

Research on the Influence Effect of Digital Economy on Urban-Rural Integration Development - Based on Provincial Panel Data Empirical Analysis

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ABSTRACT

As socialism with Chinese characteristics enters a new era, the problem of unbalanced and insufficient development in China remains prominent at this stage. In the Vision 2035, "strengthening digital development" and achieving "agricultural modernization" and "significantly narrowing the development gap between urban and rural areas and the gap between the living standards of the population" will coincide with each other. The digitalization of urban-rural integration is both an opportunity and a challenge. This project focuses on the impact of digital economy development on urban-rural integration. Based on the panel data of 31 provinces in China from 2010 to 2020, we conduct a systematic research on the impact of digital economy on urban-rural integration development, focusing on the three dimensions of theoretical analysis, empirical measurement and mechanism. Firstly, we reveal the spatial and temporal evolution of China's digital economy development; secondly, we conduct theoretical analysis through literature review and model construction; thirdly, we construct the index system of digital economy and urban-rural integration level and measure the level of urban-rural integration development; we adopt the random effect and fixed effect models to test the direct impact of digital economy development level on urban-rural integration development, and utilize the mediation effect model to validate the effect mechanism of digital economy on urban-rural integration; finally, we propose that digital economy contributes to the development of urban-rural integration. mechanism; and finally put forward the suggestions for digital economy to boost the high-quality development of urban-rural integration, with a view to realizing the development of rural digital economy and promoting urban-rural integrated development.

KEYWORDS

Digital economy; Urban-rural integration; Eeffects

1. BACKGROUND OF THE STUDY

After the outbreak of the new crown pneumonia epidemic, China's social development and economic situation have experienced a severe test, while the new model of the digital economy and new forms of business have flourished, playing a significant role in the prevention and control of the epidemic and the resumption of work and production in the post-epidemic period, and becoming a key driving force and a new engine for stabilizing China's economic growth. Also in the face of the world's great changes, the digital economy has gradually become the core strategic direction of high-quality economic development. From the Internet, software algorithms, artificial intelligence (AI) to the platform economy, sharing economy, intelligent manufacturing, the 19th CPC National Congress report for the first time the digital economy into the government work report, proposed the construction of digital China. According to data related to the White Paper on the Development of China's Digital Economy (2021) released by the China Academy of Information and Communications

Technology, the scale of China's digital economy will continue to expand in 2020, with the scale of digital industrialization and industrial digitization accounting for 20% and 80% of the digital economy, respectively, and the digitalized new businesses that have gradually been formed around the world have become the main force for promoting the development of the urban and rural economy in the post-epidemic era, and the response to the downward pressure of the economy as a The "14th Five-Year Plan for the Development of the Digital Economy" released on December 12, 2021 mentioned that during the "14th Five-Year Plan" period, China's digital economy has shifted to a new stage of deepening application, standardized development, and universal sharing. The digital economy can play a role in optimizing the economic structure and promoting high-quality, stable development, as reflected in its impact on spatial layout and urban and rural structures.

Meanwhile, the report of the 19th CPC National Congress clearly put forward the requirement of establishing and improving the institutional mechanism and policy system for integrated development of urban and rural areas, marking a new era in which China will accelerate the pace of integrated development of urban and rural areas. The Opinions on the Establishment of Institutional Mechanisms and Policy System for Integrated Development of Urban and Rural Areas, adopted on April 15, 2019, pointed out the guiding ideology, basic principles and main objectives for the establishment of the institutional mechanisms and policy system for improved urban-rural integrated development. The recommendations of the 14th Five-Year Plan and 2035 Vision adopted on October 29, 2020 further called for "improving the mechanism for urban-rural integrated development, promoting equal exchange and two-way flow of urban and rural factors, and enhancing the vitality of agricultural and rural development." development vitality." The promotion of the digital countryside strategy has realized the development of science and technology to strengthen agriculture and the construction of rural network infrastructure, and is committed to bridging the digital divide between urban and rural areas. Regarding the construction of digital villages, the State has issued several policies to support the construction of future villages by digitization, but the specific implementation guidelines are still to be improved.

In view of this, as the trend of economic digitization collides with the strategy of urban-rural integration and development, answering such questions based on China's panel data at the level of 31 provinces (municipalities and autonomous regions) from 2010 to 2020 is of great theoretical and practical significance for solving the unbalanced development of urban and rural areas, the digital divide, as well as how to promote the construction of digital villages through the digital economy.

2. LITERATURE REVIEW

Around the research theme of this paper, there are three main types of literature that are closely related to the research of this paper: first, the measurement of the level of urban-rural integrated development and the study of urban-rural relationship, second, the study on the definition of digital economy and the level of digital economization, and third, the study on the aspect of digital economy on urban-rural integrated development.

2.1. Research On The Measurement Of The Level Of Integrated Urban-Rural Development And Urban-Rural Relations

The construction of an indicator system to measure the level of urban-rural integrated development has been a major focus of scholars' research. In the national urban-rural integrated development level research, the urban-rural integrated development indicator system is constructed from the integration of the three dimensions of "people", "land" and "capital", and the two-step global principal component analysis is used to measure the level of China's urban-rural integrated development (Liu Hui et al., 2019). component analysis to measure the level of China's urban-rural integration development (Liu Minghui et al., 2019). The comprehensive index of urbanization and the comprehensive index of rural revitalization were constructed separately, and the level of China's urban-rural integrated

development was measured using the entropy method and the coupled coordination degree model (Sun Qunli et al., 2021). In regional-level studies, an evaluation index system was constructed based on the three dimensions of urban-rural economic integration, urban-rural social integration and urban-rural people's life integration to measure the level of urban-rural integrated development in the Yangtze River Delta region (Xie Shouhong et al., 2020). Some scholars have also measured individual provinces, using the AHP method to measure the level of urban-rural integration development in Shanghai (Guo Lan, 2017). Scholars have studied many aspects of the development history, basic characteristics, influencing factors and development level of urban-rural relations, which have made a great contribution to the study of urban-rural integration and development, but there are problems such as insufficiently comprehensive and comprehensive selection of indicators and short time span.

The issue of urban-rural relations has been the focus of research by scholars, and urban-rural relations are a multidimensional interactive relationship formed by the differences and complementarities between urban and rural functions (Potter et al. 2004). Since the founding of New China, urban-rural relations have evolved from "division" to "integration", from "integration" to "fusion" (Nien et al. 2004). Since the founding of New China, urban-rural relations have evolved from "division" to "integration", from "integration" to "fusion" (Nianmeng, 2020). The current development gap or inequality between urban and rural areas is specifically manifested in the discrimination of household registration system, urban-rural wage gap, income inequality, as well as the gap between urban and rural residents' life, infrastructure, and industrial development, etc. (Sun Jingfang, 2017; Gong Mingyuan et al. 2019; Cai Jiming et al. 2019; Ye Lu et al. 2021) Reasons leading to the uncoordinated development of urban and rural areas include the uneven development of the economy, the insufficient investment of public resources to rural areas and the management system of urban-rural division and the widening gap between urban and rural areas due to the unbalanced development of urban and rural areas (Zhang Jinhua et al. 2020; Ye Lu et al. 2021) To solve the problem of urban-rural development gap in the context of rural revitalization needs to accelerate the implementation of urban-rural integration development. Urban-rural integration includes multiple aspects at multiple levels such as urban-rural spatial integration, factor integration, industrial integration, residential integration, social integration and ecological integration (Gao Bo et al. 2019; Wei Houkai 2020).

2.2. Studies On The Definition Of The Digital Economy And The Measurement Of The Level Of Digital Economization

The concept of digital economy emerged in the 1990s, and Tapscott (1996) first proposed the concept of "digital economy" in his book. As a result of the digital economy, human development has begun to gradually transform into an information-processing process. The UK government believes that in the digital economy, digital networks and communication infrastructure provide a globalized platform that facilitates mutual interactions, communication, cooperation, and information sharing among individuals and organizations (Ding, Sheng, et al., 2016). Domestic studies have defined digital economy as a new type of economic form that takes digital information as the core production factor, is supported by information technology, uses modern information networks as the main carrier, provides products or services with digital technology, and is a new type of economic form that integrates technology, industry, and producers and consumers (Zhang Liangliang et al., 2018).

The 2019 White Paper on China's Digital Economy Development Index breaks down the indicator system of the digital economy into basic indicators, industrial indicators, integration indicators and environmental indicators, and some scholars have explained the indicators of the digital economy from the three aspects of digital inputs, digital environments and digital outputs (Wan Xiaoyu et al., 2019), and some scholars have established the evaluation system of digital economy development on the basis of the three-dimensional space theory, including the information cyberspace, the real physical space and the human social space. space, physical space and human social space and other ternary space theory, to establish the evaluation system of digital economy development. The

integration and application of the digital economy is the starting point of the development of the digital economy, but also the focus of scholars' research, the integration of the digital economy is mainly in the primary, secondary and tertiary industries, the digitization of agriculture is slower compared to the digitization of industry and services, industrial digitization is mainly in the manufacturing process (Liu Jun et al., 2020), and in the service industry the most extensive application of the daily consumption, e-commerce (Wen Jun et al., 2019), digital financial inclusion, and digital financial inclusion (Liu Jun et al., 2020), digital inclusive finance (Zhang Xun et al., 2019; Zhao Tao et al., 2020), and so on, all of which embody the digital economy, while the role of the digital economy in foreign trade cannot be ignored (Qi Junyan and Ren Yida, 2020). On the one hand, the above has certain reference value for the construction and measurement of the subsequent index system, but it ignores the epochal nature and availability of the data, and it is difficult to carry out in-depth research from the perspective of empirical evidence. On the other hand most of them measure the indicators from the single dimension they need, and lack a comprehensive measurement of the comprehensive index of the digital economy.

2.3. On The Impact Of The Digital Economy On Integrated Urban And Rural Development

Against the background of the booming development of the digital economy, many studies have begun to pay attention to its impact on urban-rural relations. Scholars focused on the connotation, characteristics, and indicator system of digital economy and urban-rural integration in the early stage, and in the later stage, they mainly studied the impact of digital economy on urban-rural integration and development at the level of theoretical mechanism, with a broader research perspective. The development of digital inclusive finance mainly reduces the urban-rural income gap through the mechanism of increasing financial accessibility and reducing the threshold effect (Zhou Li et al., 2020). Fiscal policy to promote the integrated development of urban and rural areas in the context of economic digitization should be "people-oriented", improve the institutional mechanism for the provision of basic public services in urban and rural areas, and promote the synergistic development of urbanization, industrialization and digitization (Fan Yiman, 2021). The integrated development of the digital economy and the agricultural and rural economy can give full play to the multiplier and spillover effects of information technology innovation through the technological synergy of scientific and technological innovation, obtain higher-quality output, and promote the transformation of old and new kinetic energy to achieve sustainable development (Chen Yiming, 2020). The information access effect brought by the Internet is the main reason for enhancing the entrepreneurial level of urban and rural households, and the information access effect is more important for enhancing the entrepreneurial level of urban households than rural households (Song Lin et al., 2021). The digital economy takes information technology as an important carrier, and its unique sharing, high permeability, high technology and non-competitive nature give full play to the matching, multiplier, trickle-down and synergistic effects of factors of production and technological innovation, and empower the integrated development of urban and rural areas (Liu Xian et al., 2021).

In summary, regarding the research on the impact effect of digital economy on urban-rural integration development, one category is based on the macro logic of data elements and resource allocation, and the other category is to study the impact mechanism of information technology on industrial structure transformation and enterprise digitalization transformation, but there is still room for expansion as follows, firstly, from the point of view of the research methodology, the country is currently mainly from the level of the theoretical mechanism of the study of the impact of the digital economy on the integration of urban and rural development, the Fewer use economic models to deduce the specific mechanism of digital economy empowering urban-rural integrated development, and lack of empirical research; second, from the point of view of the construction of the indicator system, there are still problems of insufficiently comprehensive selection of indicators, short time span, etc., and the indicator system of the level of integration of the digital economy and urban-rural development

is not complete enough; third, from the point of view of the theoretical mechanism, the digital economy promotes the development of urban and rural areas through the threshold effect, the multiplier effect, the spillover effect, etc., and does not discuss human capital level. urban-rural development, without discussing aspects such as human capital level and industrial structure upgrading, the exploration of the mechanism is still insufficient.

3. MODEL CONSTRUCTION

3.1. Selection Of Indicators

3.1.1. Explained variables

Urban-rural integrated development Level: Urban-rural integrated development is the goal of China's economic and social development in the Fourteenth Five-Year Plan period and the longer term ahead, and it is also the theme of this study. Urban-rural integrated development is rich in connotation, always adheres to the people-centered development idea, and profoundly embodies the requirements of the new development concept: innovative development is the first driving force, coordinated development is the inherent requirement, green development is the condition of sustainability, open development is the necessary path, and shared development is the essence of the requirements. Taking the road of integrated urban and rural development does not mean giving up the total amount and speed, but still needs to be based on a certain scale of development or efficiency. Therefore, based on the new development concept and combining with the actual development of China and the availability of data, and with reference to the research of scholars such as Zhao Ruyun, Wang Wei, Zong Gang, Li Mengxin and Ren Baoping, this study selects 24 indicators from six aspects, namely, economic efficiency, innovative development, coordinated development, green development, open development, and shared development, to establish a system of indicators for the evaluation of urban-rural integrated development, as shown in Table 1.

Table 1. Evaluation index system for urban-rural integration development

Dimension index	Specific indicators	Indicator meaning	unit	Indicator attributes
commercial efficiency	Economics of scale	Regional per capita GDP	Yuan	+
	Productivity of labour	Industrial GDP / Number of industrial employees	Yuan/person	+
	Level of consumption	Total retail sales / GDP	%	+
	Level of government fiscal expenditure	Government fiscal expenditure /GDP	%	+
innovative development	Investment in science	R & D funds internal expenditure /GDP	%	+
	Ability to create scientific and technological achievements	Number of patent applications granted	Piece	+
	Number of R & D employees	R&D personnel full-time equivalent	Man-year	+
	Technology transformation ability	Technology market turnover	Ten thousand Yuan	+
harmonious development	Urbanization rate	Urbanization rate	%	+
	Urban and rural consumption level ratio	Urban per capita disposable income / rural per capita disposable income	—	-
	Advanced level of industrial structure	Industrial structure advanced index	—	+
	Rationalization level of industrial structure	The Thire index measured by the ratio of the number of employees and output value	—	-
greendevelopment	Energy consumption per unit of output value	Total industrial energy consumption / total industrial output value	Tons of coal / ten thousand yuan	-
	Industrial pollution control situation	Total investment in industrial pollution control completed	Billion	+
	Household waste disposal situation	The harmless treatment rate of household garbage	%	+
	Ecological improvement	percentage of forest cover	%	+
	Urban greening	Green coverage rate of the built-up area	%	+
Opendevelopment	Foreign trade dependence degree	Total import and export volume / GDP	%	+
	Scale of foreign investment	Total foreign direct investment	billions of dollars	+
	Scale of foreign-invested enterprises	The proportion of industrial enterprises above designated size in Hong Kong,Macao and Taiwan and foreign-funded enterprises	%	+
Shared development	Education level	Number of students enrolled in institutions of higher learning	Piece	+
	Educational level	Number of public libraries	Piece	+
	Medical care level	Number of community health service center stations	Piece	+
	Social security and employment level	Social security and employment expenditure / GDP	%	+

Some of the indicators and their meanings are explained below.

(1) Economic efficiency: the realization of urban-rural integrated development should be premised on a certain economic growth, economic scale and economic vitality, therefore, this study sets up economic efficiency indicators, which together with the five concepts form a system of urban-rural integrated development indexes, mainly including economic scale, labor productivity, consumption level, and the level of urban and rural government financial expenditures.

(2) The number of authorized patent applications: In the indicator system of innovation development, besides the common indicators such as the level of scientific and technological investment, the number of R&D employees and the ability of scientific and technological transformation, the number of authorized patent applications is also used to measure the ability of scientific and technological achievements creation. The number of authorized patent applications is the sum of three kinds of domestic patent applications, including invention patents, utility model patents and design patents.

(3) Level of advanced industrial structure: In the indicator system for coordinated development, in addition to indicators such as the urbanization rate and the ratio of urban and rural consumption levels, the level of advanced industrial structure is expressed through the calculation of the index of advanced industrial structure, which is based on the following formula.

$$\text{rank} = \sum_{i=1}^3 i * S_i \quad (1)$$

Where, rank denotes the index of advanced industrial structure, and the value ranges from 1 to 3. i is the corresponding weight of each industry, and S_i denotes the proportion of the added value of each industry in CDP, and the larger the value of rank is, the higher the level of advanced industrial structure is.

(4) The level of rationalization of industrial structure: the level of rationalization of industrial structure is also an important indicator of the coordinated development of the signs, this study refers to the method of Gan Chunhui et al. and chooses the Terre index measured by the number of employees and the ratio of the output value among the three industries to express the level of rationalization of the industrial structure, and the smaller the value is, the more rational the industrial structure is, and the index is a kind of negative indicator, and the calculation formula is as follows.

$$TL = \sum_{i=1}^n \left(\frac{Y_i}{Y} \right) \ln \left(\frac{\frac{Y_i}{L_i}}{\frac{Y}{L}} \right) \quad (2)$$

Where TL denotes the level of rationalization of industrial structure, Y denotes gross regional product, L denotes the number of employed persons, and i represents the corresponding primary, secondary and tertiary industries.

(5) Shared Development Indicators: This study measures shared development indicators from four aspects: education, culture, health care, social security and employment. Drawing on the existing literature, the number of students enrolled in higher education, the number of public libraries, the number of community health service centers, and the expenditure on social security and employment/gross regional product (GDP) T are used to measure the shared development indicators. The number of community health service center stations, social security and employment expenditures/gross regional product T are used to measure.

3.1.2. Core explanatory variables

Level of digital economy development (DE): As a new economic mode, digital economy plays an important role in promoting the integrated development of urban and rural areas. To measure the development level of digital economy, this study mainly selects 22 indicators to build the evaluation index system from the dimensions of digital industrialization and industrial digitization. Among them,

the development level of digital industrialization is mainly measured by selecting appropriate indicators from the four aspects of infrastructure construction, development of telecommunication and other information transmission services, digital innovation development and future industrialization; the level of industrial digitization is considered from the results of digital application of the primary, secondary and tertiary industries respectively, and the specific indicators are shown in Table 2.

Table 2. Indicator system for evaluating the level of development of the digital economy

Level 1 indicators	Secondary indicators	Level 3 indicators	unit
Digital industrialization	infrastructure construction	Mobile phone penetration rate long-distance optical cable line length	Ministry /100 people km
	Development of telecommunications and other information transmission services	Total volume of post services Total volume of telecommunications services fixed telephone users mobile phone users	hundred million yuan hundred million yuan ten thousand households ten thousand households
	Digital innovation and development	The number of high-tech enterprises Average annual number of high-tech employees Main business income of high and new technology enterprises Total profits of high and new technology enterprises	Piece Piece hundred million yuan hundred million yuan
	Future industrialization	R & D personnel full-time equivalent The number of degrees awarded by ordinary universities, junior colleges and students of institutions of higher learning R & D funds for internal expenditure	man-year Piece ten thousand yuan ten thousand yuan
Industrial digitization	The digitization level of the primary industry	Rural electricity consumption Total output value of agriculture, forestry, animal husbandry and non-fishery	Billions of kilowatt-hours ten thousand yuan
	Digital level of the secondary industry	Yield of industrial enterprises above designated scale Expenditure on technology introduction by industrial enterprises above designated size Expenditure for technical transformation	% ten thousand yuan ten thousand yuan
	Digital level of the tertiary industry	Express business volume Total retail sales of social consumer goods Public finance and expenditure on culture, sports and media Telecom business, the main business income	ten thousand pieces hundred million yuan hundred million yuan hundred million yuan

3.1.3. Other variables

(1) The level of economies of scale (SEE): economies of scale refer to the phenomenon that as the scale of production increases, the unit cost of production decreases and the profit margin increases. The level of economies of scale can reflect the comprehensive effect of economic development, which in turn has an important impact on the realization of urban-rural integrated development. In this study, the main business profit margin (total profit/main business cost) of industrial enterprises above large scale is chosen as an indicator to measure the level of economies of scale.

(2) Human capital level (HUM): Human capital is regarded as an important driving force for urban-rural integrated development and plays a powerful role in realizing urban-rural integrated development. In this study, the ratio of the number of R&D personnel to the number of urban employment is chosen as an indicator of the level of human capital.

(3) Level of financial development (FD): The stable and healthy development of finance can provide strong support for market players in financing and risk avoidance, and is an important support force for promoting urban-rural integrated development.

(4) Level of industrial structure upgrading (ISH): industrial structure upgrading is specifically reflected in the advanced and rationalized industrial structure, which has an important impact on urban-rural integrated development.

3.2. Model Construction And Data Sources

In order to test the direct impact of the level of development of the digital economy on the development of urban-rural integration, the following model was designed.

$$HQ_{it} = \beta_1 DE_{it} + \beta_2 SEE_{it} + \beta_3 HUM_{it} + \beta_4 LNFD_{it} + \beta_5 ISH_{it} + \mu_{it} \quad (3)$$

Among them, HQ denotes the level of urban-rural integration development in province *i* in year *t*, DE denotes the level of digital economy development in province *i* in year *t*, and SEE, HUM, FD and ISH denote the level of economy of scale, the level of human capital, the level of financial development, and the level of upgrading of industrial structure in province *i* in year *t*, respectively. Due to the fast growth rate of financial development level (FD.), in order to reduce the effect of heteroskedasticity, it is taken as logarithmic (LNFD.). $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$ are the regression coefficients of the explanatory variables, and μ_{it} is the random perturbation term.

In addition, the digital economy may not only have a direct effect on urban-rural integrated development, but also have an indirect effect on urban-rural integrated development through the level of human capital and industrial structure upgrading. Therefore, this study selects human capital level and industrial structure upgrading as mediating variables to design a mediation effect model, to test whether there is a mediation effect between digital economy and urban-rural integration development, and to analyze the degree of influence.

The mediation effect is modeled as follows:

$$HQ_{it} = aDE_{it} + e_{i1} \quad (4)$$

$$M_{1it} = bDE_{it} + e_{i2} \quad (5)$$

$$HQ_{it} = a'DE_{it} + cM_{1it} + e_{i3} \quad (6)$$

Where parameter *a* is the total effect of the independent variable DE, i.e., the level of digital economy development, on the dependent variable HQ, i.e., the level of urban-rural integration development, parameter *b* is the effect of the independent variable DE on the mediating variable M, i.e., the level of human capital and the upgrading of the industrial structure, and parameter *a'* is the direct effect of the independent variable DE on the dependent variable HQ after controlling for the effect of the mediating variable on the dependent variable. The magnitude of the mediating effect is *c***b*, which is recognized as the indirect effect, and the relationship between the indirect effect and the total effect is: $a = a' + c*b$.

4. EMPIRICAL STUDIES

4.1. Descriptive Statistics

Table 3. Descriptive statistics for benchmark regression

Variable	N	Mean	Sd	Min	Max
HQ	360	0.0527	0.0299	0.0210	0.2070
DE	360	0.0351	0.0326	0.0040	0.2250
SEE	360	0.0815	0.0387	-0.2722	0.2759
HUM	360	0.0263	0.0129	0.0075	0.0723
ISH	360	0.4475	0.0977	0.2860	0.8350
LNFD	360	1.0515	0.3221	0.2532	2.0957

Table 3 shows the descriptive statistics of the variables used in this study. Among them, the mean value of urban-rural integration development index is 0.0527, the maximum value is 0.2070, and the minimum value is 0.0210, which shows that there are big differences in the level of urban-rural integration development between regions in China. In the statistics of the level of digital economic

development, the mean value is 0.0351, the maximum value reaches 0.2250, the minimum value is 0.0040, a large gap shows that China's inter-regional level of digital economic development is not balanced. From the point of view of control variables, there are also some gaps between different regions in the level of economies of scale, the level of human capital, industrial structure and financial development.

4.2. Baseline Regression Analysis

Table 4. Benchmark regression results

DE	0.7913*** (0.0246)	0.6258*** (0.0286)	0.6619*** (0.0218)	0.6758*** (0.0209)	0.6768*** (0.0207)
HUM		0.6632*** (0.0725)	0.2065*** (0.0618)	0.2392*** (0.0592)	0.2409*** (0.0586)
ISH			0.1055*** (0.0065)	0.0561*** (0.0103)	0.0557*** (0.0102)
LNFD				0.0172*** (0.0029)	0.0182*** (0.0028)
SEE					0.0380*** (0.0137)
Cons	0.0249*** (0.0012)	0.0133*** (0.0017)	-0.0232*** (0.0026)	-0.0205*** (0.0025)	-0.0246*** (0.0029)
Adj. R ²	0.7425	0.7908	0.8796	0.8905	0.8925
N	360	360	360	360	360

Remarks: *, **, *** denote significant at 10%, 5% and 1% level of significance respectively.

This study utilizes stata software to gradually add variables through stepwise regression to ensure the rigor of the model, and the results of the benchmark regression are shown in Table 5. In Model 5, all variables passed the 1% significance test, and have a significant impact on urban-rural integration development. Among them, digital economy as the core explanatory variable of this study, the regression coefficient is 0.6768, that is to say, under the control of other variables unchanged, every unit increase in the level of digital economy development, urban-rural integration development will increase by 0.6768 units. This shows that the digital economy has a strong direct effect on urban-rural integration development. This result verifies hypothesis 1. From the regression results of other control variables, we find that for every unit increase in the level of economy of scale, the urban-rural integration development increases by 0.0380 units. For every one unit increase in the level of human capital, urban-rural integrated development increases by 0.2409 units. For every unit increase in the level of industrial structure upgrading, the level of urban-rural integrated development increases by 0.0557 units. And for every 1% increase in the level of financial development, the level of urban-rural integrated development increases by 0.0182 units. From the above results, we can see that each control variable has a certain promotion effect on urban-rural integration development.

4.2. Analysis Of Intermediation Effects

In order to verify the mechanism of digital economy on high-quality development, this paper verifies the existence of the intermediary effect of human capital level and industrial structure upgrading through the three-step stepwise regression method and Sobel test, respectively. Since the Sobel test is more accurate and efficient than the three-step stepwise regression method, this paper analyzes the intermediary effect of digital economy on urban-rural integration development by reporting the results of the Sobel test. This paper finds that human capital level and industrial structure upgrading

as intermediary variables, respectively, on the digital economy to promote urban-rural integrated development of the intermediary role is more obvious, the specific test results are shown in Table 6. from Table 6, we find that: the level of human capital level as an intermediary variable indirect impact coefficient of 0.1655, i.e., the level of the digital economy development level of every increase of 1 unit, can be indirectly through the level of human capital level of urban-rural integrated development 0.1655 units, the level of human capital level of 0.1655 units. That is to say, every one unit increase in the level of digital economy development can improve urban-rural integration development through the indirect effect of human capital level by 0.1655 units. The indirect impact coefficient of industrial structure upgrading as an intermediary variable is 0.0851, i.e., for every 1 unit increase in the development level of digital economy, the urban-rural integration development can be increased by 0.0851 units through the transmission effect of industrial structure upgrading. Thus, the digital economy not only directly promotes urban-rural integration development, but also indirectly promotes urban-rural integration development through the upgrading of human capital level and industrial structure. This result confirms hypothesis 2.

Table 5. Mediating effects test results

	HUM	ISH
Direct Effect	0.6258*** (0.0286)	0.7062*** (0.0176)
Indirect Effect	0.1655*** (0.0210)	0.0851*** (0.0183)
Adj. R ²	0.7908	0.8761
N	360	360

Remarks: *, ***, *** denote significance at 10%, 5% and 1% significance levels, respectively.

5. CONCLUSIONS AND RECOMMENDATIONS

The current booming development of the digital economy provides new opportunities, new momentum and new vitality for urban-rural integrated development, and the key to urban-rural integrated development in the era of the digital economy is to correctly deal with the relationship between technology and the economy and society, the relationship between agriculture, industry and the service industry, the relationship between urban and rural areas, the relationship between farmers and citizens, and the relationship between rural governance and urban governance in the context of the five major relationships. Digital empowerment through the four links of production, circulation, distribution and consumption of social reproduction will provide new impetus and vitality for urban-rural integrated development, digital governance will provide new ways of governance for urban-rural integrated development, and the five paths of realization will help urban-rural integrated development.

ACKNOWLEDGEMENTS

This work is supported by 2022 National Undergraduate Innovation and Entrepreneurship Training Program, Project number: 202210378021.

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