Volume 1 Number 1 November 2026, Available Online: November 20, 2026.
Journal of Decision Support Systems and Multi-Criteria Decision Making
ISSN: 3164-7022
Page 43-62
Journal Homepage: https://research.pilar.or.id/index.php/jodesma

Combination of Criteria Importance Through Intercriteria Dependence and Simple Additive Weighting Methods for Multi-Criteria Barista Selection: A Decision Support Approach

Verra Sofica✉, **Titik Misriati**✉

Information System, Universitas Bina Sarana Informatika, DKI Jakarta, Indonesia

Keywords:
Decision Support System;
Barista Selection;
CRITID;
SAW;
Sensitivity Analysis;

ABSTRACT

Barista selection is an important process in the coffee shop and hospitality industry because baristas are required to possess not only technical skills but also coffee knowledge, communication, work speed, accuracy, and creativity. Evaluating candidates based on a single criterion can result in subjective and less representative decisions. Therefore, this study aims to develop a Decision Support System (DSS) for barista candidate selection by integrating the Criteria Importance Through Intercriteria Dependence (CRITID) and Simple Additive Weighting (SAW) methods. CRITID is applied to determine objective criterion weights by considering data variation and inter-criteria relationships, while SAW is used to calculate preference values and rank the candidates. The results show that Work Speed (CB-06) has the highest criterion weight of 0.1311, followed by Technical Skills (CB-02) with 0.1275 and Coffee Knowledge (CB-04) with 0.1253. The SAW ranking identifies A7 as the highest-ranked candidate with a preference value of 0.9682, followed by A3 with 0.9603 and A8 with 0.8994. Sensitivity analysis involving 32 scenarios with criterion weight changes of ±0.05 and ±0.10 indicates that the ranking structure is relatively stable, with A7 and A3 consistently maintaining the first and second positions. These findings demonstrate that the integration of CRITID and SAW can support a more objective, systematic, measurable, and stable decision-making process for barista candidate selection.

Publication Dates:
Online First Date:
September 1, 2026
Published Date:
November 20, 2026

Corresponding Author:
Verra Sofica
Universitas Bina Sarana Informatika, Indonesia
Kramat Raya No.98, RT.2/RW.9 Kwitang, Central Jakarta, DKI Jakarta, Indonesia
Email: verra.vsc@bsi.ac.id

DOI: https://doi.org/10.67449/jodesma.v1i1.3

Article Link: https://research.pilar.or.id/index.php/jodesma/article/view/3

Volume 1 Number 1 November 2026, Available Online: November 20, 2026.
Journal of Decision Support Systems and Multi-Criteria Decision Making
ISSN: 3164-7022
Page 43-62
Journal Homepage: https://research.pilar.or.id/index.php/jodesma

I. Introduction

The role of a barista in the coffee shop and hospitality industry isn't just about making and serving coffee drinks, but also about being an important part of creating a pleasant experience for customers [1]. A barista's quality isn't only measured by their skills in handling coffee beans, operating an espresso machine, or producing consistently tasty drinks, but also by their ability to communicate, provide friendly service, understand customer needs, maintain cleanliness, and work professionally and efficiently [2]. In the hospitality environment, baristas also act as a representation of a coffee shop's quality and character because the interactions they provide can affect customer satisfaction and loyalty. That's why a barista is expected to have a mix of technical skills, coffee knowledge, service abilities, professionalism, and the ability to build positive relationships with customers.

Selecting baristas involves several aspects that need attention to get a workforce that is competent and fits the needs of the coffee shop and hospitality industry. The assessment isn't just about technical skills in making and serving coffee, but also includes the quality of service in giving customers a good experience, work experience, and knowledge about coffee. In addition, communication skills, speed, and attention to detail are important factors because baristas need to work efficiently while maintaining consistent product quality. Creativity is also needed to develop drink variations and add value to the service. By considering all these aspects, the selection process can result in baristas who are not only skilled at making coffee, but also able to provide professional service and contribute to customer satisfaction.

Evaluating based on just one criterion can lead to less objective decisions because a barista's skills can't be judged from a single aspect alone. For example, a barista with strong technical skills doesn't necessarily have good service, communication, or attention to detail. That's why the evaluation process needs to consider multiple criteria comprehensively to give a more accurate picture of a barista candidate's competence. By using several criteria, such as technical skills, experience, coffee knowledge, service, communication, work speed, attention to detail, and creativity, the decisions made can be more objective, measurable, and aligned with the needs of the coffee shop and hospitality industry.

A Multi-Criteria Decision Making (MCDM) approach is needed to evaluate candidates based on various criteria in a systematic and measurable way [3]–[5]. This approach allows the selection process to consider not just one aspect, but combine several relevant criteria, such as technical skills, service quality, experience, coffee knowledge, communication, work speed, accuracy, and creativity. With MCDM, each criterion can be weighted according to its importance, making the evaluation process more objective, consistent, and transparent. The

DOI: https://doi.org/10.67449/jodesma.v1i1.3

Article Link: https://research.pilar.or.id/index.php/jodesma/article/view/3

Volume 1 Number 1 November 2026, Available Online: November 20, 2026.
Journal of Decision Support Systems and Multi-Criteria Decision Making
ISSN: 3164-7022
Page 43-62
Journal Homepage: https://research.pilar.or.id/index.php/jodesma

evaluation results can then be used to rank candidates and help the coffee shop choose the barista who best fits their needs and service standards.

Decision Support Systems (DSS) can help make the process of selecting baristas more systematic, objective, and measurable by processing various assessment criteria in a structured way [6]-[8]. Through a DSS, each candidate can be evaluated based on predetermined criteria, such as technical skills, service quality, experience, coffee knowledge, communication, work speed, accuracy, and creativity. The scores for each criterion can then be processed using MCDM methods to produce a final score and ranking of candidates [9], [10]. That way, a DSS can help management make selection decisions based on clear data and calculations, while also reducing subjectivity in the barista selection process.

To determine the importance level of each criterion more objectively in the barista selection process, the Criteria Importance Through Intercriteria Dependence (CRITID) method is needed to determine the importance level of each criterion more objectively [11]. The CRITID method considers the dependence or relationships between criteria when assigning weights, so the importance of a criterion is not only seen separately but also based on its connection with other criteria. In barista selection, this approach can be used to set the weights for various criteria. By integrating CRITID into a Decision Support System, the process of determining criterion weights can be done more systematically and measurably, resulting in a more objective evaluation of candidates and supporting decision-making in choosing the best barista.

The Simple Additive Weighting (SAW) method can be used to rank barista candidates based on various established criteria [12], [13]. This method works by assigning scores to each candidate according to their achievement level for each criterion, then normalizing the scores so that each criterion can be compared proportionally. After that, the normalized scores are multiplied by the weight of each criterion and summed up to get each candidate's preference score. These preference scores are then used as the basis for ranking the candidates, with the highest score taking the top spot. In this way, the SAW method can help create a more systematic, measurable, and easy-to-understand ranking process for barista candidates [14]-[16].

The integration of the CRITID method and SAW can be used in a Decision Support System to create a more systematic and objective process for selecting barista candidates. The CRITID method is used to determine the importance weight of each criterion by considering the relationships and dependencies between criteria, while the SAW method is used to rank candidates based on the scores and weights obtained. By combining these two methods, each candidate can be evaluated against various set criteria, producing a final score that serves as the basis for ranking the candidates. The candidate with the highest final score can be considered the most recommended choice for the barista position.

DOI: https://doi.org/10.67449/jodesma.v1i1.3

Article Link: https://research.pilar.or.id/index.php/jodesma/article/view/3

Volume 1 Number 1 November 2026, Available Online: November 20, 2026.
Journal of Decision Support Systems and Multi-Criteria Decision Making
ISSN: 3164-7022
Page 43-62
Journal Homepage: https://research.pilar.or.id/index.php/jodesma

This study aims to develop a DSS that can help with the selection and ranking process of barista candidates in a more systematic, objective, and measurable way through the integration of the CRITID and SAW methods. The CRITID method is used to determine the importance weight of each criterion by considering the dependencies between criteria, while the SAW method is used to calculate preference values and rank candidates based on the established criteria. The contribution of this study is to provide a decision-making approach that can reduce subjectivity in the barista selection process, provide more structured assessment and ranking results, and help coffee shops identify the candidates that best match their needs and competency standards.

II. Methodology

Methodology is a series of stages, approaches, and procedures that are used systematically to carry out research in order to achieve the objectives that have been set [17], [18]. Research methodology serves as a guide in determining how to obtain, process, analyze, and interpret data so that research results can be obtained in a structured and accountable manner.

2.1. Research Stage

The research stages are a series of processes carried out systematically to achieve the research objectives and obtain results that match the problems that have been formulated. In research on the Decision Support System for Barista Candidate Selection using the integration of CRITID and SAW methods, the research stages include problem identification, literature review, data collection, determination of criteria and alternatives, data processing, weighting of criteria using CRITID, ranking of candidates using SAW, and evaluation of results. The entire series of research stages is shown in Figure 1, which illustrates the research flow from the initial stage to obtaining the final results in the form of barista candidate rankings as a basis for decision-making recommendations.

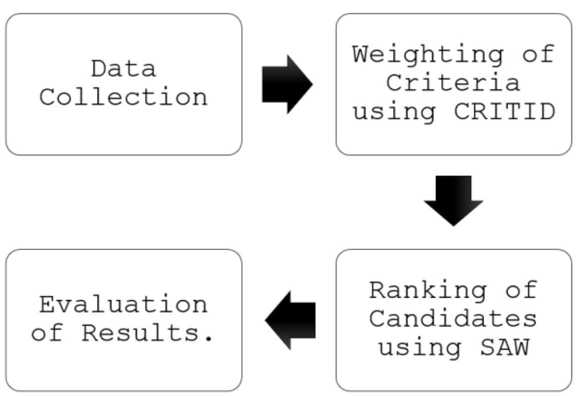

Figure 1. Research Stages

DOI: https://doi.org/10.67449/jodesma.v1i1.3

Article Link: https://research.pilar.or.id/index.php/jodesma/article/view/3

Volume 1 Number 1 November 2026, Available Online: November 20, 2026.
Journal of Decision Support Systems and Multi-Criteria Decision Making
ISSN: 3164-7022
Page 43-62
Journal Homepage: https://research.pilar.or.id/index.php/jodesma

The research stages consist of Data Collection, which is the process of gathering data on barista candidates based on predetermined criteria, such as technical skills, service quality, experience, coffee knowledge, communication, work speed, accuracy, and creativity. Next, Weighting of Criteria using CRITID is done to determine the importance weight of each criterion by considering the relationships and dependencies between criteria to get a more objective weight. The following stage is Ranking of Candidates using SAW, which involves normalizing candidate scores, multiplying those scores by the criteria weights, and adding the results to get preference values and ranking for each candidate. The final stage, Evaluation of Results, is carried out to evaluate the calculation and ranking outcomes to ensure that the system can deliver results that match the needs of the barista candidate selection process.

2.2. CRITID Weighting

CRITID Weighting is a step used to determine the weight of the importance of each criterion in the decision-making process by considering the interdependence between criteria. In a barista candidate selection study, this step is used to process the collected criteria data so that weights can be obtained that represent the importance level of each criterion more objectively. The resulting weights are then used as parameters in the candidate ranking process using the DSS method, so each criterion influences the results according to its level of importance in the final selection.

The CRITID steps start with creating a decision matrix (1) that contains the values of each alternative against all the criteria used in the barista candidate selection process. Next, the decision matrix is normalized (2) to convert each criterion's values into a uniform scale so they can be compared across criteria. After the data is normalized, the standard deviation is calculated (3) to find out the level of variation or spread of data for each criterion. The next step is to calculate the covariant value (4)-(5) to measure the level of dependence between criteria, including both linear and nonlinear relationships. Based on the standard deviation values and the level of dependence, the criterion importance values are then calculated (6), which indicate how much information each criterion provides. The final step is to determine the criteria weights (7) by normalizing the importance values of each criterion.

$$X = [x_{ij}]_{mxn} \tag{1}$$

$$d_{ij} = \frac{x_{ij} - \min_j x_{ij}}{\max_j x_{ij} - \min_j x_{ij}} \tag{2}$$

$$\sigma_j = \sqrt{\frac{\sum_{i=1}^{m} (d_{ij} - \bar{d}_j)^2}{n}} \tag{3}$$

$$dCOV^2(X_j, X_k) = \frac{1}{n^2} \sum_{p=1}^{n} \sum_{q=1}^{n} A_{pq}^{(j)} A_{pq}^{(k)} \tag{4}$$

$$dCOR(X_j, X_k) = \sqrt{\frac{dCOV^2(X_j, X_k)}{\sqrt{dCOV^2(X_j, X_j) dCOV^2(X_k, X_k)}}} \tag{5}$$

DOI: https://doi.org/10.67449/jodesma.v1i1.3

Article Link: https://research.pilar.or.id/index.php/jodesma/article/view/3

Volume 1 Number 1 November 2026, Available Online: November 20, 2026.
Journal of Decision Support Systems and Multi-Criteria Decision Making
ISSN: 3164-7022
Page 43-62
Journal Homepage: https://research.pilar.or.id/index.php/jodesma

$$C_j = \sigma_j \sum_{k=1}^{m}\left[1 - dCOR\left(X_j, X_k\right)\right] \quad (6)$$

$$w_j = \frac{C_j}{\sum_{j=1}^{n} C_j} \quad (7)$$

The CRITID method generates objective weights for each criterion by taking into account the level of data variation and the relationships between criteria. Criteria that provide more information for the decision-making process will get higher weights. The final weights produced by the CRITID method are then used as the importance values of each criterion in the multi-criteria decision-making process.

2.3. SAW Method

The SAW method is a multi-criteria decision-making method used to determine the best alternative based on the importance level of several criteria [19], [20]. This method uses the concept of weighted sum, which combines the performance values of each alternative for each criterion based on the predetermined weights. The resulting value indicates the preference level of an alternative, so the alternative with the highest preference value can be chosen as the most suitable option for the decision-making goal. The stages of the SAW method include forming a decision matrix using (1), normalizing the decision matrix using (8), and calculating preference values using (9).

$$r_{ij} = \begin{cases} \dfrac{x_{ij}}{\max\limits_{j} x_{ij}}; benefit \\ \dfrac{\min\limits_{j} x_{ij}}{x_{ij}}; cost \end{cases} \quad (8)$$

$$V_i = \sum_{j=1}^{n} r_{ij} * w_j \quad (9)$$

The SAW method can be used to produce preference values that represent how well each alternative meets the set criteria. These preference values become the basis for determining which alternative performs the best according to the decision-making goals.

2.4. Data Collection

Data collection is the process of obtaining data that is relevant and suitable for research needs to be used as a basis for analysis and decision-making. The data collected must be related to the research object and be able to represent the conditions or characteristics that are being analyzed. In this study, data collection is used to obtain the information needed as a basis for evaluating alternatives based on the criteria that have been set.

Alternatives and criteria are the main components in the multi-criteria decision-making process. Alternatives are the objects or candidates that will be compared and assessed to determine the best choice, while criteria are the aspects or indicators used as the basis for evaluating each alternative. The value data of each alternative for each criterion forms the foundation for creating the decision matrix and determining the performance level of the alternatives in the decision-making process.

Assessment data is data that shows the performance scores of each alternative based on the criteria that have been set. This data is

DOI: https://doi.org/10.67449/jodesma.v1i1.3

Article Link: https://research.pilar.or.id/index.php/jodesma/article/view/3

Journal of Decision Support Systems and Multi-Criteria Decision Making
ISSN: 3164-7022
Page 43-62
Journal Homepage: https://research.pilar.or.id/index.php/jodesma

obtained from the evaluation results of each alternative and is used as a basis in the decision-making process. Each alternative has a score for each criterion according to its characteristics and the evaluation results obtained. All the assessment data used in this study is presented in Table 1.

Table 1. Alternative Assessment Data

Alternatives	CB-01	CB-02	CB-03	CB-04	CB-05	CB-06	CB-07	CB-08
A1	22	85	4	82	88	84	86	80
A2	24	78	3	75	84	90	80	85
A3	21	92	5	90	86	82	94	88
A4	23	80	4	78	90	85	88	92
A5	25	88	3	85	82	92	84	90
A6	20	76	2	72	80	88	78	82
A7	22	90	5	88	92	86	91	95
A8	24	84	4	80	85	94	87	86
A9	23	82	3	77	89	80	90	84

CB-01 (Age) shows the candidate's age, which is one of the considerations in the barista selection process. CB-02 (Technical Skills) describes the candidate's ability to perform barista technical tasks, such as operating coffee machines, extracting espresso, steaming milk, and serving drinks. CB-03 (Experience) indicates the candidate's level of experience in barista work or relevant jobs. CB-04 (Coffee Knowledge) reflects the candidate's understanding of coffee types, bean characteristics, processing, roasting, brewing methods, and flavor profiles. CB-05 (Communication) shows the candidate's ability to communicate effectively with both customers and coworkers. CB-06 (Work Speed) shows a candidate's ability to get work done quickly and efficiently, especially when handling orders. CB-07 (Accuracy) reflects how careful a candidate is in their work and their ability to minimize mistakes when preparing ingredients, measuring portions, processing orders, and serving drinks. Meanwhile, CB-08 (Creativity) shows a candidate's ability to come up with ideas or innovations in making and presenting drinks, developing menus, and varying coffee products.

Based on the established criteria, the evaluation data of barista candidates is used as a basis to measure how well each alternative fits the needs of the position being studied. This data then becomes a decision matrix used in the process of weighting criteria using the CRITID method and ranking alternatives using the SAW method. In this way, the evaluation data obtained can provide an objective basis for determining the best barista candidate.

III. Result and Discussion

This study develops a multi-criteria decision-making approach to support the barista selection process by combining the CRITID method and SAW. The CRITID method is used to determine the importance level or objective weight of each criterion based on data characteristics and the relationships between criteria, while the SAW method is used to process

DOI: https://doi.org/10.67449/jodesma.v1i1.3

Article Link: https://research.pilar.or.id/index.php/jodesma/article/view/3

Volume 1 Number 1 November 2026, Available Online: November 20, 2026.
Journal of Decision Support Systems and Multi-Criteria Decision Making
ISSN: 3164-7022
Page 43-62
Journal Homepage: https://research.pilar.or.id/index.php/jodesma

the performance values of alternatives based on those weights, resulting in preference scores and candidate rankings. The combination of these two methods is expected to produce a more systematic, measurable, and objective selection process in determining the barista candidate who best fits the organization's needs.

3.1. Determining Criteria Weights Objectively using the CRITID Method

Determining the weight of criteria objectively using the CRITID method aims to find out the importance level of each criterion based on the characteristics of the available data. The CRITID method takes into account the variation of information in each criterion as well as the relationships between criteria, so the resulting weights don’t just rely on the decision maker's subjectivity. In this study, the CRITID weights are used to represent the level of contribution of each criterion in the barista candidate selection process and later serve as the basis for ranking using the SAW method.

The CRITID stages start with creating a decision matrix (1) that includes the values of each alternative against all the criteria used in the barista candidate selection process. The resulting decision matrix is as follows.

$$X = \begin{bmatrix} 22 & 85 & 4 & 82 & 88 & 84 & 86 & 80 \\ 24 & 78 & 3 & 75 & 84 & 90 & 80 & 85 \\ 21 & 92 & 5 & 90 & 86 & 82 & 94 & 88 \\ 23 & 80 & 4 & 78 & 90 & 85 & 88 & 92 \\ 25 & 88 & 3 & 85 & 82 & 92 & 84 & 90 \\ 20 & 76 & 2 & 72 & 80 & 88 & 78 & 82 \\ 22 & 90 & 5 & 88 & 92 & 86 & 91 & 95 \\ 24 & 84 & 4 & 80 & 85 & 94 & 87 & 86 \\ 23 & 82 & 3 & 77 & 89 & 80 & 90 & 84 \end{bmatrix}$$

Next, the decision matrix is normalized (2) to convert the values of each criterion into a uniform scale so they can be compared across criteria. The results of the normalized decision matrix are shown in Table 2 below.

Table 2.Normalization Results of the CRITID Method

Alternatives	CB-01	CB-02	CB-03	CB-04	CB-05	CB-06	CB-07	CB-08
A1	0.4000	0.5625	0.6667	0.5556	0.6667	0.2857	0.5000	0.0000
A2	0.8000	0.1250	0.3333	0.1667	0.3333	0.7143	0.1250	0.3333
A3	0.2000	1.0000	1.0000	1.0000	0.5000	0.1429	1.0000	0.5333
A4	0.6000	0.2500	0.6667	0.3333	0.8333	0.3571	0.6250	0.8000
A5	1.0000	0.7500	0.3333	0.7222	0.1667	0.8571	0.3750	0.6667
A6	0.0000	0.0000	0.0000	0.0000	0.0000	0.5714	0.0000	0.1333
A7	0.4000	0.8750	1.0000	0.8889	1.0000	0.4286	0.8125	1.0000
A8	0.8000	0.5000	0.6667	0.4444	0.4167	1.0000	0.5625	0.4000
A9	0.6000	0.3750	0.3333	0.2778	0.7500	0.0000	0.7500	0.2667

After the data is normalized, the standard deviation is calculated (3) to determine the level of variation or data spread for each criterion. The results of the standard deviation are shown in Table 3 below.

DOI: https://doi.org/10.67449/jodesma.v1i1.3

Article Link: https://research.pilar.or.id/index.php/jodesma/article/view/3

Volume 1 Number 1 November 2026, Available Online: November 20, 2026.
Journal of Decision Support Systems and Multi-Criteria Decision Making
ISSN: 3164-7022
Page 43-62
Journal Homepage: https://research.pilar.or.id/index.php/jodesma

Table 3. Standard Deviation Results of the CRITID Method

CB-01	CB-02	CB-03	CB-04	CB-05	CB-06	CB-07	CB-08
0.2981	0.3206	0.3143	0.3151	0.3063	0.3119	0.3035	0.3038

The next step is to calculate the covariant value (4) and (5) to measure the level of dependence between criteria, which includes both linear and non-linear relationships. The results of the distance correlation are shown in Table 4 below.

Table 4. Covariant Results of the CRITID Method

	CB-01	CB-02	CB-03	CB-04	CB-05	CB-06	CB-07	CB-08
CB-01	0.9111	0.9963	1.0074	0.9984	1.0006	0.9519	1.0065	0.9783
CB-02	0.9963	0.8972	0.9221	0.9002	0.9651	1.0165	0.9260	0.9542
CB-03	1.0074	0.9221	0.9012	0.9191	0.9331	1.0256	0.9205	0.9490
CB-04	0.9984	0.9002	0.9191	0.9007	0.9632	1.0156	0.9287	0.9487
CB-05	1.0006	0.9651	0.9331	0.9632	0.9062	1.0526	0.9328	0.9579
CB-06	0.9519	1.0165	1.0256	1.0156	1.0526	0.9027	1.0521	0.9917
CB-07	1.0065	0.9260	0.9205	0.9287	0.9328	1.0521	0.9079	0.9577
CB-08	0.9783	0.9542	0.9490	0.9487	0.9579	0.9917	0.9577	0.9577

Based on the standard deviation values and the level of dependence, the importance value of the criteria (6) is then calculated to show how much information each criterion provides. The results of the criteria importance values are shown in Table 5 below.

Table 5. Importance Value Results of the CRITID Method

CB-01	CB-02	CB-03	CB-04	CB-05	CB-06	CB-07	CB-08
2.3405	2.4298	2.3815	2.3869	2.3617	2.4976	2.3163	2.3377

The final step is to determine the criteria weights (7) by normalizing the importance values of each criterion. The results of the criteria weights are shown in Table 6 below.

Table 6. Criteria Weights Results of the CRITID Method

CB-01	CB-02	CB-03	CB-04	CB-05	CB-06	CB-07	CB-08
0.1228	0.1275	0.1250	0.1253	0.1240	0.1311	0.1216	0.1227

The results of the calculations using the CRITID method show the weights for each criterion in the barista candidate selection process as presented in Table 6: Criteria Weights Results of the CRITID Method. The CB-06 criterion (Work Speed) received the highest weight at 0.1311, indicating that this criterion has the greatest relative importance in the decision-making process. Next, CB-02 (Technical Skills) received a weight of 0.1275, CB-04 (Coffee Knowledge) 0.1253, CB-03 (Experience) 0.1250, CB-05 (Communication) 0.1240, CB-01 (Age) 0.1228, CB-08 (Creativity) 0.1227, and CB-07 (Attention to Detail) got the lowest weight at 0.1216. These results show that each criterion has a relatively balanced level of contribution, with work speed being the most dominant factor in determining a barista candidate's suitability.

DOI: https://doi.org/10.67449/jodesma.v1i1.3

Article Link: https://research.pilar.or.id/index.php/jodesma/article/view/3

Journal of Decision Support Systems and Multi-Criteria Decision Making
ISSN: 3164-7022
Page 43-62
Journal Homepage: https://research.pilar.or.id/index.php/jodesma

3.2. Alternative Assessment using the SAW Method

After obtaining the criteria weights using the CRITID method, the next step is to evaluate each alternative using the Simple Additive Weighting (SAW) method. The SAW method is used to process the performance scores of each candidate based on the predetermined criteria while considering the importance weight of each criterion. The results of this calculation are used to get a preference score for each alternative, which serves as the basis for determining the ranking of the most suitable barista candidates.

The SAW stages start with creating a decision matrix (1) that includes the values of each alternative against all the criteria used in the barista candidate selection process. The resulting decision matrix is as follows.

$$X = \begin{bmatrix} 22 & 85 & 4 & 82 & 88 & 84 & 86 & 80 \\ 24 & 78 & 3 & 75 & 84 & 90 & 80 & 85 \\ 21 & 92 & 5 & 90 & 86 & 82 & 94 & 88 \\ 23 & 80 & 4 & 78 & 90 & 85 & 88 & 92 \\ 25 & 88 & 3 & 85 & 82 & 92 & 84 & 90 \\ 20 & 76 & 2 & 72 & 80 & 88 & 78 & 82 \\ 22 & 90 & 5 & 88 & 92 & 86 & 91 & 95 \\ 24 & 84 & 4 & 80 & 85 & 94 & 87 & 86 \\ 23 & 82 & 3 & 77 & 89 & 80 & 90 & 84 \end{bmatrix}$$

Next, the decision matrix is normalized (8) to convert the values of each criterion into a uniform scale so they can be compared across criteria. The results of the normalized decision matrix are shown in Table 7 below.

Table 7. Normalization Results of the SAW Method

Alternatives	CB-01	CB-02	CB-03	CB-04	CB-05	CB-06	CB-07	CB-08
A1	0.9091	0.9239	0.8000	0.9111	0.9565	0.8936	0.9149	0.8421
A2	0.8333	0.8478	0.6000	0.8333	0.9130	0.9574	0.8511	0.8947
A3	0.9524	1.0000	1.0000	1.0000	0.9348	0.8723	1.0000	0.9263
A4	0.8696	0.8696	0.8000	0.8667	0.9783	0.9043	0.9362	0.9684
A5	0.8000	0.9565	0.6000	0.9444	0.8913	0.9787	0.8936	0.9474
A6	1.0000	0.8261	0.4000	0.8000	0.8696	0.9362	0.8298	0.8632
A7	0.9091	0.9783	1.0000	0.9778	1.0000	0.9149	0.9681	1.0000
A8	0.8333	0.9130	0.8000	0.8889	0.9239	1.0000	0.9255	0.9053
A9	0.8696	0.8913	0.6000	0.8556	0.9674	0.8511	0.9574	0.8842

The last step is to determine the preference values of the alternatives using Equation (9), which is done by adding up the results of multiplying each criterion's normalized value by the criterion weight obtained from the CRITID method. The results of the alternative preference values are presented in Table 8 below.

Table 8. Preference Values Results of the SAW Method

Alternatives	Preference Value
A1	0.8939
A2	0.8419
A3	0.9603
A4	0.8988
A5	0.8773

DOI: https://doi.org/10.67449/jodesma.v1i1.3

Article Link: https://research.pilar.or.id/index.php/jodesma/article/view/3

Volume 1 Number 1 November 2026, Available Online: November 20, 2026.
Journal of Decision Support Systems and Multi-Criteria Decision Making
ISSN: 3164-7022
Page 43-62
Journal Homepage: https://research.pilar.or.id/index.php/jodesma

A6	0.8157
A7	0.9682
A8	0.8994
A9	0.8591

Based on the preference values obtained through the SAW method, the next step is to rank all the alternatives based on their respective preference values. The ranking is done by sorting the alternatives from the highest to the lowest preference value, so the alternative with the highest value takes the first rank and is considered the most suitable candidate according to the set criteria. The ranking results for the barista candidates based on these preference values are shown in Figure 2.

Figure 2. Alternative Ranking

Based on the alternative ranking result chart, A7 takes the first place with a preference value of 0.9682, followed by A3 in second place with a value of 0.9603. Next, A8 is in third place with 0.8994, A4 in fourth with 0.8988, and A1 in fifth with 0.8939. Meanwhile, A5 is in sixth place with 0.8773, A9 in seventh with 0.8591, A2 in eighth with 0.8419, and A6 is the lowest-ranked alternative, in ninth place with 0.8157. These results show that the higher the preference value obtained, the higher the alternative's ranking position.

3.3. Evaluation of Results

The results evaluation is done using a sensitivity analysis to find out how stable the ranking results of the alternatives are to changes in the criteria weights. This analysis is carried out by varying the criteria weights produced by the CRITID method, then recalculating the preference values using the SAW method to observe changes in the ranking of alternatives. The results of the sensitivity analysis are used to identify the criteria that have the most influence on decision

DOI: https://doi.org/10.67449/jodesma.v1i1.3

Article Link: https://research.pilar.or.id/index.php/jodesma/article/view/3

Volume 1 Number 1 November 2026, Available Online: November 20, 2026.
Journal of Decision Support Systems and Multi-Criteria Decision Making
ISSN: 3164-7022
Page 43-62
Journal Homepage: https://research.pilar.or.id/index.php/jodesma

changes and to assess the consistency of the ranking results. The smaller the changes in the alternatives' ranks due to weight adjustments, the more stable the decision results are. In this way, sensitivity analysis is used to evaluate the reliability of the CRITID and SAW method combination in the barista candidate selection process.

Sensitivity analysis is carried out by making changes to the weights of each criterion to see how they affect the ranking results of the alternatives. The weight change scenarios are done by increasing and decreasing the weight by 0.05 and 0.10 from the initial weight produced by the CRITID method. So, there are four change scenarios: an increase of 0.05, an increase of 0.10, a decrease of 0.05, and a decrease of 0.10. In each scenario, the weights of the criteria that are changed are adjusted again so that the total weight still adds up to 1, and then the preference values and alternative rankings are recalculated using the SAW method. The results of each sensitivity analysis scenario are presented in Table 9, which are then used to compare ranking changes to the initial condition and evaluate the stability level of the decision results.

Table 9. Testing Scenario Using Changes in Criteria Weights

Testing Scenario	CB-01	CB-02	CB-03	CB-04	CB-05	CB-06	CB-07	CB-08
Test 1: CB-01 +0.05	0.1646	0.1214	0.1190	0.1193	0.1181	0.1249	0.1158	0.1169
Test 2: CB-02 +0.05	0.1170	0.1690	0.1190	0.1193	0.1181	0.1249	0.1158	0.1169
Test 3: CB-03 +0.05	0.1170	0.1214	0.1667	0.1193	0.1181	0.1249	0.1158	0.1169
Test 4: CB-04 +0.05	0.1170	0.1214	0.1190	0.1670	0.1181	0.1249	0.1158	0.1169
Test 5: CB-05 +0.05	0.1170	0.1214	0.1190	0.1193	0.1657	0.1249	0.1158	0.1169
Test 6: CB-06 +0.05	0.1170	0.1214	0.1190	0.1193	0.1181	0.1725	0.1158	0.1169
Test 7: CB-07 +0.05	0.1170	0.1214	0.1190	0.1193	0.1181	0.1249	0.1634	0.1169
Test 8: CB-08 +0.05	0.1170	0.1214	0.1190	0.1193	0.1181	0.1249	0.1158	0.1645
Test 9: CB-01 -0.05	0.0766	0.1342	0.1316	0.1319	0.1305	0.1380	0.1280	0.1292
Test 10: CB-02 -0.05	0.1293	0.0816	0.1316	0.1319	0.1305	0.1380	0.1280	0.1292
Test 11: CB-03 -0.05	0.1293	0.1342	0.0789	0.1319	0.1305	0.1380	0.1280	0.1292
Test 12: CB-04 -0.05	0.1293	0.1342	0.1316	0.0793	0.1305	0.1380	0.1280	0.1292
Test 13: CB-05 -0.05	0.1293	0.1342	0.1316	0.1319	0.0779	0.1380	0.1280	0.1292
Test 14: CB-06 -0.05	0.1293	0.1342	0.1316	0.1319	0.1305	0.0854	0.1280	0.1292
Test 15: CB-07 -0.05	0.1293	0.1342	0.1316	0.1319	0.1305	0.1380	0.0754	0.1292

DOI: https://doi.org/10.67449/jodesma.v1i1.3

Article Link: https://research.pilar.or.id/index.php/jodesma/article/view/3

Volume 1 Number 1 November 2026, Available Online: November 20, 2026.
Journal of Decision Support Systems and Multi-Criteria Decision Making
ISSN: 3164-7022
Page 43-62
Journal Homepage: https://research.pilar.or.id/index.php/jodesma

Test 16: CB-08 -0.05	0.1293	0.1342	0.1316	0.1319	0.1305	0.1380	0.1280	0.0765
Test 17: CB-01 +0.1	0.2025	0.1159	0.1136	0.1139	0.1127	0.1192	0.1105	0.1115
Test 18: CB-02 +0.1	0.1116	0.2068	0.1136	0.1139	0.1127	0.1192	0.1105	0.1115
Test 19: CB-03 +0.1	0.1116	0.1159	0.2045	0.1139	0.1127	0.1192	0.1105	0.1115
Test 20: CB-04 +0.1	0.1116	0.1159	0.1136	0.2048	0.1127	0.1192	0.1105	0.1115
Test 21: CB-05 +0.1	0.1116	0.1159	0.1136	0.1139	0.2036	0.1192	0.1105	0.1115
Test 22: CB-06 +0.1	0.1116	0.1159	0.1136	0.1139	0.1127	0.2101	0.1105	0.1115
Test 23: CB-07 +0.1	0.1116	0.1159	0.1136	0.1139	0.1127	0.1192	0.2015	0.1115
Test 24: CB-08 +0.1	0.1116	0.1159	0.1136	0.1139	0.1127	0.1192	0.1105	0.2025
Test 25: CB-01 -0.1	0.0253	0.1417	0.1389	0.1392	0.1378	0.1457	0.1351	0.1363
Test 26: CB-02 -0.1	0.1364	0.0306	0.1389	0.1392	0.1378	0.1457	0.1351	0.1363
Test 27: CB-03 -0.1	0.1364	0.1417	0.0278	0.1392	0.1378	0.1457	0.1351	0.1363
Test 28: CB-04 -0.1	0.1364	0.1417	0.1389	0.0281	0.1378	0.1457	0.1351	0.1363
Test 29: CB-05 -0.1	0.1364	0.1417	0.1389	0.1392	0.0267	0.1457	0.1351	0.1363
Test 30: CB-06 -0.1	0.1364	0.1417	0.1389	0.1392	0.1378	0.0346	0.1351	0.1363
Test 31: CB-07 -0.1	0.1364	0.1417	0.1389	0.1392	0.1378	0.1457	0.0240	0.1363
Test 32: CB-08 -0.1	0.1364	0.1417	0.1389	0.1392	0.1378	0.1457	0.1351	0.0252

Based on the results of the sensitivity analysis for each weight-change scenario, the alternatives were re-ranked using the SAW method to examine the impact of changes in criterion weights on the final decision. The ranking process was performed by sorting the preference values of all alternatives from the highest to the lowest value for each scenario. The resulting rankings were then compared with the initial ranking obtained using the original CRITID weights. This comparison was conducted to identify changes in the position of each alternative resulting from increases or decreases in criterion weights by 0.05 and 0.10. The analysis provides an overview of the consistency and robustness of the ranking results under different weighting conditions. Furthermore, alternatives that maintain their positions across multiple scenarios can be considered to have more stable performance, while alternatives with larger ranking changes indicate greater sensitivity to variations in criterion importance. The complete ranking results for all sensitivity analysis scenarios are presented in Figure 3.

DOI: https://doi.org/10.67449/jodesma.v1i1.3

Article Link: https://research.pilar.or.id/index.php/jodesma/article/view/3

Journal of Decision Support Systems and Multi-Criteria Decision Making
ISSN: 3164-7022
Page 43-62
Journal Homepage: https://research.pilar.or.id/index.php/jodesma

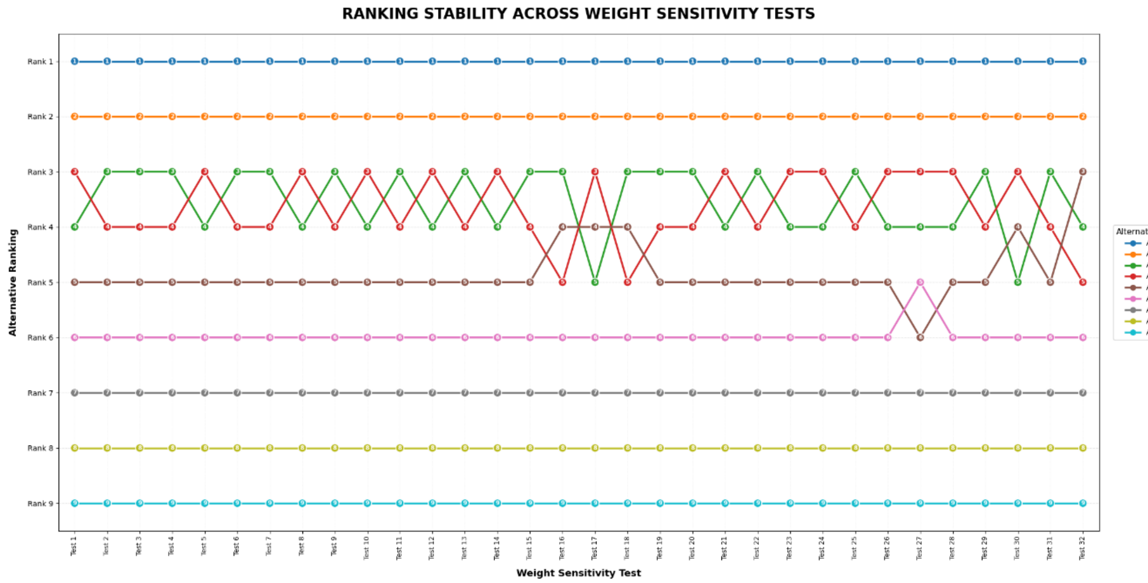

Figure 3. Ranking Stability Analysis

Figure 3 shows the results of the ranking stability analysis for 32 test scenarios (Test 1–Test 32) on nine alternatives, namely A1–A9. The results indicate that A7 and A3 have very stable rankings, consistently holding the 1st and 2nd positions across all tests, while A9, A2, and A6 are completely stable at ranks 7, 8, and 9. Alternatives A8 and A4 experienced relatively minor ranking changes, ranging from 3–5 for both, whereas A1 varied from 3rd to 6th place and A5 was almost always in 6th place, except in Test 27 where it rose to 5th. Overall, these results show that changes in the test scenarios did not cause significant ranking shifts for most alternatives, meaning the ranking structure is relatively stable and the method used is quite resilient to changing test conditions.

To further evaluate the robustness of the proposed method, a sensitivity analysis is conducted by modifying the criterion weights and observing the resulting changes in the ranking of alternatives. Each weight variation generates a new ranking configuration, which is then compared with the original ranking obtained under the initial weight configuration. To quantify the degree of consistency between the rankings, a correlation coefficient is calculated for each sensitivity test. The correlation values obtained from all tests are subsequently analyzed to determine the extent to which changes in criterion weights influence the ranking results. A high correlation value indicates that the ranking remains consistent with the reference ranking, whereas a lower value indicates greater changes in the relative positions of the alternatives. The correlation results from all sensitivity tests are presented in Figure 4, providing a quantitative overview of the ranking stability under different weight configurations. Overall, this analysis enables the robustness of the proposed method to be assessed based on the consistency of ranking outcomes across the tested scenarios.

DOI: https://doi.org/10.67449/jodesma.v1i1.3

Volume 1 Number 1 November 2026, Available Online: November 20, 2026.
Journal of Decision Support Systems and Multi-Criteria Decision Making
ISSN: 3164-7022
Page 43-62
Journal Homepage: https://research.pilar.or.id/index.php/jodesma

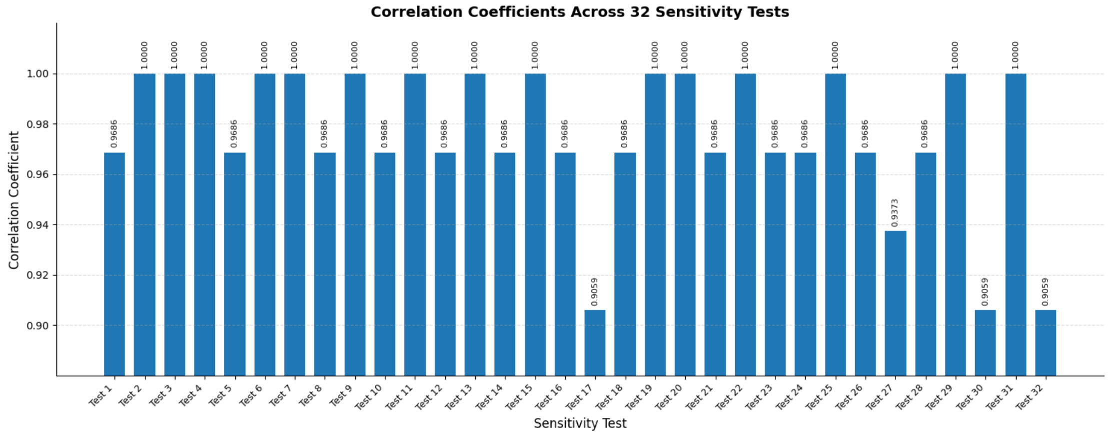

Figure 4. Correlation Score Results for Each Test

The correlation coefficient results from 32 sensitivity tests conducted to evaluate the stability and robustness of the ranking results ranged from 0.9059 to 1.0000, showing a very high level of consistency among the ranking results obtained under various testing conditions. Some tests—namely Test 2, 3, 4, 6, 7, 9, 11, 13, 15, 19, 20, 22, 25, 29, and 31—achieved a perfect correlation coefficient of 1.0000, indicating ranking results identical to the reference condition. Meanwhile, most of the other tests produced a correlation coefficient of 0.9686; Tests 17, 30, and 32 had a value of 0.9059; and Test 27 recorded a value of 0.9373. Despite these variations, all correlation coefficients remain above 0.90, confirming that the ranking outcomes are highly consistent across the sensitivity scenarios. Therefore, the results indicate that the proposed approach demonstrates strong ranking stability, robustness, and reliability, with changes in the tested conditions having only a limited effect on the final ordering of alternatives.

3.4. Discussion

The CRITID weighting results indicate that the eight criteria contribute relatively evenly to the barista candidate selection process, although differences in their relative importance can still be identified. Among all criteria, CB-06 (Work Speed) obtains the highest weight of 0.1311, indicating that this criterion provides the greatest contribution to the decision-making process. This result is followed by CB-02 (Technical Skills) with a weight of 0.1275, CB-04 (Coffee Knowledge) with 0.1253, and CB-03 (Experience) with 0.1250. Meanwhile, CB-05 (Communication), CB-01 (Age), CB-08 (Creativity), and CB-07 (Attention to Detail) obtain weights of 0.1240, 0.1228, 0.1227, and 0.1216, respectively. The relatively narrow range between the highest and lowest weights shows that no single criterion overwhelmingly dominates the decision process. Nevertheless, the higher weight assigned to Work Speed suggests that the ability of a candidate to perform tasks efficiently is considered slightly more informative based on the variation and interrelationships contained in the evaluation data. Thus, the CRITID results provide an objective basis for representing the

DOI: https://doi.org/10.67449/jodesma.v1i1.3

Article Link: https://research.pilar.or.id/index.php/jodesma/article/view/3

Volume 1 Number 1 November 2026, Available Online: November 20, 2026.
Journal of Decision Support Systems and Multi-Criteria Decision Making
ISSN: 3164-7022
Page 43-62
Journal Homepage: https://research.pilar.or.id/index.php/jodesma

relative contribution of each criterion before the ranking process is performed using SAW.

The SAW calculation produces preference values that reflect the overall performance of each barista candidate after considering the normalized criterion values and the CRITID-derived weights. A7 achieves the highest preference value of 0.9682, placing it in the first position, followed by A3 with a value of 0.9603 in second place. The next positions are occupied by A8 with 0.8994, A4 with 0.8988, and A1 with 0.8939, while A5, A9, A2, and A6 occupy the sixth to ninth positions with preference values of 0.8773, 0.8591, 0.8419, and 0.8157, respectively. The relatively high preference values of A7 and A3 indicate that these alternatives demonstrate strong overall performance across the evaluated criteria, particularly when the objective criterion weights are taken into account. Conversely, A6 obtains the lowest preference value, indicating comparatively weaker overall performance under the same evaluation framework. These results demonstrate that SAW is able to aggregate the performance of candidates across multiple criteria into a single preference score, making it possible to establish a clear priority order for the selection of barista candidates.

The combination of CRITID and SAW provides a complementary decision-making framework in which the two methods perform different but interconnected functions. CRITID is applied first to objectively determine the importance of each criterion by considering the variation of normalized data and the relationships among criteria. This process reduces the dependence of criterion weighting on subjective judgments and produces a weight vector that reflects the information characteristics of the evaluation data. Subsequently, SAW uses these weights to aggregate the normalized performance values of each candidate and generate preference scores for ranking. The resulting framework therefore separates the process of determining criterion importance from the process of evaluating alternatives, while maintaining a direct relationship between the two stages. The results show that the combination is capable of producing a clear ranking, with A7 and A3 identified as the two highest-ranked candidates. Furthermore, because the weights are derived objectively before being incorporated into SAW, the resulting ranking is not solely dependent on manually assigned criterion priorities. This combination consequently provides a systematic basis for translating multidimensional barista evaluation data into an interpretable and measurable selection decision.

From a practical perspective, the results can support organizations, coffee shops, or other service businesses in conducting a more structured barista recruitment and selection process. The identification of Work Speed (CB-06) as the criterion with the highest weight indicates that candidate evaluation should pay particular attention to the ability to perform tasks efficiently, while still considering technical skills, coffee knowledge, experience, communication, age, creativity, and attention to detail. The ranking results provide decision makers with a clear priority order, where A7 represents the most preferred candidate based on the complete set of

DOI: https://doi.org/10.67449/jodesma.v1i1.3

Article Link: https://research.pilar.or.id/index.php/jodesma/article/view/3

Volume 1 Number 1 November 2026, Available Online: November 20, 2026.
Journal of Decision Support Systems and Multi-Criteria Decision Making
ISSN: 3164-7022
Page 43-62
Journal Homepage: https://research.pilar.or.id/index.php/jodesma

evaluation criteria, followed by A3 and the other alternatives. This information can be used as an initial reference during recruitment, particularly when several candidates have relatively similar qualifications. In addition, the objective weighting process can help reduce the influence of purely subjective preferences when determining which characteristics should receive greater consideration. However, the model should be regarded as a decision-support instrument rather than a replacement for managerial judgment, since practical recruitment may also involve factors that are not represented in the current criteria, such as interview performance, attitude, teamwork, or organizational fit. Therefore, the CRITID-SAW framework can function as a quantitative complement to existing recruitment procedures.

The sensitivity analysis demonstrates that the ranking results remain highly stable despite substantial changes in criterion weights. Across 32 sensitivity tests, the weights of individual criteria were increased or decreased by 0.05 and 0.10, with the remaining weights adjusted so that their total remained equal to one. The ranking results show that A7 and A3 consistently occupy the first and second positions, respectively, across all testing scenarios, while A9, A2, and A6 consistently remain in the seventh, eighth, and ninth positions. A8 and A4 exhibit only limited changes, while A1 shows a somewhat wider variation and A5 changes position only in Test 27. This stability is further supported by the correlation analysis, where the correlation coefficients across the 32 tests range from 0.9059 to 1.0000. Several tests achieve a perfect correlation of 1.0000, while the remaining tests still demonstrate very high correlations above 0.90. These findings indicate that modifications to the criterion weights have only a limited impact on the relative ordering of alternatives. Therefore, the CRITID-SAW approach demonstrates strong ranking stability and robustness, suggesting that the decision outcomes are not highly dependent on a particular initial weight configuration and can remain reliable under different weighting conditions.

IV. Conclusion

This study demonstrates that the integration of CRITID and SAW methods can provide a systematic, objective, and measurable approach for selecting barista candidates. CRITID successfully determines the objective importance of the eight evaluation criteria by considering data variation and inter-criteria relationships, with Work Speed (CB-06) obtaining the highest weight of 0.1311, followed by Technical Skills (0.1275) and Coffee Knowledge (0.1253). The SAW method then uses these weights to evaluate and rank the candidates, resulting in A7 as the best candidate with a preference value of 0.9682, followed by A3 (0.9603), A8 (0.8994), A4 (0.8988), and A1 (0.8939). These results indicate that the proposed DSS can support a more structured and transparent barista selection process by integrating multiple competency aspects rather than relying on a single criterion.

DOI: https://doi.org/10.67449/jodesma.v1i1.3

Article Link: https://research.pilar.or.id/index.php/jodesma/article/view/3

Journal of Decision Support Systems and Multi-Criteria Decision Making
ISSN: 3164-7022
Page 43-62
Journal Homepage: https://research.pilar.or.id/index.php/jodesma

The sensitivity analysis involving 32 weight-change scenarios further demonstrates the stability of the resulting rankings. Changes in criterion weights by ±0.05 and ±0.10 did not substantially alter the overall ranking structure, with A7 and A3 consistently maintaining the first and second positions, while A9, A2, and A6 remained stable at seventh, eighth, and ninth positions, respectively. Although A1, A4, A5, and A8 experienced minor changes in ranking, these variations did not affect the dominance of A7 and A3. Therefore, the combination of CRITID and SAW provides not only an objective basis for weighting and ranking barista candidates but also relatively stable decision results under different weighting conditions, making it suitable as a decision-support approach for barista candidate selection.

CRediT Authorship Contribution Statement

Verra Sofica: Writing – review & editing, Writing – original draft, Validation, Software, Methodology, Conceptualization. **Titik Misriati:** Writing – original draft, Formal analysis, Data curation, Conceptualization.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Funding Statements

The author(s) received no financial support for the research, authorship, and/or publication of this article.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Declaration of Generative AI and AI-assisted Technologies in The Writing Process

The authors used Generative AI to improve the writing clarity of this paper. They reviewed and edited the AI-assisted content and take full responsibility for the final publication.

References

[1] M. W. Arshad, R. R. Suryono, Y. Rahmanto, S. Sumanto, S. Sintaro, and S. Setiawansyah, "Combination of Objective Weighting Method using MEREC and A New Additive Ratio Assessment in Coffee Barista Admissions," *TIN Terap. Inform. Nusant.*, vol. 5, no. 3, pp. 220–231, Aug. 2024, doi: 10.47065/tin.v5i3.5771.
[2] S. Sintaro, "Sistem Pendukung Keputusan Penentuan Barista Terbaik Menggunakan Rank Sum dan Additive Ratio Assessment (ARAS)," *J. Ilm. Comput. Sci.*, vol. 2, no. 1, pp. 39–49, 2023, doi: 10.58602/jics.v2i1.15.

DOI: https://doi.org/10.67449/jodesma.v1i1.3

Article Link: https://research.pilar.or.id/index.php/jodesma/article/view/3

[3] J. Qian, G. Zhou, W. He, Y. Cui, and H. Deng, "Optimization of teacher evaluation indicator system based on fuzzy-DEMATEL-BP," *Heliyon*, vol. 10, no. 13, pp. 1–16, Jul. 2024, doi: 10.1016/j.heliyon.2024.e34034.
[4] M. Baydaş, M. Yılmaz, Ž. Jović, Ž. Stević, S. E. G. Özuyar, and A. Özçil, "A comprehensive MCDM assessment for economic data: success analysis of maximum normalization, CODAS, and fuzzy approaches," *Financ. Innov.*, vol. 10, no. 1, p. 105, Mar. 2024, doi: 10.1186/s40854-023-00588-x.
[5] D. A. Megawaty *et al.*, "DAM Weighting: A New Approach to Determining Criteria Weighting in Multi-Criteria Decision Making," *Evergreen*, vol. 13, no. 2, pp. 788–800, 2026, doi: 10.5109/7432655.
[6] A. Aytekin, "DETERMINING CRITERIA WEIGHTS FOR VEHICLE TRACKING SYSTEM SELECTION USING PIPRECIA-S," *J. Process Manag. new Technol.*, vol. 10, no. 1–2, pp. 115–124, Jun. 2022, doi: 10.5937/jpmnt10-38145.
[7] Q. Ma and H. Li, "A decision support system for supplier quality evaluation based on MCDM-aggregation and machine learning," *Expert Syst. Appl.*, vol. 242, p. 122746, May 2024, doi: 10.1016/j.eswa.2023.122746.
[8] N. Hendrastuty, M. G. Ar'nars, Setiawansyah, Mesran, T. A. Putra, and M. W. Arshad, "Decision Support System in Teacher Pedagogy Assessment Using MAIRCA with Geometric Mean Weighting," in *2024 International Conference on Informatics, Multimedia, Cyber and Information System (ICIMCIS)*, 2024, pp. 265–270. doi: 10.1109/ICIMCIS63449.2024.10957630.
[9] A. Yudhistira, S. Setiawansyah, T. Ardiansah, S. Maryana, Y. Yadin, and R. Oktaviani, "Development of Multi-Attribute Utility Theory Methods in Dynamic Decision Models Using Change-Data Driven," *Evergreen*, vol. 11, no. 4, pp. 3279–3289, Dec. 2024, doi: 10.5109/7326962.
[10] F. Tamtam and A. Tourabi, "Scenario-Based Security and Reliability Evaluation of Connected Autonomous Vehicles Using a Hybrid CRITID-Fuzzy BWM-VIKOR Swarm Approach," *Int. J. Inf. Eng. Electron. Bus.*, vol. 18, no. 3, p. 124, 2026, doi: 10.5815/ijieeb.2026.03.08.
[11] Q. Zhang, J. Fan, and C. Gao, "CRITID: enhancing CRITIC with advanced independence testing for robust multi-criteria decision-making," *Sci. Rep.*, vol. 14, no. 1, p. 25094, 2024, doi: 10.1038/s41598-024-75992-z.
[12] D. D. Trung, N. T. P. Giang, D. Van Duc, T. Van Dua, and H. X. Thinh, "The Use of SAW, RAM and PIV Decision Methods in Determining the Optimal Choice of Materials for the Manufacture of Screw Gearbox Acceleration Boxes," *Int. J. Mech. Eng. Robot. Res.*, vol. 13, no. 3, pp. 338-347, 2024, doi: 10.18178/ijmerr.13.3.338-347.
[13] Y. P. Suprapto, H. Haerudin, and A. Danuwidodo, "Decision Support System for Employee Performance Assessment Using Analytical Hierarchy Process and Simple Additive Weighting Methods," *J. Inf. Syst. Informatics*, vol. 6, no. 2, pp. 766–780, 2024, doi: 10.51519/journalisi.v6i2.721.
[14] M. Soltani, B. Barekatain, F. Hendessi, and Z. Beheshti, "PSSN: a novel cache placement method based on adapted Shannon entropy and simple additive weighting method in named data networking," *Knowl. Inf. Syst.*, vol. 67, no. 2, pp. 1507–1540, 2025, doi: 10.1007/s10115-024-02266-5.
[15] M. A. M. Al-Gerafi *et al.*, "Promoting inclusivity in education amid the post-COVID-19 challenges: An interval-valued fuzzy model for pedagogy method selection," *Int. J. Manag. Educ.*, vol. 22, no. 3, p. 101018, 2024, doi: 10.1016/j.ijme.2024.101018.
[16] C. Z. Radulescu and M. Radulescu, "A Hybrid Group Multi-Criteria Approach Based on SAW, TOPSIS, VIKOR, and COPRAS Methods for Complex IoT Selection Problems," *Electronics*, vol. 13, no. 4, p. 789, Feb. 2024, doi: 10.3390/electronics13040789.
[17] H. Sulistiani, S. Setiawansyah, P. Palupiningsih, F. Hamidy, P. L. Sari,

Journal of Decision Support Systems and Multi-Criteria Decision Making
ISSN: 3164-7022
Page 43-62
Journal Homepage: https://research.pilar.or.id/index.php/jodesma
and Y. Khairunnisa, "Employee Performance Evaluation Using Multi-Attribute Utility Theory (MAUT) with PIPRECIA-S Weighting: A Case Study in Education Institution," in *2023 International Conference on Informatics, Multimedia, Cyber and Informations System (ICIMCIS)*, 2023, pp. 369–373. doi: 10.1109/ICIMCIS60089.2023.10349017.

[18] A. D. Putra, A. T. Priandika, D. Alita, C. Mario, A. D. Wahyudi, and Setiawansyah, "Implementations of the Entropy and Complex Proportional Assessment Methods in Determining the Best Independent Student Exchange," in *2024 International Conference on Informatics, Multimedia, Cyber and Information System (ICIMCIS)*, 2024, pp. 247–252. doi: 10.1109/ICIMCIS63449.2024.10957397.

[19] G. Patel, S. Das, and R. Das, "Evaluation of optimal normalization techniques in multi-criteria decision-making to rank CMIP6 climate models," *Theor. Appl. Climatol.*, vol. 156, no. 7, p. 385, 2025, doi: 10.1007/s00704-025-05617-6.

[20] S. Eti *et al.*, "Enhancing solar panel recycling efficiency through zero-shot learning and hybrid fuzzy decision-making techniques," *Renew. Energy*, vol. 256, p. 124411, 2026, doi: 10.1016/j.renene.2025.124411.

DOI: https://doi.org/10.67449/jodesma.v1i1.3

Article Link: https://research.pilar.or.id/index.php/jodesma/article/view/3