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Developing a hierarchy relation with an expert decision analysis process for selecting the optimal resort type for a Taiwanese international resort park

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Abstract

This study presents a state-of-the-art review of the use of an expert decision analysis process in land-use planning and resort type selection in particular. Additionally, the expert decision analysis process was modified to quantitatively resort types; these assessments involve multiple criteria and interdependent features. This study examines the international resort park type selection in Taiwan.

Keywords: Location selection; Diamond model; Modified Delphi expert consensus process; Analytic network process

1. Introduction

This study adopts the analytic network process (ANP) for solving a resort type selection problem based on the following motivations (Saaty, 2000), characteristics of the ANP: (1) by allowing for interdependence among, the ANP goes beyond the AHP by including independent and hence considers the AHP as a special case; (2) the ANP deals with interdependence within a set of elements (inner dependence), and among different sets of elements (outer dependence); (3) the ANP is a non-linear structure that deals with sources, cycles and sinks that have a hierarchy of linear form with goals on the top level and alternatives on the bottom level (Saaty, 2000). Thus, the ANP approach is utilized to solve the evaluation and selection problem. Additionally, this study uses a numerical example to illustrate the steps in the proposed method. Base on results, we conclude that the weights of have a central role when selecting a resort type. The ANP is the generic form of the AHP, and allows for complex interdependent relationships among elements (Saaty, 2001). The proposed develop analytic network process (ANP) evaluation structure approach generates more informative and accurate results than the conventional ANP for resort type analysis. The ANP-based decision-making approach provides expert decision-makers with a valuable reference for selecting the location for an international resort park type in Taiwan.

The remainder of this paper is organized as follows. Section 1 presents the literature review of research related to Porter's diamond model and the modified Delphi expert consensus process for identifying international resort park type. Section 3 describes the modified Delphi approach and the expert ANP model, its components, and the interrelationships among location factors in detail. Section 4 applies ANP analysis to select the location for an international resort park type and ensure competitive advantage. Discussions and conclusions are presented in Section 5.

Linear programming has been utilized to solve location selection-related problems (Ross & Soland, 1980). For example, studies attempted to identify the optimal locations for international resort parks by via conventional mathematical or statistical models. In addition to legislative restrictions, policymakers and business groups seldom consider how to select an optimal location during the

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decision-making process; this shortcoming can often affect the competitiveness of a tourism advantageous position. Based on the resort development model utilized in Bali, the Taiwanese Tourism Bureau will handled site selection, feasibility assessments, and initial planning of resort areas (Tourism Bureau MOTC, 2004, 2005). These factors reflect the need for tourism planning to ensure that market demand is met.

Taiwan has enormous growth potential, as evidenced by the establishment of numerous hotels and the increasing competitiveness in the tourism sectors. Given the saturated and fiercely competitive resort service sector, selecting the incorrect location for a new hotel can significantly increase operational costs and limit future market growth.

2. Literature review

To devise a standardized operational procedure, this study adopts the well-known diamond model, introduced by Porter's in the The Competitive Advantage of Nations (1990), which affects how competitive advantages, particularly those related to developing and evaluating location selection objectives are related. The criteria for the evaluation decision model are derived an exhaustive literature review and the modified Delphi approach. After interviewing experts, the evaluation criteria hierarchy was constructed. Finally, criteria weights and rank of importance are calculated by applying the ANP procedure.

2.1. Porter's diamond model

Porter's diamond offers an organizational structure for regional development linked to a theory of competitive behavior that can accommodate the features of Taiwanese international resort parks. This study determines whether Porter's (1990) theory of competitive advantage and his 1998 analysis of the concept of business clusters is an appropriate model for a Taiwanese international resort park context.

Porter's diamond model, which consists of six elements, conceptualizes how a nation can attain success in a particular industry. Although the variables function independently, an advantage variable in one element can produce, or improve, advantage in another variable. However, an advantage variable for all elements is not necessary for industry success. Both individually and as a system, the determinants create a context within which a nation's firms are created and competed (Yetton, Davis, & Swan, 1991).

Porter's four determinants and two outside forces interact in the diamond competitive advantage model, whereas the global competitiveness of a country depends on the formation and quality of these interactions. According to Porter, the four determinants of a nation shape the environment in which local firms compete and promote or impede the creation of competitive conditions (Porter, 1990). The four determinants and the two forces are as follows:

1. *Factor conditions:* These are factors of production, such as labor resources, nature resources, capital, and infrastructure.
2. *Demand conditions:* Demand conditions emphasize the nature of consumer demand in a home country in motivating a firm to increase its competitive position. In this study, marketing division, marketing scope, and local resident attitudes are the primary factors considered under demand conditions.
3. *Firm strategy, structure and rivalries:* The conditions govern how companies are created, organized, managed, and determine the nature of domestic rivalry (Tayeb, 1996). It includes business strategies and structures, policymaker attitudes, vision and corporate social responsibility in a relevant industry.
4. *Related and supporting industries:* The presence or absence in a nation of supplier industries and related industries that are globally competitive (Tayeb, 1996). Examples of are local natural resources, local human resources, and a medical center and police station for emergencies that support products and a materials management control system and unit.
5. *Government:* Government policy has a marked influence on the success of an industry. It includes legal restrictions, government policies and the political environment.
6. *Chance:* Certain events such as disasters, technological developments, Popular media, changing market demand, and set up bilingual. Chance creates discontinuities that affect competition.

Although some components in Porter's diamond model are unoriginal, the model accurately focuses on firm strategies rather than those of countries. Porter states that firms, not nations, compete in international markets. In creating firm-specific linkages between the four determinants and two external forces, Porter's model is useful and, potentially, an accurate predictor of future trends. However, Porter's policy recommendations restrict a government's industrial and strategic trade policies rather than opening markets to foreign investment.

2.2. Modified Delphi expert consensus process

The Delphi approach accumulates and analyzes the results of anonymous experts that communicate in writing, and through discussions and feedback formats regarding a particular topic. Anonymous experts share knowledge skills, expertise and opinions until mutual consensus is attained (Chang, Wu, & Chen, 2008). The Delphi method has the following five procedures.

1. Select anonymous experts.
2. Conduct the first round of a survey.
3. Conduct the second round-a questionnaire survey.
4. Conduct the third round of a questionnaire survey.
5. Integrate expert opinions to reach consensus.

Steps (3) and (4) are typically repeated until consensus is reached on a given topic (Chang et al., 2008). Results of the literature review and expert interviews can be employed to identify all common views expressed in the survey. Furthermore, Step (2) is simplified and replaces the conventional open-style survey; this is commonly referred to as the modified Delphi method (Chang et al., 2008). This study develops a quality evaluation criterion for selecting the optimal resort type for a Taiwanese international resort park using the modified Delphi method and by conducting interviews with anonymous experts.

Murry and Hammons (1995) proposed that the modified Delphi method must summarize opinions from 10 to 30 experts. Consequently 15 experts comprised the modified Delphi method-based decision group in this study. Compared to some previous studies (Miller, 2001), the sample size in this study is relatively small (Wu, Chang, & Lin, 2007).

To minimize interference, expert group opinions are accumulated and synthesized. These 15 experts are academics of department of hotel, government planners, industry experts, and policy-makers. Expert opinions are used to identify the principal factors to be considered in quality evaluation criteria for resort type selection for a Taiwanese international resort park.

3. Analytical network process methodology

Building a computer-based system involves collecting, analyzing, structuring, validating, and interpreting information decision-makers when dealing with a particular problem (Liebowitz, 1998; Witlox, 2005). Generally, different tasks are fulfilled by different systems. ANP of measurement concerned with deriving the dominance priorities from paired comparisons of homogeneous elements with respect to a common criterion or attribute (Saaty, 1980, 1994). The ANP, which was first developed by Saaty (1980) helps establish decision models for a process containing both qualitative and quantitative components. Qualitatively, ANP decomposes a decision problem from the top overall goal to a set of manageable clusters and sub-clusters, down to the bottom level, which typically contains scenarios or alternatives. The clusters and sub-clusters can be forces, attributes, criteria, activities, or objectives. Quantitatively, ANP uses pair-wise comparisons to assign weights to elements at the cluster and sub-cluster levels, and finally calculates "global" weights for assessments at the bottom level. Each pair-wise comparison measures the relative importance or strength of elements within a cluster level using a ratio scale. One of the primary functions of the AHP is to calculate a consistency ratio to determine whether the matrices are appropriate for analysis (Saaty, 1980). However, AHP models assume that uni-directional relationships exist between elements at different decision levels in a hierarchy and uncorrelated elements within each cluster, as well as between clusters. Models that specify interdependent relationships in the AHP are inappropriate. The ANP is then developed to fill this overcome this shortcoming.

The ANP is also known as the systems-with-feedback approach (Meade & Sarkis, 1998). By incorporating interdependencies (i.e., addition of feedback loops in the model), a super-matrix is created. The super-matrix adjusts the relative weights of individual matrices to form a new overall matrix with eigenvectors of the adjusted relative weights (Meade & Sarkis, 1998). Notably, ANP utilizes a network without needing to specify levels as in a hierarchy. The primary reason for choosing the ANP as the methodology for selecting resort type operations is due to its suitability in offering solutions in a complex multi-criteria decision environment.

Fig. 2 presents the structural difference between a hierarchy and network. The elements in a node can influence some or all elements in any other node. A network can have source nodes, intermediate nodes and sink nodes. Relationships in a network are represented by arcs, and the directions of arcs indicate dependence (Saaty, 2001). Interdependency between two nodes, called outer dependence, is represented by a two-way arrow, and inner dependencies among elements in a node are represented by a looped arc (Sarkis, 2003). The procedure in the ANP has four principal steps (Meade & Sarkis, 1999; Saaty, 2001).

Step 1: Model construction and problem structuring.

The problem must be stated clearly and decomposed into a rational system, such as a network. The structure can be generated based on decision-maker opinions generated through, say, brainstorming or other methods. Fig. 2b presents an example of a network format.

Step 2: Pair-wise comparison matrices and priority vectors.

In the ANP, like the AHP, decision elements for each component are compared pair-wise with respect to their importance in terms of their control criterion, and the components are also compared pair-wise with respect to their contribution to a goal. Decision-makers are asked to

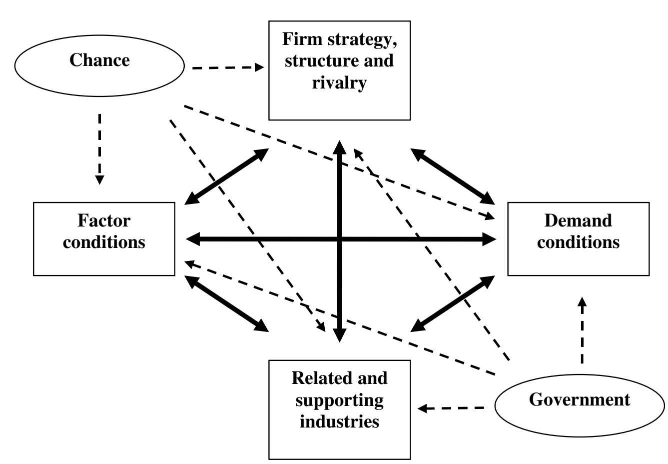

Fig. 1. Porter's diamond model showing interdependent variables that determine industrial competitiveness.

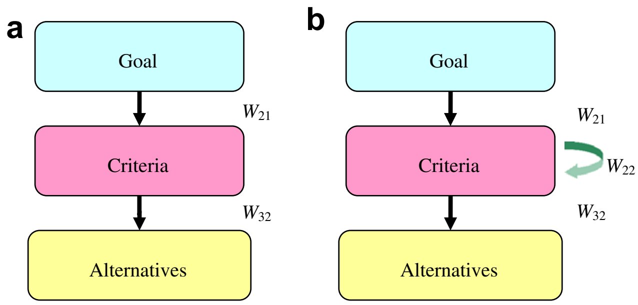

Fig. 2. Structural difference between a hierarchy and a network – (a) a hierarchy; (b) a network.

respond to a series of pair-wise comparisons in which two elements or two components are compared base don how they contribute to their particular upper level criterion (Meade & Sarkis, 1999). Additionally, when interdependencies exist among elements in a component, pair-wise comparisons must also be performed, and an eigenvector can be derived for each element that indicates the affects of other elements on that element. The relative importance values are determined on a scale of 1–9, where a score of 1 represents equal importance between two elements and a score of 9 indicates extreme importance of one element (row component in the matrix) compared to another element (column component in the matrix) (Meade & Sarkis, 1999). A reciprocal value is assigned to the inverse comparison; that is, $a_{ij} = 1/a_{ji}$; where (a_{ij}) is the importance of the ith (jth) element compared to the jth (ith) element. Like the AHP, pair-wise comparisons in the ANP are in the framework of a matrix, and a local priority vector can be derived as an estimate of relative importance associated with elements (or components) being compared by solving the following formula:

$$A \cdot w = \lambda_{\max} \cdot w, \tag{1}$$

where A is the matrix of a pair-wise comparison, w is the eigenvector, and $\lambda_{\max}$ is the largest eigenvalue of A. Saaty (1980) developed several algorithms for approximating w. In this study, the following three-step procedure is utilized to synthesize priorities (Meade & Presley, 2002).

(a) Sum the values in each column in the pair-wise comparison matrix.
(b) Divide each element in a column by the sum of its respective column. The resulting matrix is then called the normalized pair-wise comparison matrix.
(c) Sum the elements in each row of the normalized pair-wise comparison matrix, and divide the sum by the n elements in the row. These final values provide an estimate of relative priorities for compared elements with respect to the upper level criterion. Priority vectors must be derived for all comparison matrices.

Step 3: Supermatrix formation.

The supermatrix concept is similar to the Markov chain process (Saaty, 2001). To acquire global priorities in a system with interdependent influences, local priority vectors are entered in the appropriate columns of a matrix, which is known as a supermatrix. Consequently, a super-matrix is actually a partitioned matrix, in which each matrix segment represents a relationship between two nodes (components or clusters) in a system (Meade & Sarkis, 1999). Let the components of a decision system be C_k, $k = 1, 2, \ldots, N$, which has n_k elements denoted as $e_{k1}, e_{k2}, \ldots, e_{kn_k}$. The local priority vectors obtained in Step 2 are grouped and allocated to the appropriate positions in a super-matrix according to the flow of influence from one component to another, or from a component to itself as in a loop. A standard form of a super-matrix is as in the following equation (Saaty, 2001).

$$W = \begin{array}{cc} & \begin{array}{ccccc} C_1 & \cdots & C_k & \cdots & C_N \\ e_{11} \cdots e_{1n_1} & \cdots & e_{k1} \cdots e_{kn_k} & \cdots & e_{N1} \cdots e_{Nn_N} \end{array} \\ \begin{array}{cc} C_1 & \begin{array}{c} e_{11} \\ \vdots \\ e_{1n_1} \end{array} \\ \vdots & \vdots \\ C_k & \begin{array}{c} e_{k1} \\ \vdots \\ e_{kn_k} \end{array} \\ \vdots & \vdots \\ C_N & \begin{array}{c} e_{N1} \\ \vdots \\ e_{Nn_N} \end{array} \end{array} & \begin{bmatrix} W_{11} & \cdots & W_{1k} & \cdots & W_{1N} \\ \vdots & & \vdots & \ddots & \vdots \\ W_{k1} & \cdots & W_{kk} & \cdots & W_{kN} \\ \vdots & & \vdots & \ddots & \vdots \\ W_{N1} & \cdots & W_{Nk} & \cdots & W_{NN} \end{bmatrix} \end{array}, \tag{2}$$

As an example, a supermatrix representation in a hierarchy with three levels (Fig. 2a) is as follows (Saaty, 2001):

$$W_h = \begin{bmatrix} 0 & 0 & 0 \\ W_{21} & 0 & 0 \\ 0 & W_{32} & I \end{bmatrix}, \tag{3}$$

where W_{21} is a vector representing the impact of the goal on the criteria, W_{32} is a matrix representing the impact of criteria on each alternatives, I is an identity matrix, and zeros correspond to elements that have no impact.

For this example, when criteria are interrelated the hierarchy is replaced by a network Fig. 2b. The $(2,2)$ entry of W_n given by W_{22} indicates interdependency, and the supermatrix would be (Saaty, 2001)

$$W_n = \begin{bmatrix} 0 & 0 & 0 \\ W_{21} & W_{22} & 0 \\ 0 & W_{32} & I \end{bmatrix}. \tag{4}$$

Notably, any zero in the supermatrix can be replaced by a matrix when an interrelationship exists between elements in a component or between two components. As an interdependence typically exists among clusters in a network, the sum of columns in a supermatrix usually is typically greater than >1. The supermatrix must first be transformed to make it stochastic, in other words, each column in a matrix sums to unity. In other words, the row components with nonzero entries for the blocks in a given column block are compared according to their impact on the component of that column block (Saaty, 2001). An eigenvector can be obtained for a pair-wise comparison matrix of the row components with respect to the column component. This process yields an eigenvector for each column block. The first entry of the respective eigenvector for each column block is multiplied by all elements in the first block of that column, the second entry is multiplied by all elements in the second block of that column – this process continues. In this manner, the block in each column of the supermatrix is weighted the result is known as a weighted supermatrix, which is stochastic.

Raising a matrix to powers generates the long-term relative influences each elements has on each other element. To attain a convergence on importance weights, the weighted supermatrix is raised to the power of $2k + 1$, where k is an arbitrarily large number. This new matrix is called a limit supermatrix (Saaty, 2001). A limit supermatrix has the same form as a weighted supermatrix, however, all the columns in the limit supermatrix are the same. By normalizing each block of this supermatrix, the final priorities of all elements in the matrix can be derived.

Step 4: Selection of best alternatives.

When the supermatrix formed in Step 3 covers the entire network, the priority weights of alternatives are found in the column of alternatives in the normalized supermatrix. Conversely, when a supermatrix only has interrelated components, additional calculations must be performed to acquire the final priorities of alternatives. The alternative with the largest overall priority should be selected. In this study, the ANP is applied, and a supermatrix covering the entire network bracket in Fig. 3.

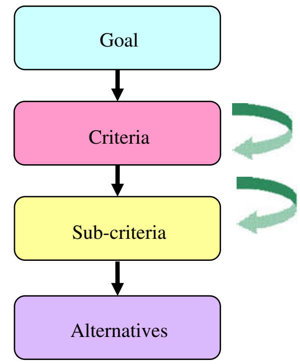

Fig. 3. Network form for this paper.

As the proposed ANP is a multi-attribute, decision-making approach based on reasoning, knowledge and experience of experts the ANP is a valuable aid for decision-making involving both tangible and intangible attributes associated with the model under study. The ANP relies on the process of eliciting managerial inputs, thereby allowing for structured communication among decision-makers. Thus, the ANP can act as a qualitative tool for strategic decision-making problems. Eddie, Cheng, and Ling (2005) applied the ANP to select the best site for a shopping mall. Wu and Lee (2007) developed an effective method based on the ANP to help companies that must assess and select knowledge management strategies. Lin, Chiu, and Tsai (2008) utilized the ANP approach to construct a dispatching model based on the characteristics of all on-site production facilities and examine the relationships among various performance indicators and the correlations between performance indicators and dispatching rules. These studies demonstrate the appropriateness of using the ANP for strategic facility resort type. Although the ANP produces a comprehensive analytic framework for solving societal, governmental, and corporate decision problems few studies have applied the ANP for selecting the location of an international resort park type. This study uses the ANP for selecting the best resort type for an international resort park in Taiwan.

4. Case implementation

Based on a review of location selection evaluations for international resort park types, this study constructed indicators for resort type selection. The modified Delphi approach is then adopted to summarize expert opinions and construct an evaluation model for location selection for international resort park types. Based on factors affecting location selection of international resort park types, i.e., factor conditions, demand conditions, firm strategy, structure and rivalry, related and supporting industries, government and chance the ANP is utilized to identify the problems and combine these six factors in establishing a hierarchy and network structure for performance evaluation. Finally, locations for international resort park type in Taiwan are the research objects in this study. According to expert opinions, four international resort park types – seaside resorts, lakeside resorts, casino resorts, and locations health/spa resorts – are considered.

The expert ANP evaluation model attempts to select the location for international resort park types in Taiwan based on competitive advantage. This process has the following steps.

Step 1: Select and define evaluative criteria and establish an ANP model.

Here, the modified Delphi approach is applied for selecting and defining evaluation criteria and sub-criteria. Finally, according to the input from 15 experts, such as academics, hotel operators, government planners, industry experts, and policy-makers, validate the six evaluation criteria and 22 evaluation sub-criteria.

The modified Delphi method is utilized to obtain criteria. Next, a general consensus among experts was reached and generated a hierarchical structure that considers the dependence of factors. The final goal of evaluating ideal resort types was achieved Fig. 4 followed by six evaluation criteria, 22 evaluation sub-criteria and finally alternatives locations for international resort parks – seaside resort types, lakeside resorts, casino resorts, and health/spa resorts – were identified.

- Factor conditions (C_1)

Factor-related conditions refer to an international resort park's investment in production, including labor resources (Agarwal & Brunt, 2006), natural resources (Gray & Liguori, 2001), capital (Agarwal & Brunt, 2006), and infrastructure (Andriotis, 2006).

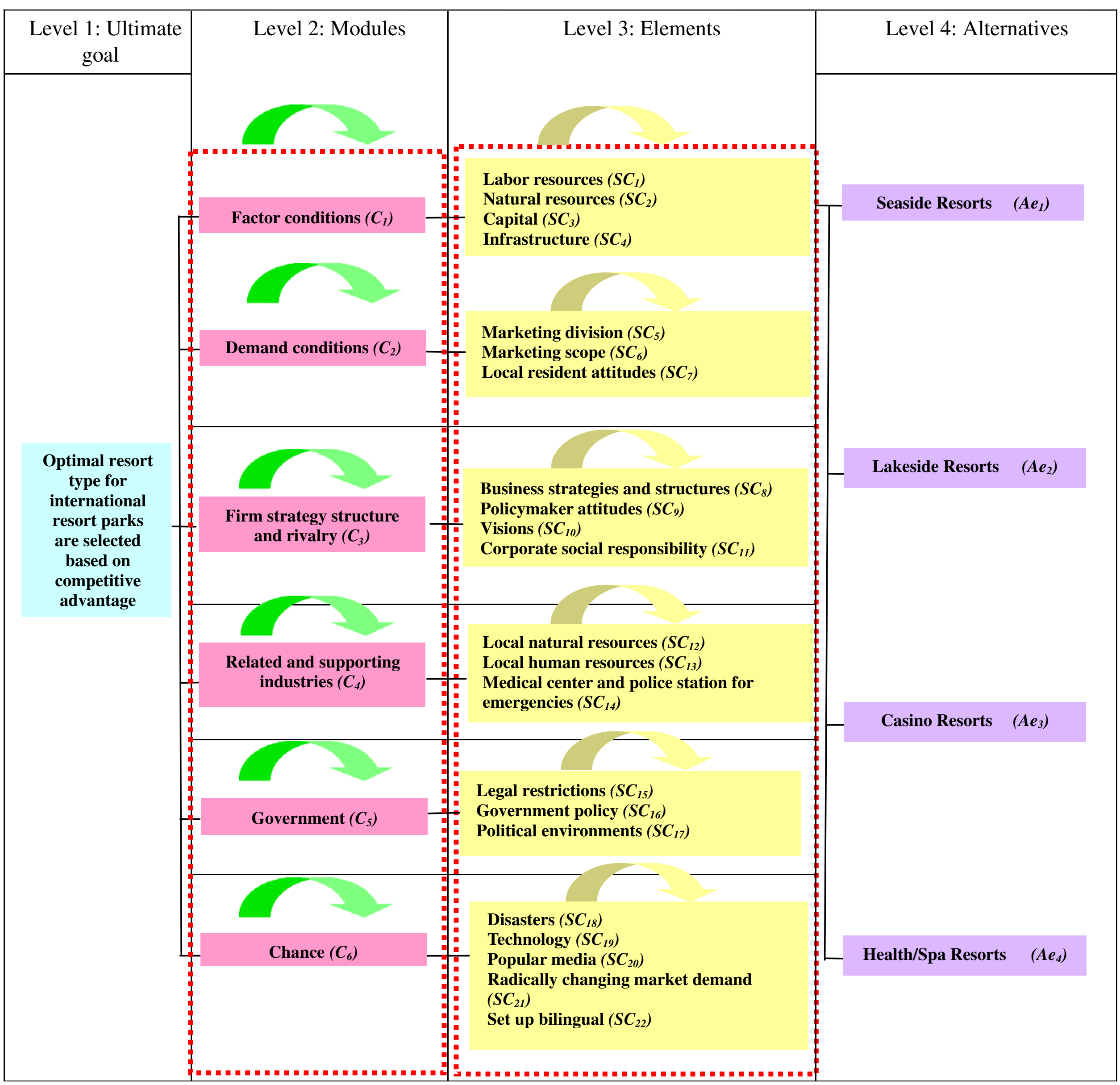

Fig. 4. Hierarchical structure to select and evaluate the optimal resort type for international resort parks with respect to competitive advantage.

1. *Labor resources (SC_1):* Demand for international resort park personnel, including those engaged in accounting, personnel management, purchasing, security, and public relations, are usually designated as staff. The quality and quantity of individuals with specialized talenteds are also considered.
2. *Natural resources (SC_2):* Assess of the physical/chemical/biological environments of land, water, and air; the ecological system, including terrestrial and aquatic species, flora, fauna, and fragile life forms, and the visual environments, such as landscapes or townscapes.
3. *Capital (SC_3):* Building an international resort park requires capital.
4. *Infrastructure (SC_4):* The access to necessary utilities, such as water, energy, transportation, and communication services.

- Demand conditions (C_2)

Factors affecting medical market demand include marketing division (Morgan & Pritchard, 1999), marketing scope (Morgan & Pritchard, 1999), and local resident attitudes (Agarwal & Brunt, 2006) – these are the principal entities considered under the demand conditions.

1. *Marketing division (SC_5):* Traditional seaside resort products are sun, sea and sand. Changing lifestyles, a focus on increasing personal needs, and active travel participation have expanded the notion of value. These have also sparked the growth of all-inclusive packages/resorts, soft adventure travel, increased numbers of health-related holidays, and an expansion of the concepts of vacation ownership and timesharing. New tourism needs have given rise to major market segments such as the family market and mature travel market and have also changed business travel.
2. *Marketing scope (SC_6):* Marketing scope includes new customers and those displaced through resort competition (improved locations, facilities, standards, prices) and other latent markets whose needs can be serviced (club memberships, convention facilities, and banqueting).
3. *Local resident attitudes (SC_7):* Resident-responsive tourism underlines the relationship between resident attitudes toward tourism as a function of the ability of residents to control and influence decision-making in their community. Resident attitudes are critical in creating hospitable and appealing environments for tourists. Local resident attitudes directly impact tourist enjoyment.

- Firm strategy, structure and rivalry (C_3)

International resort park establishment, organization, management practices and competitors all impact business strategies and structures (Porter, 1990), policymaker attitudes (Gold, 1991), visions (Smith, 2003) and corporate social responsibility (Lordkipanidze, Brezet, & Backman, 2005).

1. *Business strategies and structures (SC_8):* Assessing business competitive strategies, such as diversification versus specialization, vertical, horizontal and diagonal integration, acquisitions and mergers, strategic alliances and joint ventures, franchise contracts, management contracts, lease and ownership, branding and the internationalization or globalization of hotel chains.
2. *Policymaker attitudes (SC_9):* Individuals affecting policymaker attitudes include boards of directors (administrators), consultants (including resort park management and financial personnel) and other related professionals, such as architects, that have opinions regarding management style, such as whether management is authoritative or benevolent.
3. *Visions (SC_{10}):* Assessment of what an organization wants to be in the future. The vision statement can galvanize employee will to achieve defined objectives, even when these objectives are difficult to attain – provided the vision is SMART (Specific, Measurable, Achievable, Relevant and Timebound).
4. *Corporate social responsibility (SC_{11}):* Assessment of organizations, especially but not limited to corporations that have an obligation to consider the interests of customers, employees, shareholders, communities, and ecology in all their operations.

- Related and supporting industries (C_4)

Development of in the tourism sector and supporting sectors includes local natural resources (Andriotis, 2006), local human resources (Agarwal & Brunt, 2006), and a medical center and police station for emergency services (Mitchell, 2006).

1. *Local natural resources (SC_{12}):* Assessing the array of natural attractions ranging from beautiful countryside with its flora and fauna.
2. *Local human resources (SC_{13}):* Assessing the activities and regional cultural pastimes, such as biking, hiking, fishing, sightseeing, sailing, bird watching, golfing, touring castles, temples, cultural festivals, museums, manor houses, and aboriginal cultures.
3. *Medical center and police station for emergencies (SC_{14}):* There is a medical center and police station for emergencies in the resort park.

- Government (C_5)

International resort parks and governments cannot foresee all circumstances that would negatively impact the medical care sector and likely influence current market competition, or other constructs in the diamond theory, including legal restrictions (Reichel, Mehrez, & Altman, 1998), government policy (Shoval & Cohen-Hattab, 2001), and political environments (Andriotis, 2006).

Table 1
Aggregate pair-wise comparison matrix for criteria of level 2

Goal	C_1	C_2	C_3	C_4	C_5	C_6	Eigenvectors (weights)
C_1	1.000	0.963	1.636	2.456	1.977	2.849	0.255
C_2	1.039	1.000	1.699	2.551	2.053	2.959	0.265
C_3	0.611	0.589	1.000	1.501	1.208	1.742	0.156
C_4	0.407	0.392	0.666	1.000	0.805	1.160	0.104
C_5	0.506	0.487	0.828	1.242	1.000	1.441	0.129
C_6	0.351	0.338	0.574	0.862	0.694	1.000	0.090

Table 2
Eigenvectors (weights) for level 2 and level 3

Criteria	Weights of criteria (W_{21})	Sub-criteria	Weights of sub-criteria (W_{32})
C_1	0.255	SC_1	0.155
		SC_2	0.314
		SC_3	0.246
		SC_4	0.285
C_2	0.265	SC_5	0.329
		SC_6	0.474
		SC_7	0.197
C_3	0.156	SC_8	0.227
		SC_9	0.252
		SC_{10}	0.372
		SC_{11}	0.150
C_4	0.104	SC_{12}	0.434
		SC_{13}	0.389
		SC_{14}	0.177
C_5	0.129	SC_{15}	0.401
		SC_{16}	0.406
		SC_{17}	0.193
C_6	0.090	SC_{18}	0.177
		SC_{19}	0.245
		SC_{20}	0.143
		SC_{21}	0.290
		SC_{22}	0.146

Table 3
Eigenvectors (weights) for level 4

	W_{34}			
Alternatives	Ae_1	Ae_2	Ae_3	Ae_4
Sub-criteria				
SC_1	0.156	0.121	0.388	0.336
SC_2	0.418	0.317	0.179	0.085
SC_3	0.186	0.138	0.401	0.274
SC_4	0.248	0.184	0.325	0.243
SC_5	0.180	0.174	0.312	0.334
SC_6	0.230	0.266	0.202	0.302
SC_7	0.361	0.261	0.157	0.222
SC_8	0.127	0.087	0.448	0.338
SC_9	0.128	0.141	0.366	0.365
SC_{10}	0.153	0.117	0.449	0.281
SC_{11}	0.306	0.242	0.262	0.190
SC_{12}	0.394	0.360	0.159	0.087
SC_{13}	0.346	0.316	0.237	0.101
SC_{14}	0.181	0.113	0.388	0.318
SC_{15}	0.370	0.275	0.178	0.178
SC_{16}	0.486	0.280	0.145	0.089
SC_{17}	0.353	0.274	0.237	0.136
SC_{18}	0.463	0.308	0.147	0.082
SC_{19}	0.142	0.094	0.351	0.413
SC_{20}	0.315	0.257	0.251	0.177
SC_{21}	0.275	0.243	0.245	0.237
SC_{22}	0.216	0.148	0.366	0.270

1. *Legal restrictions (SC_{15}):* Assessment land area legislation, the availability of land for development, and the legal status of land.
2. *Government policy (SC_{16}):* Assessment of policy developments, such as The Eastern Sustainability Development Plan, Executive Yuan's Challenge 2008 National Development Plan.
3. *Political environments (SC_{17}):* Assessment of planning regulations, public investment (such as for infrastructure), partnership development, and financial incentives.

- Chance (C_6)

Assessment of governmental policies toward the establishment of international resort parks are strengthen their competitiveness. These policies include regulations covering the establishment of international resort park efforts to promote tourism network and tasks requiring assessment of an international resort park (Agarwal, 2002). Disasters (Becken, 2005), technology (Chon & Singh, 1995), popular media (Kim, Agrusa, Lee, & Chon, 2007), radically changing market demand (Lawson, 1997), and establishing a bilingual (Okumus, Okumus, & McKercher, 2007) may turn a poor situation into an advantage.

Table 4
Inner dependence matrix of criteria, W_{22}

W_{22}	C_1	C_2	C_3	C_4	C_5	C_6
C_1	0	0	0	0	0.232	0.296
C_2	0.548	0	0	0	0.296	0.316
C_3	0.280	0	0	0	0.274	0.226
C_4	0.172	0	0	0	0.199	0.163
C_5	0	0	0	0	0	0
C_6	0	0	0	0	0	0

1. *Disasters (SC_{18}):* Tourism is vulnerable to natural hazards, such as earthquakes, tsunamis, floods, droughts, and cyclones. Tourism is also adversely affected by wars. Examples of detrimental events are the political coup in Fiji in 2000, the terrorist attack in the United States on September 11, 2001, the Bali attack in 2002, and the outbreak of Severe Acute Respiratory Syndrome in Asia in 2003.
2. *Technology (SC_{19}):* Advances in technology have contributed to a favorable tourism experience and affected the way resorts market to business and leisure travelers.
3. *Popular media (SC_{20}):* Television (TV) is one of the most popular and influential vehicles for attracting the attention diverse populations. Among the various studies that have mentioned the power of TV affecting contemporary social life, some have focused on the impacts TV programs have on location from a tourism-marketing standpoint. These studies indicate that movies can be a beneficial vehicle for vicarious satisfaction for tourists, a satisfaction that does not require tourist to incur the costs related to travel, time, and health. The effects of films on tourist flow in tourism literature have been widely discussed in terms of economic impacts, intangible benefits, negative impacts, and symbolic meaning and value.
4. *Radically changing market demand (SC_{21}):* An increasing population in a region often decreases tourism, e.g., SARS, subsequently created a dramatic reduction in demand for the local tourism markets.

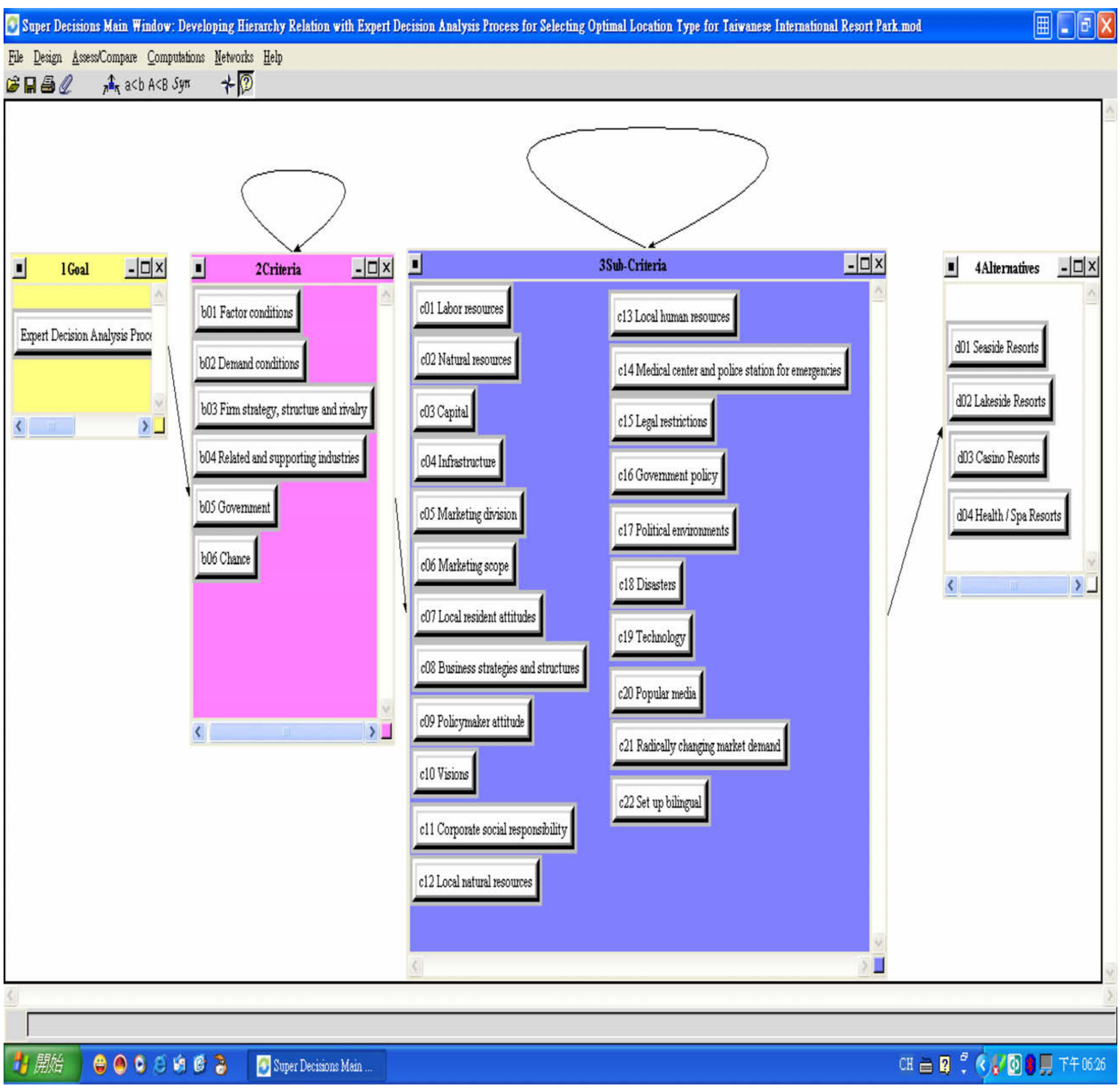

Fig. 5. Analytic network process hierarchical structure with computer-based system.

5. *Set up bilingual (SC_{22}):* To eliminate language barriers, domestic resort parks can utilize bilingual placards and pamphlets. Set up bilingual is based on written or visual materials, including booklets, newspapers, magazines, brochures, advertisements, films, official documents, video tapes, photographs and web pages, that can provide rich information about tourism destinations in two languages.

The focus of resort development in Taiwan is mixed-use destination resorts in seaside resorts, lakeside resorts, casino resorts, or health/spa resorts locations with golf and other recreational amenities, luxury lodging, health spas, marinas and other attractions. First, the seaside resort have scenic beaches favorable weather conditions, outstanding recreational facilities, or easy accessibility by air or car, unfortunately fall victim to their own excessive popularity and become saturated in terms of development. Examples of saturated resort destinations typically cited by the travel media are Waikiki Beach in Hawaii, Miami Beach in Florida, and the Rivera in Italy and France. Secondly, the lakeside resort sites may front lakes directly or provide elevated views with convenient access to the waterfront activities (Lawson, 1997), the visitors are traveling by steamboat reach resort park. Thirdly, the casino resorts that operates a casino as its primary profit center offer deluxe accommodations, a wide range and variety of restaurants and cocktail lounges, dinner showrooms, convention facilities, meeting space, entertainment, and health and recreational facilities to complement the dining, drinking, entertainment, shopping, and of course, gambling, than would be found in a conventional type of resort as Las Vegas, Reno, and Atlantic City. Finally, the health/spa resort derives from the therapeutic benefits of local mineral springs and other related forms of treatment as Saratoga springs, Europe and Japan (Gee, 1996; Lawson, 1997).

Step 2: Establish a pair-wise comparison matrix and determine eigenvectors.

The weights of level 2 and level 3 are then determined for a sample group of 22 factors matching the above characteristics with each respondent who makes a pair-wise comparison of the decision elements and assigning relative scores. The relative scores provided by 15 experts are summed using the geometric mean method. Table 1 presents the aggregate pair-wise comparison matrix for the criteria. The eigenvectors for levels 2–3 (Table 2) include the respective weights of the six evaluative criteria (W_{21}) and the respective weights of the 22 evaluative sub-criteria (W_{32}). We assume no interdependence exists among criteria and sub-criteria, thus, criteria and sub-criteria should be emphasize when determining their respective upper-level criterion. The priorities for the criteria, W_{34}; Table 3 presents the weights of the 22 sub-criteria in level 4.

Table 5
Inner dependence matrix of sub-criteria, W_{33}

W_{33}	SC_1	SC_2	SC_3	SC_4	SC_5	SC_6	SC_7	SC_8	SC_9	SC_{10}	SC_{11}	SC_{12}	SC_{13}	SC_{14}	SC_{15}	SC_{16}	SC_{17}	SC_{18}	SC_{19}	SC_{20}	SC_{21}	SC_{22}
SC_1	0	0	0.090	0	0	0	0.067	0.083	0	0	0	0.007	0.046	0	0.046	0	0	0.016	0.113	0	0.017	0.065
SC_2	0.041	0	0.179	0.279	0	0	0	0.040	0	0	0	0.237	0.035	0	0.200	0	0	0	0.026	0	0.065	0.007
SC_3	0.261	0	0	0	0	0.194	0	0.346	0	0.228	0	0.015	0.049	0	0	0	0	0.083	0.206	0	0.007	0.048
SC_4	0.126	0.182	0.217	0	0.110	0.146	0.085	0.048	0	0.064	0	0.163	0.075	0	0	0	0	0.368	0.252	0	0.043	0.023
SC_5	0	0	0	0.131	0	0	0	0.187	0	0.219	0	0	0.085	0	0	0	0	0.014	0	0	0.362	0.158
SC_6	0	0	0.259	0	0	0	0	0.163	0	0.244	0	0.031	0.150	0	0.121	0	0	0.017	0.114	0	0.056	0.140
SC_7	0.208	0.170	0	0	0.034	0	0	0.008	0	0.015	0	0.091	0.228	0	0.176	0	0	0.044	0	0	0	0
SC_8	0	0.085	0	0	0.160	0.038	0.074	0	0	0.073	0	0.009	0.015	0	0.076	0	0	0	0.207	0	0.024	0.190
SC_9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SC_{10}	0	0	0.171	0.097	0.356	0.118	0.102	0	0	0	0	0	0.103	0	0	0	0	0.021	0	0	0.088	0
SC_{11}	0	0	0	0	0	0	0.473	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SC_{12}	0	0.288	0	0	0	0.248	0.066	0.029	0	0.083	0	0	0.074	0	0.214	0	0	0.297	0	0	0.277	0.004
SC_{13}	0.082	0	0.035	0.197	0.123	0.105	0.036	0.014	0	0.021	0	0.013	0	0	0.105	0	0	0.026	0.018	0	0.035	0.009
SC_{14}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SC_{15}	0.113	0.186	0	0	0.086	0.059	0.046	0.029	0	0.023	0	0.149	0.053	0	0	0	0	0.065	0.021	0	0.008	0.039
SC_{16}	0.093	0	0	0	0.100	0.079	0.044	0.049	0	0.028	0	0.230	0.084	0	0	0	0	0.041	0.036	0	0	0.237
SC_{17}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SC_{18}	0	0	0.021	0.122	0.005	0.002	0.006	0	0	0.001	0	0.053	0.001	0	0.045	0	0	0	0.003	0	0.003	0
SC_{19}	0.053	0.060	0.019	0.133	0	0.003	0	0.002	0	0	0	0.002	0.001	0	0.010	0	0	0.007	0	0	0.002	0.007
SC_{20}	0	0	0	0	0.014	0.001	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SC_{21}	0.015	0.029	0.007	0.022	0.009	0.006	0	0.001	0	0.001	0	0	0.001	0	0.007	0	0	0.001	0.003	0	0	0.071
SC_{22}	0.007	0	0	0.020	0.002	0.001	0	0	0	0	0	0	0	0	0.001	0	0	0	0.001	0	0.014	0

	Goal	Criteria	Sub-Criteria	Alternatives
Goal	I			
Criteria	W_{21}	W_{22}		
Sub-Criteria		W_{32}	W_{33}	
Alternatives			W_{34}	I

Fig. 6. Generalized supermatrix.

Step 3: Establish pair-wise comparison matrices of interdependencies.

Porter's diamond model determines the inner interdependence among criteria (Fig. 1). The resulting eigenvectors obtained from pair-wise comparisons form matrix, W_{22} (Table 4). Notably, zeros are assigned to eigenvector weights for criteria that are independent. Based on expert interviews the interdependence among sub-criteria is analyzed next. Fig. 5 presents an analytic network process hierarchical structure with computer-based system. The relative importance weights of the inter dependence among detailed criteria are represented by W_{33} (Table 5).

Step 4: Establish a supermatrix and limit matrix.

A supermatrix allows for identification of the effects of interdependence between system elements. A supermatrix is a partitioned matrix, in which each sub-matrix is composed of vectors obtained from pair-wise comparisons. As discussed in the Appendix and dotted parentheses in Fig. 3, the supermatrix in this study covers all network elements. Fig. 6 shows the generalized form of the supermatrix. The supermatrix, inserted with respective vectors and matrices obtained prior to before in Table 6. Because the supermatrix includes interactions between clusters, (e.g. an inter dependence exists among criteria and among sub-criteria), not all columns sums to 1. A weighted supermatrix is transformed first to be stochastic (Table 7). After entering normalized values into the supermatrix and completing the column stochastic, the supermatrix is then raised to a sufficiently large power until convergence occurs. The current super-matrix reached convergence and attained a unique eigenvector. Table 8 presents the final limit matrix. This limit matrix is column stochastic and represents the final eigenvector. Synthesis, with respect to selection of resort type, obtained the following results, seaside resorts (0.165), lakeside resorts (0.128), casino resorts (0.141) and health/spa resorts (0.111) (Table 8). Thus, the optimal resort type is seaside resorts.

Table 6
The supermatrix

	Goal	C_1	C_2	C_3	C_4	C_5	C_6	SC_1	SC_2	SC_3	SC_4	SC_5	SC_6	SC_7	SC_8	SC_9	SC_{10}	SC_{11}	SC_{12}	SC_{13}	SC_{14}	SC_{15}	SC_{16}	SC_{17}	SC_{18}	SC_{19}	SC_{20}	SC_{21}	SC_{22}	Ae_1	Ae_2	Ae_3	Ae_4
Goal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C_1	0.255	0	0	0	0	0.232	0.296	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C_2	0.265	0.548	0	0	0	0.296	0.316	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C_3	0.156	0.280	0	0	0	0.274	0.226	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C_4	0.104	0.172	0	0	0	0.199	0.163	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C_5	0.129	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C_6	0.090	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SC_1	0	0.155	0	0	0	0	0	0	0	0.090	0	0	0	0.067	0.083	0	0	0	0.007	0.046	0	0.046	0	0	0.016	0.113	0	0.017	0.065	0	0	0	0
SC_2	0	0.314	0	0	0	0	0	0.041	0	0.179	0.279	0	0	0	0.040	0	0	0	0.237	0.035	0	0.200	0	0	0	0.026	0	0.065	0.007	0	0	0	0
SC_3	0	0.246	0	0	0	0	0	0.261	0	0	0	0	0.194	0	0.346	0	0.228	0	0.015	0.049	0	0	0	0	0.083	0.206	0	0.007	0.048	0	0	0	0
SC_4	0	0.285	0	0	0	0	0	0.126	0.182	0.217	0	0.110	0.146	0.085	0.048	0	0.064	0	0.163	0.075	0	0	0	0	0.368	0.252	0	0.043	0.023	0	0	0	0
SC_5	0	0	0.329	0	0	0	0	0	0	0	0.131	0	0	0	0.187	0	0.219	0	0	0.085	0	0	0	0	0.014	0	0	0.362	0.158	0	0	0	0
SC_6	0	0	0.474	0	0	0	0	0	0	0.259	0	0	0	0	0.163	0	0.244	0	0.031	0.150	0	0.121	0	0	0.017	0.114	0	0.056	0.140	0	0	0	0
SC_7	0	0	0.197	0	0	0	0	0.208	0.170	0	0	0.034	0	0	0.008	0	0.015	0	0.091	0.228	0	0.176	0	0	0.044	0	0	0	0	0	0	0	0
SC_8	0	0	0	0.227	0	0	0	0	0.085	0	0	0.160	0.038	0.074	0	0	0.073	0	0.009	0.015	0	0.076	0	0	0	0.207	0	0.024	0.190	0	0	0	0
SC_9	0	0	0	0.252	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SC_{10}	0	0	0	0.372	0	0	0	0	0	0.171	0.097	0.356	0.118	0.102	0	0	0	0	0	0.103	0	0	0	0	0.021	0	0	0.088	0	0	0	0	0
SC_{11}	0	0	0	0.150	0	0	0	0	0	0	0	0	0	0.473	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SC_{12}	0	0	0	0	0.434	0	0	0	0.288	0	0	0	0.248	0.066	0.029	0	0.083	0	0	0.074	0	0.214	0	0	0.297	0	0	0.277	0.004	0	0	0	0
SC_{13}	0	0	0	0	0.389	0	0	0.082	0	0.035	0.197	0.123	0.105	0.036	0.014	0	0.021	0	0.013	0	0	0.105	0	0	0.026	0.018	0	0.035	0.009	0	0	0	0
SC_{14}	0	0	0	0	0.177	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SC_{15}	0	0	0	0	0	0.401	0	0.113	0.186	0	0	0.086	0.059	0.046	0.029	0	0.023	0	0.149	0.053	0	0	0	0	0.065	0.021	0	0.008	0.039	0	0	0	0
SC_{16}	0	0	0	0	0	0.406	0	0.093	0	0	0	0.100	0.079	0.044	0.049	0	0.028	0	0.230	0.084	0	0	0	0	0.041	0.036	0	0	0.237	0	0	0	0
SC_{17}	0	0	0	0	0	0.193	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SC_{18}	0	0	0	0	0	0	0.177	0	0	0.021	0.122	0.005	0.002	0.006	0	0	0.001	0	0.053	0.001	0	0.045	0	0	0	0.003	0	0.003	0	0	0	0	0
SC_{19}	0	0	0	0	0	0	0.245	0.053	0.060	0.019	0.133	0	0.003	0	0.002	0	0	0	0.002	0.001	0	0.010	0	0	0.007	0	0	0.002	0.007	0	0	0	0
SC_{20}	0	0	0	0	0	0	0.143	0	0	0	0	0.014	0.001	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SC_{21}	0	0	0	0	0	0	0.290	0.015	0.029	0.007	0.022	0.009	0.006	0	0.001	0	0.001	0	0	0.001	0	0.007	0	0	0.001	0.003	0	0	0.071	0	0	0	0
SC_{22}	0	0	0	0	0	0	0.146	0.007	0	0	0.020	0.002	0.001	0	0	0	0	0	0	0	0	0.001	0	0	0	0.001	0	0.014	0	0	0	0	0
Ae_1	0	0	0	0	0	0	0	0.156	0.418	0.186	0.248	0.180	0.230	0.361	0.127	0.128	0.153	0.306	0.394	0.346	0.181	0.370	0.486	0.353	0.463	0.142	0.315	0.275	0.216	0	0	0	0
Ae_2	0	0	0	0	0	0	0	0.121	0.317	0.138	0.184	0.174	0.266	0.261	0.087	0.141	0.117	0.242	0.360	0.316	0.113	0.275	0.280	0.274	0.308	0.094	0.257	0.243	0.148	0	0	0	0
Ae_3	0	0	0	0	0	0	0	0.388	0.179	0.401	0.325	0.312	0.202	0.157	0.448	0.366	0.449	0.262	0.159	0.237	0.388	0.178	0.145	0.236	0.147	0.351	0.251	0.245	0.366	0	0	0	0
Ae_4	0	0	0	0	0	0	0	0.336	0.085	0.274	0.243	0.334	0.302	0.222	0.338	0.365	0.281	0.190	0.087	0.101	0.318	0.178	0.089	0.136	0.082	0.413	0.177	0.237	0.270	0	0	0	0

Table 7
The weighted supermatrix

	Goal	C_1	C_2	C_3	C_4	C_5	C_6	SC_1	SC_2	SC_3	SC_4	SC_5	SC_6	SC_7	SC_8	SC_9	SC_{10}	SC_{11}	SC_{12}	SC_{13}	SC_{14}	SC_{15}	SC_{16}	SC_{17}	SC_{18}	SC_{19}	SC_{20}	SC_{21}	SC_{22}	Ae_1	Ae_2	Ae_3	Ae_4
Goal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C_1	0.255	0	0	0	0	0.116	0.148	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C_2	0.265	0.274	0	0	0	0.148	0.158	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C_3	0.156	0.140	0	0	0	0.137	0.113	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C_4	0.104	0.086	0	0	0	0.099	0.082	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C_5	0.129	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C_6	0.090	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SC_1	0	0.077	0	0	0	0	0	0	0	0.045	0	0	0	0.034	0.041	0	0	0	0.003	0.023	0	0.023	0	0	0.008	0.057	0	0.009	0.033	0	0	0	0
SC_2	0	0.157	0	0	0	0	0	0.021	0	0.089	0.140	0	0	0	0.020	0	0	0	0.119	0.017	0	0.100	0	0	0	0.013	0	0.032	0.004	0	0	0	0
SC_3	0	0.123	0	0	0	0	0	0.131	0	0	0	0	0.097	0	0.173	0	0.114	0	0.008	0.025	0	0	0	0	0.041	0.103	0	0.004	0.024	0	0	0	0
SC_4	0	0.142	0	0	0	0	0	0.063	0.091	0.108	0	0.055	0.073	0.043	0.024	0	0.032	0	0.081	0.038	0	0	0	0	0.184	0.126	0	0.021	0.011	0	0	0	0
SC_5	0	0	0.329	0	0	0	0	0	0	0	0.065	0	0	0	0.094	0	0.109	0	0	0.042	0	0	0	0	0.007	0	0	0.181	0.079	0	0	0	0
SC_6	0	0	0.474	0	0	0	0	0	0	0.130	0	0	0	0	0.082	0	0.122	0	0.015	0.075	0	0.060	0	0	0.009	0.057	0	0.028	0.070	0	0	0	0
SC_7	0	0	0.197	0	0	0	0	0.104	0.085	0	0	0.017	0	0	0.004	0	0.007	0	0.045	0.114	0	0.088	0	0	0.022	0	0	0	0	0	0	0	0
SC_8	0	0	0	0.227	0	0	0	0	0.042	0	0	0.080	0.019	0.037	0	0	0.037	0	0.004	0.008	0	0.038	0	0	0	0.103	0	0.012	0.095	0	0	0	0
SC_9	0	0	0	0.252	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SC_{10}	0	0	0	0.372	0	0	0	0	0	0.086	0.048	0.178	0.059	0.051	0	0	0	0	0	0.052	0	0	0	0	0.010	0	0	0.044	0	0	0	0	0
SC_{11}	0	0	0	0.150	0	0	0	0	0	0	0	0	0	0.237	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SC_{12}	0	0	0	0	0.434	0	0	0	0.144	0	0	0	0.124	0.033	0.014	0	0.041	0	0	0.037	0	0.107	0	0	0.149	0	0	0.138	0.002	0	0	0	0
SC_{13}	0	0	0	0	0.389	0	0	0.041	0	0.017	0.099	0.062	0.052	0.018	0.007	0	0.011	0	0.007	0	0	0.052	0	0	0.013	0.009	0	0.017	0.004	0	0	0	0
SC_{14}	0	0	0	0	0.177	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SC_{15}	0	0	0	0	0	0.200	0	0.057	0.093	0	0	0.043	0.029	0.023	0.015	0	0.012	0	0.074	0.027	0	0	0	0	0.032	0.011	0	0.004	0.020	0	0	0	0
SC_{16}	0	0	0	0	0	0.203	0	0.047	0	0	0	0.050	0.039	0.022	0.024	0	0.014	0	0.115	0.042	0	0	0	0	0.021	0.018	0	0	0.119	0	0	0	0
SC_{17}	0	0	0	0	0	0.096	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SC_{18}	0	0	0	0	0	0	0.088	0	0	0.011	0.061	0.002	0.001	0.003	0	0	0.001	0	0.027	0	0	0.022	0	0	0	0.002	0	0.001	0	0	0	0	0
SC_{19}	0	0	0	0	0	0	0.122	0.026	0.030	0.010	0.066	0	0.002	0	0.001	0	0	0	0.001	0	0	0.005	0	0	0.004	0	0	0.001	0.003	0	0	0	0
SC_{20}	0	0	0	0	0	0	0.071	0	0	0	0	0.007	0.001	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SC_{21}	0	0	0	0	0	0	0.145	0.008	0.015	0.004	0.011	0.005	0.003	0	0.001	0	0.001	0	0	0	0	0.003	0	0	0	0.002	0	0	0.036	0	0	0	0
SC_{22}	0	0	0	0	0	0	0.073	0.003	0	0	0.010	0.001	0	0	0	0	0	0	0	0	0	0.001	0	0	0	0.001	0	0.007	0	0	0	0	0
Ae_1	0	0	0	0	0	0	0	0.078	0.209	0.093	0.124	0.090	0.115	0.180	0.063	0.128	0.076	0.306	0.197	0.173	0.181	0.185	0.486	0.353	0.232	0.071	0.315	0.138	0.108	0	0	0	0
Ae_2	0	0	0	0	0	0	0	0.060	0.159	0.069	0.092	0.087	0.133	0.130	0.044	0.141	0.059	0.242	0.180	0.158	0.113	0.138	0.280	0.274	0.154	0.047	0.257	0.121	0.074	0	0	0	0
Ae_3	0	0	0	0	0	0	0	0.194	0.090	0.201	0.163	0.156	0.101	0.078	0.224	0.366	0.224	0.262	0.080	0.118	0.388	0.089	0.145	0.236	0.074	0.175	0.251	0.122	0.183	0	0	0	0
Ae_4	0	0	0	0	0	0	0	0.168	0.043	0.137	0.121	0.167	0.151	0.111	0.169	0.365	0.141	0.190	0.044	0.050	0.318	0.089	0.089	0.136	0.041	0.206	0.177	0.119	0.135	0	0	0	0

Table 8
The limit supermatrix

	Goal	C_1	C_2	C_3	C_4	C_5	C_6	SC_1	SC_2	SC_3	SC_4	SC_5	SC_6	SC_7	SC_8	SC_9	SC_{10}	SC_{11}	SC_{12}	SC_{13}	SC_{14}	SC_{15}	SC_{16}	SC_{17}	SC_{18}	SC_{19}	SC_{20}	SC_{21}	SC_{22}	Ae_1	Ae_2	Ae_3	Ae_4
Goal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C_1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C_2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C_3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C_4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C_5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C_6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SC_1	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0	0.013	0	0.013	0.013	0	0.013	0	0	0.013	0.013	0	0.013	0.013	0	0	0	0
SC_2	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0	0.043	0	0.043	0.043	0	0.043	0	0	0.043	0.043	0	0.043	0.043	0	0	0	0
SC_3	0.034	0.034	0.034	0.034	0.034	0.034	0.034	0.034	0.034	0.034	0.034	0.034	0.034	0.034	0.034	0	0.034	0	0.034	0.034	0	0.034	0	0	0.034	0.034	0	0.034	0.034	0	0	0	0
SC_4	0.052	0.052	0.052	0.052	0.052	0.052	0.052	0.052	0.052	0.052	0.052	0.052	0.052	0.052	0.052	0	0.052	0	0.052	0.052	0	0.052	0	0	0.052	0.052	0	0.052	0.052	0	0	0	0
SC_5	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0	0.024	0	0.024	0.024	0	0.024	0	0	0.024	0.024	0	0.024	0.024	0	0	0	0
SC_6	0.034	0.034	0.034	0.034	0.034	0.034	0.034	0.034	0.034	0.034	0.034	0.034	0.034	0.034	0.034	0	0.034	0	0.034	0.034	0	0.034	0	0	0.034	0.034	0	0.034	0.034	0	0	0	0
SC_7	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0	0.030	0	0.030	0.030	0	0.030	0	0	0.030	0.030	0	0.030	0.030	0	0	0	0
SC_8	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0	0.021	0	0.021	0.021	0	0.021	0	0	0.021	0.021	0	0.021	0.021	0	0	0	0
SC_9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SC_{10}	0.033	0.033	0.033	0.033	0.033	0.033	0.033	0.033	0.033	0.033	0.033	0.033	0.033	0.033	0.033	0	0.033	0	0.033	0.033	0	0.033	0	0	0.033	0.033	0	0.033	0.033	0	0	0	0
SC_{11}	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0	0.016	0	0.016	0.016	0	0.016	0	0	0.016	0.016	0	0.016	0.016	0	0	0	0
SC_{12}	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0	0.043	0	0.043	0.043	0	0.043	0	0	0.043	0.043	0	0.043	0.043	0	0	0	0
SC_{13}	0.028	0.028	0.028	0.028	0.028	0.028	0.028	0.028	0.028	0.028	0.028	0.028	0.028	0.028	0.028	0	0.028	0	0.028	0.028	0	0.028	0	0	0.028	0.028	0	0.028	0.028	0	0	0	0
SC_{14}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SC_{15}	0.028	0.028	0.028	0.028	0.028	0.028	0.028	0.028	0.028	0.028	0.028	0.028	0.028	0.028	0.028	0	0.028	0	0.028	0.028	0	0.028	0	0	0.028	0.028	0	0.028	0.028	0	0	0	0
SC_{16}	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0	0.025	0	0.025	0.025	0	0.025	0	0	0.025	0.025	0	0.025	0.025	0	0	0	0
SC_{17}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SC_{18}	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0	0.012	0	0.012	0.012	0	0.012	0	0	0.012	0.012	0	0.012	0.012	0	0	0	0
SC_{19}	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0	0.013	0	0.013	0.013	0	0.013	0	0	0.013	0.013	0	0.013	0.013	0	0	0	0
SC_{20}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SC_{21}	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0	0.004	0	0.004	0.004	0	0.004	0	0	0.004	0.004	0	0.004	0.004	0	0	0	0
SC_{22}	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0	0.001	0	0.001	0.001	0	0.001	0	0	0.001	0.001	0	0.001	0.001	0	0	0	0
Ae_1	**0.165**	0.165	0.165	0.165	0.165	0.165	0.165	0.165	0.165	0.165	0.165	0.165	0.165	0.165	0.165	0	0.165	0	0.165	0.165	0	0.165	0	0	0.165	0.165	0	0.165	0.165	0	0	0	0
Ae_2	0.128	0.128	0.128	0.128	0.128	0.128	0.128	0.128	0.128	0.128	0.128	0.128	0.128	0.128	0.128	0	0.128	0	0.128	0.128	0	0.128	0	0	0.128	0.128	0	0.128	0.128	0	0	0	0
Ae_3	0.141	0.141	0.141	0.141	0.141	0.141	0.141	0.141	0.141	0.141	0.141	0.141	0.141	0.141	0.141	0	0.141	0	0.141	0.141	0	0.141	0	0	0.141	0.141	0	0.141	0.141	0	0	0	0
Ae_4	0.111	0.111	0.111	0.111	0.111	0.111	0.111	0.111	0.111	0.111	0.111	0.111	0.111	0.111	0.111	0	0.111	0	0.111	0.111	0	0.111	0	0	0.111	0.111	0	0.111	0.111	0	0	0	0

5. Discussion and conclusion

The study presents for applying the expert ANP for decision-making. The ANP involves forming a super-matrix that specifies the relationships between elements within the process model and generates a limit matrix that prioritizes the relative weights of elements. Additionally, the ANP is an effective tool that generates an accurate solution for decision-makers. In particular, international resort park administrators typically lack objective decision-making procedures and evaluation criteria. Moreover, most international resort park administrators feel that given governmental regulations and constraints, selecting an optimal location for an international resort park type is extremely difficult.

Therefore, the expert ANP-based decision making model utilizes the renowned diamond model described in Porter's *The Competitive Advantage of Nations* to identify the intricate relationships among competitive advantages involved in selecting a international resort park type. A case study is also performed to confirm the effectiveness of the proposed model in selecting among four resort types – seaside resorts, lakeside resorts, casino resorts and health/spa resorts – in which the enters constructs under the construction evaluation pattern. Analytical results suggest that the relative weights changed considerably as the interdependent relationships have a considerable effect on the process model. Finally, by applying the ANP to obtain criteria weight and ranking those results, the seaside resort is the preferred resort type. For the international resort park considered in this case study the four resort types considered are utilized to construct the evaluation model. Analytical results correspond to those for the international resort park. The proposed evaluation method selects resort type for a new international resort park under construction, ensuring that it has competitive advantage once established. This study developed an evaluation criterion for selecting seaside resorts for a new international resort park to be established in Taiwan. Additionally, the proposed evaluation criterion provides policy makers and academics with recommendations for future development.

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