The Performance Evaluation Model of Financial Special Rural Revitalization Funds from the Perspective of the Digital Economy

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Abstract: - Digital village is the strategic direction of rural revitalization, and also an important part of building a digital China. At present, the construction of digital countryside is advancing, and a reasonable evaluation of the results of rural revitalization can effectively evaluate the use of funds. Therefore, in this study, firstly, based on the economic, social, and ecological perspectives, the fund performance evaluation index system of rural revitalization is constructed. Secondly, the correlation analysis method is used to select the evaluation index, and the combined weight method is employed to obtain the weight of the evaluation index. Finally, according to the extension cloud theory, the performance evaluation model of targeted poverty alleviation is implemented, and an empirical study is conducted on the performance evaluation of S Province with excellent rural revitalization. The results reveal that the income growth rate of the poor population, the incidence of rural poverty, and the rate of good air quality are the most vital indicators, with weights of 0.094, 0.092, and 0.07 respectively. From 2015 to 2021, S Province maintained a high level of environmental performance, while its economic performance and social performance needed to be further improved. The fund performance of rural revitalization experienced four levels: average, medium, good, and excellent, and showed a reverse trend in 2018 and 2021. This study makes a quantitative and qualitative evaluation of rural revitalization by using the extension cloud theory, which provides a reference for the effective use of special funds, and also provides a sufficient scientific basis for the macroeconomic layout.

Key-Words: - Digital Economy; Performance Evaluation Model; Extension Cloud Theory; Rural Vitalization; Special Financial Funds

Received: May 13, 2023. Revised: October 17, 2023. Accepted: October 31, 2023. Published: November 10, 2023.

1. Introduction

China is a typical developing agricultural country, and agriculture is very vital to China's social and economic development, [1], [2]. After the reform and opening up, China's economic construction has made remarkable progress, but it is also faced with many practical problems, [3], [4]. With the changes in the economic situation of China and its neighboring countries, China's economic growth has gradually slowed down, transforming from the stage of high-speed growth to the stage of quality development, [5], [6]. With the swift growth of Internet information technology (IT), the digital economy continuously promotes the development of all walks of life and has become the main economic form second only to the agricultural and industrial economy, [7], [8]. The initial practice of building a demonstration zone for common prosperity in China's Z Province shows that the development level of the digital economy is directly related to whether agriculture is developed, whether the countryside is beautiful, and whether the farmers are wealthy. In addition, it will affect the quality of China's well-off society and of socialist modernization. The digital economy is a new driving force for high-quality economic progress, [9], [10]. The digital economy, which determines resource allocation and improves productivity through data, was included in China's government performance report for the first time in 2017, and

then for four consecutive years from 2019 to 2022, [11], [12]. The effective combination of the digital economy and agricultural production and operation has attracted more and more attention from government departments, [13], [14]. In 2018, the first document of the Central Committee put forward the initial ideas for implementing the digital rural strategy. Subsequently, a series of policy documents were gradually issued aimed at promoting the development of the digital countryside and digital agriculture. It is of great significance to explore the digital economy to improve rural revitalization in this context.

[15], believed that digitalization did not lead to the reduction of workers' or farmers' skills. It was also controversial that the reduction of agricultural employment opportunities led to an increase in workers' dependence. It is important to establish agricultural policies that can promote fair and just working conditions, [16], denoted that in many low- and middle-income countries, more than 70% of farmers were small-scale producers. Research on digital agriculture technology can help accelerate the use of digital agriculture by smallholder producers, improve farmers' income and ensure global food security. [17], investigated the economic and environmental performance of traditional and ecological farming methods through an economic analysis of digital agricultural technologies in the upper Gangetic Plain of northern India. Digital agricultural information shared with farmers can improve farmers' productivity and profitability, [18], studied the development prospect of digital agriculture in Russia and believed that agricultural efficiency could be increased by five times after the transition to digital agriculture in Russia. However, under the premise of considering the target output level, farmland and employment need to be significantly reduced, and investment in agriculture should be increased.

It can be seen that since 2015, many scholars have carried out investigations and research on the evaluation of rural economic results, providing valuable guidance for the development of digital agriculture. From the selection of performance indicators, the design of the current performance indicator system mainly considers economic, social, cultural, or environmental factors, as well as factors related to poverty reduction, which is not accurate enough. This has a certain impact on the accuracy of the accurate evaluation of the results of the special financial rural revitalization. In order to solve the above problems, it is necessary to consider the scientific weight of the evaluation index and the fuzziness of the classification boundary and establish an accurate evaluation model for the effect of rural revitalization. By combining the cloud model and the matter-element theory, the performance evaluation estimate of finance on rural revitalization is transformed into the solution of the uncertainty problem, which provides a new research method for evaluating the effectiveness of economic development.

2 Scheme Design of Digital Economy Special Revitalization of Rural Areas based on Extension Cloud Model

2.1 Overview of the Development of the Digital Economy

The whole rural development under the digital economy includes three levels: individual farmers, agricultural enterprises, and the whole rural community, as displayed in Figure 1.

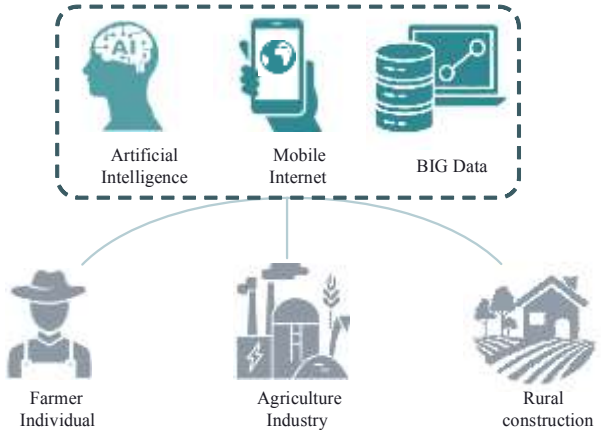

Fig. 1: The overall development level of the rural under the digital economy

At the level of individual farmers, the digital economy can significantly increase farmers' non-agricultural employment. The development of digital finance is conducive to guiding rural low-skilled labor into the non-agricultural sector, and the progress of artificial intelligence (AI) and digital technology is beneficial to lead rural high-skilled labor into the non-agricultural sector, [19], [20]. In terms of farmers' income, the digital economy will promote rural entrepreneurial behavior, enhance rural entrepreneurial opportunities, greatly improve the economic conditions of rural low-income groups, and bring China's overall economic growth. For urban and rural residents, in the aspect of income inequality, influence of the digital economy on the income inequality of urban and rural residents is U-

shaped, [21]. In the field of agriculture, the digital economy not only pushes agriculture from the era of poverty alleviation to the stage of revitalization by increasing human capital but also drives rural integration, informatization, strengthening, specialization, and green development. The revitalization of the rural industry is promoted from the aspects of the industry, production efficiency, development mode, and industrial structure, [22], [23]. Of course, the digital economy is also playing an important positive role in promoting green urban development.

With the continuous in-depth development of digital village construction, the academic community's attention and exploration of economic resilience are also following up, and relevant research results are gradually enriched and diversified. The existing literature has studied the construction of digital countryside and the application of digital functions to specific scenes from different perspectives. From the perspective of technology governance, digital technology can empower the modernization of rural governance system, promote co-governance of multiple subjects, promote the intelligent transformation of governance decisions, consolidate the material foundation of governance, and create a good human environment, [24]. From the perspective of industrial development, the embedding and development of digital technology in rural space can help accelerate the integration process of urban and rural business circulation, [25], activate the rural financial market, [26], and break the traditional industrial integration path to achieve diversified development, [27]. From the perspective of ecological protection, [28] pointed out that the implementation of e-commerce into rural areas would significantly reduce the ecological and environmental performance of pilot counties.

2.2 Impact of Fiscal Expenditure on Rural Revitalization

Whether rural revitalization through financial special measures can play a positive role needs to consider many factors. Blindly investing a large number of funds may not bring orderly economic development. The following three issues should be considered, as expressed in Figure 2.

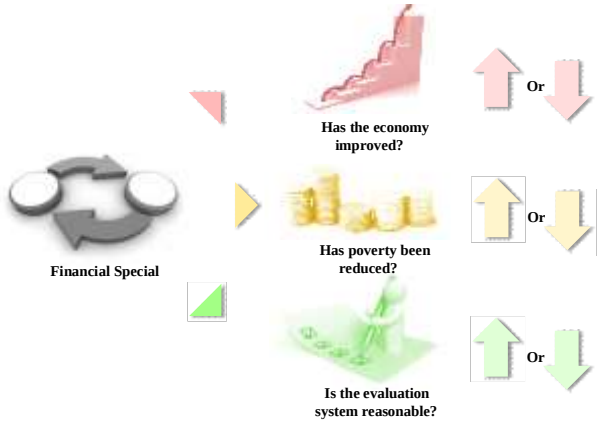

Fig. 2: Financial special issues on rural revitalization and development

In Figure 2, first, has the financial special program promoted the economic development of poor areas? Both general fiscal expenditure and financial special have positive effects on economic growth in poor rural areas. In pilot areas of poverty alleviation reform, the greater the degree of financial dependence of local governments, the more obvious the effect of economic growth, [29]. In some ethnic autonomous counties, poverty alleviation funds and other fiscal policies have promoted the relative improvement of the economic level of ethnic autonomous counties, but also increased their budget expenditure and fiscal deficit, [30].

Second, has the financial special measure effectively improved rural poverty alleviation? In general, financial special has a significant impact on the poor population and the incidence of poverty. However, the improvement of absolute indicators such as per capita Gross Domestic Product (GDP) in poor areas is not obvious, and the problem is still prominent, [31], [32]. At the same time, government transfer welfare with obvious poverty reduction characteristics is more effective in poverty reduction and eradication. But in practice, local governments use fiscal transfer more to cope with the assessment of superiors and less to effectively promote their own economic development and social security.

Third, is there a transparent and effective operation of special financial funds and valid effect evaluation? At present, there is still room for improvement in the investment objectives, distribution system, performance evaluation, and social participation of the poverty alleviation fund, [33]. There are different degrees of problems, but generally speaking, the main reason is that the original goal of the policy deviates from the effectiveness of the policy implementation, and the policy goal has not been achieved. The effectiveness

audit of poverty alleviation funds faces many challenges in the aspects of focus, coverage, public participation, resource integration, and audit concentration. To improve the audit level and effectiveness, it is urgent to use anti-poverty funds audit level and actual benefits.

2.3 Special Rural Revitalization Program of the Digital Economy, Taking S Province as an Example

As a relatively backward province in economic development in China, S Province has gradually developed its GDP from 1.74 trillion yuan in 2015 to 2.98 trillion yuan in 2021. Various ways have been adopted in rural development, which can be divided into the following five categories, as revealed in Figure 3.

Fig. 3: Rural development model of the digital economy in S Province

Based on the cultural characteristics of S Province, it gives full play to its tourism advantages and builds a famous cultural city with characteristics and a rural cultural industrial park. It has effectively promoted the integrated development of rural tourism and agriculture in S Province and created a complete rural cultural industry chain. Particularly, the Internet, big data, and other factors have stimulated the potential productivity of rural areas and promoted the progress of the digital industry. Under the digital economy, it can be displayed by means of panoramic interaction and holographic projection. Traditional rural culture will be combined with digital tourism, digital performance, and other new cultural formats to fully show the rural features of Yanhe River, potato flour, Pagoda Mountain, kidney drum, Loess Plateau, and so on. The development mode of rural traditional culture will be innovated, and the culture and characteristic products of S province will be better promoted to the world. S Province has improved the construction of rural Internet and other digital infrastructure. Integrated development promotes the construction of infrastructure for the deep integration of digital economy and agriculture, and contributes to the improvement of rural infrastructure construction in S Province. Rural revitalization and development in S Province mainly face such problems as low financial inclusion, unbalanced regional development, and backward infrastructure. In order to solve the above problems, rural revitalization in S Province relies on the digital economy, integrates social resources, raises funds for rural industrial development, further promotes the integrated development of the digital economy and rural industries, and effectively improves the overall living environment in rural areas.

The distinctive rural revitalization industries in S Province are the production of apples, kiwifruit, goat's milk, cereals, tea, and edible fungi. Therefore, the key to rural revitalization and development is to help the quality development of the characteristic agricultural industry in S Province. Firstly, the informatization and logistics of the agricultural industry chain will be promoted through the development of water, electricity, roads, and the Internet. Secondly, through the analysis of big data and the processing of market information, factors such as price and supply and demand are integrated into the production chain to achieve maximum efficiency. Finally, by combining big data and the Internet of Things (IoT), various factors affecting crop growth can be controlled to achieve precision in crop production and fundamentally optimize crop growth conditions. Using IT and AI created by the digital economy, combined with advanced technologies such as the IoT in farmland and mechatronics, the progress of agricultural products from research and development (R&D) of agricultural products to agricultural development will be promoted. To further expand market opportunities, the digital economy is helpful to build the province's characteristic agricultural industry chain.

The digital economy facilitates the digitalization and development of smart agriculture through the Internet, big data, AI, and other technologies. It has also improved the quality of farming. Through the Internet + distance education platform, the smart village platform created by the digital economy has fostered a new type of professional farmers and improved their quality so that they can not only use new technologies but also give full play to the advantages of the technologies, thus promoting the improvement of farmers' main quality.

2.4 Extension Cloud Model

Based on the principle of the cloud model, the rural revitalization performance of S Province is evaluated. This work adopts an extension cloud model for modeling. The basic model of the extension cloud model is the normal cloud model,

which uses expectations (E_R), entropy (E_C), and hyper entropy (H_U) to build a cloud correlation function, the related calculation is as follows:

$$E_R = (x_{max} + x_{min})/2 \quad (1)$$
$$E_C = (x_{max} - x_{min})/6 \quad (2)$$
$$H_U = s \quad (3)$$

E_R refers to the evaluation grade of rural revitalization funds; E_C expresses the uncertainty degree of attribute concept; H_U stands for the degree of uncertainty of E_C; x_{max} and x_{min} represent the maximum and minimum values of indicators respectively; s is the experience value of the designated expert.

The extension cloud model is the coupling of the cloud model and matter-element theory. According to the matter-element theory, an extension cloud model for the fund performance evaluation of rural revitalization is implemented, as denoted in Eq. (4), [34]:

$$R = \begin{bmatrix} P_1 & c_1 & x_1 \\ P_2 & c_2 & x_2 \\ \vdots & \vdots & \vdots \\ P_i & c_i & x_i \end{bmatrix} \quad (4)$$

P_i means the fund performance level of rural revitalization; c_i signifies the ith fund evaluation index of rural revitalization; x_i demonstrates the value of c_i.

Combined with the double uncertainty of the cloud model, x_i is replaced by using the E_{R_i}, E_{C_i}, and H_{U_i} in the cloud model. Then the extension cloud matter-element model for fund performance evaluation of rural revitalization is written as Eq. (5):

$$R = \begin{bmatrix} P_1 & c_1 & x_1 \\ P_2 & c_2 & x_2 \\ \vdots & \vdots & \vdots \\ P_i & c_i & x_i \end{bmatrix} = \begin{bmatrix} P_1 & c_1 & (E_{R_1}, E_{C_1}, H_{U_1}) \\ P_2 & c_2 & (E_{R_2}, E_{C_2}, H_{U_2}) \\ \vdots & \vdots & \vdots \\ P_i & c_i & (E_{R_i}, c, H_{U_i}) \end{bmatrix} \quad (5)$$

The fund performance evaluation of rural revitalization involves a large number of evaluation indicators, among which there may be collinearity and other problems. Therefore, correlation analysis is used to screen indicators, [35]. The correlation coefficient is plotted in Eq. (6):

$$n_{ij} = \frac{\sum_{k=1}^{m}(x_{ij}-\overline{x_i})(x_{ij}-\overline{x_j})}{\sqrt{\sum_{k=1}^{m}(x_{ij}-\overline{x_i})^2 \sum_{k=1}^{m}(x_{ij}-\overline{x_j})}} \quad (6)$$

n_{ij} stands for the correlation coefficient of index i and index i; x_{ki} refers to the value of the ith index of the kth evaluation object; $\overline{x_i}$ displays the average value of the ith index; m represents the total number of fund evaluation indicators of rural revitalization.

The combination weight can be obtained by using the weighted combination method. p_j and q_j are the objective weight and subjective weight respectively. w_j is set to the composite weight:

$$w_j = ap_j + (1-a)q_j \quad (7)$$

a means weight coefficient, $0 \le a \le 1$, and $a = 0.5$.

In the process of fund performance evaluation of rural revitalization, the various evaluation index x_i is taken as a cloud droplet, and an average value E_C is produced. The standard deviation (SD) is the random number E_C' of obeying the normal distribution of H_U. The correlation between the evaluation index value x_i and the normal extension cloud is illustrated in Eq. (8):

$$u = \exp[-(x_i - E_R)^2/2(E_{C_i}{}')^2] \quad (8)$$

The cloud correlation matrix and weight matrix of each evaluation index are integrated to obtain the comprehensive cloud correlation degree, and the weighted average is carried out to get the expected value of the fund performance level of rural revitalization:

$$R_k = x_i \times \mathrm{U} \quad (9)$$
$$R' = \sum_{k=1}^{m} kR_k / \sum_{k=1}^{m} R_k \quad (10)$$

R_k stands for comprehensive cloud correlation; R' refers to the characteristic value of the level; U is the normal cloud correlation matrix of each evaluation index; k means evaluation level. The fund performance level of rural revitalization is divided into 5 levels, namely $k \in \{\mathrm{I}, \mathrm{II}, \mathrm{III}, \mathrm{IV}, \mathrm{V}\}$.

The weighted average method is used to calculate comprehensive evaluation score r as shown in Eq. (11):

$$r = \sum_{j=1}^{5} b_j f_j / \sum_{j=1}^{5} b_j \quad (11)$$

b_j represents the corresponding component of R_k; f_j signifies scoring value, respectively corresponding to the evaluation levels of $\{\mathrm{I}, \mathrm{II}, \mathrm{III}, \mathrm{IV}, \mathrm{V}\}$.

The computation of expected value E_{R_r} and entropy E_{C_r} of the comprehensive evaluation score is as follows:

$$E_{R_r} = \frac{r_1(x) + r_2(x) + \cdots + r_m(x)}{m} \quad (12)$$
$$E_{C_r} = \sqrt{\frac{1}{m}\sum_{i=1}^{m}(r_i(x) - E_{R_r})^2}$$

$r_i(x)$ expresses the composite score calculated for the i th time; m refers to the number of operations, and m=150.

In order to describe the credibility of the fund performance evaluation results of rural revitalization, the credibility factors are defined, as implied in Eq. (14):

$$\theta = \frac{E_{R_T}}{E_{C_T}} \tag{14}$$

θ is the credibility factor, and the smaller the value, the smaller the dispersion degree of the fund performance evaluation results, and the greater the credibility? Conversely, the less confidence in the evaluation results.

2.5 Construction of Evaluation Index System

According to the actual situation of S Province, a total of 7 indicators are obtained from the economic perspective. The historical data came from the statistical bulletin of S Province over the years and the relevant data of the poverty alleviation office, and some data came from the field sampling survey data of the research group, as exhibited in Table 1 (Appendix).

Through the screening results, the item of per capita total retail sales of consumer goods is deleted.

Based on the social perspective, a total of 7 indicators are obtained. The relevant statistical data came from the poverty alleviation office and the statistical bulletin of S Province over the years, as described in Table 2 (Appendix).

According to the screening results, the items of URUR and the number of people lifted out of poverty by year-end are removed.

On the basis of the ecological perspective, a total of 6 indicators are obtained. The relevant statistical data came from the statistical bulletin of S Province over the years and the data of the poverty alleviation office, as unfolded in Table 3 (Appendix).

The newly afforestation area and the per capita total power of agricultural machinery are deleted according to the screening results. Through the screening of evaluation indexes, the redundant and less correlated evaluation indexes are eliminated, and the index system is simplified to ensure the accuracy of evaluation results.

2.6 The Division of Performance Levels

According to the national poverty standard, the level of national income, and income hierarchy standards in China, with no division standard of the evaluation index, such as economic growth rate, per capita grain output, highway density index, the fund performance level of rural revitalization in S Province is divided based on the evaluation of water resources security, ecological security, traffic mileage and density, and expert opinions, as portrayed in Table 4 (Appendix).

2.7 Determination of the Standard Cloud

By Eq. (1) to Eq. (3) the classification interval value of index grade is converted, according to expert opinions, s = 0.02 can get. After the interval value is converted, the cloud matter-element represented by E_R, E_C, and H_U is obtained. Due to the fuzziness and randomness of the grade boundary value, the grading interval is blurred. The cloud model of the grade boundary of the evaluation index is presented in Table 5 (Appendix).

2.8 Determination of the Combined Weight of Evaluation Indicators

The G1 method and the entropy weight method are adopted to calculate the weight of the proposed performance evaluation index in S Province, and Eq. (7) is used to combine the results, as indicated in Table 6 (Appendix).

2.9 Results of Fund Performance Evaluation of Rural Revitalization

MATLAB 2022 is used to calculate the correlation degree between the cloud matter element and each level, and the maximum membership principle and level characteristic value are adopted to obtain the membership degree and fund performance evaluation level of rural revitalization in S Province from 2015 to 2021, as signified in Table 7 (Appendix).

Table 7 (Appendix) describes that from 2015 to 2021, the overall performance spans four states: average, medium, good and excellent. Among them, in 2015-2016, the fund performance of rural revitalization of S Province was at the general level. In 2015, the performance showed a trend of changing from the general to the medium level. In 2017-2018, the performance was at the medium level, and the changing trend remained unchanged. In 2019-2020, the performance was at a good level and presented a trend of changing to an excellent level in 2020. In 2021, the performance of S Province was at an excellent level, but showed a downward trend.

It can be seen that with the increase of rural revitalization funds in S Province and the further deepening of the digital economy and agricultural development measures, the fund performance level of rural revitalization in S Province will be further improved. It can also be found from Table 7

(Appendix) that although the comprehensive performance level of S Province has been improved to a great extent, there will be an obvious reverse trend in 2021. Therefore, the local government departments should take measures for scientific management and precise assistance to prevent the occurrence of new poverty.

3 Results and Discussion

The membership matrix of economic performance, social performance, and ecological performance of rural revitalization funds in S Province was obtained according to the weight of the criterion layer, and the maximum membership principle was adopted to determine the performance level of the criterion layer.

3.1 Economic Performance Subsystem

Figure 4 denotes the evaluation results of the economic performance subsystem.

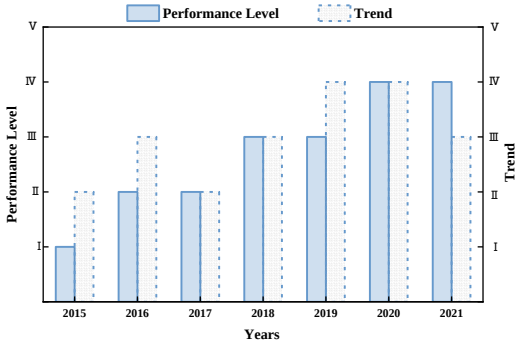

Fig. 4: Performance level and development trend of economic performance subsystem

The economic performance subsystem changed from a low level in 2015 (Ⅰ) to a good level in 2021 (Ⅳ). The subsystem of economic performance was at a low level in 2015, but there was a trend of change at the general level. In 2016 and 2017, the level was average, but both showed a trend to medium or even good levels. In 2018-2019, it will reach the medium level, and in 2020-2021, it will reach a good level, but there is a trend of reverse change in 2021. Thus, during the period of rural revitalization, the economic performance in S Province has improved to a large extent, but the state is not stable. The analysis of the regression coefficient found that the enhancement effect of digital rural construction on the resilience of agricultural economy during 2015-2019 was slightly greater than that during 2019-2021.

3.2 Social Performance Subsystem

The assessment results of the social performance subsystem are outlined in Figure 5.

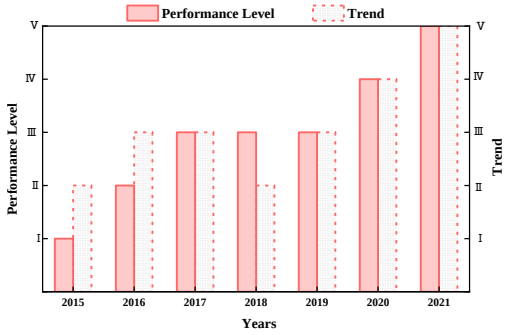

Fig. 5: Development trend and performance level of social performance subsystem.

The variation trend of social performance and economic performance is similar, both of which change from a low level in 2015 to a good level in 2021. Among them, it was the low level in 2015, and it was the average level in 2016-2017. From 2017 to 2019, the social performance level reached the medium level, but there was a reverse trend in 2018. It reached a good level in 2020-2021.

3.3 Ecological Performance Subsystem

Figure 6 refers to the evaluation results of the ecological performance subsystem.

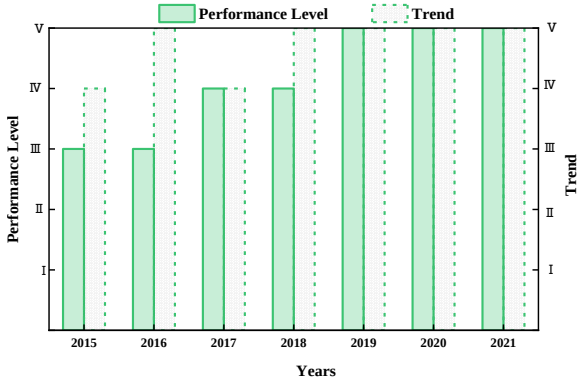

Fig. 6: Performance level and growing trend of ecological performance subsystem.

S Province had a higher level of ecological performance, which was at a medium level from 2015 to 2016. In 2017-2018, the ecological performance reached a good level, and in 2019-2021, it reached an excellent level. The overall ecological performance level developed stably with a positive trend of change.

3.4 Specific Evaluation Combined with Overall Indicators

Through the radar chart processing from 2015 to 2021, the growing trend of rural revitalization in S Province in 7 years was viewed, as signaled in Figure 7.

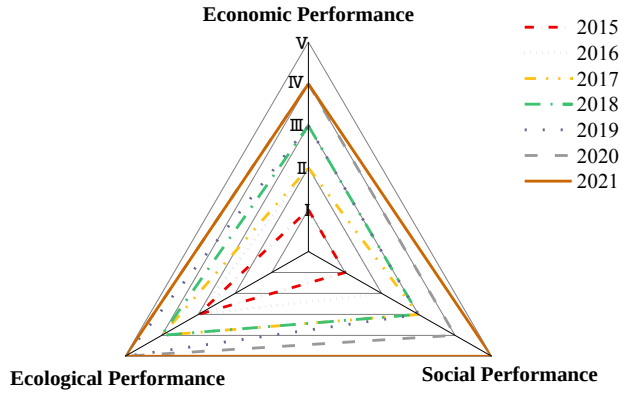

Fig. 7: Radar chart of the trend of comprehensive indicators from 2015 to 2021

On the whole, the rural revitalization project in S Province is developing well. From the specific indicators of economic performance, the per capita GDP increased from 46,654 yuan in 2015 to 75,400 yuan from 2015 to 2021. The per capita disposable income of farmers increased from 8,689 yuan in 2015 to 13,316 yuan in 2021, and the income gap between urban and rural areas has been narrowing, from 3.04:1 to 2.76:1. It means that with the swift economic progress of S Province, the digital economy has been continuously involved in farmers' lives, and farmers' income has been improved to a certain extent. In terms of specific indicators of social performance, the incidence of poverty in rural areas has dropped significantly, grain output has advanced from 318 kilograms in 2015 to 320 kilograms in 2021, and the urbanization rate has added from 52.57% in 2015 to 63.6% in 2021. The density of the highway increased from 0.65 km/10,000 sq km in 2015 to 0.95 km/10,000 sq km in 2021. The growth of these indicators has enhanced the social performance of S Province. However, compared with the national average level, the province's social security indicators still have a large room for improvement, and various social security measures still need to be strengthened. In the aspect of specific indicators of ecological performance, the forest coverage rate of S Province increased gradually from 44.66% in 2015 to 46.39% in 2021. With the rapid rise of local rural development and rural tourism, the disposal rate of centralized garbage and rural sewage treatment was promoted from 59.52% and 18.22% in 2015 to 90% and 32% in 2019, respectively. The local rural environment has been greatly improved, and the growth potential of the ecological industry is huge.

4 Conclusion

Through correlation analysis, 20 performance indicators of the rural revitalization system are selected, and 5 redundant and irrelevant evaluation indicators are eliminated. As a whole, the change in economic and social performance has a very important impact on the overall level of regional poverty reduction performance. From 2015 to 2021, the completion rate of some indicators in S Province increased from average to excellent. But the overall level of performance needs to be improved. The level of economic, social, and environmental performance improved during the study period, but the development of economic and social performance was unstable. Among them, the social index is slightly higher than the economic index, but the level is relatively low. The level of environmental performance is high, reaching an excellent level in 2021. The digital economy can make a great contribution to the high-quality development of agriculture and become the driving force of agricultural growth in the new era. According to the performance evaluation of the special financial fund for the rural revitalization of S Province, the validity of the conclusion is confirmed. The influence of the digital economy on the development of agricultural quality has its own threshold effect. Only when the digital economy is developed to a certain level, can it make contributions to the progress of agricultural quality.

At present, emphasize the important cultivation role of digital rural construction in the resilience system of the agricultural economy, grasp the penetration, development, and application of digital information technology in agriculture and rural areas, accelerate the construction of rural information infrastructure, improve the optimization, transformation, and management level of digital information equipment, and provide strong support for achieving modernization of agriculture and rural development and ensuring the security of the agricultural economic system. Strengthen the supervision of rural digital inclusive finance, improve the construction of rural digital finance system, innovate rural digital finance business models, and comprehensively enhance the carrying capacity of rural finance and the availability of rural financial services. At the same time, we will focus on the diversified cultivation of rural digital service

platforms and optimize the environment for agricultural economic development.

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Contribution of Individual Authors to the Creation of a Scientific Article (Ghostwriting Policy)

Tianyu Zhou carried out the simulation and the optimization.

Sources of Funding for Research Presented in a Scientific Article or Scientific Article Itself

No funding was received for conducting this study.

Conflict of Interest

The authors have no conflict of interest to declare.

APPENDIX

Table 1. Evaluation index system of economic performance

Goal layer/Performance	Economic performance						
Criterion layer	C11: Growth rate of GDP (%)	C12: Per capita GDP (ten thousand yuan)	C13: Per capita disposable income of farmers (yuan)	C14: Urban-rural income gap (Gini coefficient)	C15: Per capita total retail sales of consumer goods (yuan)	C16: Engel coefficient of rural residents (%)	C17: Income growth rate of the poor (%)
Indicator attribute	+	+	+	-	+	-	+
Indicator description		GDP/Number of resident population		The Gini coefficient is used to measure the urban-rural gap			Data from field sampling survey
Filter Results	Retain	Retain	Retain	Retain	Delete	Retain	Retain

Table 2. Evaluation index system of social performance.

Goal layer/Performance	Social performance						
Criterion layer	C_{21}: Incidence of rural poverty (%)	C_{22}: Grain output per capita (kg)	C_{23}: The urbanization rate (%)	C_{24}: The urban registered unemployment rate (URUR) (%)	C_{25}: Coverage rate of health insurance (%)	C_{26}: Number of people lifted out of poverty by year-end (persons)	C_{27}: Density of highway (km/10,000 sq km)
Indicator attribute	-	+	+	-	+	+	+
Indicator description		Total grain production/total population of the region					
Filter Results	Retain	Retain	Retain	Delete	Retain	Delete	Retain

Table 3. Evaluation index system of ecological performance.

Goal layer/Performance	Ecological performance					
Criterion layer	C_{31}: Good air quality rate (%)	C_{32}: Forest coverage rate (%)	C_{33}: Newly afforestation area (10,000 mu)	C_{34}: Rural garbage centralized treatment rate (%)	C_{35}: Rural sewage treatment rate (%)	C_{36}: Per capita total power of agricultural machinery (kW)
Indicator attribute	+	+	+	+	+	+
Indicator description						
Filter results	Retain	Retain	Delete	Retain	Retain	Delete

Table 4. Classification interval of performance level.

Index	Low (Ⅰ)	Average (Ⅱ)	Medium (Ⅲ)	Good (Ⅳ)	Excellent (Ⅴ)
C_{11}	$C_{11} \le 0.1$	$0.1 < C_{11} \le 1$	$1.3 < C_{11} \le 3$	$3 < C_{11} \le 5$	$C_{11} > 5$
C_{12}	$C_{12} \le 0.5$	$0.5 < C_{12} \le 1$	$12 < C_{12} \le 1.5$	$1.5 < C_{12} \le 2$	$C_{12} > 2$
C_{13}	$C_{13} \le 0.23$	$0.23 < C_{13} \le 3$	$3 < C_{13} \le 5$	$5 < C_{13} \le 8$	$C_{13} > 8$
C_{14}	$C_{14} > 0.6$	$0.4 < C_{14} \le 0.6$	$0.3 < C_{14} \le 0.4$	$0.2 < C_{14} \le 0.3$	$C_{14} \le 0.2$
C_{16}	$C_{16} \le 60$	$50 < C_{16} \le 60$	$30 < C_{16} \le 50$	$20 < C_{16} \le 30$	$C_{16} \le 20$
C_{17}	$C_{17} \le 1$	$1 < C_{17} \le 3$	$3 < C_{17} \le 7$	$7 < C_{17} \le 10$	$C_{17} > 10$
C_{21}	$C_{21} > 20$	$10 < C_{21} \le 20$	$2 < C_{21} \le 10$	$0.2 < C_{21} \le 2$	$C_{21} \le 0.2$
C_{22}	$C_{22} \le 250$	$250 < C_{22} \le 400$	$400 < C_{22} \le 550$	$550 < C_{22} \le 700$	$C_{22} > 700$
C_{23}	$C_{23} \le 25$	$25 < C_{23} \le 35$	$35 < C_{23} \le 55$	$55 < C_{23} \le 70$	$C_{23} > 70$
C_{25}	$C_{25} \le 60$	$60 < C_{25} \le 70$	$70 < C_{25} \le 80$	$80 < C_{25} \le 90$	$C_{25} > 90$
C_{27}	$C_{27} \le 0.1$	$0.1 < C_{27} \le 0.3$	$0.3 < C_{27} \le 0.5$	$0.5 < C_{27} \le 0.8$	$C_{27} > 0.8$
C_{31}	$C_{31} \le 60$	$60 < C_{31} \le 70$	$70 < C_{31} \le 80$	$80 < C_{31} \le 90$	$C_{31} > 90$
C_{32}	$C_{32} \le 30$	$30 < C_{32} \le 40$	$40 < C_{32} \le 60$	$60 < C_{32} \le 70$	$C_{32} > 70$
C_{34}	$C_{34} \le 60$	$60 < C_{34} \le 70$	$70 < C_{34} \le 80$	$80 < C_{34} \le 90$	$C_{34} > 90$
C_{35}	$C_{35} \le 60$	$60 < C_{35} \le 70$	$70 < C_{35} \le 80$	$80 < C_{35} \le 90$	$C_{35} > 90$

Table 5. The cloud model of the grade boundary.

Index	Low (Ⅰ)	Average (Ⅱ)	Medium (Ⅲ)	Good (Ⅳ)	Excellent (Ⅴ)
C_{11}	(0.25, 0.083, 0.02)	(1, 0.273, 0.02)	(2.25, 0.375, 0.02)	(4, 0.333, 0.02)	(12.5, 2.5, 0.02)
C_{12}	(0.4, 0.133, 0.02)	(1, 0.333, 0.02)	(1.4, 0.093, 0.02)	(1.8, 0.086, 0.02)	(2.25, 0.008, 0.02)
C_{13}	(0.3, 0.1, 0.02)	(0.8, 0.229, 0.02)	(1.2, 0.1, 0.02)	(1.6, 0.123, 0.02)	(2.15, 0.218, 0.02)
C_{14}	(0.8, 0.067, 0.02)	(0.5, 0.033, 0.02)	(0.35, 0.017, 0.02)	(0.25, 0.017, 0.02)	(0.1, 0.033, 0.02)
C_{16}	(30, 2.5, 0.02)	(52.5, 1.667, 0.02)	(37.5, 3.125, 0.02)	(25, 1.667, 0.02)	(10, 3.333, 0.02)
C_{17}	(1, 0333, 0.02)	(3, 0.5, 0.02)	(5.5, 0.733, 0.02)	(8.5, 0.5, 0.02)	(55, 15, 0.02)
C_{21}	(24, 8, 0.02)	(9, 1, 0.02)	(4, 0.889, 0.02)	(1.1, 0.3, 0.02)	(0.1, 0.033, 0.02)
C_{22}	(125, 41.667, 0.02)	(325, 25, 0.02)	(475, 25, 0.02)	(625, 25, 0.02)	(850, 50, 0.02)
C_{23}	(12.5, 4.167, 0.02)	(32.5, 1.667, 0.02)	(50, 3.333, 0.02)	(70, 2.672, 0.02)	(90, 3.75, 0.02)
C_{25}	(30, 10, 0.02)	(65, 1.667, 0.02)	(75, 1.667, 0.02)	(87.5, 1.667, 0.02)	(97.5, 1.667, 0.02)
C_{27}	(0.1, 0.033, 0.02)	(0.3, 0.05, 0.02)	(0.5, 0.067, 0.02)	(0.7, 0.05, 0.02)	(3, 0.067, 0.02)
C_{31}	(30, 10, 0.02)	(65, 1.667, 0.02)	(75, 1.667, 0.02)	(85, 1.667, 0.02)	(95, 1.667, 0.02)
C_{32}	(20, 6.667, 0.02)	(45, 1.667, 0.02)	(55, 1.667, 0.02)	(65, 1.667, 0.02)	(85, 1.667, 0.02)
C_{34}	(30, 10, 0.02)	(65, 1.667, 0.02)	(75, 1.667, 0.02)	(85, 1.667, 0.02)	(95, 1.667, 0.02)
C_{35}	(30, 10, 0.02)	(65, 1.667, 0.02)	(75, 1.667, 0.02)	(85, 1.667, 0.02)	(95, 1.667, 0.02)

Table 6. The index weight of performance evaluation.

Index	G1	Entropy weight	Combination weight	Index	G1	Entropy weight	Combination weight
C_{11}	0.071	0.093	0.082	C_{23}	0.06	0.058	0.059
C_{12}	0.051	0.045	0.048	C_{25}	0.022	0.053	0.038
C_{13}	0.071	0.091	0.081	C_{27}	0.035	0.059	0.057
C_{14}	0.06	0.065	0.062	C_{31}	0.082	0.058	0.07
C_{16}	0.079	0.092	0.085	C_{32}	0.082	0.057	0.069
C_{17}	0.097	0.091	0.094	C_{34}	0.041	0.047	0.044
C_{21}	0.104	0.08	0.092	C_{35}	0.041	0.048	0.045
C_{22}	0.104	0.063	0.084				

Table 7. Evaluation results of criteria layer of the fund performance level of rural revitalization in S Province from 2015 to 2021.

Year	Low (Ⅰ)	Average (Ⅱ)	Medium (Ⅲ)	Good (Ⅳ)	Excellent (Ⅴ)	Performance level	Variation tendency	The eigenvalue of the level	Confidence factor
2015	0.286	0.495	0.324	0.1016	0.151	Ⅱ	Ⅲ	1.515	0.0024
2016	0.239	0.424	0.386	0.353	0.137	Ⅱ	Ⅱ	1.908	0.0026
2017	0.141	0.238	0.356	0.4083	0.211	Ⅲ	Ⅲ	2.262	0.0005
2018	0.084	0.182	0.589	0.471	0.253	Ⅲ	Ⅲ	2.865	0.0011
2019	0.123	0.121	0.412	0.707	0.329	Ⅳ	Ⅳ	3.446	0.0007
2020	0.056	0.098	0.277	0.768	0.444	Ⅳ	Ⅴ	4.379	0.0012
2021	0.012	0.136	0.243	0.771	0.601	Ⅴ	Ⅳ	4.718	0.0005