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Integrated MCDM-AHP and MABAC for Selection Head of Branch Offices

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Abstract: Leadership changes are very urgent in maintaining organizational stability. A good relay can build significant strength in carrying out organizational operational activities, of course, this must be done with good selection. The purpose of this writing is to provide a consistent picture of the selection of branch heads in carrying out business competition which is measured based on the competencies possessed by the selected employees. The barometer is determined based on eight criteria as an assessment that is declared objective by the leadership, namely critical thinking, communication, analyzing, creativity and innovation, leadership, adaptation, cooperation, and public speaking. The method used will be implemented in an integrated manner from the two MCDM-AHP methods and the MABAC method. These two methods have similar applications to the selection process. MCDM-AHP is used to select eight criteria as determinants of weighting and the MABAC method is used to determine the ranking process assessment for integrated decision making. The results obtained based on the weighted matrices of the branch head office selection process were measurably obtained, namely that the first priority was held by A11 with a weight of 1,406. the three rankings below were sequentially A12, A1, A9 with a weight of each 0.761; 0.675; and 0.469. The results of the integrity of both methods can provide evidence of decision support for the branch head selection process consistently with optimal results. The ranking system can be regulated and utilized for the purposes of selecting leaders to be placed in other positions.

Keywords: Branch head offices, Integrated, MABAC, MCDM-AHP, Multi-criteria.

INTRODUCTION

A leader must have a big responsibility in running the business in all lines of leadership (Bhat et al., 2024),(Yang et al., 2022). Leaders must have internal and external abilities, both for themselves and for the benefit of common goals outside the organizational environment (Tang et al., 2024),(Yang et al., 2022). The aim of this writing is to provide a consistent and optimal description of the branch head selection process in the organization. The process of selecting leaders for placement as branch heads requires a barometer in the form of a number of criteria as a basis for assessing the selection process (Demir et al., 2023). The selection carried out must of course have a good level of independence and consistency (Shanta et al., 2024), meaning there is no subjective interference from anywhere. Input an assessment of the criteria with the help of instrumentation in the form of a questionnaire sourced from experts who have experience as leaders. Assessment of questionnaire entries is processed objectively with the help of the Multi-criteria Decision Making-Analytic Hierarchy Process (MCDM-AHP) method and the Multi Attributive Border Approximation Area Comparison (MABAC) method which can be collaborated in an integrated manner to support decision making. This method is a priority in the discussion of this research, because this method can be compared with other methods of the selection process. Another method is ranking using the WASPAS method which provides differences in ranking with the TOPSIS method in providing a mean range with the help of the Delphi questionnaire (Bid & Siddique, 2019), The project selects an indigenous community approach using the WASPAS method by addressing key aspects of decision making in a consistent way (Rudnik et al., 2021), selection of the best cell phone model using the proposed COPRAS and ARAS methods through model preferences using four criteria provides selection decision results that are not much different. (Goswami & Mitra, 2020), With the advantages and disadvantages of each MCDM method, it is possible to combine several existing methods to provide a better solution or alternative. This research compares the ranking results between the AHP-VIKOR method combination and the AHP-SAW method combination in a performance assessment case study. The AHP method is used to weight criteria and sub-criteria, while the VIKOR and SAW

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methods used in the alternative ranking process. The test results show that there are differences in the ranking of alternative results between the two combinations of MCDM methods used (Waas et al., 2022).

Looking at the results of previous research, giving weighting values to criteria does not provide an overview of the optimal value of weighting and testing the feasibility of the results of weighting criteria. It would be better if value weighting were implemented, so that the results are able to answer the failures that have been made until finding real success when value weighting is applied. (Elshall et al., 2022), (Büscher & Bauer, 2023). The research that will be discussed here certainly has different proposals for assigning weighting values using the MCDM-AHP method through a mathematical algebra matrices approach which is compared with the expert choice application as proof of identical eigenvector values which are referred to as weighting of eight criteria, with feasibility testing aimed at being able to used as a form of collaboration with other methods such as the MABAC method in this research to obtain rankings in the branch head office selection process.

The MCDM-AHP method is used to provide numerical quantities for all criteria used as a measure of weighting for eight criteria that have been determined together with experts as assessors, namely critical thinking, communication, analyzing, creative and innovation, leadership, adaptation, cooperation, and public speaking . The achievement made was by using two methods of comparing the magnitude of the obtained eigenvector values to prove the results were identical. (Shpiz et al., 2013), to be accepted for eligibility first. This feasibility provides clear evidence that the results obtained with respect to eigenvector values can be integrated with other methods. In this case the MCDM-AHP method with the MABAC method can provide support for decision making. With this method, the decisions taken can be said to be consistent calculations and their implementation is objective.

Several other studies prove the selection process using the MABAC method, such as hotel reservations (Aldisa, 2022), but determining the weight of each criterion is determined manually without using specific research results. In other research using the MABAC method regarding loan applications (Ismail & Hasanah, 2022), the weighting applied was not based on the results of selection research on the criteria and without feasibility testing on the weights of the criteria used, it should have been carried out using a weight feasibility test to give better results. In particular, this research provides an overview of the use of criteria weighting techniques using the AHP method based on the results of optimal eigenvector values whose feasibility was tested using two approaches, namely the mathematical algebra matrices approach and the expert choice apps approach. This is what is unique about this research, which explains in detail in the discussion of this research that the acquisition of the eigenvector used in weighting has provided the feasibility of being able to be used both internally and externally method as collaboration method.

To achieve objectivity, all input is based on input data through a questionnaire instrumentation process which will be calculated using mathematical algebra matrices as appropriate measurements. (Ekström et al., 2021), (Hema Surya et al., 2023). These results will be compared and tested to see how big the level of inconsistency is with the expert choice application, which first looks at the identical eigenvector value results obtained through mathematical algebra matrices and the expert choice application as an application of the AHP concept. (Hema Surya et al., 2023). The results of obtaining identical eigenvector values and what must be achieved are truly identical. The truth of this identical eigenvector value can be stated that the eigenvector value has obtained the feasibility of being integrated with other methods, of course in this research it can be integrated with the MABAC method.

The MABAC method is integrated because it has the function of analyzing to provide utility interval level values for all selected alternatives, namely twelve branch head candidates, through weighted alternative elements and alternative distances from the estimated area to obtain the final value with the highest priority as the superior alternative of the twelve candidate for branch head office regarding the selection process.

Contributions that can be taken from the understanding above are 1) Providing a unique picture in determining the feasibility of eigenvector values in determining priority criteria whose feasibility must be tested using a mathematical algebra matrices approach and expert choice applications whose results must be identical to the consistency of the use of criteria so that they can be integrated with the method. others in the ranking system. 2) Testing the feasibility of the eigenvector values must find the optimal point marked by the matrix iteration process, which in this study occurred five times, meaning that no difference between the last eigenvector value and the previous eigenvector was found. This is what is said to be the optimal eigenvector value as a form of feasibility that can be integrated and this is a clear difference when compared with other AHP method approaches.

LITERATURE REVIEW

Multi-criteria Decision Making-Analytic Hierarchy Process

Multi-criteria Decision Making-Analytic Hierarchy Process (MCDM-AHP) This is a method that is very different from other AHP methods (Moslem & Pilla, 2024). This difference can be seen in the process of determining the eigenvector value as a form of weighting a number of criteria used. MCDM-AHP determines weights by stating the eigenvector values (Akmaludin, Sihombing, et al., 2023). The processing of input data through questionnaire instrumentation is determined based on comparison numbers which are compared against

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the criteria as a whole with each other, so that nothing is left out of the comparison process. This process is carried out to provide an objective assessment system for these criteria. As for its use, it can be implemented via (1).

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

Exp: CN: Number of comparison ; n: materices ordo

The arrangement of the element matrices known through (1) will be arranged based on pairwise matrices rules which are adjusted to the number of matrices orders. The resulting matrices formation will form a square according to the order of the matrices being compared (Olabanji & Mpofu, 2014). Pairwise matrices must be arranged according to the rules of the game in applying matrices according to the rows and columns that have been arranged. The usage can be shown in accordance with (2) as the original form of matrices.

$$M_{(i,j)} = \begin{bmatrix} e_{(1,1)} & e_{(1,2)} & e_{(1,3)} & \cdots & e_{(1,j)} \\ e_{(2,1)} & e_{(2,2)} & e_{(2,3)} & \cdots & e_{(2,j)} \\ e_{(3.1)} & e_{(3,2)} & e_{(2,4)} & \cdots & e_{(3,j)} \\ \vdots & \vdots & \vdots & \ddots & \vdots \\ e_{(i,1)} & e_{(i,2)} & e_{(i,3)} & \cdots & e_{(i,j)} \end{bmatrix} \quad (2)$$

Exp: $M_{(i,j)}$: Matrices M in row i and colomn j

$e_{(i,j)}$: elemen matrices in row i and colomn j

This MCDM-AHP method has a long stage of consistency to determine the eigenvector value by repeated geometric multiplication (Erzan & Tuncer, 2020), especially in the iteration process if there is a difference in the assessment of the normality point which deviates quite far from the normality graph. This will be processed thoroughly through iteration stages of questionnaire assessments from experts. The iteration process aims to provide a feasibility value for providing eigenvector values. This can be known by the difference value of the eigenvector iteration at the last calculation position with the eigenvector value of the previous calculation. The iteration will stop when no difference eigenvector value is found, this indicates that the eigenvector value is optimal. The first stage of the process is carried out after determining the pairwise matrices to find the optimal eigenvector value (Akmaludin, Samudi, et al., 2023) is to do the multiplication of the matarices, through the iteration stages you have to obtain the consistency vector (CV) which can be done using (3)

$$CV = \prod_{n=i}^{j} \lambda \max \quad (3)$$

Exp: CV: Consistency vector; i= in row; j: vector totality;

λ max: dividing each row produced by the optimal eigenvector value by multiplying the matrices with the optimal eigenvector.

The second stage of consistency is to calculate the consistency index which can be obtained through λ max as a determinant of vector length which can be searched through (4) which is influenced by the order value of the pairwise matrices.

$$CI = \frac{(\lambda \max - n)}{(n-1)} \quad (4)$$

Exp: CI: Consistency index; λ max: length of vector; n: ordo matrices

The final consistency which is used as a reference for the optimal eigenvector quantity is the consistency ratio (CR). The value of obtaining the consistency ratio can be proven using two approaches, namely the mathematical algebra matrices approach. (Erzan & Tuncer, 2020) and an approach with proof through the expert choice application. The first approach and the second approach must provide identical results regarding the eigenvector values, the second approach will provide an illustration besides the identical values and the amount of inconsistency that should be obtained. Both refer to the consistency ratio which must be smaller than ten percent. To obtain the consistency ratio value, it can be applied using (5).

$$CR = \frac{CI}{RI} \quad (5)$$

Exp: CR: Consistency ratio; RI: Random index in table

The value of the consistency ratio (CI) is greatly influenced by the random index (RI) (Ampofo et al., 2023), Determining the RI value requires the help of a table that has been determined by AHP experts. The RI table can be seen in Table 1. Each order has a clear difference in value as the denominator.

Table 1. Random Index (RI) (Deretarla et al., 2023)

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Ordo	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
RI	0	0	0.6	0.9	1.12	1.24	1.32	1.41	1.45	1.48	1.51	1.48	1.56	1.57	1.58

Multi Attributive Border Approximation Area Comparison

Multi Attributetive Border Approcimation Area Comparison (MABAC) Determining the RI value requires the help of a table that has been determined by AHP experts. The RI table is a method used to analyze a number of different alternatives and provide an assessment of the alternatives according to their utility which is determined based on intervals to increase efficiency and an assessment of the accuracy of decision making support which can be seen in Table 1. Each order has a clear difference in value. as the denominator. (Chakraborty et al., 2023). The basic assumption of this method lies in the distance of the criterion function from each alternative. This method can be used as decision-making support because the results are assessed rationally in determining ranking alternatives (Wang et al., 2020). There are several stages that must be carried out using the MABAC method, namely the first step is to prepare initial decision matrices in which all alternatives are declared in vector form and each data element has different criteria for each vector row. The layout of the data elements is as shown in (6).

$$M = \begin{matrix} & C1 & C2 & C3 & & Cn \\ A_1 & x_{(1,1)} & x_{(1,2)} & x_{(1,3)} & & x_{(1,q)} \\ A_2 & x_{(2,1)} & x_{(2,2)} & x_{(2,3)} & \cdots & x_{(2,q)} \\ A_3 & x_{(3,1)} & x_{(3,2)} & x_{(3,3)} & & x_{(3,q)} \\ \vdots & & \vdots & & \ddots & \vdots \\ A_n & x_{(p,1)} & x_{(p,2)} & x_{(p,3)} & \cdots & x_{(p,q)} \end{matrix} \quad (6)$$

where: Cn = Criteria n
A_n= A= Element matrices in row p as alternative; n= {1,2,3, ….m}
$x_{(p,q)} = x$: Element matrices in row p and colomn q

By preparing the layout of the matrices elements, to be able to calculate them using the MABAC method, a normalization process must be carried out first to determine the range of each matrix element. The data matrix elements have two approach assumptions, namely the benefit (B) and cost (C) criteria approaches.

$$N_{(p,q)} = \frac{(X_{(p,q)} - X_p^-)}{(X_p^+ - X_p^-)}; normalization\ for\ benefit\ criteria \quad (7)$$

Where: $N_{(p,q)} = Normalization\ for\ element\ data\ matrices$

$$N_{(p,q)} = \frac{(X_{(p,q)} - X_p^+)}{(X_p^- - X_p^+)}; normalization\ for\ cost\ criteria \quad (8)$$

Where: $X_{(p,q)}$ = position of matrices elements in row p and column q
X_p^- = the smallest value of element matrices in colomn p
X_p^+ = the largest value of element matrices in column p

After the normalization process is carried out, then carry out calculations for the weighted matrix elements which function to obtain the total number of criteria and the total number of alternatives. To calculate the elements of weighted matrices using (9).

$$V_{(p,q)} = (w_p * t_{(p,q)}) + w_p \quad (9)$$

Where: V: Weighted matrices
w_p: weight of each criterion
$t_{(p,q)}$: element matrices after normalization in row p and column q

Once obtained, a search is carried out for the approximate border area which can be done using (10).

$$G_q = \left(\prod_{q=1}^{m} V_{(p,q)}\right)^{1/m} \quad (10)$$

Where: G_q = Approximate border area
m = Total number of alternatives
Q=1 = The first column criteria until the last colomn criteria

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$V_{(p,q)}$ = Element matrices tertimbang

The final process that can be carried out to determine the ranking uses the calculation of alternative distance matrix elements from the estimated border area (Q) can be done using (11) and for ranking alternatives S_i using (12).

$$Q = V - G \quad (11)$$

Q = (Elements of alternative distance matrices from border areas).
V = (The weighted matrices elements of each $V_{(i,j)}$)
G = (Alternative A_i in the approximate border area)

$$S_i = \sum_{q=1}^{n} Q_{(i,j)} \text{ where q=1,2,3,….n ; i=1,2,3,…..m} \quad (12)$$

METHOD

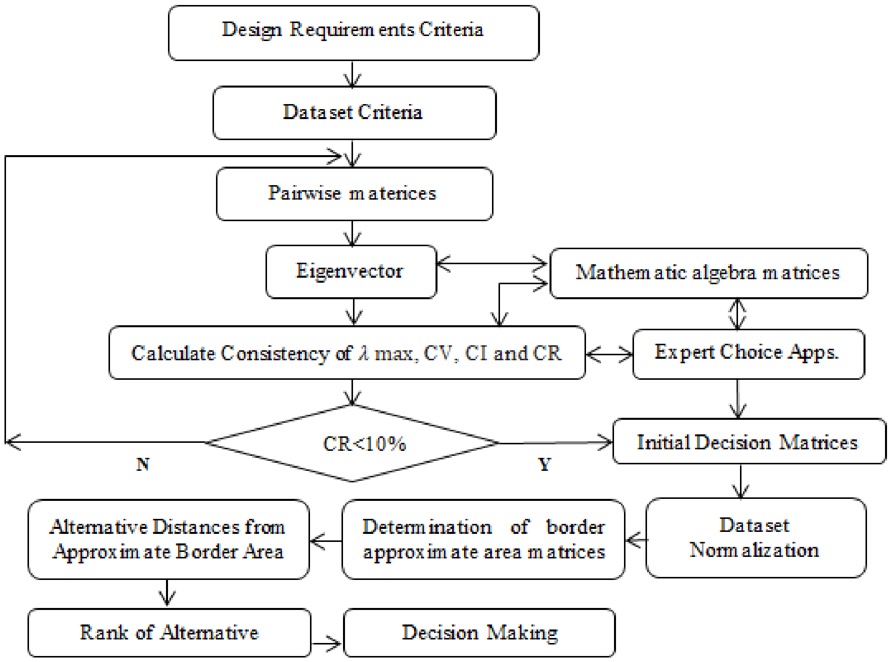

Fig. 1. MCDM-AHP MABAC Algorithm

Pay attention to the algorithm in Fig. 1 provides insight into the stages of completing the research case that will be carried out. Obtaining eigenvector values through the MCDM-AHM stage will be tested using two approaches to prove that the eigenvector values are indeed optimal and suitable for use in the collaboration method. The approach used uses mathematical algebra matrices and expert choice applications where the eigenvector values must be absolutely identical for the two approaches. Thus the eigenvector values can be used by other methods such as MABAC. The collaboration stages of the MABAC method have several stages as shown in Fig. 1. The explanation of integrated MCDM-AHP and MABAC are:

a. Design requirements criteria, determine a number of criteria that will be used as research material.
b. Dataset criteria, determine criteria data as a unit for determining criteria through expert determination.
c. Pairwise matrices, compose two-dimensional matrices against all criteria that will be calculated and tested for feasibility through mathematical algebra matrices and expert choice apps.
d. Eigenvector, determine the eigenvector value based on the multiplication of matrices through several stages of iteration until finding the optimal eigenvector value.
e. Calculate consistency, calculating the consistency value through regular stages starting from the vector length (λ max), consistency vector, consistency index, to obtain a consistency ratio whose value according to the saaty rules must be less than or equal to ten percent. If it is wrong or not found, then prepare the pairwise matrices correctly for the comparison. If correct is found, then the eigenvector value can be initialized as an acceptable decision and continue.
f. At point e, The feasibility of obtaining eigenvector values must be tested using two approaches, the first approach using mathematical algebra matrices and the second approach using expert choice apps. If both

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testing approaches provide identical values, then it is true that the eigenvector value can be used as a weight for each criterion and can be collaborated with other methods.

g. Initial decision matrices, as an initial determination of obtaining eigenvector values which can be used with other methods such as MABAC which is used in this research.
h. Dataset normalization, determine the unity of data for a number of alternatives for each criterion that has been determined by the weight of each.
i. Determination of border approximate area matrices, used as a determinant that estimates the border area of each predetermined criteria weight.
j. Alternative distance from approximate border area, determine the exact position distance from each criterion to the amount of ownership of each criterion.
k. Rank of alternative, provide a ranking of each alternative against the magnitude of each criterion obtained from the calculation results of each alternative.
l. Decision making, determine the results of the ranking system for all alternatives, the largest value index will be ranked first and the smallest value index will be ranked last.

RESULT

Data collection was carried out with the help of instrumentation i the form of a questionnaire addressed to respondents using a saturated sampling technique aimed at experts as leaders in the relevant agency to determine a number of criteria. The criteria used are eight items, namely critical thinking, communication, analyzing, creative and innovative, leadership, adaptation, cooperation, and public speaking. These eight criteria will be compared based on their importance to each other which intersects with the comparative assessment according to (1). Pairwise matrices are formed according to (2) to be processed using the mathematical algebra matrices approach. At this stage the process undergoes an iterative process five times to obtain the expected eigenvector value, so that it is obtained optimally. The results will be tested with several stages of CV, CI and CR consistency according to (3), (4), and (5). To obtain the CR value, the RI Table is assisted by the number of orders used in completing the matrices. The process of obtaining the eight criteria used provides results that can be said to be optimal as proven in Table 2.

Table 2. Pairwise matrices and eigenvector using algebra matrices

Criteria	CO	RS	LY	AT	AN	FL	PS	IN	Eigenvector
Critical Thinking (CT)	1.000	2.063	2.153	3.172	4.217	3.026	4.218	4.024	0.279
Communication (CM)	0.485	1.000	1.956	2.184	3.347	3.272	4.053	3.224	0.206
Analyzing (AN)	0.464	0.511	1.000	2.474	2.056	3.147	3.214	3.266	0.161
Creative and Innovative (CI)	0.315	0.458	0.404	1.000	1.324	4.029	2.184	3.256	0.116
Leadership (LS)	0.237	0.299	0.486	0.755	1.000	1.336	2.055	2.286	0.079
Adaptation (AD)	0.330	0.306	0.318	0.248	0.749	1.000	2.162	1.224	0.062
Cooperation (CP)	0.237	0.247	0.311	0.458	0.487	0.463	1.000	1.976	0.051
Public Speaking (PS)	0.249	0.310	0.306	0.307	0.437	0.817	0.506	1.000	0.045

λ max = 8.477 ; Consitency Index (CI)= 0.068 ; Consistency Ratio (CR)= 0.048 (Acceptable)

The second approach utilizes an automatic expert choice application in the process of obtaining optimal eigenvector values which is identical to the treatment in the first approach. The difference is the pairwise data entry of upper triangular matrices which can be shown in Table 3. Of Concern is the inconsistency value with a magnitude of 0.04, this gives The meaning of the calculation process carried out is said to be good and acceptable. Meanwhile, the calculation process using the expert choice application is automatic, so the required output from this process can be seen in Fig. 2 which displays an inconsistency value of the same magnitude, namely 0.04.

Table 3. Pairwise matrices using application of expert choice

Compare the relative importance with respect to: Softskill Criteria

	Critical Thiking	Communication	Analyzing	Creative and Innovatif	Leadership	Adaptation	Cooperation	Public Speaking
Critical Thiking		2.063	2.153	3.172	4.217	3.026	4.218	4.024
Communication			1.956	2.184	3.347	3.272	4.053	3.224
Analyzing				2.474	2.056	3.147	3.214	3.266
Creative and Innovatif					1.324	4.029	2.184	3.256
Leadership						1.336	2.055	2.286
Adaptation							2.162	1.224
Cooperation								1.976
Public Speaking	Incon: 0.04							

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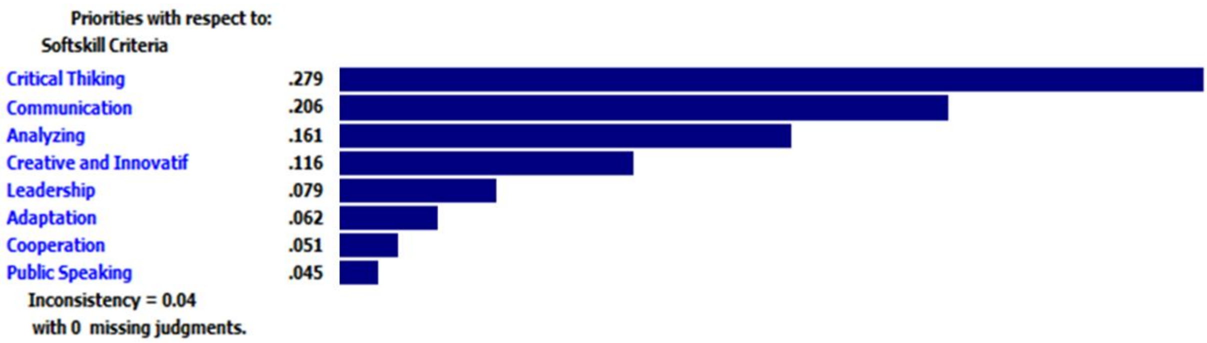

Fig. 2. Eigenvector value using application of expert choice

Referring to two approaches to proving the optimal eigenvector value, it provides the opportunity for the eigenvector value to be applied and collaborated with other methods, in this research the method used is MABAC. Determination of the code and type of criteria is shown in Table 4. All of the eight types of criteria used have type benefit (B) and include eigenvector values as a weighting for the criteria values obtained by the MCDM-AHP method which will use the eigenvector values in the MABAC method to determine the ranking of decision support of a number of alternatives.

Table 4. Criteria

Code	Criteria	Type	EV
C1	Critical Thinking	Benefit (B)	0.279
C2	Communication	(B)	0.206
C3	Analyzing	(B)	0.161
C4	Creative and Innovatif	(B)	0.116
C5	Leadership	(B)	0.079
C6	Adaptation	(B)	0.062
C7	Cooperation	(B)	0.051
C8	Public Speaking	(B)	0.045

Initial decision matrices that have been prepared using the MABAC method are normalized to be able to include the collaborative calculation process of the two methods shown in Table 5. Through stages using (6), (7), and (8) to produce a normalized dataset.

Table 5. Dataset Normalization

Criteria	C1	C2	C3	C4	C5	C6	C7	C8
Type	B	B	B	B	B	B	B	B
A1	0.125	1.000	0.000	0.000	1.000	0.389	0.778	0.059
A2	0.000	0.519	0.386	0.700	0.906	0.278	0.944	0.529
A3	0.313	0.444	0.864	0.950	0.113	0.528	0.806	0.412
A4	1.000	0.000	0.545	0.800	0.660	0.222	0.528	0.176
A5	0.125	0.222	0.114	0.900	0.792	0.917	0.917	0.824
A6	0.375	0.148	0.727	1.000	0.774	1.000	0.000	1.000
A7	0.688	0.407	0.818	0.500	0.830	0.000	1.000	0.000
A8	0.625	0.519	0.614	0.650	0.698	0.528	0.500	0.529
A9	0.438	0.370	0.568	0.750	0.925	0.556	0.694	0.000
A10	0.688	0.778	0.750	0.950	0.000	0.583	0.583	0.471
A11	0.750	0.222	0.591	0.100	0.962	0.667	0.528	0.882
A12	0.938	0.296	1.000	0.850	0.811	0.139	0.444	0.353

By using Table 5, the weighting of each criterion can be included as a calculation process for weighted element matrices (V). At this stage, you can use (9) where the eigenvector value used as a weight for the criteria has a strong influence as a determinant of the position of all alternatives. For each alternative there is a certain point. These results will be used as a determinant of border approximation area matrices (G) using (10) with an equation that is identical to the geometric mean, the results of which are shown in Table 6.

Table 6. Determination of border approcimate area matrices

Criteria	C1	C2	C3	C4	C5	C6	C7	C8
Type	B	B	B	B	B	B	B	B
Alt. / Weight	0.279	0.206	0.161	0.116	0.079	0.062	0.051	0.045

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A1	0.314	0.413	0.161	0.116	0.158	0.086	0.091	0.047
A2	0.279	0.313	0.224	0.198	0.151	0.080	0.099	0.068
A3	0.366	0.298	0.301	0.227	0.088	0.095	0.092	0.063
A4	0.558	0.206	0.249	0.210	0.131	0.076	0.078	0.053
A5	0.314	0.252	0.180	0.221	0.142	0.119	0.098	0.081
A6	0.383	0.237	0.279	0.233	0.140	0.124	0.051	0.089
A7	0.471	0.290	0.293	0.175	0.145	0.062	0.102	0.045
A8	0.453	0.313	0.260	0.192	0.134	0.095	0.076	0.068
A9	0.401	0.283	0.253	0.204	0.152	0.097	0.086	0.045
A10	0.471	0.367	0.282	0.227	0.079	0.099	0.081	0.066
A11	0.488	0.252	0.257	0.128	0.155	0.104	0.078	0.084
A12	0.540	0.268	0.323	0.215	0.143	0.071	0.074	0.060
(G)	0.410	0.286	0.251	0.191	0.132	0.091	0.082	0.062

To determine the ranking of all alternatives as a form of obtaining alternative distances from approximate border area, you can use (11), then each element of the weighted matrices is simply reduced by the obtained value (G) to find the value of each alternative as a ranking value, and then add up the values. all alternatives (12) correspond to the ownership of all criteria weights as support for ranking decision making. The largest value obtained will be ranked first and followed by smaller values. This weight value is divided into two parts, namely the positive value which is located above the x-axis or above the zero value of the y-axis and the negative value which is located below the x- axis or below zero y axis. These results can be shown in Table 7 which is included in an ordered ranking from largest to smallest.

Table 7. Alternative Distances from Appoximate Border Area

Criteria Type	C1 B	C2 B	C3 B	C4 B	C5 B	C6 B	C7 B	C8 B	(S)	Rank
A11	-0.104	-0.033	-0.044	0.102	0.085	0.461	0.387	0.552	1.406	1
A12	0.084	-0.033	0.004	-0.218	0.203	0.211	-0.119	0.628	0.761	2
A1	-0.029	-0.048	0.017	0.142	0.071	0.544	-0.805	0.781	0.675	3
A9	-0.141	0.026	-0.017	0.022	0.164	-0.178	0.423	0.170	0.469	4
A8	0.046	0.026	0.006	0.002	0.019	0.072	-0.155	0.170	0.186	5
A2	-0.048	0.011	0.031	0.122	-0.391	0.072	0.242	0.017	0.057	6
A6	0.065	0.078	0.020	0.122	-0.470	0.127	-0.047	0.093	-0.011	7
A10	-0.010	-0.003	0.002	0.042	0.177	0.100	0.098	-0.519	-0.114	8
A4	0.140	-0.018	0.045	0.082	0.098	-0.317	-0.227	-0.060	-0.257	9
A3	0.065	0.004	0.027	-0.058	0.111	-0.456	0.495	-0.519	-0.331	10
A5	-0.104	0.123	-0.055	-0.258	0.230	-0.067	0.206	-0.442	-0.367	11
A7	0.159	-0.077	-0.001	0.062	-0.008	-0.234	-0.119	-0.289	-0.507	12

DISCUSSIONS

Determining criteria values is an important reference in determining the ranking system that will be used in all methods, as stated in this research. Many researchers use inconsistent methods in giving weighting values to criteria and are subjective because they are not based on the results of their research. MCDM-AHP is the best method for providing optimal weighting of criteria sourced from obtaining eigenvector values and the input source is obtained from questionnaire instrumentation through calculation scale conversion. Decision-making support is the result of an approach from the alternative element calculation layout which is calculated according to the stages of the MABAC method to determine a ranking system that always provides positive and negative assessments of the assessment of decision-making support from all alternatives. The results of the collaboration between these two methods have many similarities in the use of equations, only they use different delivery concepts in terms of ranking methods, there are many similarities in the processing of data matrices and the dataset normalization stages. The difference from the collaboration of these two methods can be seen in the determination of a ranking system which provides a range of positive and negative values as a form of approach to results that are interesting to understand and this is unique to the MABAC method. In principle, this method can be developed and can be used in ranking systems and it is necessary to carry out comparative tests of the results obtained with several other methods in order to provide additional knowledge in determining rankings that provide optimal and consistent decision support results.

CONCLUSION

The ranking results greatly influence decision support, with the collaboration of the MCDM-AHP and MABAC methods providing a clear picture of branch of office decision making support. The results obtained from twelve alternatives which were processed using eight criteria through collaboration between the two methods provided optimal decision support with the highest ranking obtained by A11 with a weight of 1,406 and followed by other alternatives with lower weights below in sequence. The collaboration of these two methods, MCDM-AHP and MABAC, can be used as a reference for use in a ranking system that has a unique process in providing a calculation process by always giving positive and negative weights to alternative rankings. The advice from the research team is that in determining the size of the criteria that will be used to obtain accurate results, it is advisable to use input from experts to provide an assessment of a number of criteria because expert assessment really determines the accuracy of the research results and uses an appropriate method to provide value. comparison of criteria and alternatives, so that the level of decision accuracy will provide optimal value for decision support.

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