



Research Article

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## City sports tourism industry competitiveness and empirical research

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### ABSTRACT

*Through in-depth analysis of the all-round, multi-angle city's sports tourism industry, developed a scientific and reasonable evaluation index system of urban tourism industry were evaluated using AHP, the combination of macro and micro, in-depth analysis of urban travel competitiveness of the industry's current situation, trying to find the effects of urban sports tourism industry causes and improvement measures, to improve our city's comprehensive strength, and enhance international competitiveness to find countermeasures.*

**Key words:** Urban competitiveness, city sports tourism, sports tourism industry, Analytic Hierarchy

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### INTRODUCTION

Along with the development of sports enterprise in our country and many important international event held, then lead to the development of sports tourism has become an important part of tourism. Sports tourism is a tourism and sports industry of intersection with the dual characteristics of new type, cross industry are travelers enjoy sports games in the process of tourism, visit the sports venues, to participate in a variety of fitness, sports, entertainment, adventure, buy sports memorabilia, and many other activities combined [1, 2]. In the increasingly fierce competition among cities, how to evaluate and improve the urban competitiveness is a valuable research topic [3, 4]. City competitiveness is a concept with rich connotation, is an important part of tourism, and combining with the development of sports industry and tourism industry to produce a new type of sports tourism industry has become the influence urban comprehensive strength and competitiveness of an important indicator, is an important content of many cities to attract visitors. Rich sports tourism, a city can bring new vitality, let more people know yourself, know yourself, grasp the initiative in the city competition, winning advantage[5, 6].

Urban competitiveness is a comprehensive indicator, is also a relative concept, is a city in the competition of attractiveness and relative advantage, and is an important index of measuring national or regional comprehensive competitiveness. Its core is the city of industry competitiveness, with the development of the sports and its growing influence, the resulting flow of sports tourism industry as an emerging industry has become an indispensable subsystem of urban industry, industry of the whole city and even bigger impact on urban competitiveness, for individual cities, its influence has been even more than the traditional industries. Sports tourism industry is one of the most outstanding characteristic that is it don't have to sacrifice any resources, the development of environmental or ecological factors, the driving force for the city development is benign and sustainable.

### TO ESTABLISH EVALUATION INDEX SYSTEM

For urban sports tourism industry to conduct a comprehensive analysis and evaluation, the establishment of index system should follow the integrity, scientific, feasibility, basic principles, such as coordination is an index composed of many indexes.

Index selection of this paper adopts the method of expert questionnaire, draw lessons from the world economy BBS international urban competitiveness evaluation method, put forward by the use of Michael porter's diamond model, from the social system, hr system and economic system comprehensive consideration, design for urban sports

tourism industry competitiveness evaluation index system of the questionnaire, repeated solicit opinions from the experts. In the end, 100% of experts believe that the value of the sports industry and the number of international and domestic competition, a large number of venues and other factors must be considered, 90% of experts believe that the government behavior should be considered, related industry competitiveness and the competitiveness of production factors, demand conditions was the choice for 80% of experts also competitiveness and urban comprehensive competitiveness both at home and abroad, combined with the results of the survey and experts with you many times email and telephone communication, choice of multiple indexes and finally confirmed in this paper, the evaluation index system. Which has both qualitative indexes and quantitative indexes, covers from the level of productive forces, people's living standard, the level of sports development, the scale of the sports industry and the government factors, many aspects, such as total target index 1, 4 secondary indicators, tertiary level indicators 19, are shown in Table 1 below:

Table 1: Evaluation index system

First layer index A	Secondary layer index B	Third layer index C
Competitiveness evaluation index of city's sports tourism industry A	Competitiveness of production factors B1	Total GDP C1
		The number of domestic and international competitions C2
		Number of professional sports clubs C3
		Number of competition venues C4
		The number of national sports athletes C5
	Competitiveness of consumption power B2	Per capita GDP C6
		Sports Population C7
		Wages level C8
		Engel coefficient C9
	Competitiveness of government capacity B3	Behavior of government support for sport tourism C10
		Government management and coordination ability C11
		ROI of Government fiscal expenditure C12
		Crime rate C13
		Economic openness C14
	Sports industry output B4	Sports competitiveness industry C15
		Sporting Goods Industry C16
		Sports Lottery Industry C17
		Sports fitness and entertainment industry C18
		Sports Intermediation industry C19

**BUILD THE ANALYTIC HIERARCHY MODEL**

Analytic hierarchy process (AHP) is by the famous American operations research, T.L. saadi put forward in the 1970 s, after forty years of development and perfection, now has become a very commonly used in system science an analytic method. This is a kind of combining qualitative analysis and quantitative analysis of analysis method; is the decision process of complex system decision maker's quantification, modeling of the system analysis method; it is a kind of important mathematical tool dealing with multiple rules system decision. Its implementation is based on the deep analysis of complex systems, several elements of affecting system or indicators, and then divided into groups according to their different attributes, the formation of a class hierarchy, and then through the comparison of the two to determine the relative importance of all levels of the element, and hierarchical structure model, analysis the problems of the system or decisions. The hierarchical structure as shown in Fig.1:



Fig.1: AHP hierarchical structure model

Analytic hierarchy process (AHP) of each index weight calculation have a variety of different scale, this paper USES a classic saadi put forward 1 ~ 9 scaling method and reciprocal (Table 2).

Table 2: The 1 to 9 scale method of AHP model

The importance scale $a_{ij}$	The relative importance degree
1	Equally important
3	Slightly important
5	Fundamental important
7	Really important
9	Absolutely important
2,4,6,8	Intermediate values between two adjacent levels
Reciprocal	$a_{ji} = \frac{1}{a_{ij}}$

Use  $a_{ij}$  to represent the relative importance of selected two elements each time, construct the relative importance judgment matrix  $A$  of each indicator to show the results of each comparison.

$$A = \begin{bmatrix} a_{11} & a_{12} & \cdots & a_{1n} \\ a_{21} & a_{22} & \cdots & a_{2n} \\ \cdots & \cdots & \cdots & \cdots \\ a_{n1} & a_{n2} & \cdots & a_{nn} \end{bmatrix} \tag{1}$$

Wherein  $a_{ij} > 0$  and  $a_{ii} = 1$ .

In order to ensure the effectiveness of the judgment matrix, consistency check is needed. This is because of the relative importance of each index is usually through questionnaire survey, expert scoring and mathematical statistical method to determine, when some of the indicators of the importance of close to, such as the indices 1, 2, 3, different experts, due to the different opinion in comparison may be more important than 2, 2 is more important than 3, 3 is more important than 1 this kind of problem again. Therefore the need for consistency check, usually inspection method is to use the CR value, namely random consistency ratio. Formula is as follows:

$$CI = \frac{\lambda_{\max} - n}{n - 1} \tag{2}$$

$$\lambda_{\max} = \frac{1}{n} \sum_{i=1}^n \frac{(AW)_i}{w_i} \tag{3}$$

$$CR = \frac{CI}{RI} \tag{4}$$

Wherein  $CI$  is a general consistency index,  $RI$  is the average random consistency index, with different orders its value is shown in Table 3;  $\lambda_{\max}$  is the maximum eigenvalue of the judgment matrix; the smaller the calculated value  $CR$  is, more effective the judgment matrix is. The usual criterion is  $CR \leq 0.1$ . Conversely, if the value  $CR$  is too large, you need to adjust the judgment matrix.

Table 3: The value of the average random consistency index

Order	1	2	3	4	5	6	7	8	9
RI	0.00	0.00	0.58	0.90	1.12	1.24	1.32	1.41	1.45

Use the effective judgment matrix  $A$  obtained above, various indicators' weights of each index layer  $B$  can be calculated, these weights constitutes an important degree of each index in layer  $B$ . Similarly, we can calculate the weights of various indicators in the index layer  $C$  on the various indicators of layer  $B$ . Finally, the integrated weights of various indicators in layer  $B$  and layer  $C$  on the target layer obtained. The commonly method used to calculate the weight includes the averaging method and the square root method, this article uses the square root

method. That is to seek the quadrate for each row's element of the judgment matrix, and then seek the  $1/n$ th power operation:

$$w_i = \left( \prod_{j=1}^n c_{ij} \right)^{1/n}, \quad (i, j = 1, 2, \dots, n) \tag{5}$$

Then conduct normalization processing, and obtain the weighting factor:

$$W_i = \frac{w_i}{\sum_{i=1}^n w_i} \tag{6}$$

Weight vector:  $W = (W_1, W_2, \dots, W_n)^T$ .

**CITY COMPETITIVENESS EVALUATION MODEL TO BUILD SPORTS TOURISM INDUSTRY**

This article adopts the method of questionnaire investigation and expert scoring constructing judgment matrix, please related field 15 experts according to the 1 ~ 9 scaling method of the index system of elements of the two compare the relative importance, finally got every level indicators for ranking the importance of the corresponding index judgment matrix, are as follows:

$$A = \begin{pmatrix} 1 & 2 & 3 & 1/2 \\ 1/2 & 1 & 2 & 1/7 \\ 1/3 & 1/2 & 1 & 1/6 \\ 2 & 7 & 6 & 1 \end{pmatrix}$$

Then conduct consistency test on the judgment matrix  $A$ , first calculate the maximum eigenvalue  $\lambda_{\max}$ :

$$AW = \begin{pmatrix} 1 & 2 & 3 & 1/2 \\ 1/2 & 1 & 2 & 1/7 \\ 1/3 & 1/2 & 1 & 1/6 \\ 2 & 7 & 6 & 1 \end{pmatrix} \begin{pmatrix} 0.231 \\ 0.129 \\ 0.071 \\ 0.569 \end{pmatrix} = \begin{pmatrix} 0.978 \\ 0.471 \\ 0.311 \\ 2.240 \end{pmatrix}$$

$$\lambda_{\max} = \frac{1}{n} \sum_{i=1}^n \frac{(AW)_i}{w_i} = \frac{1}{4} \left( \frac{0.978}{0.231} + \frac{0.471}{0.129} + \frac{0.311}{0.071} + \frac{0.240}{0.569} \right) = 4.0475$$

$$CI = \frac{\lambda_{\max} - n}{n - 1} = \frac{4.0475 - 4}{3} = 0.016$$

$$CR = \frac{CI}{RI} = \frac{0.016}{0.90} = 0.017$$

$CR = 0.017 < 0.1$ , indicating that the judgment matrix has a good consistency. Similarly we can calculate that the each index of level  $C$  all have good consistency on indexes of layer  $B$ , so the judgment matrix  $A$  can be used to build the competitiveness evaluation model of city's sports tourism industry.

Using the above obtained eigenvectors and eigenvalues maximum of judgment matrix, can obtain the local weights of 19 third-layer index, and then seek quadrate with the local weights of the higher layer index to get global integrated weights, as shown in Table 4 below:

Table 4: The evaluation index weight table of urban sports industry's competitiveness

First layer index	Secondary layer index	Weights	Third layer index	Local weight	Comprehensive weights
A	B1	0.231	C1	0.473	0.109
			C2	0.235	0.054
			C3	0.102	0.024
			C4	0.100	0.023
			C5	0.090	0.021
	B2	0.129	C6	0.367	0.047
			C7	0.066	0.009
			C8	0.421	0.054
			C9	0.146	0.019
	B3	0.071	C10	0.489	0.035
			C11	0.231	0.016
			C12	0.076	0.005
			C13	0.041	0.003
			C14	0.163	0.012
	B4	0.569	C15	0.521	0.296
			C16	0.302	0.173
			C17	0.043	0.024
			C18	0.095	0.054
			C19	0.039	0.022

Above, construct the evaluation index system, validated the judgment matrix, consistency condition and various local and comprehensive indicators weight, can calculate each index of sports tourism industry comprehensive competitive capability of the city, realize the effect of quantitative competitive level, and then evaluated and analyzed in multiple cities. Among them, the sports tourism industry competitiveness of each city computation formula is as follows:

$$A_i = \sum_{i=1}^{19} d_i w_i \tag{7}$$

In the formula,  $A_i$  means the competitiveness of the city's sports tourism industry,  $d_i$  means that the evaluation results of the  $i$  th indicator, which is a standardized data ( $0 \leq d_i \leq 1$ ); for the selection of each indicator, directly standardize indicators that can be quantified and remove the effect of dimension; use the scoring methods of a number of experts to determine the indicators that cannot be quantified, and the scoring criteria are shown in Table 5; Some reverse indicators such as Engel's coefficient and crime rates also need positive orientation after the unitization, namely  $d_i^* = 1 - d_i$ .

Table 5: The scoring table of expert evaluation

Evaluation	Excellent	Good	Medium	Inferior	Poor
Score	0.8-1	0.6-0.8	0.4-0.6	0.2-0.4	0-0.2

This article selects the Beijing, Shanghai, shenzhen, guangzhou, tianjin five cities for evaluation model of empirical research, the indicators data from each big city bureau of statistics web site, sports sites and China statistical yearbook, the indicators will numerical standardized after the results are shown in Table 6 below:

Table 6: The standardized score results of each index in five cities

Index	City				
	Beijing	Shanghai	Guangzhou	Tianjin	Shenzhen
C1	0.85	0.82	0.70	0.68	0.69
C2	0.72	0.78	0.76	0.52	0.50
C3	0.69	0.66	0.64	0.61	0.60
C4	0.63	0.57	0.40	0.44	0.49
C5	0.68	0.52	0.46	0.49	0.41
C6	0.70	0.75	0.65	0.55	0.69
C7	0.50	0.59	0.57	0.60	0.56
C8	0.77	0.84	0.80	0.60	0.70
C9	0.61	0.63	0.61	0.60	0.66
C10	0.81	0.87	0.72	0.66	0.65
C11	0.75	0.85	0.81	0.74	0.73
C12	0.80	0.89	0.74	0.83	0.79
C13	0.87	0.80	0.70	0.80	0.70
C14	0.75	0.80	0.70	0.64	0.71
C15	0.70	0.72	0.69	0.65	0.68
C16	0.69	0.71	0.65	0.62	0.64
C17	0.65	0.69	0.68	0.70	0.64
C18	0.71	0.74	0.70	0.72	0.70
C19	0.64	0.67	0.62	0.57	0.59

According to the above comprehensive competitiveness calculation formula of the urban tourism industry as well as the weights of various indexes we have:

$$A_i = \sum_{i=1}^{19} d_i w_i = 0.109d_1 + 0.054d_2 + 0.024d_3 + \dots + 0.022d_{19} \tag{8}$$

Substitute  $d_i$  of Table 6 into the above formula, we can get the five cities' competitiveness score of sports tourism industry are respectively 0.7803,0.6541,0.5436,0.5102 and 0.5100; Compared with the actual situation, the evaluation results are accurate and objective; the above empirical analysis shows that the established model in this paper is safe and effective.

Can be seen from the results of the analysis, in order to GDP, the number of large sports venues for the representative city hard conditions is the prerequisite for urban sports tourism competitiveness, large-scale international and domestic events held during the famous sports club number and the size of the sports industry, famous or such factors as the number of outstanding athletes, also is in the process of city sports tourism competitiveness, combined with their own characteristics, can have priority in the direction of development.

### CONCLUSION

Based on the hierarchical analysis model is set up, the city competitiveness to comprehensive analysis and evaluation on sports tourism industry. The result from quantitative Angle objectively reflected the city sports tourism industry competitiveness, validated model system; the evaluation result is scientific and effective. Research shows that sports tourism industry as an important component of the urban comprehensive strength, has become an important development direction, to enhance the competitiveness of the city, the development level of sport major international competitions, especially the number of famous sports clubs are the important factors that affect the competitiveness of the sports tourism industry. To enhance the competitiveness of city sports tourism industry, first should realize the role of sports tourism industry in urban development, make fully mix city features sports tourism industry long-term planning, strengthening the construction of sports industry chain and industry cluster; Second, formulate and improve relevant laws, regulations, policies, and provide a good environment for the development of urban tourism industry and the safeguard; Finally, to undertake the high level competition, development of professional sports clubs, cultivate sports stars, make the sports industry of an internationally influential brand. These means in improving international competitiveness of tourism industry in our country at the same time, to improve the comprehensive competitiveness of the city also has the effect that cannot ignore.

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