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Medical Aesthetics Clinic Location Selection Using SMART Single-Valued Neutrosophic TOPSIS

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Abstract

Background: Location decision plays a key role in strategic logistics and business success. The beauty business in Thailand has continuously grown, and medical aesthetics clinic location is one of the critical factors for business success. The problem is also related to sustainable urban service accessibility. *Methods:* This paper presents, for the first time, a systematic selection of medical aesthetics clinic location as a multi-criteria decision-making (MCDM) problem. The Simple Multi-Attribute Rating Technique (SMART) and Single-Valued Neutrosophic TOPSIS (SVN-TOPSIS) are combined to solve the location selection problem. SMART determines criterion weights, whereas SVN-TOPSIS evaluates alternatives using linguistic terms understandable to non-technical decision makers. *Results:* The proposed SMART SVN-TOPSIS is applied to a real investment problem in which two investors select the best clinic location from five alternatives with nine criteria. Siam Square—the heart of shopping, fashion, and youth culture in Bangkok—is recommended as the top location. *Conclusions:* The results indicate that the proposed method is capable of generating a consistent ranking of alternatives and differentiating between locations that exhibit similar evaluation characteristics. The findings may also support sustainable urban service planning and healthcare-related facility location decisions.

Keywords: medical aesthetics clinic location; location decision making; multi-criteria decision-making (MCDM); neutrosophic sets; TOPSIS; SMART method

1. Introduction

The beauty and medical aesthetics sector in Thailand has exhibited consistent growth over the past decade, driven by increasing consumer demand and medical tourism [1,2]. Thailand had 7000 aesthetics clinics in 2024 [2]. The aesthetics medicine market in Thailand was valued at approximately USD 1.46 billion in 2023 and is projected to grow at a compound annual growth rate (CAGR) of 11.6% from 2024 to 2030 [3]. Many aesthetics surgery clinics are expanding into comprehensive plastic surgery ones. Although there are still business opportunities in opening new medical aesthetics clinics, the competition is extremely fierce. The opening of new medical aesthetics clinics thus requires prudent decision making. One of the critical factors for business success is the business location. Location decision plays a key role in strategic logistics and supply chain management [4].

From a theoretical perspective, location decisions influence business performance through several key mechanisms. Accessibility affects customer flow and service reach, particularly in urban environments, where transportation connectivity determines the

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ease of access [5,6]. The surrounding business ecosystem and competitor density shape both competitive pressure and potential agglomeration benefits, as emphasized in spatial economics and cluster theory [7,8]. In addition, environmental quality and urban amenities influence customer preferences and perceived service value, especially for service-oriented facilities [9]. Moreover, facility location models in operations research highlight that location decisions directly affect service coverage, accessibility, and system efficiency, reinforcing their strategic importance in decision making [10,11]. These mechanisms are especially relevant for medical aesthetics clinics, which operate at the intersection of healthcare and lifestyle services, where location plays a central role in attracting target customers and sustaining business performance.

This study does not aim to develop a facility location model within supply chain or logistics theory. Instead, it focuses on applying a hybrid MCDM framework to support location decision making under uncertainty. Such decisions can also be viewed as service facility location problems within a broader logistics context, particularly in terms of accessibility, service coverage, and competitive positioning.

The remainder of this section briefly introduces the research context, while a detailed review of the relevant literature is presented in Section 2.

In this study, the evaluation data are obtained from two investors who intend to open an aesthetics clinic in Bangkok, Thailand. The decision makers independently assessed potential locations using linguistic evaluations based on predefined criteria. Bangkok was selected as the study area because it represents one of the most dynamic metropolitan environments in Southeast Asia, characterized by high population density, diverse transportation systems, intensive commercial activities, and strong competition in the aesthetic medicine industry. These characteristics make the location selection problem particularly complex and suitable for multi-criteria decision analysis.

Based on the aforementioned successes of SMART and SVN-TOPSIS in solving real-world decision problems, this paper applies a hybrid SMART SVN-TOPSIS to a real investment problem. The decision makers are the real investors who seek a location to establish a medical aesthetics clinic. The proposed SMART SVN-TOPSIS has a number of advantages over TOPSIS, AHP-TOPSIS, or fuzzy TOPSIS in the following aspects. Firstly, the determination of criterion weights by SMART is less complicated compared to AHP. The AHP requires consistency compliance, which can lead to many revisions of tye criteria comparison. Secondly, SVN-TOPSIS can handle decision processes that involves truth, indeterminacy, and falsity, whereas the traditional TOPSIS and fuzzy TOPSIS cannot.

The results of this study can also be interpreted from a logistics perspective, particularly in terms of accessibility, service coverage, and competitive positioning of service facilities in dense urban environments.

The structure of the paper is as follows. Section 2 reviews the relevant literature. The criteria for selecting the location are then summarized. The proposed hybrid methodology is described. The application of the research methodology is then demonstrated. The discussion and conclusions are presented at the end.

2. Literature Review

This section reviews relevant studies on business location selection, healthcare facility location, and multi-criteria decision-making approaches.

For small and medium enterprises, location decision contributes to their success more than business choice [12]. Based on surveys of internet café businesses in Indonesia, it was found that favorable business location is positively related to business success [13]. The effect of the business location on sales was studied [14]. The business location has a positive effect on trader profits. The business location also directly affects customer loyalty [15]. The

combination of place and promotion tactics provides an omnichannel for medical aesthetics clinic businesses [16]. The business location plays a positive moderating role in the success of business growth, even during the COVID-19 pandemic crisis [17].

In healthcare contexts, location decisions are closely related to service accessibility, patient-centric logistics, and resource allocation efficiency. Previous studies have shown that healthcare logistics systems must ensure timely service delivery and effective access, especially under uncertainty and capacity limitations [18,19].

Facility location and allocation models are therefore widely used to determine how healthcare services should be distributed across space in order to improve accessibility and overall system performance [20,21].

In addition, studies in humanitarian and crisis-related healthcare logistics highlight the importance of system resilience and the ability to manage resource flows under disruptive conditions [22,23]. These factors indicate that location decisions should consider not only accessibility, but also risk and service efficiency.

Recent research also emphasizes spatial equity and service coverage, showing that logistics-based location strategies can improve healthcare access across different population groups [24]. Furthermore, the concept of service modularity has been introduced to improve flexibility and coordination in healthcare logistics systems [25].

Overall, these studies suggest that healthcare facility location decisions involve multiple dimensions and require systematic approaches that can integrate both quantitative and qualitative criteria.

The decision making of selecting an appropriate business location involves many criteria. Consequently, the business location selection is a class of multi-criteria decision-making (MCDM) problems. Regarding location selection, various business types have been studied. These include a casual-dining restaurant [26], commercial opening [27], gas station [28], online grocery distribution hub [29], private clinic [30], dental clinic [31,32], and dental tourism [33]. MCDM approaches for business location selection can broadly be categorized into two groups: single-method and hybrid (or integrated) approaches [34]. Methods such as AHP [26] and its modified versions [31,32] fall under the single-method category, whereas combinations like AHP-TOPSIS [27,28], AHP-SFTOPSIS [29], and DEMATEL-ANP-VIKOR [33] belong to the hybrid group. Here, AHP, TOPSIS, SFTOPSIS, DEMATEL, ANP, and VIKOR refer to the analytic hierarchy process, Technique for Order of Preference by Similarity to Ideal Solution, Spherical Fuzzy TOPSIS, Decision-Making Trial and Evaluation Laboratory, analytic network process, and Viekriterijumsko Kompromisno Rangiranje (Multi-criteria Optimization and Compromise Solution), respectively.

In hybrid approaches, it is common to use one or more MCDM techniques to determine the relative importance of decision criteria, particularly for assigning weights, while the remaining method(s) are used to rank alternatives based on those predefined weights. The AHP is the most frequently used method for determining criterion weights in the literature. In some cases, DEMATEL and ANP are combined for this purpose [33].

The criteria for selecting business locations have been widely discussed across different contexts. For instance, in the case of casual-dining restaurants, key factors include proximity to target areas, physical characteristics, expected future development, visibility, traffic patterns and accessibility, level of competition, and cost considerations [26]. For gas station locations, relevant factors include competitors, traffic volume, popularity, and vehicle ownership [28]. In the context of ship path optimization, geographical traffic characteristics are also taken into account [35]. For warehouse or distribution hub location, the criteria can generally be grouped into five dimensions: location, cost, service, infrastructure, and human resource availability [36]. In the case of dental clinics, factors such as transportation access, surrounding community, daily-life facilities, parking availability, and competitors

are considered important [31,32]. For dental tourism, criteria extend to general infrastructure, tourism infrastructure, dental services, environmental and natural resources, as well as cultural and artistic aspects [33]. Other studies on private clinic location emphasize environmental suitability, accessibility and convenience, economic efficiency, and long-term sustainability [30]. Additionally, the type of facility itself can influence how location criteria are evaluated [9].

Despite the recognized importance of location in driving economic outcomes, there is still a lack of studies applying MCDM methods to the selection of medical aesthetics clinic locations, which is a key factor for business success. This gap is particularly evident in Thailand, where the aesthetic medicine industry has expanded rapidly in recent years. Unlike general healthcare services, medical aesthetics clinics are more closely linked to lifestyle consumption, retail environments, and customer accessibility in dense urban settings. As a result, their location choice involves additional dimensions such as proximity to high-end commercial areas, accessibility through multiple transportation modes, the surrounding business ecosystem, and competitive density. These aspects make the problem inherently complex and well-suited for systematic evaluation using mathematical decision-making tools.

In this regard, MCDM approaches provide a practical decision-support perspective for facility location problems where multiple criteria and uncertainty must be considered simultaneously, complementing traditional logistics-oriented analyses.

Among the available decision-making methods, TOPSIS [37] is widely recognized for its simplicity, ease of application, and solid mathematical foundation [38]. It has been applied extensively across various domains, including healthcare [39], energy management [40], general location selection [41], supply chain management [42], human resource management [43], environmental studies [44], technology selection [45], project evaluation [46], and risk management [47].

To facilitate decision making, linguistic terms are often used, so that decision makers can express their judgments more naturally [48,49]. These linguistic assessments are typically represented using fuzzy numbers to capture their inherent vagueness [50]. A seminal extension of TOPSIS to fuzzy group decision-making environments was proposed, allowing decision makers to model imprecision through fuzzy numbers and to aggregate judgments across multiple experts effectively [51]. This approach was further extended by the introduction of intuitionistic fuzzy sets, which distinguish between membership and non-membership degrees [52]. To better handle indeterminate or inconsistent information, neutrosophic set theory was proposed from a philosophical perspective [53]. The neutrosophic set can capture truth, indeterminacy, and falsity simultaneously. A practical implementation, known as the Single-Valued Neutrosophic Set (SVNS), was later developed for scientific applications [54]. The SVNS realizes the concept of neutrosophic sets in computational procedures and has subsequently been used to represent linguistic variables in TOPSIS, leading to the development of Single-Valued Neutrosophic TOPSIS (SVN-TOPSIS) [55]. Compared to fuzzy and intuitionistic fuzzy approaches, SVN-TOPSIS allows for a more general representation of uncertainty by incorporating indeterminacy [56]. Applications of SVN-TOPSIS include sustainable fuel evaluation for ship investment decisions [57], prioritization of teaching modalities [58], e-commerce strategy selection [59], medical emergency assessment [60], medical diagnosis [61], post-pandemic project selection [62], supplier quality assessment under uncertainty [63], and supplier selection [64].

For determining criterion weights, the Simple Multi-Attribute Rating Technique (SMART) [65] is one of the most commonly adopted approaches in MCDM due to its straightforward procedure [66]. The method derives weights based on expert preferences

and has been widely combined with other MCDM techniques, including TOPSIS [67], TODIM [68], and MOORA [69].

These approaches have also been widely applied in decision-making contexts related to facility location and service system planning, where quantitative and qualitative factors must be jointly evaluated.

3. Criteria for Selecting Medical Aesthetics Clinic Location

Based on the earlier studies on dental clinic and private clinic location selection, as reported in Section 1, the following criteria are synthesized and proposed in this study. The used criteria include number of transportation types available for reaching the location, population density around the clinic area, availability level of daily-life facilities (e.g., shopping mall, grocery, pharmacy, restaurant, etc.), size of parking areas, number of similar service providers around the clinic area, quality of social surroundings, physical environment quality, and cost of land. Since there are increasing numbers of natural disasters like earthquakes, severe flooding, and landslides, the natural disaster risk level is also proposed as an additional criterion in the clinic location selection. All criteria are combined and synthesized as follows (see Table 1). It is noted that the positive criteria reflect benefit/profit and the negative ones exhibit cost/loss.

1. Number of transportation types available for reaching the location: This criterion signifies the availability of major transportation modes, including roads and rail lines, to reach the clinic location.
2. Population density around the clinic area: The area within a radius of 15 km has been used to define hospital markets [70] and is adopted in this case.
3. Availability level of daily-life facilities: This criterion considers facilities like shopping malls, groceries, hairdresser shops, pharmacies, and restaurants.
4. Size of parking area: This criterion considers the availability of parking areas and their size.
5. Quality of social surroundings: This criterion makes the location decision of an aesthetics clinic different from that of other medical services. It is directly obtained from investor experiences. Luxury, tranquility, and cleanliness in the vicinity of an aesthetics clinic location are the major indicators of the quality of social surroundings.
6. Physical environment quality: This criterion is about the quality of the natural environment, including air, water, and noise.
7. Number of similar service providers around the clinic area: This criterion considers the competition level in the vicinity of prospective locations.
8. Natural disaster risk level: This criterion considers the possibility of exposure to catastrophic risks such as flooding, seismic activity, wildfire, and adverse weather.
9. Cost of land: This criterion refers to the total expenditure incurred to make use of the land.

To enhance transparency, this study treats the proposed criteria as a synthesized set derived from the reviewed clinic- and facility-location literature, and the assessment of each alternative location is elicited from two decision makers (investors) independently, following the SMART scoring and SVN-TOPSIS linguistic evaluation described in Section 3.

In the context of multi-criteria decision making, the positive criteria are regarded as benefit-type attributes, meaning that higher values are preferable and contribute positively to the overall performance of a location alternative. In contrast, the negative criteria are treated as cost-type attributes, for which lower values are more desirable as they represent risk, expense, or competitive disadvantage. This classification is essential for the subsequent normalization and aggregation procedures in the proposed SMART SVN-TOPSIS framework.

Table 1. Criteria and their types for medical aesthetics clinic location selection.

Criterion	Symbol	Type
Number of transportation types for reaching the location	C_1	Positive
Population density around the clinic area	C_2	Positive
Availability level of daily-life facilities	C_3	Positive
Size of parking area	C_4	Positive
Quality of social surroundings	C_5	Positive
Physical environment quality	C_6	Positive
Number of similar service providers around the clinic area	C_7	Negative
Natural disaster risk level	C_8	Negative
Cost of land	C_9	Negative

4. Research Methodology

4.1. Description of SMART for Criterion Weight Determination

Based on SMART, each decision maker begins by ranking the criteria according to their importance, which is represented through assigned scores. If criterion A is considered more important than criterion B, then the score assigned to A must be higher than that assigned to B. The maximum score is set to 100. Although the least important criterion is typically given a score of 10, this is not compulsory (see, e.g., [71]). In this study, both decision makers employ the same integer scoring redscale, ranging from 0 to 100, where higher integer values indicate a greater level of importance for the respective criteria. Once scores have been assigned to all criteria, the weight of each criterion is derived by normalizing these scores:

$$w_j = \frac{s_j}{\sum_{k=1}^{N_C} s_k}, \tag{1}$$

s_k is the score of the criterion k ($k = 1, \ldots, N_C$) and N_C is the total number of criteria. w_j is the weight of criterion j.

4.2. Description of SVN-TOPSIS

4.2.1. Neutrosophic Set

Definition 1. *Let X denote a universal space of points, where x represents a generic element in X. A neutrosophic set $N \subset X$ is defined by a truth-membership function $T_N(x)$, an indeterminacy-membership function $I_N(x)$, and a falsity-membership function $F_N(x)$. The functions $T_N(x)$, $I_N(x)$, and $F_N(x)$ are real standard as well as non-standard subsets of $[0, 1^+]$, such that they satisfy $T_N(x) \to [0, 1^+]$, $I_N(x) \to [0, 1^+]$, and $F_N(x) \to [0, 1^+]$. These three membership values must satisfy the following condition [54]:*

$$0 \leq T_N(x) + I_N(x) + F_N(x) \leq 3^+ \tag{2}$$

4.2.2. SVNS

The definition of the SVNS, together with its properties and arithmetic operations, are presented below [54].

Definition 2. *Let X denote a universal space of points, where x represents a generic element in X. An SVNS $\tilde{N} \subset X$ is defined by $T_{\tilde{N}}(x)$, $I_{\tilde{N}}(x)$, and $F_{\tilde{N}}(x)$, where $T_{\tilde{N}}(x), I_{\tilde{N}}(x), F_{\tilde{N}}(x) \in [0, 1]$ for every $x \in X$.*

$$0 \leq T_{\tilde{N}}(x) + I_{\tilde{N}}(x) + F_{\tilde{N}}(x) \leq 3 \quad \textit{for all } x \in X, \tag{3}$$

when X is continuous, an SVNS $\tilde{N}$ can be written as

$$\tilde{N} = \int_x (T_{\tilde{N}}(x), I_{\tilde{N}}(x), F_{\tilde{N}}(x)) \,|x \quad \textit{for all } x \in X, \tag{4}$$

when X is discrete, an SVNS $\tilde{N}$ can be written as

$$\tilde{N} = \sum_{x} (T_{\tilde{N}}(x), I_{\tilde{N}}(x), F_{\tilde{N}}(x)) \,|x \quad \text{for all } x \in X, \tag{5}$$

an SVN number A is denoted by

$$A = \langle a, b, c \rangle, \tag{6}$$

where $a, b, c \in [0, 1]$ and $a + b + c \leq 3$. The parameters a, b, and c represent the truth, indeterminacy, and falsity membership degrees, respectively.

Definition 3 ([72]). *Let $A_1 = \langle a_1, b_1, c_1 \rangle$ and $A_2 = \langle a_2, b_2, c_2 \rangle$ be two SVN numbers. The summation of A_1 and A_2 is defined as follows:*

$$A_1 \oplus A_2 = \langle a_1 + a_2 - a_1 a_2,\ b_1 b_2,\ c_1 c_2 \rangle. \tag{7}$$

Definition 4 ([72]). *Let $A_1 = \langle a_1, b_1, c_1 \rangle$ and $A_2 = \langle a_2, b_2, c_2 \rangle$, then the multiplication is defined as follows:*

$$A_1 \otimes A_2 = \langle a_1 a_2,\ b_1 + b_2 - b_1 b_2,\ c_1 + c_2 - c_1 c_2 \rangle. \tag{8}$$

Definition 5 ([72]). *Let $A = \langle a, b, c \rangle$ be an SVN number and $\lambda \in \mathbb{R}^+$, then*

$$\lambda A = \langle 1 - (1 - a)^{\lambda},\ b^{\lambda},\ c^{\lambda} \rangle. \tag{9}$$

Definition 6 ([73]). *Let $\{A_1, \ldots, A_Q\}$ denote a set of Q SVN numbers, where $A_j = \langle a_j, b_j, c_j \rangle$ $(j = 1, \ldots, Q)$. The SVN weighted average operator is defined as*

$$\sum_{j=1}^{Q} \lambda_j A_j = \left\langle 1 - \prod_{j=1}^{Q} (1 - a_j)^{\lambda_j},\ \prod_{j=1}^{Q} b_j^{\lambda_j},\ \prod_{j=1}^{Q} c_j^{\lambda_j} \right\rangle. \tag{10}$$

where λ_j is the weight of A_j, $\lambda_j \in [0, 1]$, and $\sum_{j=1}^{Q} \lambda_j = 1$.

Definition 7 (Euclidean distance [74]). *Let two SVNs $\tilde{A}$ and $\tilde{B}$ be*

$$\tilde{A} = \{x_k \mid (T_{\tilde{A}}(x_k), I_{\tilde{A}}(x_k), F_{\tilde{A}}(x_k)) : k = 1, \ldots, M\}$$

$$\tilde{B} = \{x_k \mid (T_{\tilde{B}}(x_k), I_{\tilde{B}}(x_k), F_{\tilde{B}}(x_k)) : k = 1, \ldots, M\},$$

for $x_k \in X$ $(k = 1, \ldots, M)$. Then, the Euclidean distance Δ_{Eucl} is given by

$$\Delta_{Eucl}(\tilde{A}, \tilde{B}) = \left[\sum_{k=1}^{M} \left\{ (T_{\tilde{A}}(x_k) - T_{\tilde{B}}(x_k))^2 + (I_{\tilde{A}}(x_k) - I_{\tilde{B}}(x_k))^2 + (F_{\tilde{A}}(x_k) - F_{\tilde{B}}(x_k))^2 \right\} \right]^{1/2}. \tag{11}$$

The normalized Euclidean distance Δ_{Eucl}^{N} is defined as

$$\Delta_{Eucl}^{N}(\tilde{A}, \tilde{B}) = \left[\frac{1}{3M} \sum_{k=1}^{M} \left\{ (T_{\tilde{A}}(x_k) - T_{\tilde{B}}(x_k))^2 + (I_{\tilde{A}}(x_k) - I_{\tilde{B}}(x_k))^2 + (F_{\tilde{A}}(x_k) - F_{\tilde{B}}(x_k))^2 \right\} \right]^{1/2}. \tag{12}$$

4.2.3. SVN-TOPSIS

The MCDM problem under the SVN-TOPSIS framework is represented in matrix form. The corresponding matrix is referred to as the decision matrix. A decision matrix D_z^d is an $m \times n$ matrix in which each element z_{ij}^d represents the performance of alternative A_i when it is evaluated with respect to decision criterion C_j, where $i = 1, \ldots, m$ and $j = 1, \ldots, n$. The relative contribution of each criterion C_j to the overall objective is captured through the

weight w_j^d. The superscript d indicates that the decision is provided by the d-th decision maker, where $d = 1, \ldots, L$. The parameters L, m, and n denote the total number of decision makers, alternatives, and criteria, respectively. The decision matrix D_z^d, corresponding to the d-th decision maker and is mathematically defined by (13).

$$D_z^d = \begin{bmatrix} z_{11}^d & z_{12}^d & z_{13}^d & \cdots & z_{1n}^d \\ z_{21}^d & z_{22}^d & z_{23}^d & \cdots & z_{2n}^d \\ \vdots & \vdots & \vdots & \ddots & \vdots \\ z_{m1}^d & z_{m2}^d & z_{m3}^d & \cdots & z_{mn}^d \end{bmatrix} \tag{13}$$

The assessment z_{ij}^d is expressed in linguistic terms in accordance with Table 2. It should be noted that each linguistic term corresponds to an SVN number [75]. The linguistic terms differ between positive and negative criteria. By definition, the positive ideal solution consists of all best attainable criterion values, whereas the negative ideal solution consists of all worst attainable criterion values.

Table 2. Linguistic terms for assessment and their corresponding SVN numbers.

Linguistic Terms for Positive Criteria	SVN Numbers	Linguistic Terms for Negative Criteria
Extremely significant (ES)	$\langle 1.00, 0.00, 0.00 \rangle$	Extremely high (EH)
Very significant (VS)	$\langle 0.90, 0.10, 0.05 \rangle$	Very high (VH)
Significant (S)	$\langle 0.80, 0.20, 0.15 \rangle$	High (H)
Moderately significant (MS)	$\langle 0.65, 0.35, 0.30 \rangle$	Moderately high (MH)
Neutral (N)	$\langle 0.50, 0.50, 0.45 \rangle$	Neutral (N)
Moderately insignificant (MI)	$\langle 0.35, 0.65, 0.60 \rangle$	Moderately low (ML)
Insignificant (I)	$\langle 0.20, 0.75, 0.80 \rangle$	Low (L)
Very insignificant (VI)	$\langle 0.10, 0.85, 0.90 \rangle$	Very low (VL)
Extremely insignificant (EI)	$\langle 0.05, 0.90, 0.95 \rangle$	Extremely low (EL)

The linguistic terms are converted into the corresponding SVN numbers using Table 2 to obtain the new decision matrix from the d-th decision maker:

$$\tilde{D}^d = \begin{bmatrix} \tilde{\eta}_{11}^d & \tilde{\eta}_{12}^d & \tilde{\eta}_{13}^d & \cdots & \tilde{\eta}_{1n}^d \\ \tilde{\eta}_{21}^d & \tilde{\eta}_{22}^d & \tilde{\eta}_{23}^d & \cdots & \tilde{\eta}_{2n}^d \\ \vdots & \vdots & \vdots & \ddots & \vdots \\ \tilde{\eta}_{m1}^d & \tilde{\eta}_{m2}^d & \tilde{\eta}_{m3}^d & \cdots & \tilde{\eta}_{mn}^d \end{bmatrix} \tag{14}$$

$\tilde{\eta}_{ij}^d$ denotes the SVN number corresponding to the linguistic term z_{ij}^d, which is obtained from the conversion given in Table 2. The SVN-TOPSIS procedure then proceeds with the following steps.

1. The individuals $\tilde{D}^d = [\tilde{\eta}_{ij}^d]_{m\times n} = [(\eta_{ij,T}^d, \eta_{ij,I}^d, \eta_{ij,F}^d)]_{m\times n}$ are combined to form a final decision matrix $\tilde{D} = [\tilde{q}_{ij}]_{m\times n} = [(q_{ij,T}, q_{ij,I}, q_{ij,F})]_{m\times n}$ using Definition 6, where

$$\tilde{q}_{ij} = \sum_{d=1}^{L} \theta^d \tilde{\eta}_{ij}^d = \left\langle 1 - \prod_{d=1}^{L} (1 - \eta_{ij,T}^d)^{\theta^d}, \prod_{d=1}^{L} (\eta_{ij,I}^d)^{\theta^d}, \prod_{d=1}^{L} (\eta_{ij,F}^d)^{\theta^d} \right\rangle \tag{15}$$

θ^d denotes the weight that reflects the reliability of the d-th decision maker within the decision-making process, with $\sum_{d=1}^{L} \theta^d = 1$. This weight is referred to as the decision maker weight. The determination of decision maker weights lies beyond the scope

of this study but can be found in a recent comprehensive survey [76]. In this study, equal θ^d is adopted. Since $L = 2$, it follows that $\theta^1 = \theta^2 = 1/2$ and

$$\theta^d = \frac{1}{L}. \tag{16}$$

2. Determine the weighted decision matrix $\tilde{U} = [\tilde{u}_{ij}]_{m\times n} = \left[u_{ij,T}, u_{ij,I}, u_{ij,F}\right]_{m\times n} = [w_j\tilde{q}_{ij}]_{m\times n}$.
w_j is the final weight for the j-th criterion and the average of the corresponding weights from all decision makers, i.e.,

$$w_j = \frac{1}{L}\sum_{d=1}^{L} w_j^d. \tag{17}$$

Based on Definition 5 above, each element in the weighted decision matrix is

$$\tilde{u}_{ij} = w_j\tilde{q}_{ij} = \left\langle 1-(1-q_{ij,T})^{w_j},\, q_{ij,I}^{w_j},\, q_{ij,F}^{w_j}\right\rangle. \tag{18}$$

3. Determine the relative neutrosophic positive ideal solution $\tilde{S}_+$ and the relative neutrosophic negative ideal solution $\tilde{S}_-$, where

$$\tilde{S}_+ = [\tilde{O}_1^+ \cdots \tilde{O}_j^+ \cdots \tilde{O}_n^+]. \tag{19}$$

$$\tilde{O}_j^+ = \langle O_{j,T}^+, O_{j,I}^+, O_{j,F}^+\rangle. \tag{20}$$

$$\tilde{S}_- = [\tilde{O}_1^- \cdots \tilde{O}_j^- \cdots \tilde{O}_n^-]. \tag{21}$$

$$\tilde{O}_j^- = \langle O_{j,T}^-, O_{j,I}^-, O_{j,F}^-\rangle. \tag{22}$$

$$O_{j,T}^+ = \begin{cases} \max\left(u_{1j,T},\cdots,u_{mj,T}\right), & j\in C_+,\\ \min\left(u_{1j,T},\cdots,u_{mj,T}\right), & j\in C_-. \end{cases} \tag{23}$$

$$O_{j,I}^+ = \begin{cases} \min\left(u_{1j,I},\cdots,u_{mj,I}\right), & j\in C_+,\\ \max\left(u_{1j,I},\cdots,u_{mj,I}\right), & j\in C_-. \end{cases} \tag{24}$$

$$O_{j,F}^+ = \begin{cases} \min\left(u_{1j,F},\cdots,u_{mj,F}\right), & j\in C_+,\\ \max\left(u_{1j,F},\cdots,u_{mj,F}\right), & j\in C_-. \end{cases} \tag{25}$$

$$O_{j,T}^- = \begin{cases} \min\left(u_{1j,T},\cdots,u_{mj,T}\right), & j\in C_+,\\ \max\left(u_{1j,T},\cdots,u_{mj,T}\right), & j\in C_-. \end{cases} \tag{26}$$

$$O_{j,I}^- = \begin{cases} \max\left(u_{1j,I},\cdots,u_{mj,I}\right), & j\in C_+,\\ \min\left(u_{1j,I},\cdots,u_{mj,I}\right), & j\in C_-. \end{cases} \tag{27}$$

$$O_{j,F}^- = \begin{cases} \max\left(u_{1j,F},\cdots,u_{mj,F}\right), & j\in C_+,\\ \min\left(u_{1j,F},\cdots,u_{mj,F}\right), & j\in C_-. \end{cases} \tag{28}$$

C_+ and C_- represent the sets of positive (benefit-type) and negative (cost-type) criteria, respectively, as specified in Table 1, where $i = 1,\ldots,m$ and $j = 1,\ldots,n$. The above formulations are used to determine the neutrosophic positive ideal solution (PIS) and the neutrosophic negative ideal solution (NIS) for each criterion by differentiating between these two types.

4. Compute the distance from each alternative i to $\tilde{S}_+$ and $\tilde{S}_-$ using (11). Of course, (12) can also be used and yields no difference because the normalizing factor $3n$ is the same for every case:

$$\Delta_{i+} = \left[\frac{1}{3n}\sum_{j=1}^{n}\left\{(u_{ij,T} - O_{j,T}^{+})^2 + (u_{ij,I} - O_{j,I}^{+})^2 + (u_{ij,F} - O_{j,F}^{+})^2\right\}\right]^{1/2} \quad (29)$$

$$\Delta_{i-} = \left[\frac{1}{3n}\sum_{j=1}^{n}\left\{(u_{ij,T} - O_{j,T}^{-})^2 + (u_{ij,I} - O_{j,I}^{-})^2 + (u_{ij,F} - O_{j,F}^{-})^2\right\}\right]^{1/2} \quad (30)$$

5. Compute the relative closeness coefficient CI_i^* of each alternative i from

$$CI_i^* = \frac{\Delta_{i-}}{\Delta_{i+} + \Delta_{i-}} \quad (31)$$

6. Arrange all alternatives in descending order according to CI_i^*. Higher values of CI_i^* indicate better alternatives.

4.3. SMART SVN-TOPSIS

SMART SVN-TOPSIS integrates the procedures of SMART and SVN-TOPSIS in a sequential manner, where SMART is applied prior to SVN-TOPSIS. The criterion weights are first obtained using SMART based on the steps outlined in Section 4.1. These weights are subsequently utilized within SVN-TOPSIS in accordance with the steps described in Section 4.2.3.

The proposed SMART SVN-TOPSIS for selecting aesthetics clinic location is demonstrated in the next section.

5. Application of Proposed Methodology

The proposed methodology is applied to a real investment problem concerning the establishment of a new medical aesthetics clinic in Bangkok. Two investors want to open a medical aesthetics clinic and consider five prospective locations. The locations include the following:

1. Chatrium Grand Bangkok, Phetchaburi Road: It is a 5-star luxury hotel and has direct access to shopping malls.
2. Siam Square, Rama I Roa: It is widely considered the heart of shopping, fashion, and youth culture in Bangkok, Thailand. It is a vibrant, high-energy area located in the Pathum Wan district, known for its unique blend of open-air shopping, trendy boutiques, and modern, high-rise malls.
3. Silom Complex, Silom Road: It is a prominent 32-story, mixed-use development located on Silom Road in the heart of Bangkok's central business district (CBD). The complex serves as a central hub, combining a Grade-A office tower with a lifestyle shopping mall.
4. Sukhumvit 50: A prominent residential and commercial street located in the Phra Khanong area of the Khlong Toei district in Bangkok, Thailand. It is known as a convenient, rapidly developing residential neighborhood situated near the On Nut BTS Skytrain station, offering easy access to both the central business district and the eastern outskirts of the city.
5. 589 Ramintra Road: This area belongs to the Fashion Island Shopping Mall. It is situated at the intersection of the Ramindra-Outer Ring Road Expressway and Highway 304.

From the location descriptions, they are all comparably competitive in terms of business locations, and it is not easy to use intuition to prioritize the locations. These locations will be referred to as alternatives A_1, A_2, A_3, A_4, and A_5, respectively.

The decision makers are composed of two investors who are businessmen with a lot of experience.

Table 3 reports the integer scores assigned by each decision maker to reflect the relative importance of criteria in SMART. Higher scores indicate greater importance. The pattern of scores already gives a quick picture of which aspects the investors prioritize before moving to the SVN-TOPSIS evaluation stage. In particular, both decision makers place relatively high emphasis on C_1 (transport accessibility), C_4 (parking size), C_6 (physical environment), and C_9 (land cost). Decision maker 1 assigns the highest score to C_5 (quality of social surroundings), implying that the perceived social surrounding is a key driver in the decision context of a medical aesthetics clinic.

Table 3. SMART scores from all decision makers.

Criterion	Decision Maker 1	Decision Maker 2
C_1	80	80
C_2	70	60
C_3	60	50
C_4	70	70
C_5	90	70
C_6	80	70
C_7	60	70
C_8	40	60
C_9	70	70

Notes: C_1–C_9 follow Table 1 (i.e., C_1: transport access, C_2: population density, C_3: facilities, C_4: parking, C_5: social surroundings, C_6: physical environment, C_7: competitors, C_8: disaster risk, C_9: land cost).

All criterion weights w_j^d according to Equation (1) are given in Table 4.

Table 4. Criterion weights from all decision makers using SMART.

Criterion	Decision Maker 1	Decision Maker 2
C_1	0.129	0.133
C_2	0.113	0.100
C_3	0.097	0.083
C_4	0.113	0.117
C_5	0.145	0.117
C_6	0.129	0.117
C_7	0.097	0.117
C_8	0.065	0.100
C_9	0.113	0.117

Notes: C_1–C_9 follow Table 3 (same criterion definitions as Table 3).

Table 4 reports the normalized SMART weights for each decision maker.

Table 5 reports the final criterion weights w_j used throughout the subsequent SVN-TOPSIS computations, obtained by averaging the two decision makers' SMART-based weights. Practically, the numbers that should be highlighted in this table are simply the larger weights, because they tell us which criteria will dominate the weighted decision matrices. In this study, the most influential criteria are C_1 (number of transportation types for reaching the location, $w_1 = 0.131$) and C_5 (quality of social surroundings, $w_5 = 0.131$), followed closely by C_6 (physical environment quality, $w_6 = 0.123$). The next-tier weights are C_4 (size of parking area, $w_4 = 0.115$) and C_9 (cost of land, $w_9 = 0.115$), which together

capture an intuitive Bangkok trade-off: more attractive and central areas may be penalized by high land cost, while cheaper land may come with weaker accessibility or quality of surroundings. Criteria such as C_2 (population density around the clinic area, $w_2 = 0.106$) and C_7 (number of similar service providers around the clinic area, $w_7 = 0.107$) play supporting roles by shaping demand potential and competitive pressure, while C_8 (natural disaster risk level, $w_8 = 0.082$) is included but is the least influential in this particular decision context. The evaluation data used in this study were obtained from two investors who plan to establish a medical aesthetics clinic in Bangkok. Both decision makers have experience in healthcare-related business and investment. They were requested to assess the importance of each criterion using the SMART technique and to evaluate each alternative location using linguistic terms. The linguistic decision matrices provided by the two decision makers are shown in Tables 6 and 7, respectively.

Table 5. Average weight w_j for each criterion.

Criterion	Description	w_j
C_1	Number of transportation types for reaching the location	0.131
C_2	Population density around the clinic area	0.106
C_3	Availability level of daily-life facilities	0.090
C_4	Size of parking area	0.115
C_5	Quality of social surroundings	0.131
C_6	Physical environment quality	0.123
C_7	Number of similar service providers around the clinic area	0.107
C_8	Natural disaster risk level	0.082
C_9	Cost of land	0.115

Notes: C_1–C_9 follow Table 1 (same criterion definitions as Table 3).

Table 6. Linguistic decision matrix from decision maker 1.

	C_1	C_2	C_3	C_4	C_5	C_6	C_7	C_8	C_9
A_1	VS	S	MS	ES	S	S	N	L	H
A_2	ES	ES	ES	S	ES	ES	EH	MH	EH
A_3	S	VS	VS	MS	VS	VS	H	N	VH
A_4	N	MS	N	N	MS	MS	ML	H	MH
A_5	MI	S	MS	MS	N	N	ML	VH	N

Notes: A_1 = Chatrium Grand Bangkok (Phetchaburi Rd), A_2 = Siam Square (Rama I Rd), A_3 = Silom Complex (Silom Rd), A_4 = Sukhumvit 50, A_5 = 589 Ramintra Rd. C_1 (number of transportation types for reaching the location), C_2 (population density around the clinic area), C_3 (availability level of daily-life facilities), C_4 (size of parking area), C_5 (quality of social surroundings), C_6 (physical environment quality), C_7 (number of similar service providers around the clinic area), C_8 (natural disaster risk level), and C_9 (cost of land) follow Table 1. Linguistic terms follow Table 2.

Table 7. Linguistic decision matrix from decision maker 2.

	C_1	C_2	C_3	C_4	C_5	C_6	C_7	C_8	C_9
A_1	S	VS	VS	N	S	S	VH	N	EH
A_2	VS	ES	VS	VS	VS	VS	H	N	EH
A_3	VS	VS	ES	ES	VS	VS	VH	H	EH
A_4	VS	S	VS	ES	S	VS	MH	H	VH
A_5	S	S	S	VS	S	S	H	H	H

Notes: A_1 = Chatrium Grand Bangkok (Phetchaburi Rd), A_2 = Siam Square (Rama I Rd), A_3 = Silom Complex (Silom Rd), A_4 = Sukhumvit 50, A_5 = 589 Ramintra Rd. C_1 (number of transportation types for reaching the location), C_2 (population density around the clinic area), C_3 (availability level of daily-life facilities), C_4 (size of parking area), C_5 (quality of social surroundings), C_6 (physical environment quality), C_7 (number of similar service providers around the clinic area), C_8 (natural disaster risk level), and C_9 (cost of land) follow Table 1. Linguistic terms follow Table 2.

Table 6 presents the linguistic assessments from decision maker 1 for each alternative and each criterion before any numerical conversion. The cells that are most informative are the consistently strong ratings under the high-weight criteria in Table 5: C_1 (number of transportation types for reaching the location), C_5 (quality of social surroundings), and C_6 (physical environment quality). In particular, A_2 (Siam Square, Rama I Rd) is repeatedly assessed at the top end (ES) on C_1 (number of transportation types for reaching the location), C_2 (population density around the clinic area), C_3 (availability level of daily-life facilities), C_5 (quality of social surroundings), and C_6 (physical environment quality), which already suggests a structurally strong position before the model even starts computing distances. In contrast, A_4 (Sukhumvit 50) and A_5 (589 Ramintra Rd) show more neutral-to-low evaluations on several benefit-type criteria, implying that they may need compensating advantages elsewhere rather than winning on the most influential criteria.

Table 7 reports the linguistic assessments from decision maker 2 in the same structure as Table 6, so differences across the two tables reflect genuine differences in judgment for the same A_i (location) under the same C_j (criterion). Again, the most meaningful signals are those appearing under high-weight criteria such as C_1 (number of transportation types for reaching the location), C_5 (quality of social surroundings), and C_6 (physical environment quality). For example, A_2 (Siam Square, Rama I Rd) is rated consistently high (VS/ES) across C_1 (number of transportation types for reaching the location), C_2 (population density around the clinic area), C_5 (quality of social surroundings), and C_6 (physical environment quality), while A_3 (Silom Complex, Silom Rd) also receives strong evaluations, especially on the surrounding and environment-related criteria, which helps explain why these two locations remain close competitors in the final ranking after aggregation and weighting.

All linguistic decision matrices are converted to numerical decision matrices (Tables 8–11) according to Table 2.

Table 8. Numerical decision matrix from decision maker 1 (positive criteria).

	C_1	C_2	C_3	C_4	C_5	C_6
A_1	$\langle 0.9, 0.1, 0.05\rangle$	$\langle 0.8, 0.2, 0.15\rangle$	$\langle 0.65, 0.35, 0.3\rangle$	$\langle 1, 0, 0\rangle$	$\langle 0.8, 0.2, 0.15\rangle$	$\langle 0.8, 0.2, 0.15\rangle$
A_2	$\langle 1, 0, 0\rangle$	$\langle 1, 0, 0\rangle$	$\langle 1, 0, 0\rangle$	$\langle 0.8, 0.2, 0.15\rangle$	$\langle 1, 0, 0\rangle$	$\langle 1, 0, 0\rangle$
A_3	$\langle 0.8, 0.2, 0.15\rangle$	$\langle 0.9, 0.1, 0.05\rangle$	$\langle 0.9, 0.1, 0.05\rangle$	$\langle 0.65, 0.35, 0.3\rangle$	$\langle 0.9, 0.1, 0.05\rangle$	$\langle 0.9, 0.1, 0.05\rangle$
A_4	$\langle 0.5, 0.5, 0.45\rangle$	$\langle 0.65, 0.35, 0.3\rangle$	$\langle 0.5, 0.5, 0.45\rangle$	$\langle 0.5, 0.5, 0.45\rangle$	$\langle 0.65, 0.35, 0.3\rangle$	$\langle 0.65, 0.35, 0.3\rangle$
A_5	$\langle 0.35, 0.65, 0.6\rangle$	$\langle 0.8, 0.2, 0.15\rangle$	$\langle 0.65, 0.35, 0.3\rangle$	$\langle 0.65, 0.35, 0.3\rangle$	$\langle 0.5, 0.5, 0.45\rangle$	$\langle 0.5, 0.5, 0.45\rangle$

Notes: A_1 = Chatrium Grand Bangkok (Phetchaburi Rd), A_2 = Siam Square (Rama I Rd), A_3 = Silom Complex (Silom Rd), A_4 = Sukhumvit 50, A_5 = 589 Ramintra Rd. C_1 (number of transportation types for reaching the location), C_2 (population density around the clinic area), C_3 (availability level of daily-life facilities), C_4 (size of parking area), C_5 (quality of social surroundings), and C_6 (physical environment quality) are positive (benefit-type) criteria. Each entry is an SVN number $\langle T, I, F\rangle$ converted from the linguistic terms in Table 2.

This table is the numerical (SVN) representation of Table 6 for positive (benefit-type) criteria C_1 (number of transportation types for reaching the location) to C_6 (physical environment quality). The point of this conversion is not to change the judgments, but to make them computable in the SVN-TOPSIS procedure. For benefit-type criteria, the cells that deserve attention are those with values close to $\langle 1, 0, 0\rangle$, because they represent the strongest possible assessment on this scale. For example, A_2 (Siam Square, Rama I Rd) reaches $\langle 1, 0, 0\rangle$ under C_1 (number of transportation types for reaching the location), C_2 (population density around the clinic area), C_3 (availability level of daily-life facilities), C_5 (quality of social surroundings), and C_6 (physical environment quality), meaning decision maker 1 views this location as outstanding across nearly the entire set of benefit-side drivers that also carry relatively high weights later on. By contrast, A_4 (Sukhumvit 50) and A_5 (589 Ramintra Rd) show more mid-range SVN numbers on the same benefit criteria,

which anticipates why they are less likely to dominate once weighting and ideal-distance calculations are applied.

Table 9. Numerical decision matrix from decision maker 1 (negative criteria).

	C_7	C_8	C_9
A_1	$\langle 0.5, 0.5, 0.45 \rangle$	$\langle 0.2, 0.75, 0.8 \rangle$	$\langle 0.8, 0.2, 0.15 \rangle$
A_2	$\langle 1, 0, 0 \rangle$	$\langle 0.65, 0.35, 0.3 \rangle$	$\langle 1, 0, 0 \rangle$
A_3	$\langle 0.8, 0.2, 0.15 \rangle$	$\langle 0.5, 0.5, 0.45 \rangle$	$\langle 0.9, 0.1, 0.05 \rangle$
A_4	$\langle 0.35, 0.65, 0.6 \rangle$	$\langle 0.8, 0.2, 0.15 \rangle$	$\langle 0.65, 0.35, 0.3 \rangle$
A_5	$\langle 0.35, 0.65, 0.6 \rangle$	$\langle 0.9, 0.1, 0.05 \rangle$	$\langle 0.5, 0.5, 0.45 \rangle$

Notes: A_1 = Chatrium Grand Bangkok (Phetchaburi Rd), A_2 = Siam Square (Rama I Rd), A_3 = Silom Complex (Silom Rd), A_4 = Sukhumvit 50, A_5 = 589 Ramintra Rd. C_7 (number of similar service providers around the clinic area), C_8 (natural disaster risk level), and C_9 (cost of land) are negative (cost-type) criteria. Each entry is an SVN number $\langle T, I, F \rangle$ converted from the linguistic terms in Table 2.

This table reports the SVN numerical evaluations from decision maker 1 for negative (cost-type) criteria C_7 (number of similar service providers around the clinic area), C_8 (natural disaster risk level), and C_9 (cost of land). The key point is that these criteria are handled as costs, meaning that the PIS/NIS logic is not identical to benefit criteria; the method explicitly accounts for the fact that lower is better in the cost dimension when defining $\tilde{S}_+$ and $\tilde{S}_-$. In practical interpretation, the most important cost-side signal later will come from C_9 (cost of land), because it carries a relatively large weight ($w_9 = 0.115$) in Table 5, so land cost can materially penalize otherwise attractive locations in the final trade-off.

Table 10. Numerical decision matrix from decision maker 2 (positive criteria).

	C_1	C_2	C_3	C_4	C_5	C_6
A_1	$\langle 0.8, 0.2, 0.15 \rangle$	$\langle 0.9, 0.1, 0.05 \rangle$	$\langle 0.9, 0.1, 0.05 \rangle$	$\langle 0.5, 0.5, 0.45 \rangle$	$\langle 0.8, 0.2, 0.15 \rangle$	$\langle 0.8, 0.2, 0.15 \rangle$
A_2	$\langle 0.9, 0.1, 0.05 \rangle$	$\langle 1, 0, 0 \rangle$	$\langle 0.9, 0.1, 0.05 \rangle$	$\langle 0.9, 0.1, 0.05 \rangle$	$\langle 0.9, 0.1, 0.05 \rangle$	$\langle 0.9, 0.1, 0.05 \rangle$
A_3	$\langle 0.9, 0.1, 0.05 \rangle$	$\langle 0.9, 0.1, 0.05 \rangle$	$\langle 1, 0, 0 \rangle$	$\langle 1, 0, 0 \rangle$	$\langle 0.9, 0.1, 0.05 \rangle$	$\langle 0.9, 0.1, 0.05 \rangle$
A_4	$\langle 0.9, 0.1, 0.05 \rangle$	$\langle 0.8, 0.2, 0.15 \rangle$	$\langle 0.9, 0.1, 0.05 \rangle$	$\langle 1, 0, 0 \rangle$	$\langle 0.8, 0.2, 0.15 \rangle$	$\langle 0.9, 0.1, 0.05 \rangle$
A_5	$\langle 0.8, 0.2, 0.15 \rangle$	$\langle 0.8, 0.2, 0.15 \rangle$	$\langle 0.8, 0.2, 0.15 \rangle$	$\langle 0.9, 0.1, 0.05 \rangle$	$\langle 0.8, 0.2, 0.15 \rangle$	$\langle 0.8, 0.2, 0.15 \rangle$

Notes: A_1 = Chatrium Grand Bangkok (Phetchaburi Rd), A_2 = Siam Square (Rama I Rd), A_3 = Silom Complex (Silom Rd), A_4 = Sukhumvit 50, A_5 = 589 Ramintra Rd. C_1 (number of transportation types for reaching the location), C_2 (population density around the clinic area), C_3 (availability level of daily-life facilities), C_4 (size of parking area), C_5 (quality of social surroundings), and C_6 (physical environment quality) are positive (benefit-type) criteria. Each entry is an SVN number $\langle T, I, F \rangle$ converted from the linguistic terms in Table 2.

Table 11. Numerical decision matrix from decision maker 2 (negative criteria).

	C_7	C_8	C_9
A_1	$\langle 0.9, 0.1, 0.05 \rangle$	$\langle 0.5, 0.5, 0.45 \rangle$	$\langle 1, 0, 0 \rangle$
A_2	$\langle 0.8, 0.2, 0.15 \rangle$	$\langle 0.5, 0.5, 0.45 \rangle$	$\langle 1, 0, 0 \rangle$
A_3	$\langle 0.9, 0.1, 0.05 \rangle$	$\langle 0.8, 0.2, 0.15 \rangle$	$\langle 1, 0, 0 \rangle$
A_4	$\langle 0.65, 0.35, 0.3 \rangle$	$\langle 0.8, 0.2, 0.15 \rangle$	$\langle 0.9, 0.1, 0.05 \rangle$
A_5	$\langle 0.8, 0.2, 0.15 \rangle$	$\langle 0.8, 0.2, 0.15 \rangle$	$\langle 0.8, 0.2, 0.15 \rangle$

Notes: A_1 = Chatrium Grand Bangkok (Phetchaburi Rd), A_2 = Siam Square (Rama I Rd), A_3 = Silom Complex (Silom Rd), A_4 = Sukhumvit 50, A_5 = 589 Ramintra Rd. C_7 (number of similar service providers around the clinic area), C_8 (natural disaster risk level), and C_9 (cost of land) are negative (cost-type) criteria. Each entry is an SVN number $\langle T, I, F \rangle$ converted from the linguistic terms in Table 2.

This table is the SVN numerical representation of Table 7 for positive criteria C_1 (number of transportation types for reaching the location) to C_6 (physical environment

quality). Read it the same way as the previous positive matrix: values close to $\langle 1, 0, 0 \rangle$ indicate very strong performance under a benefit-type criterion. Here, decision maker 2 assigns A_3 (Silom Complex, Silom Rd) a particularly strong profile on C_3 (availability level of daily-life facilities) and C_4 (size of parking area), both reaching $\langle 1, 0, 0 \rangle$, while A_2 (Siam Square, Rama I Rd) remains consistently high across nearly all benefit criteria, which is important because these patterns persist after aggregation and weighting.

This table provides the SVN numerical evaluations from decision maker 2 for cost-type criteria C_7 (number of similar service providers around the clinic area), C_8 (natural disaster risk level), and C_9 (cost of land). Together with the three earlier numerical tables, these values complete the full decision input needed for the group aggregation step. From an interpretation perspective, the main reason these cost-type tables matter is that they prevent the final ranking from being dominated purely by attractiveness on the benefit side; in particular, C_9 (cost of land) has a relatively high weight and therefore acts as a real balancing mechanism when city-center locations are compared against more peripheral alternatives.

SVN-TOPSIS then follows the steps below:

1. Determine the aggregated decision matrix (Tables 12 and 13).

Table 12 aggregates the two decision makers' SVN evaluations for benefit-type criteria, yielding a single group-level assessment for each alternative location and each positive criterion prior to the application of the final criterion weights w_j. To identify the most informative entries in this table, emphasis should be placed on cells that (i) are close to the ideal SVN value $\langle 1, 0, 0 \rangle$ and (ii) correspond to criteria with relatively large weights reported in Table 5. In this respect, A_2 (Siam Square, Rama I Rd) is distinguished by attaining $\langle 1, 0, 0 \rangle$ on C_1 (number of transportation types for reaching the location), C_2 (population density around the clinic area), C_3 (availability level of daily-life facilities), C_5 (quality of social surroundings), and C_6 (physical environment quality). This configuration subsequently contributes to a smaller distance to the neutrosophic positive ideal solution $\tilde{S}_+$ and a larger distance from the neutrosophic negative ideal solution $\tilde{S}_-$, as the alternative exhibits near-ideal performance across multiple highly weighted benefit dimensions. In parallel, A_3 (Silom Complex, Silom Rd) demonstrates particularly strong performance on C_3 (availability level of daily-life facilities) and C_4 (size of parking area), both reaching $\langle 1, 0, 0 \rangle$, while also maintaining high evaluations on C_5 (quality of social surroundings) and C_6 (physical environment quality). These combined strengths provide a coherent explanation for A_3 remaining a close competitor to A_2 in the overall ranking.

Table 12. Aggregated decision matrix (positive criteria).

	C_1	C_2	C_3	C_4	C_5	C_6
A_1	$\langle 0.859, 0.141, 0.087 \rangle$	$\langle 0.859, 0.141, 0.087 \rangle$	$\langle 0.813, 0.187, 0.122 \rangle$	$\langle 1, 0, 0 \rangle$	$\langle 0.8, 0.2, 0.15 \rangle$	$\langle 0.8, 0.2, 0.15 \rangle$
A_2	$\langle 1, 0, 0 \rangle$	$\langle 1, 0, 0 \rangle$	$\langle 1, 0, 0 \rangle$	$\langle 0.859, 0.141, 0.087 \rangle$	$\langle 1, 0, 0 \rangle$	$\langle 1, 0, 0 \rangle$
A_3	$\langle 0.859, 0.141, 0.087 \rangle$	$\langle 0.9, 0.1, 0.05 \rangle$	$\langle 1, 0, 0 \rangle$	$\langle 1, 0, 0 \rangle$	$\langle 0.9, 0.1, 0.05 \rangle$	$\langle 0.9, 0.1, 0.05 \rangle$
A_4	$\langle 0.776, 0.224, 0.15 \rangle$	$\langle 0.735, 0.265, 0.212 \rangle$	$\langle 0.776, 0.224, 0.15 \rangle$	$\langle 1, 0, 0 \rangle$	$\langle 0.735, 0.265, 0.212 \rangle$	$\langle 0.813, 0.187, 0.122 \rangle$
A_5	$\langle 0.639, 0.361, 0.3 \rangle$	$\langle 0.8, 0.2, 0.15 \rangle$	$\langle 0.735, 0.265, 0.212 \rangle$	$\langle 0.813, 0.187, 0.122 \rangle$	$\langle 0.684, 0.316, 0.260 \rangle$	$\langle 0.684, 0.316, 0.260 \rangle$

Notes: A_1 = Chatrium Grand Bangkok (Phetchaburi Rd), A_2 = Siam Square (Rama I Rd), A_3 = Silom Complex (Silom Rd), A_4 = Sukhumvit 50, A_5 = 589 Ramintra Rd. C_1 (number of transportation types for reaching the location), C_2 (population density around the clinic area), C_3 (availability level of daily-life facilities), C_4 (size of parking area), C_5 (quality of social surroundings), and C_6 (physical environment quality) are positive (benefit-type) criteria. Each entry is the aggregated SVN number $\langle T, I, F \rangle$ from the two decision makers using equal decision maker weights.

Table 13 reports the aggregated group assessment for cost-type criteria C_7 (number of similar service providers around the clinic area), C_8 (natural disaster risk level), and C_9 (cost of land). The human-readable purpose of this table is to remind us that the final ranking is not a benefit-only contest: cost-type dimensions contribute through the PIS/NIS construction and the distance calculations. In this study, C_9 (cost of land) is particularly

important because its weight ($w_9 = 0.115$) is in the top tier (Table 5), so the method must explicitly balance strong city-center advantages against potential cost penalties. This is why the final results should be interpreted through the overall closeness coefficient rather than any single criterion: the top alternatives are those that remain very strong on high-weight benefit criteria while not being overly disadvantaged once cost-type criteria are incorporated into the ideal-solution comparison.

Table 13. Aggregated decision matrix (negative criteria).

	C_7	C_8	C_9
A_1	$\langle 0.776, 0.224, 0.15 \rangle$	$\langle 0.368, 0.612, 0.6 \rangle$	$\langle 1, 0, 0 \rangle$
A_2	$\langle 1, 0, 0 \rangle$	$\langle 0.58167, 0.41833, 0.36742 \rangle$	$\langle 1, 0, 0 \rangle$
A_3	$\langle 0.859, 0.141, 0.087 \rangle$	$\langle 0.684, 0.316, 0.260 \rangle$	$\langle 1, 0, 0 \rangle$
A_4	$\langle 0.523, 0.477, 0.424 \rangle$	$\langle 0.8, 0.2, 0.15 \rangle$	$\langle 0.813, 0.187, 0.122 \rangle$
A_5	$\langle 0.639, 0.361, 0.3 \rangle$	$\langle 0.859, 0.141, 0.087 \rangle$	$\langle 0.684, 0.316, 0.260 \rangle$

Notes: A_1 = Chatrium Grand Bangkok (Phetchaburi Rd), A_2 = Siam Square (Rama I Rd), A_3 = Silom Complex (Silom Rd), A_4 = Sukhumvit 50, A_5 = 589 Ramintra Rd. C_7 (number of similar service providers around the clinic area), C_8 (natural disaster risk level), and C_9 (cost of land) are negative (cost-type) criteria. Each entry is the aggregated SVN number $\langle T, I, F \rangle$ from the two decision makers using equal decision maker weights.

2. Determine the weighted decision matrix (Tables 14 and 15).

Table 14 is obtained by applying the final criterion weights to the aggregated benefit-type matrix (Table 12). The point of this table is that it translates performance into impactful performance: differences under highly weighted criteria matter more after this step. Therefore, the most meaningful pattern to highlight is whether a location stays strong under C_1 (number of transportation types for reaching the location), C_5 (quality of social surroundings), and C_6 (physical environment quality), because these are among the highest weights in Table 5. In this regard, A_2 (Siam Square, Rama I Rd) retains the strongest possible assessments on C_1 (number of transportation types for reaching the location), C_2 (population density around the clinic area), C_3 (availability level of daily-life facilities), C_5 (quality of social surroundings), and C_6 (physical environment quality), meaning it performs extremely well exactly where the decision problem puts the most weight. Meanwhile, A_3 (Silom Complex, Silom Rd) remains extremely strong on C_3 (availability level of daily-life facilities) and C_4 (size of parking area), and it also stays competitive on C_5 (quality of social surroundings) and C_6 (physical environment quality), which is consistent with its role as the second-ranked alternative in the final closeness coefficient results.

Table 14. Weighted decision matrix (positive criteria).

	C_1	C_2	C_3	C_4	C_5	C_6
A_1	$\langle 0.226, 0.774, 0.725 \rangle$	$\langle 0.188, 0.812, 0.771 \rangle$	$\langle 0.140, 0.85989, 0.8277 \rangle$	$\langle 1, 0, 0 \rangle$	$\langle 0.190, 0.810, 0.781 \rangle$	$\langle 0.179, 0.821, 0.792 \rangle$
A_2	$\langle 1, 0, 0 \rangle$	$\langle 1, 0, 0 \rangle$	$\langle 1, 0, 0 \rangle$	$\langle 0.201, 0.799, 0.75517 \rangle$	$\langle 1, 0, 0 \rangle$	$\langle 1, 0, 0 \rangle$
A_3	$\langle 0.226, 0.774, 0.725 \rangle$	$\langle 0.217, 0.783, 0.727 \rangle$	$\langle 1, 0, 0 \rangle$	$\langle 1, 0, 0 \rangle$	$\langle 0.261, 0.740, 0.676 \rangle$	$\langle 0.246, 0.754, 0.692 \rangle$
A_4	$\langle 0.178, 0.822, 0.780 \rangle$	$\langle 0.132, 0.868, 0.848 \rangle$	$\langle 0.126, 0.874, 0.843 \rangle$	$\langle 1, 0, 0 \rangle$	$\langle 0.160, 0.840, 0.816 \rangle$	$\langle 0.186, 0.814, 0.773 \rangle$
A_5	$\langle 0.125, 0.875, 0.854 \rangle$	$\langle 0.157, 0.843, 0.817 \rangle$	$\langle 0.113, 0.887, 0.870 \rangle$	$\langle 0.175, 0.825, 0.786 \rangle$	$\langle 0.140, 0.860, 0.838 \rangle$	$\langle 0.132, 0.868, 0.847 \rangle$

Notes: A_1 = Chatrium Grand Bangkok (Phetchaburi Rd), A_2 = Siam Square (Rama I Rd), A_3 = Silom Complex (Silom Rd), A_4 = Sukhumvit 50, A_5 = 589 Ramintra Rd. C_1 (number of transportation types for reaching the location), C_2 (population density around the clinic area), C_3 (availability level of daily-life facilities), C_4 (size of parking area), C_5 (quality of social surroundings), and C_6 (physical environment quality) are positive (benefit-type) criteria. Each entry is the weighted SVN number after applying the final criterion weights w_j (Table 5).

Table 15 shows the weighted group-level SVN values for cost-type criteria, which will later determine how strongly each location is penalized (or not) when ideal solutions are constructed. The key idea to highlight here is not to read these cells as standalone winners, but to see how the cost-side criteria interact with the benefit-side strengths. In

this study, C_9 (cost of land) has a relatively high weight, so it is one of the main constraints that can prevent a location from ranking first purely on attractiveness. Consequently, the top-ranked alternatives should be interpreted as those that remain very strong on high-weight benefit criteria such as C_1 (number of transportation types for reaching the location), C_5 (quality of social surroundings), and C_6 (physical environment quality), while also not being excessively disadvantaged once cost-type criteria such as C_9 (cost of land) are accounted for in the PIS/NIS distance calculations.

Table 15. Weighted decision matrix (negative criteria).

	C_7	C_8	C_9
A_1	$\langle 0.148, 0.852, 0.817 \rangle$	$\langle 0.0370, 0.960, 0.959 \rangle$	$\langle 1, 0, 0 \rangle$
A_2	$\langle 1, 0, 0 \rangle$	$\langle 0.069, 0.931, 0.921 \rangle$	$\langle 1, 0, 0 \rangle$
A_3	$\langle 0.188, 0.812, 0.770 \rangle$	$\langle 0.090, 0.910, 0.895 \rangle$	$\langle 1, 0, 0 \rangle$
A_4	$\langle 0.0760, 0.924, 0.913 \rangle$	$\langle 0.124, 0.876, 0.856 \rangle$	$\langle 0.175, 0.825, 0.786 \rangle$
A_5	$\langle 0.103, 0.897, 0.879 \rangle$	$\langle 0.149, 0.851, 0.818 \rangle$	$\langle 0.124, 0.876, 0.857 \rangle$

Notes: A_1 = Chatrium Grand Bangkok (Phetchaburi Rd), A_2 = Siam Square (Rama I Rd), A_3 = Silom Complex (Silom Rd), A_4 = Sukhumvit 50, A_5 = 589 Ramintra Rd. C_7 (number of similar service providers around the clinic area), C_8 (natural disaster risk level), and C_9 (cost of land) are negative (cost-type) criteria. Each entry is the weighted SVN number after applying the final criterion weights w_j (Table 5).

3. Compute the relative closeness coefficient Cl_i^* (Table 16).

Table 16 reports the final SVN-TOPSIS outcome as a single index for each candidate location. A larger closeness coefficient Cl_i^* indicates that the alternative is closer to the relative neutrosophic positive ideal solution $\tilde{S}_+$ (best reference) and farther from the relative neutrosophic negative ideal solution $\tilde{S}_-$ (worst reference), and is therefore more preferable overall. The results show that A_2 (Siam Square, Rama I Road) achieves the highest Cl_i^*, followed by A_3 (Silom Complex, Silom Road) and A_4 (Sukhumvit 50), while A_5 (589 Ramintra Road) and A_1 (Chatrium Grand Bangkok, Phetchaburi Road) obtain the lowest values.

Table 16. Cl_i^*.

	Cl_i^*
A_1	0.372167
A_2	0.565146
A_3	0.458027
A_4	0.441323
A_5	0.373349

Notes: $Cl_i^* = \frac{\Delta_{i-}}{\Delta_{i+}+\Delta_{i-}}$ is the relative closeness coefficient. A_1 = Chatrium Grand Bangkok (Phetchaburi Rd), A_2 = Siam Square (Rama I Rd), A_3 = Silom Complex (Silom Rd), A_4 = Sukhumvit 50, and A_5 = 589 Ramintra Rd.

In practical terms, the high rank of A_2 (Siam Square, Rama I Road) is consistent with its strong performance on several highly weighted benefit-type criteria, especially C_1 (number of transportation types for reaching the location), C_5 (quality of social surroundings), and C_6 (physical environment quality). These criteria carry relatively large weights in Table 5 and jointly emphasize accessibility, quality of the surroundings, and the overall environmental setting, that typically matter for an urban medical aesthetics clinic. For A_3 (Silom Complex, Silom Road), its competitiveness is supported by strong evaluations on C_3 (availability level of daily-life facilities) and C_4 (size of parking area), while still maintaining favorable assessments on C_5 (quality of social surroundings) and C_6 (physical environment quality). In contrast, A_4 (Sukhumvit 50) exhibits a more balanced but less dominant profile: it does not match the top alternatives on the most influential criteria, yet it performs sufficiently well across multiple dimensions to remain in the middle of the ranking.

For the lower-ranked locations, A_5 (589 Ramintra Road) and A_1 (Chatrium Grand Bangkok, Phetchaburi Road) are comparatively farther from the ideal profile when all criteria are considered simultaneously. This outcome is typically driven by weaker performance on the high-importance benefit-type criteria such as C_1 (number of transportation types for reaching the location), C_5 (quality of social surroundings), and C_6 (physical environment quality), and/or by less favorable trade-offs under the cost-type criteria C_7 (number of similar service providers around the clinic area), C_8 (natural disaster risk level), and C_9 (cost of land). Overall, the method highlights that the ranking is shaped by a combined criterion pattern rather than by a single standout attribute.

$$A_2 > A_3 > A_4 > A_5 > A_1.$$

Based on the relative closeness coefficients, the potential locations in descending order are Siam Square, Rama I Road (A_2 = Siam Square, Rama I Road); Silom Complex, Silom Road (A_3 = Silom Complex, Silom Road); Sukhumvit 50 (A_4 = Sukhumvit 50); 589 Ramintra Road (A_5 = 589 Ramintra Road); and Chatrium Grand Bangkok, Phetchaburi Road (A_1 = Chatrium Grand Bangkok, Phetchaburi Road), respectively. It is noted that the first three locations—Siam Square, Rama I Road (A_2 = Siam Square, Rama I Road), Silom Complex, Silom Road (A_3 = Silom Complex, Silom Road), and Sukhumvit 50 (A_4 = Sukhumvit 50)—are situated along the main city-train line of Bangkok, namely the BTS Skytrain, which reinforces the role of C_1 (number of transportation types for reaching the location) as a key driver for location suitability in this context.

Apart from this remark, the first two locations—Siam Square, Rama I Road (A_2 = Siam Square, Rama I Road) and Silom Complex, Silom Road (A_3 = Silom Complex, Silom Road)—share a number of prominently similar characteristics. They are located in central business districts with high land costs, which directly relates to C_9 (cost of land); are accessible through multiple modes of transportation which links to C_1 (number of transportation types for reaching the location); and are surrounded by high-quality commercial and urban environments, which corresponds to C_5 (quality of social surroundings) and C_6 (physical environment quality). A slight difference is that the first-ranked location, Siam Square, Rama I Road (A_2 = Siam Square, Rama I Road), is the premier shopping, entertainment, and fashion district of Bangkok, whereas the second, Silom Complex, Silom Road (A_3 = Silom Complex, Silom Road), is located in the primary financial zone, often referred to as the Wall Street of Thailand. Consequently, it may not be straightforward to rank these two alternatives based solely on intuitive judgment, particularly when both are strong on the high-importance criteria C_1 (number of transportation types for reaching the location), C_5 (quality of social surroundings), and C_6 (physical environment quality), while also facing the common constraint implied by C_9 (cost of land).

To examine the robustness of the ranking results, a sensitivity analysis is conducted.

To see whether the decision maker (DM) reliability creates differences in the decision-making results, a sensitivity analysis of decision maker reliability is performed. The study is carried out by varying θ^d ($d = 1, 2$). For each combination of expert reliabilities, a sensitivity analysis with respect to the criterion weight variation is performed. A Monte Carlo simulation (MCS) of 1000 runs is carried out for each reliability combination. Uniform random samplings are taken from $[0, w_j]$ to obtain a criterion weight w_j^{isim}, where w_j is the final criterion weight of the j-th criterion (Table 5) and $isim$ indicates the $isim$-th MCS run, with $isim = 1, \ldots, 1000$. In other words, w_j^{isim} is taken as the mean of the uniform probability density function (PDF), with the lower bound equal to 0. Examples of w_j^{isim} samples are shown in Table 17.

Table 17. Examples of criterion weight samples for sensitivity analysis of DM reliability and weight variation.

$isim/w_i^{isim}$	w_1^{isim}	w_2^{isim}	w_3^{isim}	w_4^{isim}	w_5^{isim}	w_6^{isim}	w_7^{isim}	w_8^{isim}	w_9^{isim}
1	0.198	0.129	0.073	0.160	0.085	0.037	0.021	0.130	0.166
2	0.201	0.006	0.058	0.050	0.184	0.165	0.174	0.087	0.076
3	0.041	0.223	0.170	0.143	0.189	0.094	0.001	0.071	0.068
4	0.176	0.146	0.105	0.118	0.106	0.096	0.122	0.062	0.068
5	0.152	0.132	0.031	0.187	0.220	0.037	0.160	0.061	0.020
6	0.027	0.170	0.093	0.233	0.079	0.156	0.196	0.013	0.032
7	0.075	0.162	0.082	0.129	0.204	0.066	0.019	0.041	0.222
8	0.136	0.079	0.110	0.030	0.186	0.152	0.081	0.019	0.207
9	0.242	0.134	0.123	0.033	0.096	0.163	0.053	0.029	0.127
10	0.243	0.035	0.131	0.057	0.143	0.177	0.164	0.038	0.013

Each set of w_j^{isim} is used in the ranking again. The highest-priority location corresponding to every combination of DM reliabilities is reported for $isim = 1{:}10$ in Table 18.

Table 18. Samples of highest-priority location corresponding to every combination of DM reliabilities.

$isim/(\theta^1, \theta^2)$	0, 1	0.1, 0.9	0.2, 0.8	0.3, 0.7	0.4, 0.6	0.5, 0.5	0.6, 0.4	0.7, 0.3	0.8, 0.2	0.9, 0.1	1, 0
1	3	2	2	2	2	2	2	2	2	2	2
2	3	2	2	2	2	2	2	2	2	2	2
3	4	2	2	2	2	2	2	2	2	2	2
4	4	2	2	2	2	2	2	2	2	2	2
5	3	2	2	2	2	2	2	2	2	2	2
6	4	2	2	2	2	2	2	2	2	2	2
7	3	2	2	2	2	2	2	2	2	2	2
8	3	2	2	2	2	2	2	2	2	2	2
9	3	2	2	2	2	2	2	2	2	2	2
10	4	2	2	2	2	2	2	2	2	2	2

From 1000 runs of the MCS, it is found in the same manner as shown in Table 19 that Siam Square, Rama I Road has the highest priority, except for in the cases where the first investor is not at all reliable. This case represents the reliability at the boundary of the sensitivity study. Based on the reliability sensitivity analysis, it is advised that Siam Square, Rama I Road is selected.

Table 19. AHP-derived criterion weights.

Criterion	Decision Maker 1	Decision Maker 2	w_j (AHP)	w_j (SMART)
C_1	0.227	0.162	0.194	0.131
C_2	0.072	0.094	0.083	0.106
C_3	0.092	0.061	0.077	0.090
C_4	0.110	0.094	0.102	0.115
C_5	0.110	0.257	0.184	0.131
C_6	0.110	0.162	0.136	0.123
C_7	0.110	0.052	0.081	0.107
C_8	0.057	0.026	0.042	0.082
C_9	0.110	0.094	0.102	0.115

To further validate the robustness of the results, a comparison with AHP-derived weights is conducted.

It should be noted that the criterion weights from AHP and SMART are consistent with each other. The important criteria remain the number of transportation types, quality of social surroundings, and physical environment quality, followed by size of parking area and cost of land. The AHP weights are used in conjunction with the decision matrix. The

ranking results are shown in Table 20. A sensitivity analysis of decision maker reliability is also included.

Table 20. AHP SVN-TOPSIS with sensitivity analysis of decision maker reliability.

θ^1, θ^2	Ranking in Descending Order
0, 1	3, 4, 2, 5, 1
0.1, 0.9	2, 3, 4, 5, 1
0.2, 0.8	2, 3, 4, 5, 1
0.3, 0.7	2, 3, 4, 5, 1
0.4, 0.6	2, 3, 4, 5, 1
0.5, 0.5	2, 3, 4, 5, 1
0.6, 0.4	2, 3, 4, 1, 5
0.7, 0.3	2, 3, 4, 1, 5
0.8, 0.2	2, 3, 4, 1, 5
0.9, 0.1	2, 3, 4, 1, 5
1, 0	2, 1, 3, 5, 4

Therefore, it can be concluded that Siam Square, Rama I Road is the top priority in this case.

The use of SMART SVN-TOPSIS, however, results in a clear and systematic distinction between the first and second ranks by integrating the criterion weights derived from SMART with the linguistic evaluations modeled through SVN-TOPSIS. This provides an effective and efficient decision-support mechanism under circumstances involving alternatives that appear highly similar or seemingly inseparable. Another advantageous feature of SMART SVN-TOPSIS is that the methodology is scalable with respect to the number of criteria and alternatives, making it suitable for more complex real-world decision-making problems involving location selection.

6. Discussion

6.1. Implications for Theory

Location decisions play a key role in strategic logistics and business planning. The beauty industry in Thailand has experienced continuous growth over several years, and the selection of a medical aesthetics clinic location is one of the critical factors contributing to business success. This paper presents a systematic approach to selecting a medical aesthetics clinic location. SMART and SVN-TOPSIS are integrated to form a hybrid methodology for solving the location selection problem. The simplicity of weight determination using SMART and the linguistic term-based evaluation mechanism of SVN-TOPSIS facilitate alternative evaluation, particularly for non-technical decision makers. SVN-TOPSIS can handle a decision process that involves truth, indeterminacy, and falsity, whereas the traditional TOPSIS and fuzzy TOPSIS cannot.

The findings further support the theoretical perspective that location decisions influence business performance through key mechanisms, particularly accessibility, surrounding business environment, and urban amenities, which jointly affect customer reach, competitive positioning, and perceived service value.

This aligns with the broader logistics and facility location perspective, where location choices directly shape service coverage, accessibility, and operational effectiveness in urban service systems.

The findings suggest that location decisions in aesthetic healthcare can be interpreted within a broader logistics perspective, particularly in terms of accessibility, service coverage, and competitive positioning of service facilities.

6.2. Implications for Practice and Policy

The proposed SMART SVN-TOPSIS methodology is applied to a real business case in which two investors select the best clinic location from five competitive alternatives evaluated against nine criteria. The methodology not only provides a complete ranking of potential locations but also successfully distinguishes between the two top-ranked locations, that appear nearly inseparable when assessed intuitively. The results highlight that locations with strong transportation accessibility, a high-quality surrounding environment, and well-developed urban facilities tend to perform better in the overall ranking.

These results are consistent with the theoretical mechanisms discussed earlier, where accessibility enhances customer flow, while environmental quality and surrounding amenities influence customer preference and perceived value.

These findings reflect the importance of accessibility, environmental quality, and surrounding urban amenities in determining the attractiveness of medical aesthetics clinic locations in a metropolitan context such as Bangkok.

From a policy perspective, the findings suggest that urban accessibility and the quality of surrounding facilities play an important role in shaping the attractiveness of healthcare-related business locations. Policymakers and urban planners may therefore consider improving transportation connectivity, pedestrian accessibility, and urban service infrastructure in emerging commercial districts in order to promote balanced spatial development of healthcare services. In addition, clearer zoning policies and business-support infrastructure may help investors identify suitable locations for healthcare-related businesses more efficiently.

6.3. Limitations and Future Research Directions

Although the proposed methodology is not limited by the place and the number of decision makers, several limitations of the present study should be acknowledged. Firstly, the proposed methodology is an expert-based decision-making method, it is not recommended to be used by novice investors. Secondly, since the SVN-TOPSIS is a linguistic-based decision-making method, numerical data cannot be directly used in the criterion evaluation. Thirdly, the evaluation scale is limited to nine levels, i.e., EI to ES and EL to EH. The alternatives with almost identical criterion performances may not be distinguishable.

Future research may extend the present work in several directions. Firstly, the formulation of TOPSIS could be modified to support other types of neutrosophic numbers, e.g., triangular neutrosophic numbers. Secondly, the number of evaluation scales could be increased. Thirdly, the capability of Neutrosophic TOPSIS could be improved for processing both the numerical and linguistic evaluations at the same time.

7. Conclusions

This paper presents a systematic approach to selecting a medical aesthetics clinic location by integrating SMART and SVN-TOPSIS into a hybrid MCDM framework. The proposed method is capable of generating a consistent ranking of alternatives and differentiating between locations with similar evaluation characteristics. The results highlight the importance of accessibility, the surrounding environment, and urban amenities in shaping location attractiveness. The findings also support the interpretation of clinic location selection as a service facility location problem within a broader logistics perspective.

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