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The AHP analysis of folk sports inheritance under the circumstance of new urbanization construction

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ABSTRACT

China is translating into a urbanized country from a rural one. As the urbanization gains its development, folk sports are facing important tests. As the economy of our country grows, the reform and opening-up brings some advanced systems from foreign countries. For the analysis of folk sports in our country grows yearly and the need of searching for the modes and methods that suitable for the features of folk sports in our country, lots of scholars begin to research folk sports. This text takes advantage of AHP Model and get the degree and the current situation of folk sports inheritance under the circumstance of new urbanization construction. Moreover, the text uses some folk sports events from Chinese intangible cultural heritage to analyze.

KEYWORDS

Folk sports; AHP analysis; New urbanization; Intangible cultural heritage.



INTRODUCTION

The Olympic Games of 2008 in Beijing made our country call on an activity of nationwide body-building. The pageant not only influenced those large-scale and medium-sized cities in the country, but also had effect on the relatively undeveloped countryside. It has not only improved China's sports industry, but also quickened China's pace to becoming a world sports power in the aspect of economy, education and culture, etc.

According to the intangible cultural heritage relevant to folk sports events in TABLE 1 and TABLE 2, more and more folk sports in our country are concerned as time goes by.

TABLE 1 : Folk sports events in the first batch of national intangible cultural heritage

Classification	Quantity	Sporting events	Region and area
Custom	70	Water sprinkling Festival, Torch Festival, March-the-third Festival, etc.	The Dai, Yi, Li nationality, etc.
Folk dance	41	Yangko, Waist drum, Dragon dance, Flower-drum lantern, Stilt, etc.	Yunnan, Guizhou, Guangxi, Qinghai, Sichuan Chongqing, etc.
Acrobatics and competition	17	Shaolin Kung Fu, Zhongdao wushu of Hui, etc.	Beijing, Tianjin, etc.

TABLE 2 : Folk sports events in the second batch of national intangible cultural heritage

Classification	quantity	Sporting events	Region and area
Custom	51	Chang Gu Dance of Yao and Gaoshan nationality, etc.	Hunan Jianghua Yao Autonomous county, Guangxi Zhuang Autonomous Region, Fujian Huaan county, Tibet Autonomous, etc.
Folk dance	55	Manchu pearl ball, Mantis boxing, Form and will boxing, E Mei wushu, etc.	Jilin in Jilin province, Laiyang in Shandong province, Shenzhou in Hebei province, Emeishan in Sichuan province, etc.
Acrobatics and competition	38	Binyang firecracker Dragon Festival, Miao Du Mu Dragon Boat Festival, Da Tie Hua, etc.	Binyang county in Guangxi Zhuang Autonomous Region, Taijiang county in Guizhou Province, Queshan county in Henan province, etc.

In accordance with the situation of Chinese traditional culture application, there will be more and more sporting events of intangible cultural heritage accepted as Chinese folk sports become more and more agreeable.

MODEL CONSTRUCTION AND ANALYSIS

AHP origins from 1970s, found by an American professor of operations research. It separates the factors relevant to the objects into Goal, Criteria and Alternatives. Also, AHP forms a good qualitative and quantitative analysis.

Model the problem as a hierarchy

This text quantifies the mode of university physical education based on AHP and establishes the relationship between Goal, Criteria and Alternatives.

Goal:Folk sports culture inheritance

Criteria:The influential factors of the program are c_1 For entertainment, c_2 Mental relaxation, c_3 Physical exercise, c_4 Safety.

Alternatives: A_1 Folk sports, A_2 International popular sports, A_3 The domestic popular sports
 The hierarchy is as Figure 1 shows:

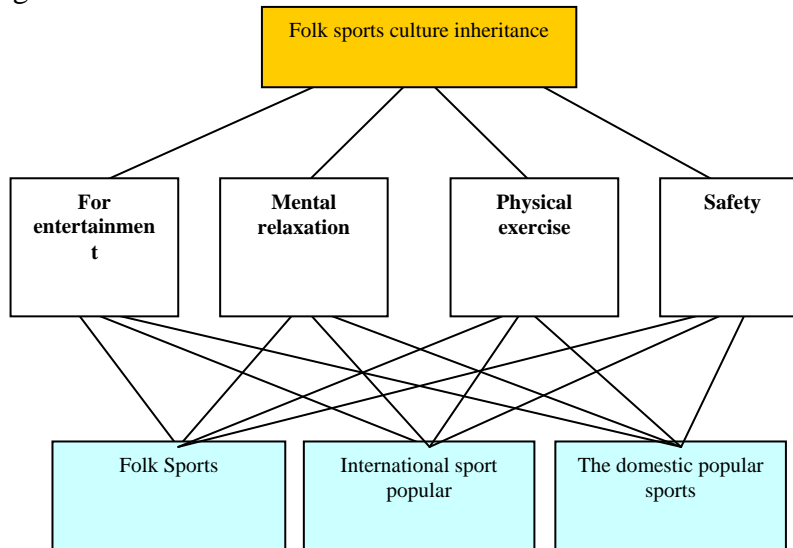


Figure 1 : Class hierarchy

Establish the judgment (by making a series of judgments based on pairwise comparisons of the elements.) matrices.

The objects in the Criteria have different proportions. Researchers can study the Criteria and judge the proportions of the objects by 1~9 and their reciprocals. This text analyzes priorities according to the scale TABLES 1~9 in TABLE 3.

TABLE 3 : Scale 1~9

Scale a_{ij}	Definition
1	Factor i and Factor j are equally important
3	Factor i and Factor j are slightly important
5	Factor i and Factor j are relatively important
7	Factor i and Factor j are very important
9	Factor i and Factor j are absolutely important
2 4 6 8	The corresponding scale values of the mediacy between the judgments above
Reciprocal	If Factor i and Factor j are relatively weak, the judgment values will be reciprocal.

Figure 2 is the scale table of 1~9

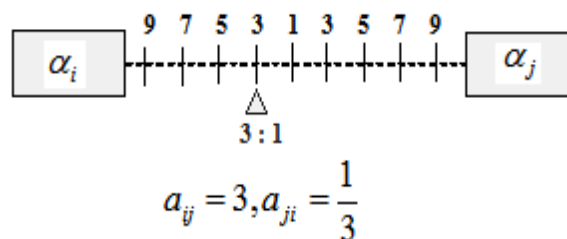


Figure 2 : Scale table of 1~9

First is to solve the judgment matrices. Then according to the rules above, the setting of scale 1~9, the experience of experts and the author and large amounts of bibliography, we can get the matrices based on pairwise comparisons. They are TABLE 4~8

TABLE 4: Comparison matrix G

G	c_1	c_2	c_3	c_4
c_1	1	1/3	3	3
c_2	31/8	1	5	5
c_3	1/3	1/5	1	1
c_4	1/3	1/5	1	1

TABLE 5 : Comparison matrix c_1

c_1	A_1	A_2	A_3
A_1	1	2	1/3
A_2	1/2	1	1/5
A_3	3	5	1

TABLE 6 : Comparison matrix c_2

c_2	A_1	A_2	A_3
A_1	1	8	6
A_2	1/8	1	5
A_3	1/6	1/5	1

TABLE 7 : Comparison matrix c_3

c_3	A_1	A_2	A_3
A_1	1	9	4
A_2	1/9	1	5
A_3	1/4	1/5	1

TABLE 8: Comparison matrix c_4

c_4	A_1	A_2	A_3
A_1	1	5	8
A_2	1/5	1	6
A_3	1/8	1/6	1

Do hierarchical single arrangement and test its consistence

To check by the standard of consistence:

Assume that in the comparison matrix, λ_{\max} is the biggest characteristic value and n is the order of the comparison matrix:

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

The value of CI is relatively small and it means that the judgment matrix is very close to complete consistence. The bigger CI is, the degree of consistence are lower.

Establish the hierarchical overall arrangement and test its consistence

$$A = \begin{pmatrix} 1 & 1/3 & 3 & 3 \\ 3 & 1 & 5 & 5 \\ 1/3 & 1/5 & 1 & 1 \\ 1/3 & 1/5 & 1 & 1 \end{pmatrix}$$

Column vector normalization $\rightarrow \begin{pmatrix} 0.224 & 0.182 & 0.3 & 0.29 \\ 0.065 & 0.587 & 0.52 & 0.56 \\ 0.141 & 0.125 & 0.13 & 0.23 \\ 0.191 & 0.115 & 0.12 & 0.63 \end{pmatrix}$

According to the row sum $\rightarrow \begin{pmatrix} 1.056 \\ 2.62 \\ 0.346 \\ 0.313 \end{pmatrix}$

The normalized $\rightarrow \begin{pmatrix} 0.245 \\ 0.545 \\ 0.0865 \\ 0.0945 \end{pmatrix} = W^{(0)}$

$$AW^{(0)} = \begin{pmatrix} 1 & 1/3 & 4 & 3 \\ 3 & 1 & 6 & 5 \\ 1/4 & 1/6 & 1 & 1 \\ 1/3 & 1/5 & 1 & 1 \end{pmatrix} \begin{pmatrix} 0.234 \\ 0.565 \\ 0.0925 \\ 0.0935 \end{pmatrix} = \begin{pmatrix} 1.042 \\ 2.265 \\ 0.327 \\ 0.394 \end{pmatrix}$$

$$\lambda_{\max}^{(0)} = \frac{1}{4} \left(\frac{1.232}{0.231} + \frac{2.265}{0.555} + \frac{0.327}{0.0925} + \frac{0.302}{0.0975} \right) = 4.25$$

$$w^{(0)} = \begin{pmatrix} 0.251 \\ 0.555 \\ 0.097 \\ 0.097 \end{pmatrix}$$

In this way the matrix can be judged:

$$B_1 = \begin{pmatrix} 1 & 1 & 1/5 \\ 1 & 1 & 1/3 \\ 5 & 3 & 1 \end{pmatrix}, B_2 = \begin{pmatrix} 1 & 6 & 5 \\ 1/6 & 1 & 5 \\ 1/5 & 1/5 & 1 \end{pmatrix}, B_3 = \begin{pmatrix} 1 & 3 & 8 \\ 1/3 & 1 & 5 \\ 1/8 & 1/5 & 1 \end{pmatrix}, B_4 = \begin{pmatrix} 1 & 6 & 8 \\ 1/6 & 1 & 5 \\ 1/8 & 1/5 & 1 \end{pmatrix}$$

The corresponding biggest characteristic value and the eigenvector from the text are:

$$\lambda_{\max}^{(1)} = 3.58, \omega^{(1)} = \begin{Bmatrix} 0.224 \\ 0.224 \\ 0.572 \end{Bmatrix}$$

$$\lambda_{\max}^{(2)} = 3.59, \omega^{(2)} = \begin{Bmatrix} 0.641 \\ 0.2591 \\ 0.069 \end{Bmatrix}$$

$$\lambda_{\max}^{(3)} = 3.41, \omega^{(3)} = \begin{Bmatrix} 0.648 \\ 0.204 \\ 0.148 \end{Bmatrix}$$

$$\lambda_{\max}^{(4)} = 3.61, \omega^{(4)} = \begin{Bmatrix} 0.658 \\ 0.194 \\ 0.158 \end{Bmatrix}$$

To check by the standard of consistence: $CI = \frac{\lambda_{\max} - n}{n - 1}$, $CR = \frac{CI}{RI}$, 如TABLE 9.

TABLE 9 : RI value

n	1	2	3	4	5	6	7	8	9	10	11
RI	0	0	0.58	0.90	1.12	1.24	1.32	1.41	1.45	1.49	1.51

(1)The matrix A is gained. $\lambda_{\max}^{(0)} = 4.073, RI = 0.9$

$$CI = \frac{4.073 - 4}{4 - 1} = 0.24$$

$$CR = \frac{CI}{RI} = \frac{0.024}{0.90} = 0.027 < 0.1$$

It means that the inconsistency test of A is effective and it moved in a allowed range. The eigenvector of A can replace the weight vector.

Similarly, making the consistence tests of judgment matrices B_1, B_2, B_3, B_4 can get the weight vector. Hierarchy structure images are used to depict the calculations from Goal to Alternatives, as Figure 3 shows:

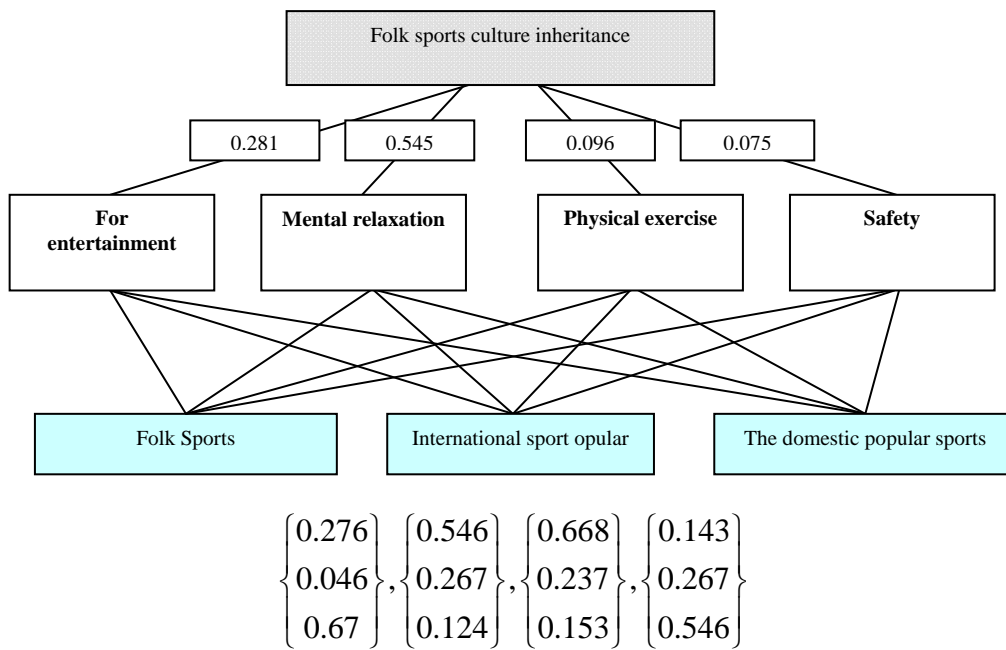


Figure 3 : Hierarchy structure

The calculations are:

$$\omega^{(1)} = (\omega_1^{(1)}, \omega_2^{(1)}, \omega_3^{(1)}, \omega_4^{(1)})$$

$$= \begin{Bmatrix} 0.624 & 0.185 & 0.252 & 0.575 \\ 0.234 & 0.240 & 0.089 & 0.286 \\ 0.136 & 0.575 & 0.66 & 0.139 \end{Bmatrix}$$

$$w = w^{(1)} w^{(0)}$$

$$= \begin{Bmatrix} 0.254 & 0.565 & 0.642 & 0.184 \\ 0.083 & 0.287 & 0.233 & 0.250 \\ 0.36 & 0.135 & 0.126 & 0.565 \end{Bmatrix} \begin{Bmatrix} 0.527 \\ 0.067 \\ 0.124 \\ 0.273 \end{Bmatrix}$$

$$= \begin{Bmatrix} 0.553 \\ 0.24 \\ 0.157 \end{Bmatrix}$$

According to the priorities, the education mode of folk sports is of 55.3%, international sports of 24%, national sporting events of 29%. Consequently, it can be learnt that in the mode of university education, club education takes a big proportion.

CONCLUSION

As the Olympic Games become more and more popular, many folk sports in many countries are facing the threaten of being encroached. So, in order to protect the national folk sports and its diversity, the government should play a part to quicken the construction of relevant laws and strengthen the publicity and education degree of our national folk sports.

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