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Theoretical Mechanism and Practical Application Research of Metaverse Empowering Digital Economy Development

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ABSTRACT

The digital economy is profoundly transforming production methods, lifestyles, and governance models, becoming a crucial force in reorganizing global resources, reshaping the global economic structure, and altering the global competitive landscape. As a comprehensive manifestation of a series of new technologies, the metaverse represents a new ecology and interaction mode, as well as a new advantage and growth point for the transformation and upgrading of the digital economy. However, the application of the metaverse in the digital economy is still in the preliminary exploration stage, and there is an urgent need to clarify its impact on the development of the digital economy and the specific mechanisms for empowering it. This paper reviews relevant literature from both theoretical mechanisms and practical applications, aiming to provide new insights into how the metaverse can promote the high-quality development of the digital economy.

KEYWORDS

Metaverse; Digital Economy; Practical Application

1. INTRODUCTION

In recent years, the pace of global digitization has significantly accelerated, and the metaverse, as a field closely related to and filled with boundless potential for the digital economy, has begun to attract widespread attention. As one of the key directions for future industrial transformation, the metaverse will integrate the latest information technologies to further promote the development of the digital economy and potentially trigger significant shifts in social structures. For instance, in the "14th Five-Year Plan" for the Development of the Electronic Information Industry in Shanghai, released on December 30, 2021, the metaverse was listed as one of the key development directions for the electronic information industry, marking the first time this concept appeared in a local government's five-year plan. Subsequently, cities like Hefei and Wuhan also mentioned the metaverse in their relevant policy documents. Additionally, the People's Bank of China's "FinTech Development Plan (2022-2025)" proposed utilizing metaverse-related technologies and scenarios to build diversified financial service channels. Against this backdrop, delving into the connection between the metaverse and the digital economy is crucial for addressing issues encountered in the development of the digital economy, maximizing its potential, and driving China's digital economy towards higher-quality development.

The digital economy thrives under the impetus of digital network technologies, and the development of the metaverse similarly relies on these network technologies. The metaverse can significantly enhance the efficiency of factor allocation and production in the digital economy, eliminating spatial and temporal barriers in resource distribution to achieve Pareto optimality in resource allocation, thereby enhancing the overall benefits of the digital economy. On a deeper level, the application of

the metaverse serves national strategies, the real economy, and the improvement of people's lives. By creating new application scenarios, production methods, and service models through metaverse technologies, comprehensive innovation and upgrading can be driven in the fields of life, consumption, and industry. However, as an emerging phenomenon, the metaverse, while bringing positive impacts, may also generate uncertainties and potential risks: firstly, it may lead to frequent fluctuations in commodity prices due to the possibility of comparing, trading, and circulating assets and commodities in the metaverse with those in the real world. When large amounts of financial capital flow into virtual assets in the metaverse, it may cause price volatility. Secondly, this also poses challenges to the risk management systems of financial institutions, particularly in areas such as identity verification and data protection, while also involving innovations in financial institution service channels, products, and service models. Therefore, while encouraging the establishment of a metaverse-based digital economy system and the development of a digital China, it is necessary to conduct a comprehensive assessment of its necessity and feasibility to ensure the healthy and orderly development of the metaverse.

2. OVERVIEW OF THE METAVERSE AND DIGITAL ECONOMY

2.1. Concept of the Metaverse

The term "metaverse" stems from the blending of the English words "Meta" (meaning "beyond" in Greek) and "Universe," literally interpreted as "beyond the universe," or a virtual world that transcends the real world. It was first coined in 1992 by American writer Neal Stephenson [1] in his science fiction novel "Snow Crash." The year 2021 is widely acknowledged as the "First Year of the Metaverse." In this pivotal year, the renowned American gaming company Roblox debuted on the New York Stock Exchange with the "metaverse concept," experiencing a surge in its stock market valuation. Simultaneously, Facebook, a leading social media giant in the United States, rebranded itself as Meta (the Metaverse), sparking a wave of interest and excitement surrounding the metaverse. As a nascent concept, the metaverse has garnered significant attention from academia, industry, and the public alike since its inception, yet there remains a lack of consensus on its definition, with various scholars and institutions offering diverse perspectives. Essentially, the metaverse is a virtual cyberspace, albeit one that is "enhanced with data and intelligence" [2]. As articulated in the "Tsinghua University: 2021 Metaverse Development Research Report," "The metaverse represents a novel integrated Internet application and social form arising from the convergence of multiple emerging technologies. It offers immersive experiences through extended reality technology and creates digital twins of the real world via digital twin technology. Furthermore, it establishes an economic system leveraging blockchain technology, intimately intertwining the virtual and real worlds in economic, social, and identity systems, empowering every user to produce and edit content." [3] Based on this definition, we can at least make the following assertions about the metaverse: it is not merely a virtual digital world; it transcends being a simplistic digital economy; nor is it solely a novel application or a platform for user-generated content. In essence, the metaverse should be regarded as a virtual world constructed upon numerous cutting-edge digital technologies, existing in parallel with the real world while fostering interactions between the two. If we adopt a relatively optimistic viewpoint, the metaverse could potentially represent the third generation of the Internet, following the PC internet and mobile internet eras.

2.2. Concept of Digital Economy

The digital economy refers to "a series of economic activities that use digitalized knowledge and information as key production factors, rely on modern information networks as the primary carrier, and effectively utilize information and communication technologies (ICT) as an important driving force to enhance efficiency and optimize economic structures." [4] Based on this definition, we can discern that the digital economy represents a novel economic form, marking a new stage following

the agricultural and industrial economies. Notably, the foundation of this new economic form lies in internet technology. It can be said that the digital economy gradually emerged alongside the advancement of internet technologies. Between 1990 and 2010, developed countries led global economic development through the personal computer (PC) internet, triggering widespread societal transformations, particularly prominent in the United States. During this period, the US economy exhibited characteristics of high growth, low unemployment, and low inflation, often attributed to the information technology revolution.

Moving into the period from 2010 to 2020, the internet shifted from fixed PCs to more convenient mobile intelligent devices, marking the popularization and maturation of the digital economy, with all industries accelerating their digital transformation. Arriving at 2021 and beyond, the digital economy has entered its third phase—the era of the metaverse. As Zhao Guodong [5] states in his book "Metaverse," "The metaverse represents economic activities where the creation, exchange, and consumption of digital products take place entirely within the digital world." In summary, an analysis of the definition and developmental trajectory of the digital economy reveals that, from the perspective of internet technology development, the metaverse constitutes the most revolutionary component of the digital economy, or we can consider it as the "new-type digital economy."

3. THEORETICAL MECHANISM OF THE METAVERSE EMPOWERING THE DEVELOPMENT OF THE DIGITAL ECONOMY

The metaverse, primarily relying on data networks as its carrier, serves as a pivotal factor driving the development of the digital economy. Through a review of relevant research literature, most scholars agree that the metaverse can facilitate the high-quality development of the digital economy, albeit adopting diverse perspectives in analyzing the specific mechanisms of this effect.

3.1. Multiplier Effect Mechanism of the Metaverse on the Development of the Digital Economy

In the context of the metaverse, data, as a new production factor, exerts a multiplier effect on other factors, altering the supply system of production factors, overcoming the constraints of their scarcity, and propelling the sustained growth of the digital economy. Zhong Yexi and Wu Siyu [6] analyzed the theoretical mechanisms of the metaverse's impact on the efficiency, benefits, and sustained growth of the digital economy. In terms of economic efficiency, as advanced technologies continue to mature, data gradually breaks down the boundaries between virtual and physical spaces, facilitating the rational allocation of production factors and enhancing combination efficiency and production efficiency. Regarding economic benefits, the metaverse adheres to the production laws of diminishing marginal costs and increasing marginal returns, thereby enhancing the economic benefits of the digital economy. The metaverse plays a significant role in the four fundamental elements of digital creation, digital currency, digital assets, and digital markets, exhibiting characteristics such as near-zero transaction costs, diminishing marginal costs, and increasing marginal benefits. Li Jing [7] noted that the metaverse utilizes advanced digital technologies to continuously enhance productivity and effectively reallocate various production resources, thereby altering the original production relations and shaping the digital economy into an entirely new economic model.

3.2. Technology-Driven Effect of the Metaverse on the Development of the Digital Economy

The metaverse technology is poised to break through the limitations faced by the traditional digital economy, shatter spatial and technological boundaries, and propel the digital economy towards innovative transformation. In the metaverse, the Internet of Things (IoT) and the Internet achieve a profound integration of "real-time sharing and open parallelism," which can, to a certain extent,

dismantle the temporal and spatial barriers to resource allocation, enabling distributed production activities that transcend geographical distances. Lu Minfeng [8], analyzing from the perspectives of technology and scenario ecology, argues that the metaverse can create more diversified application scenarios, transcend spatial constraints, maximize consumer satisfaction, promote the upgrading of information consumption, advance the process of industrial digitization, and enhance the economic benefits of the digital economy. Yuan Zeng [9] points out that digital currency serves as a crucial link connecting the virtual space of the metaverse with the real physical world. At the technological level, as an amalgamation of multiple advanced technologies, the metaverse can propel the digital economy towards breakthrough development. Wang Wenxi et al. [10], conducting an in-depth analysis of the metaverse from a technological dimension, first outline how the metaverse connects the physical and virtual worlds through technologies such as 6G and IoT, fostering their integration and interactive development, thereby providing a powerful impetus for the development of the digital economy. They then discuss how the metaverse leverages cloud computing technologies in data processing and storage to promote the coordinated development of computing and storage capabilities, laying a solid technological foundation for the digital economy. Furthermore, the metaverse addresses information asymmetry and payment method upgrades in the digital economy. Through the linkage of the real and virtual worlds and the analysis of behavioral patterns and real-world contexts, the metaverse enables precise targeting of consumer preferences, thereby resolving information asymmetry between the consumer and supply sides. Qi Yudong and Chu Xi [11] contend that digital currencies, with their rapid payment and convenient transaction advantages, significantly surpass the circulation speed of traditional currencies, achieving efficient digital payments and enhancing the efficiency of the digital economy.

3.3. Scale Effect of the Metaverse Empowering the Development of the Digital Economy

In the metaverse environment, as production scales expand, marginal costs tend to decrease, and scale effects become increasingly pronounced, without encountering turning points in economic growth. Xiang Peng [12] notes that the development of the metaverse will converge multi-industry resources, create new consumption scenarios and models, and collaborate with digital technologies represented by blockchain to drive digital industrialization, forming new advantages for the digital economy. Big data, relying on the metaverse environment, alters the way resources are invested, combined, and utilized, achieving maximum output with minimal input of production materials, thereby enhancing the efficiency of combining production factors. Zheng Lei and Zheng Yangyang [13], from a micro-level perspective, argue that both platforms and individuals can create digital virtual products through data and technology, with an increasing number of people becoming producers in the virtual digital economy. Data itself is the production material of the digital economy, and everyone continuously generates vast amounts of data, making the production and acquisition of production materials extremely easy and cost-effective, thereby enhancing economic benefits. Under the influence of the metaverse, the law of increasing marginal costs is broken. Chen Yongwei and Cheng Hua [14], analyzing from a macro-level perspective, contend that compared to the internal and external cycles of the real economy, the metaverse introduces an additional cycle between the virtual and real worlds, further promoting the integration of the digital and real economies.

4. PRACTICAL APPLICATION RESEARCH OF METAVERSE IN THE DEVELOPMENT OF DIGITAL ECONOMY

In recent years, the global digitalization process has significantly accelerated, and the metaverse, which is closely related to the digital economy and holds immense potential for future development, has garnered tremendous attention worldwide.

4.1. Expanding Financial Institution Service Modes to Promote the Healthy Development of the Digital Economy

Under the influence of the metaverse, the widespread application of digital technologies has provided traditional financial institutions with diversified business models. Globally, there is an open attitude towards the metaverse, with major American internet companies actively leveraging it to expand their business horizons, while commercial banks are also experimenting and exploring in this field. The rise of the metaverse offers a new direction for the digital transformation of commercial banks. For instance, Bank of America employs virtual reality (VR) technology to train employees, BNP Paribas has developed new VR programs, and KB Kookmin Bank in South Korea has established a virtual town on a metaverse platform. Domestically, Zeng Shengjun and Zhou Tao [15] point out that while the development of the metaverse is primarily concentrated in a few leading enterprises such as Tencent and ByteDance, China's high penetration rate of the internet and virtual services has prompted the People's Bank of China to actively promote digital currency innovation and development with an open mindset. Domestic commercial banks like China Zheshang Bank and Bank of Jiangsu have also begun their metaverse layouts. Wang Fangyuan [16] believes that the metaverse could be a pivotal force driving the digital transformation of banks, potentially revolutionizing the ways in which banks interact with and serve their customers. The outbreak of the COVID-19 pandemic accelerated the demand for online services, fostering the integration of online and offline operations, thereby creating conditions for the rise of the metaverse. Zuo Xi [17] predicts that future banking services may shift from offline to online, with digitization becoming a crucial driving force for financial service development, ultimately enhancing customer experiences. However, some scholars express concerns about potential negative effects, arguing that the metaverse could contribute to the creation of virtual economic bubbles.

The metaverse represents a future development trend, playing an active role in the fusion of the real and virtual worlds and poised to emerge as a new form of social development, transforming people's lifestyles. Despite being in its early stages of development, the metaverse still has vast room for growth, and most scholars agree that it has a positive impact on the digital economy. Ouyang Rihui [18] maintains that metaverse technology is significant for the digital transformation and innovative development of the financial industry. Zhang Yan [19] notes that the metaverse adds more digital asset value to business ecosystems and opens up new avenues for society's digital transformation. It is anticipated that the future development of the metaverse will coincide with the digitization of manufacturing and the digital dissemination of cultural industries, thereby realizing the deployment of the metaverse industry.

4.2. Reducing Information Asymmetry and Constructing a Sound Credit System

The metaverse can optimize the business environment, reduce the overall credit costs of China's socio-economic development, and foster a favorable credit economy market environment. Liang Wei and Qiang Tianjian [20] argue that the metaverse represents the ultimate and highest form of the internet, ushering in innovative scenarios that promote effective competition among financial institutions and foster a positive market atmosphere. China's real economy and financial sectors face high credit costs, and the metaverse offers a solution to the problem of information asymmetry by providing a platform characterized by "low credit costs and a favorable credit environment." In the metaverse, information asymmetry between producers, consumers, and operators can be effectively mitigated, as all parties involved in transactions gain more opportunities for supervision and quality signals, encouraging enterprises to voluntarily abandon low-quality products and offer reliable products and services. Consequently, the metaverse can provide data sharing and resource trading mechanisms for diverse participants in economic activities, strongly supporting socio-economic development by enabling the acquisition of larger-scale credit capital at lower transaction costs.

5. CONCLUSION

As a crucial component of the next-generation internet, the Metaverse not only represents the forefront of technological innovation but also serves as a pivotal force driving the transformation of the digital economy. This paper delves into how the Metaverse empowers the development of the digital economy from both theoretical mechanisms and practical applications. Theoretically, the Metaverse, through a data-driven approach, achieves efficient resource allocation, breaks through spatial and temporal constraints, enhances production efficiency, promotes information symmetry, and reduces credit costs, thereby facilitating the high-quality development of the digital economy. Practically, the Metaverse has sparked widespread interest and exploration worldwide, particularly in the field of financial services. By leveraging virtual reality technology, digital currencies, and virtual platforms, it offers new directions for the digital transformation of traditional financial institutions. Nevertheless, the development of the Metaverse also confronts challenges such as potential commodity price fluctuations, tests to the risk management systems of financial institutions, and the looming specter of virtual economic bubbles. Consequently, in advancing the Metaverse's empowerment of the digital economy, it is imperative to strike a balance between technological innovation and risk management. This necessitates not only actively exploring the application scenarios of the Metaverse but also establishing and improving corresponding regulatory frameworks to ensure its healthy development. Looking ahead, the development of the Metaverse will coincide with the digitalization of manufacturing and the digital dissemination of cultural industries, becoming a significant force driving societal digital transformation. As technology continues to advance and mature, the Metaverse will usher in new growth points for the digital economy and potentially evolve into a new form of economic and social development. Although the Metaverse is still in its early stages of development, it has already demonstrated immense potential and vast application prospects, deserving our sustained attention and in-depth research.

REFERENCES

[1] Neal Stephenson. Snow Crash [M]. Translated by Guo Ze, Chengdu: Sichuan Science and Technology Press, 2018.

[2] Zhao Xing, Lu Qiwen. "Governance of the Metaverse: A Forward-Looking Agile Governance Perspective for the Future Intelligent Digital World." Journal of the China Society for Library Science, Vol. 1, 2022.

[3] "Tsinghua University: 2021 Metaverse Development Research Report," Tencent News.

[4] "2016 G20 Hangzhou Summit: Digital Economy Development and Cooperation Initiative of the G20," October 2020.

[5] Zhao Guodong, Yi Huanhuan, Xu Zhongyuan. The Metaverse [M]. Beijing: China Translation & Publishing Corporation, 2021, p. 86.

[6] Zhong Yexi, Wu Siyu. "The Metaverse Empowering High-Quality Development of the Digital Economy: Foundations, Mechanisms, Paths, and Application Scenarios." Journal of Chongqing University (Social Sciences Edition), 2022(4).

[7] Li Jing. "Potential Risks and Regulatory Countermeasures of Token Economy Development in the Metaverse." E-Government, 2022(3): 54-65.

[8] Lu Minfeng. "Research on the Development Path of Strengthening the Integration of Digital Technology and the Real Economy under the New Pattern." Qinghai Social Sciences, 2022(1): 82-91.

[9] Yuan Zeng. "On the Power of Coinage in the Metaverse." East China Law Review, 2022(2): 31-43.

[10] Wang Wenxi, Zhou Fang, Wan Yueliang, Ning Huansheng. "A Review of Metaverse Technology." Chinese Journal of Engineering, 2022(4): 744-756.

[11] Qi Yudong, Chu Xi. "Economic Benefits and Risk Prevention of Central Bank Digital Currencies from the Perspective of Digital Economy." Reform, 2019(11): 52-62.

[12] Xiang Peng. "The Metaverse: A New Digital Ecosystem Centered on Blockchain." Hi-Tech and Industrialization, 2022(4): 26-29.

[13] Zheng Lei, Zheng Yangyang. "Non-Consensus in Metaverse Economics." Review of Industrial Economics, 2022(1): 28-37.

[14] Chen Yongwei, Cheng Hua. "The Economics of the Metaverse: A Comparison with the Real Economy." Research on Financial and Economic Issues, 2022: 1-21. [Note: Citation format may vary, as the original number [25] seems out of context.]

[15] Zeng Shengjun, Zhou Tao. "Research on the Development of the Metaverse Industry and Banking Financial Innovation." Journal of International Finance, 2022(3): 15-20.

[16] Wang Fangyuan. "Banks Rush to the Financial Metaverse, Anticipating Changes in Service Forms." China Securities Journal, 2022-01-17.

[17] Zuo Xi. "The Rise of the Metaverse Concept: Opening New Spaces for the Digital Transformation of Banks." Financial Times, 2022-01-11.

[18] Ouyang Rihui. "The Future of Finance in the Metaverse." China Information World, 2022(4): 59-62.

[19] Zhang Yan. "Will the 'Metaverse' Become the Next New Growth Point of the Digital Economy?" China Economic Weekly, 2022(3): 72-73.

[20] Liang Wei & Qiang Tianjian. (2023). "A Literature Review of the Metaverse Empowering the Development of the Digital Economy." Northern Trade and Economy, (02), 30-37.