

Decision Support System Selection of Achievement Employees in PT PLN (PERSERO) UP3 Samarinda using Simple Multi-Attribute Rating Technique (SMART) Method

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Abstract- The purpose of this research is to produce a Decision Support System for Selection of Outstanding Employees at PT PLN (Persero) UP3 Samarinda by using the SMART (Simple Multi Attribute Rating Technique) method with the hope that the selection will be carried out objectively. By using the PHP programming language and the database used is MySQL. In this study, the data collection techniques used were literature study, observation and interviews. The decision support system for selecting outstanding employees at PT PLN (Persero) UP3 Samarinda, is a system designed to assist in making decisions in selecting the right outstanding employees using the help of the SMART method, using the feasibility study system development stage, designing, selecting and making a support system. Decision. The result of this research is the creation of a decision support system to make decisions for high performing employees. Users can input employee data, criteria data and sub criteria data. Then the system will look for a solution using the SMART (Simple Multi Attribute Rating Technique) method. After the decision is obtained, the system will display the decision

Decision Support System (DSS) or Decision Support System (DSS) is a system capable of providing problem solving and communication skills for problems with semi-structured and unstructured conditions. This system is used to help decision making in semi-structured and unstructured situations, where no one knows exactly how decisions should be made (Ahmad, 2016).

The existence of a decision support system (SPK) is very beneficial for many groups such as education, government, companies, and even individuals so that they can make better decisions. One example: At PT PLN (Persero) UP3 Samarinda, currently in the process of selecting outstanding employees, it is carried out with the criteria set by PT PLN (Persero) UP3 Samarinda, but in its decision it still involves the participation of existing leaders. There are often disagreements due to subjective assessments of employees so that the process does not run properly and the results are not appropriate. With the Decision Support System (SPK), it is very beneficial for PT PLN (Persero) UP3 Samarinda to be able to make better decisions.

Keywords- DSS, SMART, PLN, Employees

I. INTRODUCTION

Human resources are the most important part of the growth and development of a company. A company can develop well, of course, it is influenced by the quality of human resources, in this case the 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 conduct a performance appraisal 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 (Abdul, 2016).

II. LITERATURE REVIEW

A. System

According to Mulyadi (2010), the system is a network of procedures created according to an integrated pattern to carry out the main activities of the company while the procedure is a sequence of clerical activities, usually involving several people in one or more departments that are designed to ensure uniform handling of corporate transactions happened over and over again. There are two basic groups of approaches in defining the system, namely those based on the approach to the procedure and those based on the component approach:

1. System Approach and Procedure

A system is a network and procedures that are interrelated and work together to do a job or solve a particular problem.

2. Approach to Systems and Its Components

A system is a collection of several elements that interact with each other regularly to form a totality to solve a particular problem

B. Employees Or Workers

According to Nawawi (2011) manpower, workers, employees, human potential as the driving force of the organization in realizing its existence or potential which is an asset and functions as non-material capital in a business organization that can be transformed into a real potential physically and non-physically in realizing the existence of the organization.

C. Decision Support System

According to Pratiwi (2016), a decision support system is a system that produces specific information aimed at a problem that must be solved by managers at various levels. A decision support system is also a computer-based information system that produces various alternative decisions to assist management in dealing with various structured problems using data or models. Decision support system (DSS) supported by a computer-based information system can help someone improve their performance in decision making. A manager in a company can solve semi-structured problems, so managers and computers must work together as a problem-solving team in solving problems that are in a semi-structured area.

1. Feasibility Study (Intelligence) In this step, targets are determined and searched for procedures, data collection, problem identification, identification of problem ownership, problem classification, until finally a problem statement is formed (Kadir, 2011).
2. Design (Design) At this stage the model to be used will be formulated and the specified criteria. After that, look for an alternative model that can solve these problems. The next step is to predict the possible outcomes. Then determine the model variables. (Jayan, 2010).
3. Selection (Choice) After the design stage various alternative models and their variables are determined. At this stage, the model selection will be carried out, including the solution to the model. Furthermore, a sensitivity analysis was carried out, namely by replacing several variables (Chaffey, 2011).

D. Simple Multi-Attribute Rating Technique (SMART)

According to Novianti (2016), SMART is a multicriteria decision-making technique based on the theory that each alternative consists of a number of criteria that have a weight that describes how important they are compared to other criteria. This weighting is used to assess each alternative in order to obtain the

best alternative. The advantage of this method is that it is a flexible decision-making method. The following are several steps and calculation formulations using the simple multi attribute rating technique (SMART) method.

1. Determining the criteria used in this system has been predefined
2. Determine the goal (goal) in the calculation
3. Determine the weight of each objective factor (Goal Weight Factor) with a weight value interval between 1 to 100.
4. Calculating the normalized weight factor of each goal by comparing the value of each goal weight (Goal Weight Factor) with the total number of goal weights (Total Goal Weight Factor)
Formula for calculating Normalized Weight Factor (1)

$$\text{Normalized Weight Factor} = \frac{\text{Goal Weight Factor}}{\text{Total Weight Factor}} \quad (1)$$

5. Provide a criterion value for each alternative
6. Calculate the utility value for each criterion (2)

$$u_i(a_i) = 100 \frac{(C_{\text{out } i} - C_{\text{min}})}{(C_{\text{max}} - C_{\text{min}})} \% \quad (2)$$

Source: Theorem, Hendy P. 2011. Decision Support System for Car Selection Using Simple Multi Attribute Rating Technique Method

7. Calculate the final grade for each (3)

$$u_i(a_i) = \sum_{j=1}^m w_j u_j(a_i), \quad i = 1, 2, \dots, m \quad (3)$$

Source: Theorem, Hendy P. 2011. Decision Support System for Car Selection Using Simple Multi Attribute Rating Technique Method

E. Web Server

According to Madcoms (2016), a Web server is a computer program that has the responsibility or task of receiving HTTP requests from client computers, which are known as web browsers and serving them by providing HTTP responses in the form of data content. There are several types of software to build a local or local host web server that supports Windows operating systems including WampServer, Appserv, XAMPP, PHP Triad or Vertigo.

F. Web Browser

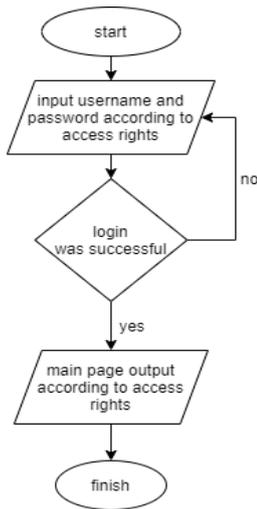
According to Arief (2011), a Web Browser is an application capable of running web documents by means of translation. The process is carried out by the components contained in the browser application which is usually called a web engine. All web documents are displayed by the browser in a translated manner. Several types of browsers that are popular today include: Internet Explorer produced by Microsoft, Mozilla Firefox, Opera, and Safari produced by Apple

III. RESEARCH METHODS

The following is a design of the Outstanding Employee Selection Decision Support System at PT PLN (Persero) UP3 Samarinda Using the Simple Multi-Attribute Rating Technique (Smart) Method.

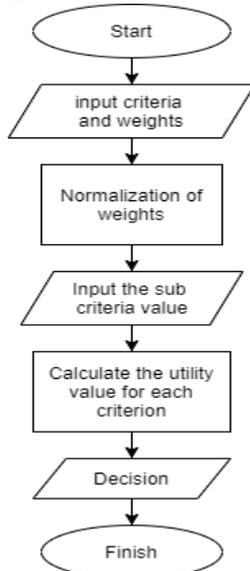
A. Flow chart

In Picture 1, the login flowchart starts by entering the username and password according to the access rights. If the login is not successful, then enter the username and password again if successful then go to the main page according to access rights.



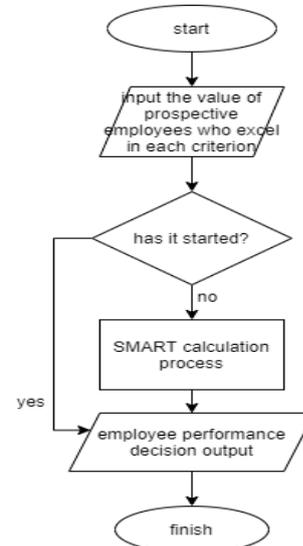
Picture 1. Login Flowchart

Picture 2 is the calculation flowchart of the SMART method, starting with the input criteria and weights, then processed in the normalization of weights, then inputting the sub-criteria values, then calculating the utility value of each sub-criterion and calculating the final value, then the output of the decision, and finished.



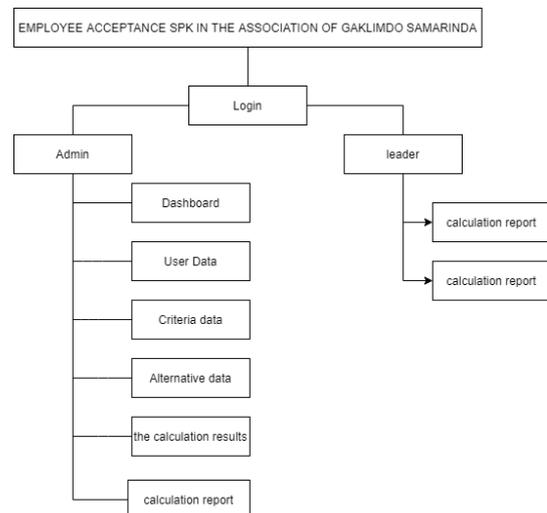
Picture 2. Flowchart of SMART Method Calculation

In Picture 3 is a flowchart of the outstanding employee selection system using the SMART method, starting from selecting outstanding employee candidates who will be assessed and then processing the employee data to be assessed, the next step is to input the value of the prospective employee with achievement on each criterion and the system will check whether it has been assessed no then go to the previous stage, if yes then the process of calculating smart and getting the results of employee achievement decisions.



Picture 3. Flowchart of Outstanding Employee Selection System Using the SMART Method

In Picture 4 is a sitemap of the decision support system for selecting outstanding employees at PT PLN (Persero) UP3 Samarinda. There are two access rights, namely admin containing Dashboard, Admin Data, Criteria Data, Alternative Data, Calculation Results and access rights of the leader, namely containing the Dashboard and SPK SMART Results (Ichwan, 2011).



Picture 4. Sitemap

B. Calculation of Weighted Utility Value Using the (SMART) Method

The utility value of each criterion is calculated using the formula (4)

$$u_i(a_i) = 100 \frac{(C_{out\ i} - C_{min})}{(C_{max} - C_{min})} \% \quad (4)$$

Description (4)

1. $u_i(a_i)$ Value Criterion 1 for iteration i
2. C_{max} Maximum criteria value
3. C_{min} Minimum criterion value
4. $C_{out\ i}$ The value of the i-criteria

Utility Value Weight:

1. Weighted Value of Utility Integrity (5)

$$100 \frac{\text{Nilai Utility} - \text{Min Nilai Utility}}{\text{Maks Nilai Utility} - \text{Min Nilai Utility}} \% = 100 \frac{75-25}{100-25} = 0.66 \text{ (66\%)} \quad (5)$$

2. Cooperation Utility Value Weight (6)

$$100 \frac{\text{Nilai Utility} - \text{Min Nilai Utility}}{\text{Maks Nilai Utility} - \text{Min Nilai Utility}} \% = 100 \frac{50-25}{100-25} = 0.33 \text{ (33\%)} \quad (6)$$

3. Weighted Value of Creative Utility (7)

$$100 \frac{\text{Nilai Utility} - \text{Min Nilai Utility}}{\text{Maks Nilai Utility} - \text{Min Nilai Utility}} \% = 100 \frac{75-25}{100-25} = 0.66 \text{ (66\%)} \quad (7)$$

4. Discipline Utility Score Weight (8)

$$100 \frac{\text{Nilai Utility} - \text{Min Nilai Utility}}{\text{Maks Nilai Utility} - \text{Min Nilai Utility}} \% = 100 \frac{75-25}{100-25} = 0.66 \text{ (66\%)} \quad (8)$$

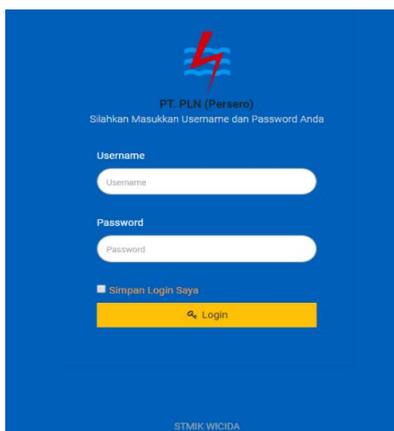
5. Weighted Value of Utility Professionalism (9)

$$100 \frac{\text{Nilai Utility} - \text{Min Nilai Utility}}{\text{Maks Nilai Utility} - \text{Min Nilai Utility}} \% = 100 \frac{100-25}{100-25} = 1 \text{ (100\%)} \quad (9)$$

IV. RESULTS AND DISCUSSION

A. Login page

In Picture 5 the login page is a page to enter the admin back-end page by entering the correct username and password then clicking the login button.



Picture 5. Login page

B. Admin Dashboard page

In Picture 6 the admin dashboard page is the admin start page for managing the system. There are several menus including: user management menu, criteria, employee data and SMART SPK results.

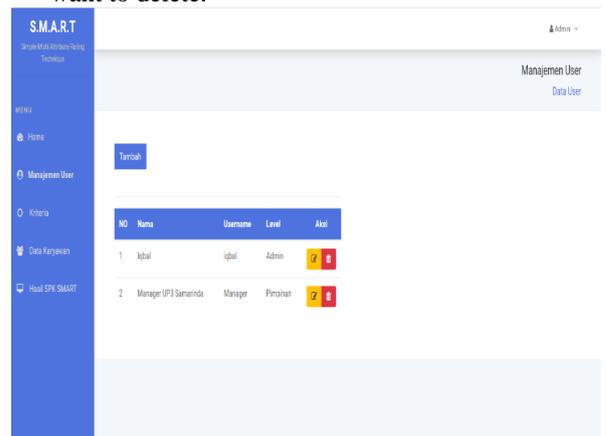


Picture 6. Admin Dashboard Page

C. User Management page

In Picture 7 the user management page is a page for admins to manage admin data, as for the buttons available on the user management page as follows.

1. *Button* added functions to add user data.
2. *Button* edit functions to change user data that you want to change.
3. *Button* delete functions to delete user data that you want to delete.

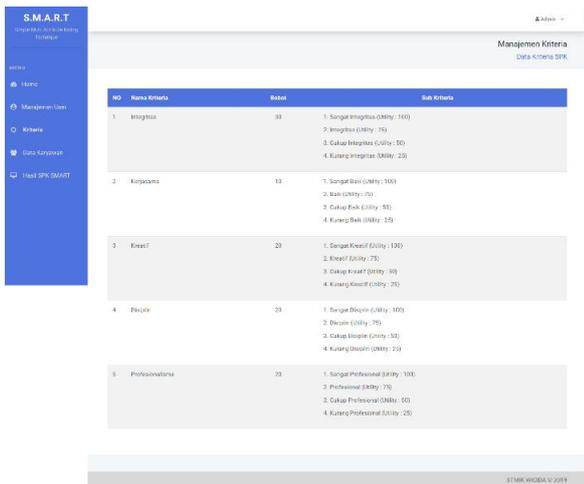


Picture 7. User Management page

D. Criteria page

In Picture 8 the criteria management page is a page for admins to manage criteria data. The buttons available on the criteria management page are as follows.

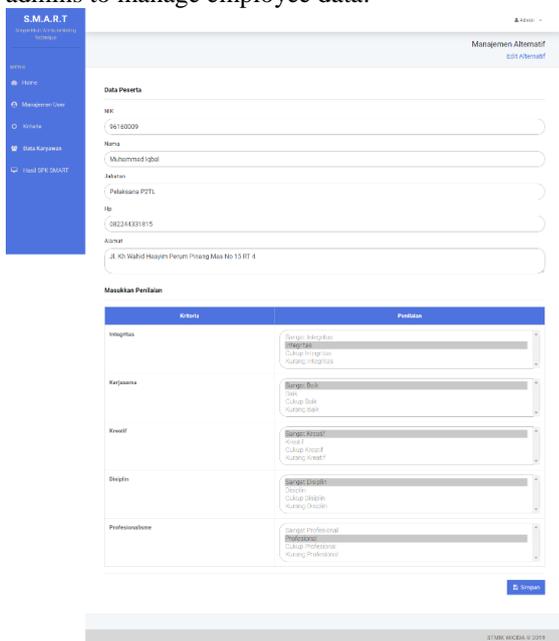
1. *Button* add criteria serves to add data criteria and sub criteria.
2. *Button* edit functions to change the data criteria and sub criteria that you want to change.
3. *Button* delete functions to delete the criteria and sub criteria data that you want to delete.



Picture 8. Criteria page

E. Employee Data page

In Picture 9, the employee data display is a page for admins to manage employee data.



Picture 9. Employee Data Page

V. CONCLUSION

This decision support system for selecting outstanding employees is made using the programming languages PHP, CSS, HTML, JavaScript, and MySQL as the database using flowchart and sitemap system development tools.

The design and manufacture of a Decision Support System for Selection of Outstanding Employees at PT PLN (Persero) UP3 Samarinda Using the SMART Method (Simple Multi Attribute Rating Technique) has been produced.

The decision support system for selecting outstanding employees fulfills the needs of PT PLN (Persero) UP3 Samarinda to assist in selecting outstanding employees according to the required criteria.

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