HIPSTER CAFE LOCATION SELECTION USING SPHERICAL WEIGHTED ARITHMETIC MEAN IN TOPSIS

Nurul Suhada Binti Aziz[1]*, Muhammad Atiq Najmuddin Bin Mohd Yussof[1], Muhammad Afiq Adam Bin Che Su[1], Muhammad Syafiq Bin Mat Isa[1]

[1]*College of Computing, Informatics and Mathematics, Universiti Teknologi MARA (UiTM), Kelantan Branch, Machang Campus, Bukit Ilmu, 18500 Machang, Kelantan Darul Naim, Malaysia*

**Corresponding author: nurulsuhada@uitm.edu.my*

Abstract

In recent years, the popularity of hipster cafes has increased due to their modern, contemporary, and traditional ambiances, as well as the comfort of their patrons. Selecting an appropriate location is essential for the success of a hipster cafe. This paper suggests a technique termed The Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS) for the selection of an ideal location. The objective of this research is to utilize TOPSIS as a methodology to identify the optimal location for a hipster cafe. The factors or criteria considered included cost, location characteristics, target customers, and environmental factors. In addition, there are four other options to consider: Kota Bharu, Kubang Kerian, Machang, and Tanah Merah. The fuzzy questionnaire must be completed by three decision-makers chosen from the shareholders. The data was collected from decision-makers and then processed using the Spherical Weighted Arithmetic Mean (SWAM) operator and aggregated weighted spherical fuzzy decision matrix. The Spherical Fuzzy Positive Ideal Solution (SF-PIS) and Spherical Fuzzy Negative Ideal Solution (SF-NIS) values are used to calculate the distance between alternatives. The value of the closeness ratio determines the rank of the alternatives. As a result, the alternative was chosen based on its ranking. According to the findings of this study, Kota Bharu has the highest closeness ratio compared to the other options.

Keyword: closeness ratio, SWAM, SF-NIS, SF-PIS, TOPSIS

Introduction

In recent years, hipster cafes have gained popularity due to their more current, contemporary, and classic cafe ambiance and their patrons' comfort. According to Sharee and Muhammad (2018), a hipster cafe is a distinctive eatery that specializes in brewing coffee and serves food that is distinct from that found in other coffee shops. Several hipster cafe owners are successful in their businesses and stay in them because they are creative, imaginative, and visionary. One of the commercial choices that need to be carefully considered is location. According to Alli et al. (1991), the success of a firm is related to its location. Business success can be measured in a variety of ways in this context, but it is almost certainly correlated with both subjective and objective data on a few performance indicators, including sales growth, market share, and profitability as mentioned by Dawes (1999).

Furthermore, according to Gordon (2017), it is crucial to have a single location in order to ensure smooth operations and facilitate business expansion. When choosing a location, it is important to consider the needs of the business, clients, staff, and necessary tools for service delivery. According to Indarti (2004), recent studies on location decisions have focused on finding quantitative indicators of the decision's effectiveness by linking site selection choices to improved company performance. Although the success of a firm is not solely determined by its location, it does have an impact on it. In order to maximise profits, it is crucial for business owners to carefully choose a location that is easily accessible to customers, provides parking facilities, and is cost-effective for the owner. Chen et al. (2018) state that choosing the right location involves multiple criteria and requires the use of an appropriate methodology.

There are various factors to consider when using Multi-Criteria Decision-Making (MCDM) procedures to address location selection issues. Zadeh (1965) defines a Fuzzy Set as a class of objects that have varying degrees of membership. Each object is assigned a grade of membership between zero and one, determined by a membership function. Chen and Hwang (1992) made further advancements to Fuzzy TOPSIS. According to Chen and Hwang (1992), the complex normalisation formula used in classical TOPSIS can be eliminated by using linear scale transformation. According to Nordin et al. (2021), linguistic variables are used to assess the importance of every element and the scores given to each option concerning each element. This approach considers the fuzziness in choice information and the group decision-making process. After combining the ratings from the decision-makers, the decision matrix can be converted into a fuzzy decision matrix. From there, a weighted-normalized fuzzy decision matrix can be generated. Spherical Fuzzy TOPSIS is a variant of Fuzzy TOPSIS that includes spherical fuzzy sets. Kahraman et al. (2019) create and illustrate the Spherical Fuzzy TOPSIS as an extension of multi-criteria decision-making method TOPSIS. According to Gündoğdu and Kahrahman (2019) the concept of spherical fuzzy sets was developed as an enhancement to the original fuzzy set theory. The core principle of SFS is to enable decision-makers to broaden the scope of other fuzzy set extensions by establishing a membership function on a spherical surface and freely allocate the parameters of that membership function over a wider range. Other than this, Gündoğdu and Kahrahman suggested expanding the traditional analytic hierarchy process (AHP) to include the spherical fuzzy AHP (SF-AHP) approach, demonstrating its usefulness and accuracy through examples of selecting sites for renewable energy and a side-by-side comparison with the neutral-sophisticated AHP. (Gündoğdu & Kahrahman, 2020)

Sharaf (2023) introduced a new approach to TOPSIS and VIKOR that incorporated spherical fuzzy sets (SFSs) to effectively address both subjective ambiguity and objective uncertainty at the same time. The first example involves choosing a warehouse location. As a second example, the hydrogen storage systems for automobiles are examined using a variety of types of data.

According to previous research conducted by Kahraman et al. (2019), the study utilised the Spherical Fuzzy TOPSIS approach. This study aims to provide company owners and investors with a robust and structured decision-making tool to assist them in making more informed choices regarding the location of their businesses. The Spherical Fuzzy TOPSIS approach is utilised for this purpose.

The chosen criteria encompass cost, location characteristics, target customers, and environmental factors, all of which emerged as key factors from the referenced works (**Table 1**).

Table 1 Decision making criteria from past studies

Research Paper	**Criteria**
Tzeng et al. (2002)	Economy, transpotation, competition, commercial region and environment.
Wibisono and Marella (2020)	Location characteristics, demography, cost, physical features and physical features.

Lakshmanan et al. (1965)	Annual sales, consumer annual expenditure, distance
Indarti (2004)	Geographic location, access speed, facility comfort, service quality, and leasing cost.

Preliminaries

Definition 1: Spherical Fuzzy Set (SFS) (Kutlu Gündoğdu and Kahraman, 2019)

Spherical Fuzzy Set (SFS) allow decision makers to generalize other extensions of fuzzy sets by defining membership functions on spherical surfaces and independently assigning parameters to each membership function. A SFS must satisfy the following condition:

$$0 \le \mu_{A}^{2}(u) + \nu_{A}^{2}(u) + \pi_{A}^{2}(u) \le 1, \ \forall u \in U$$

where U is universe of discourse; $\mu_{A}^{2}(u), \nu_{A}^{2}(u)$ and $\pi_{A}^{2}(u)$ are the degree of membership, non-membership and hesitancy of u to the fuzzy set $\overline{A}$ respectively.

Definition 2: Interval-valued spherical fuzzy sets (IVSFS) (Kutlu Gündoğdu and Kahraman, 2019)

An Interval-Valued Spherical Fuzzy Set A_S of the universe of discourse U is define as

$$A_S = \left\{ \left\langle u, \left[\mu_{A_S}^{L}(u), \mu_{A_S}^{U}(u)\right], \left[\nu_{A_S}^{L}(u), \nu_{A_S}^{U}(u)\right], \left[\pi_{A_S}^{L}(u), \pi_{A_S}^{U}(u)\right] \right\rangle \middle| u \in U \right\}$$

where

$$0 \le \mu_{A_S}^{L}(u) \le \mu_{A_S}^{U}(u) \le 1, \ 0 \le \nu_{A_S}^{L}(u) \le \nu_{A_S}^{U}(u) \le 1 \text{ and } 0 \le \left(\mu_{A}^{2}(u)\right)^{2} + \left(\nu_{A}^{2}(u)\right)^{2} + \left(\pi_{A}^{2}(u)\right)^{2} \le 1$$

Methodology

The Spherical Fuzzy TOPSIS approach was used in this work for support in decision-making. This method is ideal for dealing with the problem of decision-making in a fuzzy TOPSIS. There are 8 steps that are used in order to evaluate the location selection for the new hipster cafe business. The procedures are based on a previous research report by Kahraman et al. (2019). The steps are as follows:

Step 1: Data Collection

Questionnaires were given to three decision-makers, who were asked to rate their judgements on a scale from 1 (Absolutely low importance) to 9 (Absolutely more importance) based on the rubric provided in the questionnaires. They were asked to consider the criteria and alternatives. **Table 2** below displays the linguistic terms and scale for questionnaires. Below is **Table 3**, which displays the criteria and alternatives that have been listed. Below is **Table 4**, which displays the judgments made by the decision-makers.

Table 2 Linguistic term, scale and Spherical Fuzzy Number

Linguistic Term	Scale	SFN (μ, ν, π)
Absolutely More Importance (AI)	9	(0.9,0.1,0.1)

Very High Important (VHI)	8	(0.8,0.2,0.2)
High Importance (HI)	7	(0.7,0.3,0.3)
Slightly More Importance (SMI)	6	(0.6,0.4,0.4)
Equally Importance (EI)	5	(0.5,0.5,0.5)
Slightly Low Importance (SLI)	4	(0.4,0.6,0.4)
Low Importance (LI)	3	(0.3,0.7,0.3)
Very Low Importance (VLI)	2	(0.2,0.8,0.8)
Absolutely Low Importance (ALI)	1	(0.1,0.9,0.1)

Table 3 List of criteria and alternative

Criteria	**Alternative**
C_1 : Cost	A_1 : Kota Bharu
C_2 : Location Characteristic	A_2 : Kubang Kerian
C_3 : Target Customers	A_3 : Machang
C_4 : Environmental Factor	A_4 : Tanah Merah

Table 4 Judgements of Decision Makers (DMs)

DM1	C_1	C_2	C_3	C_4	**DM2**	C_1	C_2	C_3	C_4	**DM3**	C_1	C_2	C_3	C_4
A_1	SMI	VHI	AI	EI	A_1	VHI	VHI	VHI	LI	A_1	AI	AI	AI	HI
A_2	SMI	HI	HI	SMI	A_2	HI	EI	HI	SLI	A_2	HI	SMI	VHI	VHI
A_3	HI	SLI	EI	HI	A_3	SLI	SLI	HI	HI	A_3	HI	EI	VHI	VHI
A_4	HI	SMI	HI	VHI	A_4	SMI	EI	EI	HI	A_4	VHI	HI	SMI	HI

Step 2: Aggregate the Data Using SWAM Operator

Aggregate each decision maker's (DM) judgments using the Spherical Weighted Arithmetic Mean (SWAM) operators provided as below.

$$SWAM_W\left(\tilde{A}_{s1},...,\tilde{A}_{sn}\right)=w_1\tilde{A}_{s1}+w_2\tilde{A}_{s2}+...+w_n\tilde{A}_{sn}$$

$$=\left(\left[1-\prod_{i=1}^{n}\left(1-\mu_{\tilde{A}_{si}}^{2}\right)^{w_i}\right]^{1/2},\prod_{i=1}^{n}v_{\tilde{A}_{si}}^{w_i},\left[\prod_{i=1}^{n}\left(1-\mu_{\tilde{A}_{si}}^{2}\right)^{w_i}-\prod_{i=1}^{n}\left(1-\mu_{\tilde{A}_{si}}^{2}-\pi_{\tilde{A}_{si}}^{2}\right)^{w_i}\right]^{1/2}\right) \tag{1}$$

Let $X=\{x_1,x_2,...,x_m\}$ where $m\geq 2$ be a discrete set of m feasible alternatives and $C=\{C_1,C_2,...,C_n\}$ be a finite set of criteria, $w=\{w_1,w_2,...,w_n\}$ be the weight vector of all criteria which satisfies $0_j\leq 1$ and $\sum_{j=1}^{n}w_j=1$ and $\tilde{A}_s$ is the Spherical Fuzzy Set, μ is the number degree of memberships, v is the number degree of non-memberships and π is the hesitancy of μ and $\tilde{A}_s$.

Table 5 Decision matrix for each decision makers

	Weight	A_n	C_1	C_2	C_3	C_4
DMI	0.5	A_1	(0.6, 0.4, 0.4)	(0.8, 0.2, 0.2)	(0.9, 0.1, 0.1)	(0.5, 0.5, 0.5)
		A_2	(0.6, 0.4, 0.4)	(0.7, 0.3, 0.3)	(0.7, 0.3, 0.3)	(0.6, 0.4, 0.4)
		A_3	(0.7, 0.3, 0.3)	(0.4, 0.6, 0.4)	(0.5, 0.5, 0.5)	(0.7, 0.3, 0.3)
		A_4	(0.7, 0.3, 0.3)	(0.6, 0.4, 0.4)	(0.7, 0.3, 0.3)	(0.8, 0.2, 0.2)
DM2	0.3	A_1	(0.8, 0.2, 0.2)	(0.8, 0.2, 0.2)	(0.8, 0.2, 0.2)	(0.3, 0.7, 0.3)
		A_2	(0.7, 0.3, 0.3)	(0.5, 0.5, 0.5)	(0.7, 0.3, 0.3)	(0.4, 0.6, 0.4)

		A_3	(0.4, 0.6, 0.4)	(0.4, 0.6, 0.4)	(0.7, 0.3, 0.3)	(0.7, 0.3, 0.3)
		A_4	(0.6, 0.4, 0.4)	(0.5, 0.5, 0.5)	(0.5, 0.5, 0.5)	(0.7, 0.3, 0.3)
DM3	0.2	A_1	(0.9, 0.1, 0.1)	(0.9, 0.1, 0.1)	(0.9, 0.1, 0.1)	(0.7, 0.3, 0.3)
		A_2	(0.7, 0.3, 0.3)	(0.6, 0.4, 0.4)	(0.8, 0.2, 0.2)	(0.8, 0.2, 0.2)
		A_3	(0.7, 0.3, 0.3)	(0.5, 0.5, 0.5)	(0.8, 0.2, 0.2)	(0.8, 0.2, 0.2)
		A_4	(0.8, 0.2, 0.2)	(0.7, 0.3, 0.3)	(0.6, 0.4, 0.4)	(0.7, 0.3, 0.3)

It should be noted that the weight of Equation (1) is determined by the business experience of each decision maker. Equation (1) can be employed to generate a decision matrix that employs the Spherical Weighted Arithmetic Mean (SWAM) operator, as shown in **Table 6**.

Table 6 Aggregated Decision Matrix Using SWAM Operator

DM	C_1	C_2	C_3	C_4
A_1	(0.76, 0.25, 0.27)	(0.83, 0.17, 0.18)	(0.88, 0.12, 0.13)	(0.51, 0.50, 0.42)
A_2	(0.65, 0.35, 0.35)	(0.63, 0.37, 0.38)	(0.72, 0.28, 0.28)	(0.62, 0.39, 0.36)
A_3	(0.64, 0.37, 0.33)	(0.42, 0.58, 0.43)	(0.65, 0.36, 0.38)	(0.72, 0.28, 0.28)
A_4	(0.70, 0.30, 0.31)	(0.60, 0.40, 0.41)	(0.63, 0.37, 0.38)	(0.76, 0.24, 0.25)
Weight of each criteria	(0.76, 0.25, 0.27)	(0.63, 0.37, 0.38)	(0.65, 0.36, 0.38)	(0.76, 0.24, 0.25)

Step 3: Create the Aggregated Weighted Spherical Fuzzy Decision Matrix

Following the determination of the weights of the criterion and the rating of the alternatives, the aggregated weighted spherical fuzzy decision matrix is produced using Equation (2).

$$\tilde{A}_s \otimes \tilde{B}_s = \left\{ \mu_{\tilde{A}_s}\mu_{\tilde{B}_s}, \left(v_{\tilde{A}_s}^2 + v_{\tilde{B}_s}^2 - v_{\tilde{A}_s}^2 v_{\tilde{B}_s}^2\right)^{1/2}, \left(\left(1-v_{\tilde{B}_s}^2\right)\pi_{\tilde{A}_s}^2 + \left(1-v_{\tilde{A}_s}^2\right)\pi_{\tilde{A}_s}^2 - \pi_{\tilde{A}_s}^2\pi_{\tilde{A}_s}^2\right)^{1/2} \right\} \quad (2)$$

Weights for each criterion can be determined by finding the diagonal element in **Table 6**. Once the weights of each criterion and the rating of the alternatives have been determined, we construct the aggregated weighted spherical fuzzy decision matrix using Equation (2). This matrix is then defined in **Table 7**.

Table 7 Weighted Decision Matrix Based on SWAM Operator

DM	C_1	C_2	C_3	C_4
A_1	(0.58, 0.34, 0.36)	(0.52, 0.40, 0.40)	(0.57, 0.38, 0.39)	(0.39, 0.54, 0.45)
A_2	(0.50, 0.42, 0.41)	(0.40, 0.51, 0.48)	(0.47, 0.44, 0.43)	(0.47, 0.45, 0.41)
A_3	(0.49, 0.43, 0.39)	(0.27, 0.65, 0.48)	(0.42, 0.49, 0.48)	(0.55, 0.36, 0.35)
A_4	(0.53, 0.38, 0.39)	(0.38, 0.53, 0.49)	(0.41, 0.50, 0.48)	(0.57, 0.34, 0.34)

Step 4: Defuzzification

Defuzzify the aggregated weighted decision matrix by using Equation (3). This operation is only required to find the SF positive and negative ideal solutions. In the next phases, we will continue with the SF numbers.

$$Score\left(C_j\left(X_{iw}\right)\right) = \left(2\mu_{ijw} - \frac{\pi_{ijw}}{2}\right)^2 - \left(v_{ijw} - \frac{\pi_{ijw}}{2}\right)^2 \quad (3)$$

Score function values are calculated by defuzzifying the aggregated weighted decision matrix, using **Table 7** and Equation (3). This operation is necessary solely for determining the

SF positive and negative ideal solution. The score function values can be found in **Table 8**.

Table 8 Score Function Values Based on SWAM Operator

Alternatives	C_1	C_2	C_3	C_4
A_1	0.922	0.673	0.863	0.204
A_2	0.578	0.246	0.475	0.471
A_3	0.541	-0.083	0.306	0.807
A_4	0.724	0.183	0.275	0.921

Step 5: Compute Spherical Fuzzy Positive Ideal Solution (SF-PIS) and Spherical Fuzzy Negative Ideal Solution (SF-NIS)

Based on the score values obtained in Step 4, compute the Spherical Fuzzy Positive Ideal Solution (SF-PIS) using Equation (4) and Equation (5) and the Spherical Fuzzy Negative Ideal Solution (SF-NIS) using Equation (6) and Equation (7).
For the SF-PIS

$$X^* = \left\{ C_j, max\ i < Score\left(C_j\left(X_{iw}\right)\right) > \middle| j = 1,2,...,n \right\} \tag{4}$$

$$X^* = \left\{ \left\langle C_1, \left(\mu_1^*, v_1^*, \pi_1^*\right)\right\rangle, \left\langle C_2, \left(\mu_2^*, v_2^*, \pi_2^*\right)\right\rangle, ..., \left\langle C_n, \left(\mu_n^*, v_n^*, \pi_n^*\right)\right\rangle \right\} \tag{5}$$

For the SF-NIS

$$X^- = \left\{ C_j, min\ i < Score\left(C_j\left(X_{iw}\right)\right) > \middle| j = 1,2,...,n \right\} \tag{6}$$

$$X^- = \left\{ \left\langle C_1, \left(\mu_1^-, v_1^-, \pi_1^-\right)\right\rangle, \left\langle C_2, \left(\mu_2^-, v_2^-, \pi_2^-\right)\right\rangle, ..., \left\langle C_n, \left(\mu_n^-, v_n^-, \pi_n^-\right)\right\rangle \right\} \tag{7}$$

According to **Table 8**, the highest score values for each criterion are represented by Positive Ideal Solution (PIS), while the lowest score values for each criterion are represented by Negative Ideal Solution (NIS), which are calculated using Equations (5) and (7). Based on the highest and lowest scores, we have selected the Spherical Fuzzy Positive Ideal Solution (SF-PIS) and Spherical Fuzzy Negative Ideal Solution (SF-NIS) from **Table 8**. These selections are then presented in **Table 9**.

Table 9 SF-PIS and SF-NIS Based on SWAM Operator

	C_1	C_2	C_3	C_4
X^*(Best)	(0.58, 0.34, 0.36)	(0.52, 0.40, 0.40)	(0.57, 0.38, 0.39)	(0.57, 0.34, 0.34)
X^-(Worst)	(0.49, 0.43, 0.39)	(0.27, 0.65, 0.48)	(0.41, 0.50, 0.48)	(0.39, 0.54, 0.45)

Step 6: Calculate the Distance Using Normalized Euclidean

Calculate the distance between alternative Xi and the SF-PIS and SF-NIS, as applicable. This step used the normalised Euclidean distance, Equations (8) and (9).
For the SF-PIS:

$$D\left(X_i, X^*\right) = \sqrt{\frac{1}{2n}\sum_{i=1}^{n}\left[\left(\mu_{X_i} - \mu_{X^*}\right)^2 + \left(v_{X_i} - v_{X^*}\right)^2 + \left(\pi_{X_i} - \pi_{X^*}\right)^2\right]} \tag{8}$$

For the SF-NIS:

$$D\left(X_i, X^-\right) = \sqrt{\frac{1}{2n}\sum_{i=1}^{n}\left[\left(\mu_{X_i} - \mu_{X^-}\right)^2 + \left(v_{X_i} - v_{X^-}\right)^2 + \left(\pi_{X_i} - \pi_{X^-}\right)^2\right]} \tag{9}$$

In the next step, we use the criteria values from **Table 7** and **Table 9** to calculate the distance between alternative Xi and the SF-PIS and SF-NIS, as applicable. Normalised Euclidean distance, using Equations (8) for the SF-PIS and (9) for the SF-NIS. The distances between alternatives are calculated and shown in **Table 10**.

Table 10 Distances to Positive and Negative Ideal Solutions

	$D\left(X_i, X^*\right)$	$D\left(X_i, X^-\right)$
A_1	0.104	0.157
A_2	0.106	0.090
A_3	0.156	0.091
A_4	0.109	0.123

Step 7: Calculate the Classical Closeness Ratio

The classical closeness ratio is calculated as Equation (10) and is presented in **Table 11**.

$$\xi\left(X_i\right) = \frac{D\left(X_i, X^-\right)}{D\left(X_i, X^*\right) + D\left(X_i, X^-\right)} \tag{10}$$

Table 11 The Classical Closeness Ratio

Alternatives	Closeness Ratio
A_1	0.602
A_2	0.459
A_3	0.369
A_4	0.529

Step 8: Rank the Result

Determine the best alternative by ranking the alternatives in the optimal order. The alternatives are arranged in descending order of closeness ratio.

Table 12 The Ranking

Alternatives	Ranking
Kota Bharu	1
Tanah Merah	2
Kubang Kerian	3
Machang	4

Results and Discussion

The research focused on determining the ideal location for a hipster cafe using Spherical Fuzzy TOPSIS. The findings, which are displayed in **Table 12**, showcase the rankings based on the calculated closeness ratios presented in **Table 11**. After analysing the data using Spherical Fuzzy TOPSIS, it is clear that Kota Bharu (A1) is the top choice for the location of a hipster cafe. Tanah Merah (A4) comes in second place, followed by Kubang Kerian (A2) in third place, and Machang (A3) in fourth place. These rankings offer decision-makers valuable insights into the process of selecting the most appropriate location for the project, ensuring that it is in accordance with their objectives and criteria. Kota Bharu, the capital of Kelantan, is a town that is deeply rooted in tradition and yearns for progress. Investors perceive enhanced infrastructure as indicative of stability and potential for expansion. Businesses would be more inclined to establish their operations in Kota Bharu if they were provided with reliable utilities, including clean water and proper drainage. This would result in capital investment, job opportunities, and economic prosperity. Kota Bharu has the potential to unlock its economic potential by attracting businesses from a variety of sectors, thereby stimulating job creation and income generation for its residents, provided that the requisite infrastructure is in place. In order to make a well-informed decision, it is imperative to conduct additional evaluations and considerations of specific needs and requirements.

Conclusion

The research was able to obtain the closeness ratios for each alternative location by utilising Spherical Fuzzy TOPSIS. This allowed for a systematic and objective ranking of the locations based on their proximity to the ideal solution. The findings indicated that Kota Bharu A1 was the most advantageous location, with Tanah Merah A4, Kubang Kerian A2, and Machang A3 following in that order. Spherical Fuzzy TOPSIS has demonstrated its value as a valuable tool for decision-makers, as it allows them to make informed decisions in intricate decision-making processes, particularly in the selection of a location that involves multiple criteria. The consideration of uncertainties and vagueness in real-world scenarios enhances the robustness and reliability of this approach, setting it apart from traditional TOPSIS. In the future, Spherical Fuzzy TOPSIS can be applied to a wide range of decision-making problems, extending beyond location selection to other fields where uncertainty and imprecision are significant factors. Further research and advancements in the method can lead to its wider application and contribute to enhancing decision-making processes across different domains.

Ethics Statement

The research does not require research ethics approval.

Authors Contribution

Writing – Original draft preparation, Aziz, N.S; Literature Review, Mat Isa, M.S; Methodology, Mohd Yussof, M.A.N and Che Su, M.A.A; Writing – Review and editing, Aziz, N.S.

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Conflict of interests

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