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Performance Evaluation of Rural Cooperative Economic Organizations in Hunan Province Based on Structural Equation

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Abstract Using the method of structural equation and balanced scorecard, this paper establishes the evaluation indicators and evaluation model for the performance of 21 rural cooperative economic organizations in X City of Hunan Province, and analyzes the relationship between indicators and dimensions of performance evaluation indicators, in order to find the influencing factors, obstacles and successful experience concerning the development of rural cooperative economic organizations. According to model analysis and conclusions, this paper sets forth the recommendations for promoting the development of rural cooperative economic organizations in Hunan Province, in order to provide a scientific basis for the institutional design and mechanism innovation of rural cooperative economic organizations in Hunan Province.

Key words Rural cooperative economic organizations, Performance evaluation, Structural equation model, Hunan Province

1 Introduction

As a mutual aid organization that members voluntarily participate in, rural specialized cooperative economic organization is more dependent on institutional arrangements and cooperation mechanisms than the average business. Due to a late start, there are still many problems in the current development of China's rural cooperative economic organizations, including loose interest relationships inside organization, low degree of farmers' participation and low operational efficiency. Through the institutional construction and mechanism innovation, it is necessary to stimulate the farmers' enthusiasm for active participation in cooperation and improve the performance of Chinese rural cooperative economic organizations. Therefore, this paper includes four key factors that affect the operational performance of rural cooperative economic organizations (property structure; internal governance; distribution of benefits; members' behavior) in the evaluation indicators, and use the method of structural equation and balanced scorecard to perform the empirical analysis of 21 rural cooperative economic organizations in X City of Hunan Province, in order to find out the obstacles to the development of rural cooperative economic organizations. According to the analysis results, this paper comes up with the recommendations for promoting the development of rural cooperative economic organizations in Hunan Province, to provide a scientific basis for institutional building and mechanism innovation of rural cooperative economic organizations.

2 Literature review

How to use system to promote economic development has been one of the hot issues in the field of Western agricultural economic research. After the study of the American "new generation cooperatives", Cook *et al.*[1] find that the property right of traditional cooperatives is not clear and has high agency costs, which will inevitably lead to "laziness" and "free rider" behaviors of members, resulting in low efficiency of allocation of resources of cooperatives. International Cooperative Alliance[2] notes that the cooperative distribution system is determined by the property rights system of its members. Fulton[3] believes that only when there are clear property rights of cooperatives, clear governance structure and strong homogeneity of members can the members have strong willingness to participate in investment of cooperatives and transact with cooperatives. Hendrikse and Veerman[4] believe that there is the relationship between investment constraints and control constraints in agricultural marketing cooperatives, so it is necessary to regulate the governance structure in accordance with the form of property rights in the incomplete contract theory to maximize investment benefit. Eilers[5] uses the analytical framework of incomplete property contract to study the favorable conditions for agricultural producers to conduct horizontally integrated investment under certain kind of market and incentive organizations. Many Chinese scholars have studied the low efficiency of Chinese rural cooperative economic organizations and its influencing factors. Zhou Qinghai[6], Zhao Huifen[7], Deng Guimei *et al.*[8], Huang Zuhui *et al.*[9] conclude that product features, production clusters, distribution of benefits, members and institutional environment all have varying degrees of effects on the development of rural cooperative economic organizations. Sun Zhijie[10] also believes that unsound internal system building of rural cooperative economic organizations, inadequate supply of national legal systems and unscientific government guidance are the main factors responsible for the inefficient operation of rural economic cooperation organizations. Therefore, it is necessary to establish an effective internal control mechanism, strengthen the common interests of the mem-

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bers, establish and improve the supervision mechanism of laws and regulations, and set up scientific government management mechanism, in order to effectively improve the efficiency of rural cooperative economic organizations.

3 Questions and research hypothesis

3.1 Questions Originating from the rural economic reform in the early 1980s, Chinese rural cooperative economic organizations flourish in China with a new organizational form and mode of operation, to some extent, solving the "fragmentation" of rural operation scale. However, compared with developed countries, there are some prominent problems in the Chinese rural cooperative economic organizations such as imperfect institutional arrangement, unclear property structure, unsound internal systems, flawed operation mechanism, loose partnership, and unfair distribution of benefits. So, in the face of the functional flaws and development difficulties in Chinese rural cooperative economic organizations, it is necessary to re-examine the following questions: (i) What are the main factors affecting the efficiency of rural economic cooperation organizations? (ii) What is the impact of property structure, internal governance, distribution of benefits and members' behavior on the performance and sustained growth of rural cooperative economic organizations, respectively?

3.2 Research hypothesis In this study, structural equation[11] and balanced scorecard[12] are combined to conduct an empirical analysis. Based on the main research questions, we make the following hypotheses.

$\mathbf{H}_1$: The soundness of property rights system and governance structure of rural cooperative economic organizations is positively correlated with the operation performance of organizations. If the property rights system is clear and governance structure is proper, then the members will have greater enthusiasm for participating in cooperation and the organizational performance will be higher.

$\mathbf{H}_2$: The soundness of benefit distribution system of rural cooperative economic organizations is positively correlated with the performance of organizations. If the members of rural cooperative economic organizations are more active in cooperation, it will be more conducive to promoting the organizational performance.

$\mathbf{H}_3$: Members' cooperative behavior is positively correlated with the organizational performance of rural cooperative economic organizations, and if the members of rural cooperative economic organizations are more active in participation, the organizational performance of cooperatives will be higher.

4 Empirical study

4.1 Questionnaire design and sampling With the 21 rural cooperative economic organizations in X City of Hunan Province as the research object, based on the stratified random sampling principle, we sent out 200 questionnaires, recovered 170 questionnaires and finally obtain 150 questionnaires. The samples consist of chairman or president of cooperatives, members of the supervisory board, ordinary members, and municipal, county or village cadres. The study sample can reflect the basic situation of operation of rural cooperative economic organizations.

4.2 Analysis of exploratory factors for evaluation model In order to more concisely and precisely describe the interactive relationship between various factors, there is a need to first conduct the exploratory factor analysis of performance evaluation indicators for rural cooperative economic organizations, and simplify the factors influencing the performance of rural cooperative economic organizations into several major dimensions to facilitate the use of SPSS14.0 software for KMO test and Bartlett test of sphericity on sample A(n = 231).

4.2.1 Commonality of estimation variables. The exploratory factor analysis results (Table 1) show that the correlation of overall performance evaluation indicators for the rural cooperative economic organizations is KMO = 0.920 and the Bartlett test of sphericity also presents a significant level. The related statistical overall indicators of performance model also reach KMO = 0.948, and the Bartlett test of sphericity is also in line with expectation, indicating that the above indicators are suitable for the performance evaluation of rural cooperative economic organizations (Table 2).

Table 1 KMO and Bartlett test of sphericity of model

KMO value		0.920
Bartlett test of sphericity	χ^2	2502.927
	DOF	210
	Threshold	0.000

Table 2 KMO and Bartlett test of sphericity of performance evaluation model

KMO value		0.951
Bartlett test of sphericity	χ^2	4579.885
	DOF	253
	Threshold	0.000

4.2.2 Factor rotation. Using principal component analysis, we conduct maximum variance orthogonal rotation on the sample A (n = 231) to identify the relationship between the various factors. Rotated factor load matrix is shown in Table 3, 4. Table 3, 4 show that 4 indicators of "property and governance structure" have a large load on factor 1 (distribution of benefits); 4 indicators of "property and governance structure" have a large load on factor 2 (members' behavior); 6 indicators of "property and governance structure" have a large load on factor 3 (organizational performance). According to the factor load matrix rotation results, it can be found that the dimension of evaluation structure of "organizational performance" indicator and performance is clear, basically consistent with the predicted dimension of "property and governance structure" and four dimensions of balanced scorecard.

Table 3 Factor loading of "property and governance structure" and organizational performance indicators

Factor loading matrix of "property and governance structure" indicators	Factor			
	1	2	3	4
Whether the major decisions are based on "one man one vote"	0.804	0.048	0.114	0.163
Democratic principle of selecting members of Council and Supervisory Board	0.759	0.216	0.094	0.190
Democratic principle of profit allocation decisions	0.672	0.245	0.216	0.199
Council structure	0.651	0.266	0.305	0.145
Supervision of the Board of Supervisors	0.568	0.389	0.337	0.129
Whether ordinary members become shareholders	0.292	0.669	0.231	0.155

Table 4 Performance indicator factor loading of "distribution of benefits and members' behavior"

Factor loading matrix of "distribution of benefits and members' behavior" indicators	Factor			
	1	2	3	4
Whether to withdraw surplus accumulation fund	0.786	0.216	0.261	0.125
Whether to purchase product at a protective price	0.746	0.346	0.232	0.115
Whether to implement patronage refund	0.746	0.371	0.169	0.284
Whether to distribute capital stock dividends	0.711	0.306	0.164	0.397
Contribution of cooperative leaders	0.710	0.325	0.071	0.319
Members' behaviors of fulfilling the contract and complying with the production standards	0.657	0.402	0.086	0.401
Members' behavior of investment in capital	0.291	0.688	0.323	0.279
Members' behavior of participating in management and other affairs	0.338	0.665	0.202	0.176
Operating conditions of cooperatives in the past two years	0.377	0.632	0.173	0.361
Lower members' enthusiasm for producing similar products compared with non-members	0.431	0.631	0.318	0.185
Degree of members' satisfaction with the service and income distribution of cooperatives	0.421	0.625	0.267	0.194
Market competitiveness of cooperatives	0.492	0.599	0.248	0.146
Financial virtuous cycle mechanism	0.230	0.559	0.382	0.376
The ability of cooperatives to expand the operation scale	0.491	0.546	0.430	0.084
The ability of cooperatives to improve service levels	0.135	0.252	0.758	0.322

4.2.3 Reliability test. After the completion of the operation, we conduct reliability test on the data, and the results are shown in Table 5. From Table 5, it can be found that the internal consistency coefficient of four dimensions (property structure, internal governance, distribution of benefits, members' behavior) is greater than 0.7 standard, indicating that the various dimensions of the performance evaluation model have high reliability.

Table 5 Reliability of evaluation indicators

Benefit distribution indicators	α value after removing this item	α value
Whether to withdraw surplus accumulation fund	0.825	0.848
Whether to purchase product at a protective price	0.809	
Whether to implement patronage refund	0.821	
Whether to distribute capital stock dividends	0.810	
Whether ordinary members become shareholders	0.812	
Property structure indicators	α value after removing this item	α value
Ownership	0.851	0.857
Usufruct	0.824	
Right of disposal	0.846	
Right to yields	0.838	
Members' behavioral indicators	α value after removing this item	α value
Contribution of cooperative leaders	0.780	0.836
Members' behaviors of fulfilling the contract and complying with the production standards	0.782	
Members' behavior of investment in capital	0.786	
Members' behavior of participating in management and other affairs	0.819	
Internal governance indicators	α value after removing this item	α value
Whether the major decisions are based on "one man one vote"	0.832	0.852
Democratic principle of selecting members of Council and Supervisory Board	0.829	
Democratic principle of profit allocation decisions	0.811	
Council structure	0.826	
Supervision of the Board of Supervisors	0.833	

4.3 Verification analysis of evaluation model for rural cooperative economic organizations Based on the sample B (n = 231), using Lisrel statistical software, we perform the verification analysis on the performance evaluation model for rural cooperative economic organizations. The model is shown in Fig. 1. The model fitting index is shown in Table 6. As can be seen from Table 6, the model fitting index $\chi^2/df = 1.69 < 2$, indicating that the overall degree of fitting of model is good; GFI is 0.87, basically close to the expected level of 0.90; NNFI, IFI and CFI are all greater than 0.9; RMSEA is equal to 0.055 <0.10. This shows that the performance evaluation model for rural cooperative economic organizations obtained from the exploratory factor analysis is ideal, and the performance evaluation indicators for rural cooperative economic organizations have good construct validity. To further study the factors affecting the operating efficiency of rural cooperative economic organizations, we use the sample B ($n = 231$) and adopt the balanced scorecard and structural equation model to conduct high-order verification comparison analysis on 24 performance evaluation indicators for general businesses. The structural model is shown in Fig. 2, and the model fitting index is shown in Table 7. The fitting index shown in Table 7 is $\chi^2/df = 2.55 < 3$, indicating that the overall degree of fitting of model is good; GFI is 0.80, close to the expected level of 0.90; NNFI, IFI and CFI are all greater than 0.9; RMSEA is equal to 0.092 <0.10. This shows that the four-dimensional performance evaluation indicators for rural cooperative economic organizations established by balanced scorecard have high validity.

Table 6 Fitting index of performance model for rural cooperative economic organizations (n = 231)

Measurement model	χ^2	df	χ^2/df	*GFI*	*AGFI*	*NFI*	*NNFI*	*IFI*	*CFI*	*RMSEA*
Verification analysis	317.81	184	1.72	0.87	0.88	0.95	0.97	0.97	0.97	0.055

Table 7 Fitting index of structural model of performance indicators for rural cooperative economic organizations

Measurement model	χ^2	df	χ^2/df	*GFI*	*AGFI*	*NFI*	*NNFI*	*IFI*	*CFI*	*RMSEA*
Verification analysis	573.8	225	2.55	0.80	0.75	0.96	0.97	0.97	0.97	0.092

4.4 Analysis of the results To further analyze the influence of various dimensions of performance indicator evaluation model for rural cooperative economic organizations on the performance of rural cooperative economic organizations, this paper uses Enter Method in multiple regression analysis to examine. Regression analysis results are shown in Table 8. Various dimensions in the performance indicator evaluation model for rural cooperative economic organizations jointly explain 64.9% of the variance of organizational performance. The property and governance structure, benefit mechanism and cooperative behavior have a significant impact on the performance of rural cooperative economic organizations, but the degree of impact is different. The distribution of benefits has the greatest impact on organizational performance, and the impact factor (T value) is 8.290; the internal governance has also a significant impact on organizational performance, and the impact factor (T value) is 3.153; the impact factor (T value) of members' cooperative behavior and property structure on organizational performance is 0.736 and 1.384, respectively. This shows that the establishment of a good benefit distribution mechanism and constant adjustment of distribution system based on members' income expectation on organization, is the prerequisite for the performance improvement and sustainable development of cooperatives.

Table 8 Regression analysis on the performance of rural cooperative economic organizations

	Non-normalization factor		Normalization factor	T value	Sig.
	Standard error	B	Beta distribution		
Constant	0.313	0.211	–	1.484	0.139
Property structure	0.112	0.081	0.098	1.384	0.168
Internal governance	0.208	0.066	0.198	3.153	0.000
Distribution of benefits	0.056	0.077	0.055	8.290	0.463
Members' behavior	0.645	0.078	0.624	0.736	0.000
R^2 adjusted	0.656(0.649)	–	–	–	–

5 Conclusions and recommendations

5.1 Conclusions

5.1.1 The distribution of benefits is the primary factor affecting the performance of rural cooperative economic organizations. This shows that only by effective management and equitable distribution can the rural cooperative economic organizations make members consciously recognize the value of rural cooperative economic organizations and support the development of the organization. Therefore, the establishment and improvement of benefit distribution mechanism for rural cooperative economic organizations, is

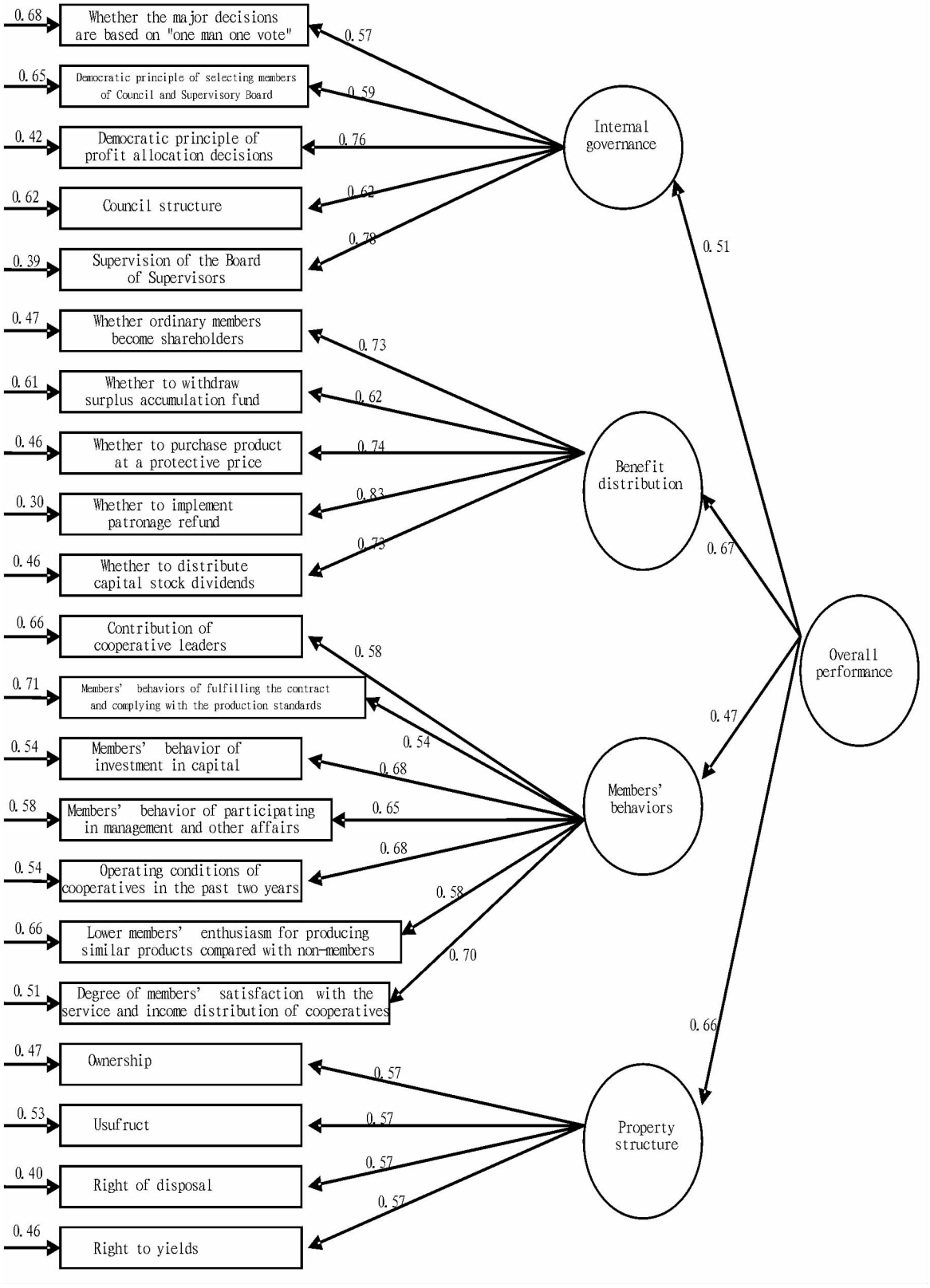

Fig. 1 Performance evaluation model for rural cooperative economic organizations

not only the objective requirement of improving the operating effect of property and governance structure, but also an important way to improve the performance of rural cooperative economic organizations.

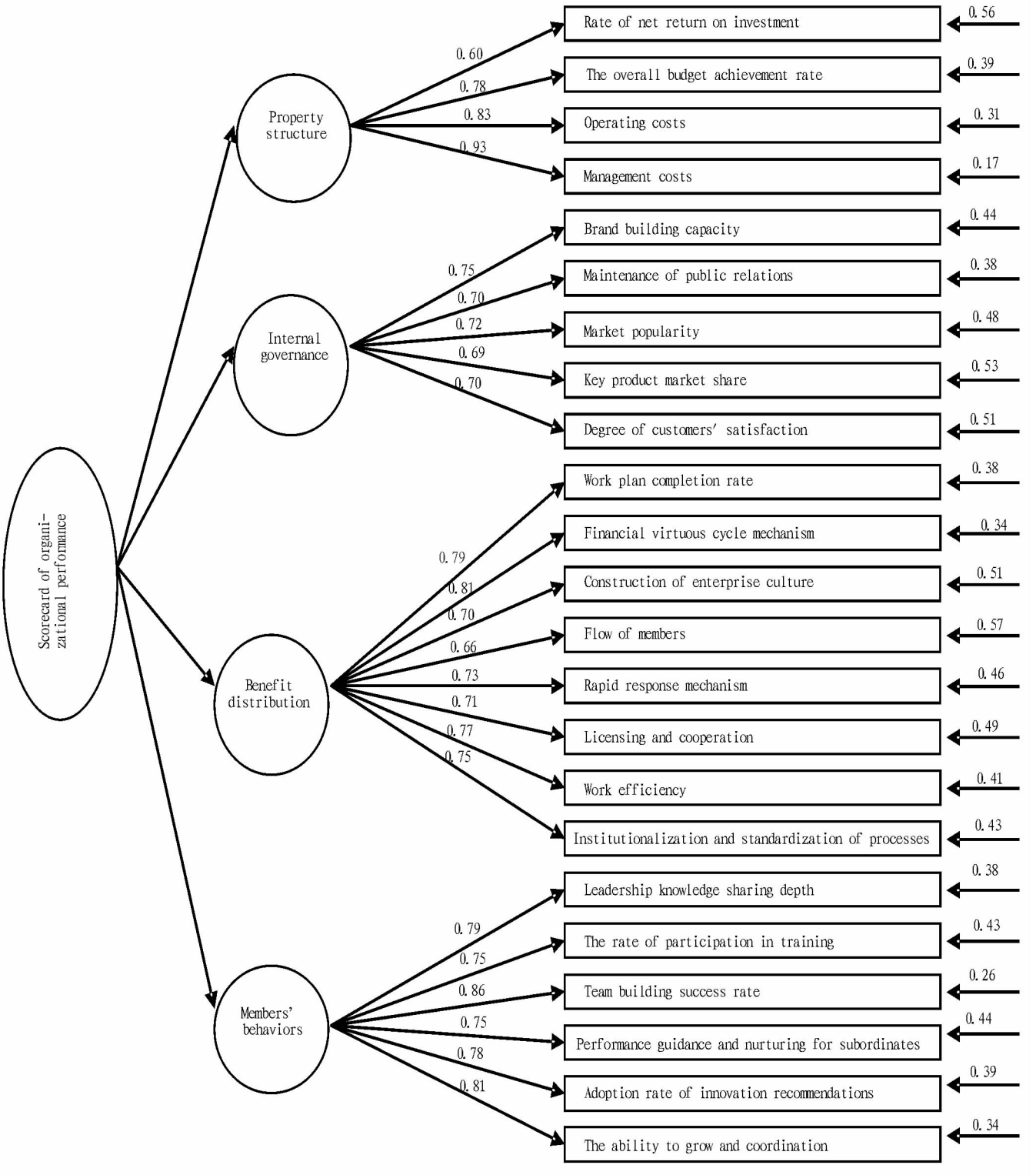

Fig. 2 High-order verification analysis of performance evaluation model for rural cooperative economic organizations

5.1.2 Property structure and internal governance significantly affect the performance improvement of rural cooperative economic organizations. Unclear property rights and chaotic internal governance not only directly affect members' cooperative behavior, but also negatively affect the incentive effects of distribution of benefits. Therefore, to improve the performance of rural cooperative economic organizations, there is a need to learn modern business management experience, and use the property structure of mem-

bers holding share and internal governance of members' participation, to stimulate the enthusiasm of members for participating in cooperation and enhance the performance of cooperative organizations.

5.1.3 The impact of members' cooperative behavior on the performance improvement of rural cooperative economic organizations can not be ignored. If the members of rural cooperative economic organizations have higher cognitive level on the internal organization and management system, organizational trust and interest prospects, they will be more willing to follow the constraints and incentives of organization and have a positive willingness to cooperate to expand production scale. Conversely, if the system of rural cooperative economic organizations is not perfect, it will affect the interests expectation of members and damage the members' enthusiasm for cooperation, thereby affecting the operation and development of rural cooperative economic organizations.

5.2 Recommendations

5.2.1 Establishing and improving member capital stock system. For the cooperative economic form, it is necessary to improve the competition mechanism of the capitalist economic system, so as to achieve economic equilibrium[11]. Currently, the equity of some rural cooperative economic organizations in Hunan Province is mostly concentrated in the hands of a few members, which is obviously not conducive to the formation of incentive mechanism for members' participation in cooperation, development of rural cooperative economic organizations, and enhancement of organizational performance. Therefore, it is necessary to follow the principle of equal rights and obligations to clearly define the property ownership, and establish a sound system of member capital stock to form an incentive mechanism.

5.2.2 Establishing and improving the internal governance structure. Poter and Scully[12] believe that low efficiency of technology, distribution and scale is the main cause of low efficiency of cooperatives. In reality, the internal management is in chaos for some rural cooperative economic organizations, and many farmers are very dissatisfied with this, and cold towards the participation in rural cooperative economic organizations. Therefore, to improve the situation, it is necessary to enhance the performance of rural cooperative economic organizations and improve the internal governance structure. In accordance with democratic procedures for the election, we can elect the members of Council and Supervisory Board, and make the General Meeting decide the main management policy and major issues.

5.2.3 Improving the service and management capacity. The formation of rural cooperative economic organizations is due to economic purposes. Therefore, it is necessary to improve management level and profitability in order to stimulate the enthusiasm of members for participating in cooperation and improve the organizational performance. The rural cooperative economic organizations should continue to broaden the area of services, and improve service levels and profitability. It is necessary to actively extend from the previous services in technology exchanges, production and sales to integrated services in the whole production.

5.2.4 Strengthening the policy support and supervision. The studies of Alehian *et al.*[13], Jensen *et al.*[14] and Fama *et al.*[15] think the cooperative members make vague definition of property rights, and abuse financial resources. Fulton[16] believes that the changes in technology and social values will make cooperatives face more difficulties to survive. Chinese rural cooperative economic organizations are facing the constraints of property rights, internal governance, distribution of benefits and members' individual behavior, and the development is very slow. Therefore, the government should further clarify the guiding ideology of rural cooperative economic organizations, establish appropriate policies and regulations, and create favorable conditions for the healthy development of rural cooperative economic organizations through propaganda and guidance, policy support, legal protection, operational guidance, public services, supervision and management.

6 Discussions

The model studies in the existing literature within the framework of cooperative organizations are rich, but they are not suitable for the assessment on performance of China's rural cooperative economic organizations. On the basis of contract theory and game theory, Zusman[17] establishes the collective choice model for cooperatives and enterprises, and it can explain how the cooperatives with different members make rules and choose collective rules in the case of incomplete information, uncertainty and bounded rationality, but it is a far cry from the operation rules of China's rural cooperative economic organizations. Rausser[18] views cooperative as a relationship network, and uses the equilibrium organization model developed by Nash-Harsanyi for the collective choice in an organization with many participants. The model describes the collective decision-making as the prisoner's dilemma with N people, and emphasizes the individual authority in decision-making. This is obviously far from China's democratic decision-making system. The model, developed by Karantlninis and Zago[19] based on game theory, assumes that the members are homogeneous, but it can not clearly simulate the possibility of members looking for external opportunities. Using game model and the background analysis of bargaining rights allocation, Hendrikse and Bijman[20] study the effects of ownership structure on investment, and it is revealing to some extent, but it can not reveal the development laws of China's rural cooperative economic organizations. Based on the situation of China's rural cooperative economic organizations, we establish the performance evaluation indicators and evaluation model for rural cooperative economic organizations, and clarify the main factors influencing the operational performance of rural cooperative economic organizations and interaction mechanism. We put forward our ideas and views based on measuring whether the performance can promote the development of rural cooperative economic organizations. These ideas can be used to solve various kinds of problems in current rural cooperative economic organizations. The study focuses on the development ideas of rural cooperative eco-

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to promote change from family operation of using traditional production and management technology to intensive management of using advanced science and technology and production means, increase input of technologies, capitals, and other production elements, to raise intensification level of production and operation of logistics of fresh agricultural products. Secondly, it is recommended to continue strengthening cooperation of farmer households, to establish diversified, multi-level and multi-form operation and service system. Also, it is recommended to cultivate industrial leading and train new farmers, closely connect industrial chain through promotion of leading enterprises, joint action of specialized cooperatives, and farmers, upgrade industrial chain to supply chain, and well organize farmers, to realize integration of production, industry, sales, and service, benefit sharing, work division and cooperation, and risk sharing.

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nomic organizations, and the analysis is performed according to the factors affecting the performance of rural cooperative economic organizations. We only provide recommendations in a broad sense, and do not conduct in-depth research at micro-level. It is a shortcoming of the study, and there is a need to further research it.

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