria data, SAW assessment data and reports as shown in Figure 4 below:

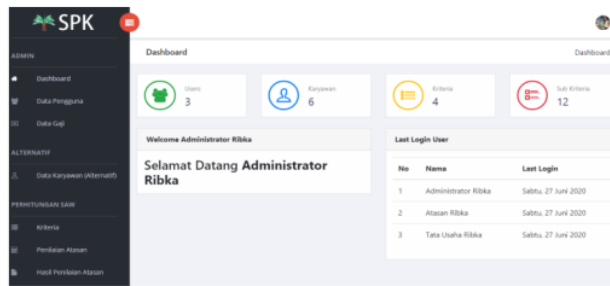


Figure 4 Display Dashboard Form

User Data Form

In this user data form access is by the admin whose function is to input user data for the SAW method decision support system at PT. Mayatama Solusindo as seen in Figure 5 below:

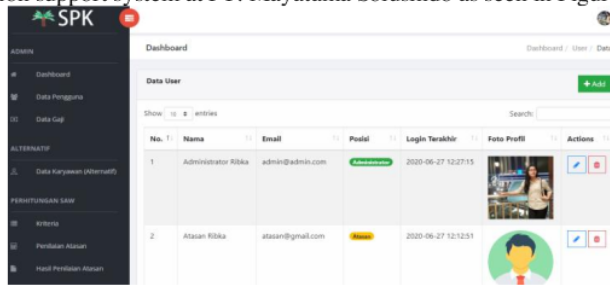


Figure 5 Display User Data Form

Salary Data Form

This form functions to organize employee salary data each year according to the District Minimum Wage (UMK) as shown in Figure 6. the following:

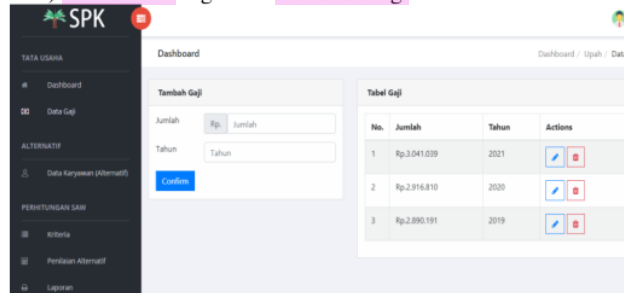


Figure 6. Display of Salary Data Form

Supervisor Assessment Data Form

In this appraisal data form, it functions to carry out the appraisal process for employees to determine employee bonuses which can be seen in Figure 7. below:

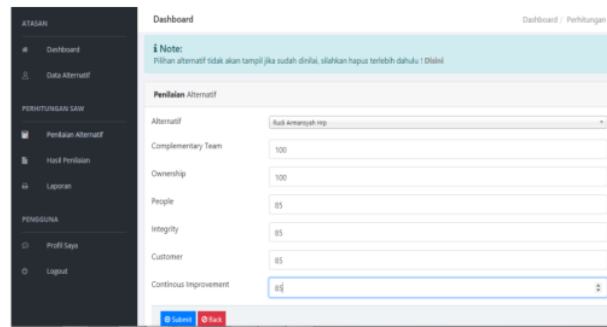


Figure 7. Display of Supervisors Assessment Data Form

SAW Calculation Form

In this SAW calculation form functions to see the SAW method starting from the alternative data value table, alternative data v_{ij} conversion table, normalization weight table, and bonus ratings received by each employee, can be seen in Figure 8 as follows:

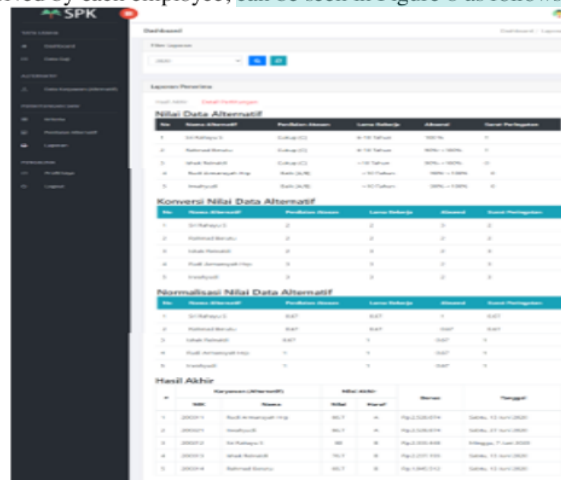


Figure 8. Display of SAW Calculation Form

27 **5. Conclusion**

From the results of the author's research, several conclusions can be drawn, namely with the decision support system for giving bonuses to employees at PT. Mayatama Solusindo, the company will find it easier to determine the number of employee bonuses in accordance with the company's criteria, namely Supervisory Assessment (PA), Length of Work, Attendance and Warning Letters (SP) and data storage is more accurate than the old system entered into the system database. The appraisal process in determining employee bonuses at PT. Mayatama Solusindo with the Simple Additive Weighing (SAW) method, namely the administration of determining the weight value of each assessment criterion, such as the assessment of bosses with a weight value of 30%, length of work with a weight value of 10%, attendance with a weight value of 40% and a warning letter with a weight value of 20. %. Decision Support System for determining employee bonuses at PT. Mayatama Solusindo was designed using the SAW method (Simple Additive Weighing Method) with supporting software, namely Notepad ++ and a database using Xampp.

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