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A Comparative Analysis of the CRITIC and Entropy Methods for Objective Weighting of Priority Criteria

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Abstract
Various criteria weighting methods are available, and this study aims to compare the Criteria Importance Through Inter Criteria Correlation (CRITIC) and Entropy methods to determine the criteria weights. This case study focuses on identifying priority customers from 2 years of sales transactions in an online retail company, which processes more than 1 million transactions with 8 features. The researcher selected 100 high-value customers as alternative data, prioritizing research efficiency and high-value insights. Four criteria were set for customer prioritization. Sensitivity analysis was conducted using the Additive Ratio Assessment (ARAS) method to measure the stability of the method. The CRITIC method produced balanced weights (0.23-0.27), while Entropy produced more variable weights, with C3 being the largest criterion weight with a value of 0.46, indicating its strong dependence on the data distribution. Sensitivity analysis revealed that the Entropy-ARAS method was more sensitive to weight changes (75.11134%) in this customer prioritization case compared to the CRITIC-ARAS method (56.95372%).

Keywords : *Weighting method, CRITIC, Entropy, ARAS, Analysis sensitivity*

1 Introduction

Decision Support System (DSS) is a system designed to assist decision makers in dealing with problems with semi-structured or unstructured conditions. This system provides information, guidance, predictions, and recommendations to support the achievement of more optimal decisions[1]. DSS is able to combine various data sources, perform predictive analysis, and offer alternative solutions through decision modeling. Another advantage of DSS is its ability to simplify complex information, help understand the impact of decisions, and provide analytical support to show the consequences of each decision alternative [2]. Decision support systems were developed because humans often have difficulty in dealing with cases with many choices, which raises various challenges in the decision-making process. Some of these include the large amount of data that must be processed, the large number of specifications or criteria that need to be met, and the difficulty in matching each value accurately [3].

In the decision-making process, there are a number of criteria that have different levels of importance. These criteria have a major influence on the results of the decisions taken, where the level of importance is represented through the weight value [4]. Criteria weight is the value attached to each criterion, usually expressed in the form of a number derived from dividing the value of 1 or 100%. This value serves as a differentiator between one criterion and another [4]. Various methods have been developed to determine the weight of criteria in DSS, either subjectively or objectively. Subjective weighting is done if there are expert considerations in determining the priority of the criteria, Meanwhile, objective weighting is not influenced by the subjectivity of the decision maker, but is

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based on the strengths and weaknesses of the relationships between criteria as reflected in the distribution of data [1]. This research focuses on objective weighting methods, examples of which are the Criteria Importance Through Inter Criteria Correlation (CRITIC) method and Entropy method.

The CRITIC method is one of the objective weighting methods that is able to measure the level of importance of correlated criteria. This method analyzes the correlation matrix to determine how strong the relationship is between two criteria using a statistical approach. Determining the weight in the CRITIC method is done by calculating the magnitude and direction of the correlation between the criteria [1][5]. Meanwhile, The determination of the criteria weight using the entropy method is generally influenced by the alternative data used in the decision-making process [6]. Therefore, if there is a change in the alternative data, the weight value produced by the entropy method will also change [4][7]. Each of these two methods has a different focus, but in this study the researcher will see how each method produces weighting values for the online retail sales case study.

To get an objective picture of the reliability and stability of the method used in decision making, a sensitivity analysis is needed. Before conducting a sensitivity analysis, it is necessary to conduct an initial ranking of the alternatives based on the weight value of each method. various ranking methods are used in the decision-making system, one of which is the Additive Ratio Assessment (ARAS). The ARAS method was chosen because of its ability to determine the weight of each attribute, then rank them to select the best alternative from several available choices. [8]. The ARAS method is based on the idea that to obtain optimal function, an alternative must have the largest ratio (anas, 2019 in [9]).

This case study uses several criteria to determine priority customers. Customers are a key element in driving the progress of a company, both in the service and goods sectors, so special attention is needed in providing services to them. One form of such service is by providing special facilities for selected customers, such as giving discounts or priority services [10]. The criteria used to determine priority customers include total purchases, purchase frequency, average transaction value, and number of product variants.

2 Literature Review

This study discusses the differences in weighting methods using CRITIC and entropy with a case study of sales transaction data in online retail. Several previous studies related to these methods and case studies include research conducted by Abdul Karim (2022) [11]. The study used the Entropy weighting method and the ARAS method for ranking criteria in determining the best village in the Labuhanbatu district government. The results show that both methods are suitable for use in the case of determining the best village. The use of the entropy method as an objective weighting is also used to select the ten best customers based on four criteria, namely total spending, frequency, customer reviews, and communication. The results of the study showed the highest weight on the shopping frequency criterion with the final result providing recommendations for the best customer ranking [12].

Another study used the CRITIC and entropy weighting methods for Determining Community Welfare Priorities. The ranking was carried out using the ELECTRE method. The results showed that the ranking of family welfare using the entropy weighting was 86.4% in the correct order. Meanwhile, the use of the CRITIC weighting produced an appropriate priority order of 92.7% [13]. Another study compared several weighting methods, namely research conducted by Nafiatul, et al. (2024) which analyzed three criteria weighting methods, namely ROC, AHP, and CRITIC in a case study of determining outstanding students. The results of the study show that the CRITIC method is objective in carrying out weighting because the priority of the criteria is determined based on the correlation between the criteria [1].

A study on sensitivity analysis was conducted by Halimah, et al conducted a sensitivity test of the ARAS method with the Ahnon Entropy and SWARA criteria weighting approach to selecting prospective employees. The results showed that the SWARA-ARAS method was more sensitive with a value of 91.24% compared to the Shahnon Entropy-ARAS method with a value of 74.75% [14]. Sensitivity analysis was also conducted to integrate AHP and CRITIC methods with TOPSIS method for natural fiber selection. The results showed that higher initial criteria weights resulted in lower ranking variations and vice versa [15].

3 Research Methods

This research was conducted through several steps as shown in Figure 1. The first stage is data determination. The data used in this study is transaction data from an online retail company based in the UK, which sells unique gift products. The data was obtained from the kaggle data source [16]. The total data is 1,067,371 transactions with a transaction period from December 1, 2009 to December 9, 2011. In this case study, the data is used to determine priority customers. The next stage is data preprocessing. This process is carried out to clean outlier data, incomplete and missing or empty data, and clean up canceled transactions. After data cleaning, a total of 779,425 transaction data were obtained.

Next, the criteria are weighted using the CRITIC and Entropy methods. There are four criteria selected in determining priority customers, namely total purchases, purchase frequency, average transaction value, and number of product variants. These criteria are based on the features contained in the dataset, and are supported by several studies that discuss determining the best customers [17][12]. The alternative data used is Customer ID, taking 100 data points based on the highest total sales. This is based on the focus of the study on high-value, as well as the efficiency of analysis on large data.

After weighting, calculations are then carried out using the ARAS method to determine the ranking for each weight. Then the calculation results are subjected to a sensitivity analysis to see changes in the ranking results if the criteria weight value is changed. The results of the sensitivity analysis are then compared for the CRITIC-ARAS and Entropy-ARAS methods. The results of each change in the criteria weight value are calculated as a difference and totaled. The calculation results are then concluded.

3.1 Criteria Importance Through Inter Criteria Correlation (CRITIC) Method

The CRITIC method is an objective weighting approach designed to assess the importance of criteria that are correlated with one another. It can be seen at Figure 1

This method analyzes a correlation matrix to evaluate the strength of the relationships between pairs of criteria using statistical techniques. The CRITIC method determines criterion weights by calculating both the magnitude and direction of these correlations [1][18][19]. The level of correlation and information contained in each indicator is reflected through its level of conflict. The higher the correlation coefficient, the stronger the relationship between indicators, the lower the level of conflict, the greater the redundancy of information indicated by the indicator, and ultimately the weight of the indicator will be smaller [13][20].

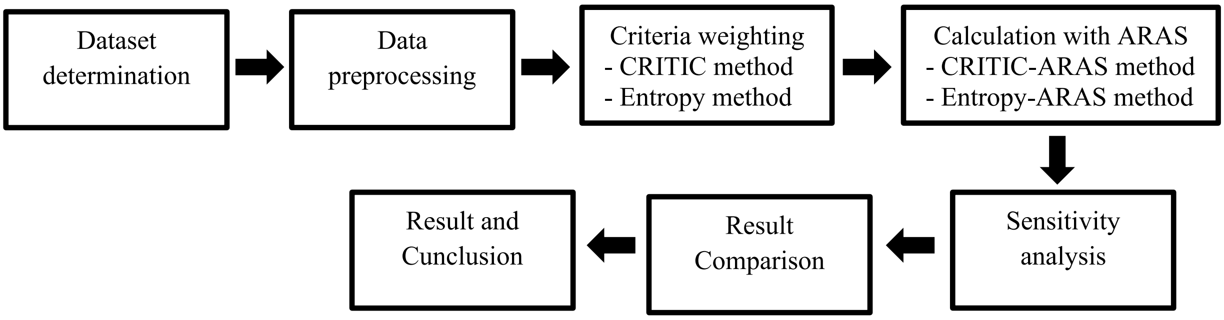

Figure 1 Research stages

The process of determining criterion weights using the CRITIC method involves several steps. First, the ideal value for each evaluation criterion (f_m) is identified within the alternative decision matrix (a). At this stage, the best and worst values for each criterion are established using a general formula [1].

$$Max\{f_1(a), f_2(a), \dots, f_m(a) | a \in A\} \tag{1}$$

The best (x_j^{max}) value is obtained from the best performance value while the worst (x_j^{min}) value is obtained from the worst performance value in each alternative data set.

Second, a normalization matrix (X) is constructed using two separate formulas, equation 2 for normalizing benefit criteria and equation 3 for normalizing cost criteria.

$$X = \frac{x_{ij} - x_j^{min}}{x_j^{max} - x_j^{min}} \tag{2}$$

$$X = \frac{x_j^{max} - x_{ij}}{x_j^{max} - x_j^{min}} \tag{3}$$

Third, calculate the standard deviation of the normalized matrix (σj) on each criterion, which serves as a measure of the intensity of the contrast between alternative values. The equation showed on equation 4.

$$\sigma j = \sqrt{\frac{1}{m-1} \cdot \sum_{i=1}^{m} (x_{ij} - \bar{x}_{ij})^2} \tag{4}$$

Fourth, calculate the linear correlation coefficient (r_{jk})between the conflicting criteria values. The calculation of the correlation coefficient for each pair of criteria is carried out as a measure of the level of conflict between criteria, using the following equation. From a set of correlation coefficients for a symmetric matrix (R_{jk}), of dimension m x m with generic elements of correlation coefficients (r_{jk}).

$$R_{jk} = r_{jk_{mxm}} \tag{5}$$

Fifth, calculate the total information conveyed by each criterion (C_j)by using the aggregation formula, namely multiplying the standard deviation by the complementary number of the correlation coefficient.

$$C_j = \sigma j \,.\sum_{k=1}^{m} (1 - r_{jk}) \tag{6}$$

Sixth, determine the weight of each criterion by dividing the amount of information held by each criterion by the total information from all criteria.

$$w_j = \frac{c_j}{\sum_{k=1}^{m} c_k} \tag{7}$$

3.2 Entropy Method

The entropy method is one approach that can change data into a weighted form. The resulting weight reflects the criteria value of each alternative in the Decision Matrix (DM). Therefore, the Entropy Weighting method is used to determine the weight of both qualitative and quantitative data. Another advantage of this method is that it does not require all criteria to have the same value range [13][21]. The Entropy weighting method is a technique in the context of multi-criteria decision making that aims to determine the level of importance (weight) of each criterion objectively. This determination is based on the degree of variation or uncertainty of the information contained in the criteria data, by applying the basic principle of entropy from information theory as a measure of uncertainty or disorder in a system [22]. The entropy method is one of the techniques in the MCDM (Multi-Criterion Decision Making) model that is quite reliable for calculating the weight of the criteria. By utilizing this method, researchers can determine the initial weight (level of importance) for each criterion. The following is the equation used in the entropy method [4].

$$H_i = -h_0 \,.\sum_{j=1}^{m} P_{ij} \,.\, lnP_{ij} \,, i = 1, \ldots, n \tag{8}$$

H_i is the initial entropy value, $-h_0$ is the value of the result of dividing $\frac{-1}{\ln(sum\ of\ alternative)}$ and P_{ij} is the value of the result of normalizing alternative data. Then for the alternative data normalization equation such as the following equation

$$P_{ij} = \frac{X_{ij}}{\sum_{j=1}^{m} X_{ij}} \text{, j = 1, ...,m, i = 1, ...,n} \tag{9}$$

Description:

1. P_{ij} is the normalization value for each column or just one column in the table.
2. $X_{ij}$is the value contained in each column of the criteria and alternative tables.
3. $\sum_{j=1} m\, X_{ij}$ is the total value of each row of criteria and alternative columns

The last step is to determine the criteria weight value of the entropy method using the following equation.

$$W = \frac{d_i}{\sum_{j=1}^{m} d_i}, i = 1, \ldots, n \quad (10)$$

Description:
1. W is the final weight of entropy.
2. d_i is the value of the subtraction result between $1 - h_i$.
3. $\sum_{j=1} m\, d_i$is the total value of d_i.

3.3 Aditive Ratio Assessment (ARAS) Method

The ARAS method is a ranking technique that compares the value of each criterion across different alternatives, taking into account their respective weights, to identify the ideal alternative [14]. The ARAS method can determine the weight of each attribute, then rank them to select the best alternative from several available choices [8]. There are several steps in ranking:

1. Formation of decision matrix

$$X = \begin{bmatrix} Xo1 & Xoj & \ldots & Xon \\ Xi1 & Xij & \ldots & Xin \\ \ldots & \ldots & \ddots & \vdots \\ Xn1 & Xmj & \ldots & Xmn \end{bmatrix} \quad i = \overline{0, m}\, ; j = \overline{1, n} \quad (11)$$

Description:
m = number of alternatives
n = number of criteria
X_{ij} = value of alternative i to criterion j
X_{oj} = optimal value of criterion j

2. Normalization of Decision Making Matrix for all criteria

$$\bar{X} = \begin{bmatrix} \bar{X}o1 & \bar{X}oj & \ldots & \bar{X}on \\ \bar{X}i1 & \bar{X}ij & \ldots & \bar{X}in \\ \ldots & \ldots & \ddots & \vdots \\ \bar{X}n1 & \bar{X}mj & \ldots & \bar{X}mn \end{bmatrix} \quad i = \overline{0, m}\, ; j = \overline{1, n} \quad (12)$$

3. Determining the weight of the normalized matrix step 2

$$\sum_{j-1}^{n} wj = 1$$

$$\hat{X} = \begin{bmatrix} \hat{X}o1 & \hat{X}oj & \ldots & \hat{X}on \\ \hat{X}i1 & \hat{X}ij & \ldots & \hat{X}in \\ \ldots & \ldots & \ddots & \vdots \\ \hat{X}n1 & \hat{X}mj & \ldots & \hat{X}mn \end{bmatrix} \quad i = \overline{0, m}\, ; j = \overline{1, n} \quad (13)$$

4. Determining the value of the optimization function (*Si*)

$$Si = \sum_{j=1}^{n} \hat{X}ij; \qquad i = \overline{0, m} \quad (14)$$

Where *Si* is the value of the optimality function of alternative *i*

5. Determining the highest ranking of the alternatives

$$Ki = \frac{Si}{So}\ ; i = \overline{0, m} \tag{15}$$

The alternative with a larger or higher K value produces the best alternative and sequentially produces a ranking.

3.4 Sensitivitytivy Analysis

Sensitivity describes the degree of response to a stimulus or reaction [4]. Sensitivity tests are conducted to identify, obtain, and compare the results of each assessment criterion to determine which criteria have the most influence or are most sensitive to changes in alternative rankings [23]. In this study, the sensitivity test was conducted through the following stages:

1. Determining the criteria weights using the CRITIC and Entropy methods.
2. Normalizing the weights so that the total is 1, then changes were made to the criteria weight values. In this study, each weight was increased by 0.3 in each calculation.
3. Applying the normalized weights to the ARAS method to obtain alternative rankings.
4. Calculating the difference in ranking changes by comparing the maximum results when the total weight is equal to 1.

4 Results and Discussions

4.1 Results

In this case study, there are four criteria that are considered in determining priority customers. All criteria have benefit value, which means that the greater the value, the greater the profit or benefit obtained. The list of criteria, as shown in Table 1, includes all criteria that have corresponding benefits categories. Next, an alternative matrix is formed. Alternative values are obtained from selecting 100 customers with the highest total transaction value. The formation of an alternative matrix is shown in the Table 2.

4.1.1 Criteria Weighting with CRITIC Method

After the alternative matrix is formed, the best worst value is determined for each criterion, which is shown in Table 3. The next step is to normalize the matrix based on the best and worst values. Then the standard deviation calculation of the normalized matrix is carried out. Furthermore, to determine the potential for conflict between criteria, it is necessary to calculate the linear correlation coefficient. Based on the C*j* value of each criterion the next step is to calculate the criteria weight. The results of the criteria weight calculation are shown in Table 4.

4.1.2 Criteria Weighting with Entropy Method

The stages in the entropy method are first to normalize the data. The results of the normalization are shown in Table 5. The next step is to calculate the entropy for each criterion and calculating degree of diversification. The higher the degree value, the more important the criterion is. The final step is to calculate the final weight of the criteria values. The results of the weight calculation are shown in table 6.

Table 1 Data of Criteria

Code	Criteria	Category
C1	Total purchases	Benefit
C2	Purchase frequency	Benefit
C3	Average transaction value	Benefit
C4	Number of product varian	Benefit

Table 2 Alternative matrix formation

Cust.ID	Code	C1	C2	C3	C4
18102	A1	580987.04	145	40068.07	382
14646	A2	528602.52	151	3500.67	961
14156	A3	313437.62	156	20092.15	1446
14911	A4	291420.81	398	7322.13	2550
17450	A5	244784.25	51	4799.69	144
13694	A6	195640.69	143	13681.16	896
17511	A7	172132.87	60	28688.81	657
16446	A8	168472.5	2	84236.25	3
16684	A9	147142.77	55	26753.23	184
12415	A10	144458.37	28	51592.27	498
...	...	...	...	...	...
17243	A99	20203.58	69	29280.55	359
18008	A100	19759.07	23	8.590.90	77

Table 3 Determining best and worst values

Value	C1	C2	C3	C4
Best	31466.76	398	50315.20	2550
Worst	20203.58	2	2252.93	1

Table 4 Criteria weighting with the CRITIC method

Criteria	Deviation standard	C*j*	Weight	Rank
C1	0.158885	0.327305	0.247785	2
C2	0.162989	0.263467	0.238347	4
C3	0.101683	0.26069	0.239697	3
C4	0.179671	0.31996	0.274171	1

4.1.3 CRITIC-ARAS and Entropy-ARAS method calculations

Based on the weighting results of each CRITIC and Entropy method, calculations are then carried out on the alternatives with the ARAS method, so that alternative values are produced with the CRITIC-ARAS and Entropy-ARAS methods. The results are presented in Table 7.

4.1.4 Sensitivity test

This study uses a relative sensitivity test by changing the weight of each criterion and then calculating the difference in the maximum value of the weight change with the initial value. The following are the calculation results with a weight change of 0.3 for each criterion shown in the following Table 8 until Table 11 respectively

Table 5 Entropy normalization

Cust.ID	Alternative	C1	C2	C3	C4
18102	A1	0.089040396	0.023508431	0.01632995	0.010648084
14646	A2	0.081012095	0.024481193	0.014267198	0.026787456
14156	A3	0.048036544	0.025291829	0.008188662	0.04030662
14911	A4	0.044662312	0.064526589	0.002984172	0.071080139
17450	A5	0.037514927	0.008268482	0.01956139	0.004013937
13694	A6	0.029983327	0.023184176	0.005575831	0.02497561
17511	A7	0.026380586	0.009727626	0.011692274	0.018313589
16446	A8	0.025819609	0.000324254	0.343309202	0.024083623
16684	A9	0.022550676	0.008916991	0.010903418	0.00512892
12415	A10	0.022139273	0.004539559	0.021026699	0.013881533
...	...	...	...	...	...
17243	A99	0.003096342	0.01118677	0.001193344	0.010006969
18008	A100	0.00302822	0.003728923	0.003501268	0.002146341

Table 6 Calculation of weight value with entropy

Criteria	Entropy	Diversification	Weight	Rank
C1	0.890173	0.109827	0.184304	3
C2	0.914190	0.085810	0.144000	4
C3	0.721396	0.278604	0.467530	1
C4	0.878336	0.121664	0.204166	2

Table 7 CRITIC and Entropy with ARAS Method calculation

No.	Alternative	CRITIC-ARAS	Entropy-ARAS
1	A1	0.031162066	0.025962027
2	A2	0.033316442	0.027093453
3	A3	0.028371092	0.022083871
4	A4	0.043336621	0.030874738
5	A5	0.014904892	0.015040675
6	A6	0.019401012	0.014911796
7	A7	0.014954465	0.013340694
8	A8	0.067227941	0.123915917
9	A9	0.010385837	0.009795105
10	A10	0.013358963	0.014325078
...	...	...	...
99	A99	0.005983694	0.004360093
100	A100	0.002698073	0.00264462
Max		0.067227941	0.123915917

Table 8 Sensitivity test of weight change C1 +0.3

No.	Alternative	CRITIC-ARAS	Entropy-ARAS
1	A1	0.03467435	0.033876312
2	A2	0.03616746	0.03380165
3	A3	0.029463542	0.02520786
4	A4	0.043175167	0.032312394
5	A5	0.016261455	0.017793311
6	A6	0.019965416	0.016701793
7	A7	0.015597889	0.014884308
8	A8	0.064207046	0.109702794
9	A9	0.011102275	0.011342806
10	A10	0.013842799	0.015176679
...	...	...	...
99	A99	0.005765696	0.004144939
100	A100	0.002703804	0.002663912
Max		0.064207046	0.109702794
Change		4.49351%	11.46997%

Table 9 Sensitivity test of weight change C2 +0.3

No.	Alternative	CRITIC-ARAS	Entropy-ARAS
1	A1	0.030427186	0.025255186
2	A2	0.032481142	0.026346951
3	A3	0.02799774	0.022389107
4	A4	0.044735265	0.036294745
5	A5	0.014327129	0.013715151
6	A6	0.01959349	0.016163271
7	A7	0.014483642	0.012574779
8	A8	0.061810744	0.101388621
9	A9	0.010223187	0.009536571
10	A10	0.012622791	0.012491588
...	...	...	...
99	A99	0.006349975	0.00548063
100	A100	0.002763221	0.002801035
Max		0.061810744	0.101388621
Change		8.05795%	18.17950%

4.2 Discussions

Based on the results of online retail transaction data processing, 100 customers with the highest total transactions were selected as priority customers. 4 criteria were used based on dataset features and weighted using the CRITIC method and the Entropy method. The CRITIC weighting results are presented in Table 4, indicating that criterion C4 has the highest weight, with a value of 0.27, followed by C1, C3, and C2. The weighting results of the Entropy method are presented in Table 6, indicating that criterion C3 has the highest weight, with a value of 0.46, followed by C4, C1, and C2. There is a difference in the highest weight in the two methods, but both methods produce the same criteria for the lowest weight. CRITIC produces balanced weights between criteria with values between 0.23 -

0.27. In contrast, entropy produces varying weight values , with criterion C3 being the most significant weight, namely 0.46. This shows that the entropy method is greatly influenced by data distribution.

Table 10 Sensitivity test of weight change C3 +0.3

No.	Code	CRITIC-ARAS	Entropy-ARAS
1	A1	0,029655	0,030306
2	A2	0,031516	0,032276
3	A3	0,026604	0,027114
4	A4	0,040076	0,03989
5	A5	0,014878	0,015191
6	A6	0,018191	0,018298
7	A7	0,014459	0,0148
8	A8	0,082166	0,082494
9	A9	0,010206	0,010323
10	A10	0,013541	0,013907
...	...	...	...
99	A99	0,00558	0,005452
100	A100	0,002691	0,002657
Max		0,082166	0,082494
Change		22,22026%	33,42749%

Table 11 Sensitivity test of weight change C4 +0.3

No.	Code	CRITIC-ARAS	Entropy-ARAS
1	A1	0,03467435	0,033876312
2	A2	0,03616746	0,03380165
3	A3	0,029463542	0,02520786
4	A4	0,043175167	0,032312394
5	A5	0,016261455	0,017793311
6	A6	0,019965416	0,016701793
7	A7	0,015597889	0,014884308
8	A8	0,064207046	0,109702794
9	A9	0,011102275	0,011342806
10	A10	0,013842799	0,015176679
...	...	...	...
99	A99	0,005765696	0,004144939
100	A100	0,002703804	0,002663912
Max		0,064207046	0,109702794
Change		22,18199%	12,03437%

The weighting results show that the average transaction and the number of product variants have the highest weights in each method, indicating that these two criteria are important in determining priority customers. This is in accordance with previous research, which states that customers with higher average transaction values (monetary) tend to be more profitable, even though their transaction frequency may be lower [24]. This highlights the importance of considering the average transaction value in customer segmentation. The number of product variations is also discussed in other studies that product variety has a positive effect on customer satisfaction and loyalty in online retail [25]

Tabel 12 Comparison of percentage changes in rankings in sensitivity tests

No.	Criteria	CRITIC-ARAS	Entropy-ARAS
1	C1	4,49351%	11,46997%
2	C2	8,05795%	18,17950%
3	C3	22,22026%	33,42749%
4	C4	22,18199%	12,03437%
TOTAL		56,95372%	75,11134%

The weighting results of each method are then ranked using the ARAS method to determine the ranking value of each data alternative. To determine how the weight value affects the ranking results, a sensitivity test is carried out. Based on the results of the sensitivity test, by adding a weight of 0.3 to each criterion and then comparing it with the initial weight as shown in Table 12, the CRITIC-ARAS method produces a percentage change value of 57%, which means it is more stable against changes, while the Entropy-ARAS method with a change value of 75% shows that changes in weight cause a significant shift in results.

5 Conclusion

A comparison of criteria weighting in a case study on determining priority customers for online retail transactions yields different criterion weight rankings for the CRITIC and Entropy methods. This shows that each method has certain characteristics in determining the weight value. The results of the ranking sensitivity test carried out by the weighting method with the ARAS ranking method produced a greater Entropy-ARAS sensitivity percentage value of 75.11134% compared to the CRITIC-ARAS method with a value of 56.95372%. This shows that the CRITIC-ARAS method is more stable against changes in weight values than the Entropy-ARAS method.

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