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Grey correlation degree-based city spontaneous sports organizations development research

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ABSTRACT

With constantly advancement of society, people increasingly focus on their health problems. City spontaneous sports organization as a sport industry, it has rapidly developed in current society, people have already recognized importance of developing low carbon economy, and it has become one of people sports exercises important forms. Therefore, city spontaneous sports organization development research is a problem that worth us considering at present. The paper starts from city spontaneous sports organization development influential numerous factors, selects city support factor, sports organization construction factor, field construction as relative main factors, establishes city spontaneous sports organization-based correlation degree model, by comparing the three correlation degrees sizes, finds out city spontaneous sports organization development influential main factors. The conclusion is: Government support factor correlation degree value is the largest that is upmost influence factor, secondly is sports organization construction factor, field construction factor.

KEYWORDS

Grey correlation degree; Spontaneous sports organization; City sports; National sports; Public sports.

INTRODUCTION

City spontaneous sports organization is people spontaneous formed each kind of sports organization according to their respective interests and hobbies, respectively targets, the organizations forms are various, such as: community spontaneous sports organization, exercisers spontaneous formed sports organization, sports community, sports clubs and so on.

Han Jun in the article "Chinese spontaneous masses sports organizations development countermeasure research", by comprehensive analyzing present Chinese spontaneous sports organizations status, he found out Chinese spontaneous sports organizations existing problems, and put forward some countermeasures for future Chinese spontaneous sports organizations development.

Shi Da-Wei, Zhang Xu-Lian, Wang Wei in the article "Chinese municipal spontaneous masses sports organizations development research –take Shijiazhuang as an example", took Shijiazhuang spontaneous sports organizations as research objects, applied multiple methods, found out spontaneous masses sports organizations development confronted problems, and made concrete analysis of causes for confronted dilemma, finally put forward suggestions and countermeasures for spontaneous masses sports organizations existing problems.

Liu Ming-Sheng in the article "City social sports organizations development mode research in the background of public services—take Shanghai as an example", by researching on sports public service construction and social sports organization development, Shanghai city social sports organizations development status, city social sports organizations development mode in the background of public services and others researches, and got conclusions: To promote city social sports organization development, government should provide strong support.

The paper comprehensive analyzes present Chinese city spontaneous sports organizations development status, by understanding present city spontaneous sports organizations activities events, activities motivation, staff composition, fund sources development status, puts forward corresponding measures for the shortcomings that it finds. Establish city spontaneous sports organization development influential correlation degree model, analyze government support factor, sports organizations construction factor, field construction factor influence degree on its development, and then gets conclusion, city spontaneous sports organizations are urgently in need of government strong support.

CITY SPONTANEOUS SPORTS ORGANIZATIONS DEVELOPMENT STATUS

City spontaneous sports organizations activities events

In order to meet people's different demands on sports contents, spontaneous sports organizations activities set colorful events. The specific events are as following TABLE 1 shows (following data is from China's statistical yearbook), make statistical analysis of them and then get relative conclusions:
In order to easy to observe and analysis, draw TABLE 1 into following bar Figure1:

TABLE 1 : Spontaneous sports organizations activities events status table (N=491)

Events	Number of people (N)	Percentage (%)	The sorting
Square dance, aerobics	248	33.93	1
Yangko	111	15.18	2
Social dance	99	13.54	3
Fitness apparatus	92	12.59	4
Kicking shuttlecock	68	9.3	5
Football, basketball and volleyball	59	8.07	6
Tai Chi, Qigong and martial arts	54	7.39	7
Total	491	100.0	

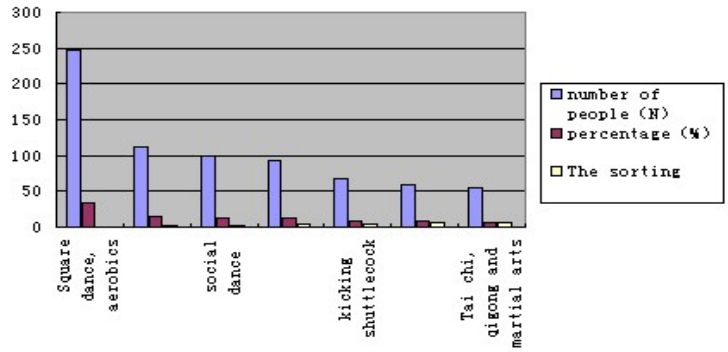

Figure 1 : Spontaneous sports organization activity project situation

From above Figure 1, TABLE 1, we can clearly find that square dance aerobics rank first in spontaneous sports organizations activities events, secondly is Yangko, social dance, fitness apparatus types, finally is kicking shuttlecock, football basketball and volleyball, Tai chi, Qigong and martial arts as well as others. From above analysis, it can analyze that among masses spontaneous organizations' sports activities, people more tend to participate in some events that technical requirements are lower, have no requirements on fields and relative effective to body building, such as square dance aerobics.

Motivations of members participating in city spontaneous sports activities

With improvements of living quality, people are increasingly focusing on their physical health. Therefore, more and more people participate in their favorite city spontaneous sports activities according to their physical health, mind and body amusing and other aspects motivations. TABLE 2 is spontaneous masses organizations' members' participation in activities motivations status table, takes Shanghai city as an example, data is from Chinese statistical bureau and Chinese statistical internet.

TABLE 2 : Spontaneous masses organizations' members participation in activities motivations status (N=491)

Motivations of activities	Number of people (N)	Frequency number proportion (%)	The sorting
Enhanced physique, promote the communication	336	34.64	1
Entertainment	168	17.32	2
Edify sentiment	138	14.23	3
Shape beauty body	129	13.30	4
Meet personal interests	108	11.13	5
Other	46	4.74	6
Integrated into the group	45	4.64	7
Total	491	100.0	

In order to more intuitional carry out observation and analysis, transform TABLE 2 into pie Figure 2, as following:

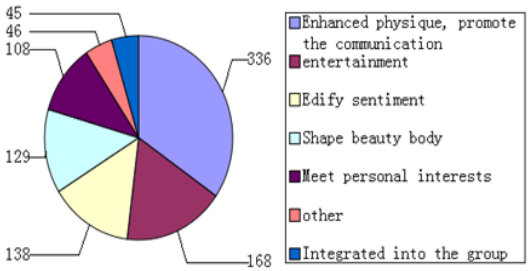

Figure 2 : Spontaneous mass organization members to participate in the activities of motivation

From above data TABLE 2 and pie Figure 2, we can clearly find that main motivations of members participating in spontaneous sports organization activities are enhancing physique promoting the communication, secondly is entertainment.

Edify sentiment shape beauty body meet personal interests, finally is other and integrating into the group. And then, we can get conclusions: first purpose of people participating in spontaneous sports organizations activities is to implement physiological values, psychological value ranks the second.

City spontaneous sports organizations staff composition status

City spontaneous sports organizations have already become main ways of citizen daily sports fitness activities. They are beneficial to increase city sports population, and also have promotions to enhance citizen physical health. At present, people of different industries have already repeatedly joined in city spontaneous sports organizations teams.

TABLE 3 : City spontaneous sports organizations staff composition (N=563)

Occupation	Number of frequency	Percentage (%)
Public institution	32	5.6
All kinds of enterprises	67	11.9
Freelancer	29	5.2
Civil servants	13	2.3
Unemployed	74	13.1
Retire (or retreat)	332	58.9
Other	16	2.8
Total	563	100

In order to easy to observe, draw above TABLE 3 into bar figure, as following Figure 3:

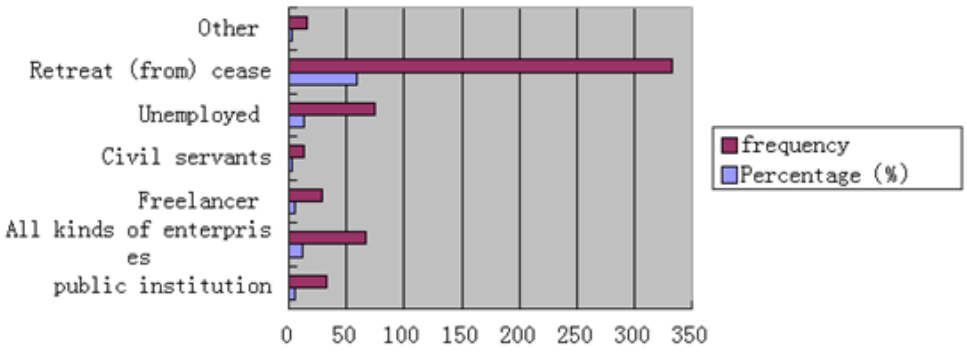

Figure 3 : City spontaneity of staff sports organizations

From above city spontaneous sports organizations staff composition status graphs, we can see that “retire (or retreat)”staff occupies maximum proportion in city spontaneous sports organizations members’ occupations as 58.9%, secondly is unemployed staff that occupies 13.1%, which has greatly differences from “retire (or retreat)”staff proportions, the third is all kinds of enterprises staff that occupies 11.9%, which has no big differences with unemployed staff.

Therefore, it can illustrate that city spontaneous sports organizations mainly are composed of retire (or retreat) staff, because the group of people leisure time is more, and age is larger, with respect to other groups of people, they more focus on physical health, and meanwhile can spend most of vigor into physical exercises.

In city spontaneous sports organizations members, other occupations occupied proportions are in order from big to small as: unemployed, all kinds of enterprises, public institution, freelancer, civil servants, and other. In order to better develop spontaneous city sports organizations, we should let more office staff, young staff also to join in city sports organizations construction teams. Let spontaneous city sports organizations to be popularized in nationwide.

City spontaneous sports organizations organizing activities funds status

Fund input is top priority of organizing activities, it is related to whether activities can organize, organizing status. Of course, city spontaneous sports activities organizing have no exception. From city spontaneous sports organizations started organizing to now; fund issue is always the problem that troubles the organizations development.

Below TABLE 4 is spontaneous masses sports organizations fund sources statistical figure, make statistical analysis of them, and get correlation results as following:

TABLE 4: Spontaneous masses sports organizations fund sources

Fund sources	Percentage (%)	The sorting
Pay membership dues	40.78	1
Administrative support	15.95	2
Sports associations support	14.56	3
Prize in the race	12.29	4
Enterprise sponsor	9.52	5
Provide social services	4.7	6
Other	2.2	7
Total	100.0	

In order to easy to observe, draw TABLE 4 into following pie Figure 4:

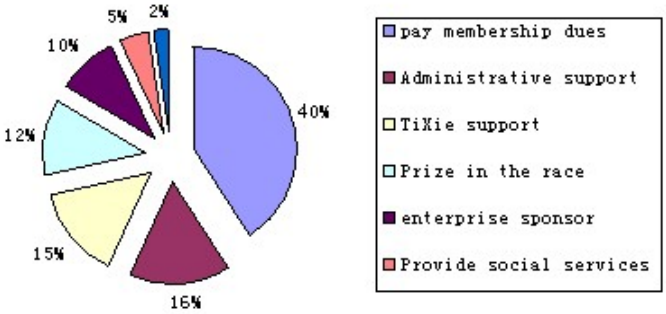

Figure 4 : Spontaneous masses sports organizations funding sources

By TABLE 4 and Figure 4, it is clear that city spontaneous sports organization fund main source is from members paid dues, secondly is administrative and sports associations supports, the third is prize in the race enterprise sponsor, finally is providing social services and acquiring from other channels. In order to better develop spontaneous sports organizations, our government should increase supports on them.

GREY CORRELATION DEGREE METHOD-BASED CITY SPONTANEOUS SPORTS ORGANIZATIONS DEVELOPMENT

Participate in city spontaneous sports organizations activities are beneficial to enhance people physical health, cultivate people sports behaviors, and have promotions to communication and guiding among people. City spontaneous sports organizations development mainly contain community spontaneous sports organizations sports communities sports clubs, government support factor (investment amount) city sports organization construction factor (construction quantity)and field construction are main factors, every factor different trend will surely restrict city spontaneous sports organizations forms development. Utilize grey correlation degree to analyze city spontaneous sports organizations satisfaction index and above three kinds of main factors relationships, according to correlation values size, judge which kind of factor has the maximum impacts to provide references for Chinese city spontaneous sports organizations development, and further propel to Chinese city spontaneous sports organizations popularization in nationwide.

The significance of grey correlation degree analysis is based on system overall development changes, if system changes and factor changes trends are consistent, then the two correlation degree is larger: if system changes are inconsistent with factors' changes trends, or have certain differences, then the two correlation degree is smaller.

Data processing

Below are Chinese "City spontaneous sports activities organizations" influential three main factors data TABLE 5-7.

TABLE 5: Status of government investment on spontaneous sports organizations

Investment Government Form Years	Year 2009	Year 2010	Year 2011	Year 2012	Average value
Community spontaneous sports organizations	14.32	15.76	17.89	16.45	16.11
Sports communities	17.69	16.34	18.24	17.24	17.38
Sports clubs	17.98	16.03	16.58	15.24	16.46

TABLE 6 : City spontaneous sports organizations quantity status table

	Year 2009	Year 2010	Year 2011	Year 2012	Average value
Community spontaneous sports organizations	324	334	342	348	337
Sports communities	214	216	218	224	218
Sports clubs	105	107 111	113	109	
Total	643	657	671	685	

TABLE 6 is investigation on Shanghai city spontaneous sports organizations; data is from Shanghai city statistical internet.

TABLE 7 : Number of training fields

	Community spontaneous sports organizations	Sports communities	Sports clubs
Number of venues	275	2281	3488
Number of fields	10368	4972	1685
Total	10643	7251	5173

For Chinese citizen satisfaction index on city spontaneous sports organizations, it makes investigation, full score is 10 scores, and investigation result is as TABLE 8 shows:

TABLE 8 : Status table of citizen satisfaction index on spontaneous sports organizations

	Community spontaneous sports organizations	Sports communities	Sports clubs
Satisfaction index	3	2	5

In order to easy to establish grey correlation degree model, draw TABLE 3--TABLE 6 into following TABLE 9:

TABLE 9 : Influence factors statistical table

	Satisfaction index	Government support (2009-2011 government investment amount average value / hundred million Yuan)	Sports organizations construction	Fields construction
Community spontaneous sports organizations	3	16.11	337	10643
Sports communities	2	17.38	218	7251
Sports clubs	5	16.46	119	5173

Establish model

(1) Record Chinese city spontaneous sports organizations influence factors feature behaviors sequence as following:

$x_i^{'} = \left(x_i^{'}(1), x_i^{'}(2), x_i^{'}(3)\right)^T, i = 1,2,3$, from which correlation factor line sequence is:

$x_1^{'} = (16.11,\quad 17.38,\quad 16.46)$;

$x_2^{'} = (337,\quad 218,\quad 119)$;

$x_3^{'} = (10643,\quad 7251,\quad 5173)$

Thereupon, it can get: $x_i^{'} = \begin{pmatrix} 16.11 & 17.38 & 16.46 \\ 337 & 218 & 119 \\ 10643 & 7251 & 5173 \end{pmatrix}$

Define reference sequence

Define city spontaneous sports organizations satisfaction index $x_0^{'}$ as reference sequence,

$x_0^{'} = (3,\quad 2,\quad 5)$

Initialization method data processing

Utilize formula $x_i(k)=\frac{x_i^{'}(k)}{x_i^{'}(1)}$, to handle with relative factors line sequence, result is as following :

$$x_1(k)=\frac{x_1^{'}(k)}{x_1^{'}(1)}=\frac{(16.11,\quad 17.38,\quad 16.46)}{16.11}=(1,\quad 1.08,\quad 1.02);$$

$$x_2(k)=\frac{x_2^{'}(k)}{x_2^{'}(1)}=\frac{(337,\quad 218,\quad 119)}{337}=(1,\quad 0.65,\quad 0.35);$$

$$x_3(k)=\frac{x_3^{'}(k)}{x_3^{'}(1)}=\frac{(10643,\quad 7251,\quad 5173)}{10643}=(1,\quad 0.68,\quad 0.49)$$

Calculate $\min\limits_{1\le i\le 3}\min\limits_{1\le k\le 3}\left|x_0^{'}-x_i(k)\right|, \max\limits_{1\le i\le 3}\max\limits_{1\le k\le 3}\left|x_0^{'}-x_i(k)\right|$

Input

$x_1(k)=(1,\quad 1.08,\quad 1.02),\ x_2(k)=(1,\quad 0.65,\quad 0.35),$

$x_3(k)=(1,\quad 0.68,\quad 0.49),\ x_0^{'}=(3,\quad 2,\quad 5)$

into above formula and get: $\min\limits_{1\le i\le 3}\min\limits_{1\le k\le 3}\left|x_0^{'}-x_i(k)\right|=4.46$, $\max\limits_{1\le i\le 3}\max\limits_{1\le k\le 3}\left|x_0^{'}-x_i(k)\right|=5.24$

Calculate Chinese city spontaneous sports organizations development correlation coefficient

And correlation coefficient computational formula:

$$\zeta_i(k)=\frac{\min\limits_{1\le i\le n}\min\limits_{1\le k\le m}\left|x_0^{'}(k)-x_i(k)\right|+\rho\times\max\limits_{1\le i\le n}\max\limits_{1\le k\le m}\left|x_0^{'}(k)-x_i(k)\right|}{\left|x_0^{'}(k)-x_i(k)\right|+\rho\times\max\limits_{1\le i\le n}\max\limits_{1\le k\le m}\left|x_0^{'}(k)-x_i(k)\right|}$$

Among them, ρ is resolution ratio, and $\rho\in(0,1)$, $\rho=0.5$, ρ gets bigger and then relation is bigger.

Input $\left|x_0^{'}(k)-x_i(k)\right|$ each value, and can solve:

$\zeta_1=(1.53,\quad 2.00\quad 1.07);\zeta_2=(1.53,\quad 1.78,\quad 0.97);\zeta_3=(1.53,\quad 1.79,\quad 0.99)$

Calculate correlation degree

Use correlation degree computational formula $r_i=\frac{1}{m}\sum_{k=1}^{m}\zeta_i(k)$, input

$\zeta_1=(1.53,\quad 2.00\quad 1.07);\zeta_2=(1.53,\quad 1.78,\quad 0.97);\zeta_3=(1.53,\quad 1.79,\quad 0.99)$ And get: $r_1=1.533, r_2=1.427, r_3=1.437$, and then it gets following data TABLE 10:

TABLE 10 : City spontaneous sports organizations grey correlation degree value

	Government support	Sports organizations construction	Fields construction	
Correlation degree	1.533		1.427	1.437

Evaluation result

By above calculation result, we can know that government support correlation degree value is 1.533, sports organizations construction correlation degree value is 1.427, fields construction correlation degree value is 1.437, by comparing, it is clear that government correlation degree value is the largest, secondly is fields construction sports organizations construction, therefore, for Chinese city spontaneous sports organizations development, maximum influential factor is government support that government investment amount on city spontaneous sports organizations, second influence factor is fields construction, the third factor is sports organizations construction.

Grey correlation calculation can define three factors influence extent on Chinese city spontaneous sports organizations development. Though assign different resolution coefficient, it will get different correlation degrees values, their sizes orders will not change, correlation sequence is essence of correlation analysis. Though three factors and Chinese city spontaneous sports organizations development correlation degrees have bigger one and smaller ones, each correlation degree has no big differences, that when making comprehensive evaluation o Chinese city spontaneous sports organization development trend, three factors should be taken into comprehensive consideration, and combine with other factors to evaluate.

CONCLUSION

(1) Firstly, the paper makes detailed analysis of city spontaneous sports organizations activities contents, activities motivations, staff composition and fund sources, it finds present Chinese spontaneous city sports organizations existing problems and shortcomings, and puts forward reformation measures on relative problems, and makes contributions for future spontaneous city sports organizations.

(2) By comprehensive analyzing Chinese city spontaneous sports organizations development influential government support factor, city organizations construction factor, fields construction factor, the paper establishes grey correlation degree model, by comparing correlation degrees values, it gets conclusions: government support is the key factor that affects city spontaneous sports organizations development, therefore, Chinese government should provide strong support to city spontaneous sports organizations.

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