

# Performance Evaluation and Empirical Analysis of Regional Sports Industry Government Behavior

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## Abstract

According to the government behavior theory of public economics, the index system of government behavior performance evaluation of regional sports industry is constructed. This paper selects 24 provinces (autonomous regions and municipalities directly under the Central Government) as research objects, and analyzes the performance level of sports industry government behavior in 2014-2018 by using principal component analysis method. The results show that: 1) The comprehensive scores of sports industry government behavior performance evaluation in economically developed regions such as Guangdong, Shanghai and Jiangsu are higher, while those in some economically underdeveloped regions (such as Guizhou, Gansu and Qinghai, etc.) are at a lower level. 2) In terms of the growth rate of government behavior performance, Sichuan has the fastest growth rate, followed by Hunan, Anhui and Tianjin, and Gansu has the slowest growth rate. 3) From the perspective of the composition of government behavior performance, capital investment is the core, management policy is the key, economic level is the leading, service ability is the auxiliary, the four complement each other, and none is indispensable. Finally, it puts forward ways to improve the performance of regional sports industry government behavior.

## Keywords

Sports Industry, Government Behavior Performance, Empirical Analysis

## 1. Introduction

With the rapid development of socialism and the deepening reform of the sports industry management system, profound changes have taken place in the economic structure of our country. The sports industry is booming day by day (Department

of Sports Economics, 2019) and accounts for a larger and larger proportion of the national economic system. The sports industry is at the third level of the tertiary industry. It is a collection of activities that produce sports products and provide social services for the public (Zheng, 2010), and it is a consortium of sports products and sports services. In 1978, the Third Plenary Session of the Eleventh Central Committee formulated the policy of reform and opening up and vigorously developed the socialist market economy, and China's sports industry began to start (Cong et al., 2013). Over the past 40 years, China's sports industry has been developing continuously, and has been advancing from "sports power" to "sports power" (Liu, 2019).

In recent years, in order to promote the rapid development of the sports industry, China has introduced and formulated a series of policies and regulations to regulate and guide the sports industry. In 2011, The State Council put forward the national fitness plan to promote national fitness and accelerate the process of building a powerful sports country. Later, the 12th Five-Year Plan for the Development of Sports Industry was promulgated, in which it was proposed to accelerate the development of the sports industry, enhance the competitiveness of the sports industry, and further enrich and improve the sports industry (State General Administration of Sports, 2011). In October, The State Council formulated Several Opinions on Accelerating the Development of the Sports Industry and Promoting Sports Consumption (referred to as "Document No. 46 of The State Council"), which, based on national policies, put forward specific action guidance plans for the development of the sports industry and provided a new opportunity for the development of China's sports industry (Central Government of the People's Republic of China, 2014; Gao & Wu, 2012; Cong & Liu, 2019). 2016 "General Office of the State Council on Accelerating the Development of Fitness and Leisure Industry", 2018 "General Office of the State Council on Accelerating the Development of Sports Competition Performance Industry", September 4, 2019, The General Office of the State Council officially issued the Opinions on Promoting National Fitness and Sports Consumption to Promote High-quality Development of the Sports Industry. The promulgation of these policies and opinions shows the determination of the state to vigorously develop the sports industry, points out the future direction of the development of the sports industry, and promotes the continuous deepening of the reform and development of the sports industry (Central Government of the People's Republic of China, 2016, 2018, 2019; Chen, 2019).

Despite these positive developments, the sports industry still faces several key issues that need to be addressed. Infrastructure and facilities are often inadequate or outdated, limiting the industry's growth. Funding and investment from both public and private sectors remain insufficient. There is also a need for structured programs to nurture talent from a young age. Governance and regulation challenges, including mismanagement and malpractice, persist. Market saturation in some regions makes it difficult for new ventures to thrive, and

ensuring equal access and opportunities for all demographics is a continuous challenge.

Regarding legislation, China has implemented various laws and regulations to support the sports industry. These legislative measures cover areas such as funding, doping regulations, safety standards, and fair play. Effective legislation helps maintain integrity, promotes fair competition, and ensures the sustainable development of the sports sector. Notable legislations include policies for funding sports initiatives, laws against doping and match-fixing, regulations ensuring the safety of athletes and spectators, and inclusive policies to promote sports among all segments of society.

Under the promotion of the sports industry policy of the Chinese government, the sports industry has developed rapidly (Ma & Wang, 2023). In 2013, the total scale of the national sports and related industries exceeded the trillion yuan mark for the first time. From 2014 to 2018, the total scale of the sports industry in China increased from 1.35 trillion yuan to 2.66 trillion yuan, with an average annual growth rate of 18%; The added value of the sports industry increased from 404.1 billion yuan in 2014 to 1007.8 billion yuan in 2018, with an average annual growth rate of 25%, far exceeding the growth rate of the national economy in the same period. The added value of the sports industry has also increased from 0.64% to 1.1% of GDP in the same period, and has become one of the new growth points of the national economy (Liu, 2019). Government behavior is crucial to industrial development. Based on the theory of government behavior, this paper will collect the performance indicators of government behavior in the sports industry in China's provinces (municipalities directly under the Central Government and autonomous regions) in the past five years from 2014 to 2018, adopt the principal component analysis method to build an evaluation model of government behavior performance in the regional sports industry, and conduct empirical research on government behavior performance in the sports industry.

## **2. Research Methods**

### **2.1. Theoretical Basis of Government Behavior Research**

#### **2.1.1. Positioning of Government Behavior in Social Development**

Local governments are closely related to economy, society and ecology, and are closely related to people's lives. As an important institution for the implementation of national political management, local governments are the specific implementers of national will (Jordan & Boody, 2007). Government behavior refers to the administrative activities conducted by the government to manage social public affairs in accordance with the relevant policies formulated by the government in order to safeguard public interests and improve the public foundation (Chen & Hsieh, 2011). It is of public welfare and publicity, providing universal public goods and services for people, such as solving people's problems in education, medical care, health and housing, improving the social security system, developing charity and other public welfare behaviors (Geng et al., 2013).

### **2.1.2. Analysis of the Role of Government Behavior in Industrial Development**

In industrial development, government behavior plays an important role. The government is not only the maker of rules, but also the manager, supporter and supervisor of the market.

1) Formulate favorable policies and create a favorable environment. Through favorable policies on industry, foreign investment and talents, local governments can create a good external environment for industrial development, effectively improve the initiative of industrial subjects, induce and promote the industry to cultivate its own industrial innovation ability, promote the training and introduction of high-quality talents, and accelerate industrial development (Zhen & Bi, 2011).

2) Guide capital investment and activate the industrial market. Industrial development requires a large number of funds, and local governments formulate preferential tax subsidy policies and overall plans for industrial development, which are conducive to foreign investment entering the industrial market, expanding financing channels, promoting the research and development and application of industrial technology, and reducing possible risks in industrial development (Yang, 2012a).

3) Establish a regulatory system to maintain market stability. The government is the regulatory department in industrial development, and the formulation of a series of supervision and management systems matching the industrial development is an important basis for industrial development. By establishing an operating mechanism combining government supervision and self-regulatory supervision, and constructing and improving the legal system of industrial supervision mechanism, the government can strengthen the supervision efficiency in the industrial field, prevent and resolve industrial development risks, and ensure the scientific and stable operation of the industrial market (Zhang et al., 2007).

## **2.2. Definition of Related Concepts**

### **2.2.1. Sports Industry**

The sports industry belongs to the tertiary industry in the national economy and is an industry aiming at the production of sports products and sports services. According to the economic theory of the tertiary industry, after the input of production factors such as manpower and material resources, the sports industry does not have any output, but produces non-physical sports service products in the form of sports (Zhang et al., 2008). The sports service products produced by the sports industry have both value and use value. In the market economy system, sports service products can be used for exchange, which is the result of the hard work of sports workers and has value. The monetary expression of value is the price of sports service products. At the same time, it also has non-physical form of use value, and is an important part of people's physical fitness, aesthetic communication and other entertainment and leisure activities (Guo & Fan, 2009). Therefore, the sports industry is a service industry with both input

and output.

### **2.2.2. Government Behavior**

Government behavior refers to the activities that the local government and its staff carry out social public management and provide social services under the guidance of the governing philosophy in accordance with relevant policies and legal systems in a specific period (He, Liao, & Wang, 2012). It is closely related to the concept of government, which is often based on the ruling ideology of the government, and government behavior is influenced and guided by the concept of government, which is the external manifestation of the concept of government (Deng, 2010).

### **2.2.3. Performance of Government Behavior**

The performance of government behavior refers to the achievements and effects achieved by the government under certain investments in the process of public management, which is the measurement and feedback of the government's governance ability (Bao & Wang, 2012). According to the achievements of management efficiency, service quality and public satisfaction of different regional governments, the performance reflected in the evaluation can understand the behavioral performance of different regional governments. According to different levels of government, government behavior performance can be divided into Central Government performance and local government performance (Ji, 2007). Local government behavior performance can be further divided into provincial government behavior performance, municipal government behavior performance, county government behavior performance and township government behavior performance. After an in-depth investigation, the research group of government behavior performance combined with the design ideas and methods of relevant index systems at home and abroad, summarized the analysis results of relevant experts, and put forward the performance index system of local government in China. The system includes three levels of government function index, government influence index and government potential index. Among them, government function indicators mainly include social management, economic regulation of public services and market supervision, etc. Government influence indicators mainly include economic growth, improvement of people's quality of life and social development, etc. Government potential indicators mainly include personnel allocation, personnel quality and work efficiency (Gong et al., 2014).

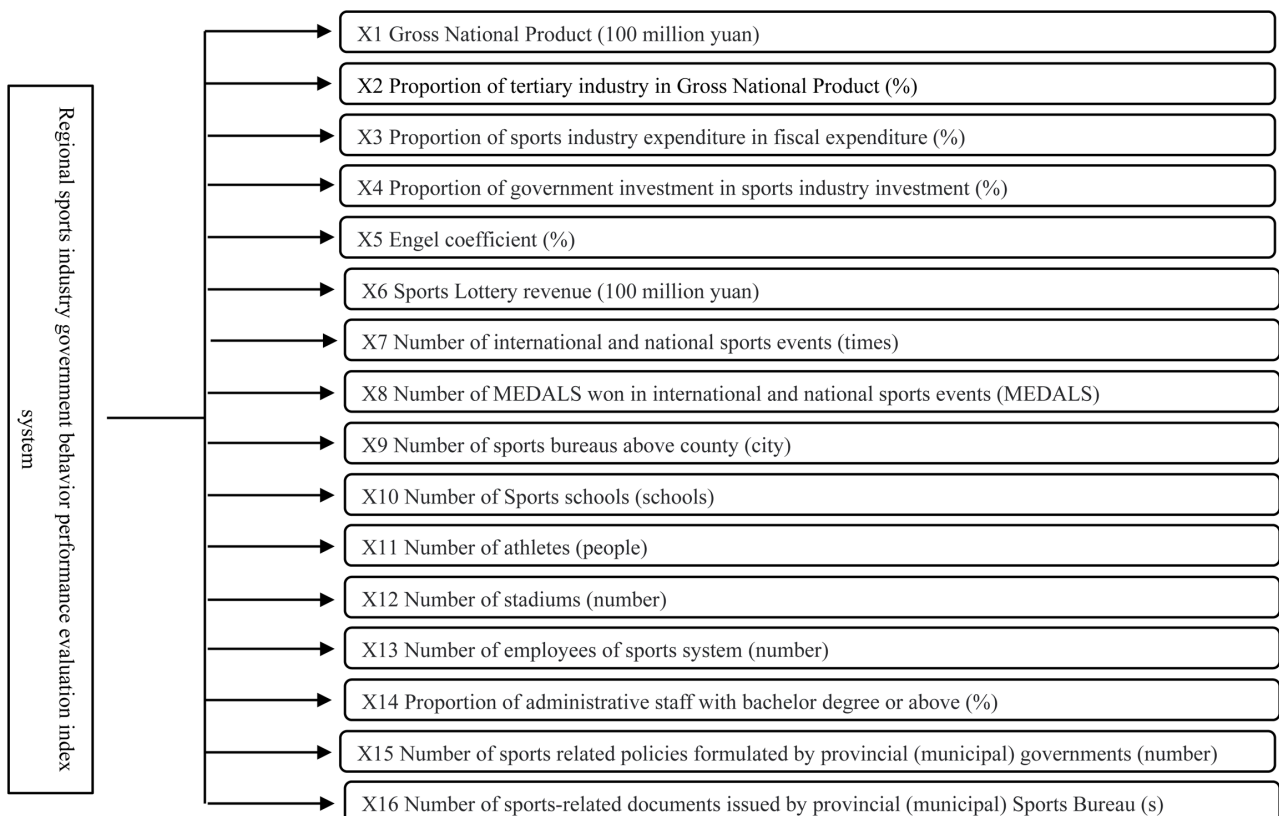
### **2.2.4. Performance of Government Behavior in Regional Sports Industry**

The performance of government behavior of regional sports industry refers to the achievements and effects achieved by governments at all levels in the process of public management and development of the sports industry in a province (municipality directly under the Central Government or autonomous region) as a unit, which reflects the development level of the sports industry in the region and is often closely related to local culture, economy and policies. It has strong

regional characteristics.

### 2.3. Construction of Regional Sports Industry Government Behavior Performance Evaluation System

The theoretical basis of this study mainly includes the theory of government behavior, the principle of industrial economics, the theory of regional industry, the theory of public policy and the basic theory of sports industry. This paper analyzes the connotation and decisive factors of government behavior affecting regional sports industry, and establishes the performance evaluation model of regional sports industry government behavior. This study draws on the ideas and methods of the relevant index design research at home and abroad, consults the relevant experts in economics and sports science, combines the actual level of China, and follows the principles of comprehensiveness, scientificity and feasibility of the research to determine the evaluation index system suitable for the performance of the government behavior of China's regional sports industry (see **Figure 1**). It includes the gross national product, the proportion of the tertiary industry in the gross national product, the proportion of the sports industry expenditure in the financial expenditure, the proportion of government funds in the sports industry investment, the Engel coefficient, the sports lottery income, the number of international and national sports events, the number of sports of sports There are 16 indicators, including the number of mobilization, the



**Figure 1.** Sports industry government behavior performance evaluation index system.

bureaus above the county (city), the number of sports schools, and the number number of stadiums, the number of employees in the sports system, the proportion of administrative personnel with bachelor's degree or above, the number of sports-related policies formulated by the provincial (municipal) government, and the number of sports-related documents issued by the provincial (municipal) sports bureau.

## 2.4. Performance Evaluation Method of Regional Sports Industry Government Behavior

This study combines logical analysis with empirical analysis, qualitative analysis with quantitative analysis. It mainly involves the principal component analysis in the multi-index comprehensive evaluation method, and the software used is SPSS 22.0.

### 2.4.1. Basic Ideas of Principal Component Analysis

Principal component analysis is also an advanced multivariate statistical analysis method. The basic idea is to summarize the comprehensive index that can summarize the information of the original index by analyzing the correlation between the original indicators and using the idea of dimensionality reduction.

Let's say  $X_1, X_2, \dots, X_m$  total  $m$  indicators, to use  $Z_1, Z_2, \dots, Z_m$  several comprehensive indicators summarize the information of the  $m$  original indicators, then the following mathematical model can be established:

$$\begin{cases} Z_1 = a_{11}X_1 + a_{12}X_2 + \dots + a_{1m}X_m \\ Z_2 = a_{21}X_1 + a_{22}X_2 + \dots + a_{2m}X_m \\ \vdots \\ Z_m = a_{m1}X_1 + a_{m2}X_2 + \dots + a_{mm}X_m \end{cases}$$

where  $Z_i$  is the original index  $X_1, X_2, \dots$ . The  $i$ th principal component of  $X_m$ ,  $Z_i$ , is the linear combination of the original index with the largest difference, so  $Z_1$  is called the first principal component. The principal components are independent of each other,  $Z_2$  is  $X_1, X_2$ , other than  $Z_1$ ... The linear combination of  $X_m$  has the largest difference. Since the purpose of principal component analysis is to reflect the information of all original indicators with fewer indicators, principal component analysis will reduce the number of original indicators.

### 2.4.2. Steps of Principal Component Analysis

1) Since the original indicators use different dimensions and the units are not uniform, it is necessary to standardize each original indicator before analysis (Wang et al., 2014b)

$$X'_{ij} = \frac{X_{ij} - \bar{X}_j}{S_j}, \quad j = 1, 2, 3, \dots, m$$

The original index is standardized, and then the standardized index  $X'$  is analyzed by the principal component method.

2) Find the correlation matrix  $R$  of the standardized index  $X'$  and analyze the correlation of the original index.

$$R = \begin{bmatrix} r_{11} & r_{12} & \cdots & r_{1m} \\ r_{21} & r_{22} & \cdots & r_{2m} \\ \vdots & \vdots & \ddots & \vdots \\ r_{m1} & r_{m2} & \cdots & r_{mm} \end{bmatrix} = \begin{bmatrix} 1 & r_{12} & \cdots & r_{1m} \\ r_{21} & 1 & \cdots & r_{2m} \\ \vdots & \vdots & \ddots & \vdots \\ r_{m1} & r_{m2} & \cdots & 1 \end{bmatrix}$$

3) Find the eigenvalues and eigenvectors of the correlation matrix

Since  $R$  is a semi-definite matrix, it can be determined by the eigenequation of  $R$

$$|R - \lambda I| = 0$$

The eigenvalues  $\lambda$  of  $m$  correlation matrices are obtained, and  $\lambda$  are all non-negative.

4) Determine the number of principal components. Generally, not all principal components are required, and the number of principal components retained is usually determined according to the following criteria: a) The principal component is determined by the cumulative contribution rate: When the cumulative contribution rate of the current  $k$  principal components reaches a certain value (generally greater than 80%), the  $k$  principal components are retained. b) Principal components are determined by eigenvalues: that is, only principal components whose eigenvalues are greater than 1 are retained (Bao & Wang, 2012).

5) Calculation of factor load and factor load matrix. Factor load is the product of the square root of the eigenvalue and the coefficient of the original index, which reflects the closeness and direction of the relationship between the principal component and the original index (Han et al., 2012). The matrix composed of factor loads is called factor load matrix

$$Q = \begin{bmatrix} \sqrt{\lambda_1} a_{11} & \sqrt{\lambda_1} a_{12} & \cdots & \sqrt{\lambda_1} a_{1m} \\ \sqrt{\lambda_2} a_{21} & \sqrt{\lambda_2} a_{22} & \cdots & \sqrt{\lambda_2} a_{2m} \\ \vdots & \vdots & \ddots & \vdots \\ \sqrt{\lambda_m} a_{m1} & \sqrt{\lambda_m} a_{m2} & \cdots & \sqrt{\lambda_m} a_{mm} \end{bmatrix}$$

6) Calculation of each principal component score. The principal component score can be used to evaluate and infer the sample (Lin & Du, 2013).

### 3. Empirical Analysis

#### 3.1. Research Object

Based on the theory of government behavior, combined with the regional sports industry theory and the existing performance evaluation index system of government behavior, relevant reports were consulted to collect the performance indicators of government behavior in the sports industry of 24 provinces (municipalities directly under the Central Government and autonomous regions) in China in the past five years from 2014 to 2018. Some data are difficult to obtain, so Beijing is not selected as the research object in this study. And perform logical verification on the data to ensure the authenticity and reliability of the data. The

data collected in this paper are mainly from China Statistical Yearbook, local statistical yearbook of various regions, government summary reports, government-related websites and sports industry development reports in the past five years.

## 3.2. Principal Component Analysis

### 3.2.1. Standardization of Government Behavior Performance Evaluation Index Data

Standardization is an equivalent linear transformation, which can eliminate the influence of different index dimensions, maintain the relative comparability of indicators, and retain the correlation of variables. Due to the different dimensions of the regional sports industry government behavior performance evaluation indicators selected in this study, the different dimensions of the indicators have a great impact on the results of principal component analysis, so it is necessary to adopt standardization method for all the indicators before analysis Data conversion of the original indicator. By standardizing raw data metrics,  $X'_{ij} = (X_{ij} - \bar{X}_j) / S_j$  convert to standardized Z-scores.

### 3.2.2. Correlation Coefficient Matrix among Government Behavior Performance Evaluation Indicators

It can be seen from the correlation coefficient matrix of government behavior performance evaluation indicators (**Table 1**) that there is a certain correlation among all indicators, among which the gross national product ( $X_1$ ) and the number of stadiums ( $X_{12}$ ) are highly correlated with each indicator. The proportion of government investment in the sports industry ( $X_4$ ) has a strong positive correlation with the number of sports schools ( $X_{10}$ ), the number of athletes ( $X_{11}$ ) and the number of stadiums ( $X_{12}$ ), and the Engel coefficient ( $X_5$ ) has a negative or weak correlation with most of the indicators, with strong correlation among the indicators and more overlapping information. Therefore, principal component analysis can be used to reduce the dimension of indicators, and the original indicators can be transformed into several unrelated principal components, so as to better evaluate the government behavior performance of provinces (municipalities and autonomous regions).

**Table 1.** Correlation coefficient matrix of sports industry government behavior performance evaluation index.

Index	$X_1$	$X_2$	$X_3$	$X_4$	$X_5$	$X_6$	$X_7$	$X_8$	$X_9$	$X_{10}$	$X_{11}$	$X_{12}$	$X_{13}$	$X_{14}$	$X_{15}$	$X_{16}$
$X_1$	1.000															
$X_2$	0.728	1.000														
$X_3$	0.813	0.545	1.000													
$X_4$	0.535	0.457	0.767	1.000												
$X_5$	-0.472	-0.242	-0.594	-0.365	1.000											
$X_6$	0.458	0.447	-0.071	-0.215	-0.327	1.000										

## Continued

$X_7$	0.632	0.408	0.604	0.014	-0.381	0.678	1.000										
$X_8$	0.252	0.016	0.469	0.078	0.017	0.539	0.893	1.000									
$X_9$	0.569	0.330	0.367	0.210	-0.624	0.541	0.697	0.474	1.000								
$X_{10}$	0.468	0.288	0.792	0.703	-0.498	0.601	0.433	0.569	0.589	1.000							
$X_{11}$	0.345	0.230	0.558	0.744	-0.475	0.646	0.768	0.554	0.543	0.900	1.000						
$X_{12}$	0.505	0.327	0.513	0.772	-0.101	0.757	0.697	0.501	0.702	0.599	0.824	1.000					
$X_{13}$	0.380	0.589	0.472	0.663	-0.798	0.618	0.615	0.456	0.888	0.710	0.721	0.683	1.000				
$X_{14}$	0.827	0.520	0.568	0.533	-0.218	0.065	0.529	0.558	0.787	0.575	0.560	0.677	0.664	1.000			
$X_{15}$	0.738	0.435	0.542	0.644	-0.128	0.127	0.411	0.297	0.601	0.349	0.385	0.664	0.415	0.832	1.000		
$X_{16}$	0.655	0.544	0.601	0.505	-0.203	0.110	0.389	0.135	0.623	0.221	0.228	0.573	0.488	0.735	0.936	1.000	

### 3.2.3. Characteristic Values of Correlation Matrix of Government Behavior Performance Evaluation Indicators

From the characteristic values of correlation matrix of sports industry government behavior performance evaluation index (Table 2), it can be seen that the characteristic values of the first four principal components are all greater than 1 (6.562, 3.487, 1.744, 1.340, respectively), and the cumulative contribution rate is 82.074%. Therefore, it is more appropriate to extract four principal components in this study and synthesize most of the information of government behavior performance evaluation indicators.

### 3.2.4. Factor Load Matrix of Government Behavior Performance Evaluation Index

In order to further understand the correlation between the original index and the principal component, the factor load matrix reflecting the correlation coefficient between the original index and the principal component can be obtained, as shown in Table 3. The professional significance of the four principal components in the unrotated factor load matrix is difficult to explain, and the integration effect of the original data information is not clear, so that each principal component is not representative and has no obvious practical significance. Therefore, the data is rotated, and the orthogonal rotation method of variance maximum is used in this study to obtain the rotated factor load matrix.

As can be seen from Table 3, the first principal component after the rotation of the factor load matrix is closely related to the gross national product ( $X_1$ ), the proportion of the tertiary industry in the gross national product ( $X_2$ ), the Engel coefficient ( $X_5$ ) and the sports lottery income ( $X_6$ ), which mainly reflects the local economic level. The second main component is closely related to the proportion of sports industry expenditure in fiscal expenditure ( $X_3$ ), the proportion of government investment in sports industry investment ( $X_4$ ), the number of sports schools ( $X_{10}$ ), the number of athletes ( $X_{11}$ ) and the number of sports venues ( $X_{12}$ ), which mainly reflects the degree of investment in local sports industry. The third

component is closely related to the number of international and national sports events hosted ( $X_7$ ), the number of MEDALS won in international and national sports events ( $X_8$ ), the number of sports-related policies formulated by the provincial (municipal) government ( $X_{15}$ ) and the number of sports-related documents issued by the provincial (municipal) sports bureau ( $X_{16}$ ), which mainly reflects the sports management policies of local governments. The fourth component is closely related to the number of sports bureaux above the county (city) ( $X_9$ ), the number of employees in the sports system ( $X_{13}$ ) and the proportion of administrative personnel with bachelor's degree or above ( $X_{14}$ ), which mainly reflects the local government's sports industry service ability. Therefore, the four principal components extracted mainly reflect the original number. (Figure 2)

**Table 2.** Characteristic values of correlation matrix of sports industry government behavior performance evaluation index.

Principal component	Initial eigenvalue			Load sum of squares			Load sum of squares		
	Eigenvalue	Variance contribution rate (%)	Cumulative variance contribution rate (%)	Eigenvalue	Variance contribution rate (%)	Cumulative variance contribution rate (%)	Eigenvalue	Variance contribution rate (%)	Cumulative variance contribution rate (%)
1	6.562	41.010	41.010	6.562	41.010	41.010	5.444	34.027	34.027
2	3.487	21.791	62.801	3.487	21.791	62.801	4.089	25.559	59.586
3	1.744	10.900	73.701	1.744	10.900	73.701	2.043	12.770	72.355
4	1.340	8.373	82.074	1.340	8.373	82.074	1.555	9.719	82.074
5	0.743	4.646	86.720						
6	0.524	3.275	89.994						
7	0.357	2.233	92.227						
8	0.332	2.073	94.300						
9	0.278	1.740	96.040						
10	0.226	1.411	97.451						
11	0.105	0.656	98.107						
12	0.102	0.639	98.745						
13	0.081	0.507	99.252						
14	0.054	0.339	99.592						
15	0.033	0.208	99.800						
16	0.032	0.200	100.000						

**Table 3.** Factor load matrix of correlation matrix of sports industry government behavior performance evaluation index.

	Original factor load matrix				Factor load matrix after rotation			
	1	2	3	4	1	2	3	4
$X_1$	0.775	0.521	-0.199	0.051	0.804	0.127	0.022	0.256
$X_2$	0.519	0.379	-0.242	0.524	-0.682	0.120	-0.011	0.065

Continued

$X_3$	0.147	0.042	0.848	0.329	0.514	-0.039	0.203	0.167
$X_4$	0.326	-0.047	-0.063	0.792	0.753	0.003	0.147	0.233
$X_5$	0.786	0.000	0.379	-0.194	0.117	0.852	0.030	-0.114
$X_6$	0.746	-0.450	-0.056	0.013	0.148	-0.836	0.130	0.155
$X_7$	0.653	0.270	-0.279	-0.304	0.011	0.615	-0.145	-0.098
$X_8$	0.593	-0.246	0.009	-0.396	0.086	0.721	0.093	-0.274
$X_9$	0.842	-0.135	0.351	0.010	0.097	0.636	0.348	0.095
$X_{10}$	0.782	-0.399	-0.290	0.016	0.094	0.052	-0.782	0.215
$X_{11}$	0.733	-0.521	-0.253	0.022	0.007	-0.083	-0.760	0.200
$X_{12}$	0.815	-0.392	-0.188	0.060	0.191	0.055	0.031	0.643
$X_{13}$	0.770	-0.204	0.511	0.071	0.056	0.136	0.369	0.733
$X_{14}$	0.477	0.755	-0.278	0.022	0.060	0.103	-0.130	0.894
$X_{15}$	0.375	0.890	0.074	-0.074	-0.136	0.047	0.867	0.013
$X_{16}$	0.358	0.852	0.214	-0.157	-0.141	0.103	0.934	-0.100

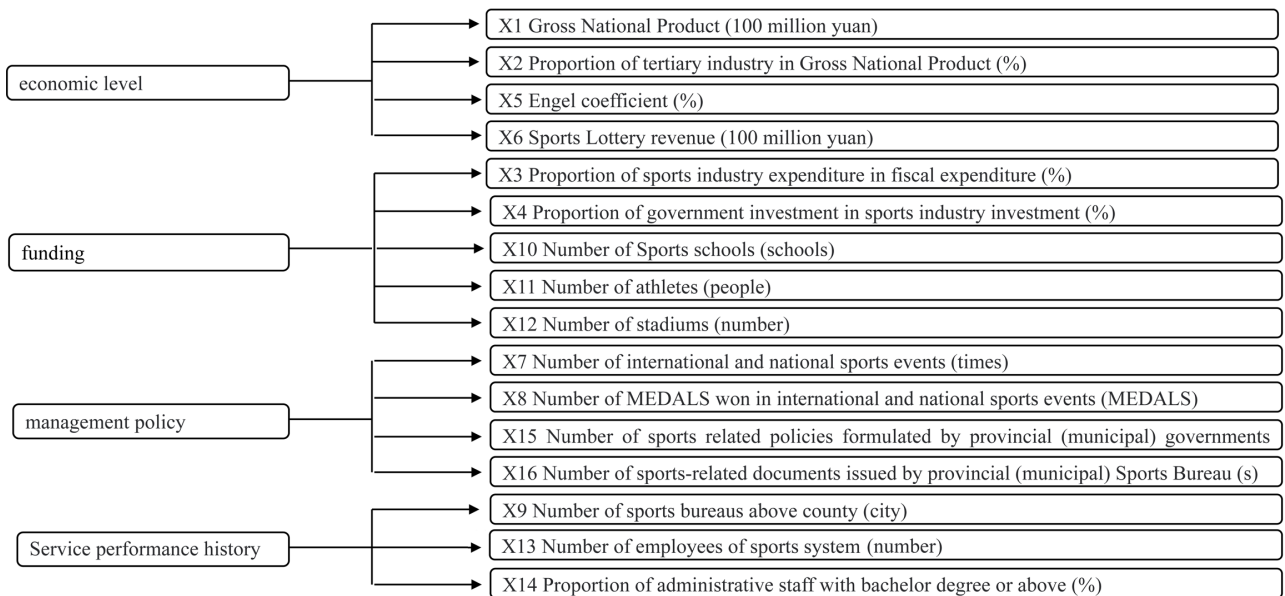


Figure 2. Principal components of sports industry government behavior performance evaluation index.

### 3.2.5. Government Behavior Performance Evaluation Index Factor Score Coefficient Matrix

After principal component analysis, the original index reflecting the performance evaluation of sports industry government behavior is reduced to four independent principal components, which summarize the economic level, capital investment, management policy and service ability of the original data. According to the sports industry government behavior performance evaluation index factor score coefficient matrix (see Table 4), the expression of four principal components can be listed as follows:

Economic level:

$$Z_1 = 0.536X_1 - 0.339X_2 + 0.422X_3 + 0.558X_4 + \dots + 0.077X_{16}$$

Capital input:

$$Z_2 = 0.192X_1 + 0.089X_2 + 0.070X_3 + 0.071X_4 + \dots + 0.240X_{16}$$

Management Policy:

$$Z_3 = 0.071X_1 - 0.049X_2 + 0.209X_3 + 0.073X_4 + \dots + 0.416X_{16}$$

Service capability:

$$Z_4 = 0.088X_1 + 0.123X_2 + 0.138X_3 + 0.083X_4 + \dots + 0.120X_{16}$$

**Table 4.** Sports industry government behavior performance evaluation index factor score coefficient matrix.

	1	2	3	4
$X_1$	0.536	0.192	0.071	0.088
$X_2$	-0.339	0.089	-0.049	0.123
$X_3$	0.422	0.070	0.209	0.138
$X_4$	0.558	0.071	0.073	0.083
$X_5$	0.087	0.352	0.215	-0.161
$X_6$	0.162	0.556	-0.002	0.034
$X_7$	0.115	0.369	-0.162	-0.162
$X_8$	0.165	0.324	-0.020	-0.069
$X_9$	0.088	0.403	0.225	-0.011
$X_{10}$	0.183	-0.026	0.429	0.066
$X_{11}$	0.190	-0.063	0.510	0.063
$X_{12}$	0.170	-0.033	-0.066	0.386
$X_{13}$	0.084	-0.021	0.200	0.492
$X_{14}$	-0.023	0.137	-0.128	0.570
$X_{15}$	-0.078	0.151	0.350	-0.043
$X_{16}$	-0.077	0.240	0.416	-0.120

**3.2.6. Performance Evaluation of Government Behavior in Provinces (Municipalities Directly under the Central Government and Autonomous Regions)**

1) Comprehensive score of government behavior performance evaluation. Using the expression of each principal component and the variance contribution rate of each factor as the weight, we can calculate the government behavior performance ranking of all regions in China. Publicity can be expressed as:

$$Z \text{ synthesis} = Z_1 \times 34.027\% + Z_2 \times 25.559\% + Z_3 \times 12.770\% + Z_4 \times 9.719\%$$

As can be seen from the scores of government behavior performance evaluation

of provinces (municipalities directly under the Central Government and autonomous regions) (Table 5), the comprehensive scores of government behavior performance evaluation of economically developed regions such as Guangdong, Shanghai and Jiangsu are relatively high, while the comprehensive scores of government behavior performance evaluation of some economically underdeveloped regions (such as Guizhou, Gansu and Qinghai) have been at a low level in the past five years.

**Table 5.** Comprehensive scores of government behavior performance evaluation of provinces (municipalities directly under the Central Government and autonomous regions).

District	The year 2014	The year 2015	The year 2016	The year 2017	The year 2018	Mean value
Guangdong	1.08	1.14	1.45	1.52	2.05	1.45
Shanghai	1.16	1.03	0.96	1.24	1.42	1.16
Jiangsu	0.79	0.97	0.79	0.56	1.18	0.86
Shandong	0.70	0.57	0.74	0.53	1.03	0.71
Zhejiang	0.37	0.76	0.58	0.43	0.97	0.62
Liaoning	0.41	0.48	0.68	0.55	0.95	0.61
Hubei	0.40	0.46	0.43	0.41	0.76	0.49
Fujian	0.31	-0.08	0.38	0.33	0.73	0.33
Anhui	0.07	0.41	0.26	0.27	0.57	0.32
Heilongjiang	0.13	-0.11	0.37	0.29	0.68	0.27
Chongqing	-0.32	0.83	0.56	-0.22	0.46	0.26
Hebei	0.25	0.38	0.02	0.22	0.34	0.24
Hubei	0.06	-0.44	0.24	0.24	0.56	0.13
Sichuan	0.03	-0.45	0.08	0.23	0.49	0.08
Tianjin	-0.03	0.15	-0.18	0.12	0.14	0.04
Shanxi	-0.31	-0.17	0.06	0.16	0.35	0.02
Jilin	-0.28	0.15	-0.04	-0.14	0.22	-0.02
Guangxi	-0.21	-0.19	-0.23	-0.14	-0.10	-0.17
Jiangxi	-0.32	-0.57	-0.58	-0.36	0.32	-0.30
Shanxi	-0.97	-1.11	-1.01	0.47	0.77	-0.37
Inner Mongolia	-0.78	-0.90	-0.70	-0.47	-0.11	-0.59
Guizhou	-1.14	-1.72	-1.04	0.02	0.16	-0.74
Gansu	-0.98	-1.24	-1.03	-0.77	-0.78	-0.96
Qinghai	-1.19	-1.96	-1.26	-1.16	-0.77	-1.27

2) The growth rate of the comprehensive score of government behavior performance evaluation. According to the comprehensive score of government behavior performance evaluation of each province (municipality directly under the Central Government, autonomous region), the growth rate of the comprehensive score of performance evaluation of each region can be calculated, and the calculation formula is as follows.

As can be seen from **Table 6**, the comprehensive scores of government behavior performance evaluation of all provinces (municipalities directly under the Central Government and autonomous regions) have increased in the past five years, among which Sichuan Province has the fastest growth rate, followed by Hunan, Anhui and Tianjin, with growth rates of more than 100%. Gansu had the lowest growth rate in the past five years.

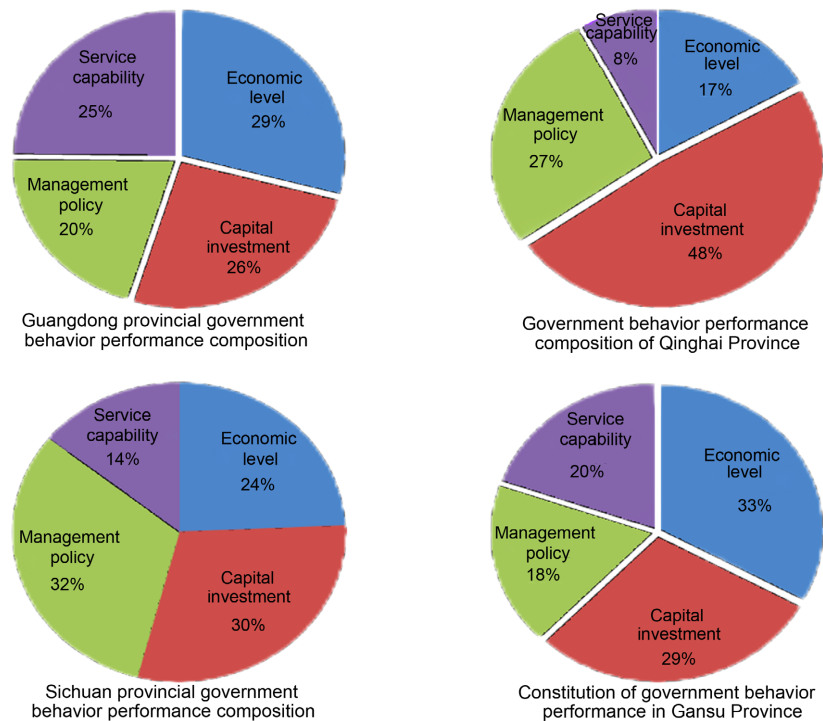
**Table 6.** Growth rate of comprehensive scores of government behavior performance evaluation of provinces (municipalities and autonomous regions) (%).

District	The year 2011	The year 2012	The year 2013	The year 2014	Mean value
Sichuan	-1600.00	117.78	187.50	113.04	383.33
Hunan	-833.33	154.55	0.00	133.33	208.33
Anhui	485.71	-36.59	3.85	111.11	178.57
Tianjin	600.00	-220.00	166.67	16.67	141.67
Heilongjiang	-184.62	436.36	-21.62	134.48	105.77
Chongqing	359.38	-32.53	-139.29	309.09	60.94
Shaanxi	45.16	135.29	166.67	118.75	53.23
Jiangxi	-78.13	-1.75	37.93	188.89	50.00
Shanxi	-14.43	9.01	146.53	63.83	44.85
Jilin	153.57	-126.67	-250.00	257.14	44.64
Zhejiang	105.41	-23.68	-25.86	125.58	40.54
Fujian	-125.81	575.00	-13.16	121.21	33.87
Liaoning	17.07	41.67	-19.12	72.73	32.93
Guizhou	-50.88	39.53	101.92	700.00	28.51
Hubei	15.00	-6.52	-4.65	85.37	22.50
Guangdong	5.56	27.19	4.83	34.87	22.45
Inner Mongolia	-15.38	22.22	32.86	76.60	21.47
Guangxi	9.52	-21.05	39.13	28.57	13.10
Jiangsu	22.78	-18.56	-29.11	110.71	12.34
Shandong	-18.57	29.82	-28.38	94.34	11.79

Continued

Hebei	52.00	-94.74	1000.00	54.55	9.00
Qinghai	-64.71	35.71	7.94	33.62	8.82
Shanghai	-11.21	-6.80	29.17	14.52	5.60
Gansu	-26.53	16.94	25.24	-1.30	5.10

3) Analysis of government behavior performance evaluation score composition. The provinces and cities with the highest and lowest comprehensive scores and growth rates of government behavior performance evaluation were selected to analyze their score composition. As can be seen from **Figure 3**, Guangdong Province has a higher economic level and capital input, a more balanced proportion of each component, and the highest comprehensive score in the performance evaluation of government behavior; The economic level, capital investment, management policy and service ability of Qinghai Province are all low, and all parts are extremely unbalanced, capital investment occupies a large proportion, and the comprehensive score of government behavior performance evaluation is the lowest. The government behavior performance of Sichuan province is mainly government management policy and capital input, and the comprehensive score increases the fastest; In Gansu Province, the investment of each part is small, the proportion of management policy and capital investment is low, and the comprehensive score of government behavior performance evaluation has the slowest growth rate. It can be seen that in the performance of government behavior,



**Figure 3.** Composition of government behavior performance score.

capital investment is the core of the development of the sports industry, management policy is the key to the development of the sports industry, economic level is the leading role of the development of the sports industry, and service ability is the auxiliary of the development of the sports industry. The four complement each other and are indispensable.

#### **4. Ways to Improve the Performance of Regional Sports Industry Government Behavior**

China's sports industry keeps up with the pace of The Times and develops with the improvement of various sports policies. After more than 40 years of efforts, China's sports industry has continuously improved and innovated, and created a good development situation. At present, all kinds of sports service hardware in our country are becoming more and more perfect, the sports market is becoming more and more active, and the sports industry has gradually become a hot spot of economic consumption and development investment of the social masses. China's sports industry has become an important part of the national economy, and will hopefully become the pillar industry of China's economic growth in the future. The sports industry has played a more and more significant role in the industry of our country, not only improving the regional economic level, optimizing the structure of economic development, but also increasing regional jobs and improving the quality of life of residents. The research results of this paper show that in the government behavior performance of the sports industry, capital investment is the core of development, management policy is the key to development, economic level is the leading development, service ability is the auxiliary development, the four together constitute the main body of the development of the sports industry, complement each other, indispensable. Therefore, governments at all levels should give full play to the influencing factors of government behavior to improve the development level of regional sports industry.

1) Improve government support and improve sports industry policies. Good sports industry is inseparable from policy support and vigorous advocacy. From the foreign research status, many countries attach great importance to the sports industry policy for a long time, provide various preferential policies for sports organizations, and the sports industry has become the pillar industry of the country. Our government should promote the transformation of sports management methods, draw lessons from foreign advanced experience, formulate a reasonable and effective industrial policy in line with the actual development of our country's sports industry, and vigorously develop the sports industry. a) To plan and build a number of high-quality industrial projects, widely attract domestic and foreign investment, by the government to focus on procurement, and provide loan discounts, project subsidies and later incentives and other policies, encourage multiple parties to participate in raising funds, support in line with the government policy guidance direction of corporate sports products and services, improve the influence of sports brands with potential. b) Strengthen policy guidance and

encouragement, the state should provide appropriate policy preferences for the development of the sports industry, and promote the driving role of policies for the development of the sports industry. The government assumes the function of sports industry management, should carry out system innovation, focus on popularizing and improving youth sports, give full play to the guiding role of funds, actively attract the participation of social funds, support social organizations to increase investment in sports undertakings, and promote the rapid development of sports industry. c) Improve the financial accounting system, increase the income tax deduction of independent innovation income of sports enterprises, exempt some technical consulting and technical training income of scientific research institutions and colleges and universities from income tax, and encourage scientific research institutions to conduct new product research and development. By formulating relevant supporting policies such as industry support, foreign investment introduction and tax preference, the government can effectively induce the investment of sports industry resources, promote enterprises to cultivate their own innovation ability, and improve the initiative of scientific research institutions (Wang et al., 2014a).

2) Strengthen the research of sports economy and increase the investment of sports industry. The development of foreign sports industry has provided the experience foundation for the rapid development of China's sports industry, made people's values changed, and gradually found the development potential of sports industry. With the rapid development of our country's economy, the development potential of the sports industry has been gradually tapped, and its position in the national economy has gradually appeared. However, the service capacity of China's sports industry is limited, so we should increase financial support, speed up the improvement of public sports facilities, promote the supply of sports products and the improvement of service capacity, and actively develop the sports industry (Yang, 2012b). The construction of sports facilities is the foundation of the development of sports industry, and the backward sports facilities cannot create favorable conditions for the development of sports development, which has a serious impact on the development and improvement of regional sports industry level. Governments at all levels should provide preferential investment policies, prioritize project approval for sports facilities construction, provide corresponding supporting funds in a timely manner, and appropriately provide certain discount interest policies for sports industry loans (Lu, Ni, & Xiong, 2009). Local sports departments should encourage the development of the sports industry, combined with the local actual situation, jointly revise the development plan with relevant departments, strengthen the construction of sports facilities and the transformation of old sports facilities, integrate the mass fitness, sports competitions and leisure and entertainment functions of sports facilities, comprehensively develop the utilization value of sports facilities, and improve the utilization rate of sports facilities under construction. The construction of sports venues requires a large amount of funds, should refer to the international organization of large-scale events, increase financial support, combined with the development of China's

sports industry, to establish and improve multi-directional investment and financing channels. National policy institutions can use their own professional and information advantages to establish sports industry funds, develop sports industry investment, investment and financing in capital operation business, financing planning, guaranteed transactions, etc., in order to reduce investment risks, increase industrial development funds, alleviate government financial pressure, make up for the shortcomings in China's sports industry, and accelerate the development of sports industry.

3) Attach importance to personnel training and introduce high-end management talents. China's sports market started late, the early government investment is limited, resulting in the slow development of the sports industry, the lack of management personnel, especially in the planning, marketing, promotion and other aspects of the lack of experience, far from meeting the needs of industrial development, in the international competition is often at a disadvantage. Science and technology are created and improved by people. Talent is the driving force to promote social development and progress, and it is one of the most important strategic resources. The development of sports industry needs the promotion of all kinds of high-quality and high-level talents. At present, there are not many talents in China's sports industry. Although most of the event executors have the background of athletes, they lack the training of commercial operation. People who have received training in commercial operation have not understood the laws of the development of the sports industry. Colleges and universities are basic positions for the training of all kinds of talents in our country. The government should pay attention to the cultivation of sports talents, and provide financial support and help for each sports college to cultivate more and better professional sports talents. According to the actual situation, sports colleges and universities can appropriately relax the difficulty of selecting talents in order to expand the ranks of sports professionals; In physical education teaching, we can add sports industry courses to the curriculum and carry out targeted physical education. At the same time, our country should organize a team of professionals to research abroad (Bao, Bao, & Zhang, 2018), study the policy system of the development of foreign sports industry, and formulate effective policies in line with our basic national conditions to promote the rapid development of our sports industry. The future development of sports industry depends on outstanding talents, we must speed up the introduction of sports industry talents, especially high-end management talents, and promote the rapid development of sports industry. The introduction of high-end management talents not only improves the management level and level of the sports industry, but also promotes the international development of China's sports industry. In short, only by continuously training and strengthening the construction of sports talent team, providing manpower support for the development of industry, can our sports industry be further developed.

4) Improve the market supervision mechanism and maintain the development and stability of the sports industry. The development of anything has its own laws, the development of sports industry must follow its internal logic, we must

strengthen the supervision and management of sports industry market. The market supervision mechanism is crucial to maintaining the market order of the sports industry, and is an important means for the state to carry out macro-control. A unified, open and orderly sports market system enables the production and operation of the sports industry to be freely exchanged and circulated throughout the country in accordance with unified market rules. China should gradually improve the supervision mechanism of the sports industry on the basis of grasping the core elements of the development of the sports industry, and finally establish an orderly and efficient supervision mechanism of the sports industry (Zheng, 2011). First of all, clarify the functions and division of labor of various government regulatory departments, combine government supervision and self-regulatory supervision, and establish an operating mechanism of government supervision, social supervision and market supervision of the sports industry. Secondly, improve the legal system of China's sports industry supervision, including the formulation of a series of laws and regulations matching the sports industry supervision, as well as the specific arrangements for the implementation of the system, which is an important foundation for the establishment of the sports industry supervision mechanism. Finally, the establishment of sports industry supervision and operation mechanism, incentive mechanism and restraint mechanism combined system to form a complete system of sports industry supervision mechanism system. To construct and improve the supervision mechanism of sports industry in our country and strengthen the efficiency of supervision of sports industry market is an important role in preventing and defusing sports industry risks, which is the basic premise of guaranteeing the scientific development and operation of sports industry.

## 5. Conclusion

As a sunrise industry in our country, sports industry plays an important role in economic and social development. The development of the regional sports industry depends on the effective regulation of the local government, and the government promotes the development of the regional sports industry in the aspects of policy formulation, service supply, market supervision and capital investment. This study analyzes the influence of government behavior performance on regional sports industry, and proposes ways to improve government behavior performance, which provides a theoretical basis for accelerating the development of regional sports industry in China. The economic structure of a region significantly impacts the development of its sports industry. An advanced and diversified economic structure tends to support a robust sports sector through better infrastructure, higher disposable incomes, and greater investment in sports activities and facilities. Conversely, a more limited economic structure might constrain these factors, resulting in fewer resources for sports development. In summary, there is a symbiotic relationship where economic prosperity boosts the sports industry, which in turn can contribute to the economy through job creation, tourism, and associated industries.

## Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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