Research on the Coupling Coordination Mechanism of Rural Revitalization and Digital Economy in Zhejiang Province

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Abstract: The internet economy's explosive growth is a crucial factor in encouraging rural revitalization(RR). This paper analyses the relevant data of RR and digital economy(DE) in Zhejiang Province from 2012 to 2021, providing a basis for the completion of RR strategies, enhancing the state of rural areas today and encouraging the growth of the DE. Firstly, a thorough assessment system for DE and RR was built, and the degree of development of both was assessed using the entropy weight technique. Then, the coupling coordination degree(CCD) model and spatial autocorrelation model were used to explore the coupling relationship and spatiotemporal distribution characteristics of the two systems. Finally, the influencing factors were determined through a random panel Tobit regression. The study found that: (1) The development level of RR and DE in Zhejiang Province is constantly improving, and the development level of RR is higher than that of the DE. The gap between them is gradually narrowing during the development process. (2) The CCD of RR and DE has risen from the verge of imbalance to primary coupling coordination from 2012 to 2021, and the overall CCD shows a slow growth trend. (3) There is a positive spatial association observed in the CCD between the DE and rural rejuvenation. The Zhejiang Northeast region is mainly characterized by high-high aggregation, while the Zhejiang Southwest region is mainly characterized by low-low aggregation. (4) Government support, urbanization level, economic level, transportation level, and industrial structure have a promoting effect on the CCD of the two systems of RR and DE. Based on the above conclusions, relevant policy suggestions are proposed from multiple perspectives.

Keywords: Rural Revitalization; Digital Economy; Coupling Coordination Degree Model; Spatial Autocorrelation Model; Panel Tobit Regression

1. Introduction

1.1 Research Background

Under the urban-rural dichotomy, the level of development and living conditions in China's rural areas have always lagged far behind those of urban residents. The uneven growth of rural and urban areas as well as the insufficient development of the large rural areas require China to make up for this short board of rural development as soon as possible[1]. Based on this, at the 19th National Congress, the General Secretary put forward the strategy of RR, clarifying that this is the general grasp of China's rural work at the current stage and a strategic deployment for building a well-off society in all aspects[2-4]. The Outline of the National Informatization Development Strategy states that informatization should be integrated into modernization to promote economic development and provide sufficient power for economic development[5]. In the 14th Five-Year Plan for DE Development, it is proposed that the DE is the main economic form in the new era, and digital resources are turned into important driving force through information network, which is a new form to promote economic development and social progress.

The existing literature has done a lot of research on RR and DE, but most of them have been studied from one side, and there are fewer studies on the coupling relationship between RR and DE[6-8]. The coordinated

development of them is conducive to promoting the development of rural revitalization, expanding the scale of DE development, and constituting a virtuous cycle between them.

1.2 Data Source

The research object for this paper is eleven cities in Zhejiang Province, and the research period is from 2012 to 2021, with a total of ten years. The data on RR comes from the "Zhejiang Statistical Yearbook", "China Rural Statistical Yearbook", and the statistical yearbooks of various cities from 2013 to 2022. The data on the DE comes from the "Zhejiang Statistical Yearbook", "China Tertiary Industry Statistical Yearbook", "China Information Industry Yearbook", and the Digital Inclusive Finance Index of Peking University.

1.3 Indicator System Construction

This article starts with the five aspects of the goals and tasks of RR, follows the principles of scientificity and rationality, selects 12 secondary indicators and establishes a comprehensive evaluation system for RR. The evaluation methods to measure the development degree of DE mainly includes the direct method and the comparative method. This article chooses the more representative comparative method to construct a comprehensive evaluation system to assess the level of the DE. By referring to the EU Digital Economy Index and DEI, this article finally determines the DE indicator system. The indicator system mainly includes digital infrastructure, digital innovation, and digital industry. See Table 1 for a detailed evaluation system.

Table 1. RR and Digital Economy Indicator System

	Tier 1 Indicators	Secondary indicators	Direction	Weights
RR	Industrial prosperity (0.10023)	Total output value of agriculture, forestry, animal husbandry and fishery	+	0.019723
		Percentage of machine farming area	+	0.080507
	Ecological Livability (0.293819)	Civilian car ownership	+	0.068166
		General public service expenditures	+	0.08476
		Average pesticide use per acre	-	0.140893
	Countryside Civilization (0.149098)	Public Library Collection	+	0.075428
		Education Expenses	+	0.073669
	Effective governance (0.193269)	Number of doctors	+	0.07145
		Consumption ratio of rural and urban residents	+	0.099743
	Living well (0.285661)	Per capita disposable income of rural residents	+	0.093526
		Per capita consumption expenditure of rural residents	+	0.099529
		Income ratio of rural residents to urban residents	+	0.092606
DE	Digital Foundation (0.231683)	Number of Internet users	+	0.110139
		Number of cell phone subscribers	+	0.121544
	Digital Innovation (0.50579)	R & D expenses of industrial enterprises above the scale	+	0.200611
		Number of patents	+	0.136425
		R & D equivalent full time staff	+	0.168752
	Digital Industry (0.262526)	Telecommunications business volume	+	0.155557
		Degree of digitization	+	0.05118
		Digital Inclusive Finance Index	+	0.055789

2. Empirical Analysis

2.1 Development Level

2.1.1 Development level of RR

The average annual value of Zhejiang Province's RR development level was 0.247408 in 2012 and 0.574929 in 2021, with an annual growth rate of 9.8219%, as shown in Figure 1. This indicates that with the economic growth and the implementation of RR policies in Zhejiang Province, the development level of RR is gradually improving. Nonetheless, there are still a lot of regional variations in the province's different cities' approaches to RR.

The specific level of development of RR is shown in Table 2. In 2021, only two cities, Hangzhou and Ningbo, had a level of RR and development greater than 0.6, namely 0.823355 and 0.73347 respectively. Additionally, the RR's development level in Wenzhou, Jiaxing, Shaoxing, Huzhou, Zhoushan, Taizhou and Jinhua is 0.5-0.6. The RR development level of Quzhou and Lishui was the lowest, with a development level below 0.5, which were 0.402165 and 0.396857, respectively. It can be found that Hangzhou and Ningbo, which rank in the forefront, have strong comprehensive strength. Through the spillover effect, the RR and development trend is good. Quzhou and Lishui are relatively backward in terms of economic development due to geographical location and other conditions, so the level of RR is comparatively low.

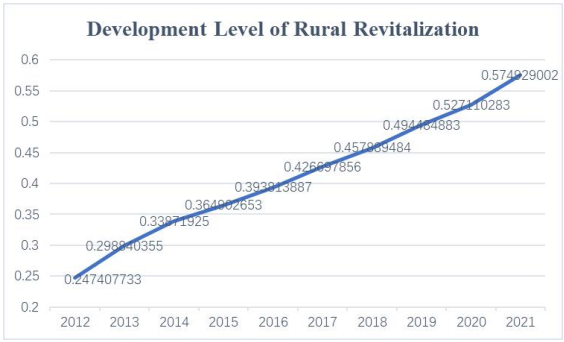

Figure 1. The Level of RR and Development

Zhejiang Province can be divided into two parts according to geographical location, Zhejiang Northeast and Zhejiang Southwest. Huzhou, Hangzhou, Shaoxing, Ningbo, Jiaxing, and Zhoushan belong to Zhejiang Northeast, while Taizhou, Wenzhou, Lishui Quzhou, and Jinhua belong to Zhejiang Southwest. Calculations show that the average annual value of RR development level in Zhejiang Northeast is 0.64496, while that in Zhejiang Southwest is 0.490892, with a significant difference between the two.

Table 2. The Level of RR and Development

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Hangzhou	0.369	0.41	0.462	0.5	0.541	0.593	0.639	0.695	0.742	0.823
Ningbo	0.333	0.383	0.415	0.465	0.508	0.548	0.589	0.639	0.687	0.733
Wenzhou	0.258	0.312	0.361	0.385	0.412	0.454	0.482	0.522	0.552	0.596
Jiaxing	0.257	0.325	0.365	0.383	0.399	0.43	0.462	0.509	0.548	0.592
Huzhou	0.292	0.318	0.374	0.395	0.423	0.447	0.464	0.481	0.511	0.566
Shaoxing	0.22	0.294	0.327	0.355	0.374	0.403	0.451	0.499	0.531	0.585
Jinhua	0.138	0.208	0.263	0.284	0.308	0.342	0.372	0.409	0.446	0.503
Quzhou	0.156	0.216	0.244	0.255	0.273	0.305	0.325	0.349	0.372	0.402
Zhoushan	0.348	0.352	0.379	0.398	0.442	0.461	0.491	0.518	0.531	0.571
Taizhou	0.265	0.287	0.327	0.357	0.393	0.421	0.452	0.484	0.516	0.557
Lishui	0.085	0.183	0.209	0.236	0.259	0.29	0.311	0.334	0.362	0.397

Compared with Zhejiang Northeast, the level of RR in Zhejiang Southwest is relatively low. However, the average annual growth rate of RR in Zhejiang Northeast is 8.8273%, while that in Zhejiang Southwest is 12.6996%, and the development speed in Zhejiang Southwest is much faster than that in Zhejiang Northeast. With the strategy for RR being promoted, the gap in the RR's development level in Zhejiang Province is gradually narrowing.

2.1.2 DE development level

From Figure 2, it can be seen that the level of DE's development in Zhejiang Province has been continuously improving from 2012 to 2021, with the average value increasing from 0.16013 in 2012 to 0.39876 in 2021, with an average growth rate of 10.6694%.

This is closely related to the implementation of the DE "Number One Project" by the Zhejiang Provincial Committee in 2017. In addition,

with the rapid development of the Internet industry and the economy, the DE has also experienced rapid development.

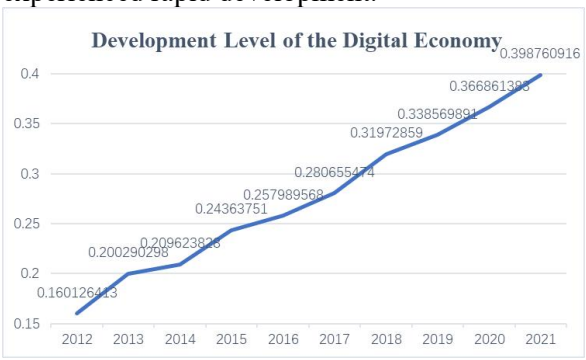

Figure 2. The Level of Development of the DE

The specific level of DE development is shown in Table 3. From the table, it can be seen that the level of DE development in 11 cities in Zhejiang Province has generally been on the rise from 2012 to 2021. Some cities have slower development speeds, among which Hangzhou has the fastest development speed, from 0.451 in 2012 to 0.981 in 2021. In 2021, Hangzhou has the highest level of DE development, far exceeding other cities, with a difference of 0.3 from Ningbo. Apart from the reasons such as the developed economy of the provincial capital city, the developed Internet industry, and an enormous number of workers in the information service industry, it is also inseparable from the "G20 Digital Economy Development and Cooperation Initiative" signed at the G20 Hangzhou Summit and the construction of Digital Hangzhou during the 13th Five-Year Plan period. The three cities with slower development speeds are Quzhou, Zhoushan, and Lishui, all of which have a DE development level in 2021 of less than 0.2, lower than the average development level. Among them, Lishui and Quzhou are located in the mountainous areas of southwestern Zhejiang, and their economic development levels are relatively backward compared to the developed areas in the province due to factors such as geographical location. The digital foundation is not perfect, the digital industry is not developed, and there are fewer employees in the Internet service industry, so the level of DE development is relatively backward. Zhoushan, on the other hand, is located by the sea, with a closed geographical location, inconvenient transportation, and fewer large enterprises, which makes it less attractive to talent, resulting in a lower level of DE development. In terms of geographical division, the annual average values of DE development level in Zhejiang Northeast and Zhejiang Southwest are 0.32532 and 0.22039, respectively, showing the situation of "Zhejiang Northeast > Zhejiang Southwest". The difference between the DE development levels in Zhejiang Northeast and Zhejiang Southwest is 0.10493, indicating a significant "strong Northeast, weak Southwest" phenomenon and an unbalanced regional development of the DE. The annual growth rates of Zhejiang Northeast and Zhejiang Southwest are 14.64968% and 18.57279%, respectively, with Zhejiang Southwest developing faster than Zhejiang Northeast. With the introduction of the "Zhejiang Provincial Digital Economy Promotion Regulations" and the deployment of digital reform work, the province has strengthened regional coordinated development, promoted the cross-regional flow of resource elements, and helped mountainous areas and islands achieve leapfrog development, gradually narrowing the DE gap in the province.

Table 3. The Level of Development of the DE

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Hangzhou	0.451	0.517	0.51	0.577	0.633	0.689	0.754	0.815	0.908	0.981
Ningbo	0.354	0.411	0.417	0.453	0.459	0.49	0.549	0.584	0.621	0.682
Wenzhou	0.241	0.297	0.3	0.34	0.359	0.388	0.443	0.462	0.488	0.533
Jiaxing	0.153	0.193	0.202	0.23	0.248	0.269	0.297	0.315	0.344	0.373
Huzhou	0.062	0.099	0.109	0.147	0.155	0.173	0.215	0.226	0.244	0.269
Shaoxing	0.143	0.18	0.199	0.246	0.26	0.281	0.308	0.313	0.339	0.36
Jinhua	0.165	0.203	0.212	0.242	0.252	0.272	0.339	0.34	0.37	0.385
Quzhou	0.009	0.039	0.047	0.076	0.074	0.093	0.112	0.121	0.129	0.148
Zhoushan	0.009	0.031	0.058	0.066	0.07	0.076	0.085	0.093	0.105	0.115
Taizhou	0.155	0.185	0.199	0.228	0.244	0.262	0.304	0.33	0.351	0.387
Lishui	0.019	0.049	0.051	0.075	0.084	0.094	0.111	0.125	0.137	0.153

2.1.3 Comparison of the development level of RR and DE

It can be seen from Figures 1 and 2 that the development levels of RR and DE in 11 cities in Zhejiang Province have been continuously improving from 2012 to 2021. The average level of RR development is 0.41248, and the average level of DE development is 0.27762. The development level of RR is higher than that of the DE. The fundamental reason is that rural issues are a major issue related to the national economy and people's livelihoods. The rural economy and environment have significantly improved since RR policies have been put into place. The development rate of RR is 9.8219%, and the development rate of the DE is 10.6694%. With the deployment and implementation of DE-related policies, the gap between the two is gradually narrowing during the development process.

2.2 Analysis of the Degree of Coordination between RR and DE Coupling

Using the formula, the specific findings of the calculation of the degree of coupling coordination between the DE and RR are displayed in Table 4. At the same time, the spatial pattern of the CCD in 2012 and 2021 was obtained through ArcGIS spatial visualization.

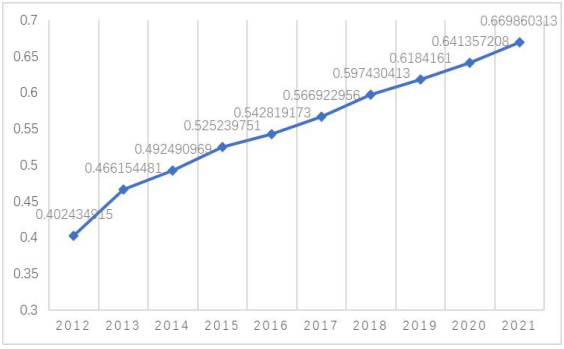

Figure 3. 2012-2021 Coupling and Coordination of RR and DE

From Figure 3, it can be seen that from 2012 to 2021, the degree of coupling coordination between DE and RR has In Zhejiang Province increased from 0.40243 to 0.66986, and the degree of coupling coordination has risen from the edge of imbalance to elementary coupling coordination. There is a trend of slow growth in the overall CCD. Between 2012 and 2021, there are essentially three stages to the coupling coordination of DE and RR. The first stage is from 2012 to 2014, the second stage is from 2015 to 2018, and the third stage is from 2019 to 2021. The average CCD from 2012 to 2014 is 0.402, 0.466, and 0.492, which is almost imbalanced, according to the level division in Table 2. The average CCD from 2015 to 2018 is 0.525, 0.543, 0.567, and 0.597, which is in a state of barely coupling coordination. The average CCD from 2019 to 2021 is 0.618, 0.641, and 0.670, which is in the primary coupling coordination stage.

The specific results are shown in Table 4. From Table 4, it can be seen that the CCD of RR and DE in 11 cities in Zhejiang Province has been continuously increasing from 2012 to 2021. Among them, Hangzhou has the highest CCD, reaching 0.948, which is in the stage of high-quality coupling coordination. This is inseparable from Hangzhou's high level of rural development and DE. Ningbo follows closely behind, with a CCD of 0.841, which is in a good coupling coordination stage, but the gap between Ningbo's DE development level and Hangzhou's is large. Wenzhou has a CCD of 0.751, which is in the intermediate coupling coordination stage. The CCDs of Jiaxing, Huzhou, Shaoxing, Jinhua, and Taizhou are all between 0.6 and 0.7. According to the DE and RR development levels, all five cities are at the same stage of development, meaning that their CCDs are at the primary stage. Zhoushan has a CCD of 0.507, which is in the barely coupling coordination stage. The CCDs of Lishui and Quzhou are 0.494 and 0.496, respectively, which are in the verge of imbalance stage. The degree of coupling coordination between the two systems is lower because the three cities have relatively low levels of economic development, as well as low levels of RR and DE.

To make the evaluation results more concise and intuitive, the coupling level in 2012 and 2021 was visualized using ArcGIS.

From Figure 4, it is evident that the two systems in Zhejiang Province's northeast have a higher CCD than those in the southwest. The economic development level in the northeast is higher, and digital technology application and innovation have developed faster, while the digital foundation in the southwest needs to be improved, resulting in a large gap between the two. However, the growth rate in the southwest is faster, and the improvement is more significant, and the gap between regions will gradually decrease. From the figure, it can be seen that from 2012 to 2021, the coupling

coordination level of RR and DE in the 11 cities has improved significantly. Among them, Hangzhou has risen from primary coupling coordination to high-quality coupling coordination, Ningbo has risen from barely coupling coordination to intermediate coupling coordination, Wenzhou, Jiaxing, and Taizhou have risen from the verge of imbalance to primary coupling coordination, Shaoxing and Jinhua have risen from mild imbalance to primary coupling coordination. Compared with the above cities, the development speed of Huzhou is relatively slow, only rising from mild imbalance to barely coupling coordination. Lishui and Quzhou have risen from severe imbalance to the verge of imbalance, and Zhoushan's development speed is relatively slow, rising from moderate imbalance to the verge of imbalance.

Table 4. Coupling and Coordination between RR and DE

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Hangzhou	0.639	0.678	0.697	0.733	0.765	0.799	0.833	0.867	0.906	0.948
Ningbo	0.586	0.63	0.645	0.677	0.695	0.72	0.754	0.781	0.808	0.841
Wenzhou	0.499	0.552	0.573	0.602	0.62	0.648	0.68	0.701	0.72	0.751
Jiaxing	0.445	0.5	0.521	0.545	0.561	0.583	0.609	0.633	0.659	0.686
Huzhou	0.367	0.421	0.449	0.491	0.506	0.528	0.562	0.574	0.595	0.625
Shaoxing	0.421	0.479	0.505	0.544	0.558	0.58	0.611	0.629	0.651	0.677
Jinhua	0.388	0.453	0.486	0.512	0.528	0.552	0.596	0.611	0.637	0.663
Quzhou	0.192	0.302	0.328	0.373	0.378	0.41	0.436	0.453	0.468	0.494
Zhoushan	0.238	0.323	0.385	0.403	0.42	0.433	0.452	0.469	0.486	0.507
Taizhou	0.45	0.48	0.505	0.534	0.556	0.576	0.609	0.632	0.652	0.681
Lishui	0.201	0.308	0.322	0.364	0.385	0.406	0.431	0.452	0.472	0.496

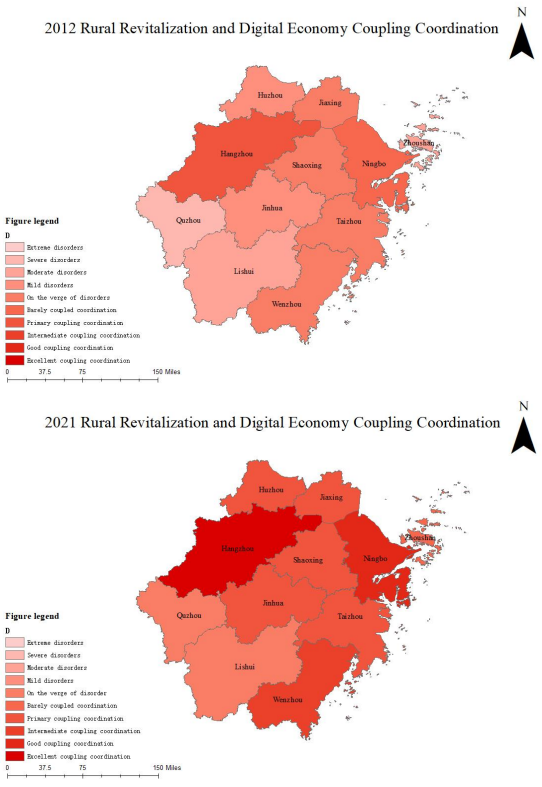

Figure 4. Level of Coordination between RR and DE coupling in 2012 and 2021

2.3 Identification of Coupled Coordinated Spatio-Temporal Evolutionary Features

To verify the spatial correlation between these two phenomena, the Moran's I test was conducted on the CCD of RR and DE, as calculated in Table 4. The Moran's I index and test results were calculated according to the formula and are shown in Table 5.

Table 5: The Moran Index of Coupling Coordination between RR and DE

Year	I-value	Z-value	P-value
2012	0.953	3.4086	0.001
2013	0.9411	3.5737	0.001
2014	0.9387	3.5625	0.001
2015	0.9204	3.8011	0.001
2016	0.9098	3.9849	0.001
2017	0.8490	4.2084	0.001
2018	0.8597	4.2364	0.001
2019	0.8499	4.2077	0.001
2020	0.8356	4.2552	0.001
2021	0.8311	4.2512	0.001

Table 5 shows that the coordination between the DE and RR from 2012 to 2021 is measured by the Moran's I index, which is greater than 0 and passes the significance test. This indicates a significant positive spatial correlation between RR and DE coupling coordination, which means that areas with high coupling coordination tend to cluster with other high coordination areas, while low coordination areas tend to cluster with other relatively low

coordination areas.

3 Analysis of Influencing Factors

3.1 Selection of Influencing Factors

For the analysis of factors influencing the coupling coordination of RR and DE, the article selected seven variables, including government intervention, urbanization level, economic level, transportation level, industrial structure, education level, and technology level, as explanatory variables, as shown in Table 6.

1. Government intervention

The development of rural industries, ecology, and public services depends on local financial support, and the local financial support is an important guarantee for promoting the coordinated development of RR and DE. Therefore, the proportion of general budgetary expenditures of local finance to regional GDP is used as an indicator to measure the degree of government support.

2. Urbanization level

The level of urbanization development has a significant impact on income gap, consumption gap, and digital infrastructure, which in turn influences the degree of coordination between the two systems. Therefore, the level of urbanization development is selected to explore the impact of the coupling of the two. The ratio of the urban population to the permanent population is used in the article to measure the degree of urbanization.

3. Economic level

The level of economic development reflects the scale and speed of regional development. RR is the overall improvement of various aspects of rural areas. As a new economic system, DE is also influenced by the level of economic development to some extent. The per capita GDP of each region is used to reflect the level of economic development.

4. Transportation level

Building infrastructure and transportation systems is essential to advancing the DE and is a crucial component of advancing RR. Convenient transportation and improved infrastructure help to promote the flow of rural elements and promote the development of the DE. The article uses the per capita road mileage to measure the development of transportation.

5. Industrial structure

One of the goals of RR is to promote industrial prosperity, and upgrading the industrial structure can help promote traditional factors of production such as labour and capital, as well as the flow of new factors such as data to high-value-added areas, improve the efficiency of the allocation of factors of production, and achieve the development of the DE. In practice, the tertiary industry is the main area of integration and development with the DE. Therefore, the article adopts the ratio of tertiary industry output value to regional GDP to measure the industrial structure.

Table 6. Explanation of Factors

	Variable Name	Symbols
Explained variables	Coupling coordination	D
Explanatory variables	Government intervention	Gov
	Urbanization level	Urb
	Economic level	Eco
	Traffic Level	Tra
	Industry Structure	Ind

Before conducting regression analysis, it is necessary to perform a correlation analysis on the five factors to exclude the possibility of multicollinearity. In this article, Pearson correlation coefficients were used to determine the correlation, and the test results are shown in Table 7, with correlation coefficients all less than 0.8, rejecting the hypothesis of high correlation. In addition, the article also used stepwise regression to test and exclude the possibility of multicollinearity.

Table 7. Correlation Analysis of Influencing Factors

r	Gov	Urb	Eco	Tra	Ind
Gov	1				
Urb	0.796	1			
Eco	0.662	0.778	1		
Tra	0.502	0.208	0.0427	1	
Ind	0.590	0.632	0.289	0.416	1

3.2 Regression Analysis

Due to the Hausman test results showing a p-value of 0.8867, which is much larger than the significance level of 0.05, it is considered that there is no connection between the explanatory variables and the individual effects in the random effects model. Therefore, the random effects model was chosen instead of the fixed effects model.

Table 8 illustrates that the government support demonstrated a significant and positive marginal effect on the CCD between RR and DE, passing the significance level test at 1%. This means that the CCD between RR and DE increases with the level of government support. For every unit increase in average government support, the CCD between RR and DE will increase by 0.0094. As government fiscal expenditure increases, rural construction gradually improves, basic public service facilities continue to improve, rural economy develops, and fiscal support also attracts some talents to start businesses in rural areas, achieving RR. Simultaneously, fiscal investment can foster innovation in digital technology, enhance digital infrastructure, and aid in the establishment of the DE. This can lead to an improvement in the CCD between the DE and RR.

Table 8. Random Effects Tobit Regression Model

D	Coef	Std.Err	z	P >|z|
Gov	0.0094***	0.0014	6.71	0.000
Urb	0.0065***	0.0011	5.88	0.000
Eco	0.0125***	0.0027	4.71	0.000
Tra	0.0040**	0.0020	2.00	0.046
Ind	0.4229***	0.0779	5.43	0.000
_cons	-0.3384***	0.0580	-5.84	0.000

Similarly, the urbanization level passed the significance level test at 1%, indicating that the marginal effect of urbanization level on the CCD between RR and DE is the same as that of government support, with a positive effect. For every unit increase in average urbanization level, the CCD between RR and DE will increase by 0.0064. Urbanization construction is not only a law of economic and social evolution, but also a necessary path for RR. The higher the level of urbanization, the more it will radiate and drive the enhancement of the surrounding rural capacity, promoting the integration and development of urban and rural areas and driving the flow of resources and elements between urban and rural areas, promoting RR. The higher the level of urbanization, the more various infrastructure matching urbanization will be improved and progressed, and the DE infrastructure will be improved, which will inevitably promote the improvement of the CCD between RR and DE.

The economic level passed the significance level test at 1%, indicating that the marginal effect of the economic level on the CCD between RR and DE is positive. The CCD between DE and RR will rise by 0.0125 for each unit increase in economic level. The economic level is mainly reflected by per capita GDP. The higher the economic level, the higher the per capita GDP, and the higher the living standard of the rural population. Therefore, the higher the economic level, the higher the level of RR, and the higher the CCD. As the DE is an engine for promoting economic development, the higher the economic level, the more steadily digital development will progress, and the higher the degree of digital economic development, which is more advantageous to the coupling development of RR and DE.

The transportation level passed the significance level test at 5%, indicating that the marginal effect of the transportation level on the CCD between RR and DE is positive. This means that for every unit increase in transportation level, the CCD between RR and DE will increase by 0.004. RR starts with transportation. The improvement of transportation level greatly improves people's travel problems. As the main or even the only transportation infrastructure in rural areas, the more per capita road mileage, the more convenient transportation is, which greatly satisfies the travel needs of rural residents, and the convenient transportation also promotes the development of rural tourism. The relationship between transportation and economic development has always been close. Currently, the DE has become a new form of economic development, which puts higher demands on transportation development. Therefore, the transportation level to some extent affects the development of the DE, and thus affects the CCD between the two systems.

The industrial structure passed the significance level test at 1%, indicating that the marginal effect of the industrial structure on the CCD between RR and DE is positive. That is, for every unit increase in industrial structure, the CCD between the two will increase by 0.4229. Among the five influencing factors of government support, urbanization level, economic level, transportation level, and industrial structure, the industrial structure has the greatest impact on the CCD between the two. Industry is the foundation of development, and optimizing the industrial structure helps

develop rural industries, and promote rural industrial revitalization, thus achieving comprehensive RR. The optimization and adjustment of industrial structure can lay the foundation for the development of DE. Therefore, as the industrial structure continues to improve, the CCD continues to improve.

4. Recommendations

Due to factors such as geographical location, natural resources, and development foundation, the level of RR and DE's development in different regions of Zhejiang Province shows a trend of higher development in the northeast than in the southwest. In the future, the southwest region can rely on its abundant natural resources, low-cost labor, and potential consumer market to tap local resources, actively implement large-scale development. Second, some lagging cities should strengthen government policy support, and under the background of common prosperity, implement digital economic support policies and measures for RR.

There are also variations in different regions and differentiaid development strategies should be adopted. For the northeastern region, the integrated development of DE and RR should be encouraged to accelerate the digital transformation and upgrading of rural areas. For the southwestern region with relatively low coupling coordination, the government needs to increase investment in digital industry infrastructure and RR, enhance the ability to transform scientific and technological achievements, strengthen policy guidance and publicity for DE development, encourage rural areas to gradually achieve digital transformation, and set up a model.

Urbanisation is an indispensable part of the solution to the problems of agriculture. Therefore, raising the level of urbanisation is crucial. Firstly, big cities should drive the progress of neighbouring small cities, and actively develop towns and cities, forming a pattern of mutual promotion and drive. To raise the level of urbanisation, it is necessary to coordinate urban and rural planning, ensure a balanced allocation of resources and safeguard rural development.

The improvement of economic level and transport level also plays a crucial role in enhancing the coupling and coordination between RR and the DE. To raise the economic level of rural residents, it is necessary to improve the allocation of labour factors and improve basic public services such as medical care, education and pension in rural society. Secondly, rural residents should learn to adapt to local conditions, keep up with market demand, actively adjust the agricultural structure, develop regional advantages, and form special industries." To get rich, build roads first." For economically backward areas, the level of transport should be improved and transport problems solved. Improve transport infrastructure and facilities.

Among the factors affecting the coupling coordination, the industrial structure accounts for the largest proportion, so optimizing the industrial structure is unstoppable. Firstly, each city should find its own characteristic and key industries based on its actual situation. Secondly, with the development of scientific and technological level, each city should actively develop emerging industries based on high-tech. In addition, foreign investment should be actively introduced, funds should be reasonably allocated, and investment in the primary and secondary industries should be increased, thereby improving agricultural productivity, especially rural science and technology levels.

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