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SELECTION OF THE BEST COFFEE SHOP USING THE VIKOR METHOD

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Abstract: Coffee businesses in Medan are becoming increasingly competitive. Due to the invention of coffee menus and coffee serving packaging to remain competitive, every coffee shop has a distinct quality. However, choosing the finest coffee shop remains a challenge for the decision-maker in this scenario, the consumer. Therefore, we need a mechanism to pick which clients or visits to a coffee shop. Clear, simple-to-understand idea-winning tactics make it simple to make decisions that are effective. The efficacy of various choices may be assessed by an efficient computer procedure. The purpose of this study is to use the Visekriterijumsko Kompromisno Rangiranje (Vikor) technique to choose the best coffee shop based on the following criteria: ambience, taste, pricing, diversity of the menu, service, and facilities. The responses of the questionnaire are used to determine the weight gain based on weighing. The option with the lowest value is chosen as the best option when A5 = 0. In other words, alternative A5 was chosen as the spot where coffee is most strongly recommended.

Keywords: coffee shop; criteria; decision support system; selection;vikor

Abstrak: Bisnis kopi di Medan semakin kompetitif. Karena penemuan menu kopi dan pengemasan sajian kopi agar tetap kompetitif, setiap kedai kopi memiliki kualitas yang berbeda. Namun, memilih kedai kopi terbaik tetap menjadi tantangan bagi para pengambil keputusan dalam skenario ini, yaitu konsumen. Oleh karena itu, diperlukan mekanisme untuk memilih klien atau kunjungan ke kedai kopi. Taktik kemenangan yang jelas dan mudah dipahami memfasilitasi pengambilan keputusan yang efektif. Kemanjuran berbagai pilihan dapat dinilai dengan prosedur komputer yang efisien. Tujuan dari penelitian ini adalah untuk menggunakan teknik Visekriterijumsko Kompromisno Rangiranje (Vikor) untuk memilih kedai kopi terbaik berdasarkan kriteria berikut: suasana, rasa, harga, keragaman menu, layanan, dan fasilitas. Jawaban kuisioner digunakan untuk mengetahui pertambahan berat badan berdasarkan penimbangan. Opsi dengan nilai terendah dipilih sebagai opsi terbaik ketika A5 = 0. Dengan kata lain, alternatif A5 dipilih sebagai tempat di mana biaya kopi paling direkomendasikan.

Kata kunci: kedai kopi; kriteria; sistem pendukung keputusan; seleksi; vikor

INTRODUCTION

The culture of drinking coffee is a means to unwind or interact with family members or other community members [1]. The coffee shop business offers a wide selection of coffee and food [2]. Many coffee shops that are managed do not have knowledge about the characteristics and quality of coffee so that consumers who come only enjoy coffee without knowing the quality and characteristics of the coffee itself [3]. Competition in the coffee business is also

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getting tougher, this can be seen from the many coffee shops spread across several regions. Most people nowadays prefer to drink coffee at coffee shops or cafes rather than at home [4].

Competition between coffee shops in Medan is growing, each coffee shop has its own characteristics, be it from the packaging of coffee serving or from innovative coffee menus to keep the business competitive in the midst of the development of the coffee industry and what is equally important is the increasing number of competitors. coffee business must improve marketing strategy. In Medan there are several coffee shops that have loyal customers and coffee connoisseurs with a variety of innovative menus and have their own product characteristics. Things like this are one of the many factors that can influence consumer decisions to buy products. Seeing the existing situation, the coffee shop now appears to be an inherent symbol for its connoisseurs, not only from the level of sheer enjoyment, lifestyle and distinctive style, but now its function is increasingly in the hearts of the community. In addition to the affordable price, the real value in the coffee shop is also an inherent entertainment of people's lives.

Therefore, develop a simplified systematic decision support system algorithm based approach can assist stakeholders in strategic selection [5]. One of the main methods to upgrade the robustness of the MADM approach is combining it with other mathematical models for building decision support systems (DSS) [6]. Management quality in café selection as an effort to ease decision making [7]. In a decision support system using a method that can process criteria and give each criterion a weight according to the value of the alternative included [8]. Several MCDM methods can be implemented into the system to select the best coffee shop, one of which is Visekriterijumsko Kompromisno Rangiranje (VIKOR).

VIKOR has the advantage of compromising alternatives, and can complete conflicting and non-matchable discrete criteria decision making, namely the unit of difference between criteria but VIKOR also has weaknesses, such as direct weighting without considering its consistency [9]. VIKOR is one of the MADM methods used to search closest solution/alternative as the approximate ideal solution in the ranking [10]-[11]. The VIKOR method can determine the ideal-positive solution as well as the ideal-negative solution solution in the first step [12]. Practical strategies that produce the closest ideal results can be determined using the VIKOR method [13].

Related research regarding the selection of relevant coffee shops has been carried out by implementing the AHP method. The research produced a decision support application for choosing a coffee shop that makes it easier for decision makers because it is equipped with recommendation results and coffee shop feasibility rankings [14]. Choosing the greatest coffee shop is based on a number of factors, including the waitstaff's friendliness, the menu's thoroughness, the availability of parking and wifi, and the cost [15].

The vikor technique is used to determine graduation, and because it takes into consideration the criteria, it can produce useful findings [16]. The vikor approach makes it simpler for different parties to design any solution model since computational processing is

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effective and simple to grasp [17].

This study's goal was to use the Vikor technique to identify the best coffee shop based on the following factors: atmosphere, taste, price, variety of the menu, service, and facilities. The findings of the questionnaire are used to determine the acquisition's weighting, which is based on assigning weights from greatest to smallest. However, the people who ultimately decide in this scenario are still having problems picking the finest coffee establishment. Therefore, we want a method for deciding which coffee shop visitors or customers will choose.

METHOD

Research Stages

To conduct research, so that it can run well, it is necessary to develop research stages. The research stage in choosing the best coffee shop uses the Vikor method can be seen in image 1.

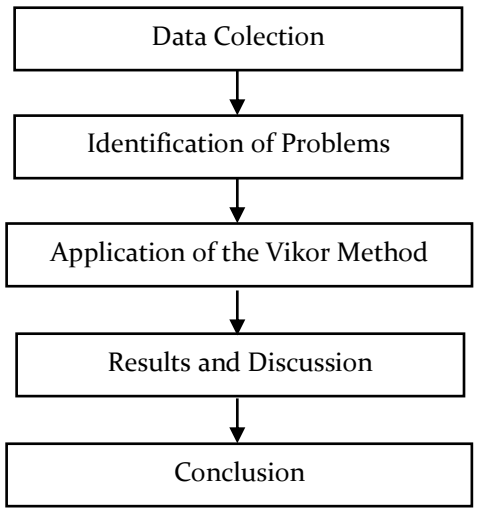

Image 1. Research Stages

An explanation of the stages of the research can be seen in Figure 1 below:

1. Research data collection was carried out through interviews and filling out coffee shop visitor questionnaire forms, with visitor data periods from January to March 2023. The location of the Coffee Shop observation was in Medan Johor District, Medan City. In addition to strengthening the rationale in solving problems using literature studies related to decision support system theory using the VIKOR method and others.
2. In order to discover a decent solution, it is necessary to identify the challenges that currently exist in relation to choosing the finest coffee shop.
3. The VIKOR technique, which focuses on rankings with competing criteria, may be used to select the top coffee shops, which can aid in making the final choice.
4. Based on the implementation results, the Decision Support System that adopts the VIKOR method produces a decision and the final score, a coffee shop with a rating of 1 is an alternative code A5 with an index value of 0, and can be printed in the form of a report. The second rank is the alternative (A8) with an index value (Qi) of 0.369.
5. The next step is to offer conclusions and describe the overall or core findings of the study. The VIKOR approach, which may be used to a variety of issues to get more optimum and precise decision results, employs the best utility (Qi) to generate the best decisions. The decision support system technique for choosing the best coffee shop in accordance with the criteria can be handled by a desktop programming-based system.

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VIKOR Method

The VIKOR method is a method proposed to solve MDM problem [18]. This technique was invented by Opricovic in 1998, who bases its logic on compromise solutions with conflicting criteria [19]. One or a subset of the alternatives that are closest to the optimum solution are chosen using the VIKOR technique, which rates a collection of alternatives [20]. By being aware of the maximum value and the number of rows in each alternative [21]. Each choice option is ranked by comparing the measure of proximity to the ideal alternative after being examined according to several criterion functions [22]. VIKOR is used to resolve issues with competing criteria by optimizing intricate systems to get the desired outcome [23]. The following are the steps of the VIKOR technique:

a. Using equation 1, normalize the choice matrix.

$$r_{ij} = \frac{x_j+ - x_{ij}}{x_j+ - x_{ij}-} \quad (1)$$

b. Using equations 2 and 3, determine the Utility Measure (Si) and Regret Measure (Ri) values.

$$S_i = \sum_{j=1}^{n} Wj \left(\frac{x_j+ - x_{ij}}{x_j+ - x_{ij}-}\right) \quad (2)$$

and

$$R_i = Max\, j\left[wj\left(\frac{x_j+ - x_{ij}}{x_j+ - x_{ij}-}\right)\right] \quad (3)$$

c. Using equation 4, determine the VIKOR index value.

$$Q_i = \left[\frac{Si - S+}{S-- S_+}\right] V + \left(\frac{R_i - R_+}{R-- R_+}\right)(\mathbf{I} - \mathbf{V}) \quad (4)$$

d. According to greatest value to lowest value, with the smallest value being the best option, the three Si, Ri, and Qi values are ranked. The mathematical fulfillment of condition C1 is seen in equations (5) and (6).

$$\mathbf{Q(a'')} - \mathbf{Q(a')} \geq \mathbf{DQ} \quad (5)$$

$$\mathbf{DQ} = \frac{1}{m-1} \quad (6)$$

Use equation (7) if criterion C1 is not met.

$$\mathbf{Q(a^m)} - \mathbf{Q(a')} < \mathbf{DQ} \quad (7)$$

RESULT AND DISCUSSION

Table 1 has the criteria and weighting whereas table 2 contains the coffee shop data and is a list of options with the value of each criterion.

Table 1. Criteria and Weighting

Criteria	W	Range	Value
Atmosphere	25%	Just normal	1
		Unique	2
		Comfortable	3
Flavor	23%	Less delicious	1
		Just normal	2
		Nice	3
Price	20%	Expensive	1
		Currently	2
		Cheap	3
Menu Variation	15%	A little	1
		Enough	2
		Lots	3
Service	10%	Indifferent	1
		Friendly	2
		Very friendly	3
Facility	7%	Less complete	1
		Complete	2
		Very Complete	3

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Table 2. List of Coffee Shops

Alt	C1	C2	C3	C4	C5	C6
A1	1	3	3	2	2	2
A2	2	3	2	2	2	2
A3	1	2	3	3	2	2
A4	3	3	2	3	3	3
A5	3	3	3	3	3	3
A6	3	2	3	2	2	2
A7	3	3	2	2	3	2
A8	3	2	3	3	2	2
A9	2	2	3	2	2	2
A10	1	3	2	2	2	2
A11	2	3	3	2	2	1
A12	2	2	2	3	3	2
A13	1	3	2	2	3	3
A14	2	3	2	3	2	1
A15	2	2	2	3	1	2
A16	3	1	3	3	2	2
A17	3	2	3	2	1	1
A18	2	2	2	3	3	1
A19	2	3	2	2	3	3
A20	1	1	2	3	3	2

The normalized matrix must first be determined using equation (1). The results of the normalized matrix are shown in table 3.

Table 3. Normalized Matrix (rij)

Alt	C1	C2	C3	C4	C5	C6
A1	1	0	0	1	0.5	0.5
A2	0.5	0	1	1	0.5	0.5
A3	1	0.5	0	0	0.5	0.5
A4	0	0	1	0	0	0
A5	0	0	0	0	0	0
A6	0	0.5	0	1	0.5	0.5
A7	0	0	1	1	0	0.5
A8	0	0.5	0	0	0.5	0.5
A9	0.5	0.5	0	1	0.5	0.5
A10	1	0	1	1	0.5	0.5
A11	0.5	0	0	1	0.5	1
A12	0.5	0.5	1	0	0	0.5
A13	1	0	1	1	0	0
A14	0.5	0	1	0	0.5	1
A15	0.5	0.5	1	0	1	0.5
A16	0	1	0	0	0.5	0.5
A17	0	0.5	0	1	1	1
A18	0.5	0.5	1	0	0	1
A19	0.5	0	1	1	0	0
A20	1	1	1	0	0	0.5

By multiplying the normalized results by the weights for the criteria values, Table 4 displays the outcomes of the normalized weighting.

Table 4. Results Calculating Normalized Weights

Code	C1	C2	C3	C4	C5	C6	Total
A1	0.25	0	0	0.15	0.05	0.035	0.485
A2	0.125	0	0.2	0.15	0.05	0.035	0.56
A3	0.25	0.115	0	0	0.05	0.035	0.45
A4	0	0	0.2	0	0	0	0.2
A5	0	0	0	0	0	0	0
A6	0	0.115	0	0.15	0.05	0.035	0.35
A7	0	0	0.2	0.15	0	0.035	0.385
A8	0	0.115	0	0	0.05	0.035	0.2
A9	0.125	0.115	0	0.15	0.05	0.035	0.475
A10	0.25	0	0.2	0.15	0.05	0.035	0.685
A11	0.125	0	0	0.15	0.05	0.07	0.395
A12	0.125	0.115	0.2	0	0	0.035	0.475
A13	0.25	0	0.2	0.15	0	0	0.6
A14	0.125	0	0.2	0	0.05	0.07	0.445
A15	0.125	0.115	0.2	0	0.1	0.035	0.575
A16	0	0.23	0	0	0.05	0.035	0.315
A17	0	0.115	0	0.15	0.1	0.07	0.435
A18	0.125	0.115	0.2	0	0	0.07	0.51
A19	0.125	0	0.2	0.15	0	0	0.475
A20	0.25	0.23	0.2	0	0	0.035	0.715

To get the values of (Si) and (Ri), utilize equations 2 and 3. The calculation results are displayed in table 5.

Table 5. Value of (Si) and (Ri)

Alternatif	S	R
A1	0.485	0.25
A2	0.56	0.2
A3	0.45	0.25
A4	0.2	0.2
A5	0	0
A6	0.35	0.15
A7	0.385	0.2
A8	0.2	0.115
A9	0.475	0.15
…..	…….	…..
A20	0.715	0.25
MIN	0	0
MAX	0.715	0.25

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The VIKOR index (Qi) value is then determined using equation (4). Table 6 below displays the results of computing the VIKOR index for each coffee shop along with its rating.

Table 6. VIKOR Index Values And Ranking

Alternatif	Q	Ranking
A1	0.839	17
A2	0.791	14
A3	0.814	16
A4	0.539	3
A5	0	1
A6	0.544	4
A7	0.669	8
A8	0.369	2
A9	0.632	7
A10	0.979	19
A11	0.576	5
A12	0.732	11
A13	0.919	18
A14	0.711	10
A15	0.802	15
A16	0.680	9
A17	0.604	6
A18	0.756	13
A19	0.7321678	11
A20	1	20

CONCLUSION

Based on the results of the analysis of the problem of choosing the best coffee shop in Medan Johor District, the system built can be used by visitors or users based on alternative assessment data and predetermined criteria, namely: Atmosphere, Taste, Price, Menu Variation, Service, Facilities. Based on the implementation results, the Decision Support System adopts the VIKOR method to produce decisions and final scores. The smallest value at A5 = 0, then alternative A5 is the alternative chosen as the best alternative. In other words, the A5 alternative was voted the best recommended coffee shop. According to the VIKOR method, the criterion must be given priority. If the index value (Qi) is lower than the alternative, the better choice is selected.

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