

Ways of the Integration of the Digital Economy with the Real Economy: Evidence from China

Zhenli Tian^{1,2}, Lianjin Tian^{3,*}

¹*JSNU SPBPU Institute of Engineering-Sino-Russian Institute, Jiangsu Normal University, Nanjin, Jiangsu, China*

²*Department of Economics, Plekhanov Russian University of Economics, Moscow, Russia*

³*Institute of Higher Education, Yibin University, Yibin, Sichuan, China*

**Corresponding Author.*

Abstract: The purpose of this study is to explore the integration of the digital economy and the real economy to drive the development of internationally competitive digital industrial clusters. By analyzing literature data and investigating the development of various industries and industrial economies, we categorized the types of the real economy based on the economic function dimension. This study comprehensively analyzed the digital economy and real economy, with a focus on their intersection. Our findings indicate that the integration of these two economies can be categorized based on their economic function, providing a comprehensive understanding of the various forms and their application range, reflecting the fundamental aspect of economic realization. The characteristics of the digital economy and real economy not only capture the overall traits of various forms but also highlight their unique features. The proposed paths for integrating the digital economy and real economy, designed with a systematic thinking approach, are practical and effective. These integrated forms encompass the key types of future economic development and represent the commanding heights of future economic competition. Developing the integration of the digital economy and real economy based on their morphological characteristics and corresponding paths is crucial for achieving high-quality economic development.

Keywords: Digital Economy; Real Economy; Forms; High-quality Economic Development; Realization Paths

1. Introduction

With the continuous development and

improvement of science, technology, and the information network, the digital economy has transformed the previous economic model and emerged as a new driver of economic growth. The digital economy, which is centered around emerging technologies such as artificial intelligence, big data, and 5G communications, provides a robust catalyst for economic development. The real economy, serving as the foundation and support for economic growth, plays a crucial role in the prosperity of a country or region. Given the inseparable nature of the digital economy and the real economy, their integration is an inevitable trend with significant strategic implications. Therefore, exploring the integration of the digital economy and the real economy to achieve high-quality economic development holds immense importance.

The integration of the digital economy and the real economy is influenced by the characteristics of the digital economy. This integration has become unavoidable. To understand the main forms resulting from this integration, it is important to have a clear understanding of both the digital economy and the real economy. By doing so, we can explore the primary ways in which the digital economy and the real economy integrate and analyze the corresponding paths to achieve this integration.

The concept of digital economy has emerged alongside the advancement of information technology. Currently, there is still a range of perspectives within the academic community regarding the definition of digital economy. The term 'digital economy' was first introduced by Don Tapscott [1], a renowned American economist. Tapscott identified the key characteristics of the digital economy as molecular drive, virtualization, and digitalization. Building on Tapscott's work, Hao Ting [2] emphasized additional features of the digital

economy, including its speed, high permeability, increasing marginal benefit, external economy, and sustainability. These perspectives provide valuable insights into the distinct features of the digital economy. According to Japanese scholar Kim [3], the digital economy can be defined as an economic activity involving commodity trading through information technology, which can be seen as the perspective of information trading. Carlsson [4] identified three essential elements of the digital economy: e-commerce infrastructure, e-commerce activities, and e-commerce itself. Additionally, Singh highlighted the importance of information and knowledge, which form the element view of the digital economy. Elmasry [5] emphasized that the digital economy represents a behavioral approach to achieving economic development. Xueling Zhang and Yuexia Jiao [6] argued that the digital economy is a form of economy that transforms various industries through the use of information transmission tools, with the goal of optimizing resource allocation and information transmission. Changhong Pei et al. proposed that the digital economy is a new economic form that promotes sustainable development, with its foundation based on data information and transmission technology. Chenghao Li and Baoping Ren [7] also recognized the potential of the digital economy in enhancing resource allocation and information transmission. However, they emphasize the importance of addressing challenges related to technological innovation, industrial integration, and talent shortage. Their perspective aligns with the resource view of the digital economy. Overall, the connotation research of the digital economy encompasses various viewpoints such as the feature view, information transaction view, element view, purpose view, new economic view, and resource view. In conclusion, the digital economy can be defined as an economic behavior that utilizes data information, optimizes resource allocation, improves productivity, reduces costs, and facilitates economic transactions through currency and commodity circulation.

The study of the real economy by economists is a topic that has been explored for a long time, but there is still no universally agreed-upon definition. Early western economists considered it to be a theoretical economic system that corresponds to the virtual economy. Keynes [8] defined the real economy as the existence of

goods and services, while Drucker defined it as economic activities that involve the sale of products and services and the circulation of currency. Following the subprime mortgage crisis in the United States, the Federal Reserve concluded that real estate had financial properties, which led to a false economic boom and ultimately caused the financial crisis. As a result, the financial industry and real estate were excluded from the real economy. In the 21st century, Chinese scholars have defined the real economy as the economic activity involving actual material production and physical exchange. However, there are different dimensions to this definition. According to Qin Xiao [9], the real economy consists of human production, service, circulation, and consumption activities. These activities form the foundation of economic development. Therefore, the research scope of the real economy encompasses the economic activities that occur in each stage of the production and circulation of material goods. The real economy includes material production activities, which combine both the production of goods and the creation of value. The output of the study conducted by Xiaoxin Liu and Heng Tian [10] on the model of 'virtual economy-real economy' confirms that the virtual economy serves the real economy and has the ability to perform functions such as resource allocation and risk management. Therefore, economic activities primarily involve the production, sale, and consumption of both material and spiritual products, with physical form being the main focus [11]. Zhibiao Liu [12] differentiates between virtual economy and real economy based on the media attribute of capital circulation. According to Liu, the real economy occurs when the natural attribute of goods and services, i.e., their use value, is used as the transaction medium for currency appreciation. Furthermore, other scholars have proposed alternative classifications of the real economy. For instance, Qunhui Huang [13] divides the real economy into three types: the narrow real economy, the traditional real economy, and the broad real economy, which includes the service industry.

The study of the real economy encompasses various perspectives, leading to a diverse classification of the subject. However, achieving a reasonable classification is not only crucial for understanding the essence of the real economy, but also plays a vital role in integrating it with

the digital economy. Therefore, conducting research on the integration of the digital economy and the real economy based on a sound classification can help address the existing gaps in current studies.

2. Methods

2.1 Literature Research

Until May 2023, we conducted an extensive literature search using databases such as CNKI, SCOPUS, and Web of Science to collect information on the digital economy and real economy. Additionally, we thoroughly studied the relevant literature, comparing and analyzing the definitions of digital economy and real economy. This analysis served as the basis for our qualitative research.

2.2 Industry Survey

To investigate the digitalization of industries, we examined the development of the digital economy in various industrial sectors in order to discover breakthroughs in the study of the digital economy and the real economy. According to the National Bureau of Statistics of the People's Republic of China and China Academy of Information and Communications Technology, the digital economy in China has been growing at a faster rate than the GDP in recent years (Figure 1 and 2). The agriculture, industry, and service sectors have all shown a consistent upward trend, indicating that the digital economy has emerged as a new form of economic development in China. Although there is limited data available on specific types of real economy in our survey and research, this may be due to difficulties in collecting statistics or the lack of substantial progress in certain areas. However, our comprehensive industry survey and analysis provide valuable data to support the classification research of the real economy as a whole.

2.3 Qualitative Research Based on Literature and Data

In this research, the division of the real economy is identified as a crucial aspect. The division is based on the ownership of economic entities, reflecting their status and the nature of the public and private economy. Additionally, the division based on economic activities highlights the various forms of economy, while the division based on economic regulation signifies the relationship between planning and the

market. However, none of these divisions truly capture the essence of the economy. Therefore, this study focuses on the division of economic function to gain a better understanding of the different types of economies and their underlying essence. In terms of economic function, the production of multiple products together results in lower costs compared to producing them separately, which is known as an economy of scope. Similarly, when the scale of production increases, there are economic benefits in the form of an economy of scale. The sharing of resources leads to economic benefits, known as a sharing economy. Additionally, the preservation of the environment and its positive impact on the economy is referred to as a green economy. Artificial intelligence also contributes to economic benefits. Furthermore, the creative economy exists to cater to human cultural and leisure needs. The concepts of scope economy and scale economy are primarily applicable to the industry sectors, while the creative economy is mainly associated with the service industry. On the other hand, the sharing economy, green economy and smart economy can be applied to both industry and service sectors. It is important to note that human economic activities are predominantly focused on the industry and service sectors. Scope economy and scale economy are specific to the industry sectors, whereas the creative economy is more relevant to service industries. The sharing economy, green economy, and smart economy, however, can be applied to both industries and service sectors simultaneously. This work explores the integration of the digital economy with various economic types, such as the scope economy, scale economy, sharing economy, green economy, smart economy, and creative economy and its application range. By drawing on existing literature and investigations, the paper analyzes the dimensions of economic function in relation to the scope economy, scale economy, sharing economy, green economy, digital economy, intelligent economy, and creative economy. Furthermore, it examines the form, characteristics, and pathways of integrating the digital economy with the real economy.

3. Results

3.1 Forms

The integration of the digital economy and the real economy has resulted in various economic

forms, including the size economy, digital scale economy, digital sharing economy, digital green economy, digital intelligent economy, and digital creative economy. These economic forms represent the outcome of merging the digital economy with different sectors of the real economy.

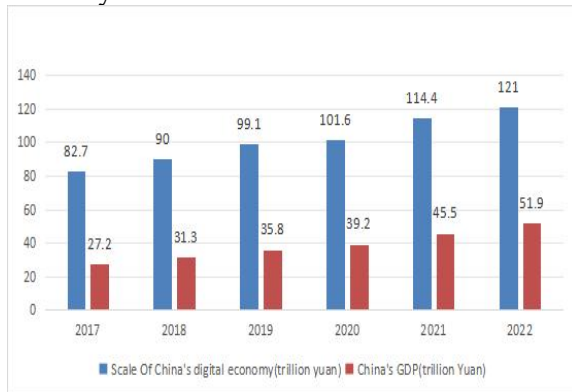


Figure 1. The Size of China's Digital Economy Versus China's GDP



Figure 2. Annual Growth Rate of China's Digital Economy Versus China's Annual GDP Growth Rate

Digital economies of scope and digital economies of scale are concepts applied to the manufacturing or production industry. Digital scope economy is an emerging economic form that results from the integration of the digital economy and scope economy. Scope economy, initially proposed by American economists Panzar and Willig, refers to the economic phenomenon where the average cost of enterprises decreases as they expand their production scope by diversifying the types of products or services they offer. The economy of scope arises from the economic benefits gained by a single enterprise through the production and sale of multiple products, leading to reduced total costs [14]. The competitive advantages of economy of scope stem from the spillover effects in technology, management, marketing, and other aspects that occur when multiple related products are produced. Furthermore, the

economy of scope brings about benefits in terms of efficiency improvement and risk diversification [15]. The economy of scope effect is evident when enterprises collaborate in producing multiple products to reduce costs. By using digital technologies and resources, digital scope economy enables enterprises to leverage the economy of scope effect in marketing, procurement, and research and development channels. Digital scale economy is a novel economic concept resulting from the integration of the digital economy and scale economy, which has the potential to generate significant economic impacts on the manufacturing or production industry. The concept of economies of scale was initially introduced by Adam Smith, who posited that as the output increases, the unit cost of production decreases, leading to economies of scale. Building upon Krugman's [16] new trade theory, economies of scale serve as the foundation for the emergence and growth of international trade, facilitating specialized production across different countries. Man Li [17] argued that big data primarily gave rise to economies of scale in innovation, intelligent operations, platform utilization, information management, and organizational efficiency. By harnessing the power of digitalization, the combination of scale economy and the digital economy not only enables the expansion of existing products and production scales, but also enhances the utilization of resources, facilitates economies of scale, optimizes decision-making processes, and improves production efficiency. Therefore, digital economy of scope and digital economy of scale can improve the economic efficiency of the manufacturing or production industry.

The digital creative economy is a novel economic form that emerges from the integration of the digital economy and the creative economy, which is mainly applied to the service industry. The creative economy refers to the gradual transformation of creative ideas into products or services, resulting in the emergence of a creative economy. The essence of the creative economy lies in its cultural significance and the presence of creative industries such as music, literature, design, fashion, and architecture. Cultural and creative products in tourist areas often serve as important vehicles for the creative economy. Due to its inclusive, permeable, and cross-border nature, the creative economy primarily thrives in

industries with a strong emphasis on intellectual property rights. This economy places a strong emphasis on creativity, which can be understood in two ways: firstly, as the patent rights of technology, highlighting the innovation in production technology; secondly, as copyright and trademark rights, focusing more on the product's design and creative consensus. Therefore, Qiaoming Li [18] argued that the development of the creative economy should prioritize the protection of intellectual property rights. The development and practice of the creative economy are primarily concentrated in urban areas, as highlighted by Richards [19] and Vanloa [20]. The authors have highlighted the issue of urban areas receiving more attention in the development of the creative economy, while rural areas are being neglected. They argue that urban elites often control the development value of the creative economy in rural regions, leading to an underestimation of the creative potential in these remote areas. However, rural areas offer distinct landscapes, abundant cultural heritage, a tranquil lifestyle, and a more affordable cost of living, making them a promising and untapped frontier for the creative economy. The digital economy and the creative economy are closely intertwined, forming a complex network of relationships. This symbiotic relationship is evident in various industries such as design, music, film and television, writing, painting, games, software, and more. The digital environment provides fertile ground for the integration and coordinated development of the creative economy. Therefore, the digital creative economy not only creates economic benefits, but also brings leisure, entertainment and cultural enjoyment to mankind.

The digital sharing economy, digital green economy, and intelligent economy are concepts that can be applied to the manufacturing and services industries. The digital sharing economy, which combines the digital economy and sharing economy, is particularly relevant in these sectors. The sharing economy utilizes advanced information technology, such as big data and the Internet, to facilitate resource sharing. Sharing is the main feature of this economic model, where ownership and usage rights are separated, and the focus is on sharing the right to use. The sharing economy enables efficient matching of supply and demand, offering flexibility in resource allocation. It also integrates consumption and use with production services,

promoting product sharing. The essence of the sharing economy lies in the integration of idle resources to provide resource services at a lower cost. This model caters to diverse economic activities and helps conserve internal and social resources. In their study, Li Zhanfeng and Sun Weiwei [21] found that the digital economy has a positive impact on shared development. They constructed a comprehensive evaluation index system to assess the relationship between the digital economy and shared development. The development of the sharing economy relies on various factors such as regional economic development, internet technology, scientific and technological innovation, social civilization progress, and government support tactics. To achieve the sharing economy, it is necessary to rely on the digital economy. Although sharing economy and digital economy are not separate sectors, they are logically connected. Firstly, digital technology provides technical support for the development of the sharing economy, facilitating its growth. Secondly, the digital economy plays a significant role in addressing the issue of unbalanced resource distribution by promoting sharing. In remote and less developed areas, the digital economy plays a crucial role in promoting the coordinated development of urban and rural areas, as well as the decentralization of regional industries. This ensures that resources are not concentrated in one location. By utilizing digital technology, the sharing economy allows for the maximization of resources, enabling more people to share and utilize idle items, skills, and space. Ultimately, this enhances resource utilization efficiency and reduces unnecessary waste. The digital green economy is a novel economic model that combines the principles of the digital economy and the green economy, which can be applied to the manufacturing and services industries. The concept of the green economy was initially introduced by British economist Pearce in his book 'Green Economy Blue Book' in 1989. Pearce argued that the prevailing economic growth model posed significant threats to the environment, and he advocated for an economic model centered around environmental protection to achieve a harmonious development of both the economy and the environment. This idea has gained widespread recognition worldwide. The green economy is a sustainable economic model that emphasizes resource efficiency and environmental conservation. To promote green

economic development, environmental governance plays a crucial role. In his study, Xionglang He [22] confirmed a positive U-shaped relationship between environmental governance and the performance of regional green economy development using an intermediary effect model. The study found that the impact of environmental governance on green economy development initially showed a negative trend, but later turned positive. In the early stages of environmental governance, the development of the green economy was not significant and even declined. However, as the intensity of environmental governance increased and surpassed a certain threshold, the speed of green economy development gradually increased. This suggests that without adequate environmental governance measures in place, the benefits of green economic development cannot be realized. Therefore, a favorable ecological environment is a prerequisite for the development of a digital green economy. Additionally, technological progress is a key factor in both productivity development and the advancement of a green economy. Hence, the success of the digital green economy relies on effective management and technological support. By leveraging digital technology, the digital green economy can effectively detect and manage environmental resources, enhance resource utilization efficiency, reduce energy consumption, and minimize environmental pollution, ultimately achieving a harmonious balance between economic development and environmental sustainability. The digital intelligent economy is a novel economic form resulting from the integration of the digital economy and intelligent economy, which can be applied to the manufacturing and services industries. The intelligent economy, which emerges from the advancements in artificial intelligence, has a significant influence on social and economic development. According to Rou yang and Yan Ma, the labor mode has transitioned from a 'humanized' approach to a 'less humanized' or even 'unmanned' mode, giving rise to the intelligent economy. In the production process, the intelligent economy primarily involves the participation of artificial intelligence as an intermediary in interactions between individuals, between individuals and artificial intelligence, and between artificial intelligence systems. The digital economy, driven by cutting-edge artificial intelligence

technology, has become a driving force for the development of advanced cities, leading to the formation of the digital intelligent economy. In 2021, the core industries of Shenzhen's digital economy contributed over 900 billion yuan to the city's GDP, accounting for 30.5% of the total. This growth can be attributed to the infusion of vitality brought about by the digital intelligent economy. It is evident that the digital sharing economy, digital green economy, and digital smart economy can be implemented in various industry sectors and service sectors, thereby enhancing their economic efficiency. The integration of China's digital economy with the real economy is gaining momentum. As shown in Figure 3, the penetration rate of China's digital economy into the industry and service sector is evident. The current integration of the digital economy and the physical economy varies in terms of its visible structure. While certain forms have already materialized, others are still in the development stage. However, it is anticipated that the predominant forms of this integration will become more pronounced in the future.

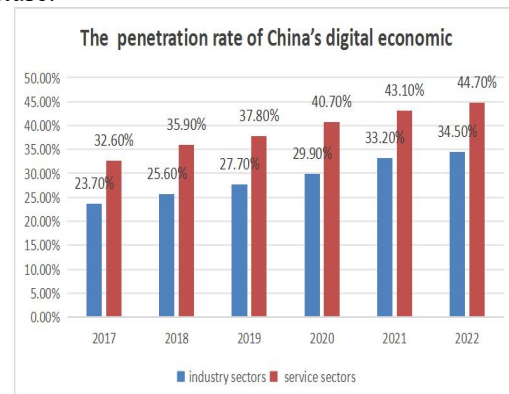


Figure 3. The Penetration Rate of China's Digital Economy

3.2 Characteristics

The integration of the digital economy and the real economy is characterized by rapid scale and speed, the dominance of digital industrialization, and imbalanced national or regional development. This integration creates new economic forms that are cost-effective, efficient, data-driven, platform-based, and innovative. Enterprises can reduce production and operating costs through digital production processes and supply chain management, as well as lower marketing costs through online advertising and social media promotion. This results in overall cost reduction. Additionally, digitalization

improves the efficiency of production, management, circulation, and sales, leading to higher productivity and competitiveness. Data-driven decision-making and informatization enable accurate and scientific decision-making, reducing the cost of trial and error. By analyzing data and establishing prediction models, businesses gain a better understanding of market demand, allowing for optimized product types, designs, and promotion strategies. The platform economy becomes the primary channel for economic operations, enabling businesses to quickly launch new products or services to meet evolving market needs. This integration is characterized by its innovative nature.

The integration of the digital economy and the real economy has led to the formation of different economic forms, each with its own unique characteristics and development opportunities. The digital scope economy relies on low cost, decision-making, and information technology, providing a fertile ground for scientific and technological innovation and opening up new possibilities for cost-effective digital production and operation. The digital economies of scale benefit from digital technology to enhance the economies of scale effect. The digital sharing economy thrives on digital sharing, regional economic cooperation, and the establishment of robust data management and security mechanisms, aiming for sustainable development. The digital green economy stands out with its digital detection and management, digital production processes and supply chains, and innovative products and services, presenting a promising future for ecological and environmental protection. The development of the digital intelligent economy is characterized by the strong integration of artificial intelligence with all elements of the digital economy. This integration is evident in the close correspondence and compatibility between the main elements of the digital economy and the core elements of artificial intelligence, particularly in terms of data foundation, technology, and algorithms. The digital creative economy is characterized by its high added value, reliance on advanced technology, and integration across various industries. Therefore, in the real market, the digital creative economy requires the integration of high-tech and multiple industries in order to generate high added value.

However, it is important to address certain

challenges that arise during the development process of the digital economy, such as data security, privacy protection, and data divide. To fully comprehend the integration of the digital economy and the real economy, it is necessary to consider their similarities, differences, and security aspects.

3.2 Paths

The integration of the digital economy and the real economy is not a spontaneous or deductive process, but rather requires deliberate efforts in its construction. This integration is a complex and systematic project that necessitates focus on several key aspects. These include the development of digital composite talents, advancements in digital core technologies for production, enhancements in digital functions for circulation and sales, and the implementation of tactics for integrating digital technologies.

The construction of digital composite talents serves as a fundamental requirement for the integration of the digital economy and the real economy. This is because the success of this integration relies on digital transformation. Without digital transformation, it becomes challenging to effectively integrate the digital economy with the real economy. Digital transformation is closely tied to the cultivation of digital talents in universities and the establishment of digital talent pools within enterprises. Only by combining these two aspects can we successfully drive digital transformation. Universities must adapt their professional structures, curriculum systems, and evaluation methods to foster the development of digital talents. Similarly, enterprises should incorporate data and quantitative thinking into decision-making, production, management, and other processes, while also emphasizing the recruitment and training of digital composite talents. These efforts will help solidify the construction of a strong team of digital composite talents.

The integration of the digital economy and real economy heavily relies on the breakthrough of digital core technology in the production field. This breakthrough serves as the driving force behind the growth of the real economy and promotes the development of the industrial digital economy. By promoting the digital transformation of the production field, the breakthrough of digital core technologies enhances production efficiency, quality, and

flexibility, fostering sustainable industry development. However, this progress also brings new challenges in terms of data security.

In addition, the improvement of digital functions in the circulation and sales field plays a crucial role in integrating the digital economy and real economy. In the circulation field, implementing a visual e-commerce platform, mobile payment systems, and intelligent terminals, along with analyzing big data and utilizing technologies like the Internet of Things and blockchain, enhances the circulation of goods. Similarly, constructing customer relationship management (CRM) systems, sales data visualization models, e-commerce platforms, mobile sales tools, personalized sales and recommendations, online customer service, and social media contribute to the enhancement of sales functions. It is evident that improving digital functions in the circulation and sales field not only enables digital transformation in sales but also enhances sales rates.

The strategy of integrating digital technology aims to apply it across all areas of an enterprise and its economic operations in order to achieve synergy, enhance efficiency, and create greater value. This integration primarily involves three aspects: digital decision-making, digital production and operations, and digital management and services. Digital decision-making involves integrating data from various sources and utilizing data analysis technology to extract valuable information, which serves as a scientific basis for enterprise decision-making. This process helps enterprises gain insights into market demand, customer behavior, and operational status, enabling them to optimize business processes and enhance competitiveness. Digitalization is employed to improve the quality and efficiency of production and operations. By leveraging cloud computing and virtualization technologies, enterprises can virtualize their computing resources, storage resources, and applications in the cloud, enabling resource sharing, flexible expansion, and reducing IT costs and management complexity. This, in turn, enhances the quality and efficiency of enterprise production and operations. The use of digital management and services helps save time and costs, thereby improving the efficiency of management and services.

The integration of the digital economy and the real economy is interconnected and mutually

dependent. This integration can be achieved through the development of digital composite talents, advancements in core digital technologies in the production field, the enhancement of digital functions in the circulation and sales field, and the implementation of tactics promoting digital technology integration.

4. Conclusions

The integration of the digital economy and the real economy is an area that has received limited research attention, primarily due to the challenges in defining economic dimensions. However, studying the various forms of this integration from an economic function perspective can provide valuable insights into the main types of economies involved, their characteristics, and the pathways for their operation. The integration of the digital economy and the real economy gives rise to several main types of economies, namely the digital scope economy, digital scale economy, digital sharing economy, digital green economy, digital intelligent economy, and digital creative economy. The scope of application of these types of economies varies. Some can be applied to industries, some to services, and some to both industries and services. The integration of the digital economy and the real economy should consider the common characteristics and differences between them. The integration of the digital economy and the real economy is a complex process that requires the development of digital composite talents, advancements in digital core technology, improvements in digital functions in circulation and sales, and the implementation of digital technology integration. This integration is of great significance for the practical integration of the digital economy and the real economy. It will become the main form of economic competition in the future and will determine the high-quality development of the economy. The digital economy cannot exist independently, but must integrate with both the real economy and the virtual economy. However, the study did not specifically address the virtual economy, and there are still unresolved issues related to personal privacy, intellectual property, and data security. Given the broad scope of the digital economy's convergence, interdisciplinary research is needed to find solutions to these problems.

Acknowledgments

This paper is supported by the Reform and Development Research Center of Newly Built Universities (No. XJYX2023W03).

References

- [1] Don Tapscott. *The Digital Economy: Promise and Peril in the Age of Network Intelligence*. McGraw-Hill, New York, 1996.
- [2] Hao Ting. Digital economy, innovation ability and high-quality economic development. *Yunnan University of Finance and Economics*, 2023.
- [3] B. Kim, A. Barua A B., Whinston. Virtual field experiments for a digital economy: a new research methodology for exploring an information economy. *Decision Support Systems*, 2002, 32(3): 215-231.
- [4] Bo Carlsson. The Digital Economy: what is new and what is not? Structural change and economic dynamics, 2004, 15(3): 245-264.
- [5] T. Elmasryel, et al. Digital Middle East Transforming the Region into a Leading Digital Economy. [http:// www.mckinsey.com/Global-themes/middle-east-transforming -the-region-into-a-leading-digital-economy](http://www.mckinsey.com/Global-themes/middle-east-transforming-the-region-into-a-leading-digital-economy), 2022.
- [6] Xueling Zhang and Yuexia Jiao. China digital economy development index and its application. *Zhejiang Social Sciences*, 2017, 248(4): 32-40+157.
- [7] Chenghao Li, Baoping Ren. The mechanism and path of total factor productivity improvement driven by digital economy. *Journal of Northwest University (Philosophy and Social Sciences Edition)*, 2023, 53(4): 159-167.
- [8] John Maynard Keynes. *General Theory of Employment, Interest and Money*. Beijing: The Commercial Press, 1999.
- [9] Xiao Qin. On the impact of virtual economy on Real economy. *China Foreign Exchange Management*, 2000, 43(5): 10-12.
- [10] Xiaoxin Liu, Heng Tian. The relationship between virtual economy and real economy: A comparative study of major capitalist countries. *Social Sciences in China*, 2021, 310(10):61-82+205.
- [11] Nengsheng Luo, Fuzheng Luo. A study on the evolution trend of China's real economy since the reform and opening up and its influencing factors. *China Soft Science*, 2012, 263(11):19-28.
- [12] Zhibiao Liu. Rethinking the interaction between real economy and virtual economy. *Learning and Exploration*, 2015, 242(9):82-89.
- [13] Qunhui Huang. On the development of China's real economy in the New era. *China Industrial Economy*, 2017, 354(9):5-24.
- [14] A. D. Chandler. *Economies of scale and scope*. China Social Sciences Press, 1999.
- [15] Yixuan Xiao, Xiaopeng Yin. The product strategy of multi-product export enterprises under uncertainty. *Science of Finance and Economics*, 2023, 424(7): 107-117.
- [16] Krugman P R. Increasing returns, monopolistic competition, and international trade. *Journal of International Economics*, 1979, (4): 469-479.
- [17] Man Li. Product differentiation and economies of Scale in the era of Big Data. *Journal of Jishou University (Social Science Edition)*, 2017, 38(6): 113-121.
- [18] Qiaoming Li, Wenjun Li, Sihui Ye. Creative economy, Intellectual Property protection and Market effect: Evidence from China's creative products trade. *Industrial Economics Review*, 2021, 42(1): 65-77.
- [19] Richards G. Creativity and tourism in the city. *Current Issues in Tourism*, 2014, 17(2): 119 -144.
- [20] Vanolo A. The image of the creative city: some reflections on urban branding in Turin. *Cities*, 2008, 25(6): 370 -382.
- [21] Zhanfeng Li, Weiwei Sun. The impact of digital economy on shared development under the goal of common prosperity. *Statistics and Decision*, 2023, 627(15): 18-23.
- [22] Xionglang He, Yu Bai. Environmental governance, technological progress and green economy development performance. *Journal of Nanjing Audit University*, 2023, 20 (2):103-111.