

Decision Support System for Determining Employees Staying Using the Simple Additive Weighting Method

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Abstract—Assessment of employee achievements is an absolute thing to do to find out the achievements that have been achieved by each employee, a problem that also exists is that employee assessment data is still stored in the form of archives / notebooks, there is no protection for each data. Follow-up assessments allow employees to be promoted to permanent employees if they are not permanent employees. The purpose of this study is to create a decision support system to determine the appointment of permanent employees using the Simple Additive Weighting (SAW) method in which the criteria used are work quality, work accuracy, responsibility, professionalism, initiative, behavior. This study also aims to change employee appraisal storage data that is still stored in the form of archives / notebooks in digital form, to facilitate the search for data about employee assessments and identities and design the application for appointment of contract employees into permanent employees. PHP programming. In connection and configuration the programming is supported by XAMPP and MySQL.

Keywords: *appointment of permanent employees, SAW method, XAMPP, PHP, MySQL*

I. INTRODUCTION

One of the supporting parts to increase productivity in a company that is very important is one of them is an employee. The contribution of an employee of a company greatly influences many important roles in determining the success or progress of a company. If employees can be managed wisely, the company is expected to be able to carry out all the processes of all its business well in carrying out the process of selecting the performance of an employee, many criteria have been determined by each company. Each company must have different types of criteria when conducting performance appraisals. On the occasion of this study a problem will be raised namely finding the best alternative based on the weight of the criteria that have been given by using the Simple Additive Weighting method. This method is able to provide good results in decision making.

Decision support systems are very complex things involving humans and information. Decision makers are a group of people or individuals who are responsible for a system. The task of decision makers is to control an output produced and an expected goal. With the development of business intelligence di era industry 4.0 decision support system is very easy to understand and understand, with a dashboard, a decision maker will get data faster and faster in the decision making process. One of the most important in the selection

of permanent employees periodically so that those selected will be given awards in the form of awards or certificates to motivate employees to improve their dedication and performance (Handri Murdianto, et., Al., 2016). [1]

In the decision making for the best employee selection can be seen from several values obtained from predetermined criteria data so that the assessment is clearer and right on target. Utilization of decision making methods using the Simple Additive Weighting (SAW) method helps managers to make faster and more accurate decision making. The basic concept of the SAW method is a method that can find the number of weighted performance ratings on each element of the criterion data and on all the attribute values that need to normalize the decision making matrix (X) to a scale comparable to all existing alternative ratings (Syafri Hafni Sahir, et., al, 2017). [2]

In some theoretical studies obtained several related research studies include: Research conducted (AD Andriana, et., Al., 2018) entitled "The Determination of Market Areas using Single Additive Weighting (SAW)" The purpose of this study is to determine the right market share to choose the best market area to increase volume the sale. Simple additive weighting (SAW) is a method that works to determine market areas, this method can choose the best area based on several criteria including age, gender, income of each region and the number of tourist sites and shopping centers. [3]

(Ronda Deli Sianturi, et., Al., 2017) with the theme "Simple Additive Weighting Method to Determine the Location of Fuel Station" Decision making is always associated with the uncertainty of the results of the decisions it takes. Decision support systems are disseminated to reduce the value of uncertainty factors by processing information into alternative solutions to existing problems. [4]

Multi Attribute Decision Making Using Simple Additive Weighting and Weighted Products in Investment" Multi attribute decision making (MADM) is a decision making method to determine the best alternative from a number of alternatives based on a specific set of values criteria. The methods used by MADM in the study are the SAW method (simple additive weighting model) and the WPM model (weighted product). The results of this study through the method of Simple Additive Weighting (SAW) and Weighted Product (WP). The SAW method generates decisions or recommendations based on alternative criteria for high value

investments. High marks are the best alternative. The best alternative for investment is agriculture in Indonesia. For future work, multi-purpose ways of making decisions at MADM (Yeni Melia, 2016) [5]

Decision Support System for High School Student Majoring Using Simple Additive Weighting Method" decision-making methods that can help students in choosing the required majors. The system will be developed as a web-based application program, using the Simple Additive Weighting Method (SAW) better known as the weighted sum method. The SAW method is used to produce departmental recommendations that will be given to students in the department's recommendation list, which are sorted by highest to lowest percentage results (Dyah Pratiwi, et., Al., 2014) [6]

II. METHOD

The appointment of permanent employees is done by paying attention to the values of the criteria given to determine a permanent employee the criteria given are work quality, work accuracy, responsibility, professionalism, initiative, behavior. Then from each of these criteria will be decided into a criteria weight value The steps for completing the SAW are as follows:

- Determine the value of the criteria that will be used as a provision in making decisions
- Determine the relevant value for each alternative.
- Building the value of the decision-making matrix based on the specified criteria, then giving a matrix normalization value based on the value of the equation adjusted for the attribute model (profit attribute or cost attribute) to obtain a normalized matrix value, namely R.
- The final result of the grading ranking process is the combination of a normalized matrix R multiplication with the weight vector value, it will obtain the largest value chosen as the selection of the best value as a solution.

$$r_{ij} = \begin{cases} \frac{X_{ij}}{\text{Max}_i X_{ij}} \\ \frac{\text{Min}_i X_{ij}}{X_{ij}} \end{cases}$$

(1)

$$V_i = \sum_{j=1}^n w_j r_{ij}$$

(2)

There are 6 (six) total criteria given for this assessment, namely:

- K1 = quality of work
- K2 = accuracy of work
- K3 = responsibility
- K4 = Professionalism
- K5 = Initiative
- K6 = Behavior

A decision maker assigns a weighting value to each of the following criteria:

- K1 = 0.3 or with a percentage of 30%
- K2 = 0.2 or with a percentage of 20%
- K3 = 0.2 or with a percentage of 20%
- K4 = 0.1 or with a percentage of 10%
- K5 = 0.1 or with a percentage of 10%
- K6 = 0.1 or with a percentage of 10%

Calculate the normalization of each alternative :

$$r_{ij} = \frac{X_{ij}}{\text{Max}_i X_{ij}}$$

(3)

$$V_i = \sum_{j=1}^n w_j r_{ij}$$

(4)

The result of the normalized matrix value, which is to calculate a preference value of each criteria value (V) by adding a result value from the multiplication between the normalized matrix (R) together with the value of the weight (W) which gets a preference value of each alternative. Then calculate the alternative preference values intended for the following equation:

Given weight values: W = [0.3, 0.2, 0.2, 0.1, 0.1, 0.1]. Provided that a passing grade or whether an employee is accepted as a permanent employee is **0.90**

III. RESULTS AND DISCUSSION

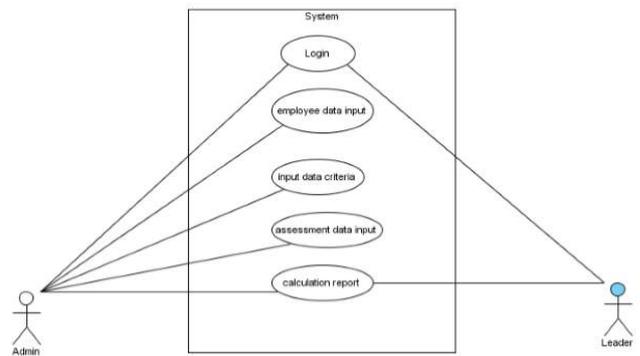


Fig.1. Model Use Case Diagram

TABLE I. USE CASE ADMIN DIAGRAM

Admin	Use Case	Description
Admin	Login	Login function is used by the user when it will do activities to enter into system
	Employee Data Input	Employee identity data • Admin Enter employee data
	Input Criteria Data Value	Several criteria are given to make the passing grade level parameter • Admin input criteria weights values
	Rating Input	Admin input values on the criteria that have been determined
	Calculation report	Admin can display the results of the assessment in each period

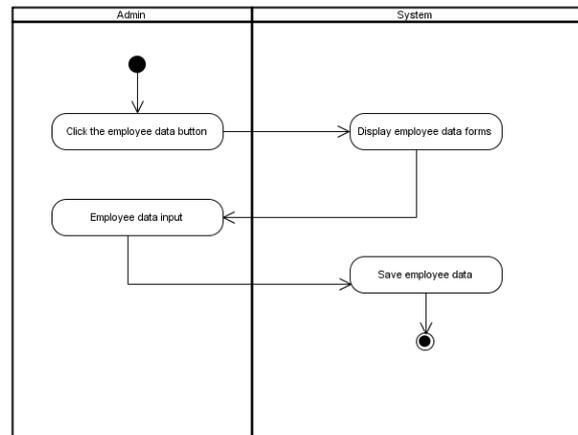


Fig.4. Model of the Activity Diagram Input criteria data

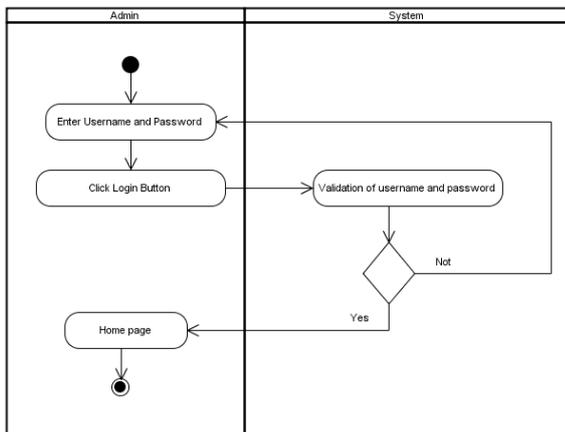


Fig.2. Admin Login Activity Diagram

TABLE II. MODEL USE CASE LEADERSHIP DIAGRAM

Leader	Model Use Case	Description
Leader	Login	Leaders can log in according to the conditions set
	Calculation Result Report	Leaders can see the final results of calculations or the final results of assessments that have been made

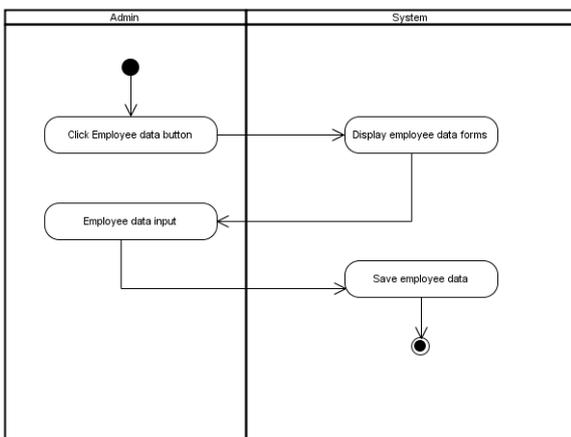


Fig.3. Model Activity Diagram Input employee data values

REFERENCES

- [1] J. Crabtree 2012. India ' s uncertain future vol. 19, no. 2, pp. 132–136.
- [2] S. Pratomo, D, and Bagus Sumargo 2016 Sebuah Alternatif: Better Life Index sebagai Ukuran Pembangunan Multidimensi di Indonesia *Jakarta, J. Ekon. dan Pembang. Indones.*, vol. 16, no. (2), Januari 2016, pp. 123-140.
- [3] B. Sumargo and T. Novalia 2018 Structural Equation Modelling for Determining Subjective Well-Being Factors of the Poor Children in Bad Environment *Procedia Comput. Sci.*, vol. 135, pp. 113–119.
- [4] N. (Eds.). Kahneman, D., Diener, E., dan Schwarz 1999 *Well-being: The foundations of hedonic psychology*. New York: Russell Sage Foundation.
- [5] S. S. Franklin, *The Psychology of Happiness* 2010 New York: Cambridge University Press.
- [6] M. J. C. Forgeard, E. Jayawickreme, M. L. Kern, and M. E. P. Seligman 2011 Doing the right thing: Measuring wellbeing for public policy vol. 1, pp. 79–106.
- [7] M. W. Martin 2014 Happiness and the Good Life pp. 272–276.
- [8] M. E. P. Seligman 2002 *Authentic Happiness*. New York: Simon & Schuster.
- [9] M. E. P. Seligman, 2005 *Authentic Happiness: Using The New Positive Psychology to Realize Your Potential for Lasting Fulfillment*. New York: Free Press.
- [10] M. E. P. . Seligman 2011 *Flourish*. New York: Simon & Schuster.
- [11] *OECD 2008 Guidelines on Measuring Subjective Well-being.* .
- [12] F. A. Huppert 2009 Psychological Well-being : Evidence Regarding its Causes and Consequences vol. 1, no. 2, pp. 137–164.
- [13] N. E. F. NEF 2011 Measuring Our Progress The Power of Wellbeing. London: New Economic Foundation.
- [14] A. E. Clark, C. Senik, A. E. Clark, C. Senik, and C. Senik 2011 Is happiness different from flourishing? Cross-country evidence from the ESS To cite this version: hal Id: halshs-00561867 Cross-country evidence from the ESS
- [15] R. M. Ryan and E. L. Deci 2001 on Happiness nad human potentials: A Review of Research on Hedonic and Eudaimonic Well-Being
- [16] Badan Pusat Statistik BPS-Statistics Indonesia 2017 ECAS. 2013a, *Indeks*