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Metaverse development based on blockchain technology and NFT in China

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Abstract: *In 2021, the concept of "meta-universe" has attracted a lot of attention worldwide. This paper discusses the significance of Blockchain-based Non-Fungible Token (NFT) for the development of China's metaverse industry. In addition, in the context of China's unique institutional environment, this chapter compares current Blockchain and NFT-related regulations and explains whether and how these regulations facilitate the development of China's digital economy. Finally, a case study will be conducted and a Citespace analysis will be performed to provide some recommendations. This chapter will highlight the importance of balancing governance and innovation to facilitate the application and value of emerging technologies in the development of China's metaverse ecosystem and Blockchain.*

Keywords: *Metaverse; Blockchain; NFT; China; digital economy*

1. Introduction

These days, "metaverse" is a hot topic in the financial industry. Zhao et al. (2021) suggest that the metaverse is a virtual space parallel to the real world and independent from the real world. It is an online virtual world that maps the real world and an increasingly real digital virtual world. The concept of the metaverse not only attracted the attention of capitalists but also many developed countries began to plan the development of the metaverse.

There are six major technology systems in the metaverse: network and computing technology, artificial intelligence technology, Internet of Things technology, interaction technology, Blockchain technology, and video game technology. Among them, Blockchain, Web 3.0 and NFT technology provide technical support such as decentralized storage and authentication for the meta-cosmic economic system.

2. Building the metaverse concept with blockchain

The origins of the metaverse concept can be traced back to Stephenson's 1992 novel, in which he depicted a multi-person online virtual world called the Metaverse, which is seen as a vast virtual physical world where people come together and interact on a digital platform to work, shop and socialize through created avatars. The structure of the Metaverse allows for the creation of virtual communities beyond business and entertainment, it is a new generation of the Internet that includes a three-dimensional virtual space where users can communicate and interact through their avatars. The birth of the Metaverse was marked by the successful IPO of the gaming company Roblox in March 2021, which was the first to include the "Metaverse" concept in its prospectus and to introduce a timeline and an economic system based on cryptocurrency in its game system, thus making such a Metaverse. In October 2021, Facebook changed its name to Meta and announced a major strategic shift to a metaverse. Some big companies in China and internationally are also laying out metaverse-related businesses.

As we can see from the Table 1, scholars tend to focus more on the realization and development process of metaverse, or propose the problems encountered in the development process of metaverse, but since the development of metaverse is still in its initial stage, there are no specific measures to solve the related problems, and the problems arising from metaverse can only be solved by strengthening the regulation, and the development of metaverse is supposed to be innovative and regulatory at the same pace.

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Table 1: Overview of papers related to the most cited metaverse

Article	Author	Citations	Published years	Contributions	DOI
3D Virtual worlds and the metaverse: Current status and future possibilities	Dionisio, John David N. et al.	264	2013	Describes the current state of development of the metaverse in 3D virtual worlds, considers the factors that support the formation of a viable Metaverse, describes the constraints	DOI:10.1145/2480741.2480751
All One Needs to Know about Metaverse: A Complete Survey on Technological Singularity, Virtual Ecosystem, and Research Agenda	Lee, Lik-Hang et al.	198	2021	Technologies as enablers of the current Internet transition to the Metaverse. This paper examines eight virtual technologies, including extended reality, and discusses six user-centered factors, concluding with a specific research agenda for the development of the Metaverse.	DOI:10.1145/3474085.3479238
Metaverse	Mystakidis, Stylianos.	170	2019	The Metaverse is a post-reality universe, a timeless and persistent multi-user environment that combines physical reality with digital virtuality.	DOI:10.5040/9781350126909.0000017
Metaverse for Social Good: A University Campus Prototype	Duan, Haihan et al.	162	2021	The metaverse has great potential for improvement, and this paper focuses on representative applications for social good and proposes a three-tier metaverse architecture from a macro perspective	DOI:10.1145/3474085.3479238
A Metaverse: Taxonomy, Components, Applications, and Open Challenges	Park, Sang-Min and Young-Gab Kim.	127	2021	This paper describes the concepts and basic technologies needed to implement metaverse, and summarizes the limitations and directions for implementing immersive metaverse as a social impact, constraint and open challenge	DOI:10.1109/ACCESS.2021.3140175
Educational applications of metaverse: possibilities and limitations	Kye, Bokyung et al.	96	2021	This review aims to define the four types of metaverse and explain the potential and limitations of their educational applications.	DOI:10.3352/jeehp.2021.18.32
A Survey on Metaverse: the State-of-the-art, Technologies, Applications, and Challenges	Ning, Huansheng et al.	80	2022	The paper presents the current state of development of the Metaverse from five perspectives: network infrastructure, management technologies, basic generic technologies, virtual reality object connectivity, and virtual reality convergence, and discusses the issues and challenges it may face.	Corpus ID: 244346044
Advertising in the Metaverse: Research Agenda*(web3.0)*	Kim, Jooyoung.	75	2021	That the metaverse could be the next network, the Web 3.0 or spatial network, which could fundamentally change the way we interact with the digital world.	DOI:10.1080/15252019.2021.2001273
The Social Metaverse: Battle for Privacy	Falchuk, Benjamin et al.	56	2018	The Internet and the metaverse change the way people live their daily lives	DOI:10.1109/MTS.2018.2826060
Artificial Intelligence for the Metaverse: A Survey	Huynh-The, Thien et al.	55	2022	A comprehensive survey of AI-based approaches to six technological aspects that have potential for the metaverse: natural language processing, machine vision, blockchain, the Web, digital twins, and neural interfaces, is conveyed.	DOI:10.1016/j.engappai.2022.105581

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3. Regulatory framework of blockchain in China

Blockchain has become one of the most important basic technologies in the era of the digital economy by virtue of its transparent, open, traceable, and immutable characteristics, and has risen to the national level (Maldonado, 2021). In 2019, developing Blockchain technology has become China's strategy at the national level. At the same time, local governments are also constantly putting forward various supportive and regulatory policies to help the development of Blockchain technology, especially the introduction of a large number of encouraging development policies, providing impetus for the development of regional Blockchain technology.

Blockchain-related policies at the national level have also been launched. In March 2021, Blockchain was written into the 14th Five-Year Plan of the People's Republic of China for National Economic and Social Development and the Outline of the Vision and Goals for 2035 (2021), which proposed to build new advantages of the digital economy and accelerate digital industrialization. In June, the Ministry of Industry and Information Technology (MIIT) and the Cyberspace Administration of China issued the Guidance on Accelerating the Application and Industrial Development of Blockchain Technology (2019), pointing out that focusing on supply chain management, product traceability, data sharing, and other real economic fields, it is important to promote the integrated application of Blockchain to support the digital transformation of the industry and the high-quality development of the industry .

While encouraging the development of Blockchain technology, China has also stepped up its financial regulation. From the perspective of the provision, use, and management of Blockchain information services, the Provisions on the Management of Blockchain Information Services issued by the Cyberspace Administration of China on January 10, 2019, require that Blockchain information service providers need to put on record, and change or terminate services should go through alteration or cancellation procedures. When a service provider develops and launches a new product, application, or function, it shall conduct a safety assessment in accordance with relevant provisions. Those who violate the Provisions will be punished according to these Provisions and relevant laws and administrative regulations. If the case constitutes a crime, criminal responsibility shall be investigated according to law.

4. The importance of nft in blockchain under metaverse

"NFT" stands for "Non-Fungible Token", which means non-homogenized token. Unlike Fungible Token(FTs), each NFT is unique and irreplaceable. However, like FT, the issuance of NFT relies on the underlying Blockchain technology, and after the NFT-related content is created by its creator, its related information will be stored on the corresponding Blockchain, i.e., the NFT will be chained (Kathleen, 2021). Thanks to the feature that Blockchain technology can time-stamp each NFT and give it a unique label, each NFT can be permanently stored on the Blockchain and cannot be arbitrarily tampered with. The collector's value of NFT also comes from the aforementioned uniqueness and scarcity. With Blockchain technology, the buyer of NFT can obtain specific proof of "ownership" of the NFT and its underlying content. Almost all art works (such as pictures, videos, photos, songs, etc.) can be created as NFT works and recorded on the Blockchain through Blockchain technology, which is of positive significance to further encourage digital art creation and protect intellectual property rights. a document, an avatar. In order to better analyze the concept of NFT, it is necessary to explain its relationship with Blockchain, homogeneous passwords and smart contracts (Liu, 2022).

The general theory is that a Blockchain is a chain consisting of one block after another, with certain information stored in each block, and this chain is kept in all servers and protected by encryption. The Blockchain system only recognizes the earliest transaction confirmed in the system and makes the majority of people in the whole network recognize this transaction. nft is based on Blockchain technology and marks digital assets through Blockchain technology to ensure that this digital asset is unique in the whole network and recognized by the whole network. nft can complete the transfer through on-chain transaction after obtaining the identity mark through Blockchain technology, and the transaction information is recorded by the Blockchain ledger and supports traceability. It can be said that Blockchain technology is the foundation technology of NFT.

NFT can solve the problem of identity authentication and rights confirmation in the metaverse and meet the needs of strong social interaction. The social nature of the metaverse requires strong immersion and an open and inclusive environment (Mystakidis, 2022). Metaverse. Interference.. The

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meta-universe will allow users from all corners of the globe to communicate with each other anytime, anywhere. NFT's non-repeatable, non-replicable, and relatively simple architecture meets the fundamental need for identity recognition in projects with strong social attributes. A standardized identity marker that ultimately serves hundreds of millions of people needs to be simple, fast, and accurate in identifying information (Yu, 2021).

5. Application of nft in China

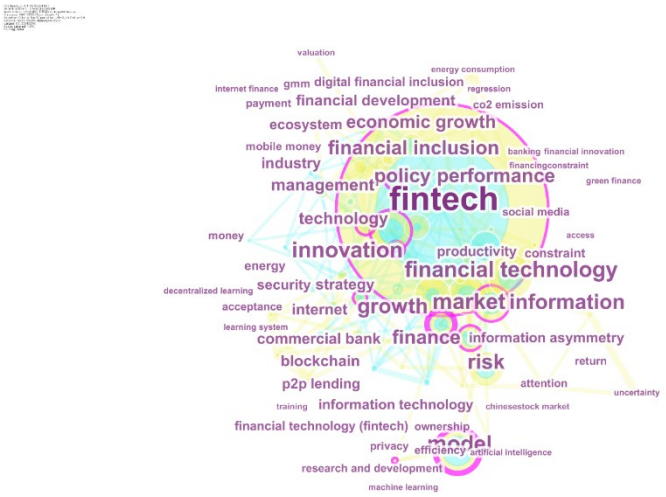
NFTs (Non-Fungible Tokens) are commonly known as "digital collectibles" in the Chinese market. The process of issuing NFTs is often referred to as "casting." NFTs are built on Blockchain technology and possess several characteristics, including non-tamperability, traceability, openness, and transparency. These features allow NFTs to have a unique identifier, represented by a string of metadata. This uniqueness and scarcity contribute to their growing significance in addressing rights verification issues and enabling decentralized transactions. NFTs provide a way to establish ownership, provenance, and authenticity for digital assets, ranging from artwork and music to virtual real estate and more.

NFT in China can be seen as a virtual asset (digital collection). NFT is produced by human labor and condenses the human abstract labor force. Similar to virtual assets, NFT supports the transfer of consideration, trading, generating income, and has value. NFT holders can possess, use, dispose of, profit from, and have disposable. At present, some well-known China's NFT product platforms such as the Tencent Magic core APP changed to "digital collection". From this point of view, the convergence of virtual assets or digital collections may be the possible legal nature of NFT under the Chinese compliance framework.

NFT in China is not a virtual currency. Tokens can be divided into fungible and non-fungible ones, but they are fundamentally different. Fungibility refers to the fact that there can be no difference in the exchange between coins. For example, Bitcoin and Ethereum are all fungible tokens. NFT is differentiated from virtual tokens by their non- fungibility, which carries the value of the physical or digital assets attached to it. In China, virtual currencies are easy to be used for illegal activities such as money laundering and a lack of exchange mechanism, which can easily cause inflation and market chaos. China has been cracking down on virtual currencies.

These policies indicate that the development of NFT in China must not rely on the model of coin issuance and speculation and arbitrage, otherwise it will follow the path of virtual currency and seriously disrupt the financial order. Therefore, some Chinese enterprises that currently use NFT technology tend to rename related products as "digital collections" and avoid using "NFT" to emphasize the "separation of token and digital collections", which reflects the necessity of separating it from virtual currency qualitatively in practice.

6. Innovative strategies of China



Source: WoS (2020-2022)

Figure 1: Keywords cloud map

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In this paper, *Citespace* is used to conduct a bibliometric analysis of 200 core papers on China Fintech Policy from Web of Science, and a keyword clustering map is drawn. As shown in the Figure 1, Blockchain attracts the most attention in terms of technology, followed by AI, while NFT, as a global emerging thing, hardly appears in the literature. On the policy front, innovation is at the top of the list. The second is the study of policy performance (Chen et al., 2015). Based on the above review of the legal framework of the three technologies in the field of fintech, as well as the current situation of relevant enterprises in China, this paper will explore the Chinese government's policy suggestions for balancing fintech regulation and innovation.

6.1 Encouraging the integration of fintech development with the real economy to promote the development of other related industries.

Take the cultural and tourism industry as an example. According to the 14th Five-year Plan for Tourism Development issued by The State Council, the application and popularization of new technologies such as big data, cloud computing, Internet of Things, Blockchain, and 5G, virtual reality and augmented reality will be accelerated in the field of tourism, and the development level of tourism will be improved through scientific and technological innovation (Chen et al, 2022). This paper believes that NFT digital collection, as an important application of Blockchain, will play an important role in enabling local culture and tourism.

Take Wuhan as an example, the yellow Crane Tower, East Lake, Mulan Scenic Area, and other 5A scenic spots are well known, and many historical figures and stories related to the scenic spots have been derived. And these IPs released digital collections of good subject matter Wuhan Legend of Yu flood control (folk literature), Wuhan zhangtou puppet show (traditional drama), Mayinglong traditional Chinese medicine preparation methods (traditional Chinese medicine), Han embroidery, and other intangible cultural heritage are also suitable for the release of digital collections. These digital collections can play multiple roles in activating intangible cultural heritage, promoting the city, and gaining the recognition and dissemination of the younger generation.

The first project produced by NVWA is in the national ecological civilization transformation and rural revitalization background, by Henan Pingdingshan city mound town cooperative association launched the garden village "digital villagers" rights and interests project, project sale income for the development of local villages. Every digital Villager holder is a "digital villager" of Huayuan Village and can participate in the integration of various resources such as funds and talents, and share the dividends of overall rural development. This project provides a beneficial attempt to explore the path of rural revitalization under the background of the digital economy and plays a demonstration role in enabling the real economy.

Based on the NOVA case, this paper suggests that China's future NFT development can make more use of "NFT+ ecological resources", "NFT+ rural assets" and other modes combined with the regional real economy to attract more capital attention, human and material resources for rural revitalization, and drive the development of local tourism industry, thus driving the regional economic development.

6.2 Strengthen supervision of third-party platforms using emerging technologies, and clarify responsibilities and obligations.

The domestic NFT supervision mainly covers four aspects: first, preventing the risk of virtual currency speculation; second, controlling the financial risk caused by secondary transactions on the platform; third, copyright protection; fourth, preventing digital artwork from money laundering and terrorist financing. Based on this, this paper argues that future policies should enhance the review responsibility of third-party platforms, promote digital trading platforms to establish intellectual property review mechanisms, conduct a preliminary review of the copyright aspects of NFT works traded on the platform, and prevent platforms from using the financialization and securitization of NFT products to engage in illegal financial activities.

7. Conclusion and recommendations

First, this chapter takes Blockchain as the core to discuss the significance of NFT based on Blockchain technology for the development of China's metaverse industry. Blockchain promote each other and develop together. The importance of NFT in Blockchain is also reflected in the meta universe. NFT platforms and risks in China are listed. Finally, this chapter discusses the development trend of

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relevant policies in China in the future, that is, the combination of innovation and regulation. NFT will inject vitality into the economy and help build a diversified world in the future.

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