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BEST EMPLOYEE ASSESSMENT DECISION SUPPORT SYSTEM USING WEIGHTED PRODUCT METHOD BASED ON MOBILE WEB AT PUTRI COLECTION STORE

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Abstract
The decision support system is a computer-based system that can be designed to assist in the decision-making process regarding the results of selecting the best employees at the Putri Collection Store sales business . In selecting the best employees, we use the *Weighted Product method*, which is a method used to find optimal alternatives from a number of alternatives with a certain number of criteria through weighted multiplication of the performance rating of each alternative on each attribute. In selecting the best employees at the Putri Collection Store, five criteria are used, namely Discipline, Discipline, Responsibility, Attendance, Cooperation. The results of this research, the Weighted Product Method, make it possible to assign relative weights or values to each employee assessment criterion. By using Weighted Products, stores can easily adjust criteria weights according to specific interests and needs. This allows flexibility in adjusting the determination of the best employees according to the objectives of the business location. This method makes it possible to make decisions based on robust data analysis. By giving weight to each criterion, you can measure employee performance objectively and based on data, reducing the potential for subjective bias. By combining the Weighted Product Method and a mobile web-based platform, you can optimize the process of determining the best employees, increase accuracy, and respond quickly to changes in the organization.

I. INTRODUCTION

Employee assessment is an important part of the entire employee activity process. The best and most qualified employees are a company asset that will make a business grow rapidly. In companies that have employees, they carry out performance evaluations (assessments) of employees *relatively* often with the aim of providing *feedback* to employees. In an effort to improve the business as a whole, the company needs to carry out an assessment.

Having quality human resources will make a company grow rapidly. [1], [2] Quality Human Resources (HR) is very important for increasing sales efforts. Well-trained human resources have a deep understanding of the products or services being sold. They can provide accurate and convincing information to potential customers, thereby increasing customer trust and satisfaction. [3], [4]HR who have good communication skills can interact effectively with customers. Good communication skills help in explaining product benefits, responding to customer questions, and convincing them to buy. [5]Quality human resources can identify customer needs and preferences well. They are able to understand market characteristics, customer purchasing behavior, and adjust sales strategies to increase the relevance of products or services.

In an effort to improve service at the Putri Collection Store, determining good employees can have an impact on improving service at the Store. Determining the best employees is a motivation for all employees to improve performance and service. Several studies in determining outstanding employees have been carried out by several companies and institutions, such as that carried out by [6]This decision support system helps and provides alternatives in assessing each employee, changing criteria and changing weight values. This is useful for making it easier for decision makers related to the problem of selecting outstanding employees, so that employees who are most worthy of being given rewards or awards will be obtained. [7] The results of this research are in the form of a decision support system that can process data on selecting outstanding employees into considerations. valid. It is hoped that the results of this research will help decision makers in determining which employees will excel in a company or agency. [8] This research aims to design a Decision Support System for determining contract employees as permanent employees which can help companies in selecting the right employees using the Java NetBean and XAMPP programming languages with a combination of the Techinique for Order Preference by Similarity to Ideal Solution (TOPSIS) method.

Employee performance assessments are carried out at the Putri Collection Store for the best employee assessment process using the *Weighted Product method* using criteria determined as assessment variables, so as to get the best employee assessment according to business needs, the criteria used in conducting the assessment such as Discipline, Smallness, Responsibilities, Attendance and Cooperation. The expected benefits and uses of this research are a website-based decision-making system that can help and speed up the selection of the best employees at the Putri Collection Store.

II. LITERATURE REVIEW

2.1. Decision Support Systems

A decision support system is part of a computer-based information system that is used to support decision making in an organization. Decision Support System (DSS) is a model-based system that consists of procedures for processing data and considerations to help managers make decisions. In order to successfully achieve its goals, the system must be simple, robust, easy to control, easy to fully adapt to important things and easy to communicate with. Implicitly it also means that this system must be computer-based and used as an addition to a person's problem-solving abilities [9]–[11] .

This system is a computer-based system that is intended to help decision makers by utilizing certain data and models to solve various unstructured problems. A decision support system is not a decision-making tool, but a system that assists in decision-making by completing information from data that has been processed and used to make fast and accurate decisions in resolving a problem [12]–[14] .

2.2. *Weighted Product* (WP)

Weighted Product is a method used to complete decision support systems using multiplication to connect criterion values. The weighted product method has steps to normalize the criteria using a formula.

$$W_j = \frac{W_j}{\sum W_j}$$

Information:
Wj = Criterion weight,
ΣWj = Addition of weights. criteria [15], [16]

The decision matrix normalization (S) process is carried out by multiplying the criteria, the attributes must first be raised to the power of the criteria weight. In the weighted product method, the criteria are divided into two categories, namely profit criteria (positive rank criteria) and cost criteria (negative rank criteria).

The following is the formula for calculating matrix normalization (S):

$$S_i = \prod_{j-1}^{n} X_{ji}\, W_j$$

Information:
Si = matrix normalization result,
Xij = alternative rating. per attribute,
Wj = attribute weight,
i = alternative,
J = criteria.

Preference process (Vi) or ranking for each alternative. The ranking process for each alternative uses the following formula [17], [18] :

$$Vi = \frac{\prod_{j=1}^{n} X_{ij}^{\ wj}}{\prod_{j=1}^{n} (x_j)^{\ wj}}$$

Information:
Vi = Alternative preferences are analogous to the vector V,
X = criterion value,
W= criteria weight,
i = alternative,
J = criteria,
n=number of criteria

2.3. Hypertext Preprocessor (PHP)

PHP is often used by programmers to create dynamic websites because it is free and useful in designing web applications. PHP (PHP: Hypertext

Preprocessor) is a programming language used to translate lines of program code into machine code that can be understood by computers on a server-side basis that can be added to HTML. PHP (Hypertext Preprocessor) is a scripting language that can be embedded or inserted into HTML. PHP is widely used to create dynamic website programs. Hypertext preprocessor (PHP) is a programming language for creating or developing web-based applications and is open source and embedded in HTML scripts [19], [20] .

III. RESEARCH METHODS

3.1. Method of collecting data

Methods in the research carried out consisted of:

A. Observation Method

Observation Method Analyzing existing problems by observing data sources and processing as well as collecting data from parts related to the Putri Collection Shop, *observations* are carried out in order to directly see the ongoing work process.

B. Interview Method

The interview method is a method of collecting data by conducting direct questions and answers

3.2. Waterfall Method

The waterfall method or what is often called the waterfall method is often called the classic life cycle , where it describes a systematic and sequential approach to software development, starting with the specification of user needs and then continuing through the planning stages . In general, the waterfall method has the following steps [21], [22]:

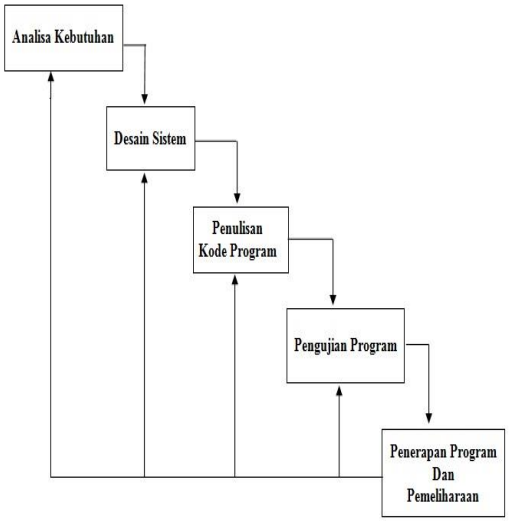

Figure 1. Waterfall System Development Method

3.3. Determination of Criteria and Calculation of Weighting

The criteria in the Best Employee research using the website-based WP method are used to determine the criteria and weights for carrying out calculations. This research uses 5 criteria. The criteria used are:

Table 1. Weight Table for Best Employee Criteria

Code	Criteria	Criteria Value Weights	Status
C1	Discipline	50	Benefits
C2	A little	40	Benefits
C3	Responsibility	40	Benefits
C4	Absence	30	Benefits
C5	Cooperation	40	Benefits

Table 2. Criteria Weighting Table

Criteria	Sub criteria	Weight
Mark Discipline	Not enough	1
	Enough	2
	Good	3
	Very good	4
Small Value	Not enough	1
	Enough	2
	Good	3
	Very good	4
Value of Responsibility	Not enough	1
	Enough	2
	Good	3
	Very good	4
Absence Value	>4 Absent	1
	3 Absent	2
	1 Absent	3
	Always present	4
Value of Collaboration	Not enough	1
	Enough	2
	Good	3
	Very good	4

Alternative data is obtained after making direct observations or observations, the data that has been obtained:

A1 Tiara, Good Discipline, Very Good Small Good Responsibility, 1 Absence Not Present, Very Good Cooperation.

A2 Andi's discipline is sufficient, a little lacking, responsibility is sufficient, absenteeism 3 is not present, cooperation is sufficient.

A3 Mansur, Good Discipline, Good Skill, Sufficient Responsibility, Absence 1 Not Present, Sufficient Cooperation.

A4 Tika, Very Good Discipline, Very Good Attention, Good Responsibility, Always Attendance, Very Good Cooperation.

A5 Dedi, Very Good Discipline, Little Enough, Less Responsibility, Absence Always Present, Good Cooperation.

Table 3. Alternative Suitability Ratings

No	Alternative	C1	C2	C3	C4	C5
1	Tiara	3	4	3	3	4
2	Andy	2	1	2	2	2
3	Mansur	3	3	2	3	2
4	Tika	4	4	3	4	4
5	Dedi	4	3	2	4	3

3.3.1. Determination of Weight Normalization

Before carrying out calculations, weighting is carried out on each criterion first, The initial weight is (5,4,4,3,4). It will be corrected so that the total weight ∑wj = 1, by means of $Wj = \frac{Wj}{\sum wj}$

W= Criterion weight value divided by the total value of all criteria. Seen from Criteria table 3.

So weight improvements are made:

$$W1 = \frac{50}{50+40+40+30+40} = \frac{50}{200} = 0.25$$
$$W2 = \frac{40}{50+40+40+30+40} = \frac{40}{200} = 0.2$$
$$W3 = \frac{40}{50+40+40+30+40} = \frac{40}{200} = 0.2$$
$$W4 = \frac{30}{50+40+40+30+40} = \frac{30}{200} = 0.15$$
$$W5 = \frac{40}{50+40+40+30+40} = \frac{40}{200} = 0.2$$

3.3.2. Determining the Value of Vector S

Determining the vector value S = Table 3 alternatives are raised to the power using Weight Normalization by multiplying all the criteria for an alternative with the weight as the power.

$S1 = (3^{0.25})(4^{0.2})(3^{0.2})(3^{0.15})(4^{0.2}) = 3.365865$
$S1 = (2^{0.25})(1^{0.2})(2^{0.2})(2^{0.15})(2^{0.2}) = 1.741101$
$S1 = (3^{0.25})(3^{0.2})(2^{0.2})(3^{0.15})(2^{0.2}) = 2.550849$
$S1 = (4^{0.25})(4^{0.2})(3^{0.2})(4^{0.15})(4^{0.2}) = 3.77635$
$S1 = (4^{0.25})(3^{0.2})(2^{0.2})(4^{0.15})(3^{0.2}) = 3.103691$

3.3.3. Determining Vector Values

Determine the value of the vector V that will be used for ranking, then compare the results of the final value of the vector V and determine the order of the best alternatives that will become the decision.

$$V1 = \frac{3.365865}{3.365865+1.741101+2.550849+3.77635+3.103691} = 0.231524$$
$$V2 = \frac{1.741101}{3.365865+1.741101+2.550849+3.77635+3.103691} = 0.119763$$
$$V3 = \frac{2.550849}{3.365865+1.741101+2.550849+3.77635+3.103691} = 0.175463$$
$$V4 = \frac{3.77635}{3.365865+1.741101+2.550849+3.77635+3.103691} = 0.25976$$
$$V5 = \frac{2.491462}{3.365865+1.741101+2.550849+3.77635+3.103691} = 0.21349$$

After all the steps have been carried out, then look for the largest value, because based on calculations using the Weighted Product (WP) method, the best value is the largest value of all existing alternatives, TIKA 0.25976, the largest alternative value is the best employee.

IV. DISCUSSION

4.1. System Flow Design

The best employee selection system is built on a web basis using the PHP programming language, this employee calculation application runs on Web Mobile. The system development design is built with a structured model starting with a context diagram:

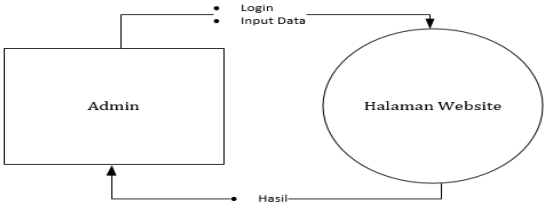

Figure 2. Context Diagram

A description in the form of a flow diagram of the algorithms in a program, which states the direction of the program flow. The following are some symbols used in drawing a flowchart.

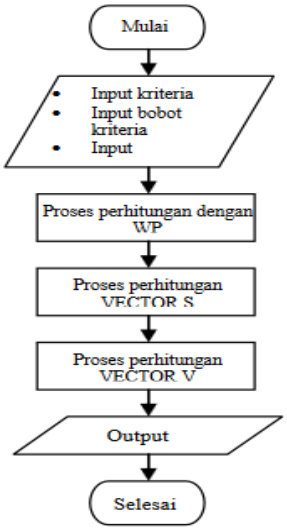

Figure 3. Flowchart Diagram of the Calculation Process

4.2. Test Application System

This decision support system application selects the best employees, to assess the best employees, this application was created using the PHP programming language.

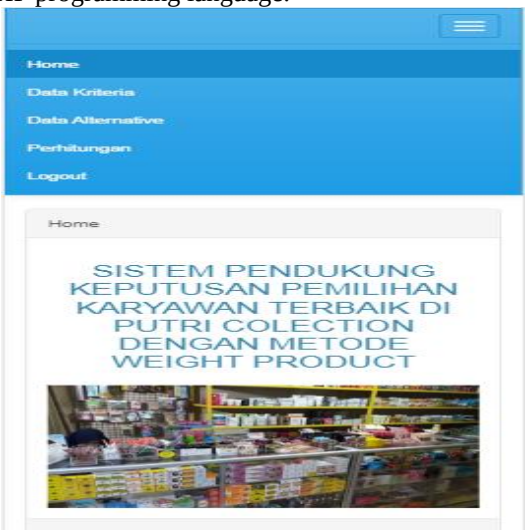

Figure 4. Home Menu Display

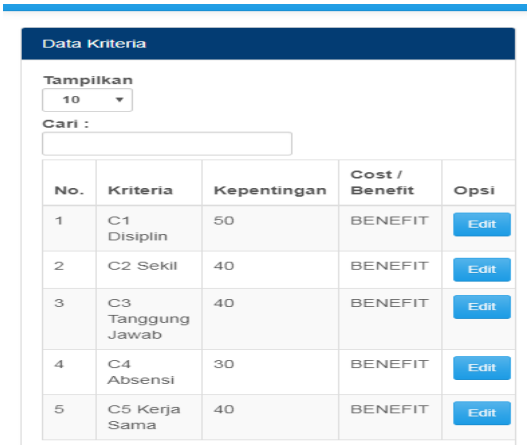

Figure 5. Criteria Data Menu Display

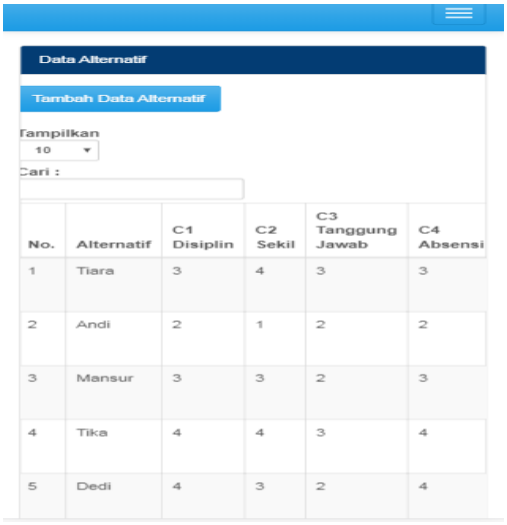

Figure 6. Alternative Data

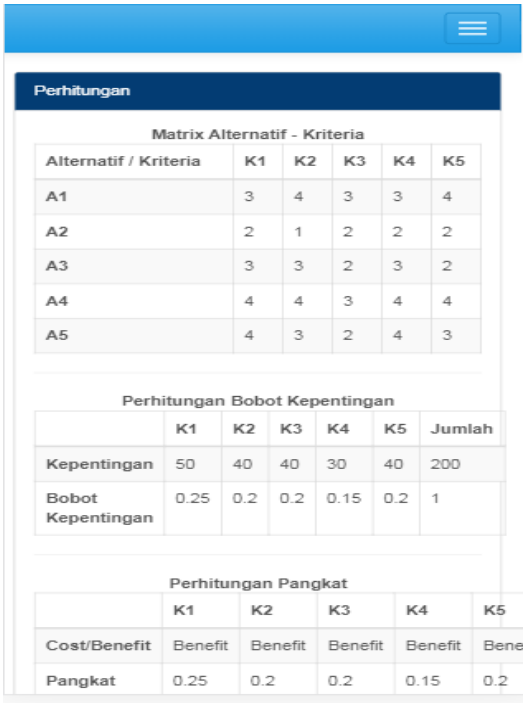

Figure 7. Calculation of Criteria Based on Weights

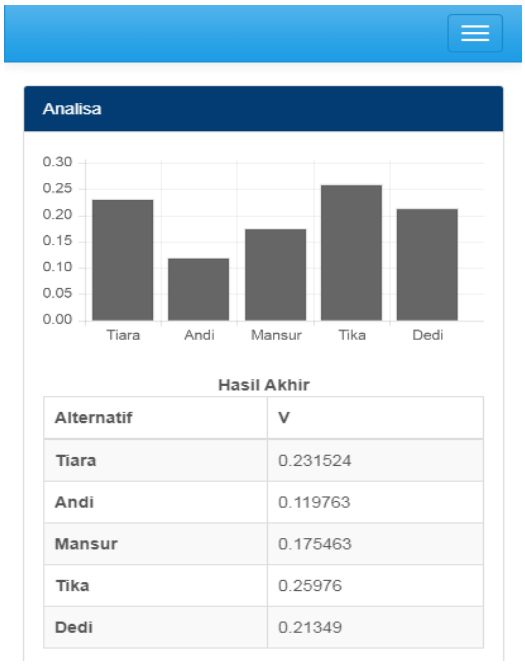

Figure 8. Best Employee Ranking Results

4.3. Analysis of Research Results

Determining the best employees using the mobile web-based Weighted Product method has several advantages that make it very good. Using website-based applications, employee-related information and data can be accessed easily from various devices such as smartphones or tablets. This gives users the flexibility to assess and select the best employees without having to be limited to one particular location or device. Users can monitor and access information in real-time through website-based applications. This allows management to see developments and changes quickly, so that decisions can be taken more quickly and precisely. This Weighted Product Method makes it possible to assign relative weights or values to each employee assessment criterion. By using Weighted Products, you can easily adjust the criteria weights according to their specific interests and needs. This allows flexibility in adjusting the determination of the best employees according to company goals.

This Weighted Product Method makes it possible to make decisions based on strong data analysis. By giving weight to each criterion, companies can measure employee performance objectively and based on data, reducing the potential for subjective bias. Website-based applications can be integrated with human resource management systems. This integration can make it easier to update employee data, store performance history, and increase the overall efficiency of the employee management process. Easy access and use of website-based methods can increase efficiency in the employee assessment process. The speed and affordability of information can lead to faster decisions, which in turn can increase organizational productivity.

V. CONCLUSION

With the existence of a decision support system for selecting the best employees using the *Weighted Product method*, it can provide alternative decisions that are more precise and accurate. From the results of manual tests and website-based system tests, it has very good accuracy. Testing with a website-based system simplifies the calculation process and can calculate larger amounts of data in a shorter time.

Realizing that there are still many shortcomings in writing. Therefore, based on the problems found in the research, so that future research will be better, the author recommends that this application only handle one employee selection, and this application can only be accessed by the admin, so that only the admin can view and provide information. evaluation.

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