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Comparative Analysis of the SMARTER and ELECTRE Methods for Determining Priority Recipients of Free Legal Aid

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ABSTRACT

Access to justice is a fundamental right guaranteed to every citizen by the Constitution. One implementation is the prodeo service, which covers court fees for those with financial difficulties. However, the implementation of prodeo services at the Cirebon City Religious Court still faces challenges in determining recipient priority due to the lack of a multi-criteria decision-making mechanism capable of objectively and measurably assessing various aspects. This study aims to provide recommendations for methods that can assist the court in determining the priority of prodeo service recipients in a transparent, fast, and targeted manner. The methods used are Multi-Criteria Decision Making (MCDM), namely SMARTER (Simple Multi-Attribute Rating Technique Exploiting Ranks) and ELECTRE (Elimination Et Choix Traduisant la Realite). The study was conducted using a quantitative, descriptive-comparative approach, based on Prodeo application data that includes criteria such as income level, number of dependents, health conditions, and case urgency. The results showed that both methods produced objective, transparent priority rankings of prodeo recipients, but differed in computational complexity and efficiency. The SMARTER method had advantages in simplicity and processing speed, while the ELECTRE method excelled at considering dominance among alternatives with high accuracy.

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1. INTRODUCTION

One method for ensuring access to justice is the prodeo mechanism, which provides exemptions from court fees for individuals who cannot afford them. This mechanism is both regulated and carried out within the judicial system, including the Religious Courts. The execution of this policy is governed by Supreme Court regulations and technical circulars that outline guidelines for managing the provision of prodeo services [1].

The number of requests for waivers of court expenses (prodeo) at the Religious Courts, similar to what is seen at the Religious Courts of Cirebon City and Regency, is growing annually [2]. This increase often exceeds allocated funds and the budget, making it harder to assist less fortunate people [3]. Moreover, the decisions made sometimes do not adequately consider several criteria that could account for multiple elements simultaneously. This situation calls for a more effective method for deciding who should actually receive prodeo services, so that fairness, transparency, and accuracy can be achieved [4].

This requires the use of a Decision Support System (DSS) or Multi-Criteria Decision Making (MCDM) techniques as a relevant solution to support this selection process objectively [5]. SMARTER is an extension of the SMART approach that uses Rank Order Centroid (ROC) to convert criterion importance rankings into numerical weights [6]. Meanwhile, ELECTRE is an outranking method developed by Bernard Roy in the mid-1960s. The ELECTRE method is a pairwise comparison analysis of alternatives that calculates concordance and discordance indices [7]. The SMARTER method can generate accurate rankings with shorter calculation times compared to the AHP method, making it efficient for use at the local government level. In addition, the SMARTER method is also considered simpler to apply because the criterion weights can be determined directly [8]. The ELECTRE method has also been widely used in selection and prioritisation problems. Previous researchers compared the ELECTRE and TOPSIS methods for determining the priority of UMKM assistance recipients [9], [10]. The results of this study show that the ELECTRE method is better able to handle significant differences between criteria and provides more consistent rankings for data with high variability, even though its processing time is longer than that of other methods [11].

Based on the background of this study, the author aims to implement both the SMARTER and ELECTRE methods on the pro bono application dataset at the Cirebon Religious Court, then conduct a comparative analysis of the ranking results, computation time, and parameters for weighting and practical implementation, which is expected to produce policy recommendations for the Cirebon Religious Court in selecting the most appropriate SPK approach to determine the priority of pro bono recipients.

2. METHOD

Metode Simple Multi-Attribute Rating Technique Exploiting Ranks (SMARTER)

The SMARTER method (Simple Multi-Attribute Rating Technique Exploiting Ranks) is an extension of the SMART method (Simple Multi-Attribute Rating Technique) used in the Multi-Criteria Decision-Making (MCDM) process [12], [13]. This method aims to assist decision-makers in determining the best alternative based on a set of criteria with varying levels of importance. The main difference between SMARTER and SMART is the use of the Rank Order Centroid (ROC) weighting technique, which assigns weights based on the relative priority of criteria without directly determining them [14], [15], [16]. With ROC, weights are calculated from each criterion's rank, making the process simpler while still preserving the relative importance of differences between criteria [17].

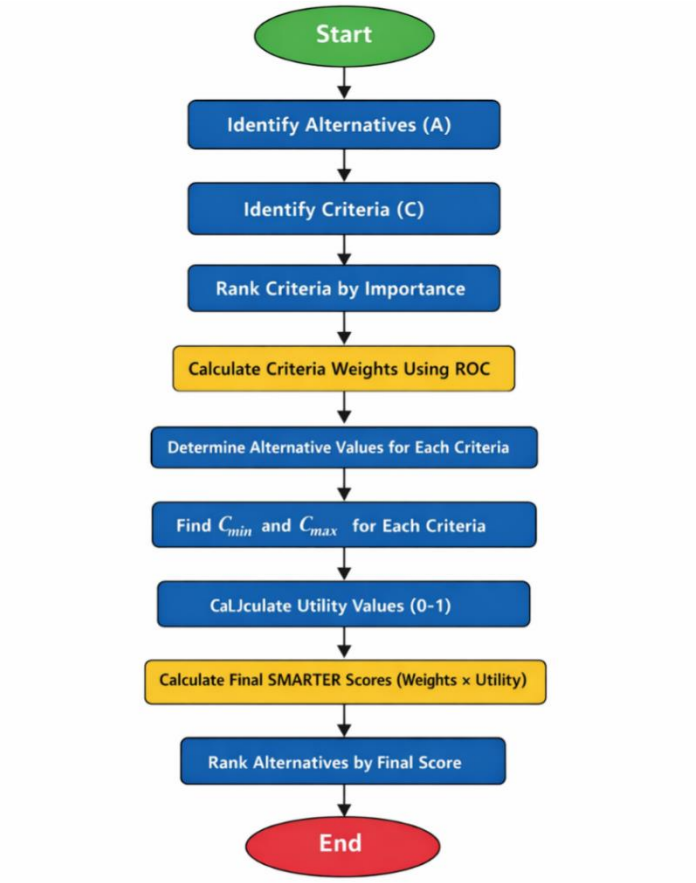

Figure 1. Steps for using the SMARTER method

The steps for using the SMARTER method are as follows [6], [17], [18]:

1. Determine the alternatives and criteria.
2. Rank the criteria based on their level of importance.
3. Determine the weight of each criterion using the Rank Order Centroid (ROC) method.

Explanation:

$$Wk = \left(\frac{1}{k}\right) \sum_{i=k}^{k} \left(\frac{1}{i}\right) \quad \text{.....[1]}$$

W = Weight value of the criterion.
k = number of criteria.
i = Alternative value.

4. Determine the alternative value for each criterion, i.e., assign a score to each alternative for each criterion.
5. Calculate the utility value of each alternative
6. Multiply the criterion weight by the utility value

$$u_i\,(\alpha) = 100\% \times \left(\frac{C_1 - C_{min}}{C_{max} - C_{min}}\right) \text{.....[2]}$$

Explanation:
C_i = value of criterion i

C_min = minimum criterion value

C_max = maximum criterion value

7. Add up the multiplication results to obtain the final value for each

$$U_n = \sum_k^k W_k \; U_n(X_n) \quad \text{.....[3]}$$

Description:

U_n = Final Value

W_k = weight of criterion k

U_n (X_n) = Utility value k for alternative h

8. Determine the ranking of alternatives

Metode Elimination Et Choix Traduisant La Realite (ELECTRE)

The ELECTRE method is a technique in Multi-Criteria Decision-Making (MCDM) that assists decision makers in selecting, filtering, or ranking alternatives based on a set of predetermined criteria [19]. The name ELECTRE comes from French, meaning Elimination and Selection Translating Reality[20]. This method uses the principle of outranking, which is comparing alternatives in pairs to determine the extent to which one alternative outperforms another based on existing criteria [8], [21], [22].

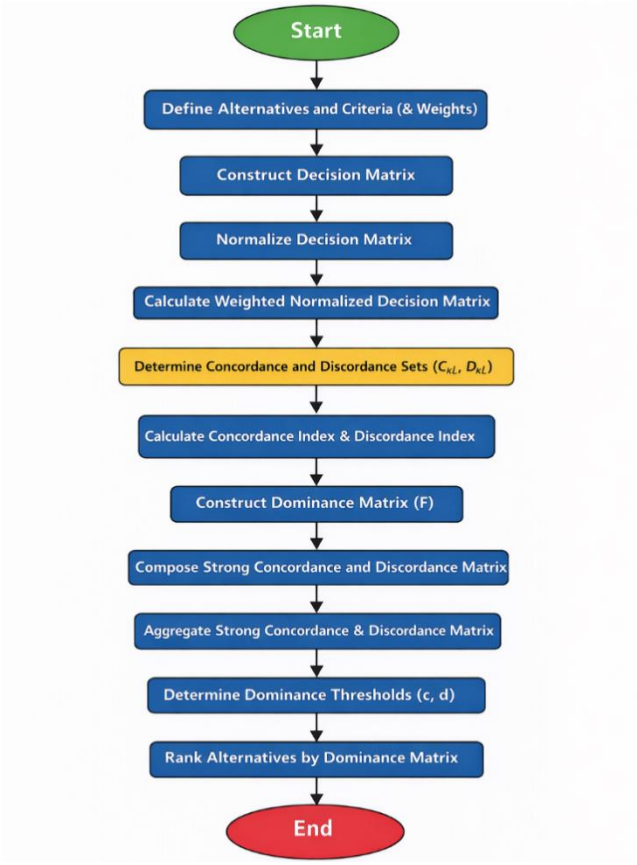

Figure 1. Steps for using the ELECTRE method

The following are the general steps for using the ELECTRE (Elimination Et Choix Traduisant La Realité) method [23]:

1. Determine the alternatives and criteria.
2. Compile a decision matrix.
3. Normalise the decision matrix.

$$r_{ij} = \frac{x_{ij}}{\sqrt{\sum_{i=1}^{m} x_{ij}^2}} \quad \ldots\ldots [3]$$

Explanation:

r_{ij} = Normalisation Value

x_{ij} = Value of Alternative i on criterion j

4. Calculate the weighted normalised decision matrix

$$v_{ij} = w_j \, x \, r_{ij} \quad \ldots\ldots [4]$$

Explanation:

vij = Decision Matrix Value

wj = weight of criterion j

rij = value of alternative i on criterion j

5. Determining the Concordance and Discordance Matrices

Concordance → indicates the degree of dominance of alternative A over alternative B. The formula is:

$$C_{kl} = \{j \mid v_{kj} \geq v_{lj}\} \quad \ldots\ldots [5]$$

Discordance → indicates the degree of inconsistency (significant difference) between alternatives A and B. The formula is:

$$D_{kl} = \{j \mid v_{kj} < v_{lj}\} \quad \ldots\ldots [6]$$

Explanation:

C_{kl} = set of criteria that support that alternative A_k is better than or equal to alternative A_l

D_{kl} = set of criteria that indicate the weakness of alternative A_k compared to alternative A_l

j = criterion index.

v_{kj} = value of alternative Ak on criterion j after normalisation and weighting.

6. Calculate the Concordance and Discordance Index Matrix using the following formula [23]:

$$\text{Indeks } \textit{Concordance}: \; c_{kl} = \frac{\sum j \epsilon c_{kl} \, w_j}{\sum_{j=1}^{n} w_j} \quad \ldots\ldots [7]$$

$$\text{Indeks } \textit{Discordance}: \; d_{kl} = \frac{max_{j \epsilon \, d_{kl} \mid v_{kj} - v_{lj}}}{max_{xj \mid v_{kj - v_{ljj}}}} \quad \ldots\ldots [8]$$

7. Determining the Dominance Matrix (F)

$$F_{ij} = \begin{cases} 1, & Jika \; C_{ij} \geq c \; dan \; D_{ij} \leq d \\ 0, & lainnya \end{cases} \quad \ldots\ldots [9]$$

Explanation:

C_ij = Concordance Matrix element value
D_ij = Discordance Matrix element value
c = Concordance threshold value
d = Discordance threshold value

8. Compile a dominance matrix, namely a dominant Concordance matrix
9. Determine the ranking of alternatives, namely the alternatives that dominate the most among other alternatives

Mean Squared Error (MSE)

Mean Squared Error (MSE) is one of the most commonly used criteria for assessing the quality of a prediction model, as it measures the average squared difference between the estimated and actual values. A small MSE value indicates that the model has higher accuracy [13], [24], [25], [26].

$$MSE = \frac{1}{n}\sum_{i=1}^{n}(yi - \hat{y}i)^2 \quad \text{.....[11]}$$

Where:
n = number of data points.
yi = i-th squared value.
ŷi = i-th predicted value.
(yi – ŷi) = Squared difference between actual and predicted values.

3. RESULTS AND DISCUSSION

In this research, five main criteria were used, namely the applicant's income, number of dependents, employment status, asset ownership/social assistance, and the applicant's social/legal status. Meanwhile, the alternative data analysed comprised several applicants or plaintiffs registered at the Cirebon Religious Court during the 2024 period, which will serve as research objects to test the application of the decision-making method.

3.1. Results

1. Determine the criteria data and criteria weights as a basis for assessment

Table 1. Criteria assessment

Code	Criteria	Priority Level	Weight
C1	Applicant Income	1	0.46
C2	Number of Family Dependents	2	0.26
C3	Employment Status	3	0.16
C4	Asset Ownership / Social Assistance	4	0.09
C5	Social Condition / Applicant Legality	5	0.04

2. Sub-Criteria and Weights

Table 2. Sub-criteria

Code	Sub-Criteria Description	Priority	Weight
C1.1	< 50% of Regional Minimum Wage (RMW)	1	0.457
C1.2	51% – 75% of RMW	2	0.257
C1.3	76% – 100% of RMW	3	0.157
C1.4	> 100% – 125% of RMW	4	0.090
C1.5	> 125% of RMW	5	0.040
Code	**Sub-Criteria Description**	**Priority**	**Weight**
C2.1	More than 5 dependents	1	0.457
C2.2	4 dependents	2	0.257
C2.3	3 dependents	3	0.157
C2.4	2 dependents	4	0.090
C2.5	1 dependent	5	0.040
Code	**Sub-Criteria Description**	**Priority**	**Weight**
C3.1	Unemployed / no income	1	0.457
C3.2	Casual lab / daily worker	2	0.257
C3.3	Low-income informal worker	3	0.157
C3.4	Formal employee with RMW-level salary	4	0.090
C3.5	Formal employee with a salary above RMW	5	0.040
Code	**Sub-Criteria Description**	**Priority**	**Weight**
C4.1	No home / simple rented housing and social assistance recipient	1	0.457
C4.2	No vehicle and social assistance recipient	2	0.257
C4.3	Owns a simple house without a vehicle	3	0.157
C4.4	Owns a simple house and one two-wheeled vehicle	4	0.090
C4.5	Owns productive assets / more than one vehicle	5	0.040
Code	**Sub-Criteria Description**	**Priority**	**Weight**
C5.1	Holds a Certificate of Indigence (SKTM) from the local authority	1	0.457
C5.2	Registered in DTKS (Integrated Social Welfare Data)	2	0.257
C5.3	Recipient of government assistance programs (PKH, BPNT, KIS, KIP, BLT)	3	0.157
C5.4	Recommendation from Legal Aid Institute (LBH) or related agency	4	0.090
C5.5	Does not possess supporting poverty documentation	5	0.040

3. Determining applicant data as alternative assessment data

Table 3. Alternative assessment data

No.	Applicant Name	Age	Gender
1	Ahmad Sulaiman	35	Male
2	Siti Rahmawati	29	Female
3	Bambang Hermawan	40	Male
4	Dewi Sartika	33	Female
5	Eko Prasetyo	27	Male
6	Nur Aisyah	30	Female
7	Jajang Supriyadi	45	Male
8	Lina Marlina	31	Female
9	Rudi Hartono	40	Male
10	Murniati	36	Female
11	Dedi Kurniawan	28	Male
12	Rohani	34	Female
13	Sugeng Riyadi	29	Male
14	Yuni Safitri	26	Female
15	Taufik Hidayat	37	Male
16	Sri Wahyuni	32	Female
17	Hendra Saputra	41	Male
18	Marlina	30	Female
19	Agus Salim	44	Male
20	Rina Puspitasari	29	Female

4. Initial decision matrix (SMARTER Method)

Table 4. Initial decision matrix

No.	alternative	C1	C2	C3	C4	C5
1	Ahmad Sulaiman	0,257	0,257	0,157	0,157	0,157
2	Siti Rahmawati	0,04	0,09	0,257	0,457	0,457
3	Bambang Hermawan	0,157	0,157	0,09	0,09	0,157
4	Dewi Sartika	0,157	0,09	0,09	0,09	0,157
5	Eko Prasetyo	0,257	0,157	0,157	0,157	0,457
6	Nur Aisyah	0,09	0,09	0,257	0,257	0,257
7	Jajang Supriyadi	0,457	0,257	0,257	0,457	0,457
8	Lina Marlina	0,257	0,157	0,09	0,04	0,04
9	Rudi Hartono	0,157	0,157	0,09	0,09	0,157
10	Murniati	0,457	0,09	0,04	0,09	0,257
11	Dedi Kurniawan	0,09	0,09	0,157	0,09	0,257
12	Rohani	0,257	0,157	0,04	0,04	0,04
13	Sugeng Riyadi	0,09	0,09	0,157	0,157	0,457
14	Yuni Safitri	0,157	0,09	0,04	0,157	0,157
15	Taufik Hidayat	0,457	0,257	0,04	0,04	0,04
16	Sri Wahyuni	0,09	0,257	0,157	0,09	0,257
17	Hendra Saputra	0,157	0,09	0,04	0,157	0,04
18	Marlina	0,157	0,09	0,09	0,09	0,157
19	Agus Salim	0,257	0,157	0,04	0,04	0,09
20	Rina Puspitasari	0,157	0,09	0,09	0,09	0,257

5. Utility Value Data Results(SMARTER Method)

Table 5. Utility Data

No.	alternative	C1	C2	C3	C4	C5
1	Ahmad Sulaiman	0,5204	1	0,5392	0,2806	0,2806
2	Siti Rahmawati	0	0	1	1	1
3	Bambang Hermawan	0,2806	0,4012	0,2304	0,1199	0,2806
4	Dewi Sartika	0,2806	0	0,2304	0,1199	0,2806
5	Eko Prasetyo	0,5204	0,4012	0,5392	0,2806	1
6	Nur Aisyah	0,1199	0	1	0,5204	0,5204
7	Jajang Supriyadi	1	1	1	1	1
8	Lina Marlina	0,5204	0,4012	0,2304	0	0
9	Rudi Hartono	0,2806	0,4012	0,2304	0,1199	0,2806
10	Murniati	1	0	0	0,1199	0,5204
11	Dedi Kurniawan	0,1199	0	0,5392	0,1199	0,5204
12	Rohani	0,5204	0,4012	0	0	0
13	Sugeng Riyadi	0,1199	0	0,5392	0,2806	1
14	Yuni Safitri	0,2806	0	0	0,2806	0,2806
15	Taufik Hidayat	1	1	0	0	0
16	Sri Wahyuni	0,1199	1	0,5392	0,1199	0,5204
17	Hendra Saputra	0,2806	0	0	0,2806	0
18	Marlina	0,2806	0	0,2304	0,1199	0,2806
19	Agus Salim	0,5204	0,4012	0	0	0,1199
20	Rina Puspitasari	0,2806	0	0,2304	0,1199	0,5204

6. Calculate the final value of each alternative (SMARTER Method)

Table 6. Calculate the final value

No	Alternative	C1	C2	C3	C4	C5	total
1	Ahmad Sulaiman	0,2394	0,26	0,0863	0,0253	0,0112	0,6221
2	Siti Rahmawati	0	0	0,16	0,09	0,04	0,29
3	Bambang Hermawan	0,1291	0,1043	0,0369	0,0108	0,0112	0,2923
4	Dewi Sartika	0,1291	0	0,0369	0,0108	0,0112	0,1879
5	Eko Prasetyo	0,2394	0,1043	0,0863	0,0253	0,04	0,4952
6	Nur Aisyah	0,0552	0	0,16	0,0468	0,0208	0,2828
7	Jajang Supriyadi	0,46	0,26	0,16	0,09	0,04	1,01
8	Lina Marlina	0,2394	0,1043	0,0369	0	0	0,3806
9	Rudi Hartono	0,1291	0,1043	0,0369	0,0108	0,0112	0,2923
10	Murniati	0,46	0	0	0,0108	0,0208	0,4916
11	Dedi Kurniawan	0,0552	0	0,0863	0,0108	0,0208	0,173
12	Rohani	0,2394	0,1043	0	0	0	0,3437
13	Sugeng Riyadi	0,0552	0	0,0863	0,0253	0,04	0,2067
14	Yuni Safitri	0,1291	0	0	0,0253	0,0112	0,1655
15	Taufik Hidayat	0,46	0,26	0	0	0	0,72
16	Sri Wahyuni	0,0552	0,26	0,0863	0,0108	0,0208	0,433
17	Hendra Saputra	0,1291	0	0	0,0253	0	0,1543
18	Marlina	0,1291	0	0,0369	0,0108	0,0112	0,1879
19	Agus Salim	0,2394	0,1043	0	0	0,0048	0,3485
20	Rina Puspitasari	0,1291	0	0,0369	0,0108	0,0208	0,1975

7. Final Grade Ranking Data (SMARTER Method)

Table 7. Grade Ranking Data

No.	Nama Pemohon	Nilai Akhir	Presentase (%)	Rangking
1	Jajang Supriyadi	1,01	100%	1
2	Taufik Hidayat	0,72	71,29%	2
3	Murniati	0,6221	61,60%	3
4	Ahmad Sulaiman	0,4952	49,03%	4
5	Eko Prasetyo	0,4916	48,67%	5
6	Lina Marlina	0,433	42,87%	6
7	Agus Salim	0,3806	37,68%	7
8	Rohani	0,3485	34,50%	8
9	Sri Wahyuni	0,3437	34,03%	9
10	Siti Rahmawati	0,2923	28,94%	10
11	Bambang Hermawan	0,2923	28,94%	11
12	Rudi Hartono	0,29	28,71%	12
13	Nur Aisyah	0,2828	28%	13
14	Rina Puspitasari	0,2067	20,46%	14
15	Marlina	0,1975	19,56%	15
16	Dewi Sartika	0,1879	18,61%	16
17	Yuni Safitri	0,1879	18,61%	17
18	Sugeng Riyadi	0,173	17,13%	18
19	Hendra Saputra	0,1655	16,39%	19
20	Dedi Kurniawan	0,1543	15,28%	20

The steps in the calculation process using the ELECTRE method must be completed in the same way as the SMARTER method, from data initiation to matrix normalisation, then weighted matrix, Determine the Concordance Matrix, which shows the level of dominance of alternative A over alternative B. Determine the Discordance Matrix, which shows the level of incompatibility (significant differences) between alternatives A and B. Determine the Dominance Matrix (F) using the Fij Dominance Matrix equation formula.

Table 8. Dominance Matrix Data (A1-A10) Electre Method

	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10
A1	0	1	1	1	1	1	0	1	1	0
A2	0	0	0	0	0	0	0	0	0	0
A3	0	0	0	1	0	0	0	0	1	0
A4	0	0	0	0	0	0	0	0	0	0
A5	0	1	1	1	0	1	0	1	1	0
A6	0	0	0	0	0	0	0	0	0	0
A7	1	1	1	1	1	1	0	1	1	1
A8	0	1	1	1	0	1	0	0	1	0
A9	0	0	1	1	0	0	0	0	0	0
A10	0	1	0	1	0	1	0	0	0	0
A11	0	0	0	0	0	0	0	0	0	0
A12	0	1	1	1	0	0	0	0	1	0
A13	0	0	0	0	0	0	0	0	0	0
A14	0	0	0	0	0	0	0	0	0	0
A15	1	1	1	1	1	1	0	1	1	1
A16	0	0	0	0	0	1	0	0	0	0
A17	0	0	0	0	0	0	0	0	0	0
A18	0	0	0	1	0	0	0	0	0	0
A19	0	1	1	1	0	0	0	0	1	0
A20	0	0	0	1	0	0	0	0	0	0

Table 9. Dominance Matrix Data (A11-A20) Electre Method

	A11	A12	A13	A14	A15	A16	A17	A18	A19	A20
A1	1	1	1	1	0	1	1	1	1	1
A2	0	0	0	0	0	0	0	0	0	0
A3	1	0	1	1	0	0	1	1	0	1
A4	1	0	1	1	0	0	1	1	0	0
A5	1	1	1	1	0	1	1	1	1	1
A6	1	0	1	0	0	0	0	0	0	0
A7	1	1	1	1	1	1	1	1	1	1
A8	1	1	1	1	0	0	1	1	1	1
A9	1	0	1	1	0	0	1	1	0	1
A10	1	1	1	1	0	0	1	1	1	1
A11	0	0	0	0	0	0	0	0	0	0
A12	1	0	1	1	0	0	1	1	0	1
A13	1	0	0	0	0	0	0	0	0	0
A14	0	0	0	0	0	0	1	0	0	0
A15	1	1	1	1	0	1	1	1	1	1
A16	1	0	1	0	0	0	0	0	0	0
A17	0	0	0	0	0	0	0	0	0	0
A18	1	0	1	1	0	0	1	0	0	0
A19	1	1	1	1	0	0	1	1	0	1
A20	1	0	1	1	0	0	1	1	0	0

The next step is to determine the ranking of alternatives by identifying those that dominate the total sum of the Dominance Matrix for each alternative, resulting in the following ranking table. (ELECTRE Method Result)

Table 10. The ranking of alternatives

No	Kode	Alternative	Total	Rank
1	A7	Jajang Supriyadi	19	1
2	A15	Taufik Hidayat	18	2
3	A1	Ahmad Sulaiman	16	3
4	A5	Eko Prasetyo	15	4
5	A8	Lina Marlina	13	5
6	A10	Murniati	12	6
7	A19	Agus Salim	11	7
8	A12	Rohani	11	8
9	A3	Bambang Hermawan	9	9
10	A9	Rudi Hartono	9	10
11	A20	Rina Puspitasari	6	11
12	A4	Dewi Sartika	5	12
13	A18	Marlina	5	13
14	A16	Sri Wahyuni	4	14
15	A6	Nur Aisyah	2	15
16	A13	Sugeng Riyadi	1	16
17	A14	Yuni Safitri	1	17
18	A2	Siti Rahmawati	0	18
19	A17	Hendra Saputra	0	19
20	A11	Dedi Kurniawan	0	20

8. MSE, RMSE, and MAE testing

To evaluate the degree of similarity between the ELECTRE method's ranking results and the SMARTER method used as a reference, the Mean Squared Error (MSE) was used.

Table 11. Error Calculation Results (MSE, RSME, and MAE)

No.	**Alternative**	**Rank SMARTER**	**Rank ELECTRE**	**Error (S - E)**	**|Error|**	**Error²**
1	Ahmad Sulaiman	3	3	0	0	0
2	Siti Rahmawati	12	19	-7	7	49
3	Bambang Hermawan	10	10	0	0	0
4	Dewi Sartika	17	13	4	4	16
5	Eko Prasetyo	4	4	0	0	0
6	Nur Aisyah	13	15	-2	2	4
7	Jajang Supriyadi	1	1	0	0	0
8	Lina Marlina	7	5	2	2	4
9	Rudi Hartono	11	9	2	2	4
10	Murniati	5	8	-3	3	9
11	Dedi Kurniawan	18	18	0	0	0
12	Rohani	9	7	2	2	4
13	Sugeng Riyadi	14	17	-3	3	9
14	Yuni Safitri	19	16	3	3	9
15	Taufik Hidayat	2	2	0	0	0
16	Sri Wahyuni	6	14	-8	8	64
17	Hendra Saputra	20	20	0	0	0
18	Marlina	16	12	4	4	16
19	Agus Salim	8	6	2	2	4
20	Rina Puspitasari	15	11	4	4	16
	TOTAL				**46**	**208**
Mean Squared Error (MSE)						10,4
Root Mean Squared Error (RMSE)						3,2249
Mean Absolute Error (MAE)						2,3

9. Comparison of the SMARTER and ELECTRE Methods

Table 12. Comparison of the SMARTER and ELECTRE Methods Results

No.	Alternative	Age	Rank SMARTER	Rank ELECTRE
1	Ahmad Sulaiman	35	3	3
2	Siti Rahmawati	29	12	19
3	Bambang Hermawan	40	10	10
4	Dewi Sartika	33	17	13
5	Eko Prasetyo	27	4	4
6	Nur Aisyah	30	13	15
7	Jajang Supriyadi	45	1	1
8	Lina Marlina	31	7	5
10	Murniati	36	11	9
11	Dedi Kurniawan	28	18	18
12	Rohani	34	9	7
13	Sugeng Riyadi	29	14	17
14	Yuni Safitri	26	19	16
15	Taufik Hidayat	37	2	2
16	Sri Wahyuni	32	6	14
17	Hendra Saputra	41	20	20
18	Marlina	30	16	12
19	Agus Salim	44	8	6
20	Rina Puspitasari	29	15	11

3.2. Discussion

The comparison between the SMARTER and ELECTRE methods shows that both yield similar rankings for the best choices, with strong agreement when an applicant clearly meets most of the evaluation criteria. For example, the top two applicants are ranked identically by both methods, indicating that these choices are reliable. However, there are differences in the middle and lower rankings. SMARTER tends to rank some choices higher because they have strong overall performance, while ELECTRE is more strict and lowers the rank of choices that have major weaknesses in certain areas. This happens because SMARTER uses a method that lets strengths in some areas compensate for weaknesses in others, while ELECTRE uses a different method that assesses how well one choice is better than another based on agreement and disagreement. As a result, ELECTRE prefers choices that perform well across all areas, while SMARTER provides a more flexible, easier-to-understand ranking. Overall, using both methods together makes the decision more reliable, as the choices ranked highly by both are the most trustworthy and recommended.

4. CONCLUSION

The analysis of the error results shows that the rankings produced by the SMARTER and ELECTRE methods are quite similar, especially at the top and bottom. The calculated values MSE = 10.4, RMSE = 3.2249, and MAE = 2.3 show that the average differences in rankings between the two methods are small and acceptable. Many of the alternatives have the same rankings in both methods, indicating consistent decision results. However, there are clear differences in the middle rankings: SMARTER uses a compensatory approach based on utility, while ELECTRE uses a non-compensatory approach that focuses on dominance. Overall, the results show that ELECTRE's rankings are closely aligned with

SMARTER's, supporting ELECTRE as a reliable alternative and demonstrating that it can provide a more stringent dominance-based evaluation.

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