Study on Influencing Factors of Rural Digital Cultural Industry from Principal Component Analysis

-- Illustrated by the Case of Qiqihar City

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Abstract. The rural digital cultural industry plays a vital role in the rural revitalization and industrial development of Qiqihar City. In this study, I propose an analysis model for the influencing factors of the rural digital cultural industry in Qiqihar City based on principal component analysis. Firstly, I select preliminary indicators of the influencing factors of the rural digital cultural industry in Qiqihar City from many potential factors, which are further screened by Pearson correlation coefficient. Then, I construct an indicator system for the influencing factors of the rural digital cultural industry in Qiqihar City by using principal component analysis and identified 16 key factors including the gross output value of the primary industry, rural retail sales of consumer goods, total fiscal expenditure of the city, total power of agricultural machinery, gross output value of the tertiary industry, per capita net income of rural residents, local financial expenditure, broadband access ports of the internet, population with a college diploma, government agricultural financial expenditure, fixed asset investment in agriculture, forestry, animal husbandry, and fishery, the number of telephone-accessible villages in the city, number of people with undergraduate education or above, area of machine-planted crops, Engel coefficient of rural residents' household expenditure, and population with a high school education or above.

Keywords: Rural Digital Cultural Industry; Influencing Factors; Principal Component Analysis; Pearson Correlation Coefficient; Qiqihar City.

1. Introduction

With the emergence of new technologies such as 5G, supercomputing, and blockchain and the development of the digital economy, and the digital cultural industry is gradually emerging. President Xi Jinping has pointed out: "We should follow the trend of industrial digitization and digital industrialization, accelerate the development of new cultural formats, transform and upgrade traditional cultural formats, and thus improve quality, efficiency and core competitiveness."[1] The 20th National Congress of the Communist Party of China also proposed the goal of "implementing the national cultural digitization strategy." To implement the national cultural digitization strategy, we should adhere to the people-centered approach, promote a deeper integration of culture and technology, push the construction of cultural digitization to a new stage, and thus let the achievements of cultural digitization benefit all the people. Rural areas are currently a relatively weak point in the construction of China's modern economic system, and the underdevelopment and imperfection of the cultural industry in rural areas are particularly prominent. In the great background of the country's vigorous promotion of common prosperity, rural revitalization has become the main theme of rural development in the new era, also the main battlefield for the development of digital cultural industries. How to use the momentum of the development of digital cultural industries to accelerate rural revitalization is an urgent problem that should be explored. In recent years, with the continuous support of government policies and the joint efforts of all the people, the digital infrastructure construction in rural areas of our country has been comprehensively strengthened, and the "information artery" of digital rural construction has been initially established. By the end of 2021, the overall population coverage of rural radio programs reached 99.17%, and the overall population coverage of TV programs reached 99.45%. The rural power grid renovation and upgrading project covered 2,389 counties and cities, benefiting 160 million rural residents. In 2022, all administrative villages without broadband access achieved "dynamic zero" through universal telecommunication services, and the proportion of fiber-optic connectivity increased from less than 70% to 100%, with

an average download speed exceeding 100Mb/s, which basically achieves the same network and speed service as urban areas. Heilongjiang Province is an important grain production base in China. In recent years, though the traditional agricultural development in Qiqihar City, Heilongjiang Province has been keeping stable, the development of new types of agriculture, such as characteristic agriculture, facility agriculture, and green agriculture, is not optimistic. Through investigation, it is found that as a new form and trend of agricultural development/, digital agriculture is in a leading position in the ShuangHe Farm of Capital Agribusiness Group in Qiqihar city. However, the overall development of this city's new agricultural industries still lags behind.

Based on a thorough review of existing literature, it is found that previous studies have mostly discussed the cultural and agricultural industries separately, with a lack of attention on the rural digital cultural industry as a whole. This paper first establishes a three-level indicator system for analyzing the factors affecting the development of the rural digital cultural industry, then investigates the factors of Qiqihar mainly from five aspects: economy, government support, technological factors, environmental factors, and related industry development. Next, the Pearson correlation coefficient is applied to remove indicators with a p-value of less than 0.3 and principal component analysis is used to reduce multiple indicators into two principal components. And finally, an in-depth analysis of the rural digital cultural industry in Qiqihar in conducted and some effective advice is proposed.

2. Literature Review

2.1 Literature Review of Foreign Studies

After reviewing the literature, it is found that foreign scholars though having conducted extensive research on rural digital cultural industries, mainly focus on the digitalization of rural agricultural industries.

Thornber Kelly (2019) [2] found that digital communication has the great potential to fastly and widely spread antibiotic resistance awareness to rural aquaculture in Bangladesh and across Asia by studying the role of digital communication in aquaculture of Bangladesh. Pathak-Shelat Manisha (2014)[3] studied the digital culture targeting rural youth in Gujarat, India, and found that digital technologies are reconfiguring various aspects of their daily lives such as learning, leisure, friendship, and socialization. In his study, the youth regard the new media and technology as a kind of way to enrich their lives and social experience. While new technologies promote individualism, rural Indian youth still live in a collective social structure that shapes their habits0, with new media on the periphery of their lives. Yang Ying (2022)[4] focused on the digital transformation of Chinese listed agricultural companies and analyzed how digital transformation practices improve company performance and create value, finding that the impact of digitization on company performance is limited digitalization level is low, but digital transformation will create much value throughout the aquaculture industry chain as it deepens. Basel (2022)[5] studied how villages transform into digital villages and achieve sustainable development. First, it needs construct a digital village technology system, then build a theoretical framework for promoting rural sustainable development through digital empowerment theory, finally verify the theoretical framework through five Chinese cases and identified two characteristics of digital village construction: it should be based on data, digital technology, and digital platforms, attract multiple stakeholders to participate and form a symbiotic relationship, and achieve rural sustainable development. This model can provide guidance and reference for the practice of digital village. Zhou Chunlin (2019)[6] studied the development of smart rural tourism under digitalization in China and found that after more than 20 years of exploration, China has established a development path and smart rural tourism model with Chinese characteristics under the digital background. Hu Bo (2022) [7] focused on a Chinese photovoltaic agriculture company and discussed the digital business model based on solar photovoltaic fisheries, constructing an analytical framework for the photovoltaic fisheries digital business model. The digital business model of solar photovoltaic fisheries improves the operational efficiency of power generation and the economic benefits of aquaculture, and diversify income sources of solar photovoltaic agriculture and

leasing companies. Besides, policies should also be focused on advocating system coupling to accelerate the combination of distributed renewable energy based on digital technology and digital photovoltaic with rural energy markets and finance, which will promote the development of renewable energy electrification and rural economic growth.

2.2 Literature Review of Domestic Studies

Due to the late start and relatively insufficient development of China's rural digital cultural industry, there have been few studies on it and its role in promoting rural revitalization. Existing research has mostly focused on the digital cultural industry or digitalization, with limited research on the digital industry in rural areas and its contribution to rural revitalization.

Mislan Alimu (2022)[8] analyzed the position and important role of digital rural areas in the revitalization of rural culture, expounded on the current development status of China's rural digital cultural industry, listed the problems existing in the its development, and discussed in detail the path and suggestions for the revitalization of rural digital culture. Su Jingjing (2022)[9] studied the role of rural digital culture industry in rural revitalization, summarized the problems existing in the development of rural digital culture industry, and provided relevant policy suggestions for the innovative development of rural digital culture industry under the background of rural revitalization. These suggestions include expanding the forms of rural cultural content, increasing the innovation of digital rural culture, stimulating the enthusiasm of rural residents to participate, and improving the value and interaction of digital cultural industry, which have a positive trend of integration with rural economy. Ji Rui (2022)[10] discovered new digital problems such as digital space imbalance, lack of digital talent, and convergence of digital products by analyzing the current status of China's rural digital culture structure. Therefore, he proposed that the rural digital culture industry should simultaneously optimize the top-level design, promote both digital technology and agriculture, clarify the multiple subjects, and reshape the brand characteristics, so as to stimulate rural revitalization.

Through literature review, it was found that domestic scholars mainly studied the factors influencing the digital cultural industry from political, technological, and environmental perspectives. Firstly, political factors were mostly considered, for example, Xue Hui (2022)[11] and others scholars studied the promotion of digitalization in cultural industry in Shijiazhuang, and proposed that factors affecting the digital cultural industry include the level of government policy support and the amount of government investment. Secondly, technological factors should also be taken into account, Wang Meng (2021)[12] and others studied the impact mechanism of user information evasion behavior in rural public digital cultural services, and thought that the factors affecting the digital cultural industry mainly include the such infrastructure situation as network coverage rate, network stability, and network signal strength. Li Lili (2019) [13] studied the path to improve the sense of fulfillment of farmers under the background of rural cultural revitalization, and proposed that the factors affecting the rural digital cultural industry mainly include the number of technical labor force and the opportunities for agriculture and technology integration, the latter of which contains the current status of rural digital development and the degree of emphasis on scientific and technological research and development. The final one is environmental factor. By studying the impact mechanism of user information evasion behavior in rural public digital cultural services, Wang Meng (2021)[12] advised that the factors affecting the digital cultural industry should involve external environmental factors such as natural environment, cultural environment, population situation, and rural digital cultural industry management system.

2.3 Summary of Literature Review

To conclude, the current research on the influencing factors of rural digital cultural industry is too narrow, only analyzing on individual regions or aspects without sufficient depth and breadth of research and time-efficient data. There has been no special research on the rural digital cultural industry. This paper will conduct specialized research on the influencing factors of digital cultural industry development in rural areas of Qiqihar City, and give relevant policy advice for digital

empowerment of rural revitalization by using chronological data. This will further help improve the theoretical base of the rural digital cultural industry development and promote high-quality development of rural areas in China.

3. Pearson Correlation Coefficient

In statistics, the Pearson correlation coefficient is used to measure the linear correlation between two variables X and Y, with a value ranging between -1 and 1. When the Pearson correlation coefficient is between 0 and -1, X and Y are negatively correlated, and the more the Pearson correlation coefficient approaches -1, the stronger the negative correlation is. When the Pearson correlation coefficient is -1, X and Y are totally negatively correlated. When the Pearson correlation coefficient is between 0 and 1, X and Y are positively correlated, and the more the Pearson correlation coefficient approaches 1, the stronger the positive correlation is. When the Pearson correlation coefficient is 1, X and Y are totally positively correlated. When the Pearson correlation coefficient is 0, there is no linear relationship between X and Y. The following is the formula for Pearson coefficient correlation:

$$r = \frac{\sum_{i=1}^{n}(X_i-\overline{X})(Y_i-\overline{Y})}{\sqrt{\sum_{i=1}^{n}(X_i-\overline{X})^2}\sqrt{\sum_{i=1}^{n}(Y_i-\overline{Y})^2}} \quad (1)$$

Table 1. Influencing Factors of Rural Digital Cultural Industry

	Influencing factors of rural digital cultural industry.	Correlation coefficient
X_1	The annual gross product of the primary industry	0.982
X_2	Rural retail sales of consumer goods	0.985
X_3	Average annual net income of rural residents	0.966
X_4	Total fiscal expenditure of the whole city	0.983
X_5	Local government expenditure	0.971
X_6	Government agricultural financial expenditure	0.863
X_7	Fixed asset investment in agriculture, forestry, animal husbandry and fishery	0.842
X_8	Number of agricultural technical personnel in state-owned units	-0.532
X_9	The machine-seeded area	0.818
X_{10}	The machine-tilled area	0.476
X_{11}	The total power of agricultural machinery	0.985
X_{12}	Number of broadband internet access ports	0.921
X_{13}	Civilian cargo and mail throughput	-0.305
X_{14}	Total mileage of rural roads in the city	0.090
X_{15}	The number of villages with telephone access throughout the city	0.844
X_{16}	The Engel coefficient of rural households	-0.638
X_{17}	The number of employees in agriculture, forestry, animal husbandry, and fishery in the whole city	-0.449
X_{18}	Rural labor force	-0.193
X_{19}	Population with college associate degree education	0.930
X_{20}	Number of people with undergraduate and above education	0.883
X_{21}	Population with high school education	0.754
X_{22}	The annual gross product of the tertiary industry	0.974
X_{23}	Total amount of postal and telecommunications services completed in the city	0.552
X_{24}	The number of employees in information transmission, computer services, and software industry	0.270

According to Table 1 above, there are 24 factors that affect the rural digital cultural industry. However, we can find that the correlation coefficients between eight variables, including the number of technical agricultural personnel in state-owned agricultural units, machine-tilled area, civilian cargo and mail throughput, total mileage of rural roads in the city, the number of employees in

agriculture, forestry, animal husbandry, and fishery industries in the whole city, rural labor force, total amount of postal and telecommunications services completed in the city, and the number of employees in information transmission, computer services, and software industries, and the explained variable of rural digital cultural industry GDP are less than 0.6. The correlation degree of these variables is relatively moderate or low, so we remove these eight variables. The remaining 16 variables will be used for analysis in this paper.

4. Principal Component Analysis

4.1 Principle of Principal Component Analysis

In statistical research, too many variables would inevitably increase the complexity of the study. Therefore, researchers often use Principal Component Analysis (PCA) to reduce the dimensionality of the data in order to obtain more information by using fewer variables. The principle of PCA is to transform a set of possibly correlated variables into a set of linear uncorrelated variables through orthogonal transformation, which called principal components.

Assuming that there are 17 years of sample data and 24 indicators related to rural digital cultural industry, the initial sample matrix is as follows:

$$X = \begin{pmatrix} x_{11} & \cdots & x_{1\,24} \\ \vdots & \ddots & \vdots \\ x_{17\,1} & \cdots & x_{17\,24} \end{pmatrix} = (x_{ij})_{17\times 24}$$

Here, $i = (1,2,\cdots,17)$ represents the row of the initial sample matrix, and $j = (1,2,\cdots,24)$ represents the column. In the following text, what i and j represent is the same.

4.1.1 Calculating the Correlation Coefficient Matrix. $\boldsymbol{R = (r_{ij})_{17\times 24}}$

The calculation formula for $\boldsymbol{r_{ij}}$ is as follows:

$$r_{ij} = \frac{1}{n}\sum_{i=1}^{n}\frac{(x_{ij} - x_i)(x_{ij} - x_j)}{S} \tag{2}$$

"S" represents the sample variance.

4.1.2 Calculating the Eigenvalues and Eigenvectors of R.

The equation of the eigenvalue is $|R - \lambda I| = 0$. Here, R represents the correlation coefficient matrix and I represents the unit matrix. By arranging λ in descending order, we can obtain $\lambda_1, \lambda_2, \ldots, \lambda_{17}$,and we can also calculate the corresponding eigenvectors α_j.

4.1.3 Calculating the Contribution Rate and Accumulative Contribution Rate.

$$\boldsymbol{e_i} = \frac{\boldsymbol{\lambda_i}}{\sum_{i=1}^{p}\boldsymbol{\lambda_i}} \tag{3}$$

$$\boldsymbol{E_m} = \frac{\sum_{i=1}^{m}\boldsymbol{\lambda_i}}{\sum_{i=1}^{p}\boldsymbol{\lambda_i}} \tag{4}$$

4.1.4 Calculating the Principal Components

$$Z_m = \alpha_{mj}x_j \tag{5}$$

4.1.5 Determining the Number of Principal Components.

To determine the number of principal components selected, we use the accumulative contribution rate calculated earlier. Generally, we choose all the principal components whose accumulative contribution rate is greater than 85%, thus completing the extraction of the principal components.

Finally, based on the obtained indicators, an indicator system of the influencing factors of rural digital culture industry is constructed.

4.2 Empirical Study of Principal Component Analysis (PCA)

Using SPSS 26.0 software, principal component analysis was accomplished in the following steps "Analyze - Dimension Reduction - Factor". The table explaining the total score variance of the principal components is shown in Table 2:

Table 2. Total Variance Explained

Total Variance Explained						
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	13.291	83.069	83.069	13.291	83.069	83.069
2	1.022	6.388	89.457	1.022	6.388	89.457
3	.819	5.116	94.572			
4	.381	2.384	96.957			
5	.197	1.228	98.185			
6	.127	.793	98.978			
7	.069	.432	99.410			
8	.044	.277	99.687			
9	.025	.156	99.843			
10	.012	.077	99.920			
11	.007	.042	99.962			
12	.003	.021	99.983			
13	.002	.014	99.997			
14	.000	.003	100.000			
15	5.445E-5	.000	100.000			
16	-5.816E-16	-3.635E-15	100.000			

Extraction Method: Principal Component Analysis.

In order to further clarify the extracted principal components, a scree diagram is plotted as shown in Figure 1.

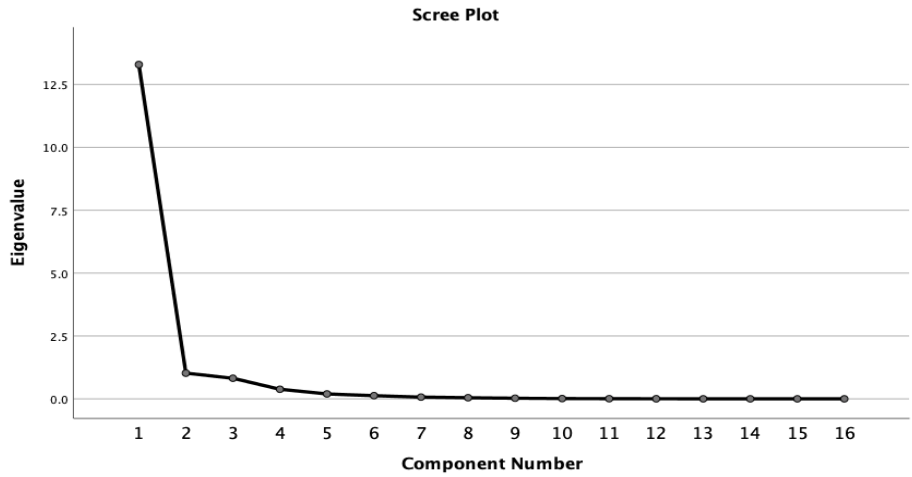


Figure 1. Scree Plot

According to Table 2, the eigenvalues of the first and second principal components are as high as 83.069% and 89.457%, respectively. And as shown in Figure 1, the slope between the first and third principal components is very steep, which means that the contribution rate of the first and second principal components is sufficient to meet the needs of data dimension reduction. Therefore, this study mainly selects two principal components.

Table 3. Component Matrix

Component Matrix[a]			
		Component	
		1	2
Zscore:	The annual gross product of the primary industry (in ten thousand yuan)	.981	.055
Zscore:	Rural retail sales of consumer goods (100 million yuan)	.982	.020
Zscore:	Average annual net income of rural residents (yuan)	.977	.177
Zscore:	Total fiscal expenditure of the whole city (in ten thousand yuan)	.991	.077
Zscore:	Local government expenditure (in ten thousand yuan)	.961	-.025
Zscore:	Government agricultural financial expenditure (in 10,000 yuan)	.900	-.140
Zscore:	Fixed asset investment in agriculture, forestry, animal husbandry and fishery (in ten thousand yuan)	.881	.381
Zscore:	The machine-seeded area (in thousand hectares)	.804	-.324
Zscore:	The total power of agricultural machinery (10,000 kW)	.986	-.088
Zscore:	Number of broadband internet access ports (in ten thousand)	.951	.121
Zscore:	The number of villages with telephone access throughout the city (in units of villages).	.843	.217
Zscore:	The Engel coefficient of rural households (%)	-.689	.501
Zscore:	Population with college associate degree education (person)	.934	-.024
Zscore:	Number of people with undergraduate and above education (person)	.892	.304
Zscore:	Population with high school education (person)	.751	-.544
Zscore:	The annual gross product of the tertiary industry (in ten thousand yuan)	.989	.044

Extraction Method: Principal Component Analysis.a
a. 2 components extracted.

After the principal component extraction, the equation for the principal components can be obtained through Table 3.

$$F_1=0.981X_1+0.982X_2+0.977X_3+0.991X_4+0.961X_5+0.900X_6+0.881X_7+0.804X_9+0.986X_{11}+0.951X_{12}+0.843X_{15}-0.689X_{16}+0.934X_{19}+0.892X_{20}+0.751X_{21}+0.989X_{22} \quad (6)$$

$$F_2=0.055X_1+0.020X_2+0.177X_3+0.077X_4-0.025X_5-0.140X_60.381X_7-0.324X_9-0.088X_{11}+0.121X_{12}+0.217X_{15}+0.501X_{16}-0.024X_{19}+0.304X_{20}-0.544X_{21}+0.044X_{22} \quad (7)$$

5. Conclusion

According to Table 3, it can be concluded that what have the greatest impact on the rural digital cultural industry are the annual gross product of the primary industry., rural retail sales of consumer goods, total fiscal expenditure of the whole city, the total power of agricultural machinery, and the annual gross product of the tertiary industry, with coefficients of 0.981, 0.982, 0.991, 0.986, and 0.989, respectively. Agriculture has been not only China's primary economic pillar industry[14] , but also the foundamental industry of rural areas. The transformation and upgrading of rural industries center around agriculture. Originating from the daily labor of farmers, most of China's rural cultural heritage,

including tangible or intangible heritage, have witnessed the collective memory of agricultural civilization.[15] Therefore, the development of agriculture will also promote the development of rural culture. Secondly, rural retail sales of consumer goods largely determine the income of farmers. The higher the rural retail sales of consumer goods are, the higher the income of farmers will be, which means they have more financial support to purchase digital products and put more energy on digital cultural creation. Policy support has also been an important driving force for rural economic development.[16] As an emerging industry with weak base, the rural digital cultural industry is difficult to develop systematically. However, in recent years, under the background of rural revitalization, the digital cultural industry has received government attention and strong financial support, and more rural labor force has been put in rural digital cultural development, which has stimulated the rise and progress of the rural digital cultural industry. Therefore, total city fiscal expenditures have the greatest impact on the rural digital cultural industry. The level of agricultural development will also have a significant impact on the rural digital cultural industry. Agricultural mechanization is conducive to promoting the commercialization and standardization of agricultural products, greatly improving agricultural production efficiency by increasing agricultural productivity. On the one hand, this can also promote rural economic development and provide financial support for cultural industries. And at the same time, it reduces the amount of labor in rural area and provides room for farmers to participate in rural digital cultural creation. Although the rural digital industry is based on the primary industry, it still belongs to the field of the tertiary industry. The development of the tertiary industry is helpful of providing better infrastructure, sharing experiences, resources and market for the rural digital cultural industry, thereby promoting its development.

Secondly, the most significant factors affecting the rural digital cultural industry are average annual net income of rural residents, local government expenditure, number of broadband internet access ports, and population with college associate degree education. Their respective weights are 0.977, 0.961, 0.951, and 0.934. The annual net income of rural residents largely determines their level of consumption. Electronic products, as high-tech products, are relatively expensive compared to daily necessities. Therefore, the consumption of electronic products is greatly influenced by the net income of rural residents. Local fiscal expenditure is an indicator of the level of government policy support. Government support is an important driving force for the development of the rural digital cultural industry. However, since local government expenditure is less than the total expenditure of the city, its impact is absolutely less than that of the total expenditure of the city. The rural digital cultural industry is much vital in the digital process, but its development is constrained by the level of digital development. Internet broadband access ports are an important indicator of the level of digital infrastructure construction. The popularization of the Internet is beneficial for farmers to conduct online sales, to purchases, to participate in social media, and to engage in online cultural creation. Therefore, the number of internet access ports has a significant impact on the rural digital cultural industry. In the relationship between education and digitization, education is the crucial variable[17] , and specialized college education is more focused on practice and technique. Compared with college undergraduates, specialized college students are more willing to return to rural areas to engage in some basic work. Therefore, the impact of the population who received college education with an associate degree in the rural digital cultural industry is the highest among all educational levels.

Furthermore, factors including government agricultural financial expenditure, investment in agriculture, forestry, animal husbandry and fishery, the number of villages with telephone access throughout the city, and number of people with undergraduate and above education also have a certain impact on the development of rural digital cultural industries, with coefficients of 0.900, 0.881, 0.843, and 0.892, respectively. Government agricultural financial expenditures and investment in agriculture provide basic financial support for improving agricultural productivity and transforming and upgrading the agricultural industry structure, thus injecting monmentum into agricultural development. The development of agriculture can also drive the development of rural digital cultural industries. Telephone is the most commonly used tool for communication between people today. The

popularization of telephone access in rural areas can deepen the connection between rural areas and the outside. At the meantime, farmers can also obtain more information through telephones, thereby improving their financial income, digital abilities and social circle[18] , which is conducive to the construction of rural digital cultural industries. College Students with bachelor's degrees or higher are mostly technical talents who can proficiently grasp related professional skills and knowledge, and thus can provide professional technical guidance and theoretical support for the development of rural digital cultural industries. However, since most college graduates choose to work in cities, the number of university graduates in rural areas with bachelor's degrees or higher is relatively small, so their impact on rural digital cultural industries is smaller than that of graduates with associate degrees.

Lastly, the impact of machine-sown area, the Engel coefficient of rural households, and population with high school education on the development of rural digital culture industries is minimal, with coefficients of 0.804, -0.689, and 0.751, respectively. Machine-sown area has a significant impact on planting efficiency and, to a large extent, affects agricultural productivity, but it still belongs to the field of mechanization and has little impact on digitization. The Engel coefficient of rural residents' household consumption expenditure has a low correlation with rural digital culture industries and they are even negatively correlated. Overall, this indicates that currently, the proportion of rural residents' food consumption expenditure in Qiqihar City is relatively high, and the expenditure on digital products or investment in digital cultural industries is relatively low, so the Engel coefficient has little influence on rural digital culture industries. High school education mainly focuses on basic subjects and does not involve specialized knowledge in certain fields. Therefore, most of the labor force with only a high school education has little knowledge of digital technology and can only engage in simple manual labor, thus are less likely to participate in rural digital cultural creation, resulting in a small impact on rural digital culture industries.

6. Policy Suggestions

6.1 Optimizing the Agricultural Industrial Structure and Promoting Agricultural Transformation and Upgrading

Agriculture is the foundation of rural economy, so the innovation of rural digital culture should center around agriculture and rural life. Agriculture is also the cornerstone of the rural digital cultural industry and the most influential factor on the rural digital cultural industry. Therefore, to develop agriculture, it is necessary to meet the requirements of new era agricultural development, further adjust and optimize the agricultural structure, improve the quality and efficiency of agricultural development, and promote the comprehensive transformation and upgrading of agriculture from "quantity" to "quality".

Firstly, located in the Northeast Plain with fertile soil, the vast land of Qiqihar City is conducive to the development of large-scale mechanized commercial agriculture under the market orientation, thus promoting the development of commercial agriculture. By making use of market information and methods to guide agricultural production, we can give full play to the decisive role of the market in resource allocation, promote the market-oriented and commercialized development of agricultural products, improve the quality of agricultural products, and create specialized agricultural product brands. Secondly, we should develop characteristic agriculture based on local conditions. In recent years, the market and sales of characteristic agricultural products have been constantly expanding. According to relevant data, it is estimated that the operating income of the national scale of agricultural production and processing will exceed 18.5 trillion yuan in 2022, with a year-on-year growth of about 4%. So enough consideration should be given to these factors such as industrial foundation, location advantages, market conditions, and resource endowment, and priority should be given to the development of industries or products with comparative advantages. Besides, we should also take agricultural products with regional characteristics as the leading products, and create characteristic industries and brands, making them a regional business card and avoiding industrial convergence. Thirdly, we should stand on the digital wave and develop digital agriculture. Digital

agriculture has become a new lighthouse of China's agricultural and rural economic development. In 2022, the national online retail sales of agricultural products reached 531.38 billion yuan, with a year-on-year increase of 9.2%, and an increase of 6.4 percentage points from 2021. It can be seen that new models and formats such as 5G, big data, AI systems, and blockchain have promoted the transformation and upgrading of traditional agriculture. Through digital agriculture, the whole industry chain from cultivation, management, processing, operation to sales can be connected, realizing transparent information to exchange and helping small farmers have access the larger market, which could achieve scale and standardized production. At the same time, it also provides more opportunities for farmers to get access to the Internet, laying the foundation for farmers to participate in the innovation of rural digital culture.[19]

6.2 Giving Full Play Role of the Government and Increasing Policy Support

Firstly, the government should improve their management and service system for the rural digital cultural industry. The Qiqihar Government has absolute power in areas such as taxation and financing, and should become the leading force in improving the development of the rural digital cultural industry in Qiqihar. Various government departments, such as commercial, industrial, cultural, and food departments, should coordinate and work together to provide corresponding institutional guarantees for the development of the rural digital cultural industry in Qiqihar, and play both a supervisory and service role and building effective platforms such as internet plus agriculture sales, service platforms, digital cultural promotion platforms, and others to improve the overall service system. Secondly, the government should increase policy and financial support for the rural digital cultural industry and increase fiscal investment. On the one hand, it should promote the development of digital applications in rural areas such as digital pastoralism, smart farms, and intelligent agricultural machinery. On the other hand, it should also promote demonstration project construction, cultivate a batch of demonstration villages and towns for the rural digital cultural industry, and exert its demonstration effect. In 2022, for example, Guangdong Province released the first ten typical cases stimulating the rural revitalization of digital cultural industry in Guangdong Province, including the overseas Chinese cultural display tourism project in Chikan Ancient Town, Jiangmen City, the Qiantingdan Cong cultural tea tourism industrial park in Chaozhou City, and the innovation project of Jieyang jade carving craftsmanship inheritance in Jieyang City. These typical cases aim to further strengthen cultural leadership and industrial driving force, foster rural economic and social development with the digital cultural industry, stimulate the vitality of excellent traditional rural culture, deeply promote the rural revitalization strategy and the high-quality integrated development of the primary, second, and tertiary industries. Thirdly, government should gradually improve relevant policies and systems and strengthen its supervision. Based on the national industry standards, laws and regulations related to the digital cultural industry and under the guidance of successful experiences of other provinces and cities, it should establish a system and legal framework for the rural digital cultural industry, and improve the organization and standardization of the rural digital cultural industry combined with local characteristics.

6.3 Strengthening the Construction of Rural Digital Infrastructure and Laying a Solid Foundation for the Development of Rural Digital Cultural Industries

During the poverty-alleviation stage in China, e-commerce poverty alleviation has become an important means of poverty reduction, leading to significant development of rural e-commerce in recent years. Although most rural areas in China have achieved network and communication connectivity, the infrastructure for broadband network and mobile internet is not yet sufficient, with some areas having only 4G and lacking high-speed broadband like 5G. Additionally, the urban-rural gap in digital infrastructure development is so significant that it makes it necessary to strengthen the construction of digital infrastructure and regards this as a necessary path for rural digital cultural industry development.

On the other hand, efforts should be made to accelerate the construction of rural broadband network communication base, establish sound network service systems for different operators and mobile terminal number locations, and strive to achieve full coverage of broadband network information services.[19] The popularity and utilization rate of high-speed broadband technologies such as 5G and fiber-optic should also be increased. The quality of high-speed broadband technology services should be improved, and diversified and personalized high-speed broadband technology services should be promoted. According to the market demand of rural areas and government policy guidance, different operators can open special package services such as agriculture-related broadband and professional service platforms. This can help farmers break through information barriers to obtain new agricultural information, understand new cultures, and develop new markets, gradually building an interconnected agricultural and rural information data network and database. For example, the new generation of agricultural and rural information infrastructure construction project implemented in Henan Province in 2022 has promoted the comprehensive upgrading of the "All-optical network Henan," built a high-speed fiber-optic broadband network covering rural areas, and achieved more than 20 households in natural villages accessing broadband networks with a speed of 100Mbps or more. This provides strong material support for the development of the rural digital cultural industry.

6.4 Attracting Technical Talents Back to Rural Areas and Improving the Education Level of Rural Labor Force

On one side, in recent years, with the implementation of the national rural revitalization strategy, an increasing number of talents have chosen back to their hometowns for entrepreneurship. They bring new ideas, technologies, and capital to rural development. Jiangsu Province has rich successful experience in attracting talent to return, and Suining County in Jiangsu Province has taken a unique and precise path to talent attraction by focusing on the rural revitalization strategy, and releasing policy dividends. This model build excellent entrepreneurial platforms, provide accurate and thoughtful services to these talents, and thus create a local talent team that does not flow away. To promote the development of rural digital cultural industry, each town and village in Qiqihar city should seize the opportunity of talent return, learn from the experience of Jiangsu's model, improve the incentive mechanism for talent return, enhance the level of public service supply in rural areas, promote capable individuals to govern the village, attract innovative and technical talents to return to their hometowns, and finally help the development of rural digital cultural industry. On the other side, due to the fact that current rural education in China, the guiding ideology and teaching content have not adapted well to the country's social and economic development, so it is difficult to promote the development of rural digital culture. [20] Therefore, it is crucial to promote the development of rural education and improve the education level of rural labor force for the development of rural digital cultural industry. To improve the education level of rural labor force, the diversified development idea of rural education should be established, and support should be given to rural residents to realize more development models. Local advantageous resources should also be incorporated into the rural education system; and the development mode of rural education should be transformed by utilizing information technology especially new technologies such as artificial intelligence and 5G remote education, to optimize the allocation of high-quality educational resources. In this way, we could overcome the limitations of inadequate rural educational resources, and promote the digital transformation of rural education. In addition, the education popularization rate and education level in rural areas should be improved, and a high-quality, inclusive, and sustainable rural education system should also be constructed. In a word, policy should play a role in establishing incentive mechanisms and subsidy mechanisms to help rural residents receive higher-level education.

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