

Research on the Role Mechanism of Digital Economy in Enhancing the Quality of County Economic Development

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Abstract: The digital economy in the new era with data as the new production factor provides an important impetus to improve the quality of county economic development. In this paper, based on the construction of a county economic development quality and digital economy index system, based on China's county panel data, a double fixed panel model is used to explore the role of digital economy in improving the quality of county economic development mechanism. It is found that the digital economy can significantly improve the quality of county economic development; industrial structure upgrading and urban-rural integration development are important mechanisms for the digital economy to improve the quality of county economic development. Finally, this paper puts forward some targeted policy recommendations based on the results of the study.

Keywords: Digital economy; Quality of county economic development; Urban-rural integration; Industrial structure upgrading

1. Introductory

Since the 18th National Congress, China's economy has transformed from a stage of rapid growth to a stage of high-quality development, and the new development concept has become the guiding principle of economic and social development, and the county economy has also shifted from "development and growth" to "high-quality development". The 20th Party Congress even emphasized, "comprehensively promote rural revitalization, adhere to the integrated development of urban and rural areas, and smooth the flow of urban and rural elements". Improving the quality of county economic development is an important way to realize rural revitalization, urban and rural comprehensive integrated development, but also to achieve the transformation of the county economic growth mode, industrial structure upgrading and development of new and old transformation of kinetic energy is the only way. However, the slow upgrading and transformation of industrial structure and the unbalanced development of urban-rural integration exist in the current county economic development, which seriously restricts the improvement of the quality of county economic development. In the new era of scientific and technological innovation and development, the digital economy provides an important driving force for the integrated development of urban and rural areas and the upgrading of industrial structures.

In recent years, the digital economy has become a hot research topic in academia, with research focusing mainly on the connotation and economic performance of the digital economy. First of all, the connotation of the digital economy has gradually evolved, extending from the early "digital technology-based economy" to economic activities such as business, governmental affairs, and non-governmental affairs. Ren and Chi (2023) argue that in the context of the digital economy, the goal of high-quality development of Chinese-style modernization has been reshaped, new driving forces of modern economic development have been cultivated, and new advantages of modern data elements have been formed. Secondly, digital economy performance research mainly focuses on industrial structure, urban-rural integration, and high-quality economic development^[1]. Qin et al. (2022) proved that the digital economy has a significant role in promoting the upgrading of urban industrial structure, and the two have an "inverted U" nonlinear characteristic^[2]. Bi and Li (2022) found that the digital economy can not only directly promote the upgrading of industrial structure but also indirectly promote the upgrading of industrial structure by accelerating circulation efficiency^[3]. Huang et al. (2022), Tai and Cai (2022) study the role of the digital economy on urban-rural integrated development based on provincial data and econometric models and find that the digital economy has a direct significant positive effect on urban-rural integrated development, and has an indirect effect on urban-rural integrated development through mechanisms such as improving the mismatch of capital factors, mismatch of data factors, and the transfer of agricultural labor^[4-5]. Chen et al. (2022), Cheng et al. (2022) use inter-provincial data to find that the digital economy can empower high-quality economic development and indirectly drive high-quality economic development through mechanisms such as improving regional innovation levels, promoting industrial structure upgrading, and green technology innovation^[6-7]. Liu

et al. (2023), Cao and Han (2022), on the other hand, use prefecture-level city data to study the impact of the digital economy on the high-quality development of the urban economy, and the results show that the digital economy has a significant contribution to the high-quality development of the urban economy, and that the digital economy contributes to the high-quality development of the urban economy mainly through the mechanisms of improving the efficiency of the service industry, technological innovation, Internet popularization, and improving the level of the real economy^[8-9].

Literature combing reveals a wealth of research related to the digital economy. However, studies on the impact of the digital economy on high-quality economic development are more concentrated at the provincial and city levels, and there is a lack of relevant studies at the county level. Therefore, based on existing studies, this paper takes urban-rural integrated development and industrial structure upgrading as mechanism variables, and based on the panel data of Chinese counties from 2009 to 2020, explores whether the digital economy can improve the quality of county economic development through this mechanism variable.

2. Theoretical analysis and research hypotheses

Hypothesis 1: Industrial structure upgrading and urban-rural integration development are important mechanisms for the digital economy to enhance the quality of county economic development

Digital technology with 5G, big data, and cloud computing as the core, with significant capital and technology preference, high value-added preference, and other characteristics, can not only improve the capital-labor ratio and optimize the structure of resource factor endowment in the county but also improve the county's product supply capacity through the transformation and upgrading of the traditional industrial chain, product chain, supply chain, and value chain. The county's economic development has been in the predicament of low industrial structure level and low industrial value, while digital technology and low carbon technology transform and upgrade the traditional industry, improve the industrial structure level and value, and promote the high-end of the county industry, and improve the supply capacity of the industry. At the same time, the integration of digital technology and traditional industry innovation and development, gives rise to a unique industrial system, while the industry has an all-round, multi-level driving effect, the industrial chain affects all industries, effectively promoting the deep integration of one, two and three industries, and thus promoting the upgrading of the county's industrial structure.

The digital economy provides important kinetic energy for the integrated development of urban and rural areas and plays an obvious positive role in narrowing the gap between the per capita income of urban and rural residents, promoting the two-way flow of urban and rural factors, and the formation of urban and rural integrated consumer markets. First, the digital economy narrows the gap between the per capita income of urban and rural residents. Digital technology is widely used in various industries in the county, such as agricultural product processing, smart agriculture, and digital countryside, which not only reduces the cost of agricultural production but also increases the opportunities for farmers' entrepreneurship and employment, thus increasing farmers' income and narrowing the urban-rural income gap. Secondly, the digital economy promotes the two-way flow of urban and rural factors. The development of the digital economy reduces market production transaction costs and information asymmetry, which is conducive to promoting the flow and pooling of factors of production by the market supply and demand and the functional positioning of industries, and facilitates the two-way flow of urban and rural factors of production. Thirdly, the development of a digital economy promotes an urban-rural integrated consumer market. With the popularization of the Internet and digital technology in the county, all aspects of the urban and rural consumption chain have been integrated into digital platforms, such as e-commerce, where urban and rural residents can conduct commodity transactions by using the Internet or smartphones to make payments online, which breaks the limitations of traditional transactions in terms of geographic location and transaction methods, breaks through the dualistic structure of urban and rural transactions, and is conducive to the promotion of urban-rural integration of the consumer market.

3. Description of variables

The independent variable in this paper is the level of digital economy development in the county and the dependent variable is the quality of economic development in the county. Among them, the digital economy is the indicator system constructed from the two dimensions of digital industrialization and industrial digitization, and the quality of county economic development is the indicator system constructed from the four dimensions of economic vitality, development dynamics, urban-rural coordination, and ecological strength, and finally, the entropy method is used to measure its composite index.

4. Empirical findings

4.1 Benchmark regression results

The double fixed effect model is used to test the effect of the digital economy on the quality of county economic development, and the results of the benchmark regression are shown in Table 1, with no control variables in column (1) and control variables added in column (2). From the table it can be seen that whether or not to join the control variables, the coefficient of the digital economy is significantly positive at

the 1% level, Indicates that the digital economy has significantly improved the quality of the county's economic development. However, after adding control variables, the value of the coefficient of digital economy increases slightly, indicating that not controlling other influencing factors will underestimate the effect of digital economy on the quality of county economic development.

Table 1. Benchmark regression results

Variant	Quality of county economic development	
	DIG	0.159***(7.93)
CONTROL	NO	YES
R ²	0.935	0.937
N	30540	30540

4.2 Robustness check

In order to ensure the robustness of the benchmark regression results, this paper conducts robustness tests from the following three aspects: shrinking the tails on 1% for the explanatory variables, the core explanatory variables, and the control variables, to exclude the impact of extreme values and outliers on the estimation; and due to the outbreak of the New Crown Epidemic in 2020, the huge shock led to the economic downturn. Therefore, the data of 2020 in the sample is excluded to exclude the impact of the new crown epidemic factor on the economy; the explanatory and control variables are lagged by one period to reduce the reverse causality problem of the digital economy and the quality of county economic development to a certain extent. The results of the robustness test show that the digital economy coefficients are all significantly positive at the 1% level, indicating that the research conclusions are robust, i.e., the digital economy can significantly improve the quality of county economic development.

Table 2. Robustness check

Variant	1% Indentation	Excluding 2020	One period behind
DIG	0.237***(22.93)	0.171***(16.09)	0.135***(13.71)
CONTROL	YES	YES	YES
R ²	0.933	0.937	0.937
N	30540	27995	27995

4.3 Mechanism testing

According to hypothesis 1, industrial structure upgrading and urban-rural integration development mechanisms are tested in turn:

(1) Mechanism test of digital economy on industrial structure upgrading. This paper adopts industrial structure rationalization and industrial structure heightening to measure industrial structure upgrading, by observing the impact of the digital economy on industrial structure rationalization and industrial structure heightening to carry out the mechanism test, the results are shown in Table 3. digital economy can significantly promote industrial structure rationalization and industrial structure heightening, that is to say, the digital economy can enhance the quality of the county's economic development by promoting industrial structure upgrading.

(2) Mechanism test of the digital economy on urban-rural integrated development. The digital economy has spawned many new industries, increased new employment opportunities for urban and rural residents, raised the income and living standards of urban and rural residents, narrowed the urban-rural gap, and promoted urban-rural integrated development, thus providing an important guarantee for the economic development of the county. Testing this mechanism, the results are shown in Table 3. The digital economy has a significant contribution to urban-rural integrated development, so the digital economy can improve the quality of county economic development by promoting urban-rural integrated development.

Table 3. Mechanism testing

Variant	Rationalization of industrial structure	Heightened industrial structure	Urban and rural integration and development
DIG	1.545***(5.82)	1.896***(2.88)	0.621***(27.55)
CONTROL	YES	YES	YES
R ²	0.706	0.722	0.894
N	30540	30540	30536

5. Conclusions

County is an important foundation for realizing the high-quality development of China's economy, and improving the quality of county economic development is an important way to realize rural revitalization, balanced urban-rural integration and development, and upgrading of the industrial structure, so this paper studies the mechanism of the role of the digital economy on the quality of the county's economic devel-

opment, which is of great practical and theoretical significance. However, the influence effect of digital economy on the quality development of county economy is still to be improved, and the role of the mechanism needs to be deeply explored. Based on the conclusions of the study this paper makes recommendations for urban-rural integrated development and industrial structure upgrading. First, urban-rural integrated development. Improve the mechanism for the flow of urban and rural factor resources, accelerate the two-way flow of urban and rural factors such as capital, land, and talents, and promote urban-rural integrated development. Accelerating the popularization of the Internet in rural areas and promoting the extension of e-commerce to rural areas. Second, Strengthening infrastructure development to improve the synergistic benefits of the industrial chain. This includes infrastructure in transportation, energy, information, etc., to provide support for the benign development of industries. Formulate industrial planning within the county and clarify the direction of key development. Guide enterprises toward high value-added, green and technologically innovative industries, and focus on creating industrial clusters with local characteristics.

References

- [1] Ren B P, Chi K H. Promotion and Expansion of Chinese Path Modernization in the Context of Digital Economy[J]. Reform, 2023, (01):18-30.
- [2] Qin J Q, Zhao J J, Wang W. Mediating effect of Digital Economy on Industrial Structure Upgrading and Empirical Evidence[J]. Statistics & Decision, 2022, 38(11):99-103.
- [3] Bi H N, Li C Y. Research on the Impact of Digital Economy Development on the Upgrading of County Industrial Structure under the New Development Pattern--Test of Mediation Effect Based on Circulation Efficiency[J]. Journal of Commercial Economics, 2022, (16):185-188.
- [4] Huang Y C, Gong S J, Zhou C, et al. Digital economy, factor allocation efficiency, and integrated urban-rural development[J]. China Population, Resources and Environment, 2022, 32(10):77-87.
- [5] Tai D J, Cai R. Digital Economy Empowers Urban and Rural Economic Integration: Internal Mechanism and Empirical Test[J]. Contemporary Economic Management, 2022, 44(10):59-70.
- [6] Chen Z, Chen Z Y, Tan W J. On Mechanism Analysis and Effect of Digital Economy on the Promotion of High-Quality Economic Development [J]. Journal of Guangdong University of Finance & Economics, 2022, 37(03):4-20.
- [7] Cheng G B, Wu J Q, Li Y. Digital Economy, Green Technology Innovation and High-quality Economic Development[J]. Statistics & Decision, 2022, 38(23):11-16.
- [8] Liu G B, Li J H, Tang B A. Digital Economy, Service Industry Efficiency Improvement and High-Quality Development of China's Economic[J]. South China Journal of Economics, 2023, (01):80-98.
- [9] Cao J F, Han Y L. Empirical Test of the Impact of Digital Economy on the High-quality Development of Urban Economy[J]. Statistics & Decision, 2022, 38(16):82-86.