

Does the Digital Economy Drive Rural-Urban Integration

-- An Explanation of the Theoretical Mechanism

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Abstract

This paper explores the digital economy's effects and mechanisms to promote urban-rural integration development. It is found that the digital economy significantly enhances urban-rural integration development, and there are stage characteristics of the urban-rural relationship. Eastern and central cities can better exploit the digital economy dividend and promote integrated urban-rural development compared with western and peripheral cities. Further research finds that stimulating regional innovation capacity and accelerating advanced human capital are important mechanisms of digital economy-driven urban-rural integration. The research in this paper promotes a deeper understanding of urban-rural integration development and the effects, mechanisms, and stages of digital economy-driven urban-rural integration development.

Keywords

Digital Economy; Urban-Rural Integration; Regional Innovation Capacity; Advanced Human Capital.

1. Introduction

The urban-rural dichotomy, which has been in common use in academia for a long time, does not clearly define the criteria of urban and rural areas; thus, it brings about two distinct development concepts, urbanism, and ruralism. Both philosophies treat urban and rural areas as separate individuals, ignoring the integration between urban and rural areas. According to the perspective of product development and social division of labor, Marx and Engels defined urban-rural relations in capitalist society as three stages of the development of urban-rural relations: chaos and unity, separation and opposition, and integration and development. The basic trajectory of China's urban-rural relationship can be divided into three stages: "urban-rural division", "urban-rural integration", "urban-rural coordination", "urban-rural integration", "urban-rural development" and "urban-rural development". "Urban-rural integration" and "urban-rural integration" are the five progressive stages. Urban-rural integration is an important transition stage toward urban-rural integration, which has become a necessary stage for the development of all countries in the world, from low-level urban-rural development to high-level urban-rural integration. In the trend of the digital economy, how to give full play to the digital economy to promote the development of urban-rural integration, and eventually urban-rural integration has become a key concern of society.

According to the China Academy of Information and Communication Technology, China's digital economy will reach US\$5.4 trillion in 2020, ranking second in the world. Undeniably, the information divide in rural infrastructure has further widened the gap between urban and rural areas, which in turn has accelerated the division between rich and poor in society. To this end, the 19th Party Congress report, for the first time, proposed "integrated development of urban and rural areas" and established a sound institutional mechanism and policy system for the integrated development of urban and rural areas. At the same time, the 14th Five-Year Plan also

points out "the comprehensive implementation of rural revitalization strategy." With the increasing abundance of data resources and the continuous improvement of big data processing and analysis technology, the digital economy is conducive to promoting the interconnection of everything in the new era and has also given rise to the concept of mutual promotion and integration of social communities. Digital technology is becoming an important driving force to break the "urban-rural division, one country, two policies" and promote the integrated development of urban and rural areas (Chen Tan, 2021). The relationship between urban and rural areas is being reshaped, the new urban-rural relationship is being established gradually, the institutional mechanism of urban-rural integration development is being improved gradually, and China's urban and rural areas are beginning to enter a period of integrated development. The rich data element resources in the digital economy era also provide effective means and tools for improving the governance of science and technology innovation and constructing an urban-rural community of destiny in the new era.

2. Literature Review

Around the research theme of this paper, the literature closely related to the research of this paper is broadly divided into two categories: one is the research on the digital economy; the other is the exploration of urban-rural integration.

The concept of the digital economy can be traced back to the 1990s. In recent years, countries all over the world have, to varying degrees, tuned in to the development of the digital economy and formulated corresponding development strategies. Scholars' research on the digital economy mainly focuses on regional economic growth and industrial transformation and upgrading. On the one hand, initial studies have focused on the impact of ICT inputs on economic growth (Jorgenson, 2001). However, studies on the digital economy and regional economic growth have produced some non-consistent conclusions. Most scholars agree with the idea that overall digital economy development can contribute to regional economic growth (Mitrović, 2020). Due to the latecomer advantage of knowledge and technology imitation, the development of new industries in the digital economy facilitates the enhancement of endogenous development dynamics in relatively economically backward regions, improving economic efficiency (Galindo-Martín et al., 2019). However, while affirming the existence of a non-linear positive impact of the digital economy on regional economic growth, some studies confirm its heterogeneous regional impact, with eastern regions and central cities enjoying the technological dividends of the digital economy more than central and western regions and peripheral cities. Hawash and Lang (2020) show that due to the large gap in digital infrastructure and the lack of highly qualified Human resources, the economic gap between less developed and developed regions may increase and fall into the vicious cycle of weak economic growth - lagging digital economy development - low-quality economic development.

On the other hand, relevant findings have been effectively confirmed. For example, the digital transformation of some traditional brick-and-mortar enterprises can play a significant role in improving business performance. Some studies have shown that the digital economy can significantly improve the "high" cost and energy consumption of traditional manufacturing industries by increasing labor productivity (Kawa, 2017), reducing information exchange and transaction costs between upstream and downstream enterprises in the industry chain, and expanding the service chain space (Banalieva & Dhanaraj, 2019). The innovative breakthrough of digital technology has enriched the manufacturing space of traditional enterprises and better met the development needs of the new society.

The origin of the idea of urban-rural integration is from the "urban-rural co-development theory" of Howard and others in the 1940s to the "urban-rural dualism theory" represented by Burke and Lewis, and the relationship between urban and rural areas and their development

has always been the focus of Western academics. Based on Spanish data, P Serra et al. (2014) found that with the intensification of land use, the study area and urban space show new interrelationships. From urban-rural integration to urban-rural integrated development, the internal logic of the urban-rural interaction relationship is becoming clearer, and the degree of urban-rural synergy is increasing in domestic research. Among them, the relevant theoretical research also gradually goes from the research on the causes of urban-rural integration, the nature of integration, and the evaluation and measurement of integration degree to further deepening into promoting the equalization of urban-rural public services and balanced allocation of factors through infrastructure integration. Establishing urban-rural ecosystems and creating environment-friendly and resource-saving societies is conducive to the sound development mechanism of urban-rural integration. However, some scholars have also raised related problems, such as low quality of urbanization and low cost-benefit return, which make it difficult for urban-rural relations to enter the advanced stage of urban-rural integration.

Combing the existing research literature, we found that although the literature on digital economy and urban-rural integration can be described as a large amount, many scholars have studied the connotation, influencing factors, measurement methods, and role mechanisms of the digital economy and urban-rural integration from different research dimensions, they have all conducted their research on the relationship between the two, and there is little literature that systematically elaborates urban-rural integration in the digital era. Similar to this paper, there are a few kinds of literature on the digital rural governance model, digital finance to help rural revitalization, and digital technology to promote the continuous optimization of productivity structure such as industrial structure, production mode, and production factors. To promote urban-rural integration, etc. There is a lack of systematic empirical tests. So, what are the effects of the booming digital economy and urban-rural integration in the new era in China? What are the mechanisms through which the two are transmitted to each other?

3. Theoretical Analysis

From "zoning governance" to "urban-rural integration," this is an important support point for rural revitalization and common prosperity. The core connotation of integrated urban-rural development is the integration of people, land, and capital, which involves the economic, political, social, cultural, and ecological dimensions of the economic and social system. Integrated urban-rural development treats urban and rural areas as an organic whole. It places them in an open, fair, and just development environment so that urban and rural resources and elements flow smoothly, industries are closely linked, and functions complement and promote each other, and promote the harmonious development of urban and rural modes of production, lifestyles and ecological environment in the direction of integration. The information dissemination, data creation, and data sharing of the digital economy across space in the new era can effectively reduce the transaction costs of factor flow and form a "flow space" for human, logistics, and capital flow between urban and rural areas, thus promoting the organic integration of urban and rural areas. At the same time, the agglomeration and diffusion mechanism of the digital economy is conducive to the knowledge spillover effect, thus forming urban-rural organisms to share high-level human capital for sound urban-rural integration development; the scale division of labor effect of the digital economy will promote regional innovation capacity, and the marginal incremental effect of innovation drive will be conducive to urban-rural multi-dimensional organic integration.

3.1. Digital Economy to Promote the Development of Urban and Rural Integration

The digital economy can promote the development of integration of people, land, and capital between urban and rural areas through the scale effect of the division of labor market,

knowledge spillover effect, and optimized factor combination effect in many aspects. First, the digital economy can reshape the industrial layout between urban and rural areas and effectively divide the market scale of horizontal and vertical industrial chains. When the amount of data increases and the total value increases, the marginal benefits of data elements show an increasing trend; thus, the wide application of digital technology broadens the horizontal industrial chain between urban and rural areas. The scale effect of "digital economy + industrial layout" promotes the mutual promotion of rural ecological advantages and urban modern technology advantages and drives the placement of a "digital engine" for the weak agricultural economic development. At the same time, the digital economy uses its sharing attributes to build a new urban-rural industrial circulation chain and extend the vertical production chain, thus increasing the production of added value. Secondly, the digital economy can bridge the data gap between urban and rural areas, reduce the transaction cost of factor flow and greatly reduce the cost of information acquisition, which can effectively alleviate the information asymmetry and "information islands" in the process of urban-rural integration. The externality of digital information reduces the cost of face-to-face communication, which enables the two-way flow of urban and rural factors and promotes the formation of an organic whole in urban and rural societies. Third, the digital economy can improve the matching of factor markets between urban and rural areas and optimize the combination of factors to reduce the friction cost in the process of factor flow. The modern product market generates rich information resources from both breadth and depth, and information redundancy forms a complex socioeconomic system, bringing the frictional phenomenon of factor flow. The means of the digital economy such as the Internet, big data, and cloud computing platforms solve the factor matching the path of the market economy and optimize the factor allocation efficiency forming the synergy of the urban and rural markets. In addition, the digital economy has strong social interaction, which not only can play the spillover effect of social capital but also will further strengthen the flow between urban and rural factors, making the urban-rural relationship of the digital economy reflect the autonomy and creativity of two subjects.

3.2. Digital Economy to Promote Urban-Rural Integration Development Mechanism

The digital economy can significantly improve regional innovation capacity. The digital economy is a kind of innovation that is conducive to broadening the breadth of innovation and prompting enterprises to realize enterprise innovation in two ways: management innovation and technological innovation. By forming multiple positive feedback loops under the cross-regional industrial division of labor in the digital economy, more and more enterprises are trying to extend their industrial chains and get involved in a wide range of fields. The scope of innovation activities is widening, which is conducive to developing new technologies and creating new products and has a significant role in promoting regional innovation. The digital economy, based on the way of industrial organization change, is conducive to enriching Internet functions and optimizing resource allocation, which eventually effectively promotes the improvement of regional innovation capacity.

At the same time, the enhancement of regional innovation capacity also contributes to the development of urban-rural integration. Innovation can stimulate the original power of consumption, promote balanced regional and urban-rural integration development, and facilitate the rational allocation and efficient circulation of science and technology innovation resources in society (Li Yanzhong et al., 2021). With the gradual increase in innovation, high technologies such as "Internet +," artificial intelligence, 5G, big data, and cloud computing have been gradually integrated into all aspects of urban and rural development. The level and capacity of urban and rural governance have been gradually improved, enabling efficient and collaborative management of urban and rural areas to cope with problems in development and

promote various development factors. It can achieve efficient and collaborative management in urban and rural areas to cope with development problems, promote reasonable circulation of various development factors between urban and rural areas, improve the employment rate and employment level of rural residents, and realize shared development in urban and rural areas. The digital economy can promote the advanced structure of human capital. Based on the in-depth use of high technology, the digital economy can rapidly penetrate scientific information (Bloom et al., 2014), which is conducive to the vertical and horizontal expansion of the ability to use existing technological resources of enterprises. The Internet provides more convenience for people to obtain information and knowledge effectively, promotes the full exchange of knowledge in the regional innovation system, and relies on the Internet; people can quickly master new skills and accumulate new knowledge, thus accelerating the process of human capital accumulation and advanced nation between urban and rural areas.

At the same time, the advanced structure of human capital also contributes to the development of urban-rural integration. As an important factor of production, human capital is conducive to economic growth and optimization of industrial structure between urban and rural areas, especially in knowledge and technology-intensive industries. The renewal iteration of human capital facilitates the control of labor-related inputs, thus optimizing the allocation of labor resources. Thus, the advanced human capital structure enhances labor efficiency and marginal productivity for the same and higher output. Compared with primary human capital, advanced human capital is more capable of self-learning and scientific management, which can effectively reduce the risk brought by technological changes and enable the effective use of advanced equipment, thus improving labor efficiency. Based on the premise of free flow of factors, according to the classical distribution theory, factors tend to flow to the more efficient industries, i.e., improving the labor efficiency of inter-urban and rural industries will be conducive to the accumulation of more advanced human capital, thus contributing to urban and rural development.

4. Conclusion and Recommendations

The digital economy can promote urban-rural integration development, especially when the urbanization rate exceeds 50%. To this end, we should invest more in Internet infrastructure, expand the "Broadband China" pilot cities, promote the construction of Digital China, and actively develop the 5G industry, big data platforms, cloud computing, and artificial intelligence applications, to consolidate the development drivers brought by the digital economy. At the same time, central and western cities and peripheral cities should also promote urbanization development. In this paper, the population urbanization rate is used as a measure in the test process, and radical urbanization should be avoided in the process of urbanization rate promotion. The road of inclusive urbanization should be taken to give full play to the dividend advantages of digital economy for urban-rural integration development. From the perspective of digital economy development level, the cities in central and western China and peripheral cities are weaker compared with the eastern and central cities. In order to fully stimulate the dividends of digital economy to enhance the level of urban-rural integration development, digital economy development still needs to be further deepened, which reflects the dynamic development of the digital economy and differential digital economy strategy. Each region should benchmark its technology level and platform structure and put forward localized Corresponding development policies. The digital economy promotes the integrated development of urban and rural areas through regional innovation capabilities. Each region should vigorously improve its innovation capacity, form an integrated research system of industry, academia, and research, and shorten the time for innovative products to be put into the market, so that universities, research institutions, enterprises, and markets can dovetail and

stimulate innovation potential and improve innovation capacity under the construction of big data platform, which is conducive to giving full play to the advantages of digital economy to help urban-rural integration development. The digital economy enhances the development of urban-rural integration through the advanced human capital structure. To this end, upgrading regional human capital levels, establishing rural skills training platforms, encouraging rural education development, stimulating the return of high-quality talents, and realizing two-way human flow exchanges between urban and rural areas are conducive to bringing into full play the synergy and spillover of digital economy-driven urban-rural integration.

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