Construction of china sports capital market system

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Abstract. The paper systematically analyzes and states China sports capital market system influence factors specific to China sports capital market system construction, and makes analysis and research on the system, it proceeds multi-objective decision analysis by dynamic integration of qualitative analysis and quantitative analysis through expert investigation method , mathematical statistics and analytic hierarchy process these methods, as well as carries out analyzes China sports capital market system various indicator influence factors' weights, obtains comparison matrix through comparing with paired factors , and finally concludes each indicator value of factor weight that affects China sports capital market system by arrangement and other methods as respectively funding needs cover 40.2% of overall proportion, technical requirements cover 30.2% of overall proportion, while talent needs cover 28.3% of overall proportion, the result provides theoretical preparation for researches on the relevant fields in future.

1 Introduction

Industrial investment as an innovation tool in financial circle in the 90s of last century has been popular; it enriches capitalism market through standard operation, professional management and collective fund as well as others, and so doe's sports capital market from them that plays an important role and has become one of the richest industries.

Regarding sports capital aspect study, many people have made contributions, such as Lu Xiao-Mei during researches on sports industrial investment, she obtained China investment industrial necessity and feasibility through analyzing and comparing relating to world investment fund development mode, analyzing world sports capital market development and corresponding system and others internal connection , and combining with China actual conditions, and thus designed China sports industry investment fund theoretical frame; Zhang Han analyzed China sports industrial market financing strategic significance and development countermeasures in China sports industry investment market development , with the purpose of seeking a strategic pattern that could drive China sports industry capital market development [1-4].

The paper just bases on above formers' researches, carries out further analyses and researches on China sports capital market development situations, implements deepening sports system reform presented by the Party Central Committee, encourages the spirits of developing sports through social force, provides theoretical supports for China sports capital market system construction, and of an important significance in improving China sports comprehensive strength.

2 China sports capital market system evaluation system theoretical analysis

Sports capital market is a capital operational mode that common constituted by finance, science and technology, innovation as well as sports, due to economic globalization lets sports capital market plays certain promotions roles in sports industrial development, it creates miracles for sports market again and again [5].

A system is composed of multiple elements, these elements determine system attributes, and so they become foundation of comprehensive evaluation theory. Therefore, comprehensive evaluation has become sports capital market system central contents in research concerning China sports capital market system, and it draws China sports capital market system indicator system flow chart as Figure 1 through combining with the paper researched contents.

It is worth noting that changes will occur to results of above evaluation system during running procedures as environment , subject and object become different, but the effect is not much, just pay attention to arrangement during input data processes can avoid such affect. Regarding China sports capital market analysis, due to each variable unit is not the same, it needs to implement nondimensionalization handling, from which there are various handling methods regarding nondimensionalization, one common used method is a method of relativity processing , the principle is firstly determining a standard indicator x_m, after that comparing the rest indicators x_i with the standard indicator x_m , so that it can obtain

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implementation extent of every indicator, and corresponding formula is :

$$\frac{x_i}{x_m} \times 100\% = \text{implementation extent of single indicator } (i = 1, 2, \cdots, n)$$

The various indicators total evaluation system can be obtained after certain processing multiple factors, the method is called comprehensive evaluation method. Formers have presented many kinds of ways on the method, combing with the paper researched contents, the common used methods as weighted geometric mean method and arithmetic method by most scholars are chosen.
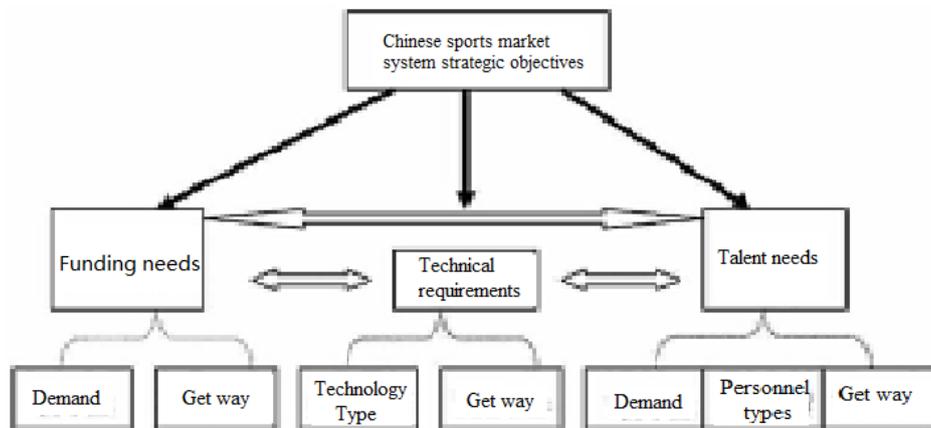

Figure 1. China's sports market system diagram.

3 Analytical hierarchy process model

AHP features are hierarchizing complicated problems, making clear about primary and secondary, possessing stronger logicality and hierarchical structure, the algorithm mainly is calculating indicators weights. It is applicable to comprehensive assessment system, is a powerful mathematical method that converts problems into quantitative research. Nowadays analytic hierarchy process has already widely used in each field to solve practical problems. China sports capital market system concerns multiple reference indicators, the decision problems is suitable to analytic hierarchy process [6].

3.1 Construction of hierarchical structure

At first it establishes an orderly, clear hierarchical structure for problems, firstly establishes three layers relationships, target layer, medium layer, scheme layer. Classified layers numbers are related to research objects complex extent and detailed extent. The paper bases on analytic hierarchy process; it quantizes China sports capital market system. Establish target layer, criterion layer, scheme layer relations. Target layer: China sports capital market system: Criterion layer: Scheme influence factors, c_1 is demand, c_2 is approach of achieving, c_3 is technological type, c_4 is talent type.

Scheme layer: A_1 is funding needs, A_2 is technical requirements, A_3 is talent needs.

It gets hierarchical structure as Figure 2 show.

3.2 Hierarchical single arrangement and consistency test thereof

Judgment matrix consistency indicator CI, and judgment matrix consistency ratio CR, their computational method is as following formula: $CI = \frac{\lambda_{\max} - n}{n - 1}$.

Among them, n represents judgment matrix order number that is the number of comparison factors. $CR = \frac{CI}{RI}$
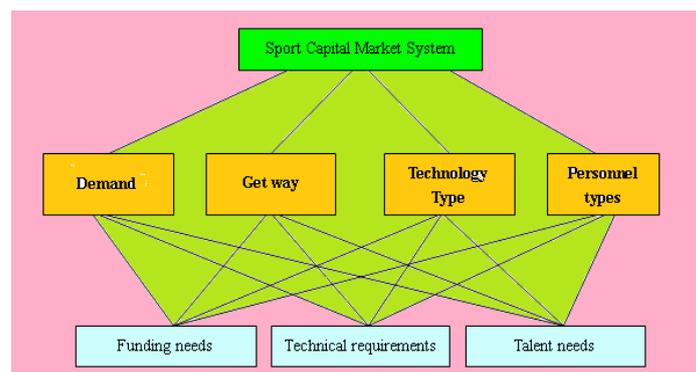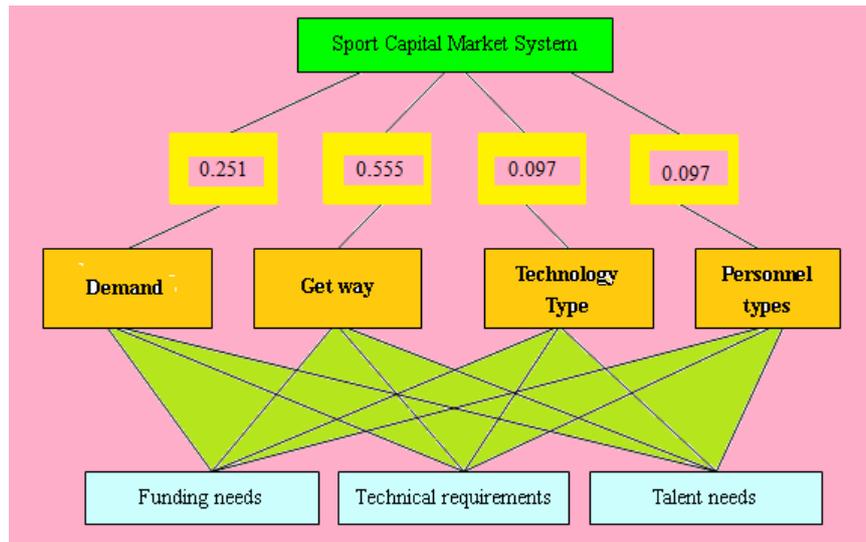

Figure 2. Hierarchy Figure.

Figure 3. Weighted index system diagram.

3.3 Hierarchical total arrangement and consistency test thereof

Use consistency indicator to test and get judgment matrix A, $\lambda^{(0)}_{max} = 4.07, RI = 0.9$

$$CI = \frac{4.07-4}{4-1} = 0.24 \text{ , } CR = \frac{CI}{RI} = \frac{0.024}{0.90} = 0.027 < 0.1$$

It shows A inconsistency test is valid and moves within permissible range, it can use A feature vector to replace weight vector.

(2) Similarly carry out consistency test on judgment matrix B_1, B_2, B_3, B_4, and get weight vectors.

Utilize hierarchical chart drawing out calculation results that are from target layer to scheme layer, as Figure 3 shows.

Calculation structure is as following:

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

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

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

$$= \begin{Bmatrix} 0.262 & 0.585 & 0.664 & 0.185 \\ 0.079 & 0.276 & 0.220 & 0.240 \\ 0.66 & 0.149 & 0.156 & 0.575 \end{Bmatrix} \begin{Bmatrix} 0.567 \\ 0.056 \\ 0.104 \\ 0.273 \end{Bmatrix}$$

$$= \begin{Bmatrix} 0.426 \\ 0.301 \\ 0.284 \end{Bmatrix}$$

By above result we can get that during China sports market system construction, funding needs cover 40.2% of overall proportion, technical requirements cover 30.2% of overall proportion, while talent needs cover 28.3% of overall proportion.

4 Conclusion

The paper systematically analyzes and states China sports capital market system influence factors through China sports capital market system construction, and makes analysis and research specific to the system thereof, it proceeds multi-objective decision analysis by dynamic integration of qualitative analysis and quantitative analysis through combining with the method of analytic hierarchy process , as well as carries out analyzes China sports capital market system various indicator influence factors' weights, obtains comparison matrix through comparing with paired factors , and finally concludes each indicator value of factor weight that affects China sports capital market system by arrangement and other methods.

Acknowledgment

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