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Track Record Model in Employee Performance Optimization Using Weight Product Method

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Abstract

Employee performance improvement is a crucial aspect for the growth and success of a company, especially in the agricultural sector that relies on the quality and competence of human resources. However, subjective and manual employee assessments often face challenges, such as high levels of subjectivity and the time required to complete the process. To overcome these obstacles, this study proposes the use of the Weighted Product (WP) method as an approach to building a track record model in employee performance assessment. This study involves several methodological stages, first by studying the literature related to decision support systems, WP methods, track records, and employee performance assessments. Furthermore, data collection is carried out from a dataset that includes monthly assessments of employee performance based on several criteria such as attendance, cooperation, work quantity, responsibility, and others. The next process involves modeling, where the WP model is designed to produce the maximum total value of the existing assessment criteria. Model validation is carried out through two approaches, namely the Criterion-related Validity Test and the Internal Consistency Test. The test results show that the WP model has a Criterion-related Validity of 0.9851, indicating a strong relationship between the employee scores generated and the assessments given by the supervisor. In addition, Cronbach's alpha reached a value of 1.0, indicating excellent internal reliability of the model. Thus, the use of the WP method in the employee performance tracking system can be considered effective and can improve objectivity and efficiency in employee performance assessment in the context of agricultural companies. This method not only helps in identifying high-performing employees, but also in motivating them to achieve the highest performance standards, which in turn can improve the overall operational quality and reputation of the company.

Keywords: *Weighted Product (WP), Employee Performance Model, Decision Support System, Criterion-related Validity, Internal Reliability.*

1. Introduction

The best and quality employees are company assets that will make the company grow rapidly. Employee performance is quite influential in the profits obtained by a company.[1]. Therefore, human resources are needed who have high competence and loyalty. [2]. Maximum effort is needed to improve employee performance. One of them is choosing the best employees to stimulate employees to improve their performance. Improving employee performance is an important point that can improve the company's overall performance. To improve employee performance, therefore the company really needs to carry out an employee performance assessment process in determining outstanding employees for each specified period.[3]. With the existence of quality human resources, a company will increase its operations, develop rapidly and become famous. However, the constraints in agricultural companies have constraints in selecting their best employees. Determining the best employees is still done manually so that the subjective element is very high, in addition, because the number of employees is relatively large, the time to determine employees becomes longer and sometimes late. The method chosen is to use the Weighted Product method because the weighted product method is more efficient and the time required for calculation is shorter and easier[4][5]. In a company, it is inseparable from the role of Human Resources (HR) who work in it. According to Handayani [5] "Employees are one of the main factors in the smoothness, progress and success of a company". The success of a company is supported by employees who can work optimally and maximally, in this case the company must be able to motivate or encourage employees to work optimally and always give their best to the company. In addition to salary, one thing that can motivate employees is by giving bonuses or awards for their achievements and work results. In giving bonuses or awards, a company is advised to make decisions based on the best employees accurately and objectively.

Companies engaged in agriculture, to improve their employee resources in improving the quality of work are certainly supported and influenced by the performance of competent employees in their fields. Where the company generally gives awards to the best employees every year so far it is still done manually, this can certainly increase employee enthusiasm in working and always running a business by meeting several criteria that have been set by the company [6]. Therefore, to provide an objective assessment of employee performance, a decision support system is needed in selecting the best employees and providing rewards to employees, then to support the above, several applications are needed, namely a decision support system that is applied to the human resource management system and based on criteria

that have been determined by management, by implementing the Weighted Product (WP) method.[7] Therefore, from the above problems, a system or application will be created that can help management in assessing its best employees every year.

2. Research Methods

The research steps for developing a track record model in optimizing employee performance can be seen in Fig 1 below.

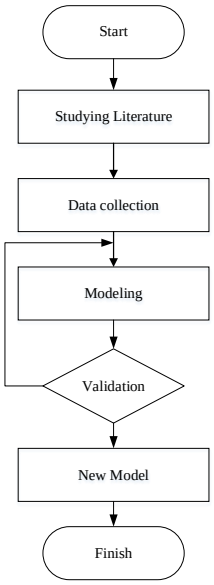

Fig. 1: Research Stages

In Fig 1 are the research stages in building a track record model in optimizing employee performance assessment using the Weight Product (WP) method, where the first stage is studying literature related to the decision support system model, the Weight Product (WP) method, track records, employee performance assessment and model validation tests. The second stage is collecting data, where the dataset collected is related to employee performance track records in the form of assessments carried out every month including Attendance (C1), Cooperation (C2), Quantity of Work (C3), Responsibility (C4), Honesty (C5), Ethics (C6), Discipline (C7), Good communication (C8), Mutual respect (C9) and Expertise (C10). The third stage is modeling, the objective function of the model built is to have a maximum total value of the assessment criteria based on track records, this model is built using the Decision Support System Technique with the Weight Product (WP) method. The next stage is to validate the model using The next stage is to validate the model using two different approaches, namely the Criterion-related Validity Test and the Internal Consistency Test. After the validation test is carried out on the model that has been built, it will produce a track record model in employee performance assessment.

The algorithm of the track record model in optimizing employee performance assessment using the Weight Product (WP) method is:
Input: Criteria that will be used as a reference in decision making, Rating of suitability of each alternative for each criterion, Weight (W) for each criterion
Output: Ranking of alternatives based on the value of the Vector V, Conclusion or final recommendation based on the ranking results

```
# Function for weight normalization
def normalize_weights(weights):
    total = sum(weights)
    return [w / total for w in weights]

# Function to calculate the value of vector S
def calculate_vector_S(ratings, normalized_weights):
    vector_S = []
    for i in range(len(ratings)):
        S_i = 1
        for j in range(len(ratings[i])):
            S_i *= ratings[i][j] ** normalized_weights[j]
        vector_S.append (S_i)
    return vector_S

# Function to calculate the value of vector V
def calculate_vector_V(ratings, normalized_weights):
    vector_V = []
    for i in range(len(ratings)):
        V_i = 0
        for j in range(len(ratings[i])):
```

```
            V_i += ratings[i][j] * normalized_weights[j]
        vector_V.append (V_i)
    return vector_V

# Function to rank the values of a vector V
def rank_alternatives(vector_V):
    return sorted(range(len(vector_V)), key=lambda k: vector_V[k], reverse=True)

# Example of input data
x1 = [value1, value2, …value n]   # Rating for each criteria in Alternative 1
x2 = [value1, value2, …value n]   # Rating for each criteria in Alternative 2
x3 = [value1, value2, …value n] # Rating for each criteria in Alternative 3
xn = [value1, value2, …value n] # Rating for each criteria in Alternative n

criteria_ratings = [x1, x2, x3, ..xn]  # Combine the criteria ratings from each alternative

weights = [w1, w2, …wn]  # Weight for each criteria

# Step 1: Normalize weights
normalized_weights = normalize_weights(weights)

# Step 2: Calculate the value of the vector S
vector_S = calculate_vector_S(criteria_ratings, normalized_weights)
print("Nilai vektor S:", vector_S)

# Step 3: Calculate the value of the vector V
vector_V = calculate_vector_V(criteria_ratings, normalized_weights)
print("Nilai vektor V:", vector_V)

# Step 4: Rank alternatives based on the values of the vector V
ranking = rank_alternatives(vector_V)
print("Ranking alternatif:", ranking)

# conclusion or recommendation
best_alternative = ranking[0]
print(f" Recommendation: The best alternative is Alternative {best_alternative + 1}")
```

3. Results and Discussion

3.1. Criteria

PT. Pertani (Persero) UPB Binjai in building a track record model as an optimization of employee assessment uses assessment criteria that are used as the main indicators of assessment. The assessment criteria used at PT. Pertani (Persero) UPB Binjai consist of ten criteria, namely, Attendance, Cooperation, Quantity, Responsibility, Honesty, Ethics, Discipline, Good Communication, Mutual Respect and Expertise as seen in table 1.

Table 1: Criteria Data

Code	Criteria Name	Score	Weight
C1	Presence	95-99	10
C2	Cooperation	90-94	9
C3	Quantity of Work	85-89	8
C4	Responsibility	80-84	7
C5	Honest	75-79	6
C6	Ethical	70-74	5
C7	Discipline	65-69	4
C8	Good communication	60-64	3
C9	Mutual respect	55-59	2
C10	Skill	50-54	1

3.2. Alternative

Determining the value of each alternative based on the criteria data obtained from PT Pertani (PERSERO) UPB Binjai for further calculations. The Alternative Data for PT Pertani (PERSERO) UPB Binjai Employees are as in table 2.

Table 2. Alternative Data

No	Name	Place and date of birth	Gender	Status
1	Efan Salim	Jakarta, 28-11-2000	M	Employee
2	Elis Sitompul	Bengkulu, 02-5-2001	F	Employee

3	Dio Febrian	Pasar 1 Kuala, 29-2-2004	M	Employee
4	Nurainun	Balai Kasih, 07-2-2004	F	Employee
5	Cika Karum	Binjai, 22-5-2003	F	Employee
6	Alwi Wijaya	Medan, 11-6-2002	M	Employee
7	Anggi Cahyani	Bandung, 04-1-2005	F	Employee
8	Indra Lesmana	Lincun, 09-1-2000	M	Employee
9	Dina Setiawati	Langkat, 10-7-2003	F	Employee
10	Gabriel Siregar	Selesai, 23-9-2005	M	Employee
11	M Adit	Bukit lawang, 10-3-2001	M	Employee
12	Romi Putra	Pasar 2, 12-4-2000	M	Employee

3.3. Model

Track Record Model in employee performance assessment using the Weight Product method (WP)[8][9]:

1. Determine the criteria that will be used as a reference in decision making.
2. Determine the suitability rating of each alternative on each criterion.
3. Determine the normalization of weight (W), the normalization formula for the WP method weight in the equation (1)

$$w_j = \frac{w_j}{\Sigma w_j} \quad (1)$$

4. Determining the Value of Vector S, the formula for vector S in the equation (2)

$$S_i = \prod_{j=1}^{n} X_{ij}^{W_j} \quad (2)$$

Information:
S : expresses the alternative preferences analogous to the vector S x : expresses the criteria values
W : stating the weight of criterion i : stating alternative j : stating the criterion
n : stating the number of criteria

5. The results of the multiplication are added up to produce the vector V value for each alternative. The vector V value can be calculated using the formula in the equation (3).

$$V_i = \frac{\prod_{j=1}^{n} x_{ij}^{W_j}}{\prod_{j=1}^{n} x_{ij*}^{W_j}} \quad (3)$$

Information:
V : express alternative preferences which are analogous to vectors V
x : stating the criteria value
w : stating the weight of the criteria
i : declare an alternative
j : stating the criteria
n : stating the number of criteria

6. Ranking Vector Values V
Searching for ideal alternative values, namely by ranking the Vector V Values while simultaneously making conclusions as the final stage.

3.4. Employee Performance Assessment with Track Record Model

Based on the assessment weight table, the following is the suitability of the assessment of each data to be calculated in table 3.

Tabel 3. Assessment Data

No	Alternative	C1	C2	C3	C4	C5	C6	C7	C8	C9
1	A1	90	80	85	75	70	70	87	95	65
2	A2	85	75	98	71	67	50	90	98	91
3	A3	78	56	60	59	71	76	65	98	99
4	A4	90	98	99	80	87	75	70	80	83
5	A5	80	85	75	78	88	90	65	59	90
6	A6	99	78	97	50	60	75	65	84	77
7	A7	80	99	70	76	50	87	88	95	66
8	A8	88	98	97	77	80	61	90	99	50
9	A9	50	60	75	85	55	90	99	77	61
10	A10	99	98	79	60	50	87	74	77	91
11	A11	50	60	70	69	80	75	77	85	54
12	A12	98	60	55	61	86	67	88	89	71

Based on table 3, the conversion is carried out according to the weight values contained in table 1 and the results are shown in table 4.

Table 4. Assessment Data based on Criteria Weighting

No	Alternatif	C1	C2	C3	C4	C5	C6	C7	C8	C9
1	A1	9	7	8	6	5	5	8	10	4
2	A2	8	6	10	5	4	1	9	10	10
3	A3	6	2	3	2	5	6	4	10	10
4	A4	9	10	10	7	8	6	5	7	7

5	A5	7	8	6	6	8	9	4	2	9
6	A6	10	6	10	1	3	6	4	7	6
7	A7	7	10	5	6	1	8	8	10	4
8	A8	8	10	10	6	7	3	9	10	1
9	A9	1	3	6	8	2	8	5	6	1
10	A10	10	10	6	3	1	8	5	6	9
11	A11	1	3	5	4	7	6	6	8	1
12	A12	10	3	2	3	8	4	8	8	5

Next, based on the assessment weight table data, the initial weight is W = (10,9,8,7,6,5,4,3,2,1). Then determine the priority level of weight for each criterion by using equation (1).

$$W1 = \frac{10}{10+9+8+7+6+5+4+3+2+1} = 0,18$$

$$W2 = \frac{9}{10+9+8+7+6+5+4+3+2+1} = 0,16$$

$$W3 = \frac{8}{10+9+8+7+6+5+4+3+2+1} = 0,14$$

$$W4 = \frac{7}{10+9+8+7+6+5+4+3+2+1} = 0,12$$

$$W5 = \frac{6}{10+9+8+7+6+5+4+3+2+1} = 0,10$$

$$W6 = \frac{5}{10+9+8+7+6+5+4+3+2+1} = 0,09$$

$$W7 = \frac{4}{10+9+8+7+6+5+4+3+2+1} = 0,07$$

$$W8 = \frac{3}{10+9+8+7+6+5+4+3+2+1} = 0,05$$

$$W9 = \frac{2}{10+9+8+7+6+5+4+3+2+1} = 0,03$$

$$W10 = \frac{1}{10+9+8+7+6+5+4+3+2+1} = 0,01$$

So as to get value W = (0,18; 0,16; 0,14; 0,12; 0,10; 0,09; 0,07; 0,05; 0,03; 0,01)

Then, based on the W value above, the S vector value for each alternative value will be calculated using the equation (2). Vector S is calculated using all multiplications of the criteria values 1 to n by raising W as the normalized weight for each work, which will have a positive value if W is a benefit attribute and a negative value if W is a cost attribute.

S1 = (90,18)(70,16)(80,14)(60,12)(50,10)(50,09)(80,07)(100,05)(40,03)(40,01) = 6,23915
S2 = (80,18)(60,16)(100,14)(50,12)(40,10)(10,09)(90,07)(100,05)(100,03)(20,01) = 5,24240
S3 = (60,18)(20,16)(30,14)(20,12)(50,10)(60,09)(40,07)(100,05)(100,03)(80,01) = 3,63406
S4 = (90,18)(100,16)(100,14)(70,12)(80,10)(60,09)(50,07)(70,05)(70,03)(90,01) = 7,22056
S5 = (70,18)(80,16)(60,14)(60,12)(80,10)(90,09)(40,07)(20,05)(90,03)(100,01) = 5,87894
S6 = (100,18)(60,16)(100,14)(10,12)(30,10)(60,09)(40,07)(70,05)(60,03)(90,01) = 4,76679
S7 = (70,18)(100,16)(50,14)(60,12)(10,10)(80,09)(80,07)(100,05)(40,03)(70,01) = 5,27843
S8 = (80,18)(100,16)(100,14)(60,12)(70,10)(30,09)(90,07)(100,05)(10,03)(70,01) = 6,40831
S9 = (10,18)(30,16)(60,14)(80,12)(20,10)(80,09)(50,07)(60,05)(10,03)(100,01) = 3,17328
S10 = (100,18)(100,16)(60,14)(30,12)(10,10)(80,09)(50,07)(60,05)(90,03)(90,01) = 6,3676
S11 = (0,18)(30,16)(50,14)(40,12)(70,10)(60,09)(60,07)(80,05)(10,03)(100,01) = 3,22616
S12 = (100,18)(30,16)(20,14)(30,12)(80,10)(40,09)(80,07)(80,05)(50,03)(10,01) = 4,24205

Then the results of the multiplication are added up to produce the vector V value for each alternative using equation (3).

$$V01 = \frac{6,23915}{6,23915+5,24240+3,63406+7,22056+5,87894+4,76679+5,27843+6,40831+3,17328+6,3676+3,22616+4,24205} = 0,068$$

$$V02 = \frac{5,24240}{6,23915+5,24240+3,63406+7,22056+5,87894+4,76679+5,27843+6,40831+3,17328+6,3676+3,22616+4,24205} = 0,057$$

$$V03 = \frac{3,63406}{6,23915+5,24240+3,63406+7,22056+5,87894+4,76679+5,27843+6,40831+3,17328+6,3676+3,22616+4,24205} = 0,039$$

$$V04 = \frac{7,22056}{6,23915+5,24240+3,63406+7,22056+5,87894+4,76679+5,27843+6,40831+3,17328+6,3676+3,22616+4,24205} = 0,079$$

$$V05 = \frac{5,87894}{6,23915+5,24240+3,63406+7,22056+5,87894+4,76679+5,27843+6,40831+3,17328+6,3676+3,22616+4,24205} = 0,064$$

$$V06 = \frac{4,76679}{6,23915+5,24240+3,63406+7,22056+5,87894+4,76679+5,27843+6,40831+3,17328+6,3676+3,22616+4,24205} = 0,052$$

$$V07 = \frac{5,27843}{6,23915+5,24240+3,63406+7,22056+5,87894+4,76679+5,27843+6,40831+3,17328+6,3676+3,22616+4,24205} = 0,057$$

$$V08 = \frac{6,40831}{6,23915+5,24240+3,63406+7,22056+5,87894+4,76679+5,27843+6,40831+3,17328+6,3676+3,22616+4,24205} = 0,070$$

$$V09 = \frac{3,17328}{6,23915+5,24240+3,63406+7,22056+5,87894+4,76679+5,27843+6,40831+3,17328+6,3676+3,22616+4,24205} = 0,034$$

$$V10 = \frac{6,3676}{6,23915+5,24240+3,63406+7,22056+5,87894+4,76679+5,27843+6,40831+3,17328+6,3676+3,22616+4,24205} = 0,069$$

$$V11 = \frac{3,22616}{6,23915+5,24240+3,63406+7,22056+5,87894+4,76679+5,27843+6,40831+3,17328+6,3676+3,22616+4,24205} = 0,035$$

$$V12 = \frac{4,24205}{6,23915+5,24240+3,63406+7,22056+5,87894+4,76679+5,27843+6,40831+3,17328+6,3676+3,22616+4,24205} = 0,046$$

Based on the results of the multiplication, they are added up to produce the vector V value for each alternative, which can be seen in table 6.

Table 6. Calculation Vektor V

Code	Vector	Value
A1	V01	0,068
A2	V02	0,057
A3	V03	0,039
A4	V04	0,079
A5	V05	0,064
A6	V06	0,052
A7	V07	0,057
A8	V08	0,070
A9	V09	0,034
A10	V10	0,069
A11	V11	0,035
A12	V12	0,046

Then, the results from table 6 can be seen in the ranking results shown in table 7, namely by sorting the values from the highest to the lowest.

Table 7. Ranking Results

Vektor	Alternative	Name	Result	Ranking
V04	A4	Nurainun	0,079	1
V08	A8	Indra Lesmana	0,070	2
V10	A10	Gabriel Siregar	0,069	3
V01	A1	Efan Salim	0,068	4
V05	A5	Cika Karun	0,064	5
V07	A7	Anggi Cahyani	0,057	6
V02	A2	Elis Sitompul	0,057	7
V06	A6	Alwi Wijaya	0,052	8
V12	A12	Romi Putra	0,046	9
V03	A3	Dio febrian	0,039	10
V11	A11	M Adit	0,035	11
V09	A9	Dina	0,034	12

Thus, based on the ranking results table above, the best employee was obtained, namely A4 = Nurainun with a value of 0.079 to be recommended to management as the employee with the best performance.

3.5. Validation Model

To validate the employee performance assessment model using the Weight Product (WP) method with the newly added criteria (Attendance, Cooperation, Quantity of Work, Responsibility, Honesty, Ethics, Discipline, Good Communication, Mutual Respect), we will carry out validation steps which include validity and reliability tests.

3.5.1. Criterion-related Validity

To ensure that the Weight Product (WP) method is valid in assessing employee performance, a Criterion-related Validity test was conducted [10]–[13] criteria by comparing the results of the WP method assessment with the assessment given by the supervisor. The technique used is Pearson correlation, which measures how strong the linear relationship is between two variables. The first step is to collect the results of employee assessments using the WP method and the assessments given by the supervisor. After the data is collected, we calculate the Pearson correlation coefficient between the two sets of assessments. The Pearson correlation coefficient (rrr) gives a value between -1 and 1, where a value close to 1 indicates a very strong positive relationship, a value close to -1 indicates a very strong negative relationship, and a value around 0 indicates no linear relationship. If the correlation results show a very high value close to or equal to 1, this indicates

that the assessment using the WP method is very consistent with the assessment given by the supervisor. This means that the WP method can be considered valid because it is able to reflect employee performance as assessed by the supervisor. This validity is important because it shows that the WP method is an accurate and reliable tool for evaluating employee performance.
Pearson's correlation coefficient (r) is calculated using equation (4):

$$r = \frac{n(\sum xy) - (\sum x)(\sum y)}{\sqrt{[n\sum x^2 - (\sum x)^2][n\sum y^2 - (\sum y)^2]}} \quad (4)$$

Where:
n = number of data pairs
x = assessment result value using the WP method
y = supervisor assessment result value
$\sum xy$ = sum of the multiplication of the values x and y
$\sum x$ = sum of x values
$\sum y$ = sum of y values
$\sum x^2$ = sum of the squares of the x values
$\sum y^2$ = sum of the squares of the y values

3.5.2. Internal Consistency

Internal consistency test is used to evaluate the extent to which the criteria in the employee performance appraisal method are consistent in measuring the same dimensions. By using the Cronbach Alpha coefficient [14]–[19], we can calculate the value that reflects the reliability or internal consistency of the assessment criteria. The higher the Cronbach's Alpha value, the more consistent the criteria are in measuring the same aspect of employee performance. The process of measuring internal consistency begins by calculating the variance of each assessment criterion and the total variance of all scores obtained. After that, Cronbach's Alpha is calculated using a statistical formula that considers the number of criteria and variance values, to provide a deeper understanding of how reliable the assessment method is in measuring employee performance consistently.

Koefisien Alpha Cronbach (α) calculated by the equation (5)

$$\alpha = \frac{N}{N-1}\left(1 - \frac{\sum s_i^2}{s_t^2}\right) \quad (5)$$

Where:
N = number of items/criteria
s_i^2 = variance of each item/criteria
s_t^2 = total variance of the scores obtained by summing all items/criteria

From the model validation calculations, it can be seen in the correlation graph of the results of the track record model with the WP and supervisor scores in giving performance scores to employee assessments, as seen in Fig 2. The average correlation value relationship between criteria can be seen in the graph in Fig 3 and the correlation matrix of assessments between criteria can be seen in Fig 4.

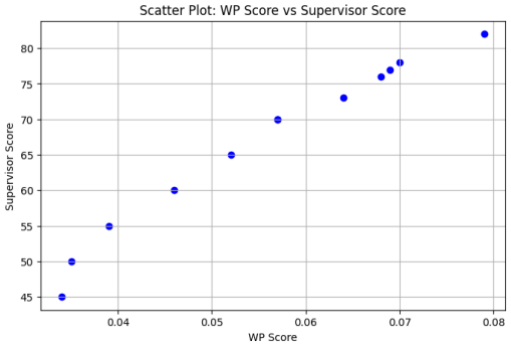

Fig. 2: Correlation graph of WP Score and Supervisor Score

In Figure 2, the scatter plot graph shows the relationship between scores given using the WP (Weighted Performance) method and scores given by supervisors to a number of individuals. Each point on the graph represents one individual, with the x-axis (WP Score) showing the score from the WP method, while the y-axis (Supervisor Score) shows the score given by the supervisor. The closer the points are to the diagonal line that goes up (from bottom left to top right), the higher the correlation between the WP method and the supervisor's assessment. For example, points that tend to be located close to the diagonal line indicate that the scores given by the WP method tend to be consistent with the assessments given by the supervisor.

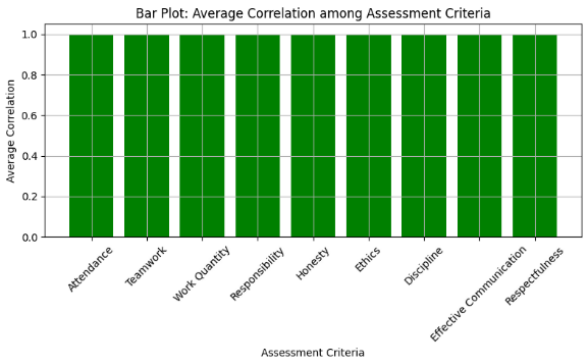

Fig. 3: Graph of average correlation values between criteria

In Figure 3, the bar graph shown illustrates the average correlation between the various assessment criteria in the dataset. From the graph, we can see that criteria such as attendance, cooperation, responsibility, honesty, ethics, good communication, and mutual respect have an average correlation of around 0.54, indicating a fairly consistent relationship with the other criteria in this assessment. On the other hand, criteria such as quantity of work and discipline show an average correlation of around 0.55, indicating that these criteria have a slightly higher correlation with the other criteria in the assessment. This graph helps to understand how concurrent or how different the measurements of each criterion are in the context of this evaluation, as well as providing insight into their relative relationships with each other.

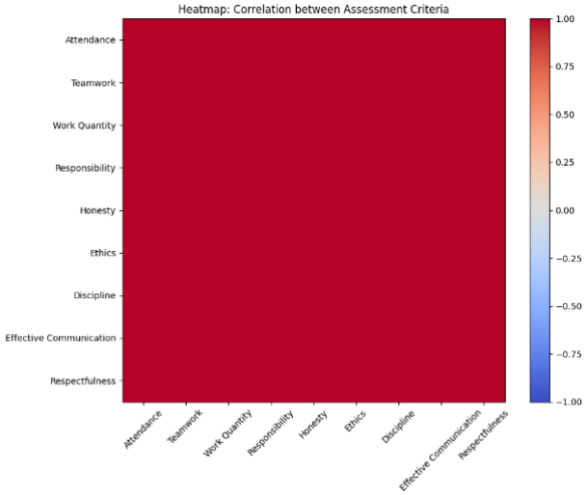

Fig. 4: Correlation heatmap between criteria assessments

In Figure 4, the Heatmap shown illustrates the correlation matrix between the various performance assessment criteria in the dataset, showing how closely related the criteria are. Each cell in the matrix shows the correlation coefficient between two specific criteria. The colors in the heatmap indicate the level and direction of correlation: blue indicates a positive correlation, red indicates a negative correlation, and white indicates no linear relationship. The correlation values range from -1 to 1, where positive values indicate a positive relationship, negative values indicate a negative relationship, and zero indicates no linear correlation. Based on the heatmap, In general, Attendance shows a strong positive correlation with Teamwork, Responsibility, Honesty, Ethics, Discipline, Effective Communication, and Mutual Respect, with correlation values ranging from 0.6 to 0.9. This suggests that employees who are well-attended tend to also receive high ratings on other aspects. Teamwork and Effective Communication also show strong positive correlations with the other criteria, ranging from 0.6 to 0.8. This indicates that individuals who are good at collaboration and communication tend to perform well on other aspects of the assessment as well. Quantity of Work shows a strong positive correlation with almost all other criteria, indicating that individuals who produce more work tend to also receive high ratings on various performance metrics. Honesty, Ethics, and Respect also show strong positive correlations with various other criteria, indicating that these ethical traits are associated with positive ratings across multiple aspects. Overall, this heatmap provides valuable insight into how closely the various aspects of performance assessment are related in this dataset. It helps in understanding the patterns and interactions between the various assessment criteria in the context of a given evaluation.

Validation test of the track record model to optimize employee performance assessment using the weight products (WP) method is
wp_scores = [0.079, 0.070, 0.069, 0.068, 0.064, 0.057, 0.057, 0.052, 0.046, 0.039, 0.035, 0.034]
supervisor_scores = [82, 78, 77, 76, 73, 70, 70, 65, 60, 55, 50, 45]
Criterion-related Validity: 0.9851379504054771
Alpha Cronbach: 1.0

In the context of using the Weighted Product (WP) method to optimize employee performance assessment, the results of the validation test show that this model has a high Criterion-Related Validity, which is 0.9851. This indicates that the scores generated from the WP method are significantly related to the assessment given by the supervisor. In addition, the Cronbach's alpha reaching a value of 1.0 indicates that this model has very good internal reliability, ensuring consistency in measuring various aspects of performance being evaluated. Thus, the use of the WP method can be considered effective in this context to optimize the employee performance assessment process.

4. Conclusion

In this study, the implementation of the Weighted Product (WP) method in employee performance assessment in agricultural companies has produced very positive and innovative results. WP not only provides efficiency in the employee evaluation process with a short calculation time, but also significantly reduces subjectivity in determining the best employees. The results of the validation test show that the WP method has high Criterion-Related Validity (0.9851) and very good internal reliability (Cronbach's alpha = 1.0), confirming that this method is consistent and reliable in providing accurate assessments of employee performance. These findings not only provide important contributions in the context of increasing the efficiency of human resource management, but also open up the potential for wider application in the agricultural industry and other sectors. Overall, the use of the WP method in employee performance evaluation is a progressive and strategic step to support the growth and sustainability of companies in this increasingly competitive era.

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