

# Key Issues of the Digital Economy in China: Concept, Measurement, Opportunities and Challenges

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## ABSTRACT

China's rapid economic transformation has given rise to the digital economy as a new engine for national development and industrial upgrading, enabling the country to navigate global economic complexity and uncertainty. This essay explores the concept of the digital economy, its development history, opportunities, challenges, and the value orientation of relevant policies in China. The study proposes a development strategy that focuses on constructing new infrastructure, improving digital governance capabilities, and promoting the sustainable development of the ecological environment to foster the digital economy and stimulate domestic demand. Additionally, it suggests measures to address issues of network security, data privacy, legal regulations, and the digital divide in China.

**Keywords:** Key issues, Digital economy, Concept, Measurement, Challenges, Solutions.

## 1. INTRODUCTION

Since 2010, the global economy has undergone a shift from industry-based to digital economies. China has experienced significant economic transformation, with the digital economy emerging as a new driver for industrial upgrading and growth. In March 2021, China's Fourteenth Five-Year Plan identified the development of the digital economy as a top priority and a crucial direction for the country's future economic growth[1]. By October 2022, the 20th National Congress of China proposed a task of "accelerating the development of the digital economy, stimulating the deep integration of the digital and real economies, and creating a globally competitive digital industry group." Amidst global economic downturns and the impact of the Covid-19 pandemic, the digital economy has become a vital path for Chinese economic development, navigating volatility and fostering potential growth.

## 2. DEFINITION OF DIGITAL ECONOMY

The idea of digital economy was first introduced in the 1990s by Don Tapscott in his book *Digital Economy*. However, he didn't provide

a definitive explanation. Since 2000, the digital economy has been a research focus in many countries. Official definition of digital economy came from the *G20 Digital Economy Development and Cooperation Initiative* in 2016, in which it stated that "Digital economy refers to a series of economic activities including facilitating digitized knowledge and information as the key production factor, utilizing modern information network as important carrier, and using effective usage of information communication technology as effectiveness promotion and vital impetus of economic structure optimization.[2]" In 2018, Bureau of Economic Analysis(BEA) defined digital economy as the economic activity based on internet and relevant communication technology[3]. In 2022, China issued the *Digital Economy Development Plan of The Fourteenth Five-Year Plan*, stating "Digital economy is the major economic form after agriculture economy and industry economy, which regards data resource as the key factor, modern information network as the major carrier, and integrated application of information communication technology, full-element digitization transformation as the vital impetus, to promote the forming of a new economic form with equity and effectiveness more uniformed[4]."

### 3. MEASUREMENT OF DIGITAL ECONOMY

"Figure 1" refers to the percentage of American digital economy in GDP in the past few years according to two authoritative institutions of China and USA. From the statistics, one can see that their definitions of digital economy differ, leading to great differences in its statistic measurement to its scale and its contribution to GDP. According to China Academy of Information and Communication's calculation, in 2021, the total

amount of Chinese digital economy accounted for 39.80% of Chinese GDP(6.71 trillion dollars), while the total amount of American digital economy made up 65.60% of its GDP(15.3 trillion dollars)[5]. In sharp contrast, according to calculation of Bureau of Economic Analysis, the total economic amount of American digital economy only took 10.3% of its GDP(3.7 trillion dollars)[6].

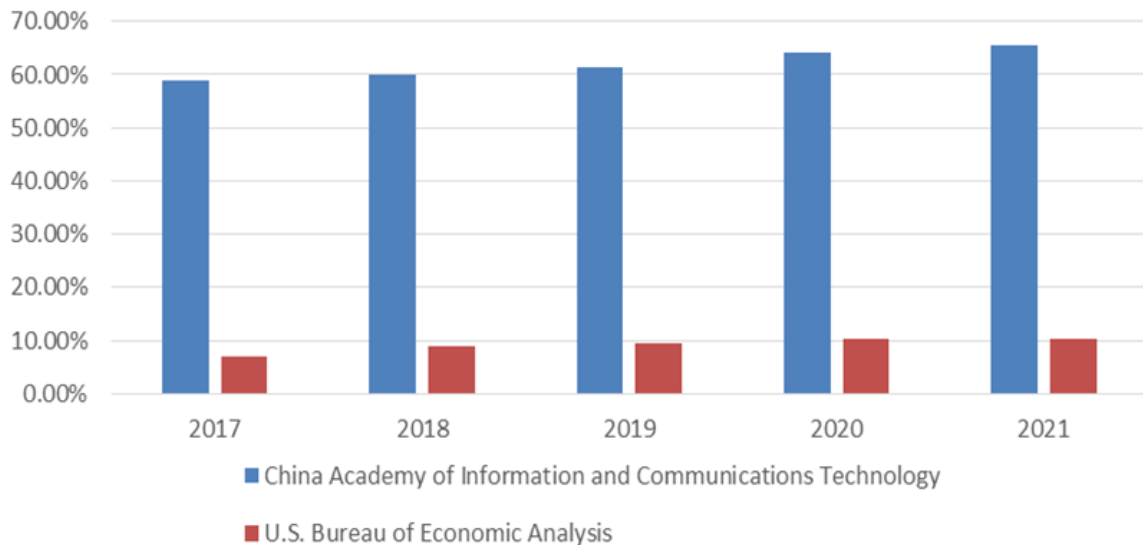


Figure 1 The total digital economy 2017 to 2021 as a percentage of the GDP of the United States. Source: China Academy of Information and Communications, Bureau of Economic Analysis of the United States Department of Commerce.

The reason for this huge difference is that China and America have adopted different definitions and measurement of digital economy. American BEA defines digital economy in a narrow sense, focusing on information communication industry. It considers that basic digital economy is the core of digital economy, while integrated digital economy should be regarded as industry overflow effect; In contrast, China Academy of Information and Communication adopts a wider sense of digital economy definition, including two major aspects of digital industrialization and industry digitization, as well as penetration and integration overflow effect to traditional industries. As a result, the basic digital economy and the integrated digital economy are combined for statistics in China [7].

Thus, having compared the two definitions of digital economy from Chinese and American institutions, the author of this paper tends to adopt BEA's definition of digital economy that "Digital economy is a newly emerged economic form after

agriculture economy, industry economy and service economy, in which network communication technology and data function as its core production factor. Digital economy consists of ICT industry, digital media, and internet platform; Development of digital economy will have integration overflow effect on other industries." Its statistic range includes the following four sectors: infrastructure (software and hardware), e-commerce (business-to-business and business-to-consumer), priced digital services (cloud services; telecommunications services), and internet and data services[8].

### 4. A BRIEF HISTORY OF DEVELOPMENT OF DIGITAL ECONOMY IN CHINA

Since the idea of digital economy was first proposed in China in early 1990s, digital economy has experienced two major stages of development over the last three decades.

#### **4.1 Exploration Stage (1990 to 2015)**

In early 1990s, concepts of "digital world" and "digital China" emerged in China as the primitive form of digital economy's development. Developing mobile communication industry became the main theme at that time, when China was making great efforts in constructing informatization infrastructure. After that, relevant digital construction achieved preliminary results, and information communication technology had stable improvement. Early in 21<sup>st</sup> century, China began to conduct experimental works of "digital economy" in pilot provinces and cities, and proposed an economic plan of "Digital Fujian" and "Digital Zhejiang" respectively in 2000 and 2003, whose core idea was to strive for integration of three industries and digital industry, and achieve transformation and upgrade of industry structure through development of digital technology. Then, "Digital Fujian" had successfully sought out a path of digital economy development, and became the exemplary project in regional informatization development, thus providing precious experience to Chinese digitization construction in many fields [9]. As the basic information facility system has been gradually completed, developing internet and informatization became the next emphasis of digital industry of China. China thus issued *Guidelines of the State Council on Actively Promoting the "Internet" Development* in 2015, stressed that internet innovation should not be isolated from economic and social development, and made it clear that the renovation and efficiency of industries in China require the integrated mutual stimulation between digital economy and entity economy.

#### **4.2 Comprehensive Development (2016-Today)**

After the initial development and exploration, an era of rapid development of digital economy has come in China. In the *G20 Digital Economy Development and Cooperation Initiative* of 2016(referred to *Initiative* hereinafter), digital economy had a new, more complete and specific definition. The *Initiative* explains that digital economy has become an economic activity with fastest development and widest scope, as well as an important agent for global economic recovery and growth[10]. Apart from this, the State Council of China issued the *National Strategic Emerging Industry Development Plan for the 13th Five-Year Plan* at the end of 2016, put forward internet power strategy which aims to accelerate building "digital

China", and added digital creative industry as the supplementary route of digitization development. In 2017, Premier Li Keqiang first proposed "digital economy" in the *Government Work Report* (referred to *Report* hereinafter). After that, the *Report* has continued to emphasize the necessity and importance of accelerating digital economy development every year without exception. "Figure 2" shows the increase rate of GDP and digital economy from 2016 to 2021. It is obvious that the increase rate of digital economy is much higher than that of GDP every year; Since the Covid-19 epidemic outbreak in 2020, development of digital economy has been accelerating. Compared with entity economy, digital economy can enabled the social economy to function properly across time and space, and become the important momentum for the recovery of national economy. However, along with its rapid development, digital economy also faces new challenges. Therefore, in the *"Fourteenth Five-Year Plan" Digital Economy Development Arrangement* issued at the end of 2021, China transformed the emphasis of digital economy development to building a coordinated and united governance framework along with its adaptive legal system, in order to form a regulated and guaranteed digital economy development.

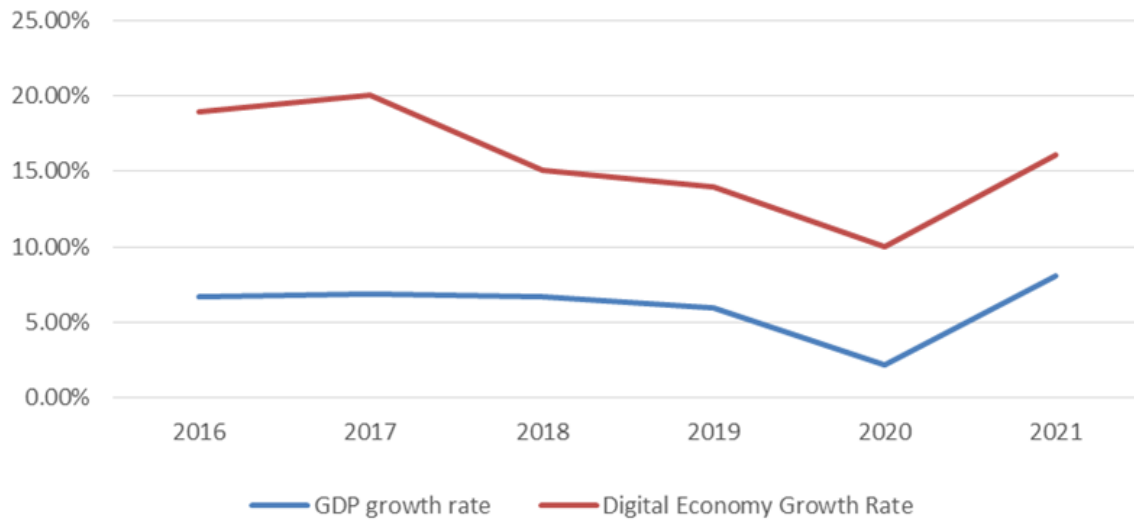


Figure 2 China's GDP and digital economy growth rate from 2016 to 2021. Source: National Bureau of Statistics, China Academy of Information and Communications.

To conclude, the development of digital economy in China is the natural outcome by the combined effect of international and domestic environment. In the international society, developed countries have an early start and thus enjoy faster development in digital economy. On the other hand, the lag in industrial age and post-industrial age has inspired China to tap its potentials in information era. To follow the trend of economic globalization, China has dedicated great efforts to developing internet and informatization technology, and decrease search costs and international trade risks incurred by information differences. In China, against the backdrop of limited development of traditional production factors, developing digital economy has become the *New Normal* of Chinese economic development. Digital economy has become the strong and new power to drive domestic demand, and improve supply chain productivity. As a result, identifying the top-level design of digital economy as the necessity of modernization development of China will enormously expedite the process of building a moderately prosperous society in an all-round way and achieving the great goal of common prosperity; in the meantime, the new stage of economic development requires China to achieve digitization transformation, positively explore new digital technology like AI, cloud computing and privacy computing.

## 5. OPPORTUNITIES AND KEY DRIVERS OF DIGITAL ECONOMY

Developing digital economy is the important measure to facilitate key factors of production, distribution, circulation and consumption, etc. Currently, as China faces complicated external environment, lack of domestic demand and insufficient economic growth momentum, China must accelerate the construction of a new development pattern that focuses on the domestic macro cycle and enhances the mutual promotion of domestic and international dual cycles, in which digital economy can become the key driver. Digital technology can promote integration of upstream and downstream enterprises on the industry chain, facilitate the transfer and high-quality integration of production factors and resources, reconstruct market model, and break through geological space constraints, thus smoothing the economic cycle at home and abroad. On the other hand, the digital economy can help stimulate domestic demand and improve the enthusiasm of social consumption. This is mainly reflected in the supply side: digital economy assists enterprises in conducting personalized production and customization, so as to cater to consumers' demand, improve product quality, and to create a mutual balance between supply and demand; The emerging new industries such as the live streaming economy, online office, and Internet medical care have fostered new consumer habits and living habits. The production and living needs through the Internet are gradually

increasing, while the huge development potential of the digital economy will be further unleashed. Based on the inevitable trend of Chinese digital economy, the following three key development priorities can be summarized: building new infrastructure, improving the government's digital governance capabilities, and achieving sustainable ecological and environmental development.

Government needs to attach greater importance to digital new infrastructure, puts it on a strategic height, and recognizes the urgency and necessity of building the new infrastructure in China. Therefore, compensating for the shortcomings of new economic development must be accelerated. The new infrastructure mainly covers three major directions. The first one is the information infrastructure evolving from the new generation of information technology, such as communication networks, new technologies, and computing power, etc. The second is the integrated infrastructure, mainly formed by supporting the transformation and upgrading of traditional infrastructure. The third is innovative infrastructure that conducive to technological development, and product research and manufacturing, such as science and education bases, industrial and technological innovation infrastructure, etc.

Compared to traditional infrastructure construction, the new infrastructure construction is a new concept that conforms to the development of the times. Relying on new digital technology, it can provide strategic significance for economic development. With innovation at its core, it stimulates effective national and private investment, improve the development quality of various industries, so as to release economic vitality. Specifically, 5G base stations, cloud computing, artificial intelligence, and the Internet of Things (IoT) contribute to the formation of an intelligent world that is interconnected throughout society. In this intelligent world, data, as a new factor of production, together with innovative digital technology, can strongly promote the upgrading and optimization of traditional agriculture, industry, and service industries. It will become the top priority in the development of the digital economy to use innovative digital technology to improve the level of intelligence and efficiency of convenient services in key areas of the social economy, and to grasp the two cores of "connectivity" and "computing" in the new infrastructure. Besides, while data provides strong momentum to development, it also brings challenges to digital economy.

During the process of building a new digital platform, data fusion, sharing and security issues require further regulations. Accessory measures of digital economy development should be completed with great efforts, so as to ensure that new infrastructure stay on its right and straight direction, and lay a solid foundation for high-quality development of digital infrastructure.

Due to the appearance of Covid-19 epidemic, our society has experienced massive changes. However, digital economy has demonstrated its great power during this period, facilitating the trend of emerging new industries, business types and new patterns based on digital technology, making digital economy the major driver to boost high quality development of economy. Digital governance has become the important guarantee to maintain the healthy development of digital economy[11]. China stated in the *Guidelines of the State Council on Strengthening the Construction of Digital Government* that in current situation, China needs to positively explore and establish governance methods that are compatible with the sustainable and healthy development of digital economy, formulate more flexible and effective policies and measures, innovate new models of digital governance transformation, and improve governance efficiency [12]. At the same time, China also needs to enhance government informatization construction, strengthen the government's digital governance and service capacity construction, build a collaborative and efficient digital government, optimize the "Internet plus government" service, promote the construction of an integrated online government service platform, create a new model of "one network for all" government service, and enhance the government's digital governance capacity. Furthermore, China also needs to accelerate the integration of information systems and data resources, better use digital means to perceive social situations and assist scientific decision-making, and improve the accuracy, coordination, and effectiveness of governance [13].

The construction of ecological civilization is the sturdy basis of ensuring high quality development and sustainable development of the society. In constructing modernization, ecology, economic development and social wellbeing need to be coordinated for a win-win situation. Amid the new round of technological revolution and industrial transformation, digital, internet and intelligent technologies energizes ecology environment protection, while resource utilization efficiency,

and ecological stability can be significantly promoted with new digital technology, so as to contribute to the realization of the green, low-carbon and sustainable development that China pursues.

## 6. RISKS AND CHALLENGES FACED BY THE DEVELOPMENT OF THE DIGITAL ECONOMY

The rapid development of digital economy also faces numerous risks and challenges, which be summarized as the following three key issues, namely, internet security and data privacy, relevant laws and regulations to needed improved, and emerging domestic "Digital divide".

### 6.1 Internet Security and Data Privacy

While digitization brings huge convenience to social development, it also incurs some problems. In enterprise operation and management, massive confidential data and citizen privacy data are stored

in cloud servers. Although cloud servers have a larger capacity and are more convenient than traditional servers, at the same time, they may suffer from hacker attacks. Thus, the risk of leakage and illegal use of confidential information and user privacy will increase significantly. [14] The occurrence of data leakage will not only impair customer rights, but also cause negative impact on digital economy development. Enterprises rely more on the network than ever in the operation and management, while local governments depend heavily on digital governance. Therefore, network security issues cannot be underestimated. According to the National Computer Network Emergency Response Coordination Center(CNCERT) statistics, leakage existed in national key industry management system, such as coal, oil and electricity industry, as shown in "Figure 3". It can be seen that in practice, many industries still lack complete construction and effective maintenance of their network security systems.

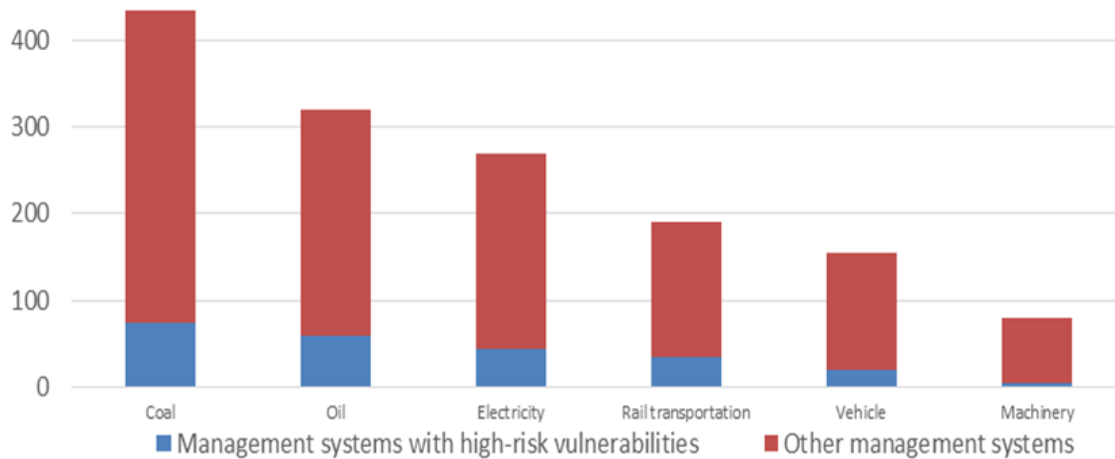


Figure 3 Main industries with cyber security vulnerabilities. Source: National Computer Network Emergency Response Coordination Center.

To improve internet security standard and enhance data privacy protection, the author identifies the following three aspects as key priorities. First, a complete network security protection system should cover network equipment, network architecture, network applications, and other aspects to prevent the occurrence of security incidents such as network attacks and hacking. Governments and enterprises should invest more resources to strengthen the construction and improvement of network security protection systems. Secondly, research on data privacy protection needs to be strengthened, including the research and development of technologies such as

data encryption, data authorization, and identity authentication, so as to improve the technical level of data privacy protection. Thirdly, response capability to data leakage incidents needs to be enhanced. After the incident happens, corresponding measures should be taken to prevent its exacerbation. Under guidance of "active prevention, timely discovery, rapid response, and ensured recovery", a protective wall of internet security will be built[15].

## 6.2 Supportive Laws and Regulations

Currently, Chinese laws and regulations in digital economy are still incomplete, which impedes the development of digital economy to a large extent. For example, the use of digital technology is prone to abuse, monopolistic behavior, violations of consumer fair dealing, discrimination against consumers, and other behaviors, which pose a challenge to laws such as the Anti-unfair Competition Law, the Anti-monopoly Law, and the Consumer Rights Protection Law[16]. Due to rapid iteration of digital technologies during the development of digital economy, laws and regulations in some emerging fields fall behind the trend, and regulatory difficulties are relatively high.

There is still a long way to go in strengthening the construction of legal provisions on network security and improving data privacy. It is particularly necessary to clarify the rights and responsibilities of all parties, provide clear legal protection for the development of the digital economy, establish a sound macro system in terms of network security, and provide a stable environment for the development of the digital economy. Meanwhile, laws and regulations in data privacy protection should be completed, thus clearly regulating data collection, storage, utilization and transmissions with a sound legal

framework. Secondly, a complete response mechanism for data leakage incidents needs to be established, and strict legal penalties should be imposed enterprises and individuals responsible for data leakage. Furthermore, supervision on monopoly needs to be strengthened to prevent digital monopoly. [17]

## 6.3 Digital Divide

Digital divide is not only a global phenomenon, but also an issue of imbalanced popularization and application of internal digital technology within a country[18]. It is also true in the case of China: while China's digital economy is developing rapidly, severe digital divide exists among different regions in China. "Figure 4" shows the growth value of digital industrialization in some provinces and cities of China in 2020. It's obvious that there is a significant gap in the development level of the digital economy among various provinces and cities. Due to unequal distribution of digital resources, and complex factors such as significant differences in the acceptance of new digital technologies at various age and in different regions, digital technology has shown a highly uneven development trend in the popularization and application, which makes it impossible for residents to enjoy the digital dividend equally[19]. If this situation continues to worsen, new social inequality may occur.

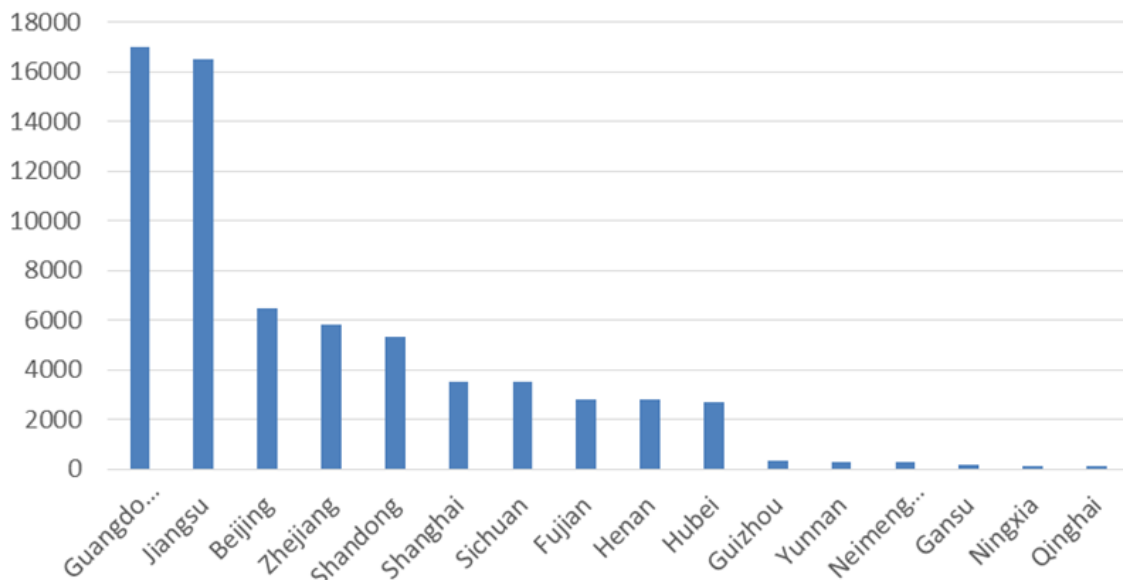


Figure 4 Growth value of digital industrialization in some provinces and cities in China in 2020 (Unit: 100 million yuan). Source: China Academy of Information and Communication.

Based on the initial development of digital economy, in January 2022, the State Council of China issued the "14<sup>th</sup> Five-Year Plan for Development of the Digital Economy", emphasizing that digitized public service should be more inclusive and equal to promote integrated development of urban and rural areas, and further narrow the digital divide. With persistent implementation of the project of "channel more computing resources from the eastern areas to the less developed western regions", the digital resources will be distributed in a fairer manner between the eastern China and the western China, and the gap in economic development will also be bridged, which are helpful for promoting a more balanced and inclusive development of China's digital economy.

To summarize, with risks and challenges posed by digital economy, we have to adopt effective counter-measures to ensure the healthy and stable development of the digital economy, and to promote high-quality benefits for the general public in the field of the digital economy. Government, enterprises and individuals should undertake their responsibilities and enhance cooperation to strive for the integration of digital economy and sustainable development in the future.

## **7. VALUE DIRECTION OF DIGITAL ECONOMY POLICY**

Over the last two decades, the digital economy in China has made tremendous achievements. Among various contributors, the most important one is the combination of "facilitating government" and "effective market". While the government enables and facilitates the development of digital economy with massive construction of infrastructure, the efficient market allocates a large number of resources, especially funds, to the emerging digital economy industry[20]. The digital economy is also conducive to improving income distribution, as it creates 200 million part-time jobs with low barriers and flexible working hours. Thus, more unemployed people have found working opportunities, and can take multiple jobs.

In 2020, several administrative departments jointly issued Opinions on Supporting the Healthy Development of New Business Forms and Models, Activating the Consumer Market and Promoting Employment Expansion, proposing to accelerate the development of industrial digital transformation, promote the continuous increase of new driving forces in the real economy, and achieve

development goal of common prosperity through the improvement and development of the digital industry. Digital technology has the potentials to boost coordinated and shared development. In promoting the coordinated development, digital economy breaks the constraints of geography to nurture a coordinated development across different regions. For example, e-commerce development in rural areas has reduced the information asymmetry between the supply and demand, thus helping the rural revitalization and the coordinated development between the urban and rural areas. In promoting the shared development, digital technologies connect online and offline industries, and continue to help traditional industries, and small and medium-sized enterprises to keep up with the pace of economic development. Therefore, it is crucial to ensure the inclusiveness and accessibility of the digital economy, so as to narrow, rather than expand, the wealth gap between the urban and the rural areas in China. "Figure 5" depicts the number and distribution density of 5G base stations in China over the past two years. It's obvious that their number and density show a stable growth trend every quarter; By the end of 2021, a total of 1.425 million 5G base stations had been built, accounting for more than 60% of the global total. The number of users reached 355 million, and the broadband rate for administrative villages reached 100% [21]. Relying on the development of these digital infrastructure, we can accelerate the narrowing of the gap between urban and rural areas and industries. By further promoting the strategic layout of the project of channeling more computing resources from the eastern areas to the less developed western regions, China can accelerate the construction of an information artery for high-quality economic and social development through 5G networks in the future.



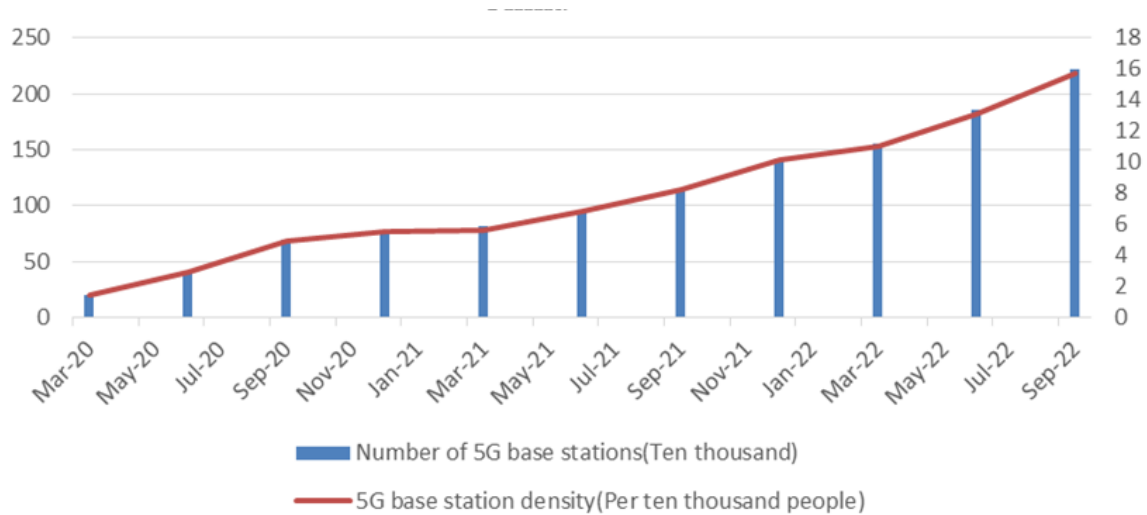


Figure 5 Number and density of 5G base stations in China. Source: China Academy of Information and Communication.

## 8. CONCLUSION

According to analysis above, the following main conclusions can be drawn. First, due to the different definitions of the digital economy by different countries and institutions, there are also significant differences in the estimation of the scale of the digital economy. As the measurement of the digital economy remains an important reference for its development, it is necessary to find a relatively unified and strict measuring method. Second, government needs to attach great importance to new digital infrastructure, and recognize that building new infrastructure has important historical opportunities. In the meantime, it also needs to improve digital governance capabilities, strengthen data security and privacy protection, optimize the digital governance system, and establish rules and standards for the digital economy. Besides, as the sustainable development of ecological environment is the important basis of digital economy development, it's necessary to strengthen ecological protection and resource recycling, and to promote benign interactions between digital economy and ecology. Third, the digital economy in China faces such major challenges as internet security and data privacy, imperfect laws and regulations, digital divide, etc. To cope with those challenges, China needs to establish a sound regulatory system for the digital economy and improve its sustainability. Meanwhile, it is necessary to strengthen digital education and popularization, bridge the digital divide, and strive for better inclusivity of digital economy. Fourthly, China has long attached great importance to the development of the digital

economy, introduced a series of policies and measures, and provided crucial support for the development of the digital economy over the past two decades. In the future, China still needs to further deepen policy support for the digital economy, and provide a better policy environment and support system for the development of the digital economy.

In summary, the digital economy has become a new engine and driving force for China's economic development, and it thus becomes necessary to measure and evaluate more carefully and rigorously the scare, policy and legal regulations of digital economy. As China is now pursuing the new development paradigm with domestic circulation being the mainstay and the two circulations reinforcing each other, China thus prioritizes the construction of new infrastructure, digital governance capability and a sustainable ecology. It is thus fundamental for China to solve various challenges faced by the digital economy and make it truly a pivotal support for high-quality development of China's economy in the decades to come.

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