

The Digital Economy Logic Analysis Based on the Metaverse

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Abstract: In the information age, the development of the Metaverse is very popular, and it is becoming one of the most popular concepts in this era. The development of the Metaverse relies on the rapid development of Internet technology and is committed to building a new ecosystem in the virtual world, including entertainment, economy, and all aspects of life. On this basis, this paper first defines the concept and important components of the Metaverse and analyzes its digital economy model. On this basis, a comprehensive analysis of the digital economic model contained in the Metaverse and the operation mode of the Metaverse's residual value production and operation enabled by the blockchain is carried out, and the digital logic laws of the Metaverse's operation are pointed out.

1. Concept Analysis of the Metaverse

1.1 Concept Definition of the Metaverse

Metaverse is a virtual reality ecosystem that integrates a new generation of Internet connection technology. This ecological structure is completely based on the cloud; its terminal is the user's virtual reality device. The interaction between users relies on the Internet, thus greatly changing the interaction structure between people and bringing a new experience.

The Metaverse Internet of Things technology is an Internet between devices formed based on the big data cloud through the gradual expansion of Internet technology. This technology can connect the devices closer, and it is easy to monitor and modify them by viewing them from the client. The architecture of the Metaverse IoT is usually divided into a perception layer, a network layer, and an application layer. It is a very standard three-layer structure, and each part of the architecture has different functions and applications.

1.2 The Technological Composition of the Metaverse

The technical components of the Metaverse are as follows:

(1) Infrastructure part: mainly includes communication server, big data cloud, blockchain Internet of Things, etc.

(2) Basic technology part: mainly includes blockchain enabling technology, virtual reality technology, brain-computer interface technology, and artificial intelligence technology.

(3) User service part: mainly includes Metaverse ecological software, such as the immersive experience of virtual reality, entertainment social platform, digital market NFT, Internet of Things driver, etc.

The business models are divided into three categories based on the perspective of the metaverse data platform provider.

(1) Core Enterprise Metaverse Digital Economy Platform: Core enterprises often use credit sales and purchases to "squeeze" the data flow of upstream and downstream enterprises, which affects the normal operation of small and medium-sized enterprises. By assisting cooperative server enterprises in solving the source of funds, core enterprises can reduce commodity costs and increase sales revenue.

(2) Virtual reality service enterprises provide metaverse digital economy data service platform: The Internet virtual reality service business is constructed based on its own technology and big data

advantages and the server data of the B2B business platform.

(3) The data agency provides a metaverse digital economy data service platform: Banks, from fund providers to risk management controllers to building a metaverse digital economy data platform, fully intervene in the industrial field to open up business processes as participants.

1.3 The Productivity of the Digital Economy Contained in the Metaverse

The digital economic productivity contained in the Metaverse mainly includes the following points:

(1) The Metaverse could provide a new form of social production.

(2) Most of the labor forms in the Metaverse are technology-intensive labor, which will improve the overall socio-economic structure.

(3) The supply structure in the Metaverse is very different from traditional production.

Specifically, the production of Metaverse data activities is an activity that summarizes various data activities of virtual users and takes stock of the results obtained. The production of digital data activities in Metaverse can systematically express a series of data production activities in the business process of enterprises through the specific selection of the financial indicator system. In this process, many disciplines are involved, such as accounting and data activities, quantitative management, etc. The evaluation of enterprise performance occupies an important part in the comprehensive evaluation system of enterprises. Therefore, it is necessary to conduct systematic and perfect inspections of enterprises to evaluate the operating systems and conditions of enterprises, the above process is critical, and it is also an indispensable step to building virtual user finance into an organic whole [1].

2. The Specific Way of Combining the Metaverse and Digital Capital

2.1 Digital Labor in the Metaverse

Most of the digital labor contained in the Metaverse is the processing of virtual data products, and the object of labor is the data contained in the server, which requires manual screening of some content that cannot be screened by artificial intelligence. In addition, a considerable part of the labor in the Metaverse is stored around the server operation, and the operation and maintenance of these databases is also a huge project [2]. The digital labor process contained in the Metaverse is shown in Figure 1 below.

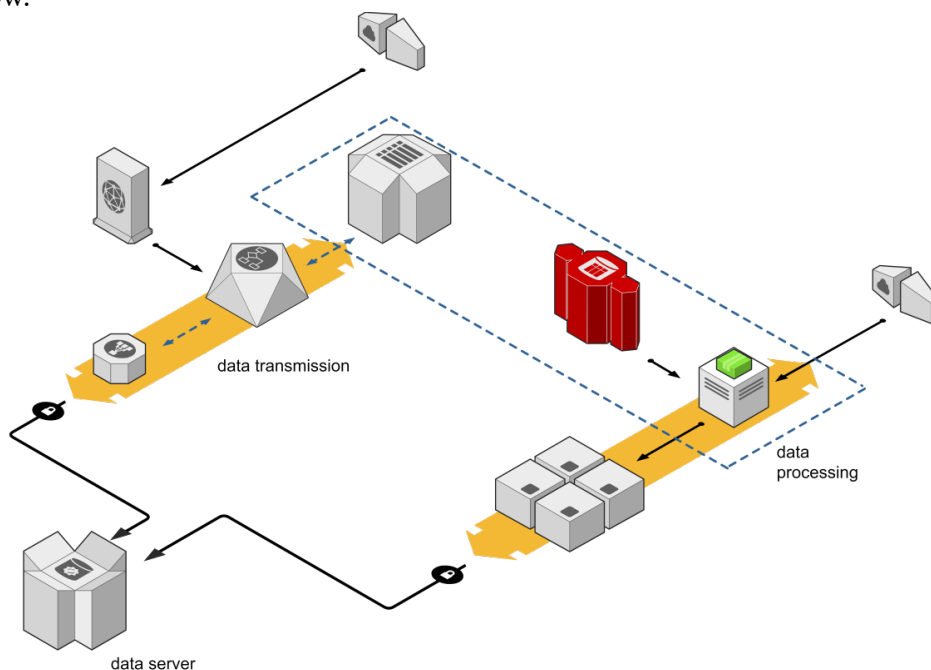


Figure 1 The digital labor process embedded in the Metaverse

The basic Metaverse digital economic data products can be divided into receivables, inventory, and prepaid according to the nodes of the transaction process. Based on this, the Internet metaverse's

digital economic and financial models are divided into three categories.

(1) Accounts receivable data model: The accounts receivable data model includes data on the pledge of data creditor's rights, factoring, and pledge of accounts receivable. The ownership belongs to the data enterprise, and the pledge data must be registered on Zhongdeng.com [3].

(2) Inventory data mode: In the data economy subject, the inventory data mode is divided into static, dynamic, and warehouse receipt pledge credit according to the liquidity of the collateral. In addition to data application companies and financial institutions, participants also include data logistics companies and data futures companies.

(3) Prepayment data: Prepayment data occurs in the data procurement process. When the buyer's enterprise funds are insufficient to pay, the data center provides a data method for the order.

2.2 Blockchain Empowerment in the Metaverse

The Internet Metaverse blockchain's digital economic foundation is the digital interactive activities between virtual users relying on exchanges to provide financing services.

(1) It is not easy to tamper with and solves the problem of data authenticity: the data itself is false before entering the block or before the transaction occurs, so for the data before the chain, the initial authenticity of the data must be determined, and the logistics, warehousing and other information can be tracked and stored through the Internet of Things technology. Judgment; connect the virtual user system directly with the platform to avoid manual data processing and input.

(2) Distributed ledger technology solves the problem of information openness: virtual user data and information in centralized data centers and information related to the platform Metaverse blockchain have network security risks.

(3) Smart contract technology reduces the risk of default and improves operational efficiency: blockchain technology uses data records that are difficult to change and realize efficient data flow. Credit transmission is realized through the transparent disclosure and flow of information, allowing virtual users to have the opportunity to obtain financing help [4].

Metaverse blockchain empowerment should be divided into the public chain and permissioned chain. The difference is that the public chain has been set up since its birth, all users can participate, and the rules are not centralized. Licensed chains include consortium chains and private chains. If new nodes want to join the licensed chain, they must be authorized and approved by the licensed chain. Multiple parties manage the alliance chain, and one or more nodes are managed according to the authorization rules. All participants have a public ledger to read, write and interact with data. Each participant is a stakeholder alliance relationship to jointly maintain the healthy operation of the alliance chain. The participants jointly formulate the alliance chain's management rights and decision-making rights [5].

3. The Production and Economical Operation Mode of Surplus Value in the Metaverse

3.1 The Production Mode of Surplus Value in the Metaverse

The evolution of the Metaverse, the digital economy supply chain, is as follows. The production method of surplus value in the Metaverse mainly relies on blockchain empowerment [6].

The first stage: connecting the core upstream and downstream enterprises into a supply chain, in which the data center is the dominant core.

The second stage: Take digital business leading companies, companies providing property rights supervision, supply chain service providers, and Internet service companies as part of the supply chain.

The third stage: In the digital economy stage of the Internet supply chain, participants are diversified, including direct participants in the digital economy of the supply chain, stakeholders, and other digital economic institutions. Internet technology can handle financing needs in batches, standardization, and process [7].

By analyzing Metaverse digital economy products and services, the common main processes are as follows:

(1) Business investigation/due diligence: Investigate the business operation model of the

Metaverse server by combining offline and online methods, collect various credit data for risk assessment, determine whether digital economic cooperation can be carried out, and determine in what mode. This stage requires a lot of data and credit information.

(2) Agreement Signing: The Metaverse Server negotiates the execution details with the data center or factoring agency. Generally, all information and materials on the Metaverse server are submitted online, and the online agreement is signed.

(3) System docking: The systems between data centers need to be docked to complete the digital Internet management of capital flow [8].

(4) Data center account opening: Metaverse servers are generally required to open a special account in a designated data center to pay and repay funds in the blockchain digital economy. Accounts have different permissions and system settings according to different blockchain products. Some data centers provide exclusive data center account services for Metaverse servers for blockchain.

(5) Credit management: In order to submit a credit application on the platform according to the business situation, the metaverse server generally needs to upload the credit demand proof materials, the current credit certificate, and other materials. According to the financing model and the metaverse server collateral, the platform grants a comprehensive line of credit.

(6) Repayment application: Metaverse server submits financing funds and corresponding interest and service fees on the Internet platform. After the repayment is completed, the credit line is released, and the next business cycle is entered.

3.2 The specific form and economic impact of the combination of the Metaverse and capital

The specific form of the combination of Metaverse and capital is as follows:

(1) The Metaverse makes data a new form of capital.

(2) Individual users in the Metaverse also generate data, which can be used as one of the new producers, and data is the new means of production in the Metaverse [9].

(3) The birth of the Metaverse enables the establishment of a huge industrial chain relying on the data structure, and the economy and virtual data value will also be established on this basis.

In terms of technical architecture, the Metaverse digital economy platform includes six structural layers: data layer, network layer, consensus layer, incentive layer, contract layer, and application layer. Business flow, logistics system, and big data analysis Metaverse digital economy platforms are seamlessly connected to provide data analysis, reporting, and monitoring functions. The distributed data structure of the blockchain mainly adopts the P2P (peer-to-peer) dynamic networking method. As the data on the chain continues to increase, all transaction data is saved by a combination of full nodes and SPV (Simple Payment Verification) nodes, while participating companies in the Metaverse blockchain only need to upload their data and save data related to their own financing. At present, most of the cross-chain methods are hash lock, parallel, multi-chain, notary mechanism, relay chain, etc.

The influence of the Metaverse digital economy is mainly reflected in the choice of consensus mechanism. The current common consensus mechanisms are as follows:

(1) Proof of work mechanism. Bitcoin adopts this mechanism, which is suitable for public digital chains. The advantage is simplicity and transparency. The disadvantage is that proof of work consumes a lot of power resources and attack mechanisms, which is unsuitable for supplying digital chain financial scenarios [10].

(2) The proof-of-stake mechanism still requires mining in essence. The advantage is that the POS algorithm saves more time and resources for reaching a consensus. However, it is easy to hack and unsuitable for digital supply chain financial scenarios.

(3) The share authorization proof mechanism, based on the first two mechanisms, improves the network security by reducing the time required for the number of accounting nodes and has the characteristics of incomplete decentralization.

(4) Byzantine fault tolerance, this algorithm manages the blockchain digital chain by verifying the identity and can quickly find malicious verifiers for the digital alliance chain and remove them to

protect the security and immutability of the digital alliance chain. At present, a large number of alliance digital chains adopt the PBFT or BFT-like consensus mechanism.

4. Conclusion

This paper mainly analyzes the digital economic form of the Metaverse. On this basis, it points out that the economy of the Metaverse is an economy based on data. Relying on virtual reality and the Internet of Everything, the data generated by the Metaverse users is used as the means of production. The virtual data is added with value, deriving a completely digital economy industrial chain of the Metaverse. The birth of the blockchain is indispensable in this process, so the impact of the two on the digital economy of the Metaverse can be viewed dialectically.

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