Research Article

Evaluating Competitive Ability of Tourism Enterprise by Using MTP-MCDM Technology for Resource-Based Viewpoint

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Tourism industry is an important industry for many countries because this industry can bring a lot of profit and worker opportunity. Tourism enterprise is the element in the tourism industry. Many scholars execute research to understand the compatibility of tourism enterprise. However, past research evaluates the compatibility ability of tourism enterprise based on tourism enterprise entire resource, but past research does not evaluate the compatibility ability of tourism enterprise in detail under consumers’ viewpoint. The goal of the work is to build the framework to evaluate the competitive ability of tourism enterprises based on tourism resource in each tourism destination. Based on this framework, tourism enterprise can understand its competitive ability in special tourism regions. Some advantages of the proposed method and future research should be taken over finally.

1. Introduction

Resource-based view (RBV) theory advocates that an enterprise can possess a long-term competitive advantage if its own internal resources have strategic value, rarity, and inimitable and are difficult to transfer [1, 2]. In the tourism industry, there are many different types of tourism resource. Some tourism resources are public goods such as landscape in tourism destination, which can attract traveler but can be considered as tourism resource for every tourism enterprise. Some tourism resources are private good such as exclusive partner. Those partners only cooperate with a single tourism enterprise, so they can be taken as exclusive tourism resource for this tourism enterprise in the tourism destination.

Each tourism enterprise has different tourism resources that have been set up in various tourism destinations. The benefits of tourism destination will be changed according to different time points. For example, Hokkaido is the popular tourism regions. However, the important activity to travel Hokkaido in spring, summer, autumn, and winter is different. Relative activity is shown in Table 1. Although Matsumae, Takinoue, Furano, Biei, Noboribetsu, Sapporo, Niseko, and Abashiri all belong to one local place in Hokkaido, the benefit of those places will be changed as the time goes by. So, each tourism enterprise invests human resource and equipment in that tourism destination. The investment performance of that tourism destination for tourism enterprise will be changed according to time points.

Travelers usually choose one tourism enterprise in order to go to Hokkaido. They will consider the characteristic of tourism destinations in Hokkaido at this time point. The attractive ability of tourism destinations has some differences among each tourism enterprise because each tourism enterprise’s investment in those destinations is different.

Therefore, the competitive ability of tourism enterprises is based on the resources of each tourism destination that belongs to specific tourism regions [3]. The overall competitive ability of the tourism enterprise will be higher than that of other enterprises in the tourism industry when the tourism enterprise has relatively sufficient resources in this tourism region.

The goal of the work is to build the framework for evaluating competitive ability of tourism enterprises based on tourism resource in each tourism destination. Based on this framework, tourism enterprise can understand its competitive ability in special tourism regions.
The execution procedure of this work is as follows. In the beginning, the resource-based view theory and tourism enterprise competitive ability relative to research will be taken over. After that, the execution process and some basic definitions of the proposed methods must be taken over in Section 3. To let the enterprise understand the proposed method, the case study will be implemented and some detailed analysis should be executed in the next section. The advantage of the proposed method, conclusion, and interesting extended research topic can be taken over finally.

2. Literature Review

Sharifabadi and Ardakani [4] integrated interpretive structural modeling (ISM) with fuzzy TOPSIS for evaluating competitive ability of tourism industry. In this research, the comprehensive framework will be designed to understand the criteria, which will affect Yazd Province tourism trend in PRC. Görener [5] applied AHP and SWOT for understanding Turkey business status in the tourism industry and judge the importance of criteria, which can influence Turkey tourism industry. Bagheri et al. [6] employed VIKOR and TOPSIS to evaluate each tourism region in Iran. Experiment results show that the excellent Iranian tourism infrastructure is Tehran in Iran.

Bire et al. [7] combined DEMATEL and fuzzy TOPSIS to evaluate tourism destination competitiveness at the regional level in East Nusa Tenggara Province from Indonesia. Gharaibeh et al. [8] analyzed that the augmented reality (AR) application influences intention for the tourism industry in Jordan. They collected 450 samples and applied Smart PLS version 3.0 to test twelve hypotheses. Research result can let us understand that aesthetics and performance expectancy were the most significant criteria, which will influence the willingness to use augmented reality application. Tleu-berdinova et al. [9] considered both internal and external factors to design tourism competitiveness indices. They applied their indices to evaluate the destination competitiveness of Kazakhstan. Agustin et al. [10] used the TTCR model and PROMETHEE-GAIA method to analyze tourism competitiveness in Indonesia. Their methods showed that health facilities and capacities were the most important ability to evaluate tourism competitiveness of villages in Indonesia.

In previous research, the scholars applied multi-criteria decision technologies to evaluate the performance of relative target. It included tourism industry, tourism enterprise, and tourism destination. However, the past method does not consider that the performance of tourism relative to target with respect to each dimension maybe needs the detailed analysis in different time points and different places. So, the motivation of the work is to design the framework for evaluating the performance of tourism relative target in more detail by considering time and space factors. This framework can overcome the gap in the traditional MCDM method, which does not consider the time and space factors.

3. Proposed Method

In the work, a novel framework could be designed for evaluating competitive ability of tourism enterprise.

3.1. Preliminary

Definition 1. Let $L$ be set as linguistic term type. Element in this set includes $L_g^a, L_g^b, \ldots, L_g^{-1}$. $g$ means the total volume of element. There are some characteristics of the element in linguistic term set [11–13].

(a) Ordered Characteristics: $L_g^b$ is better than $L_g^a$ if $a > b$.
(b) Symmetry Characteristics: let $\eta()$ is the symmetry convert function. The symmetry convert function $\eta(.)$ is given in the following equation [11, 12]:

$$\eta\left(L_g^b\right) = L_g^{a - b}.$$  \hspace{1cm} (1)

Definition 2. We defined that $\lambda()$ is function, which must be applied for linguistic translation. The linguistic translation function $\lambda()$ will translate lv to cv. $cv$ means crisp value $\epsilon[0, 1]$. $lv$ means linguistic variable. The function of $\lambda()$ is given in the following equation [11, 12]:

$$cv = \lambda\left(L_g^b\right) = \frac{f}{g - 1}.$$ \hspace{1cm} (2)

Definition 3. Let $\lambda^{-1}()$ as linguistic variable translation inverse function. The function of $\lambda^{-1}$ must translate cv into lv. The function of $\lambda^{-1}$ is given in the following equation [11, 12]:

$$\lambda^{-1}\left(cv\right) = L_{cv\ast(g-1)}^g.$$ \hspace{1cm} (3)

3.2. Execution Process. At first, the enterprise must organize enterprise competitive ability evaluation team. In the next step, some experts can be selected for inviting to enter the evaluation team.

In the beginning, the tourism enterprise provides its main competitive tourism enterprise and analysis goal

| Popular activity                              | Time  | Activity place              |
|-----------------------------------------------|-------|-----------------------------|
| Look plum blossoms and cherry blossoms         | Spring| Matsumae, Takinoue          |
| Look lavender and join festival activity      | Summer| Furano, Biei, Noboribetsu  |
| Look maple                                    | Autumn| Sapporo, Biei              |
| Sky and look iceberg                          | Winter| Niseko, Abashiri            |

Table 1: Main activity in Hokkaido at different time points.
(tourism region) to the evaluation team. The criteria and main tourism destination in the tourism region will be decided after experts take over with each other. The evaluation team will collect experts’ opinion to evaluate the performance of each tourism enterprise. The importance of each criterion under different time points and tourism destinations will be decided based on customers’ information in tourism destination. The rank of each tourism enterprise will be acquired based on the novel decision model. The relative execution process is shown in Figure 1.

3.3. Notation of Proposed Method. In general, the notation of tourism enterprise competitive ability evaluation problem is shown in Table 2 [14].

3.4. Execution Step. The process of proposed method must be executed in the following steps.

Step 1. Build the enterprise competitive ability evaluation team
Tourism enterprise must organize enterprise competitive ability evaluation team and invite some experts to evaluate the competitive ability of each enterprise in the tourism region.

Step 2. Decide competitor
Tourism enterprise should select their competitor (competitive tourism enterprise) to enterprise competitive ability evaluation team for executing follow-up evaluation.

Step 3. Decide tourism criteria and evaluation period
After experts discuss with each other, the evaluation criteria and evaluation period will be decided.

Step 4. Gather experts’ opinion
Performance of each tourism enterprise \(X_{a,b,d,y,z}\). \(X_{a,b,d,y,z}\) means \(d\)th expert’s opinion about the performance of \(a\)th enterprise with respect to \(b\)th criterion in \(p\)th time and \(q\)th tourism destination. The above opinions were expressed by experts.

Step 5. Integrate experts’ opinion
The experts’ opinion integration function is given as follows:

\[
x_{a,b,y,z} = \lambda^{-1}\left(\sum_{d=1}^{0}\lambda \left(x_{a,b,d,y,z}\right)\right).
\]  

Step 6. Collect customers’ information in tourism destination
Tourism enterprise should provide the customer volume index of each tourism destination in the tourism region to the enterprise competitive ability evaluation team.

Step 7. Normalize the customer volume index of customers’ information in tourism destination
Customer volume of each tourism destination in the tourism region should be normalized in the range between 0 and 1. The function is as follows:

\[
V_{y,z}^{N} = \frac{V_{y,z}}{\max_{a}\left(\max_{b}\left(V_{a,b}\right)\right)}
\]  

Step 8. Calculate weight of criterion combinations
Weight of criterion combinations should be executed based on the following formula:

\[
W_{b,y,z} = \frac{1}{n} \sum_{p=1}^{p} \sum_{q=1}^{q} V_{y,z}^{N}
\]  

Step 9. Calculate weighted decision matrix
Weighted performance of each tourism enterprise can be calculated by the following formula:

\[
x_{a,b,y,z}^{w} = \lambda \left(x_{a,b,y,z}\right) \ast W_{b,y,z}
\]  

Step 10. Calculate positive ideal solution (PIS) [15]
PIS can only be calculated by the following formula:

\[
P_{b,y,z} = \max_{a} \left(x_{a,b,y,z}\right).
\]  

Step 11. Calculate the negative ideal solution (NIS) [15]
NIS should only be calculated by the following formula. The formula is as follows.

\[
N_{b,y,z} = \min_{a} \left(x_{a,b,y,z}\right).
\]  

Step 12. Calculate the distance between tourism enterprise and PIS [15]

\[
\Psi_{a}^{p} = \left(\sum_{b=1}^{n} \sum_{y=1}^{p} \sum_{z=1}^{q} \left(x_{a,b,y,z} - P_{b,y,z}\right)^{2}\right)^{0.5}.
\]  

Step 13. Calculate the distance between tourism enterprise and NIS [15]

\[
\Psi_{a}^{N} = \left(\sum_{b=1}^{n} \sum_{y=1}^{p} \sum_{z=1}^{q} \left(x_{a,b,y,z} - N_{b,y,z}\right)^{2}\right)^{0.5}.
\]  

Step 14. Calculate relative closeness of tourism enterprises
The relative closeness of each tourism enterprises must be calculated by the following formula [15]:

\[
R_{a} = \frac{\Psi_{a}^{N}}{\Psi_{a}^{p} + \Psi_{a}^{N}}
\]  

4. Case Study and Detailed Analysis
In this study, we take one listed tourism enterprise in Taiwan as research target. This tourism enterprise wants to evaluate its competitive ability in the tourism region of Hokkaido. So,
the process of the proposed method must be executed in the following steps.

Step 1. Build the enterprise competitive ability evaluation team

Case tourism travel enterprise invites nine experts to organize enterprise competitive ability evaluation team. The invited experts come from the tourism industry, government, and university (refer to Table 3). So, those experts are representative to evaluate the competitive ability of each tourism enterprise.

Step 2. Decide competitor

Case enterprise selects three listed tourism enterprise as an alternative. Enterprise competitive ability evaluation team will evaluate the competitive ability of case enterprise and three listed tourism enterprise in Hokkaido. The evaluation alternative is as follows: case enterprise \( A_1 \), tourism enterprise competitor 1 \( A_2 \), tourism enterprise competitor 2 \( A_3 \), and tourism enterprise competitor 3 \( A_4 \).

Step 3. Decide tourism criteria and evaluation period

After discussing, experts decide on five criteria to evaluate the competitive of alternative. The criteria include equipment resource \( C_1 \), human resource \( C_2 \), innovation degree of activity \( C_3 \), brand image \( C_4 \), and relationship in torsion destination \( C_5 \). The evaluation period includes criteria such as

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### Table 2: Notation of tourism enterprise competitive ability evaluation problem.

| Set name                  | Notation                                                                 | Description                                                                                     |
|---------------------------|--------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| Tourism enterprise set A  | \( A = \{A_1, A_2, \ldots, A_m\} \)                                      | \( m \) means the volume of tourism enterprises. \( n \) means the volume of criteria. \( o \) means the volume of experts. \( p \) means the volume of time points. \( q \) means the volume of tourism destinations. \( S_{b,y,z} \) means the bth criterion in yth time point and zth tourism destination. \( W_{b,y,z} \) means the weight for the bth criterion in yth time point and zth tourism destination. \( x_{a,b,d,y,z} \) means dth expert’s opinion about the performance of ath enterprise with respect to bth criterion in yth time point and zth tourism destination. \( V_{y,z} \) means the customer volume in yth time point and zth tourism destination. \( D_{a} \) means ath tourism destination. |
| Criteria set C            | \( C = \{C_1, C_2, \ldots, C_n\} \)                                      |                                                                                               |
| Experts set E             | \( E = \{E_1, E_2, \ldots, E_o\} \)                                     |                                                                                               |
| Criteria combination set S| \( S = \{S_{1,1,1}, S_{1,1,2}, \ldots, S_{n,o,q}\} \)                   |                                                                                               |
| Time set T                | \( T = \{T_1, T_2, \ldots, T_p\} \)                                     |                                                                                               |
| Tourism destination set D | \( D = \{D_1, D_2, \ldots, D_q\} \)                                     |                                                                                               |
| Performance matrix X      | \( X = \{X_{1,1,1,1,1}, X_{1,1,1,1,2}, \ldots, X_{m,n,o,p,q}\} \)       |                                                                                               |
| Customer volume set V     | \( V = \{V_{1,1,1,1}, V_{1,1,1,2}, \ldots, V_{p,q}\} \)                 |                                                                                               |
Table 3: Expert information.

| Resource          | Organization               | Job position |
|-------------------|----------------------------|--------------|
| Tourism Industry  | Tourism Enterprise         | Manager      |
| Tourism Industry  | Tourism Enterprise         | Tourist guide|
| Tourism Industry  | Tourism Enterprise         | Tourist guide|
| Government        | Tourism Bureau, Ministry of Transport | Staff        |
| Government        | Tourism Bureau, Ministry of Transport | Staff        |
| Government        | Tourism Bureau, Ministry of Transport | Staff        |
| University        | Department of Tourism      | Professor    |
| University        | Department of Tourism      | Associate professor |
| University        | Department of Tourism      | Associate professor |

Table 4: Five-scale linguistic variable.

| Notation      | $L_0^5$ | $L_1^5$ | $L_2^5$ | $L_3^5$ | $L_4^5$ |
|---------------|---------|---------|---------|---------|---------|
| Linguistic variable | Extreme bad (EB) | Bad (B) | Middle (M) | Fine (F) | Extreme fine (EF) |

Table 5: Expert opinion for criterion 1.

| $S_{1,1,1}$ | $E_1$ | $E_2$ | $E_3$ | $E_4$ | $E_5$ | $E_6$ | $E_7$ | $E_8$ | $E_9$ |
|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| A_1         | F     | M     | M     | B     | M     | F     | F     | F     | B     |
| A_2         | M     | M     | F     | B     | EF    | EF    | EB    | EB    | EF    |
| A_3         | F     | M     | EF    | EF    | EB    | B     | M     | F     | EF    |
| A_4         | F     | M     | M     | M     | EB    | B     | B     | EB    | M     |

| $S_{1,1,2}$ | $E_1$ | $E_2$ | $E_3$ | $E_4$ | $E_5$ | $E_6$ | $E_7$ | $E_8$ | $E_9$ |
|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| A_1         | EB    | M     | F     | F     | EF    | B     | F     | M     | M     |
| A_2         | EF    | F     | B     | M     | F     | F     | F     | B     | EF    |
| A_3         | B     | EB    | B     | M     | M     | F     | F     | EF    | F     |
| A_4         | M     | F     | M     | M     | EF    | F     | F     | F     | EF    |

| $S_{1,1,3}$ | $E_1$ | $E_2$ | $E_3$ | $E_4$ | $E_5$ | $E_6$ | $E_7$ | $E_8$ | $E_9$ |
|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| A_1         | B     | F     | F     | M     | M     | EB    | B     | B     | F     |
| A_2         | EF    | F     | B     | M     | F     | F     | F     | B     | EB    |
| A_3         | F     | EB    | EB    | M     | B     | EF    | B     | M     | EB    |
| A_4         | EB    | EB    | F     | B     | M     | F     | F     | EF    | M     |

| $S_{1,1,4}$ | $E_1$ | $E_2$ | $E_3$ | $E_4$ | $E_5$ | $E_6$ | $E_7$ | $E_8$ | $E_9$ |
|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| A_1         | B     | B     | M     | EB    | M     | M     | M     | F     | EF    |
| A_2         | M     | B     | EB    | M     | B     | EB    | EB    | EB    | F     |
| A_3         | F     | F     | M     | F     | B     | F     | B     | B     | F     |
| A_4         | EF    | F     | B     | M     | B     | B     | B     | M     | F     |

| $S_{1,2,1}$ | $E_1$ | $E_2$ | $E_3$ | $E_4$ | $E_5$ | $E_6$ | $E_7$ | $E_8$ | $E_9$ |
|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| A_1         | EF    | F     | M     | B     | F     | EF    | EB    | B     | B     |
| A_2         | F     | M     | B     | B     | F     | EB    | F     | EF    | F     |
| A_3         | F     | M     | M     | M     | F     | M     | EB    | F     | M     |
| A_4         | EF    | F     | M     | F     | M     | B     | B     | M     | F     |

| $S_{1,2,2}$ | $E_1$ | $E_2$ | $E_3$ | $E_4$ | $E_5$ | $E_6$ | $E_7$ | $E_8$ | $E_9$ |
|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| A_1         | B     | F     | F     | M     | EF    | M     | B     | EB    | B     |
| A_2         | F     | M     | B     | EB    | EB    | EB    | B     | F     | M     |
| A_3         | F     | B     | F     | B     | B     | B     | M     | EF    | B     |
| A_4         | EB    | F     | F     | M     | F     | M     | B     | B     | M     |

| $S_{1,2,3}$ | $E_1$ | $E_2$ | $E_3$ | $E_4$ | $E_5$ | $E_6$ | $E_7$ | $E_8$ | $E_9$ |
|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| A_1         | EF    | EF    | F     | M     | B     | B     | EF    | EF    | B     |
| A_2         | B     | B     | M     | F     | F     | M     | B     | M     | B     |
| A_3         | B     | EB    | B     | EB    | EB    | M     | B     | M     | EF    |
| A_4         | EF    | M     | B     | M     | B     | EB    | EB    | EB    | M     |

| $S_{1,2,4}$ | $E_1$ | $E_2$ | $E_3$ | $E_4$ | $E_5$ | $E_6$ | $E_7$ | $E_8$ | $E_9$ |
|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| A_1         | F     | F     | EB    | EF    | B     | EB    | EF    | F     | B     |
| A_2         | F     | EB    | B     | F     | B     | M     | B     | F     | EB    |
| A_3         | M     | M     | F     | EB    | B     | M     | EF    | B     | M     |
| A_4         | M     | EB    | M     | EF    | M     | B     | EB    | F     | M     |

| $S_{1,3,1}$ | $E_1$ | $E_2$ | $E_3$ | $E_4$ | $E_5$ | $E_6$ | $E_7$ | $E_8$ | $E_9$ |
|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| A_1         | M     | B     | F     | EB    | F     | M     | M     | M     | M     |
| A_2         | EB    | EB    | EF    | EF    | B     | EF    | F     | M     | EB    |
| A_3         | M     | M     | EF    | F     | F     | F     | B     | M     | F     |
| A_4         | B     | M     | M     | F     | B     | B     | B     | B     | EB    |
Table 5: Continued.

|      | $E_1$ | $E_2$ | $E_3$ | $E_4$ | $E_5$ | $E_6$ | $E_7$ | $E_8$ | $E_9$ |
|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| $S_{1,3,2}$ | A₁ | F | B | M | M | B | B | EF | B | M |
|      | A₂ | B | EF | F | F | F | B | F | F | EB |
|      | A₃ | B | EF | M | B | F | B | M | F | EF |
|      | A₄ | EB | EB | EF | B | M | B | M | B | F |
| $S_{1,3,3}$ | A₁ | M | F | B | M | B | EF | EF | M | F | F |
|      | A₂ | B | EB | F | EB | F | F | M | EF | EB |
|      | A₃ | EF | M | M | M | EF | M | F | F | M |
|      | A₄ | EF | B | B | M | F | B | M | M | EB |
| $S_{1,3,4}$ | A₁ | B | EF | B | M | M | B | EF | M | B |
|      | A₂ | F | B | M | B | F | F | M | F | F |
|      | A₃ | F | F | M | M | M | EF | B | B | M |
|      | A₄ | B | F | M | EB | M | F | B | EF | M |
| $S_{1,4,1}$ | A₁ | B | F | M | F | B | B | F | F | M |
|      | A₂ | M | M | M | EF | B | F | F | M | F |
|      | A₃ | B | F | EF | B | B | M | M | M | F |
|      | A₄ | B | B | M | F | F | B | M | M | F |
| $S_{1,4,2}$ | A₁ | EB | EB | F | EF | F | M | F | EF | B |
|      | A₂ | F | B | F | M | B | F | F | M | F |
|      | A₃ | EB | F | B | F | B | EB | M | B |
|      | A₄ | EB | B | M | B | B | F | EF | B | M |
| $S_{1,4,3}$ | A₁ | M | M | B | F | B | M | EF | B | M |
|      | A₂ | M | M | M | EF | B | F | F | M | F |
|      | A₃ | B | M | B | EF | EF | M | B | B | B |
|      | A₄ | B | B | M | EF | B | M | B | M | M |
| $S_{1,4,4}$ | A₁ | M | B | EB | F | EF | F | M | EB | M |
|      | A₂ | M | F | M | EB | EF | M | B | B | F |
|      | A₃ | EF | F | M | M | B | EB | EF | EB | M |
|      | A₄ | B | M | EB | M | M | F | EB | M | B |

Table 6: Expert opinion for criterion 2.

|      | $E_1$ | $E_2$ | $E_3$ | $E_4$ | $E_5$ | $E_6$ | $E_7$ | $E_8$ | $E_9$ |
|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| $S_{2,1,1}$ | A₁ | F | B | B | M | B | F | M | M | F |
|      | A₂ | B | B | F | F | F | B | B | B | M |
|      | A₃ | EB | M | F | F | B | M | M | B | M |
|      | A₄ | F | F | F | M | B | EF | EB | EB | EF |
| $S_{2,1,2}$ | A₁ | M | B | B | F | F | B | F | F | EB |
|      | A₂ | EB | M | F | F | B | EB | EF | EB | EB |
|      | A₃ | M | EB | B | B | M | B | F | M | M |
|      | A₄ | M | F | B | F | EB | B | EB | M | B |
| $S_{2,1,3}$ | A₁ | M | F | F | EF | M | EF | EF | M | EF |
|      | A₂ | M | F | M | F | F | F | F | EF | M |
|      | A₃ | F | B | EB | F | F | M | B | M | F |
|      | A₄ | EF | EF | EF | EB | EF | B | EF | B | M |
| $S_{2,1,4}$ | A₁ | F | B | EB | F | B | EB | M | EB | F |
|      | A₂ | F | B | M | B | F | B | M | EB | B |
|      | A₃ | F | B | EB | M | B | B | M | B | M |
|      | A₄ | M | B | EF | B | F | M | M | F | F |
| $S_{2,2,1}$ | A₁ | EF | EB | B | EB | EF | F | B | F | M |
|      | A₂ | B | B | F | F | F | B | M | F | B |
|      | A₃ | M | F | B | B | M | M | M | F | F |
|      | A₄ | F | EF | F | B | B | F | F | B | M |
spring \((T_1)\), summer \((T_2)\), autumn \((T_3)\), and winter \((T_4)\). The destination in Hokkaido includes Matsumae \((D_1)\), Furano \((D_2)\), Sapporo \((D_3)\), and Niseko \((D_4)\).

Step 4. Gather experts’ opinion

Five-scale linguistic variable has been applied by experts (refer to Table 4) for describing opinions about the performance of tourism enterprises (refer to Tables 5–8 and 9). Compared with the 7-scale linguistic variable and the 9-scale linguistic variable, the five-scale linguistic variable is the relatively simple tool for expert to apply. Because there are too many opinions that needs expert to express and experts’ evaluation loading should be lightened, we choose the relatively simple tool (five-scale linguistic variable) to let expert express opinion.

Step 5. Integrate experts’ opinion

Formula (1) is used to integrate experts’ opinion.

Step 6. Collect customers’ information in tourism destination

Taiwan customers’ information in each tourism destination during different time points has been investigated (refer to Table 10).
Table 7: Expert opinion for criterion 3.

|     | $E_1$ | $E_2$ | $E_3$ | $E_4$ | $E_5$ | $E_6$ | $E_7$ | $E_8$ | $E_9$ |
|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| $S_{3,1,1}$ | A₁ | F | EB | EB | F | M | M | M | B | B |
|     | A₂ | M | F | B | M | M | F | B | M | F |
|     | A₃ | F | M | EF | B | M | M | F | EF | B |
|     | A₄ | EF | EB | M | EB | EB | F | EF | EB | M |
| $S_{3,1,2}$ | A₁ | F | F | F | EB | B | F | M | B | B |
|     | A₂ | M | B | M | M | F | M | B | M | M |
|     | A₃ | EB | M | F | B | M | F | M | M | EF |
|     | A₄ | F | EB | M | M | M | F | EF | EB | F |
| $S_{3,1,3}$ | A₁ | EB | EB | M | M | EB | M | F | F |
|     | A₂ | M | M | EB | M | F | M | F | B | F |
|     | A₃ | EB | F | EF | F | B | F | M | F | F |
|     | A₄ | EF | EB | M | F | EB | F | M | F |
| $S_{3,1,4}$ | A₁ | M | M | M | F | B | EF | EB | F | M |
|     | A₂ | M | M | EB | M | F | M | B | M | B |
| $S_{3,2,1}$ | A₁ | M | M | F | B | EF | EB | F | M |
|     | A₂ | M | M | EB | M | F | M | F | B | F |
|     | A₃ | EB | F | EF | F | B | F | M | F | B |
|     | A₄ | EF | EB | M | F | EB | F | M | F |
| $S_{3,2,2}$ | A₁ | B | B | F | EB | EB | F | M | B | B |
|     | A₂ | M | M | EB | EB | B | F | M | B | M |
| $S_{3,2,3}$ | A₁ | EF | F | M | F | F | F | EB | B | B |
|     | A₂ | M | F | B | EF | B | F | M | M | EF |
|     | A₃ | EB | B | EF | F | EF | M | M | F | B |
|     | A₄ | F | EB | M | B | EB | F | M | F |
| $S_{3,2,4}$ | A₁ | EF | EF | B | F | F | F | EB | B | B |
|     | A₂ | M | F | B | B | B | M | F | B | F |
| $S_{3,3,1}$ | A₁ | M | M | M | F | EF | EF | B | M | M |
|     | A₂ | M | M | EB | B | B | M | B | B | B |
| $S_{3,3,2}$ | A₁ | F | M | M | EB | B | F | M | EB | B |
|     | A₂ | B | B | M | M | M | M | EF | F | B |
| $S_{3,3,3}$ | A₁ | M | M | EF | M | M | M | B | B | B |
|     | A₂ | M | M | EB | B | B | M | M | M | M |
|     | A₃ | M | EF | F | F | F | M | B | M | M |
|     | A₄ | F | EF | M | M | M | M | B | M | M |
| $S_{3,3,4}$ | A₁ | B | B | F | F | F | F | EB | B | B |
|     | A₂ | M | F | EF | B | F | M | B | B | B |
| $S_{3,4,1}$ | A₁ | F | F | M | M | B | EB | F | B | F |
|     | A₂ | M | M | EB | M | B | EB | F | B | M |
| $S_{3,4,2}$ | A₁ | B | B | M | F | M | M | B | F | F |
|     | A₂ | EB | M | B | M | B | M | B | B | B |
| $S_{3,4,3}$ | A₁ | F | F | M | M | B | EB | F | B | F |
|     | A₂ | M | M | EB | M | B | EB | F | F | F |
| $S_{3,4,4}$ | A₁ | M | M | EF | F | M | M | M | M | M |
|     | A₂ | M | M | EF | F | M | M | M | M | M |
| $S_{3,4,5}$ | A₁ | F | EB | F | M | M | M | M | M | M |
|     | A₂ | M | M | EF | F | M | M | M | M | M |
| $S_{3,4,6}$ | A₁ | F | M | M | F | M | M | F | M | M |
|     | A₂ | B | M | F | M | M | M | M | M | M |
| $S_{3,4,7}$ | A₁ | B | M | F | M | M | M | M | M | M |
|     | A₂ | B | M | F | M | M | M | M | M | M |
Table 7: Continued.

|   | $E_1$ | $E_2$ | $E_3$ | $E_4$ | $E_5$ | $E_6$ | $E_7$ | $E_8$ | $E_9$ |
|---|---|---|---|---|---|---|---|---|---|
| $S_{3,4,3}$ | $A_1$ | $M$ | $E_F$ | $B$ | $M$ | $F$ | $M$ | $F$ | $M$ | $B$ |
|   | $A_2$ | $B$ | $B$ | $F$ | $B$ | $B$ | $B$ | $E_F$ | $M$ |   |
|   | $A_3$ | $E_F$ | $E_F$ | $F$ | $E_B$ | $F$ | $B$ | $B$ | $E_B$ | $B$ |
|   | $A_4$ | $M$ | $M$ | $B$ | $M$ | $B$ | $E_B$ | $B$ | $B$ | $F$ |
| $S_{3,4,4}$ | $A_1$ | $M$ | $B$ | $E_B$ | $E_B$ | $B$ | $B$ | $E_B$ | $E_F$ | $B$ |
|   | $A_2$ | $E_F$ | $E_F$ | $E_F$ | $E_F$ | $B$ | $F$ | $F$ | $B$ | $F$ |
|   | $A_3$ | $F$ | $B$ | $B$ | $E_F$ | $B$ | $F$ | $M$ | $E_F$ | $M$ |
|   | $A_4$ | $E_F$ | $M$ | $E_F$ | $E_M$ | $E_F$ | $E_B$ | $B$ | $B$ | $E_B$ |

Table 8: Expert opinion for criterion 4.

|   | $E_1$ | $E_2$ | $E_3$ | $E_4$ | $E_5$ | $E_6$ | $E_7$ | $E_8$ | $E_9$ |
|---|---|---|---|---|---|---|---|---|---|
| $S_{4,1,1}$ | $A_1$ | $B$ | $E_F$ | $E_F$ | $M$ | $B$ | $M$ | $F$ | $M$ | $F$ |
|   | $A_2$ | $F$ | $F$ | $F$ | $E_F$ | $E_B$ | $B$ | $F$ | $F$ | $F$ |
|   | $A_3$ | $E_F$ | $E_F$ | $F$ | $E_B$ | $F$ | $B$ | $M$ | $E_B$ |   |
|   | $A_4$ | $B$ | $M$ | $B$ | $B$ | $M$ | $B$ | $F$ | $M$ | $F$ |
| $S_{4,1,2}$ | $A_1$ | $B$ | $F$ | $F$ | $E_F$ | $E_B$ | $B$ | $F$ | $F$ | $F$ |
|   | $A_2$ | $E_B$ | $E_B$ | $E_F$ | $E_F$ | $B$ | $E_F$ | $B$ | $E_B$ | $M$ |
|   | $A_3$ | $F$ | $E_B$ | $F$ | $E_M$ | $E_E$ | $M$ | $B$ | $B$ |   |
|   | $A_4$ | $B$ | $B$ | $M$ | $M$ | $E_F$ | $M$ | $F$ | $B$ | $E_B$ |
| $S_{4,1,3}$ | $A_1$ | $F$ | $M$ | $M$ | $E_B$ | $E_F$ | $E_F$ | $F$ | $B$ | $F$ |
|   | $A_2$ | $M$ | $M$ | $E_F$ | $B$ | $E_F$ | $B$ | $E_F$ | $M$ | $E_F$ |
|   | $A_3$ | $F$ | $F$ | $M$ | $F$ | $E_E$ | $E_M$ | $B$ | $M$ | $F$ |
|   | $A_4$ | $M$ | $M$ | $B$ | $M$ | $E_F$ | $M$ | $F$ | $B$ | $E_B$ |
| $S_{4,1,4}$ | $A_1$ | $E_B$ | $M$ | $E_F$ | $B$ | $E_F$ | $B$ | $M$ | $M$ | $E_B$ |
|   | $A_2$ | $M$ | $B$ | $E_B$ | $B$ | $E_F$ | $M$ | $E_F$ | $M$ | $E_F$ |
|   | $A_3$ | $B$ | $F$ | $M$ | $M$ | $F$ | $B$ | $F$ | $M$ | $M$ |
|   | $A_4$ | $B$ | $F$ | $F$ | $E_F$ | $E_B$ | $B$ | $B$ | $B$ | $F$ |
| $S_{4,2,1}$ | $A_1$ | $E_F$ | $F$ | $F$ | $F$ | $E_F$ | $B$ | $M$ | $B$ | $F$ |
|   | $A_2$ | $M$ | $B$ | $E_B$ | $B$ | $B$ | $B$ | $M$ | $B$ | $F$ |
|   | $A_3$ | $F$ | $B$ | $M$ | $M$ | $F$ | $E_E$ | $E_M$ | $B$ | $B$ |
|   | $A_4$ | $M$ | $F$ | $F$ | $E_F$ | $E_E$ | $E_B$ | $F$ | $B$ | $B$ |
| $S_{4,2,2}$ | $A_1$ | $B$ | $F$ | $F$ | $M$ | $E_B$ | $F$ | $E_F$ | $E_B$ | $F$ |
|   | $A_2$ | $F$ | $B$ | $M$ | $B$ | $B$ | $E_F$ | $E_B$ | $F$ | $M$ |
|   | $A_3$ | $E_F$ | $E_F$ | $B$ | $B$ | $F$ | $F$ | $M$ | $F$ | $M$ |
|   | $A_4$ | $E_F$ | $M$ | $M$ | $M$ | $B$ | $E_B$ | $F$ | $B$ | $B$ |
| $S_{4,2,3}$ | $A_1$ | $F$ | $E_F$ | $M$ | $E_F$ | $E_B$ | $M$ | $F$ | $F$ | $B$ |
|   | $A_2$ | $F$ | $B$ | $M$ | $B$ | $F$ | $M$ | $B$ | $F$ | $M$ |
|   | $A_3$ | $F$ | $E_F$ | $F$ | $F$ | $M$ | $E_B$ | $E_B$ | $B$ | $M$ |
|   | $A_4$ | $F$ | $E_F$ | $M$ | $E_F$ | $E_F$ | $F$ | $M$ | $F$ | $E_F$ |
| $S_{4,2,4}$ | $A_1$ | $E_B$ | $M$ | $F$ | $B$ | $F$ | $F$ | $F$ | $E_B$ | $B$ |
|   | $A_2$ | $M$ | $B$ | $B$ | $B$ | $B$ | $B$ | $M$ | $B$ | $M$ |
|   | $A_3$ | $F$ | $F$ | $M$ | $B$ | $M$ | $M$ | $M$ | $M$ | $M$ |
|   | $A_4$ | $F$ | $M$ | $M$ | $B$ | $B$ | $E_F$ | $F$ | $F$ | $F$ |
| $S_{4,3,1}$ | $A_1$ | $B$ | $F$ | $F$ | $F$ | $B$ | $M$ | $E_B$ | $M$ | $F$ |
|   | $A_2$ | $M$ | $M$ | $B$ | $B$ | $B$ | $E_F$ | $M$ | $E_B$ | $E_B$ |
|   | $A_3$ | $E_B$ | $M$ | $M$ | $F$ | $E_E$ | $M$ | $E_F$ | $F$ | $B$ |
|   | $A_4$ | $M$ | $E_F$ | $E_B$ | $M$ | $E_F$ | $F$ | $B$ | $B$ | $B$ |
| $S_{4,3,2}$ | $A_1$ | $F$ | $E_B$ | $E_F$ | $F$ | $E_B$ | $E_B$ | $M$ | $B$ | $M$ | $F$ |
|   | $A_2$ | $M$ | $M$ | $E_B$ | $B$ | $E_B$ | $F$ | $M$ | $M$ | $E_F$ |
|   | $A_3$ | $M$ | $E_F$ | $B$ | $F$ | $E_B$ | $M$ | $E_F$ | $E_B$ | $M$ |
|   | $A_4$ | $B$ | $M$ | $E_F$ | $F$ | $M$ | $M$ | $M$ | $E_B$ | $F$ |
Table 8: Continued.

|       | $E_1$ | $E_2$ | $E_3$ | $E_4$ | $E_5$ | $E_6$ | $E_7$ | $E_8$ | $E_9$ |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| $S_{4,3,3}$ | A₁ | F | F | F | B | M | EB | M | F | M |
|       | A₂ | B | B | M | F | B | F | EF | EB | EB |
|       | A₃ | B | B | EB | B | B | B | M | M | F |
|       | A₄ | B | B | F | EF | F | F | B | EF | B | EB |
| $S_{4,3,4}$ | A₁ | EB | F | F | B | EF | F | F | F | M | EF |
|       | A₂ | F | F | M | F | EB | M | EF | B | EB |
|       | A₃ | B | EB | EF | B | B | F | EB | B | F |
|       | A₄ | F | F | M | F | M | F | M | F | EF |
| $S_{4,4,4}$ | A₁ | F | EF | M | EB | F | F | F | M | B |
|       | A₂ | M | F | B | B | B | F | F | F | B |
|       | A₃ | B | F | EF | F | EF | B | B | M | F |
|       | A₄ | F | M | M | M | M | M | M | M | M |
| $S_{4,4,2}$ | A₁ | B | B | B | EF | F | B | F | EB | F |
|       | A₂ | B | EB | F | B | F | M | B | F | F |
|       | A₃ | EF | F | EF | EB | F | F | EF | EF | B |
|       | A₄ | M | EF | F | B | EF | EF | M | M | M |
| $S_{4,4,3}$ | A₁ | B | F | M | EF | M | M | B | EF | F |
|       | A₂ | M | F | M | F | F | B | B | EB | F |
|       | A₃ | F | F | M | B | B | EB | M | M | B |
|       | A₄ | B | F | M | F | EF | F | F | M | M |
| $S_{4,4,4}$ | A₁ | M | F | B | B | M | EB | F | F | EB |
|       | A₂ | B | B | M | F | EF | M | F | B | EB |
|       | A₃ | M | F | EF | M | F | M | EB | B | F |
|       | A₄ | EB | M | F | M | F | EB | F | B | F |

Table 9: Expert opinion for criterion 5.

|       | $E_1$ | $E_2$ | $E_3$ | $E_4$ | $E_5$ | $E_6$ | $E_7$ | $E_8$ | $E_9$ |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| $S_{5,1,1}$ | A₁ | EB | M | B | F | B | M | M | B | EB |
|       | A₂ | B | EF | EB | EF | EF | EF | B | F | EF | EB |
|       | A₃ | B | B | EB | F | F | F | M | M | EF |
|       | A₄ | F | M | F | EF | EB | M | B | M | M |
| $S_{5,1,2}$ | A₁ | F | M | M | F | F | M | EF | EF | EF |
|       | A₂ | F | M | EF | EB | B | B | M | F | M |
|       | A₃ | EF | B | B | B | M | B | M | M | M |
|       | A₄ | EF | B | F | F | B | M | B | EF | B |
| $S_{5,1,3}$ | A₁ | F | B | B | M | EB | B | B | F | EF | F |
|       | A₂ | B | EB | B | M | F | B | EB | F | M |
|       | A₃ | EF | B | EF | B | EF | B | M | EF | M |
|       | A₄ | M | M | B | EF | B | B | M | M | F |
| $S_{5,1,4}$ | A₁ | EB | M | B | F | F | B | B | B | B |
|       | A₂ | M | B | F | B | B | F | M | M | EF | F |
|       | A₃ | EF | EF | F | M | M | M | F | EF | M |
|       | A₄ | M | M | EF | F | M | M | B | EF | F |
| $S_{5,2,1}$ | A₁ | F | F | F | F | F | B | M | M | M |
|       | A₂ | B | M | F | EF | M | EB | F | M | B | B |
|       | A₃ | M | M | B | EF | M | M | B | F | EF |
|       | A₄ | M | M | M | M | M | M | M | M | M |
| $S_{5,2,2}$ | A₁ | M | F | B | F | F | B | EF | EF | M |
|       | A₂ | B | M | B | B | EB | F | M | B | M |
|       | A₃ | B | M | M | M | M | EB | EB | EB | EB |
|       | A₄ | M | F | EB | M | M | M | B | EB | EB |
| $S_{5,2,3}$ | A₁ | B | F | F | M | EB | M | B | EB | B |
|       | A₂ | EB | B | M | EB | F | EB | M | F | M |
|       | A₃ | B | EF | M | B | M | EB | M | B | B |
|       | A₄ | M | B | F | B | F | EF | EF | B | EF |
Step 7. Normalize the customer volume index of customers' information in tourism destination. The customer volume of each tourism destination in the tourism region can be normalized by formula (2).

Step 8. Calculate the weight of criterion combinations. Formula (3) is applied for calculating weight of criterion combinations.

Step 9. Calculate the weighted decision matrix. The weighted decision matrix will be acquired by formula (4).

Steps 10–11. Calculate the positive ideal solution (PIS) and negative ideal solution (NIS). PIS and NIS have been acquired by formulas (5) and (6).

Steps 12–13. Calculate the distance between tourism enterprise and PIS and NIS. Formula (7) is used to calculate the distance between tourism enterprise and PIS.

Table 9: Continued.

|     | E₁ | E₂ | E₃ | E₄ | E₅ | E₆ | E₇ | E₈ | E₉ |
|-----|----|----|----|----|----|----|----|----|----|
| S₅,₂,₄ | A₁ | B  | F  | F  | F  | F  | B  | EF | B  |
|       | A₂ | M  | B  | M  | B  | M  | M  | M  | F  |
|       | A₃ | F  | EF | M  | M  | M  | M  | M  | F  |
|       | A₄ | F  | B  | F  | EB | M  | EB | EF | F  |
|       | A₅ | B  | F  | EB | M  | EB | EF | F  | B  |
| S₅,₃,₁ | A₁ | EB | EF | F  | F  | F  | B  | B  | F  |
|       | A₂ | M  | B  | F  | F  | F  | B  | F  | B  |
|       | A₃ | F  | F  | F  | F  | E  | M  | M  | M  |
|       | A₄ | F  | B  | F  | EB | M  | EB | B  | F  |
|       | A₅ | F  | B  | F  | EB | M  | EB | F  | B  |
| S₅,₃,₂ | A₁ | F  | B  | B  | EF | EB | B  | EB | B  |
|       | A₂ | M  | F  | EB | F  | F  | B  | EB | B  |
|       | A₃ | F  | B  | M  | F  | M  | E  | EF | M  |
|       | A₄ | F  | EF | F  | EF | M  | F  | EF | B  |
| S₅,₃,₃ | A₁ | F  | B  | M  | B  | EB | B  | EB | B  |
|       | A₂ | M  | B  | M  | F  | M  | M  | M  | F  |
|       | A₃ | F  | F  | M  | M  | F  | M  | E  | B  |
|       | A₄ | EB | EF | F  | EF | M  | E  | EB | F  |
| S₅,₃,₄ | A₁ | M  | F  | M  | M  | F  | E  | F  |
|       | A₂ | B  | M  | B  | M  | F  | M  | F  | E  |
|       | A₃ | M  | EF | M  | F  | M  | M  | M  | E  |
|       | A₄ | F  | B  | M  | F  | M  | M  | E  |
| S₅,₄,₁ | A₁ | M  | F  | M  | B  | F  | E  | M  | E  |
|       | A₂ | B  | M  | EB | M  | EB | B  | B  | B  |
|       | A₃ | F  | F  | M  | F  | M  | M  | M  | E  |
|       | A₄ | EB | EF | F  | EF | M  | F  | E  | B  |
| S₅,₄,₂ | A₁ | F  | M  | B  | B  | M  | B  | E  | F  |
|       | A₂ | B  | M  | EB | M  | EB | B  | B  | B  |
|       | A₃ | F  | E  | M  | B  | F  | M  | B  | F  |
|       | A₄ | EF | F  | EB | F  | E  | M  | F  | M  |
| S₅,₄,₃ | A₁ | EF | M  | M  | M  | M  | F  | F  | F  |
|       | A₂ | M  | EF | M  | EF | F  | E  | F  | E  |
|       | A₃ | B  | EF | M  | EB | M  | E  | F  | E  |
|       | A₄ | M  | EF | F  | EF | M  | F  | M  | B  |
| S₅,₄,₄ | A₁ | EF | M  | B  | B  | M  | F  | F  | F  |
|       | A₂ | B  | B  | B  | M  | F  | M  | B  | F  |
|       | A₃ | M  | B  | M  | EF | EF | B  | E  |
|       | A₄ | M  | EB | EB | EF | F  | M  | B  | F  |

Table 10: Customers' information in each tourism destination.

|     | D₁ | D₂ | D₃ | D₄ |
|-----|----|----|----|----|
| T₁  | 13235 | 4474 | 23088 | 5582 |
| T₂  | 4435 | 16409 | 26465 | 7915 |
| T₃  | 7513 | 8627 | 34248 | 4684 |
| T₄  | 5391 | 7730 | 44876 | 14344 |
Formula (8) is used to calculate the distance between tourism enterprise and NIS.

Step 14. Calculate the relative closeness of tourism enterprises

Finally, the relative closeness of tourism enterprises can be calculated by formula (9). The rank of each tourism enterprise is $A_1 > A_2 > A_3 > A_4$. The competitive ability of case enterprise is in the second rank.

5. Conclusion and Future Research

In the work, we develop a framework to evaluate the competitive ability of tourism enterprise. The advantage of the proposed method is as follows.

(1) Evaluate the competitive ability of tourism enterprise based on its resource in tourism destination

In this research, we develop a framework to evaluate the competitive ability of tourism enterprise according to tourism enterprise’s resource in tourism destination. This mechanism does not find in past research. So, tourism enterprise can understand the strong point and weak point of each tourism destination.

(2) Support tourism enterprise to make tourism activity project

The proposed model provides the framework to let tourism enterprise can understand its competitive ability in different tourism destinations under different time points. The above information can help tourism enterprise to make tourism activity project in different tourism time points.

In the future, scholar also could consider designing decision support system for tourism enterprise to apply the proposed model friendly. Besides, the relative scholar can evaluate how to execute strategic alliance among different tourism enterprises because the competitiveness of various tourism companies in the same tourist destination may vary with different seasons. The relative scholar also can try to evaluate the competitive ability of tourism enterprise by adding some dimensions such as travel hygiene control ability of enterprise, which is important after COVID-19 occurs.

Data Availability

The author states that data used in the work are collected from nine experts who come from the tourism industry, government, and university in Taiwan. Those experts are reluctant to identify themselves due to privacy concerns, but those experts agree that their opinions can be used for academic purposes, and the scholar can use the experts’ opinion, which is used in this work to do relative research.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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