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Decision Support System for Selecting the Best Restaurant Waiter Using a Combination of WENSLO Weighting and AROMAN Methods

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Abstract

The quality of service staff is a key factor in determining business success because they are the front line that interacts directly with consumers. However, performance evaluations of service staff are often still carried out subjectively, based only on the supervisor's perception or brief experiences with customers. This research discusses the application of a decision support system to determine the best restaurant service by combining the Weights by Envelope and Slope (WENSLO) method in criteria weighting and the Alternative Ranking Order Method Accounting for Two-Step Normalization (AROMAN) in the alternative ranking process. The dataset used in this study was collected in 2025 from one of the restaurants in the Lampung area, involving nine waiters as evaluation candidates using six criteria. The six criteria used consist of four benefit criteria: service speed, friendliness, accuracy, and customer satisfaction. The weighting results using the WENSLO method indicate that the order mistakes criterion received the highest weight of 0.7253, followed by completion time with a weight of 0.1700, while the other criteria have relatively small weights. The AROMAN method is used to calculate the final values of alternatives based on the specified weights, resulting in a ranking of restaurant servers. The analysis shows that alternative Waiters KS ranks first with the highest score of 1.6097, followed by Waiters QN and Waiters RB. This finding proves that the combination of the WENSLO and AROMAN methods can produce objective, systematic results, and supports restaurant management in making strategic decisions regarding the selection of the best employees.

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1. Introduction

In a service organization, particularly those engaged in areas such as restaurants, hotels, or companies focused on customer satisfaction, the quality of service staff becomes a key factor in determining business success. Service staff are the frontline who interact directly with consumers, so their performance not only reflects individual capability but also the image and reputation of the company as a whole. However, the assessment of service staff performance is often still conducted subjectively, for example, based solely on the perception of superiors or a momentary experience of customers. This raises the potential for unfairness, as unclear assessment criteria can affect decision-making in granting rewards, promotions, or even determining training. Therefore, an objective, measurable, and accountable assessment mechanism is needed so that the company can provide fair evaluations while also improving employee motivation. Other factors such as communication skills, friendly attitudes, understanding of products or menus, and the ability to resolve customer issues must also be included in the assessment indicators. The company's inability to conduct comprehensive assessments will result in low-quality service as perceived by consumers. Therefore, the need to establish an objective assessment system, with measurable and data-based criteria, becomes very urgent so that the company can improve the quality of human resources while maintaining customer loyalty in the midst of market competition.

Multi-Criteria Decision Making (MCDM) in the context of restaurant services plays an important role as a systematic approach to assess and make decisions involving multiple criteria simultaneously[1]–[3]. MCDM enables restaurant management to develop a more comprehensive assessment model by identifying, weighting, and measuring each relevant criterion, thus making the assessment of service performance more objective, and fair. The application of MCDM also helps restaurants address the issues of subjectivity that usually arise when assessments are based solely on the personal experiences of supervisors or fleeting comments from customers. By using the MCDM method, restaurants can process the performance data of waitstaff quantitatively[4]–[6], then produce rankings that show which employees are performing the best. This result is not only useful for decision-making related to promotions, bonuses, or training but also serves as a basis for ongoing evaluation to improve service standards. In other words, MCDM allows restaurants to manage human resources more strategically, maintain consistency in service quality, and ultimately enhance customer satisfaction and loyalty.

The weights by envelope and slope (WENSLO) method is an objective weighting technique in MCDM designed to measure the level of importance of a criterion based on variations in values and their change patterns[7]–[9]. The intuition behind this method is that a criterion is considered more important if it can clearly differentiate alternatives through the difference in values (slope) and the distribution of data that forms a boundary (envelope). By combining these two aspects, WENSLO not only takes into account the distribution of data as in the Entropy method but also considers the sensitivity of changes in values between alternatives, making the resulting weights more representative of the information contained in the data. The main advantage of WENSLO compared to other objective weighting methods lies in its ability to capture the dynamics of differences between alternatives in more detail. For example, in the Entropy method, weights tend to be biased towards criteria with high diversity, while CRITIC focuses more on variability and correlation among criteria. WENSLO is able to balance both because the envelope describes the range of value distribution, while the slope reflects the sensitivity of differences between alternatives[10]–[12]. As a result, the criteria weights from WENSLO are more adaptive and stable, making it suitable for complex decision-making cases where small changes in data can significantly affect the final ranking outcomes. The results of the criteria weighting from the WENSLO method are able to adjust weights based on historical data patterns, thereby reducing subjectivity and improving the accuracy of the evaluation model. Research results show that WENSLO produces supplier rankings that are more stable, efficient, and consistent compared to conventional weighting methods such as AHP or Entropy, while also speeding up the selection process through data-driven automation. This approach is recommended as an effective solution for modern DSS that require dynamic and evidence-based weighting.

The alternative ranking order method accounting for two-step normalization (AROMAN) is a ranking method in MCDM developed to enhance the accuracy of assessing alternatives based on multiple criteria[13]–[15]. Its basic concept involves the use of two-stage normalization before the weighting process and score calculation take place. After going through the two-stage normalization process, the value of each criterion is multiplied by a predetermined weight and then aggregated to produce a final score. With this mechanism, AROMAN is capable of minimizing data distortion that often occurs when only one-time normalization is used, making the ranking results more proportional and stable[16]–[18]. The main advantage of AROMAN compared to other ranking methods is its ability to maintain a balance between the simplicity of calculations and the accuracy of results. The two-stage normalization process makes this method more sensitive in distinguishing performance among alternatives, even when the differences in values are very slight. This provides an advantage for decision-makers in contexts that require high-precision evaluations, such as selecting the best employees, choosing strategic suppliers, or assessing service quality. Additionally, AROMAN is flexible as it can be combined with various weighting methods, both subjective and objective, without compromising the consistency of results[19], [20]. With the transparency of the calculation steps that are easy to understand and more representative ranking outcomes, AROMAN stands out as a superior alternative for complex decision-making that still demands efficiency. Most previous studies using ranking methods such as ARAS, WASPAS, or AROMAN still rely on subjective criteria weights based on the decision-makers' perceptions. This approach often leads to bias and inconsistency, especially when the data has high variation or complex interrelationships among criteria. Without objective weighting, the contribution of each criterion to the final result is difficult to measure proportionally. AROMAN offers transparency and efficiency in the ranking process, but its outcomes can be improved by integrating objective weighting methods such as WENSLO. Therefore, this study proposes a combination of WENSLO and AROMAN to produce a more accurate, fair, and data-driven evaluation of restaurant service performance. The results of applying the AROMAN method indicate that this approach is capable of providing more stable, objective, and balanced ranking and decision evaluation results compared to conventional MCDM methods. AROMAN works by optimizing the multi-attribute normalization process and taking into account the contribution ratios between criteria, so that the resulting weights reflect the actual influence of each factor on the decision objective.

The purpose of this study is to design a decision support system that can provide a more objective, measurable, and consistent assessment of restaurant service performance. The dataset used in this study was collected in 2025 from one of the casual restaurant chains in the Lampung area, involving nine waiters as evaluation candidates using six criteria. This study aims to integrate the objective weighting method WENSLO with the ranking method AROMAN, so that the system can determine the criteria weights proportionally based on data variations and sensitivities, and then produce fair alternative rankings through a two-stage normalization process. With this approach, the assessment relies not only on subjective perceptions but also on structured data, allowing decisions regarding who the best server is to be made transparently and accountable. The contribution of this research is the development of a more accurate restaurant service performance evaluation model through the integration of the WENSLO and AROMAN methods. Methodologically, this combination addresses the weaknesses of conventional methods by reducing data distribution bias and enhancing the sensitivity of differentiation between alternatives. Practically, this research assists restaurant management in decisions regarding promotions, incentives, and performance-based training, while also enriching academic literature on the application of MCDM in the service sector, particularly restaurants.

2. Research Methodology

Research methodology is a framework or systematic approach used by researchers to design, implement, and evaluate a study to ensure that the results obtained are valid, reliable, and accountable[21], [22]. This methodology includes the selection of research type, determination of population and samples, data collection techniques, research instruments, and analysis methods that are suitable for the research objectives. With the presence of research methodology, the research process becomes more directed and structured, thereby providing a clear picture of the steps taken to address problems and achieve research objectives[23].

2.1. Research Stages

The stages in this research require a systematic approach so that the analysis process is directed and the results obtained are valid and accountable. Each stage of the research is structured from identifying the problem to drawing conclusions, with the aim of ensuring that the methods used are appropriate to meet the research needs. With a structured sequence of steps, this research is expected to produce an accurate, objective, and beneficial decision support system in determining the best restaurant service. Figure 1 shows the stages undertaken in determining the best restaurant service.

Figure 1 shows the flow of the research stages in the development of a decision support system for selecting the best restaurant waiter using a combination of WENSLO weighting and AROMAN methods. The process begins with Problem Identification, which is the stage of identifying the main issues that form the basis of the study, namely the need for restaurant management to determine the best waiter objectively. Next, it proceeds to the stage of determination of criteria and alternatives and data collection, where the assessment criteria are established, the alternatives of waiters to be evaluated are selected, and assessment data is collected through observations and questionnaires. The next stage is calculation of criteria weights (WENSLO), which is used to objectively calculate the weight of each criterion by utilizing the WENSLO method, thus minimizing subjectivity. After the weights are determined, the process continues with the ranking of alternatives (AROMAN), which is the ranking of each servant based on the weighted criteria, using the AROMAN method to produce a more accurate assessment. Finally, the analysis of results stage is conducted to analyze the results of the calculations and rankings, so that the servant with the best performance can be identified and recommendations can be provided that are useful for restaurant management in decision making. With this flow, the research becomes systematic, clear, and can produce accountable decisions.

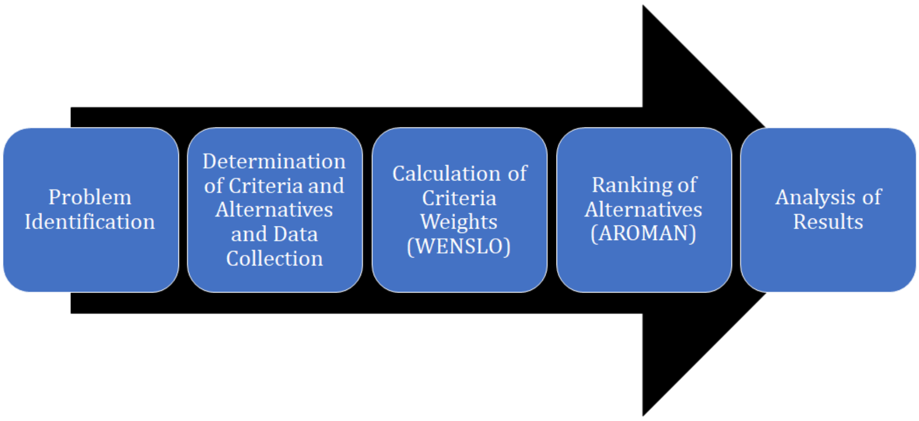

Figure 1. Research Stages

2.2. Weights by Envelope and Slope (WENSLO)

The WENSLO weighting method is one of the objective weighting methods in MCDM used to determine the importance level (weight) of each criterion based on the distribution of assessment data. The main principle of this method is to utilize the envelope (the maximum and minimum value boundaries for each criterion) and slope (the rate of change of values between data) to measure the level of information provided by a criterion[24]. The greater the variation or difference in values indicated by a criterion, the higher the weight assigned, because that criterion is considered more influential in distinguishing alternatives. With this approach, WENSLO can reduce the subjectivity of decision-makers, as weights are obtained mathematically and depend on the characteristics of the existing data. This method is widely used in decision support systems as it produces more objective, transparent weighting and is consistent with the actual conditions of the assessment data.

The initial stage in WENSLO is to form a decision matrix that contains assessment data for each alternative against the predetermined criteria. This matrix serves as the basis for calculations as it represents all the information to be analyzed. Each row in the matrix represents an alternative, while each column represents the evaluation criteria.

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

The second stage in WENSLO is to calculate the Normalized Decision Matrix values. The data in the decision matrix usually have different units or scales. Therefore, normalization is carried out so that all values are within a uniform range for fair comparison. Normalization also simplifies further calculations by converting original values into unitless values.

$$z_{ij} = \frac{x_{ij}}{\sum_{i=1}^{m} x_{ij}} \tag{2}$$

The third stage in WENSLO is to calculate the criterion class interval. The class interval is used to measure the extent of data variation within a criterion. The larger the interval produced, the greater the criterion's ability to differentiate alternatives.

$$\Delta Z_j = \frac{\max_j z_{ij} - \min_j z_{ij}}{1 + 3.322 * \log(m)} \tag{3}$$

The fourth stage in WENSLO is calculating the slope of the criterion. This stage calculates the slope of the data distribution for each criterion. The slope value indicates the level of sensitivity of changes in the data; criteria with a steeper slope are considered more important because they have a significant impact in distinguishing alternatives.

$$\varphi_j = \frac{\sum_{i=1}^{m} z_{ij}}{(m-1) * \Delta Z_j} \tag{4}$$

The fifth stage in WENSLO is calculating the criteria envelope. The Envelope is the maximum and minimum boundary of the data for each criterion. This Envelope provides an overview of the range of values that may occur within a criterion. The wider the envelope, the more information is contained by that criterion.

$$E_j = \sum_{i=1}^{m-1} \sqrt{\left(z_{i+1j} - z_{ij}\right)^2 + \Delta Z_j^{\,2}} \tag{5}$$

The sixth stage in WENSLO is to calculate the value of the proportion of the criterion envelope. The envelope obtained is then proportioned for each criterion by comparing the width of the envelope of a criterion to the total envelope of all criteria. This process helps to determine the extent of each criterion's contribution to the overall evaluation process.

$$q_j = \frac{E_j}{\varphi_j} \tag{6}$$

The final stage in WENSLO is to calculate the weights of each criterion based on the results of the proportioned slope and envelope calculations. These weights indicate the relative importance of each criterion in the decision-making process. A higher weight signifies that the criterion has a greater influence in determining the final ranking of the alternatives.

$$w_j = \frac{q_j}{\sum_{j=1}^{n} q_j} \tag{7}$$

The WENSLO weight results can be used as an objective basis in the ranking stage using advanced methods, because the weights obtained reflect the data characteristics accurately and reduce the influence of subjectivity in determining the level of importance of each criterion.

2.3. The Alternative Ranking Order Method Accounting for Two-Step Normalization (AROMAN)

AROMAN is one of the methods in MCDM used to determine the ranking order of alternatives based on a number of predetermined criteria. The main advantage of this method lies in the two-step normalization process, meaning that data normalization is performed in two stages to allow the values of each criterion to be aligned better and to produce a fairer comparison among alternatives. This method is particularly suitable for use in decision support systems, including for cases such as selecting the best restaurant server, because it can integrate objective criterion weights and provide a final result that is transparent and easy to interpret.

The first stage in the AROMAN method is to create a table containing the assessment data of all alternatives against the predetermined criteria. This matrix serves as the basis for the entire calculation process, created using equation (1). The second stage in the AROMAN method is calculating the normalized values. In the AROMAN method, normalization is carried out in two stages: first to equalize the scale of the data, and then the second stage to ensure that the values among criteria can truly be compared proportionally. Thus, each alternative value is on a uniform scale.

$$t_{ij} = \frac{x_{ij} - \min_i x_{ij}}{\max_i x_{ij} - \min_i x_{ij}} \tag{8}$$

$$t_{ij}^{*} = \frac{x_{ij}}{\sqrt{\sum_{i=1}^{m} {x_{ij}}^2}} \tag{9}$$

$$t_{ij}^{norm} = \frac{\beta t_{ij} + (1-\beta) t_{ij}^{*}}{2} \tag{10}$$

The third stage in the AROMAN method is to calculate the product of weights. After the data is normalized, the values for each criterion are multiplied by the predetermined criterion weights. This weight multiplication provides an important portion according to the level of importance of each criterion, so that more significant criteria contribute more to the final result.

$$\widehat{t_{ij}} = t_{ij}^{norm} * w_j \tag{11}$$

The fourth stage in the AROMAN method is calculating the weighted multiplication results based on the criteria type. At this stage, the weighted multiplication results are processed according to the type of criteria, namely benefit criteria (the larger the value, the better) or cost criteria (the smaller the value, the better). For benefit criteria, the alternative values are taken directly, while for cost criteria, the values are usually inverted or processed to align with the ranking objectives.

$$L_i = \left(\sum_{j=1}^{n} \widehat{t_{ij}}^{(min)}\right)^{\lambda} \tag{12}$$

$$A_i = \left(\sum_{j=1}^{n} \widehat{t_{ij}}^{(max)}\right)^{(1-\lambda)} \tag{13}$$

The final stage in the AROMAN method is calculating the final value of the alternatives. All calculation results from each criterion are used to obtain the final aggregate value for each alternative.

$$R_i = \exp(L_i - A_i) \tag{14}$$

Table 1. Restaurant Waiter Assessment Data

Waiters	C1 (Service Speed) Benefit	C2 (Friendliness) Benefit	C3 (Accuracy) Benefit	C4 (Customer Satisfaction) Benefit	C5 (Order Mistakes) Cost	C6 (Completion Time) Cost
Waiters ZR	80	85	90	88	5	12
Waiters QN	75	82	87	85	6	14
Waiters LM	90	78	85	92	4	11
Waiters KS	70	80	83	84	7	15
Waiters DP	88	90	86	91	3	10
Waiters VX	82	83	88	86	5	13
Waiters JT	85	87	84	89	4	12
Waiters RB	78	81	82	83	6	14
Waiters CY	92	88	89	90	3	11

The results of the calculations using the AROMAN method describe that each alternative was successfully assessed and ranked objectively. The final value obtained reflects the overall performance of each alternative, so the alternative with the highest score can be established as the best choice. Thus, the AROMAN method is able to provide transparent and accurate results, which can serve as a basis for making more informed decisions in determining the best alternative according to the established criteria.

2.4. Dataset

The dataset used in this study serves as the primary basis for testing the effectiveness of integrating the WENSLO–AROMAN method for restaurant service performance evaluation. The data were collected in 2025 from a casual restaurant chain operating in an urban area, involving nine waiters as assessment alternatives. Each waiter was evaluated based on six main criteria reflecting service quality, namely service speed, friendliness, order accuracy, customer satisfaction, order errors, and service completion time. The data were obtained through a combination of direct observation and customer surveys over three months, then processed into a standardized numerical format for objective analysis. The variation in values among candidates reflects real differences in individual performance, making this dataset highly relevant for the application of the WENSLO objective weighting method and the AROMAN ranking method in producing evaluations that are proportional, transparent, and data-driven. Table 1 shows the assessment data for each server's performance in the restaurant.

The assessment data in Table 1 was obtained through the restaurant management evaluation method of each server's performance. The criteria for service speed, friendliness, accuracy, and customer satisfaction (benefit) were measured based on the evaluations and observations of the supervisors during operational hours, while the criteria for order mistakes and completion time (cost) were obtained from the restaurant's operational records that track the number of errors in recording or serving orders as well as the average time taken by servers to serve customers. By collecting data from various sources, the values used in the research represent the real conditions in the field, making the resulting analysis more objective, relevant, and a strong basis for the decision-making process.

3. Results and Discussions

Determining the best restaurant servers is crucial for restaurant management because the performance of servers significantly affects service quality, customer satisfaction, and the overall image of the business. However, the process of selecting the best employees is often challenging if it solely relies on subjective assessments, as each evaluation criterion has different levels of importance, and the data used is often complex. To address this challenge, this research proposes the use of a combination of the WENSLO and AROMAN methods in a decision support system. The WENSLO method is used to objectively determine the weights of criteria based on data distribution, value variation, and differences among alternatives, thus helping to reduce subjective bias in determining the level of importance. Meanwhile, the AROMAN method is utilized to rank alternatives through a two-stage normalization process and weight multiplication, resulting in a ranking order of restaurant servers that is fairer and more proportional. By combining these two methods, the process of selecting the best server becomes more systematic, transparent, and accountable. The weight results from WENSLO ensure that each assessment criterion is considered according to its actual contribution. Furthermore, the application of the AROMAN method produces the final scores for each restaurant server, which have been processed through two stages of normalization and adjustment of criteria types (benefit or cost). Through this mechanism, the highest-scoring alternatives can be clearly identified as the best-performing servers. This approach not only helps restaurant management make more accurate decisions but also provides an objective evaluation basis for improving service quality in the future.

3.1. Problem Identification

Problem identification is a very important initial stage in a research study, as it is at this stage that the root of the issue to be solved can be recognized and clearly formulated. In the context of selecting the best restaurant server, the main problem lies in the difficulty of determining the most outstanding server if one only relies on intuition, subjective experience, or unilateral assessments from management. This occurs because each server has their own strengths and weaknesses. If the assessment is conducted without a systematic method, there is a high possibility that the decisions made will not be objective, which can lead to dissatisfaction from both management and employees.

In addition, the issues become more complex because each evaluation criterion has a different level of importance. For instance, friendliness may be considered more important than service speed in certain situations, while at other times speed may become the top priority. This situation creates a need for methods that can provide criterion weighting objectively so that the evaluation results truly reflect the real conditions. Traditional evaluation methods that only rely on simple scales or direct assessments from superiors are often insufficient to capture the existing data diversity. As a result, management may face difficulties in making accurate, fair, and consistent decisions regarding which service personnel should be chosen as the best.

Therefore, the identification of this problem emphasizes the necessity of a decision support system that can assist in the employee selection process more accurately and transparently. The system must be capable of processing assessment data from various criteria in an objective manner, and produce a final ranking that reflects the performance quality of each waiter. By utilizing a combination of WENSLO and AROMAN methods, issues related to criterion weighting and alternative ranking can be resolved in a more structured way. As a result, restaurant management not only obtains a more convincing decision in selecting the best waiters, but also gains a strong foundation for improving service quality overall.

3.2. Determination of Criteria and Alternatives and Data Collection

The stage of Determining Criteria and Alternatives and Data Collection is an important step after problem identification, because this is where the basis for calculations in the decision support system is established. At this stage, relevant assessment criteria are first determined for evaluating restaurant service performance. The selected criteria must truly reflect the main aspects of restaurant service quality. The determination of these criteria is key, as the weights and rankings produced later will heavily depend on the extent to which these criteria represent the quality standards expected by restaurant management. In addition to establishing criteria, this stage also determines alternatives, namely individuals or restaurant servers who will be assessed and compared. Alternatives can consist of several employees working in the service area, where each person will be evaluated based on the selected criteria. With a clear list of alternatives, the calculation process becomes more focused, and the ranking results can be directly used by management to make decisions. After the criteria and alternatives are determined, the next stage is the collection of data that will serve as the main material in the calculations. Data can be obtained through various methods, such as direct observation of the waitstaff's performance from internal assessments by supervisors or restaurant managers. This data is then organized into a decision matrix that contains the scores of each waiter against each criterion.

3.3. Calculation of Criteria Weights Using WENSLO

The calculation of criterion weights using the WENSLO method is an important stage to determine the relative importance of each criterion objectively based on the existing data characteristics. By utilizing the concepts of normalization, envelope, and slope of the value distribution for each criterion, this method is capable of reducing subjectivity in the weighting process and providing results that are fairer and more consistent.

The initial stage of WENSLO is to form a decision matrix that contains assessment data for each alternative based on criteria obtained from the assessment data in table 1. This matrix serves as the basis for calculations as it represents all the information that will be analyzed, with the results of the decision matrix provided below, created using equation (1).

$$X = \begin{bmatrix} 80 & 85 & 90 & 88 & 5 & 12 \\ 75 & 82 & 87 & 85 & 6 & 14 \\ 90 & 78 & 85 & 92 & 4 & 11 \\ 70 & 8 & 83 & 84 & 7 & 15 \\ 88 & 90 & 86 & 91 & 3 & 10 \\ 82 & 83 & 88 & 86 & 5 & 13 \\ 85 & 87 & 84 & 89 & 4 & 12 \\ 78 & 81 & 82 & 83 & 6 & 14 \\ 92 & 88 & 89 & 90 & 3 & 11 \end{bmatrix}$$

The second stage in WENSLO is to calculate the values of the normalized decision matrix, normalization is performed so that all values are within a uniform range for fair comparison, which is calculated using equation (1). The results of the normalization calculation using the WENSLO method are displayed in Table 2.

The third stage in WENSLO is to calculate the criterion class intervals, the class intervals are used to measure the level of data variation in a criterion, which is calculated using equation (3). The results of the criterion class interval calculations are displayed in Table 3.

The fourth stage in WENSLO is to calculate the criterion slope, the slope value indicates the sensitivity level of data changes calculated using equation (4), the results of the criterion slope value calculations are displayed in Table 4.

The fifth stage in WENSLO is calculating the criterion envelope, this value is the maximum and minimum boundary value of the data for each criterion calculated using equation (5), the results of the criterion envelope calculation are displayed in Table 5.

Table 2. Normalization Results of the WENSLO Method

Waiters	C1 (Service Speed) Benefit	C2 (Friendliness) Benefit	C3 (Accuracy) Benefit	C4 (Customer Satisfaction) Benefit	C5 (Order Mistakes) Cost	C6 (Completion Time) Cost
Waiters ZR	0.1081	0.1127	0.1163	0.1117	0.1163	0.1071
Waiters QN	0.1014	0.1088	0.1124	0.1079	0.1395	0.1250
Waiters LM	0.1216	0.1034	0.1098	0.1168	0.0930	0.0982
Waiters KS	0.0946	0.1061	0.1072	0.1066	0.1628	0.1339
Waiters DP	0.1189	0.1194	0.1111	0.1155	0.0698	0.0893
Waiters VX	0.1108	0.1101	0.1137	0.1091	0.1163	0.1161
Waiters JT	0.1149	0.1154	0.1085	0.1129	0.0930	0.1071
Waiters RB	0.1054	0.1074	0.1059	0.1053	0.1395	0.1250
Waiters CY	0.1243	0.1167	0.1150	0.1142	0.0698	0.0982

Table 3. The Class Interval Results of the WENSLO Method

C1 (Service Speed) Benefit	C2 (Friendliness) Benefit	C3 (Accuracy) Benefit	C4 (Customer Satisfaction) Benefit	C5 (Order Mistakes) Cost	C6 (Completion Time) Cost
0.0071	0.0038	0.0025	0.0027	0.0223	0.0107

Table 4. The Result of the Slope Value Criteria of the WENSLO Method

C1 (Service Speed) Benefit	C2 (Friendliness) Benefit	C3 (Accuracy) Benefit	C4 (Customer Satisfaction) Benefit	C5 (Order Mistakes) Cost	C6 (Completion Time) Cost
17.5329	32.7518	50.4309	45.6383	5.6034	11.6760

Table 5. The Result of the Envelope Value Criteria of the WENSLO Method

C1 (Service Speed) Benefit	C2 (Friendliness) Benefit	C3 (Accuracy) Benefit	C4 (Customer Satisfaction) Benefit	C5 (Order Mistakes) Cost	C6 (Completion Time) Cost
0.1357	0.0659	0.0386	0.0628	0.4614	0.2253

Table 6. The Result of the Envelope Criterion Proportion Values of the WENSLO Method

C1 (Service Speed) Benefit	C2 (Friendliness) Benefit	C3 (Accuracy) Benefit	C4 (Customer Satisfaction) Benefit	C5 (Order Mistakes) Cost	C6 (Completion Time) Cost
0.0077	0.0020	0.0008	0.0014	0.0823	0.0193

Table 7. The Result of the Criteria Weighting Values of the WENSLO Method

C1 (Service Speed) Benefit	C2 (Friendliness) Benefit	C3 (Accuracy) Benefit	C4 (Customer Satisfaction) Benefit	C5 (Order Mistakes) Cost	C6 (Completion Time) Cost
0.0682	0.0177	0.0067	0.0121	0.7253	0.1700

The sixth stage in WENSLO is calculating the envelope criterion proportion values, this process helps determine the extent to which each criterion contributes to the overall evaluation process, calculated using equation (6). The results of the calculation of the envelope criterion proportion values are displayed in Table 6.

The final stage in WENSLO is calculating the weight of each criterion based on the results of the slope calculation and the proportional envelope calculated using equation (7). The results of the criterion weight calculations are displayed in Table 7.

Based on the weighted calculation results using the WENSLO method, it was found that criterion C5 (Order Mistakes) has the largest weight of 0.7253, making it the most dominant factor in evaluating restaurant service performance. This indicates that the level of errors in recording or presenting orders greatly affects the determination of the best server, as service mistakes can have a direct impact on customer satisfaction. Furthermore, criterion C6 (Completion Time) also has a significant weight of 0.1700, emphasizing the importance of service completion speed in maintaining service quality. Meanwhile, other criteria such as C1 (Service Speed) at 0.0682, C2 (Friendliness) at 0.0177, C3 (Accuracy) at 0.0067, and C4 (Customer Satisfaction) at 0.0121 have relatively small weights, which means that although they are still taken into account, their contribution is not as significant as the two main criteria. Thus, the results of this weighting confirm that the aspects of service accuracy (minimizing order errors) and time efficiency are the main indicators in selecting the best restaurant staff based on the analyzed data.

3.4. Ranking of Alternatives Using AROMAN

The ranking process of alternatives using the AROMAN method is a subsequent step after the criteria weights have been determined, aimed at producing a ranking order for each alternative based on their performance against all existing criteria. Through a two-stage normalization mechanism and the integration of criteria weights, this method is capable of aligning data scale differences while ensuring that each criterion contributes proportionally according to its level of importance. The result of this process is a final score for each alternative, which is then used to determine the ranking order, so that the alternative with the highest value is established as the best choice in an objective and transparent manner.

The first stage in the AROMAN method is to create a table containing the assessment data of all alternatives against the predetermined criteria. This matrix serves as the basis for the entire calculation process, which is created using equation (1), the results of the AROMAN decision matrix are the same as the results of the WENSLO decision matrix.

The second stage in the AROMAN method is to calculate the normalized values, with normalization being carried out in two stages. The first stage of normalization uses equation (8), and the results of the first stage normalization are displayed in table 8.

Table 8. First Normalization Results of the AROMAN Method

Waiters	C1 (Service Speed) Benefit	C2 (Friendliness) Benefit	C3 (Accuracy) Benefit	C4 (Customer Satisfaction) Benefit	C5 (Order Mistakes) Cost	C6 (Completion Time) Cost
Waiters ZR	0.4545	0.5833	1.0000	0.5556	0.5000	0.4000
Waiters QN	0.2273	0.3333	0.6250	0.2222	0.7500	0.8000
Waiters LM	0.9091	0.0000	0.3750	1.0000	0.2500	0.2000
Waiters KS	0.0000	0.1667	0.1250	0.1111	1.0000	1.0000
Waiters DP	0.8182	1.0000	0.5000	0.8889	0.0000	0.0000
Waiters VX	0.5455	0.4167	0.7500	0.3333	0.5000	0.6000

Waiters JT	0.6818	0.7500	0.2500	0.6667	0.2500	0.4000
Waiters RB	0.3636	0.2500	0.0000	0.0000	0.7500	0.8000
Waiters CY	1.0000	0.8333	0.8750	0.7778	0.0000	0.2000

Table 9. Second Normalization Results of the AROMAN Method

Waiters	C1 (Service Speed) Benefit	C2 (Friendliness) Benefit	C3 (Accuracy) Benefit	C4 (Customer Satisfaction) Benefit	C5 (Order Mistakes) Cost	C6 (Completion Time) Cost
Waiters ZR	0.3232	0.3379	0.3487	0.3348	0.3363	0.3189
Waiters QN	0.3030	0.3259	0.3371	0.3234	0.4036	0.3720
Waiters LM	0.3636	0.3100	0.3293	0.3500	0.2691	0.2923
Waiters KS	0.2828	0.3180	0.3216	0.3196	0.4709	0.3986
Waiters DP	0.3555	0.3577	0.3332	0.3462	0.2018	0.2657
Waiters VX	0.3313	0.3299	0.3409	0.3272	0.3363	0.3455
Waiters JT	0.3434	0.3458	0.3254	0.3386	0.2691	0.3189
Waiters RB	0.3151	0.3220	0.3177	0.3158	0.4036	0.3720
Waiters CY	0.3717	0.3498	0.3448	0.3424	0.2018	0.2923

Table 10. Final Normalization Results of the AROMAN Method

Waiters	C1 (Service Speed) Benefit	C2 (Friendliness) Benefit	C3 (Accuracy) Benefit	C4 (Customer Satisfaction) Benefit	C5 (Order Mistakes) Cost	C6 (Completion Time) Cost
Waiters ZR	0.1944	0.2303	0.3372	0.2226	0.2091	0.1797
Waiters QN	0.1326	0.1648	0.2405	0.1364	0.2884	0.2930
Waiters LM	0.3182	0.0775	0.1761	0.3375	0.1298	0.1231
Waiters KS	0.0707	0.1212	0.1116	0.1077	0.3677	0.3497
Waiters DP	0.2934	0.3394	0.2083	0.3088	0.0505	0.0664
Waiters VX	0.2192	0.1866	0.2727	0.1651	0.2091	0.2364
Waiters JT	0.2563	0.2740	0.1439	0.2513	0.1298	0.1797
Waiters RB	0.1697	0.1430	0.0794	0.0790	0.2884	0.2930
Waiters CY	0.3429	0.2958	0.3050	0.2801	0.0505	0.1231

The second stage of normalization uses equation (9), and the results of the second stage normalization are displayed in Table 9. The third stage of normalization uses equation (10), which is the result of the first and second normalized values that are combined and calculated, with the final normalized value results displayed in Table 10. The third stage in the AROMAN method is to calculate the weighted multiplication; this weighted multiplication produces important portions according to the significance level of each criterion, calculated using equation (11). The results of the weighted multiplication calculations are shown in Table 11. The fourth stage in the AROMAN method is to calculate the weighted product results based on the type of criterion. The results of the weighted multiplication calculation for the cost criterion are calculated using equation (12), and the results of the weighted multiplication calculations are displayed in Table 12.

Table 11. Calculate the Weighted Multiplication Results of the AROMAN Method

Waiters	C1 (Service Speed) Benefit	C2 (Friendliness) Benefit	C3 (Accuracy) Benefit	C4 (Customer Satisfaction) Benefit	C5 (Order Mistakes) Cost	C6 (Completion Time) Cost
Waiters ZR	0.0133	0.0041	0.0023	0.0027	0.1516	0.0305
Waiters QN	0.0090	0.0029	0.0016	0.0017	0.2092	0.0498
Waiters LM	0.0217	0.0014	0.0012	0.0041	0.0941	0.0209
Waiters KS	0.0048	0.0021	0.0008	0.0013	0.2667	0.0594
Waiters DP	0.0200	0.0060	0.0014	0.0037	0.0366	0.0113
Waiters VX	0.0149	0.0033	0.0018	0.0020	0.1516	0.0402
Waiters JT	0.0175	0.0049	0.0010	0.0030	0.0941	0.0305
Waiters RB	0.0116	0.0025	0.0005	0.0010	0.2092	0.0498
Waiters CY	0.0234	0.0052	0.0021	0.0034	0.0366	0.0209

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Table 12. Calculate the Weighted Multiplication Results for the Cost Criterion of the AROMAN Method

Waiters	Cost Criterion Score Results
Waiters ZR	0.4268
Waiters QN	0.5089
Waiters LM	0.3392
Waiters KS	0.5711
Waiters DP	0.2188
Waiters VX	0.4380
Waiters JT	0.3531
Waiters RB	0.5089
Waiters CY	0.2398

Table 13. Calculate the Weighted Multiplication Results for the Benefit Criterion of the AROMAN Method

Waiters	Benefit Criterion Score Results
Waiters ZR	0.1494
Waiters QN	0.1234
Waiters LM	0.1683
Waiters KS	0.0950
Waiters DP	0.1765
Waiters VX	0.1486
Waiters JT	0.1623
Waiters RB	0.1249
Waiters CY	0.1846

Table 14. Final Value Result of the AROMAN Method

Waiters	Final Value
Waiters ZR	1.3198
Waiters QN	1.4703
Waiters LM	1.1863
Waiters KS	1.6097
Waiters DP	1.0432
Waiters VX	1.3355
Waiters JT	1.2102
Waiters RB	1.4682
Waiters CY	1.0568

The results of the weighted multiplication calculation for the benefit criterion are calculated using equation (13), and the results of the weighted multiplication calculations are displayed in Table 13. The final stage in the AROMAN method is to calculate the final value of each alternative, all the calculation results from each criterion are used to obtain the final aggregate value for each alternative calculated using equation (14), the results of the weight multiplication calculations are displayed in Table 14.

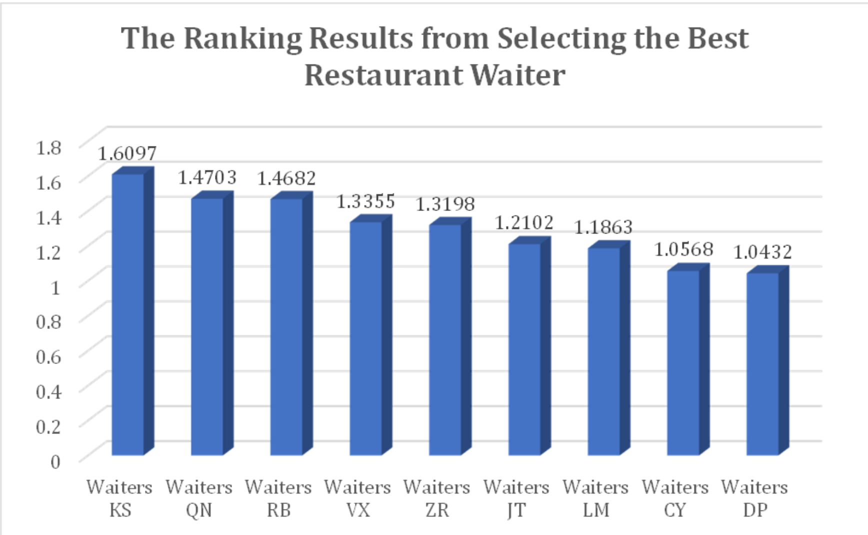

Figure 2. The Ranking Result from Selecting the Best Restaurant Waiter

Based on the results of data processing using the AROMAN method, each alternative has obtained a final score that reflects the overall performance of each restaurant server based on the previously determined criteria weights. These scores provide an objective picture of the strengths and weaknesses of each alternative, thus forming a strong basis for the selection process. With these results, the next step is to conduct a ranking process to determine the order from best to worst, where the alternative with the highest score will be designated as the best restaurant server as shown in Figure 2.

Based on the alternative ranking chart, it is evident that Waiters KS occupies the first position with the highest score of 1.6097, making it the best performer based on the criteria used. Next, the second position is held by Waiters QN with a score of 1.4703, followed by Waiters RB with a score of 1.4682, both of which have quite competitive performance. Other alternatives such as Waiters VX with a score of 1.3355, Waiters ZR with a score of 1.3198, and Waiters JT with a score of 1.2102 occupy the middle ranks, showing good quality but still below the top three. Meanwhile, Waiters LM with a score of 1.1863, Waiters CY with a score of 1.0568, and Waiters DP with a score of 1.0432 received the lowest scores, indicating that their performance is less optimal compared to other alternatives. This ranking result confirms that the criteria used successfully differentiated the quality of each staff member objectively, thereby facilitating restaurant management in selecting the best employees to improve service quality.

3.5. Discussions

The analysis of the ranking results using the AROMAN method combined with the criterion weights from the WENSLO method provides a comprehensive overview of the quality and performance of each restaurant server based on six main criteria that have been established. From the weighting results, the criterion for order mistakes has the most dominant value of 0.7253, which means that the factor of errors in recording or presenting orders is the largest consideration in determining the best server. This indicates that accuracy in work has a very significant impact on customer satisfaction and the operational efficiency of the restaurant. Meanwhile, other criteria such as completion time with a weight of 0.1700 also play an important role, emphasizing that the speed of task completion contributes to the overall quality of service. The relatively small weight on the criteria of service speed, friendliness, accuracy, and customer satisfaction indicates that although important, these aspects are not as significant as the factors of errors and timeliness in the assessment.

With this weighting, the AROMAN method then processes the values of each alternative to generate rankings. The final results show that Waiters KS occupies the highest position with a score of 1.6097, meaning that this server has the best performance combination compared to the other alternatives. The advantage of Waiters KS likely lies in the minimal errors in orders and the ability to complete tasks quickly, in line with the dominant criteria that received the highest weight. Meanwhile, Waiters QN and Waiters RB also rank high with fairly high scores of 1.4703 and 1.4682, indicating that both have competitive quality but are still slightly below Waiters KS. This condition provides a strong alternative option for restaurant management if they want to maintain service quality standards with more than one top candidate.

In the middle group, there is Waiters VX with a score of 1.3355, Waiters ZR with a score of 1.3198, and Waiters JT with a score of 1.2102. These options show fairly good performance in terms of service, but still have some weaknesses that prevent them from competing with the top three ranks. These weaknesses may stem from a higher rate of order errors or less optimal completion times compared to the top candidates. Nevertheless, their position remains important as it shows that with additional training or improved work discipline, the servers in this group have the potential to rise to a higher level in the future.

The lowest rankings were achieved by Waiters LM, Waiters CY, and Waiters DP with scores of 1.1863, 1.0568, and 1.0432, respectively. This result indicates that their performance is still far from the best standards, especially due to the significant weight on the order error and completion time criteria, which they may not be able to meet adequately. This situation serves as an important input for restaurant management to give special attention, whether in the form of performance evaluations, training, or stricter supervision, so that the existing weaknesses can be improved. Overall, the combination of the WENSLO and AROMAN methods has proven capable of providing objective and detailed analysis results, which not only help in determining the best services but also provide a clear picture of the position of each alternative as well as the development strategies that need to be undertaken moving forward. For future research, it is recommended to expand the evaluation criteria, for example by adding factors such as discipline, teamwork, or communication with customers, so that the ranking outcomes become more comprehensive. Additionally, testing the WENSLO and AROMAN methods in other cases, such as selecting the best employees in different service fields or other industrial environments, could also be an interesting study to test the consistency and reliability of these methods.

4. Conclusion

The results of this study show that the application of the WENSLO method for weighting criteria and the AROMAN method for the ranking process can provide objective, systematic, and accurate results in determining the best restaurant service. The weighting results using WENSLO indicate that the order mistakes criterion is the most dominant factor with the largest weight, followed by completion time, while other criteria such as service speed, friendliness, accuracy, and customer satisfaction have a smaller influence on decision making. With this weighting, the AROMAN method successfully produced a clear ranking of alternatives, where Waiters KS occupies the top position with the highest score, followed by Waiters QN and Waiters RB as candidates with excellent performance, while Waiters LM, Waiters CY, and Waiters DP occupy the bottom positions due to their suboptimal performance. This finding confirms that the combination of WENSLO and AROMAN can be used as an effective approach in decision support systems, particularly in cases of employee selection with various complex criteria. In addition to assisting restaurant management in choosing the best waiter, the results of this study also provide an overview of the strengths and weaknesses of each candidate, serving as a basis for evaluation and performance improvement in the future. Thus, this research is not only beneficial for the academic world in enriching the study of MCDM methods, but also practically relevant to support decision-making in the service and hospitality sector. Nevertheless, this study has limitations that need to be considered, namely that the values of alternatives for the cost criteria are not uniform with the benefit criteria; this result can affect the assessment proportions and produce a weight distribution that is not entirely balanced. For future research, it is recommended to use a criterion weighting method that can address the non-uniform data between cost and benefit criteria, so that the resulting weights are more proportional and balanced.

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