

Realization Path of Digitalization Promoting Collaborative Innovation Development between Urban and Rural Areas

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Abstract:

The 14th Five-Year Plan for National Economic and Social Development formulated by China calls for the development of a digital economy and the promotion of digital industrialization and industry digitalization. With the continuous recovery and rapid growth of industries in eastern, central and western China and the continuous improvement of regional collaborative development, urban-rural collaborative development has become a key factor for future industrial upgrading and high-quality development, and smart urban-rural integration has become a new development goal in the future. It is an important means and an effective way to realize the collaborative development of urban and rural areas to develop digital villages and new smart cities based on digitalization.

Keywords: Smart urban-rural integration, Path of collaborative development between urban and rural areas, Digital villages, New smart cities.

I. INTRODUCTION

Nowadays, the collaborative development of urban and rural integration in China has become an urgent need and necessity for regional collaborative development, showing the trend of regional differentiated collaborative development and open innovation. Driven by digitalization, the collaborative development of China's urban and rural integration has entered the stage of regional synergy exploration. A number of new heights with obvious local characteristics, such as the Bohai Rim Region, the Yangtze River Delta Region, Guangdong-Hong Kong-Macao Greater Bay Area, Sichuan and Chongqing Region with

differentiated collaborative development between urban and rural areas, are being formed to realize resource sharing and complementary advantages. However, there are still some problems that need to be solved urgently in the collaborative development of urban and rural areas, such as the significant difference in the integration level of urban and rural development among Beijing, Tianjin and Hebei that Hebei is significantly lower than that in the two cities. The collaborative development of economic development, industrial optimization, unified market construction and public goods supply will greatly promote the integration of urban and rural development in Beijing-Tianjin-Hebei region [1]. At the Fifth Plenary Session of the 19th CPC Central Committee, it was proposed that "we should strengthen the construction of digital society and digital government, and enhance the digital intelligence level of public services and social governance". China, in the context of historical node and global integration, has a new generation of information technology and digital to help the rapid development of the city. However, there is still an "urban-rural gap" in the digitalization of rural areas as compared with cities, such as difficulty in changing concepts, lack of basic elements and insufficient endogenous power. In recent years, China has clearly put forward the strategic goal of building a digital village, narrowing the gap between urban and rural areas, promoting the balanced development of urban and rural areas, and realizing the integration of urban and rural areas for many times in the great development of urban and rural areas. Based on this, it is of vital importance to study the realization path of digital promotion of urban and rural collaborative innovation development.

II. METHODOLOGY

2.1 Accelerating the Construction of Digital Villages in China

From Opinions of the *CPC Central Committee and the State Council on Doing a Good Job in the Areas of Agriculture, Countryside and Farmers to Ensure the Realization of a Well-off Society in an All-round Way* [2] to the promulgation of *Outline of Digital Rural Development Strategy* [3] and *Key Points of Digital Rural Development in 2020* [4], building digital villages has been identified as one of the important tasks of the rural revitalization strategy. Recently, the Office of the Central Cyberspace Affairs Commission, the Ministry of Agriculture and Rural Affairs, the National Development and Reform Commission, the Ministry of Industry and Information Technology, the Ministry of Science and Technology, the State Administration for Market Regulation and the Poverty Relief Office of the State Council have issued the Notice on the Implementation of the National Digital Village Pilot Work (hereinafter referred to as the Notice) [5] to fully deploy the national digital village pilot work.

2.2 The Development Status of Digital Villages in the World

At the beginning of September 2016, more than 340 rural stakeholders gathered in Cork, Ireland, and issued the *Cork Declaration 2.0* under the title of "Better Life in Rural Areas", which expounded the expectations and aspirations of rural areas, and proposed that among the priorities to be solved, special attention should be paid to overcoming the digital divide between rural and urban areas in policies and developing the potential brought by connectivity and digitalization in rural areas. The European Commission established the Smart Village Working Committee and formulated a medium-and long-term development strategy to use EU funds to encourage the Smart Villages' development, focusing on narrowing the digital divide between urban and rural areas through the innovative application of digital technology and knowledge, bringing benefits to residents and enterprises in rural areas, and mainly solving five problems: first, to improve the quality of life of residents in rural areas; second, to improve the living standards of rural residents; third, to provide high-quality public services for rural residents; fourth, to make better use of various resources to reduce the negative impact on the environment; and fifth, to provide new opportunities for rural value chains through model innovation. Through the case study of Chongzhou County, Sichuan Province, China, this paper analyzes how small-holding peasants in developing countries can access this digital agriculture and share the benefits brought by the transformation of digital agriculture, such as setting up cooperatives to own larger farms or indirectly participating in digital agriculture through agricultural outsourcing.

2.3 New Exploration of Urban-Rural Integration Development in China

With the rapid development of big data, 5G, AI and other new generation information technology, more and more industries and application scenarios have become more intelligent, and the current construction of smart cities has involved all aspects. As the new smart city complies with the development trend of the times, it is a strong support to accelerate the formation of a new development pattern with the domestic large-scale circulation as the main body and the domestic and international double circulation promoting each other. Cities are the key links in the national governance system and carry people's expectations for a better life. As China's political, economic, cultural, social and ecological civilizations enter a new era of collaborative development, the construction of new smart cities represented by the deep integration of urban governance and a new round of information technology has become an urgent need for the modernization of the national governance system and governance capabilities. In China, the emphasis on the five development concepts of "innovation, coordination, green, openness and sharing" has given new connotation to the urban development. By accelerating the construction of new-type cities, building smart cities, taking the new-type smart cities as a brand-new model for urban development, constructing a new

ecological circle of smart cities, expanding new space, optimizing new governance and reaching new life, the new pattern of sustainable economic and social development of the relationship between man and service, man and city, man and society, man and resource environment, and man and the future can be reconstructed. Besides, it is also a realistic consideration to consider creative cities as a city development strategy [6]. The new smart city is a new path to implement new development concepts in the new era, to comprehensively promote the deep integration of new generation of information technology and urban development, to lead and drive urban innovation and development, and to form a new form and model of urban development which is wise, efficient, energetic, precise and orderly, and where people live in harmony with nature [7]. Especially in the "the 14th Five-Year Plan" period, smart city construction has entered a new stage driven by big data and in-depth application of smart technology. In the future, in the construction of a new type of smart city, people should adhere to the people-centered thinking, improve the quality of digital infrastructure, stimulate the integration of innovative vitality, optimize the level of urban governance, promote collaborative regional development, strengthen the opening-up and cooperation with the outside world, so as to speed up the construction of smart cities in China [8].

2.4 New Exploration on the Integration of Urban and Rural Development in China

Urban and rural areas are urgently integrated and developed in China. On December 6, 2019, the "2019 Collaborative Innovation High-level Forum" jointly sponsored by China Development Institute (Shenzhen) and the International Cooperation Center of National Development and Reform Commission was held under the theme of "Urban-rural Integration Development: New Situation, New Exploration and New Practice" to better promote the reform of urban-rural integration development system and mechanism, which focused on building a new type of urban-rural relationship, promoting rural revitalization and agricultural and rural modernization, better promoting high-quality and harmonious development of China's economy and society, and better promoting the effective implementation of the reform of urban-rural integration development system and mechanism, and discussed the specific path to promote urban-rural integration development in depth from the aspects of basic public services, land system, population flow and rural characteristic industries. Moreover, with regard to the issue of "integration of basic public services and urban and rural infrastructure", the effective ways to solve the problems of unequal public services and large infrastructure gap between urban and rural areas were emphatically analyzed from the perspectives of distribution of public service resources in urban space, improvement of public service quality and innovation of supply methods, respectively, on how to better promote inclusive sharing of basic public services and enhance the integration level of urban and rural infrastructure. The main problems and solutions faced by the current rural land circulation and scale operation were discussed

focusing on the "land system reform under the background of urban-rural integration development". In the link of "new urbanization and orderly flow of population", some useful suggestions were put forward to effectively guide the orderly flow of urban and rural population from the aspects of perfecting the urbanization mechanism of agricultural transfer population, deepening the reform of household registration system, promoting rural innovation and entrepreneurship, and strengthening rural basic public services In view of the discussion topic of "the development of rural characteristic industries", views were shared on how to build a platform for collaborative development of urban and rural industries, improve the construction of agricultural product circulation system, and promote the transformation and upgrading of rural characteristic industries, so as to make suggestions for the diversified development of rural economy. The outcome of this Forum marks China's exploration of accelerating the development of urban-rural integration [9].

III. RESULTS AND DISCUSSION

3.1 Results

3.1.1 The absence of top-level design in smart urban and rural areas

Currently, China has entered a new stage of urban-rural economic and social integration development, in which the smart city construction with information technology as the core needs to respond to a series of specific requirements for urban-rural integration development, including expanding services, responding positively to the needs of urban and rural residents, and constructing social participation mechanisms. However, in practice, there are multidimensional dilemmas in the construction of smart cities based on the integration of urban and rural areas, such as the inherent differences between urban and rural environments, the deviation between government officials' performance orientation and public interests, the imperfection of relevant institutional norms, and the lack of coordination in the construction process, all of which limit the incentive and ability of smart cities to respond to urban-rural integration. Therefore, it is necessary to explore the development path of smart city based on urban-rural integration from the top-level design and planning of smart city, evaluation index system, multi-subject participation and institutional arrangement [10, 11]. At the national level, the lack of overall planning of smart regions has led to a large number of smart urban and rural areas with the same orientation and development direction across the country, lack of smart urban and rural characteristics and single function. At the local level, due to the lack of the concept of collaborative planning at the provincial and municipal levels, the integrated layout of smart urban and rural areas is large in number, scattered and small in scale, there is a lack of clear distinction between smart urban and rural collaborative development orientation,

development direction and development model, and new infrastructure in digital villages simply replicates smart cities and industrial digital applications. In terms of smart urban-rural collaborative development, investment promotion and talent introduction, the problem of low-level and even vicious competition within the region and with surrounding regions leads to the inability to rapidly promote the construction of smart society and guide the deep integration of urban and rural development [12, 13].

3.1.2 Weak new infrastructure in digital villages

Rural areas are one of the potential markets of digital economy in China, because rural digitalization contains huge business opportunities. It is necessary to establish a digital network and functional support system, analyze various laws through big data, and promote agriculture through science and technology. However, in reality, many rural areas still lack digital farms, intelligent, unmanned and data reuse, digital and Internet-of-Things farming, prior understanding of farms' immunity and epidemic situation, response monitoring and data analysis to minimize losses. In addition, many areas have failed to establish digital infrastructure in rural areas, so that smart agriculture, utilization and protection of natural resources, water conservancy projects, transportation, rural public services and social governance, rural inclusive financing, rural e-commerce and other fields can be fully digitalized. Nor can they connect urban and rural economies through the establishment of urban-rural digital economic integration, and accelerate the upgrading of rural modernization with the opportunity of digital transformation [14].

3.1.3 Imperfect standard system of digital village

As an important content of digital China, digital village requires a set of standards system. How to empower rural revitalization? As the agricultural industry is the foundation of rural development, the construction of digital villages in many areas begins with the digitalization of agriculture. However, the construction of digital villages cannot be separated from the construction of standardized management systems of digital villages, and needs to be supported by big data. For example, by integrating the internet, internet of things, big data, artificial intelligence and RFID technology into the systematic engineering of rural construction through professional technology, it can bridge the digital divide between urban and rural areas, improve the level of rural governance and promote the modernization of agricultural villages.

3.1.4 Urban-rural digital divide and technical barriers

Flexible urban and rural grassroots intelligent governance system and mechanism should be established to build a governance framework for the integration of urban and rural grassroots. The radiating and driving role of the central city, the undertaking and bearing role of the county economy and the strategic base role of the new rural community should be brought into play to promote the collaborative development of urban and rural industrial agglomeration, industrial transfer and balanced allocation of public resources.

3.1.5 Lack of innovative resources for urban-rural regional coordination

Urban-rural collaborative development has a long process of innovation. In the view of the whole process of urban-rural collaborative development and innovation, first, the supply of innovative resources in urban and rural areas is insufficient, the resources of various service agencies in urban and rural areas are not effectively collaborative, and the connection of innovative elements is insufficient, which affect the performance level of innovative resources; second, the research resources in urban and rural areas are insufficient, which will become more prominent with the innovation and development of urban and rural areas.

3.1.6 Lack of regional cooperation in talent exchange

With the continuous development and in-depth development of industrial synergy, the demand for high-end and mid-end talents in each link is increasing. However, due to the lack of regional synergy and integration of talents, there is no institutional mechanism for regional competent departments to coordinate and coordinate, and the level of regional talents communication, cooperation and exchange is not high, which makes the talent competition between urban and rural areas increasingly intensified.

3.2 Discussion

Digitalization should be applied to build a new ecological synergy between urban and rural areas.

3.2.1 Establishing a monitoring and assistance mechanism to prevent returning to poverty

However, due to the insufficient use of common informatization means, the efficiency of manually collecting the information on poverty alleviation is relatively low. The poverty alleviation population monitoring and assistance center, which is composed of multiple departments including the National Rural Revitalization Bureau and the Ministry of Agriculture and Rural Affairs, should be set up, a poverty alleviation risk assistance system should be

established, and a cross-domain, cross-sectoral and cross-platform national poverty alleviation risk monitoring and early warning system should be built relying on the national poverty alleviation information network system to strengthen the monitoring of the poverty returning population caused by disasters, epidemics, illness and disability, to carry out early warning and pre-judgement, follow-up assistance, and implement dynamic management.

3.2.2 Strengthening the collaborative construction of new urban and rural infrastructure

In view of the "bringism" existing in the new infrastructure of digital villages at present, the problems of digital application in smart cities and industries should be simply copied. The development of information terminals, technical products and mobile internet application software adapted to the characteristics of "agriculture, rural areas and farmers" should be encouraged. The construction of space-based facilities such as rural remote sensing satellites should be accelerated, and the application of the Beidou system and the HR earth observation system to agricultural production should be vigorously promoted. Smart water conservancy, smart transportation, smart grid, smart logistics urban and rural integration construction should be promoted [15].

3.2.3 Coordinating the development planning of smart cities and digital villages

In view of the problems existing in the current development of smart urban-rural integration, such as the lack of top-level design of smart urban and rural areas, weak new infrastructure of digital villages, imperfect standard system, and high risk of poverty-stricken people returning to poverty, it is suggested that starting from the top-level design of smart society, the development planning of smart cities and digital villages should be coordinated, the implementation plan of smart urban-rural integration should be formulated according to local conditions, and the governance framework of urban-rural grassroots integration should be constructed.

3.2.4 Breaking the digital divide between urban and rural areas and technical barriers

A set of digital rural system standards should be established. The village revitalization service team dispatched by Dongying city to the Beisong Town proposed that the construction of digital Beisong Town should be used for reference. Through a series of work such as preliminary investigation, scheme formulation, project construction, promotion and application, and after nearly a year of exploration and practice, version 1.0 of the standard system for the construction of digital villages (the "digital Beisong Town" sample) was formed. The establishment of this system can provide an effective sample and reference for the national

digital rural construction, and promote the orderly and healthy development of the national digital rural construction [16]. In China, the construction of digital villages should adhere to the methodology of combining top-level design, pilot exploration and grass-roots innovation, pay attention to the multi-level pilot, the two-way feedback between top-level design and pilot exploration, strengthen the theoretical summary and experience identification of pilot practice, and gradually explore the formation of a unified framework and standard system at the national level [17]. The flexible intelligent governance system and mechanism of urban and rural grass-roots should be established, and the governance framework of urban and rural grass-roots integration should be constructed, so as to play the role of central city, county economy and new rural community as strategic basis, promote the coordinated development of urban and rural industrial agglomeration, industrial transfer and balanced allocation of public resources, and solve the sustainable development of cities. Rural digitalization is a systematic project, involving a wide range of areas, which can be achieved through establishing mutual relations between enterprises and trade associations in developed areas and remote mountainous areas, conducting exchanges, training and exchanging advanced ideas, methods, funds and technologies so that external enterprises can find opportunities to develop rural businesses, provide various services, technical support and solutions for rural development and establish a flexible urban-rural grassroots intelligent governance system and mechanism to achieve a win-win situation [18].

IV. CONCLUSION

Digitalization, as an important means to promote the innovation of urban-rural integration development model and an effective way to realize the synergy between urban and rural areas, can promote the coordinated development of urban-rural integration, and transform the traditional urban-rural relationship in all directions, from all angles and in the whole chain by using modern information technology. Moreover, digitalization is conducive to promoting the large-scale coordinated development of urban-rural integration, improving the governance level of urban-rural integration and building a new urban-rural integration relationship system. The essence of the coordinated development of urban and rural areas is to deal with the competition of resource allocation efficiency, because only by correctly identifying its own distinctive positioning, strengthening the integration of resources between urban and rural areas, and continuously improving the efficiency of the mechanism and the ability of talent exchange, can it seize the development opportunity in the regional coordination of urban and rural areas. With the deep integration of information technology and coordinated development of urban and rural areas, the digital revolution will create unlimited opportunities for coordinated development of urban and rural areas, and will also give birth to unlimited innovation.

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