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The evaluate research on the WuShu industry under the population and spreading in Chinese folk

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ABSTRACT

Under the popularization and promotion of folk art, the construction of WuShu got an unprecedented development. Since then, WuShu not only develop in the country, but also had greatly influence to the world. WuShu become a kind of fit and healthy sport; at the same time, it is also a folk art whichfull of huge cultural atmosphere. This paper analyzed the martial art through the fuzzy comprehensive evaluation from the perspective of the government promotion. In the research, martial tourism industry, personnel cultivation, tissue culture and WuShu career revitalization, four aspects were studied. Get the evaluation result Z as excellent. For now, Chinese martial industry has good advantage for further development.

KEYWORDS

WuShu industry; Fuzzy evaluation; The tourism industry; Physical fitness; Physical exercise.

INTRODUCTION

As the vigorously promotion of WuShu industry in the 20th century, China successfully held the 1991 China Zhengzhou International Shaolin Wushu Festival. Today, there are problems in different degree of the various WuShu in the world. However, on the whole, with the rapid development of WuShu career, the development of WuShu has a good trend.

TABLE 1 shows the situation of previous shaolin WuShu festival. With the substantial increase of the WuShu industry, the number of athletes in each participating country growth by the year. WuShu festivals are held in the most intensive places of Chinese WuShu industry, it shows that WuShu festival plays an important role in promoting the influence of Chinese WuShu career to the world

TABLE 1 : The situation of previous shaolin WuShu festival

Year	session	venue	The number of competing countries	Number of Players
	China	Zhengzhou	International Shaolin	WuShu Festival
1991	First	Zhengzhou in Henan province	16	317
1992	Second	Zhengzhou in Henan province	22	350
1993	Third	Zhengzhou in Henan province	21	379
1995	Fourth	Zhengzhou in Henan province	27	620
1997	Fifth	Zhengzhou in Henan province	26	567
1999	Sixth	Zhengzhou in Henan province	18	402
2001	Seventh	Zhengzhou in Henan province	26	765
	world	Traditional	International Shaolin	WuShu Festival
2004	First	Zhengzhou in Henan province	62	2116
2006	Second	Zhengzhou in Henan province	66	2008
2008	Third	Shi Yan in Hubei province	69	2013
2010	Forth	Shi Yan in Hubei province	81	2264
2010	Eighth	Zhengzhou in Henan province	56	1200

TABLE 2 : The states contestants of WuShu festival

Number of countries	Asia	Europe	North America	South America	Africa	Oceania
First	9	2	3	2	0	1
Second	6	8	3	0	3	0
Third	6	8	4	0	3	0
Fourth	12	7	3	2	1	2
Fifth	14	7	2	0	3	0
Sixth	11	4	1	0	3	0
Seventh	9	10	3	1	2	1

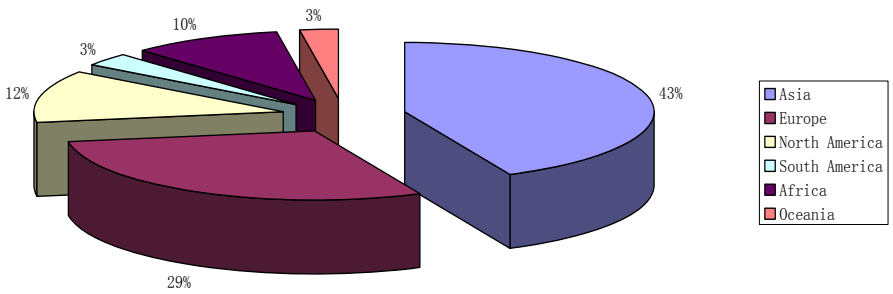

Figure 1 : The states contestants of WuShu festival

By the states contestants of WuShu festival in TABLE 1 and TABLE 2, the coverage of WuShu industry in Asia is the largest, followed by Europe; WuShu have been widely supported and developed in Europe. So far, the concept that Chinese WuShu go abroad and carry forward the world has been widely confirmed.

MODELING

Uses the fuzzy comprehensive evaluation, the steps are as follows:

(1)Establish the factors set U :

$$U = \begin{pmatrix} U_1 & U_2 & \cdots & U_k \end{pmatrix}$$

(2)Establish the judge set V (Evaluation set)

$$V = \begin{pmatrix} V_1 & V_2 & \cdots & V_n \end{pmatrix}$$

According to the evaluation system, determine the award level domain

$$V = \{V_1, V_2, V_3, V_4\}$$

= {Very good, good, general, poor}

(3)To establish judgment matrix of fuzzy mapping from U to V , the resulting fuzzy relation matrix is shown below,

First of all, make a judge $f(u_i)(i = 1,2,\cdots,n)$ to any u_i in several factors. Then the fuzzy relation f between U and V can be obtained. That is:

$$f : U \to F(U)$$
$$u_i \mapsto f(u_i) = (r_{i1}, r_{i2}, \cdots, r_{im}) \in F(V)$$

Fuzzy relations are obtained by fuzzy mapping:

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

Each row of fuzzy relationship R reflects the judge degree of influence actors on the object. at the same time, each column of R reflect the judge degree of influence actors on the object.

$$\sum_{i=1}^{n} r_{ij} \quad j = 1, 2, 3, \cdots, m$$

(4)To establish weight set $A=(a_1,a_2,\cdots,a_n)\in F(U)$ that satisfy the condition:

$$\sum_{i=1}^{n} a_i = 1 \quad a_i \geq 0$$

$$B = A \cdot R$$

$$= (a_1, a_2, a_3, \cdots, a_n) \cdot \begin{bmatrix} r_{11} & r_{12} & \cdots & r_{1n} \\ r_{21} & r_{22} & \cdots & r_{2n} \\ \vdots & \vdots & & \vdots \\ r_{m1} & r_{m2} & \cdots & r_{mn} \end{bmatrix}$$

$$= (b_1, b_2, b_3, \cdots, b_n)$$

The fuzzy combination of V is judge set B. To sum up, the change model in fact is as shown in Figure 2.

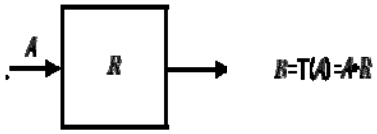

Figure 2 : Change model

As shown in Figure 1, the Change model of fuzzy comprehensive evaluation can be obtained. Thus the transformation function of the corresponding factors level evaluation can be established. The membership functions of evaluation factors u1, u2, u3, u4, u5 can be expressed as follows:

$$u_{v1}(u_1)=\begin{cases}0.5(1+\dfrac{u_i-k_1}{u_i-k_2}), & u_i \ge k_1\\ 0.5(1-\dfrac{k_1-u_i}{k_1-k_2}), & k_2 \le u_i < k_1\\ 0 \quad , & u_i < k_2\end{cases}$$

$$u_{v2}(u_1)=\begin{cases}0.5(1-\dfrac{u_i-k_1}{u_i-k_2}), & u_i \ge k_1\\ 0.5(1+\dfrac{k_1-u_i}{k_1-k_2}), & k_2 \le u_i < k_1\\ 0.5(1-\dfrac{u_i-k_3}{k_2-k_3}), & k_3 \le u_i < k_2\\ 0.5(1-\dfrac{k_3-u_i}{k_2-u_i}), & u_i < k_3\end{cases}$$

$$u_{v1}(u_1)=\begin{cases}0, & u_i \ge k_2\\ 0.5(1-\dfrac{k_1-u_i}{k_2-k_3}), & k_3 \le u_i < k_2\\ 0.5(1+\dfrac{k_3-u_i}{k_2-u_i}), & u_i < k_3\end{cases}$$

Establish the WuShu industry evaluation system, then can get TABLE 3.

TABLE 3: Evaluation index system of WuShu sports undertakings

WuShu tourism industry U_1	Staff training U_2	Tissue culture U_3	The revitalization of WuShu career U_4
WuShu tourism industry land u_{11}	Coaching staff training u_{21}	Competition u_{31}	Business introduction u_{41}
Tourists u_{12}	Teaching staff training u_{22}	Activity u_{32}	Career development u_{42}
WuShu study u_{13}	Teacher introduction u_{23}	Lecture u_{33}	The revitalization of traditional business u_{43}
Daily construction u_{14}	Training costs u_{24}	Visits u_{34}	
Industrial maintenance and replacement u_{15}			

The valuation set can be obtained by the factors in TABLE 3.

$$U_1=\{u_{11},u_{12},u_{13},u_{14}\}$$

$$U_2=\{u_{21},u_{22},u_{23},u_{24},u_{25}\}$$

$$U_3=\{u_{31},u_{32},u_{33}\}$$

$$U_4=\{u_{41},u_{42},u_{43},u_{44}\}$$

The important degree order of the four factors can be obtained by collecting and analyzing the data. As shown in TABLE 4.

TABLE 4:The statistics about important degree order of the four factors

Classification	Rank1	Rank2	Rank3	Rank4
WuShu tourism industry U_1	23	6	5	0
Staff training U_2	0	0	15	18
Tissue culture U_3	4	9	12	10
Career revitalization U_4	3	21	9	0

The ranking matrix of facilities U_1, staff training U_2, tissue culture U_3 and career revitalization U_4 can be obtained by settling the TABLE 4.

$$U_2 = \{23, 7, 4, 0\}$$

$$U_2 = \{7, 18, 8, 0\}$$

$$U_3 = \{4, 9, 12, 10\}$$

$$U_4 = \{3, 0, 9, 21\}$$

The weight vector obtained from 1 to 2:

$$\beta = \{\beta_1, \beta_2, \beta_3, \beta_4\} = \{0.4, 0.3, 0.2, 0.1\}$$

$$U_i^* = U_i \cdot \beta^T$$

$U_1^* = 12$, $U_2^* = 9.7$, $U_3^* = 6$, $U_4^* = 5$

In this paper, make the normalization process:

$U_1^* = 0.35$, $U_2^* = 0.3$, $U_3^* = 0.2$, $U_4^* = 0.15$

get:

$$\bar{A} = (0.35 \quad 0.3 \quad 0.2 \quad 0.15)$$

In this paper, get the membership degree evaluation of language through the WuShu sports, As shown in TABLE 5.

TABLE 5: Evaluation of membership degree

Evaluation methods	Set the score range			
	0-60	60-80	80-90	90-100

Very good	0	0	0.05	0.95
Good	0	0.05	0.9	0.05
General	0.05	0.9	0.05	0
poor	0.95	0.05	0	0

In this paper, TABLE 6 was obtained by the indicators that obtained in WuShu sports evaluation.

TABLE 6 : The evaluation value of the indicators of WuShu sports

Indicators	Evaluation value	Indicators	Evaluation value
WuShu tourism land u_{11}	very good	competition u_{31}	Very good
tourists u_{12}	good	Activity u_{32}	general
WuShu study u_{13}	general	lecture u_{33}	good
Daily construction u_{14}	good	visits u_{34}	general
Industrial maintenance and replacement u_{15}	general	Business introduction u_{41}	good
Coaching staff training u_{21}	Very good	Career development u_{42}	Very good
Teaching staff training u_{22}	Very good	The revitalization of traditional business u_{43}	general
Teacher introduction u_{23}	general		
Training costs u_{24}	good		

The Weighting factor fuzzy set of single index can be obtained by the model above, that is:

$$U_1^* = \{U_{11}, U_{12}, U_{13}, U_{14}, U_{15}\} = \{0.25\ 0.25\ 0.2\ 0.15\ 0.15\}$$

$$U_2^* = \{U_{21}, U_{22}, U_{23}, U_{24}\} = \{0.54\ 0.1\ 0.24\ 0.14\}$$

$$U_1^* = \{U_{31}, U_{32}, U_{33}, U_{34}\} = \{0.4\ 0.3\ 0.1\ 0.2\}$$

$$U_1^* = \{U_{41}, U_{42}, U_{43}\} = \{0.3\ 0.4\ 0.3\}$$

In this paper, through the TABLE 5 and combined with evaluation membership degree, we can get the evaluation collection of facilities U_1, staff training U_2, tissue culture U_3 and career revitalization U_4.

WuShu tourism $U_1 = \begin{pmatrix} 0 & 0 & 0.05 & 0.95 \\ 0 & 0.05 & 0.9 & 0.05 \\ 0 & 0.05 & 0.9 & 0.05 \\ 0.05 & 0.9 & 0.05 & 0 \end{pmatrix}$

Staff training $U_2 = \begin{pmatrix} 0 & 0 & 0.05 & 0.95 \\ 0 & 0 & 0.05 & 0.95 \\ 0 & 0 & 0.05 & 0.95 \\ 0 & 0.05 & 0.9 & 0.05 \end{pmatrix}$

Tissue culture $U_2 = \begin{pmatrix} 0 & 0 & 0.05 & 0.95 \\ 0 & 0 & 0.05 & 0.95 \\ 0 & 0.05 & 0.95 & 0.05 \\ 0 & 0.05 & 0.95 & 0.05 \\ 0 & 0.05 & 0.95 & 0.05 \end{pmatrix}$

Career revitalization $U_4 = \begin{pmatrix} 0 & 0 & 0.05 & 0.95 \\ 0 & 0.05 & 0.9 & 0.05 \\ 0 & 0.05 & 0.9 & 0.05 \end{pmatrix}$

$$B_i = A_i \cdot R_i$$

Make normalization process to B_i, then can get fuzzy evaluation matrix.

$$\bar{B} = \begin{pmatrix} B_1 \\ B_2 \\ B_3 \\ B_4 \end{pmatrix} = \begin{pmatrix} 0.15 & 0.22 & 0.14 & 0.43 \\ 0 & 0.2 & 0.36 & 0.5 \\ 0.07 & 0.46 & 0.35 & 0.12 \\ 0.14 & 0.2 & 0.3 & 0.36 \end{pmatrix}$$

Then can get comprehensive evaluation value

$$Z = U^* \cdot B = \begin{pmatrix} 0.35 & 0.04 & 0.26 & 0.29 \end{pmatrix}$$

Because $0.35 > 0.29 > 0.26 > 0.04$, the score after fuzzy comprehensive evaluation is in the score zone of 90-100. Chinese WuShu industry has outstanding achievement and good prospect for further development.

CONCLUSION

WuShu is a kind of fit and healthy sport and also a folk art which full of huge cultural atmosphere. With the substantial increase of the WuShu industry, the number of athletes in each participating country growth by the year. In this paper, the excellent evaluation result is obtained through the analysis to Chinese Wushu industry by the fuzzy comprehensive evaluation.

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