Artikel Employee Selection-AHP-SMART-MAUT-AKM

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Comparison of Selection for Employee Position Recommended MCDM-AHP, SMART and MAUT Method

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Abstract: In a company, employees are high-value assets, therefore it is necessary to select employees for the continuity of the company, of course, by getting quality human resources. The purpose of this paper is to refute the difference in the number of rankings in selecting the best employees through a comparison of the SMART and MAUT methods. Many methods can be used in the selection process. This article describes in detail about the selection of employee promotions using the MCDM-AHP collaboration method which is used to provide an assessment of the main criteria through eigenvector values based on joint decisions by company leaders based on consistent and optimal questionnaire instrumentation which is not set based on percentages manually based on wishes leader. The SMART method is used to provide a sub-criteria assessment based on a balanced weighting utility according to the number of criteria used, with an assessment weight starting from zero as the lowest value and one as the highest value. The MAUT method will be used as a comparison against the results of the SMART method, where the MAUT method has differences in determining the weights on the sub-criteria based on the perception of understanding the criteria, so that they are arranged in an orderly manner and then determine the utility value of the criteria, so that there are similarities between the two methods. The ranking results obtained from the comparison of the two methods are that they have the same rating, so that the decision support taken also has similarities between the two SMART methods and the MAUT method. This can happen if the standard of measurement is carried out consistently through the MCDM-AHP method by not changing the assessment range in determining the interval range of each criterion.

Keywords: MAUT, MCDM-AHP, Promotion, Ranking, Selections, SMART.

INTRODUCTION

Employee appraisal is the most important thing for the company to be able to maintain the company's existence so that it still exists. A prolonged assessment system will provide a clearer picture of the quality barometer of its human resources. If this is done properly, it will facilitate a more perfect job promotion selection system, meaning that by applying the patterns that have been done previously, it gives an easy picture of the candidates who deserve to be given the promotion. The selection process for promotions has become a lot of attention for all employees to provide consistent and optimal assessments (maryaningsih & Suranti, 2021), if carried out openly within the company using certain methods. Many methods can be used to carry out the selection process such as promotions (Haki et al., 2021), selecting the best employees, and evaluating employee performance. Methods that can be used for attribute concepts are the Simple Additive Weighting (SAW) method (Savitha & Chandrasekar, 2011) and the Technique for Orders Preference by Similarity to Ideal Solution (TOPSIS) (Aouadni et al., 2017). The methods used for ranking manipulation are the Multi-Criteria Decision Making (MCDM-AHP) method (Aziz et al., 2016), VIšekriterijumsko KOMpromisno Rangiranje (VIKOR) (Imanuwelita et al., 2018), ELimination Et Choix Traduisant la REalité (ELECTRE) (Hu et al., 2018) and Preference Ranking Organization Method For Enrichment Evaluation (PROMETHEE) (Purnomo, 2019), (Deshmukh, 2013). The method used for evaluation with the utility concept can use the Simple Multi-Attribute Rating Technique (SMART) (Safrizal, 2015) and Multi-Attribute Utility Theory (MAUT) methods (Mahendra & Hartono, 2021), all of which have an important role in the evaluation and selection process..

The discussion in this article will discuss a lot about the rating system using the MCDM-AHP method (Aziz et al., 2016) in collaboration with utility assessments for each criterion by applying the SMART (Kasie, 2013)

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SinkrOn
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and MAUT (Nasution et al., 2021) methods. The MCDM-AHP method is used to determine the weight value of each criterion used based on the magnitude of the eigenvector value generated through questionnaire instrumentation with the help of the calculation process using mathematical algebra matrieces (Saaty, 2010), (Serra Costa et al., 2016) , at this stage it will produce an optimal eigenvector value through how many iteration processes are needed. occurs which is conditioned based on no visible difference in the last eigenvector value obtained with the previous eigenvector value (Saaty, 2010). The results obtained for the eigenvectors from MCDM-AHP will be used to determine the utility reference to the main criteria, while the utility for the sub-criteria is determined by using the interval range for each level of the sub-criteria. This is done in order to provide a consistent value for the utility of each sub-criteria. Many researchers make the same mistake in setting different intervals for the utility of each sub-criteria, so this is a rebuttal for researchers to prove that the SMART and MAUT methods must have the same value (Nasution et al., 2021) in decision support in the ranking system.

LITERATURE REVIEW

Multi-criteria Decision Making-Analytic Hierarchy Process (MCDM-AHP)

To understand the Muti-criteria Decision Making of Analytic Hierarchy Process (MCDM-AHP) method, starting from filling out the questionnaire instrumentation, of course based on the comparison number (CN) to be compared, to find out how many CN values (Saaty, 2010) are by using the comparison formula listed in equation 1 , this is used to determine the data entry of the main criteria pairwise matrices that will be arranged (Alonso & Lamata, 2006) as stated in equatin 2. The resulting decision matrices will be used as main criteria that can be tested with certain steps, while the utility value of the sub-criteria is determined. by using an interval range, so as to provide a rating value with the same range of magnitude and consistency in determining the value of the rating system (Nasution et al., 2021), because this can be an important consideration.

MCDM-AHP is the application of a method that processes attribute data that is measured continuously and is able to provide support for ranking decisions consistently and optimally with an iteration system of multiplication matrices. Each stage of the multiplication matrices operation provides proof by testing the eigenvector value whether it is true that there is no difference in the value of the master eigenvector with the eigenvector at the iteration stage. If it still gives rise to the difference in the value of the eigenvector, then the next iteration must be carried out on the materices, but if it is otherwise, it can be said that the eigenvector value can be said to be optimal (Akmaludin et al., 2019) . The optimal eigenvector value gives a signal that the decision support to be taken can be said to be acceptable, of course, by testing its consistency value. The consistency eigenvector value was tested by multiplying the master matrices with the optimal eigenvector value, then the total result became a dimension called max. The vector mean value of max becomes the basis for calculating the consistency index (CI) pay attention to equation 3 and the consistency ratio (CR) with the formula listed in equation 4. The amount of CR value will be a measure of decision support whether it is accepted or not. Decisions that can be said to be accepted are measured based on the consistency ratio which must be less than 10 percentage.

$$C = \frac{n*(n-1)}{2} \quad (1)$$

Exp: C= Comparison number
N= ordo

$$M_{(b,k)} = \begin{bmatrix} a_{(1,1)} & a_{(1,2)} & a_{(1,3)} & \cdots & a_{(1,k)} \\ a_{(2,1)} & a_{(2,2)} & a_{(2,3)} & \cdots & a_{(2,k)} \\ a_{(3,1)} & a_{(3,2)} & a_{(3,3)} & \cdots & a_{(3,k)} \\ \vdots & \vdots & \vdots & \ddots & \vdots \\ a_{(b,1)} & a_{(b,2)} & a_{(b,3)} & \cdots & a_{(b,k)} \end{bmatrix} \quad (2)$$

Exp: M= Matrices dimention
a= elemen matrices M
b,k= menjelaskan baris dan kolom

$$CI = \frac{(\lambda \max - n)}{(n-1)} \quad (3)$$

Exp: CI = Consistency Index
λ max = Panjang vector
n = ordo number

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$$CR = \frac{CI}{RI} \quad (4)$$

Exp: CR = Consistency Ratio
CI = Consistency Index
RI = Random Index

The determination of the CR value is influenced by RI, where RI is arranged in the form of a table that is adjusted to the number of orders to be used, the use of the number of orders can affect the number of orders that have a value of more than two orders, pay attention in Table 1.

Table 1. Random Index

Ordo	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
RI	0.00	0.00	0.58	0.90	1.12	1.24	1.32	1.41	1.45	1.48	1.51	1.48	1.56	1.57	1.58

Simple Multi-Attribute Rating Technique (SMART)

The SMART method was developed by Edward in 1977 and is a decision support method for multi-criteria managers based on the importance of each criterion. Each criterion has a weighted value that describes the comparison of importance between one criterion and another (Mahendra & Hartono, 2021). The best alternative is the one that has the highest value compared to other alternatives. The importance value used in the SMART method can use the AHP method as a determinant of the weight of the criteria obtained based on the magnitude of the eigenvector value resulting from the determination together with the help of instrumentation in the form of a questionnaire. This is a new proposal and is important in providing a rating of the final goal. To determine the sub-criteria, it can be applied by determining the utility value in accordance with the scoring system using consistent intervals. The value of the utility stated in the maximum range is one and the minimum value is zero.

Several formulas can be used for modeling in the SMART method, to determine the normalization of data as shown below (Manalu, 2018),(Yusnitha et al., 2019). Assessment will of course be given to each alternative that has a different meaning of understanding, some assume that the largest value is the best value, for conditions like this one can use the formula in equation 5, while for normalized data which assumes that the smallest value is the best value , then the formula that can be used is stated in equation 6.

$$BU_i(x_i) = \frac{C_i - C_{min}}{C_{max} - C_{min}} x 100\, percent \quad (5)$$

Exp: $BU_i(x_i)$ = The greatest utility value is the best.
C_i = Data element on a specific row
C_{min} = The smallest data element range from each column
C_{max} = The largest range of data elements from each column

$$CU_i(x_i) = \frac{C_{max} - C_i}{C_{max} - C_{min}} x\ 100\, percent \quad (6)$$

Exp: $CU_i(x_i)$ = The smallest utility value is the best.
C_i = Data element on a specific row
C_{min} = The smallest data element range from each column
C_{max} = The largest range of data elements from each column

$$U(a_i) = \sum_{i=1}^{n} U_i W_i \quad (7)$$

Exp: $U(a_i)$ = The sum of the utility products of each row with the weight of the criteria
U_i = Utility value for each line
W_i = The utility weight of each criterion

Multi Attribute Utility Theory (MAUT)

The MAUT method is a method used to provide the final value that is summed v(x) relevantly or better known as utility. The application of the MAUT method is determined based on the value of importance that is measured numerically with the smallest weight being zero and the largest weight being 1 (Lestari et al., 2020),

*name of corresponding author

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(Gunawan, 2020), (Hayati et al., 2021). Some formulas that can be used for the use of the MAUT method are as follows. To determine the value of a total evaluation result for a particular alternative, you can use equation 8, while to find out the utility value of an alternative with a certain index, you can use equation 9, and to find out the normalized utility value of an alternative at a certain index, you can use the formula contained in equation 10.

$$v_x = \sum_{i=1}^{n} w_i . v_i(x) \quad (8)$$

Exp: v_x = The total evaluation value of the alternatives; w_i = The relative weight of a criterion to i
v_i = The results of the evaluation of each alternative

$$U_x = \frac{x - x_i^-}{x_i^+ - x_i^-} \quad (9)$$

Exp: U_x = Utilities from alternative in x; x = Alternative value to i in one criterion
x_i^- = The lowest value of criterion i on criterion; x_i^+ = The largest value of the ith criterion in the criteria

$$W_i = \frac{w_i'}{\sum w_i'} \quad (10)$$

Exp: W_i = The utility weight of each alternative to x; W_i' = Alternative value to i in one criterion
$\sum w_i'$ = The lowest value of criterion i on criterion

METHOD

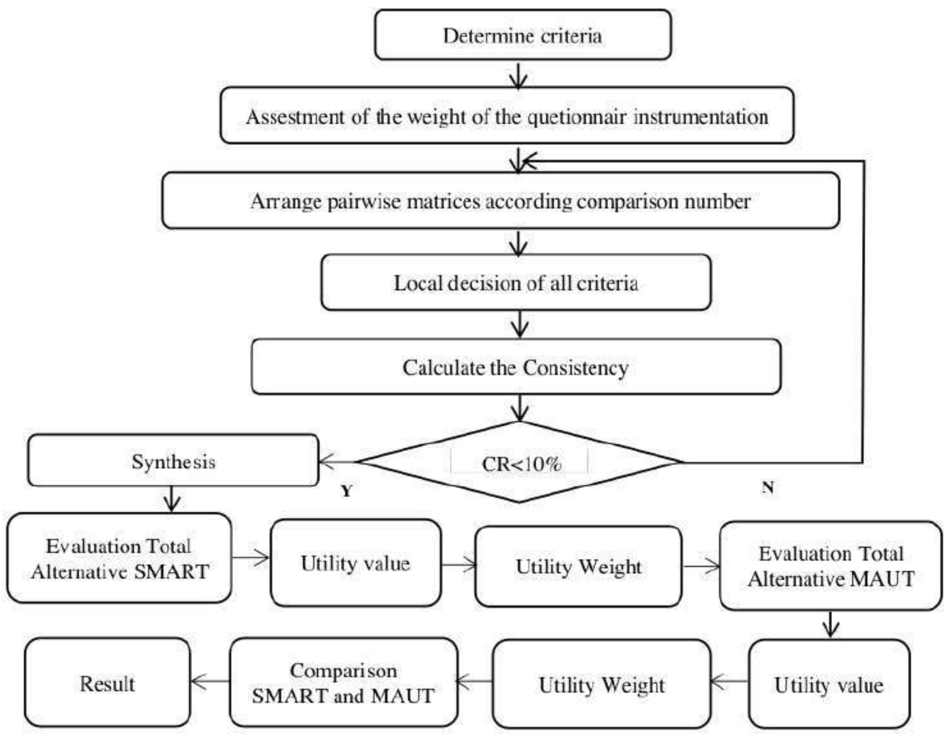

Fig. 1. MCDM-AHP SMART and MAUT Algoritm

*name of corresponding author

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RESULT

The ranking system that will be used to compare the SMART and MAUT methods has the same six criteria, this is used to prove that the two methods have similar results or produce differences. In terms of implementation, it has the same type of work method using the concept of giving value to utility and giving weight to each alternative from sub-criteria assessment. This means that logically they must have the same results, provided that different data processing methods have the same principle in their application. The criteria used are exactly the same between the two methods, both SMART and MAUT. This article is used as a rebuttal to the conclusions drawn by researchers who always have differences in the number of ranking results that are sorted manually, this difference will definitely occur if there are differences in the concept of giving weights to both criteria and sub-criteria, but if the weighting of the criteria is and sub-criteria, of course giving the same results, in this article it will be proven the truth that by giving the same weighting criteria and sub-criteria, it will produce the same output of decision support.

The assessment of the dataset used in this study includes six criteria, namely Attendance in a year, Leadership in a year, Performance in a year, Length in a year, Permit in a year, and Alpha in a year. Some of the criteria that will be used as a reference in the calculation process using the AHP method combined with the ranking calculation method in the form of the SMART and MAUT methods, pay attention to table 1. Obtaining the determination of the weight of the criteria is not set manually which is often done by researchers in a number of articles. For this time, the determination of the weights with the help of instrumentation in the form of a questionnaire with respondents based on the leaders who filled out the questionnaire sheets that have been standardized, this of course will provide an assessment system with the experience and understanding of the leaders who have experienced it and will then be used as a promotion system in the company. Likewise for the assessment of the weight of the sub-criteria which is designed using the same interval range system in order to provide a balance value and the principle of justice that is not binding on manual assessments, so it is hoped that the results of decision support will be more systematic and can be used for a long time so that it has use a system that is valid for the long term.

Table 1. Dataset Overview

Criteria/	Presence	Leadership	Performance	Length of Working	Permit	Alpha
Employee (n)	C1	C2	C3	C4	C5	C6
K1	94	Good	Less	12	2	4
K2	83	Enaugh	Good	5	3	3
K3	70	Good	Less	7	11	0
K4	73	Good	Enaugh	9	2	0
K5	68	Good	Good	5	4	0
K6	68	Enaugh	Good	6	2	3
K7	98	Good	Good	2	0	0
K8	96	Good	Good	12	0	0
K9	100	Satifying	Satifying	4	0	0
K10	75	Good	Good	2	1	0
K11	87	Good	Enaugh	3	2	1
K12	100	Good	Very good	1	2	0
K13	86	Good	Good	4	2	0
K14	68	Enaugh	Less	6	0	4
K15	100	Satifying	Good	8	0	1
K16	75	Very good	Satifying	9	0	0
K17	96	Good	Good	13	1	0
K18	86	Good	Good	10	1	0
K19	84	Good	Good	11	9	0
K20	90	Good	Good	5	0	0
K21	96	Good	Good	8	0	0

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K22	100	Satifying	Good	6	0	0
K23	95	Good	Good	7	0	0
K24	89	Good	Less	4	5	1
K25	100	Good	Good	3	1	0
K26	86	Good	Satifying	6	1	0
K27	79	Enaugh	Good	6	2	0
K28	84	Enaugh	Enaugh	7	8	0
K29	85	Enaugh	Good	9	2	0
K30	90	Good	Good	5	0	0
K31	100	Very good	Enaugh	11	0	0
K32	97	Good	Good	12	0	0
K33	100	Satisfying	Very good	5	0	0
K34	100	Good	Good	8	0	2
K35	96	Good	Good	3	0	0

Table 2. Criteria

Criteria	Code	Description
Attendance in a year	C1	Employee attendance for 1 year
Leadership in a year	C2	Leadership for 1 year
Performance in a Year	C3	Performance for 1 year
Length in a Year	C4	Working time for 1year
Permit in a Year	C5	Permit to work for 1 year
Alpha in a Year	C6	Alpha at work for 1 year

The criteria in Table 2 which consist of six items will be processed using the AHP method using an iteration system, meaning that the calculation of the eigenvector values to find the optimal eigenvector value that is ready to be used in determining the weighting of the criteria and Mathematics of algebra matrices and the results will be used as the determination of the value of the weighting criteria. . The sub-criteria are translated into sub-criteria and each sub-criteria has a utility weighting rating starting from 0 as the smallest weight and 1 as the largest weight with an interval of 0.20, while for utility to a scale with an interval of 1.

Table 3. Attendance in a Year

Presence in a Year	Scale	Weight
100	5	1
>=90-<=99	4	0.80
>=80-<=89	3	0.60
>=70-<=79	2	0.40
>=60-<=69	1	0.20
<60	0	0

Table 4. Leadership in aYear

Leadership in a Year	Scale	Weight
Satisfying	5	1
Very good	4	0.80
Good	3	0.60
Enough	2	0.40
Less	1	0.20
Very Less	0	0

Table 5. Performance in a Year

Performance in a Year	Scale	Weight
Satisfying	5	1
Very good	4	0.80
Good	3	0.60
Enough	2	0.40
Less	1	0.20
Very Less	0	0

Taking into account the range of intervals listed in Table 3, Table 4, and Table 5, the intervals have the same value, namely 0.2; this will be used as a form of testing that affects decision-making comparisons that are applied to both the SMART method and the MAUT method. The results of the decision support of the two methods so far the researchers have given different statements and in this study will prove that the two methods should have the same decision results. For other sub-criteria Table 6, Table 7 and Table 8 are made with the same interval, namely 0.17; so that each sub-criteria with the same description of the magnitude of the interval value.

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Table 6 Length of Working in a Year

Length of Working	Scale	Weight
>10	6	1
>=9.<=10	5	0.83
>=7.<=8	4	0.67
>=5.<=6	3	0.50
>=3.<=4	2	0.33
>=1.<=2	1	0.17
<1	0	0

Table 7. Permisson in aYear

Permission in a Year	Scale	Weight
>10	0	0
>=9.<=10	1	0.17
>=7.<=8	2	0.33
>=5.<=6	3	0.50
>=3.<=4	4	0.67
>=1.<=2	5	0.83
0	6	1

Table 8.Apha in a Year

Alpha in a Year	Scale	Weight
>=6	0	0
5	1	0.17
4	2	0.33
3	3	0.50
2	4	0.67
1	5	0.83
0	6	1

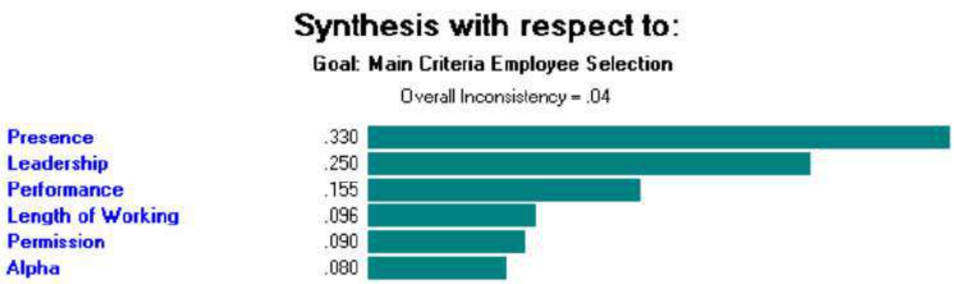
Notice in Table 6, Table 7, and Table 8 that each interval has the same interval value so it will look simpler in use into mathematical calculations. This is treated to prove that the equal weight of each sub-criteria will give the same decision value. The conversion value to be applied using the SMART method or the MAUT method with the provisions of the applicable rules, is not distinguished by the amount of utility.

By following the steps of the algorithm as shown in Fig. 1 The first step to be taken is the determination of 6 criteria and the assessment of instrumentation weights through instrumentation media in the form of a questionnaire filled out by company leaders. , so that it will produce pairwise matrices in the position of row b and column k according to what is stated in equation 2. The value of the pairwise matrices will be arranged as shown in Table 9.

Table 9. Pairwise matrices criteria using expert choice apps

	Presence	Leadership	Performance	Length of Working	Permission	Alpha
Presence		2.356	2.538	3.926	2.318	2.126
Leadership			2.301	2.913	3.128	3.238
Performance				1.986	2.362	2.213
Length of Working					1.224	1.873
Permission						1.324
Alpha	Incon: 0.04					

Pay attention to Table 9 which gives the results of the eigenvector values using an expert choice application with an arrangement that matches the number of comparison numbers for each element of the data matrices and is ready for further processing to determine the magnitude of the value of the eigenvector as the value of each criterion. The eigenvector values can be used using an expert choice application or by using a mathematical method with the concept of algebra matrices. The results of the synthesis obtained using the expert choice application can be seen in Figure 2 which is included with how much inconsistency value is obtained.



Gambar 2. Synthesis using expert choice apps

By paying attention to Figure 2, it can be determined how much each criterion is obtained to be used in determining the multiplication of the weight of the sub-criteria with the criteria. The inconsistency obtained is 0.04 this means that the suggested error value has a better level than because it can be smaller than 5%. This gives a deviation value that can be said to be good.

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Another proof of the eigenvector value can be done using mathematical algebra matrices with the concept of the Multi-criteria Decision Making Analytic Hierarchy Process (MCDM-AHP). the last eigenvector value has no difference with the previous eigenvector value obtained through iteration stages if it has not found the optimal eigenvector value. For filling in pairwise matrices data, it is somewhat different from using the expert choice application. The difference is in the filling of the lower triangular matrix data elements which are reciprocal of each element in the upper triangular matrices, pay attention to the input of pairwise matrices data using the mathematical algebra matrices in Table 10..

Tabel 10. Eigenvector dengan Algebra Matrices

Main Criteria	*C1*	*C2*	*C3*	*C4*	*C5*	*C6*	*Eigenvector*
Presence (C1)	1.000	2.356	2.538	3.926	2.318	2.126	0.330
Leadership (C2)	0.424	1.000	2.301	2.913	3.128	3.238	0.250
Performance (C3)	0.394	0.435	1.000	1.986	2.362	2.213	0.155
Length of Work (C4)	0.255	0.343	0.504	1.000	1.224	1.873	0.096
Permission (C5)	0.431	0.320	0.423	0.817	1.000	1.324	0.090
Alpha (C6)	0.470	0.309	0.452	0.534	0.755	1.000	0.080
	λ Max= 6.271		CI= 0.054		CR= 0.044		1.000

Pay attention to Table 10, it can be seen that the eigenvector values obtained from the calculation of Mathematich algebra matrices provide similar results with the eigenvectors obtained using an expert choice application. If the eigenvector value is obtained with mathematical algebra matrices, it must be proven by the amount of Consistency Ratio value that must be less than 10 percent. Pay attention to the evidence that can be seen in Figure 3 with the results of CR = 0.044, thus the decision can be accepted.

$$\begin{bmatrix} 1.000 & 2.356 & 2.538 & 3.926 & 2.318 & 2.126 \\ 0.424 & 1.000 & 2.301 & 2.913 & 3.128 & 3.238 \\ 0.394 & 0.435 & 1.000 & 1.986 & 2.362 & 2.213 \\ 0.255 & 0.343 & 0.504 & 1.000 & 1.224 & 1.873 \\ 0.431 & 0.320 & 0.423 & 0.817 & 1.000 & 1.324 \\ 0.470 & 0.309 & 0.452 & 0.534 & 0.755 & 1.000 \end{bmatrix} \text{X} \begin{bmatrix} 0.330 \\ 0.250 \\ 0.155 \\ 0.096 \\ 0.090 \\ 0.080 \end{bmatrix} = \begin{bmatrix} 2.067 \\ 1.566 \\ 0.973 \\ 0.603 \\ 0.562 \\ 0.501 \end{bmatrix}$$

Lamda Max	6.271
Consistensi Index	0.054
Consistency Ratio	0.044

Fig. 3. Multiplying criteria with eigenvectors to obtain CR

The results obtained for the eigenvector values provide similar results in their calculations using MCDM-AHP and mathematical algebra matrices. This gives a conclusion that there is an essential truth to the optimal eigenvector value that will be used as a weighting value against the criteria. The next stage is the scale conversion process for the datasets that have been shown in Table 1, which will be compared between the SMART and MAUT methods. The process of assessing the results of the acquisition using the SMART method is carried out according to the rules that have been set in the scale with the SMART method, the results can be seen in Table 11, while the normalization using the SMART method can be seen in Table 12.

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Table 11. SMART Scale Conversion

Employee (n)	Presence C1	Leadership C2	Performance C3	Length of Working C4	Permission C5	Alpha C6
K1	0.80	0.60	0.20	1.00	0.83	0.33
K2	0.60	0.40	0.60	0.50	0.67	0.50
K3	0.40	0.60	0.20	0.67	0.00	1.00
K4	0.40	0.60	0.40	0.83	0.83	1.00
K5	0.20	0.60	0.60	0.50	0.67	1.00
K6	0.20	0.40	0.60	0.50	0.83	0.50
K7	0.80	0.60	0.60	0.17	1.00	1.00
K8	0.80	0.60	0.60	1.00	1.00	1.00
K9	1.00	1.00	1.00	0.33	1.00	1.00
K10	0.40	0.60	0.60	0.17	0.83	1.00
K11	0.60	0.60	0.40	0.33	0.83	0.83
K12	1.00	0.60	0.80	0.17	0.83	1.00
K13	0.60	0.60	0.60	0.33	0.83	1.00
K14	0.20	0.40	0.20	0.50	1.00	0.33
K15	1.00	1.00	0.60	0.67	1.00	0.83
K16	0.40	0.80	1.00	0.83	1.00	1.00
K17	0.80	0.60	0.60	1.00	0.83	1.00
K18	0.60	0.60	0.60	0.83	0.83	1.00
K19	0.60	0.60	0.60	1.00	0.17	1.00
K20	0.80	0.60	0.60	0.50	1.00	1.00
K21	0.80	0.60	0.60	0.67	1.00	1.00
K22	1.00	1.00	0.60	0.50	1.00	1.00
K23	0.80	0.60	0.60	0.67	1.00	1.00
K24	0.60	0.60	0.20	0.33	0.50	0.83
K25	1.00	0.60	0.60	0.33	0.83	1.00
K26	0.60	0.60	1.00	0.50	0.83	1.00
K27	0.40	0.40	0.60	0.50	0.83	1.00
K28	0.60	0.40	0.40	0.67	0.33	1.00
K29	0.60	0.40	0.60	0.83	0.83	1.00
K30	0.80	0.60	0.60	0.50	1.00	1.00
K31	1.00	0.80	0.40	1.00	1.00	1.00
K32	0.80	0.60	0.60	1.00	1.00	1.00
K33	1.00	1.00	0.80	0.50	1.00	1.00
K34	1.00	0.60	0.60	0.67	1.00	0.67
K35	0.80	0.60	0.60	0.33	1.00	1.00

Table 12. SMART Normalization

Employee (n)	Presence C1	Leadership C2	Performance C3	Length of Working C4	Permission C5	Alpha C6
K1	0.75	0.33	0.00	1.00	0.83	0.00
K2	0.50	0.00	0.50	0.40	0.67	0.25
K3	0.25	0.33	0.00	0.60	0.00	1.00
K4	0.25	0.33	0.25	0.80	0.83	1.00
K5	0.00	0.33	0.50	0.40	0.67	1.00
K6	0.00	0.00	0.50	0.40	0.83	0.25
K7	0.75	0.33	0.50	0.00	1.00	1.00
K8	0.75	0.33	0.50	1.00	1.00	1.00
K9	1.00	1.00	1.00	0.19	1.00	1.00
K10	0.25	0.33	0.50	0.00	0.83	1.00
K11	0.50	0.33	0.25	0.19	0.83	0.75
K12	1.00	0.33	0.75	0.00	0.83	1.00
K13	0.50	0.33	0.50	0.19	0.83	1.00
K14	0.00	0.00	0.00	0.40	1.00	0.00
K15	1.00	1.00	0.50	0.60	1.00	0.75
K16	0.25	0.67	1.00	0.80	1.00	1.00
K17	0.75	0.33	0.50	1.00	0.83	1.00
K18	0.50	0.33	0.50	0.80	0.83	1.00
K19	0.50	0.33	0.50	1.00	0.17	1.00
K20	0.75	0.33	0.50	0.40	1.00	1.00
K21	0.75	0.33	0.50	0.60	1.00	1.00
K22	1.00	1.00	0.50	0.40	1.00	1.00
K23	0.75	0.33	0.50	0.60	1.00	1.00
K24	0.50	0.33	0.00	0.19	0.50	0.75
K25	1.00	0.33	0.50	0.19	0.83	1.00
K26	0.50	0.33	1.00	0.40	0.83	1.00
K27	0.25	0.00	0.50	0.40	0.83	1.00
K28	0.50	0.00	0.25	0.60	0.33	1.00
K29	0.50	0.00	0.50	0.80	0.83	1.00
K30	0.75	0.33	0.50	0.40	1.00	1.00
K31	1.00	0.67	0.25	1.00	1.00	1.00
K32	0.75	0.33	0.50	1.00	1.00	1.00
K33	1.00	1.00	0.75	0.40	1.00	1.00
K34	1.00	0.33	0.50	0.60	1.00	0.51
K35	0.75	0.33	0.50	0.19	1.00	1.00

The results of the normalization listed in Table 12 using the SMART method must be multiplied by each sub-criteria utility value to find out the score of each alternative from employees who will be decided as the best alternative, the results of the 35 best employees who will be promoted. in Table 13

.

Table 13. The result of the best employee promotion using SMART Method

Employee (n)	0.330	0.250	0.155	0.096	0.090	0.080	TOTAL
	C1	C2	C3	C4	C5	C6	
K1	0.247	0.083	0.000	0.096	0.074	0.000	0.501
K2	0.165	0.000	0.078	0.038	0.060	0.020	0.361
K3	0.082	0.083	0.000	0.058	0.000	0.080	0.303
K4	0.082	0.083	0.039	0.076	0.074	0.080	0.435
K5	0.000	0.083	0.078	0.038	0.060	0.080	0.339
K6	0.000	0.000	0.078	0.038	0.074	0.020	0.210
K7	0.247	0.083	0.078	0.000	0.090	0.080	0.577
K8	0.247	0.083	0.078	0.096	0.090	0.080	0.674
K9	0.330	0.250	0.155	0.019	0.090	0.080	0.922
K10	0.082	0.083	0.078	0.000	0.074	0.080	0.397
K11	0.165	0.083	0.039	0.019	0.074	0.060	0.439
K12	0.330	0.083	0.116	0.000	0.074	0.080	0.683
K13	0.165	0.083	0.078	0.019	0.074	0.080	0.498
K14	0.000	0.000	0.000	0.038	0.090	0.000	0.128
K15	0.330	0.250	0.078	0.058	0.090	0.060	0.864
K16	0.082	0.166	0.155	0.076	0.090	0.080	0.650
K17	0.247	0.083	0.078	0.096	0.074	0.080	0.658
K18	0.165	0.083	0.078	0.076	0.074	0.080	0.556
K19	0.165	0.083	0.078	0.096	0.015	0.080	0.517
K20	0.247	0.083	0.078	0.038	0.090	0.080	0.616
K21	0.247	0.083	0.078	0.058	0.090	0.080	0.635
K22	0.330	0.250	0.078	0.038	0.090	0.080	0.864
K23	0.247	0.083	0.078	0.058	0.090	0.080	0.635
K24	0.165	0.083	0.000	0.019	0.045	0.060	0.371
K25	0.330	0.083	0.078	0.019	0.074	0.080	0.663
K26	0.165	0.083	0.155	0.038	0.074	0.080	0.596
K27	0.082	0.000	0.078	0.038	0.074	0.080	0.352
K28	0.165	0.000	0.039	0.058	0.030	0.080	0.371
K29	0.165	0.000	0.078	0.076	0.074	0.080	0.473
K30	0.247	0.083	0.078	0.038	0.090	0.080	0.616
K31	0.330	0.166	0.039	0.096	0.090	0.080	0.800
K32	0.247	0.083	0.078	0.096	0.090	0.080	0.674
K33	0.330	0.250	0.116	0.038	0.090	0.080	0.903
K34	0.330	0.083	0.078	0.058	0.090	0.041	0.678
K35	0.247	0.083	0.078	0.019	0.090	0.080	0.596

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Table 14. MAUT conversion scale

Employee (n)	Presence C1	Leadership C2	Performance C3	Length of Working C4	Permission C5	Alpha C6
K1	4	3	1	6	5	2
K2	3	2	3	3	4	3
K3	2	3	1	4	0	6
K4	2	3	2	5	5	6
K5	1	3	3	3	4	6
K6	1	2	3	3	5	3
K7	4	3	3	1	6	6
K8	4	3	3	6	6	6
K9	5	5	5	2	6	6
K10	2	3	3	1	5	6
K11	3	3	2	2	5	5
K12	5	3	4	1	5	6
K13	3	3	3	2	5	6
K14	1	2	1	3	6	2
K15	5	5	3	4	6	5
K16	2	4	5	5	6	6
K17	4	3	3	6	5	6
K18	3	3	3	5	5	6
K19	3	3	3	6	1	6
K20	4	3	3	3	6	6
K21	4	3	3	4	6	6
K22	5	5	3	3	6	6
K23	4	3	3	4	6	6
K24	3	3	1	2	3	5
K25	5	3	3	2	5	6
K26	3	3	5	3	5	6
K27	2	2	3	3	5	6
K28	3	2	2	4	2	6
K29	3	2	3	5	5	6
K30	4	3	3	3	6	6
K31	5	4	2	6	6	6
K32	4	3	3	6	6	6
K33	5	5	4	3	6	6
K34	5	3	3	4	6	4
K35	4	3	3	2	6	6

Table 15. MAUT Normalization

Employee (n)	Presence C1	Leadership C2	Performance C3	Length of Working C4	Permission C5	Alpha C6
K1	0.80	0.60	0.20	1.00	0.83	0.33
K2	0.60	0.40	0.60	0.50	0.67	0.50
K3	0.40	0.60	0.20	0.67	0.00	1.00
K4	0.40	0.60	0.40	0.83	0.83	1.00
K5	0.20	0.60	0.60	0.50	0.67	1.00
K6	0.20	0.40	0.60	0.50	0.83	0.50
K7	0.80	0.60	0.60	0.17	1.00	1.00
K8	0.80	0.60	0.60	1.00	1.00	1.00
K9	1.00	1.00	1.00	0.33	1.00	1.00
K10	0.40	0.60	0.60	0.17	0.83	1.00
K11	0.60	0.60	0.40	0.33	0.83	0.83
K12	1.00	0.60	0.80	0.17	0.83	1.00
K13	0.60	0.60	0.60	0.33	0.83	1.00
K14	0.20	0.40	0.20	0.50	1.00	0.33
K15	1.00	1.00	0.60	0.67	1.00	0.83
K16	0.40	0.80	1.00	0.83	1.00	1.00
K17	0.80	0.60	0.60	1.00	0.83	1.00
K18	0.60	0.60	0.60	0.83	0.83	1.00
K19	0.60	0.60	0.60	1.00	0.17	1.00
K20	0.80	0.60	0.60	0.50	1.00	1.00
K21	0.80	0.60	0.60	0.67	1.00	1.00
K22	1.00	1.00	0.60	0.50	1.00	1.00
K23	0.80	0.60	0.60	0.67	1.00	1.00
K24	0.60	0.60	0.20	0.33	0.50	0.83
K25	1.00	0.60	0.60	0.33	0.83	1.00
K26	0.60	0.60	1.00	0.50	0.83	1.00
K27	0.40	0.40	0.60	0.50	0.83	1.00
K28	0.60	0.40	0.40	0.67	0.33	1.00
K29	0.60	0.40	0.60	0.83	0.83	1.00
K30	0.80	0.60	0.60	0.50	1.00	1.00
K31	1.00	0.80	0.40	1.00	1.00	1.00
K32	0.80	0.60	0.60	1.00	1.00	1.00
K33	1.00	1.00	0.80	0.50	1.00	1.00
K34	1.00	0.60	0.60	0.67	1.00	0.67
K35	0.80	0.60	0.60	0.33	1.00	1.00

If we look in more detail at the same dataset and processed with different methods, but at the normalization process stage the results are the same, this means that the two processes already provide an illustration that the results obtained with both the SMART method and the MAUT method provide the possible final results of the total. Multiplication of utility at the sub-criteria level and the weight of the criteria will give the same result value, pay attention to Table 16 which shows the final result of the total which will show the ranking system for 35 criteria giving similar results between the two SMART and MAUT methods.

Table 16. Comparison Ranking with SMART and MAUT Method

METODE SMART			METODE MAUT		
Employee (n)	Total	Ranking	Employee (n)	Total	Ranking
K9	0.922	1	K9	0.922	1
K33	0.903	2	K33	0.903	2
K22	0.864	3	K22	0.864	3
K15	0.864	3	K15	0.864	3
K31	0.800	4	K31	0.800	4
K12	0.683	5	K12	0.683	5
K34	0.678	6	K34	0.678	6
K8	0.674	7	K8	0.674	7
K32	0.674	7	K32	0.674	7
K25	0.663	8	K25	0.663	8
K17	0.658	9	K17	0.658	9
K16	0.650	10	K16	0.650	10
K21	0.635	11	K21	0.635	11
K23	0.635	11	K23	0.635	11
K20	0.616	12	K20	0.616	12
K30	0.616	12	K30	0.616	12
K35	0.596	13	K35	0.596	13
K26	0.596	13	K26	0.596	13
K7	0.577	14	K7	0.577	14
K18	0.556	15	K18	0.556	15
K19	0.517	16	K19	0.517	16
K1	0.501	17	K1	0.501	17
K13	0.498	18	K13	0.498	18
K29	0.473	19	K29	0.473	19
K11	0.439	20	K11	0.439	20
K4	0.435	21	K4	0.435	21
K10	0.397	22	K10	0.397	22
K28	0.371	23	K28	0.371	23
K24	0.371	23	K24	0.371	23
K2	0.361	24	K2	0.361	24
K27	0.352	25	K27	0.352	25
K5	0.339	26	K5	0.339	26
K3	0.303	27	K3	0.303	27
K6	0.210	28	K6	0.210	28
K14	0.128	29	K14	0.128	29

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DISCUSSIONS

Comparison of the two methods in the employee selection process using the basis of determining criteria through the eigenvector results from the Analytic Hierarchy Process (AHP) method through the calculation of algebra matrices, which will then be compared to the two SMART and MAUT methods through their sub-criteria, of course with a conversion scale that has The same standard will provide research results with the same output. Unlike the case with measurements made by researchers who use different versions of measurement conversion scales, of course, things like this can be predicted with certainty and will have different decision values. With the results of research that has been carried out to compare the two SMART and MAUT methods with the same rule base, it has been proven that the results of two different methods provide the same results in decision support..

CONCLUSION

The collaboration of the two methods, both SMART and MAUT, proves that by setting the same conversion scale value, it will support the same decision results. It is different for determining the value of a different measurement scale, of course, it will give different results. Of the 35 employees who were promoted to leadership positions in the company environment who applied using the SMART and MAUT methods, they resulted in optimal decision support, this is because the determination of the scale conversion used uses consistent and objective rules, so that both methods can be concluded to be used in the system. ranking and evaluation in the selection of promotions in a consistent manner and the results of decisions that can be said to be optimal.

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