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Chinese profession football cultural self-consciousness and development obstacle game analysis under cultural sociological perspective

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ABSTRACT

To let China football to break through bottleneck is a dream of China's hundred millions of fans, recall every time when seeing world cup competition list, disappointment and sadness is full of fans heart. To let China football to usher a new prospect, the paper firstly through game analysis and evolution analysis, it solves government and professional football organizations optimal strategy in professional football cultural self-consciousness construction issue. Subsequently then establish analytic hierarchy process model, get China professional football development obstacles that generate in multiple influence factors, and find out China professional football development main obstacle formed main factors.

KEYWORDS

Game theory; Evolution game analysis; AHP; Football culture; Development obstacle.

INTRODUCTION

Since new China was founded, productivity has been liberated, after opening-up and reform, economy even is rapidly developing, national physical quality also improves with living standards promotes. Therefore Chinese sports multiple aspects have got good results. In just several decades, China has already become sports power, and achieved repeatedly good results in every Olympic Games. However, Chinese football hasn't yet developed. China men football only entered into world cup for one time, and dominated in 2002 Japan and South Korea World Cup. Though Chinese fans still love football such event, when seeing every world cup competition lists, they are full of disappointment and sadness. In order to let Chinese football to break through bottleneck, find out development direction, the paper will make game analysis of China professional football culture, and research on Chinese football development influential each obstacle.

MODEL ESTABLISHMENTS

China professional football cultural self-consciousness game analysis

In China professional football cultural self-consciousness extent problem, it can regard government and professional football organizations as game subjects, and the two implement strategies are both two kinds, government strategy is coordinated and uncoordinated, professional football organization strategy is initiative adjust and don't adjust. Government and professional football organizations game process is as Figure 1 shows.

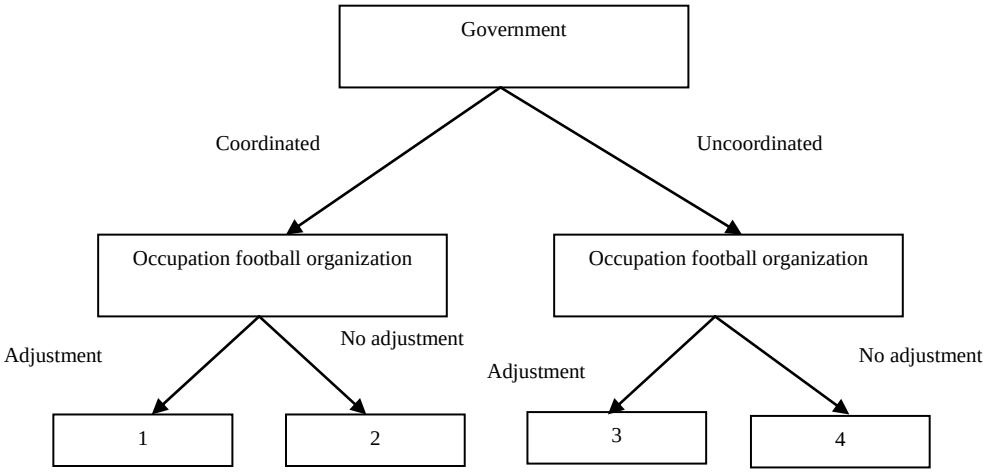

Figure 1 : Government and professional football organizations game tree schematic diagram

Set when government coordinates professional football cultural construction while professional football organizations don't adjust, government earnings is A_1, organizations earnings is 0;on the contrary, organizations consciously adjust while government hasn't played coordinating roles, organizations earnings is $A_1^{'}$,government earnings is A_2,cause is though government hasn't played coordinating roles, organizations adjustment is beneficial to football development. When both government and organizations are with positive attitudes, government earnings is A,organizations earnings is $A^{'}$;if both government and organizations are not positive, then the two earnings are 0. TABLE 1 is government and organizations football cultural construction earnings matrix.

TABLE 1 : Government and organizations football cultural construction earnings matrix

		Organizations	
		Self-consciously adjust	**Don't adjust**
Government	Coordinated	$A, A^{'}$	$A_1, 0$
	Uncoordinated	$A_2, A_1^{'}$	$0,0$

Among them, $A > A_1 > A_2$,but size of $A^{'}, A_1^{'}$ cannot define, therefore the paper will adopt evolution game analysis to analyze government and organizations football cultural construction practices, and make respectively strategies adjustment.

Professional football cultural self-consciousness construction evolution game analysis

Due to government and organizations positive and negative strategy selection in football cultural construction problem are both independent and random, and can carry on repeated games. Therefore, set government to organizations coordinated probability as p ,uncoordinated probability is $1-p$;and organizations self-consciously adjustment probability is q ,probability that don't adjust is $1-q$. According to Malthusian theorem, it is clear that government strategies coordinated times selection growth rate should be $\frac{\dot{p}}{p}$ that is difference between fitness $E_w K\{f,1-q\}^T$ and average fitness $\{p,1-p\}K\{q,1-q\}^T$. $E_w=[1,0]$,when government coordinated probability is 1, its earnings matrix is:

$$K=\begin{bmatrix} A & A_1 \\ A_2 & 0 \end{bmatrix}$$

Simplify $\dot{p}=p(1-p)\{1,-1\}K\{q,1-q\}^T$ and get:

$$\dot{p}=p(1-p)\left[(A-A_1-A_2)q+A_1\right]$$

Similarly, organizations strategy of self-consciously adjustment selection times growth rate should be $\frac{\dot{q}}{q}$ that is difference between fitness $E_J l\{q,1-q\}^T$ difference between fitness $\{q,1-q\}l\{p,1-p\}^T . E_J=[0,1]$, When organizations self-consciously adjustment probability is1,its earnings matrix is

$$l=\begin{bmatrix} A' & 0 \\ A_1' & 0 \end{bmatrix}$$

Simplify $\dot{q}=q(1-q)\{-1,1\}l\{t,1-q\}^T$ and get:

$$\dot{q}=q(1-q)\left[A_1'+(A'-A_1')p\right]$$

Therefore when $\dot{p}=0,\dot{q}=0$ 时,$(0,0),(0,1),(1,0),(1,1)$ are balance points of professional football cultural self-conscious construction. According to matrix stability, analyze these balance points partial stability, solve partial derivatives of $\dot{p}$ to p ,and partial derivatives of $\dot{q}$ to q ,matrix is:

$$d=\begin{bmatrix} \partial\dot{P}/\partial P & \partial\dot{P}/\partial q \\ \partial\dot{q}/\partial p & \partial\dot{q}/\partial q \end{bmatrix}=\begin{bmatrix} (1-2p)\left[(A-A_1-A_2)q+A_1\right] & p(1-p)(A-A_1-A_2) \\ q(1-q)(A'-A_1') & (1-2q)p \end{bmatrix}$$

Among them:

$$\det d=(1-2p)(1-2q)\left[(A-A_1-A_2)q+A_1\right]\left[A_1'+(A'-A_1')p\right]$$
$$-pq(1-p)(1-q)(A-A_1-A_2)(A'-A_1')$$
$$trd=(1-2p)\left[(A-A_1-A_2)q+A_1\right]+(1-2q)\left[A_1'+(A'-A_1')p\right]$$

TABLE 2 is balance point partial stability.

TABLE 2 : Balance point partial stability

Balance point (p,q)	$\det d$		trd		Stability
$(0,0)$	$A_1 \bullet A_1^{'}$	+	$A_1 + A_1^{'}$	+	Unstable point
$(1,0)$	$-A_1 \bullet A^{'}$	-	$A^{'} - A_1$	Unknown	Saddle point
$(0,1)$	$-(A - A_2) \bullet A_1^{'}$	-	$A - A_2 - A_1^{'}$	Unknown	Saddle point
$(1,1)$	$(A - A_2) \bullet A^{'}$	+	$-(A - A_2 + A^{'})$	-	Stable point

By above TABLE 2, it is clear $(0,0)$ point is unstable point, $(0,1)$ and $(1,0)$ are saddle points, evolution stable point is $(1,1)$. Therefore government and professional football organizations optimal strategy on professional football cultural self-conscious construction should be organizations should positive carry out reformation and adjustment on football clubs mechanism, and government should also positive carry out coordination.

Construct hierarchical structure

In order to analyze China professional football development main obstacles, it should find out China professional football development influential main causes, and find out each factors contribution degree, therefore the paper firstly bases on analytic hierarchy process, it makes quantization on China professional football development main obstacles sources. Establish target layer, criterion layer and scheme layer relations.

Target layer: The obstacle of China professional football development

Criterion layer:scheme influence factors, y_1 the number of attention of people、y_2 football construction funds、y_3 the lack of activity、y_4 management efforts.。

Scheme layer: x_1 is the lack of attention、x_2 is the lack of overall thought, x_3 is invalid management system, it gets hierarchical structure as Figure 2 shows.

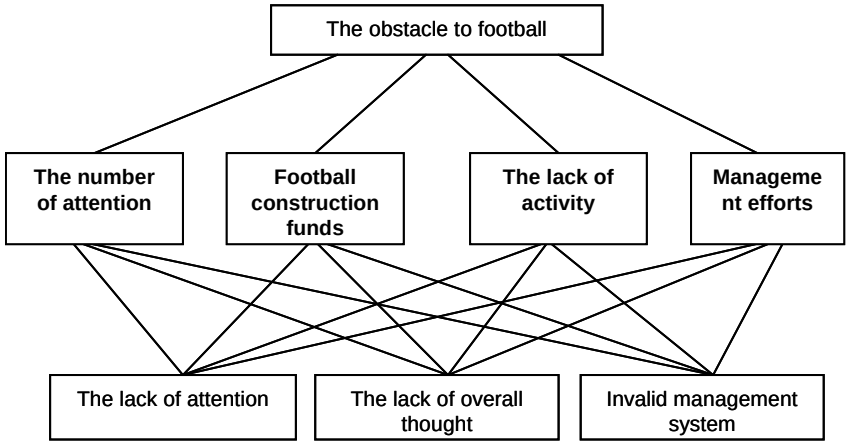

Figure 2 : Hierarchical structure

Construct judgment matrix

According to lots of experts experiences and referencing lots of documents as well as 1~9 scale setting, it gets paired comparison matrix that is judgment matrix as TABLE 3-7.

TABLE 3 : Comparison matrix G

G	y_1	y_2	y_3	y_4
y_1	1	¼	4	5
y_2	4	1	6	4
y_3	¼	1/6	1	1
y_4	1/5	¼	1	1

TABLE 4 : Comparison matrix y_1

y_1	x_1	x_2	x_3
x_1	1	1	1/6
x_2	1	1	1/3
x_3	6	3	1

TABLE 5 : Comparison matrix y_2

y_2	x_1	x_2	x_3
x_1	1	3	4
x_2	1/3	1	5
x_3	¼	1/5	1

TABLE 6 : Comparison matrix y_3

y_3	x_1	x_2	x_3
x_1	1	5	5
x_2	1/5	1	6
x_3	1/5	1/6	1

TABLE 7 : Comparison matrix y_4

y_4	x_1	x_2	x_3
x_1	1	6	5
x_2	1/6	1	4
x_3	1/5	1/4	1

Consistency test

Use consistency test formula as: $CI = \frac{\lambda_{\max} - n}{n-1}$. Among them, $\lambda_{\max}$ is maximum feature value of comparison matrix, n is comparison matrix order. It is clear that judgment matrix and CI value are in inverse proportion.

$$C = \begin{Bmatrix} 1 & 1/4 & 4 & 5 \\ 4 & 1 & 6 & 4 \\ 1/4 & 1/6 & 1 & 1 \\ 1/5 & 1/4 & 1 & 1 \end{Bmatrix} \xrightarrow{\text{normalization}} \begin{Bmatrix} 0.4333 \\ 0.4314 \\ 0.0843 \\ 0.0725 \end{Bmatrix} = U^{(0)}$$

$$CU^{(0)} = \begin{Bmatrix} 1 & 1/4 & 4 & 5 \\ 4 & 1 & 6 & 4 \\ 1/4 & 1/6 & 1 & 1 \\ 1/5 & 1/4 & 1 & 1 \end{Bmatrix} \begin{Bmatrix} 0.4333 \\ 0.4314 \\ 0.0843 \\ 0.0725 \end{Bmatrix} = \begin{Bmatrix} 2.456 \\ 2.121 \\ 1.480 \\ 3.432 \end{Bmatrix}$$

$$\lambda_{\max}^{(0)} = \frac{1}{4}\left(\frac{2.456}{0.4333} + \frac{2.121}{0.4314} + \frac{1.480}{0.0843} + \frac{3.432}{0.0725}\right) = 5.12$$

$$u^{(0)} = \begin{pmatrix} 0.259 \\ 0.224 \\ 0.155 \\ 0.362 \end{pmatrix}$$

Judgment matrix is:

$$C_1=\begin{Bmatrix}1 & 1 & 1/6\\ 1 & 1 & 1/3\\ 6 & 3 & 1\end{Bmatrix}, C_2=\begin{Bmatrix}1 & 3 & 4\\ 1/3 & 1 & 5\\ 1/4 & 1/5 & 1\end{Bmatrix}, C_3=\begin{Bmatrix}1 & 5 & 5\\ 1/5 & 1 & 6\\ 1/5 & 1/6 & 1\end{Bmatrix}, C_4=\begin{Bmatrix}1 & 6 & 5\\ 1/6 & 1 & 4\\ 1/5 & 1/4 & 1\end{Bmatrix}$$

Corresponding maximum feature value and feature vector are in order as:

$$\lambda^{(1)}{}_{\max}=3.97, u^{(1)}{}_1=\begin{Bmatrix}0.347\\ 0.347\\ 0.476\end{Bmatrix} \lambda^{(2)}{}_{\max}=3.43, u^{(1)}{}_2=\begin{Bmatrix}0.527\\ 0.253\\ 0.098\end{Bmatrix}$$

$$\lambda^{(3)}{}_{\max}=2.32, u^{(1)}{}_3=\begin{Bmatrix}0.526\\ 0.244\\ 0.156\end{Bmatrix} \lambda^{(4)}{}_{\max}=3.40, u^{(1)}{}_4=\begin{Bmatrix}0.546\\ 0.344\\ 0.257\end{Bmatrix}$$

According to $CI=\dfrac{\lambda_{\max}-n}{n-1}$ it gets RI value that can refer to TABLE 8

TABLE 8 : 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

For judgment matrix C, $\lambda^{(0)}{}_{\max}=3.97, RI=0.88$

$$RI=\frac{3.97-3}{3-1}=0.048$$

$$CR=\frac{CI}{RI}=\frac{0.048}{0.88}=0.05<0.1$$

It represents C inconsistency extent is within permissible range, now it can use C feature vector to replace weight vector.

Similarly, to judgment matrix C_1, C_2, C_3, C_4, utilize above principle, all pass consistency test. Therefore target layer to scheme layer computational result can refer to Figure 3.

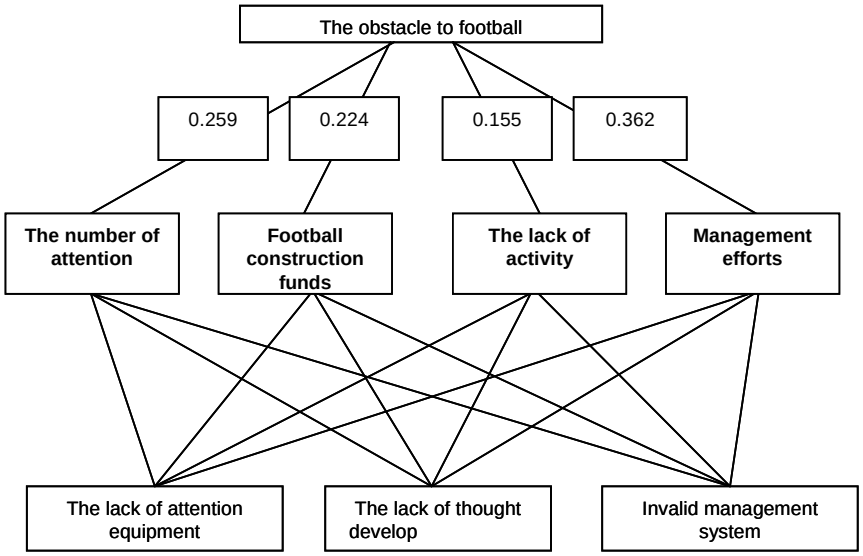

Figure 3 : Target layer to Scheme layer calculation result

$$\begin{Bmatrix}0.347\\0.347\\0.476\end{Bmatrix},\begin{Bmatrix}0.527\\0.253\\0.098\end{Bmatrix},\begin{Bmatrix}0.526\\0.244\\0.156\end{Bmatrix},\begin{Bmatrix}0.546\\0.344\\0.257\end{Bmatrix}$$

Calculation structure is as following:

$$u^{(1)}=(u_1^{(1)},u_2^{(1)},u_3^{(1)},u_3^{(1)})$$
$$=\begin{Bmatrix}0.347 & 0.527 & 0.526 & 0.546\\0.347 & 0.253 & 0.244 & 0.344\\0.476 & 0.098 & 0.156 & 0.257\end{Bmatrix}$$

$$u=u^{(1)}u^{(0)}$$
$$=\begin{Bmatrix}0.347 & 0.527 & 0.526 & 0.546\\0.347 & 0.253 & 0.244 & 0.344\\0.476 & 0.098 & 0.156 & 0.257\end{Bmatrix}\begin{Bmatrix}0.259\\0.244\\0.155\\0.362\end{Bmatrix}=\begin{Bmatrix}0.252\\0.284\\0.474\end{Bmatrix}$$

By above formula, it can get that in China professional football development main obstacles, the lack of attention, the lack of overall thought and invalid management system respective proportions are 0.252、0.284 and 0.474.

CONCLUSION

The paper firstly through game analysis and evolution game analysis, it solves government and professional football organizations optimal strategy on professional football cultural self-conscious construction should be organizations should positive carry out reformation and adjustment on football clubs mechanism, and government should also positive carry out coordination. Then establish analytic hierarchy process model, it solves China professional football development main obstacles in case considering the number of attention of people, football construction funds, the lack of activity and management efforts and other influence factors, in China professional football development main obstacles, the lack of attention, the lack of overall thought and invalid management system respective proportions are 0.252、0.284 and 0.474 .It finds out China professional football development main obstacles formed main factors.

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