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Comparative Analysis of the SMART and MFEP Methods for Selecting Baking Ingredient Suppliers for Bakery MSMEs in East Bekasi District

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Abstract

The selection of raw material suppliers is one of the key factors in maintaining product quality and operational efficiency for Micro, Small, and Medium Enterprises (MSMEs) in the bakery industry. Supplier selection processes that are still conducted subjectively have the potential to cause problems such as inconsistent material quality, delayed deliveries, and increased operational costs. This study aims to analyze and compare the performance of the Simple Multi-Attribute Rating Technique (SMART) and the Multifactor Evaluation Process (MFEP) methods in supporting decision-making for the selection of baking ingredient suppliers for bakery MSMEs in East Bekasi District. The research employed a comparative quantitative approach, with data collected through observations, interviews, and questionnaires administered to five bakery MSME owners. The evaluation was based on five main criteria: base price, material quality, delivery timeliness, service quality, and payment term flexibility. The collected data were then processed using the SMART and MFEP methods to generate preference scores and supplier rankings. The results indicate that both methods consistently identified the best supplier, namely alternative S1, with a SMART score of 0.636 and an MFEP score of 87.75. Differences in ranking were found among the middle alternatives, indicating variations in the sensitivity of the calculations between the two methods. The SMART method produced rankings that were more responsive to changes in criterion weights due to its linear utility approach, whereas the MFEP method tended to provide more stable results through direct weighted factor evaluation. Based on these findings, the SMART method is more suitable for dynamic supply chain environments, while the MFEP method is better applied in relatively stable and standardized evaluation conditions. A Spearman rank correlation analysis further confirmed a perfect positive association between the two methods' rankings (ρ = 1.00), indicating that SMART and MFEP are highly consistent in ranking the supplier alternatives.
Keywords: Bakery MSMEs; Decision Support System; MFEP; SMART; Supplier.

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1.INTRODUCING

The development of the culinary industry, particularly the Micro, Small, and Medium Enterprises (MSMEs) bakery sector, has shown significant growth in various regions, including East Bekasi District [1]. This growth has increased the need for effective supply chain management to ensure business operational sustainability. In the bakery industry, the availability of raw materials such as flour, butter, yeast, sugar, and eggs is a crucial factor that directly affects the quality of the final products, production efficiency, and customer satisfaction [2]. Therefore, selecting the appropriate supplier becomes one of the strategic decisions that must be considered by business owners.

In practice, the supplier selection process among MSMEs is still often based on personal experience, business relationships, or other subjective considerations without employing a measurable evaluation

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method [3]. Such conditions may lead to various operational problems, including inconsistent raw material quality, delivery delays, unstable prices, and increased production costs, which ultimately reduce business competitiveness [4]. This complexity indicates that supplier selection does not depend on a single factor but involves multiple criteria that need to be considered simultaneously.

To address these issues, an approach is required that can assist decision-makers in evaluating suppliers objectively and systematically. One widely adopted approach is the Decision Support System (DSS), a computer-based system designed to support decision-making processes for semi-structured and unstructured problems [5]. In the context of supplier selection, a DSS enables evaluations to be conducted based on predetermined criteria, thereby generating recommendations that are more rational and accountable.

Various multi-criteria decision-making methods have been developed and implemented within DSS to solve supplier selection problems. One of the most popular methods is the Simple Multi-Attribute Rating Technique (SMART). This method offers several advantages, including a simple calculation process, an easily understandable utility function, and the ability to produce preference values that are sensitive to changes in criterion weights. A study conducted by Pratama et al. [6] demonstrated that the SMART method provides effective evaluation results for supplier selection through a relatively simple yet accurate weighting mechanism.

In addition to SMART, the Multifactor Evaluation Process (MFEP) is also widely used for solving multi-criteria decision-making problems. MFEP operates through a weighted factor evaluation approach, allowing each criterion to contribute directly to the final score of the evaluated alternatives. Research conducted by Wijaya and Kusuma [7] showed that MFEP provides a systematic evaluation process and can be easily applied to various decision-making cases involving multiple assessment factors.

Although both methods have been widely applied in different decision-making domains, most previous studies have focused on implementing only one method independently. Studies specifically comparing the performance of SMART and MFEP in the context of selecting raw material suppliers for bakery MSMEs remain relatively limited. Meanwhile, the bakery industry possesses unique characteristics, including a high dependence on raw material quality, delivery punctuality, and price fluctuations that may change rapidly over time [8]. These characteristics may lead to differences in recommendation results when different methods are applied.

This research gap is specifically reflected in the absence of studies that [1] statistically quantify the level of agreement between SMART and MFEP rankings, rather than comparing them only qualitatively, and [2] test how sensitive each method's output is to changes in criterion weights. The present study addresses this gap by combining the SMART–MFEP comparison with a Spearman rank correlation test and a weight-sensitivity analysis, thereby providing quantitative evidence for the claim that SMART is more responsive to weight changes than MFEP.

Based on these conditions, there is a need to conduct a comparative analysis of the SMART and MFEP methods in the case of selecting baking ingredient suppliers for bakery MSMEs. Such a comparison is important to determine how each method generates supplier rankings, its sensitivity to criterion weights, and its suitability for decision-making in dynamic business environments.

This study aims to analyze and compare the application of the SMART and MFEP methods in selecting baking ingredient suppliers for bakery MSMEs in East Bekasi District. The findings are expected to contribute academically by providing a better understanding of the characteristics of both methods in multi-criteria decision-making while also offering practical benefits for MSME owners in selecting suppliers that can support operational sustainability and optimize product quality.

2.RESEARCH METHODOLOGY

This study employs a comparative quantitative approach to analyze and compare the performance of the Simple Multi-Attribute Rating Technique (SMART) and the Multifactor Evaluation Process (MFEP) methods in the supplier selection process for baking ingredients among bakery MSMEs in East Bekasi District. The quantitative approach was chosen because the study focuses on numerical data

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processing and the objective evaluation of several supplier alternatives based on predetermined criteria [9].

The data used in this study are primary data collected through field observations, interviews, and questionnaires distributed to five bakery MSME owners in East Bekasi District. These data were used to determine the importance level of each criterion and to evaluate the performance of each supplier considered in the study. Subsequently, the collected data were processed using the SMART and MFEP methods to generate preference values and supplier rankings [9].

2.1. Research Stages

The research was conducted through several systematic stages, beginning with problem identification and ending with the formulation of conclusions. The stages of the research are illustrated in Figure 1.

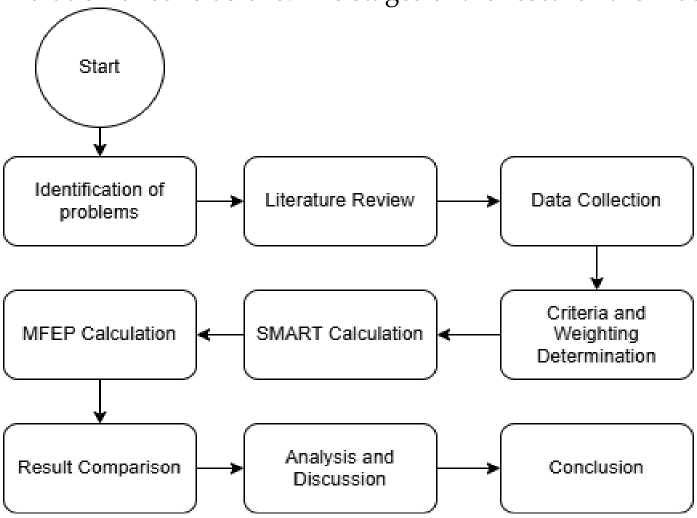

Figure 1. Research Stages

2.2. Data Collection and Criteria Determination

The selection of criteria was based on a literature review and interviews with bakery MSME owners regarding the factors considered important in choosing raw material suppliers [10]. From this process, five main criteria were identified and used in the study: base price, material quality, delivery timeliness, service quality, and payment term flexibility.

The characteristics of the criteria used in this study are presented in Table 1.

Table 1. Supplier Selection Criteria

Code	Creterion	Type
C1	Base Price	Cost
C2	Material Quality	Benefit
C3	Delivery Timeliness	Benefit
C4	Service Quality	Benefit
C5	Payment Term Flexibility	Benefit

After the criteria were determined, each respondent assigned an importance level to each criterion. The resulting weights were then normalized and used in the calculation processes of both the SMART and MFEP methods.

The initial weight of each criterion (30, 25, 20, 15, and 10) was derived using a constant-sum scaling technique: each of the five respondents distributed a total of 100 points across the five criteria according to their perceived importance, and the resulting allocations were averaged and rounded to the nearest multiple of five for ease of interpretation. Base price consistently received the highest average allocation

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because it was reported as the most decisive factor for MSME owners operating with tight profit margins, followed by material quality, delivery timeliness, service quality, and payment term flexibility. These averaged weights were subsequently normalized (divided by their total of 100) to obtain the proportional weights shown in Table 2, which were then used directly as input for both the SMART and MFEP calculations.

Table 2. Criteria Weights

Criterion	Initial Weight	Normalized Weight
C1	30	0.30
C2	25	0.25
C3	20	0.20
C4	15	0.15
C5	10	0.10
Total	100	1.00

2.3. Supplier Alternatives

The alternatives used in this study consist of five baking ingredient suppliers that actively supply bakery MSMEs in East Bekasi District. To maintain supplier confidentiality, each supplier is represented by an alternative code.

Table 3. Supplier Alternatives

Code	Creterion
S1	CHANDRA SARANA BAKING SUPPLY STORE
S2	Toko Bahan Kue Nusantara
S3	Toko Bahan Kue PTM Baking Store
S4	Toko Bahan Kue Mumtaz
S5	Toko Bahan Kue Indobaking

The evaluation data for each supplier across all criteria were obtained through observations and respondents' assessments, which were subsequently converted into numerical values.

Table 4. Supplier Evaluation Data

Supplier	C1	C2	C3	C4	C5
S1	90	88	90	85	80
S2	85	84	82	88	75
S3	88	90	85	82	78
S4	75	76	70	72	68
S5	80	80	78	79	74

2.4. Simple Multi-Attribute Rating Technique (SMART) Method

The Simple Multi-Attribute Rating Technique (SMART) is a multi-criteria decision-making method that employs a utility value approach to transform multiple attributes into a single preference value that can be directly compared [8]. This method was selected because it offers a relatively simple calculation process, is easy to understand, and is capable of accommodating both **benefit** and **cost** criteria.

The calculation procedure of the SMART method consists of the following steps:

1. Determine the evaluation criteria and assign weights to each criterion.
2. Normalize the criterion weights.
3. Calculate the utility value for each alternative.

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4. Compute the final preference value.
5. Rank the alternatives based on the highest preference value.

Weight Normalization

Weight normalization is performed to convert the initial weights into proportional weights so that the total weight equals 1. The weight normalization calculation uses Equation (1).

(1)
Wj = wj / Σwj

Description:

- Wj = normalized weight of the (j)-th criterion
- wj = initial weight of the (j)-th criterion
- Σwj = total of all criterion weights

Utility Value Calculation

The utility value is used to transform the value of each alternative into a common scale so that they can be compared objectively.

For benefit criteria, Equation (2) is used.

(2)
Ui(ai) = (Ci − Cmin) / (Cmax − Cmin)
Description:
- (Ui(ai)) = utility value of the (i)-th alternative
- (Ci) = value of the (i)-th alternative
- (Cmax}) = maximum value of the criterion
- (Cmin}) = minimum value of the criterion

For **cost** criteria, Equation (3) is used.

(3)
Ui(ai) = (Cmax − Ci) / (Cmax − Cmin)
Description:
- (Ui(ai)) = utility value of the (i)-th alternative
- (Ci) = value of the (i)-th alternative
- (Cmax}) = maximum value of the criterion
- (Cmin}) = minimum value of the criterion

2.5. SMART Final Score Calculation

The final SMART score is obtained by summing the products of the normalized weights and the utility values for each criterion. The calculation of the SMART final score uses Equation (4).

(4)
SMART = Σ(Wj × Uij)

Description:

- Wj = normalized weight of the (j)-th criterion
- Uij = utility value of the (i)-th alternative for the (j)-th criterion

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The alternative with the highest SMART score is selected as the best alternative [11].

2.6. Multifactor Evaluation Process (MFEP) Method

The **Multifactor Evaluation Process (MFEP)** is a multicriteria decision-making method that applies the concept of weighted factor evaluation to determine the preference level of an alternative [11]. In this method, each factor is assigned a weight based on its level of importance, which is then multiplied by the evaluation value of each alternative.
The calculation steps of the MFEP method include:

1. Determining the factors and their corresponding criterion weights.
2. Determining the evaluation value for each alternative.
3. Calculating the **Weighted Evaluation Score (WES)**.
4. Summing all evaluation scores.
5. Ranking the alternatives based on their final scores.

Weighted Evaluation Score Calculation
The **Weighted Evaluation Score (WES)** is calculated using Equation (5).
(5)
WES= WFV × EFV
Where:

- **WES** = Weighted Evaluation Score
- **WFV** = Weight Factor Value
- **EFV** = Evaluation Factor Value

MFEP Final Score Calculation
The final MFEP score is obtained by summing all the **Weighted Evaluation Scores (WES)** calculated in the previous step. The calculation of the MFEP final score uses Equation (6).
(6)
Total Evaluation = WES
Description:

- **Total Evaluation** = final score of the MFEP method
- **WES** = Weighted Evaluation Score

The alternative with the highest **Total Evaluation** score is selected as the best alternative [12].

2.7. Data Analysis Technique

The data analysis was conducted by applying the SMART and MFEP methods to the same dataset. Each supplier alternative was evaluated based on five predetermined criteria: base price, material quality, delivery timeliness, service quality, and payment term flexibility.

The calculation results of both methods were then compared based on the final preference scores and the resulting supplier rankings. This comparison aims to determine the level of consistency between the two methods in identifying the best supplier and to identify the method that is most suitable for supporting the decision-making process of bakery MSMEs in East Bekasi District.

Furthermore, the results of the SMART and MFEP calculations are presented in the form of tables and graphs to facilitate interpretation and analysis of the differences in the characteristics of the two methods in generating decision recommendations.

3.RESULT AND DISCUSSIONS

This section presents the results of data processing using the **SMART** (Simple Multi-Attribute Rating Technique) and **MFEP** (Multi-Factor Evaluation Process) methods to determine the best baking ingredient supplier for MSME bakeries in the East Bekasi District. Five alternative suppliers (S1–S5)

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were evaluated based on five criteria: base price (C1), product quality (C2), delivery punctuality (C3), service quality (C4), and payment term flexibility (C5).

3.1. SMART Method Calculation Results

The first stage of the SMART method is to normalize the criterion weights. The initial weights obtained from the questionnaire results are divided by the total weight of all criteria to produce the normalized weights.

Weight normalization formula:

Wj = wj / Σwj

Description:

- (Wj) = normalized weight
- (wj) = initial weight of the criterion

The results of the weight normalization are presented in Table 5.

Table 5. SMART Criteria Weights

Criteria	Initial Weight	Normalized Weight
C1	30	0,30
C2	25	0,25
C3	20	0,20
C4	15	0,15
C5	10	0,10
Total	100	1,00

3.2. Supplier Evaluation Data

The supplier evaluation data obtained from observations and interviews are presented in **Table 6**.

Table 6. Initial Supplier Data

Supplier	C1	C2	C3	C4	C5
S1	90	88	90	85	80
S2	85	84	82	88	75
S3	88	90	85	82	78
S4	75	76	70	72	68
S5	80	80	78	79	74

Based on the data presented in Table 6, the maximum and minimum values for each criterion are determined as the basis for the utility calculation.

Table 7. Maximum and Minimum Values

Criteria	Maximal Value	Minimum Value
C1	90	75
C2	90	76
C3	90	70
C4	88	72
C5	80	68

3.3. SMART Utility Calculation

In the SMART method, utility values are calculated based on the type of criterion attribute. The base price criterion (C1) is a **cost** attribute, while criteria C2, C3, C4, and C5 are benefit attributes.

a. Benefit Utility Formula

U(ai) = (Cout − Cmin) / (Cmax − Cmin)

Description:

- U(ai) = utility value of the alternative
- Cout = value of the evaluated alternative
- Cmax = maximum value

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- Cmin = minimum value

Example of the utility calculation for criterion C2 for Supplier S1:
U(C2,S1) = (88 − 76) / (90 − 76)
= 12 / 14
= 0,857
Example of the utility calculation for criterion C2 for Supplier S3:
U(C2,S3) = (90 − 76) / (90 − 76)
= 14 / 14
= 1,000
b. Cost Utility Formula
U(ai) = (Cmax − Cout) / (Cmax − Cmin)
Example of calculating the utility of criterion C1 for Supplier S1:
U(C1,S1) = (90 − 90) / (90 − 75)
= 0 / 15
= 0,000
Example of calculating the utility of criterion C1 for Supplier S4:
U(C1,S4) = (90 − 75) / (90 − 75)
= 15 / 15
= 1,000
Utility calculations were carried out on all supplier alternatives to obtain the results as in Table 8.

Table 8. SMART Utility Results

Supplier	C1	C2	C3	C4	C5
S1	0,000	0,857	1,000	0,813	1,000
S2	0,333	0,571	0,600	1,000	0,583
S3	0,133	1,000	0,750	0,625	0,833
S4	1,000	0,000	0,000	0,000	0,000
S5	0,667	0,286	0,400	0,438	0,500

3.4. SMART Final Value Calculation

All The final SMART score is obtained by multiplying the normalized weights by the utility value of each criterion.

SMART formula:
SMART = Σ (Wj × Uij)
Description:
Wj = normalized weight of criteria
Uij = utility value of alternative on the jth criterion
Example SMART calculation for Supplier S1:
SMART(S1)
= (0.30 × 0.000) + (0.25 × 0.857) + (0.20 × 1.000) + (0.15 × 0.813) + (0.10 × 1.000)
= 0.000 + 0.214 + 0.200 + 0.122 + 0.100
= 0.636
The same calculation is performed for all suppliers.

Table 9. SMART Final Result

Supplier	SMART Value	Ranking
S1	0,636	1
S3	0,617	2
S2	0,571	3
S5	0,467	4
S4	0,300	5

Based on the results of the SMART calculation, Supplier S1 obtained the highest score of 0.636 so it is recommended as the best supplier.

3.5. MFEP Method Calculation Results

The MFEP method uses direct multiplication between factor weights and the evaluation value of each supplier.
Calculation of Evaluation Weight Value (NBE)
NBE Formula:
NBE = BF × NE
Information:

- BF = Factor Weight
- NE = Evaluation Value

Example of calculating NBE Supplier S1 on criteria C1:
NBE = 0.30 × 90
= 27.00

Table 10. Supplier S1 MFEP Calculation

Criteria	Weight	Evaluation Score	NBE
C1	0,30	90	27,00
C2	0,25	88	22,00
C3	0,20	90	18,00
C4	0,15	85	12,75
C5	0,10	80	8,00

3.6. MFEP Final Grade Calculation

MFEP formula
MFEP = Σ (BF × NE)
Example of Supplier S1 calculation:
MFEP(S1)
= (0.30 × 90) + (0.25 × 88) + (0.20 × 90) + (0.15 × 85) + (0.10 × 80)
= 27.00 + 22.00 + 18.00 + 12.75 + 8.00
= 87.75
The same calculation is performed for all suppliers.

Table 11. MFEP Calculation Results

Supplier	MFEP Value	Ranking
S1	87,75	1
S3	86,00	2
S2	83,60	3
S5	78,85	4
S4	73,10	5

Based on the MFEP results, Supplier S1 again obtained the highest score and was therefore recommended as the best supplier.

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3.7. Comparison of SMART and MFEP Results

To determine the level of consistency of the two methods, a comparison of the final results of SMART and MFEP was carried out as shown in Table 12

Table 12. Comparison of SMART and MFEP Results

Supplier	SMART Value	SMART Ranking	MFEP	MFEP Ranking
S1	0,636	1	87,75	1
S2	0,571	3	83,60	3
S3	0,617	2	86,00	2
S4	0,300	5	73,10	5
S5	0,467	4	78,85	4

To clarify the comparison of the results of the two methods, the final value of each supplier is visualized in the form of a bar chart as shown in Figure 2.

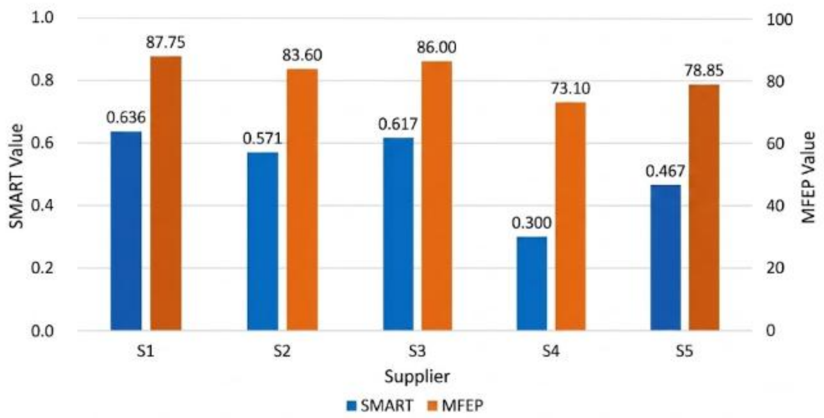

Figure 2. Comparison Chart of SMART and MFEP Values

3.8. Spearman Rank Correlation Analysis

To statistically verify the level of agreement between the SMART and MFEP rankings requested by the reviewers, a Spearman Rank Correlation analysis was performed on the ranking positions produced by the two methods. The Spearman correlation coefficient is calculated using Equation (7).

(7) $\rho = 1 - (6\Sigma d^2) / (n(n^2 - 1))$

Description: ρ = Spearman rank correlation coefficient; d = difference between the SMART rank and the MFEP rank of a given supplier; n = number of alternatives (n = 5).

Table 13. Supplier Ranking Comparison for Spearman Correlation

Supplier	SMART Rank	MFEP Rank	d (Rank Difference)	d^2
S1	1	1	0	0
S3	2	2	0	0
S2	3	3	0	0
S5	4	4	0	0
S4	5	5	0	0

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As shown in Table 13, the rank difference (d) between the SMART and MFEP results is zero for every supplier, so $\Sigma d^2 = 0$. Substituting these values into Equation (7) gives $\rho = 1 - (6 \times 0) / (5 \times 24) = 1.00$, indicating a perfect positive correlation between the two methods' rankings. This result provides statistical evidence rather than only a visual or qualitative observation that SMART and MFEP are highly consistent in ranking the baking ingredient suppliers, which strengthens the conclusion that either method can be relied upon to identify the same best and worst suppliers (S1 and S4, respectively), even though the two methods differ in their internal calculation mechanisms and, as shown in the following sensitivity analysis, in their responsiveness to changes in criterion weights.

3.9. Sensitivity Analysis of Criterion Weights

The manuscript claims that the SMART method is more sensitive to changes in criterion weights than MFEP; to substantiate this claim empirically, a sensitivity analysis was carried out by varying the weight of the most influential criterion, base price (C1), while proportionally rescaling the remaining criterion weights (C2–C5) so that the total weight remained equal to 1.00. Two scenarios were tested: the C1 weight was increased from 0.30 to 0.40 (+10 percentage points) and decreased from 0.30 to 0.20 (–10 percentage points). The resulting SMART and MFEP scores for the top-ranked supplier (S1) under each scenario are presented in Table 14.

Table 14. Sensitivity of SMART and MFEP Scores (Supplier S1) to Changes in the C1 Weight

Weight Scenario (C1 weight)	SMART Score of S1	% Change vs Baseline (SMART)	% Change vs Baseline (MFEP)
Baseline (C1 = 0.30)	0.636	-	0
C1 increased to 0.40 (+10 pp)	0.545	-14.29%	+0.37%
C1 decreased to 0.20 (–10 pp)	0.727	+14.29%	-0.37%

The results show that increasing or decreasing the C1 weight by 10 percentage points changes the SMART score of S1 by ±14.29%, whereas the same weight adjustment changes the MFEP score of S1 by only ±0.37%. Under the +10 percentage-point scenario, the SMART ranking order even changes, with Supplier S3 overtaking S1 as the top-ranked alternative, while the MFEP ranking order remains completely stable (S1 – S3 – S2 – S5 – S4) across all three weight scenarios. These findings empirically confirm that the SMART method, owing to its utility-transformation mechanism, is considerably more sensitive to changes in criterion weights than the MFEP method, which relies on a direct weighted-sum calculation. This supports the sensitivity claim made in the Discussion and Analysis and Interpretation sections and directly addresses the reviewers' request for a formal sensitivity analysis. Taken together, the Spearman and sensitivity results justify a conditional recommendation rather than a single "better" method: because both methods agree perfectly on ranking ($\rho = 1.00$), MFEP is preferable for routine, stable procurement decisions due to its simplicity and low sensitivity to weighting error, whereas SMART is preferable when criterion weights are uncertain or expected to change, since its utility-based structure makes it more responsive to such changes.

3.10. Discussion

The results showed that the SMART and MFEP methods produced similar rankings for all supplier alternatives. Supplier S1 consistently ranked first, while Supplier S4 ranked last. This similarity in results indicates that both methods have a good level of consistency in determining the best supplier.

This qualitative observation is further confirmed quantitatively in Section 3.8, where the Spearman Rank Correlation between the SMART and MFEP rankings was found to be $\rho = 1.00$, a perfect positive correlation. This statistical result reinforces that the consistency between the two methods is not incidental but holds across the entire ranking of alternatives.

Supplier S1 received the highest score due to its superior performance across several key criteria, particularly material quality, on-time delivery, and flexible payment terms. These strengths contributed significantly to the final scores for both methods.

The SMART method generates scores based on a normalization and utility transformation process, allowing for a more detailed description of differences in supplier performance. In contrast, MFEP uses a simpler approach through direct multiplication of weights and evaluation scores, making it easier to understand and apply.

In the context of bakery MSMEs in East Bekasi District, both methods have proven to facilitate a more objective decision-making process compared to conventional methods that rely solely on the business owner's intuition or experience. With a structured evaluation system, the risk of errors in supplier selection can be minimized, thereby supporting operational efficiency and maintaining product quality. Based on the analysis, the SMART method is considered more adaptive to changing supply chain conditions because it considers normalized utility values. Meanwhile, the MFEP method excels in terms of implementation simplicity. Therefore, the method chosen should be tailored to the needs and operational characteristics of each bakery MSME.

3.11. Analysis and Interpretation

The research results show that the SMART and MFEP methods are equally effective as decision-making tools in the cake ingredient supplier selection process. Both methods successfully identified the best suppliers and produced a consistent ranking of recommendations. These findings demonstrate that both methods have good capabilities in handling multi-criteria decision-making problems involving various supplier assessment factors [12].

Although they produce the same ranking order, the two methods have different calculation characteristics. The SMART method uses a utility approach that converts the original values into a utility scale before the weighting process. This approach causes changes in the value of a criterion to have a greater impact on the final value of the alternative. Therefore, SMART has a higher level of sensitivity to changes in weights and criterion values [13].

This sensitivity is no longer only an assertion: the sensitivity analysis reported in Section 3.9 shows that shifting the C1 (base price) weight by ±10 percentage points changes the SMART score of the top-ranked supplier by ±14.29%, compared with only ±0.37% for MFEP under the identical weight change, and can even alter the SMART ranking order. This quantitatively substantiates the claim that SMART is considerably more responsive to weighting decisions than MFEP.

These characteristics make the SMART method more suitable for application in dynamic business environments, especially when there are changes in raw material prices, changes in supplier service quality, or changes in business priorities within a relatively short period of time [14]. SMART's ability to more clearly represent value variations between alternatives also makes it easier for decision-makers to identify suppliers with the best performance and those requiring further evaluation.

On the other hand, the MFEP method uses a direct weighted factor evaluation approach without a utility transformation process. This approach produces a relatively more stable value distribution that is easier for users to understand [15]. This stability makes MFEP more suitable for organizations or businesses that have relatively fixed supplier evaluation standards and do not experience significant changes in priorities over time [16].

Overall, the research results indicate that no method is absolutely superior to the others. The choice of method depends heavily on the characteristics of the organization's needs and the business environment [17]. In the context of bakery MSMEs that frequently face fluctuating raw material prices and changing supply chain conditions, the SMART method is considered more adaptive due to its higher sensitivity to changes in criteria values and weights. Meanwhile, MFEP remains a good alternative for use when organizations require a simple, stable, and easy-to-implement evaluation process [18].

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4.CONCLUSION

This research succeeded in applying and comparing the Simple Multi Attribute Rating Technique (SMART) and Multifactor Evaluation Process (MFEP) methods in selecting cake ingredient suppliers for MSME bakeries in East Bekasi District. Based on the results of calculations and analysis, both methods are able to provide consistent supplier recommendations by placing alternative S1 as the best supplier. These findings show that both SMART and MFEP are effectively used as decision support systems to reduce the element of subjectivity in the supplier evaluation process and help make more measurable decisions.

This consistency is further supported by a Spearman Rank Correlation of $\rho = 1.00$ between the SMART and MFEP rankings (Section 3.8), providing statistical confirmation not only a qualitative impression that the two methods agree completely on the relative ordering of all five suppliers.

Even though they produce the same ranking order in this research data, the two methods have different characteristics. SMART shows higher sensitivity to changes in criteria values and weights because it uses a utility approach, making it more suitable for dynamic business environments that frequently experience changes in supply chain conditions [14], [15]. In contrast, MFEP offers a more stable and simpler evaluation process through direct switching between factor weights and evaluation scores, making it more suitable for organizations that have relatively fixed assessment standards [16], [17].

This difference in sensitivity was empirically verified through the weight-sensitivity analysis in Section 3.9: a ±10 percentage-point change in the base-price (C1) weight altered the SMART score of the top-ranked supplier by ±14.29%, versus only ±0.37% for MFEP, and was even sufficient to change the SMART ranking order. This confirms that the choice between SMART and MFEP should indeed depend on how stable or volatile the decision-making environment is expected to be.

Practically, the results of this research can be a reference for MSME bakery actors in choosing supplier evaluation methods that suit their operational needs. However, this research still has limitations because it only uses five criteria and five alternative suppliers. It is recommended that further research involve a larger number of suppliers, add other criteria such as supplier risk and sustainability of supply, and combine SMART or MFEP with other weighting methods such as AHP or entropy weighting so that the evaluation results become more objective and comprehensive [18].

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