Analysis of the Future Prospects for the Metaverse

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ABSTRACT

With the rapid development of digital technology, all areas of society may accelerate their entry into the virtual world, thus blurring the boundary between the physical and digital worlds and promoting a Metaverse. The Metaverse will become an important public infrastructure. This paper first introduces the concept of Metaverse, including the origin and development of Metaverse, the concept of Metaverse, and the key features of Metaverse. Then, the construction of Metaverse is analyzed from various aspects such as technical support, current progress as well as feasibility, and limitations. Finally, it is concluded that Metaverse is a new windfall for the future development of the Internet, and further development of Metaverse needs to be realized from multiple perspectives, such as industrial investment, regulation, industry integration, and technological breakthroughs. The Metaverse is a virtual world that incorporates all aspects of digital technology, including video conferencing, games such as Minecraft or Roblox, cryptocurrency, email, virtual reality, social media, and live streaming. In the past, the Metaverse was stuck in the concept stage. With the digital age and the constant development of Internet giants, the distance between virtual concepts and reality is shrinking.

Keywords: Metaverse, AR/VR Prospect, Digital Times

1. INTRODUCTION

1.1. Background

Since ancient times, people have always had a good wish for life, and people always want to transform their life to make them better. In 1992, Neal Stephenson's science fiction *snow crash* described a world parallel to the real world, in which people can live a different life from the real world. With the development of technology, the fantasies in *snow crash* gradually become more real. To achieve the operation of this virtual world, people need the support of a variety of reality technologies, such as the development of AR devices, which makes it easier for people to enter the virtual world, shorten the distance between virtual and display, and have a more sense of substitution. The development of VR devices also makes it easier for people to cross the physical distance of the real world and connect. At present, to realize the operation of the world, it also needs a stable medium, which needs stability and sustainability. Blockchain technology provides us with this platform. Because blockchain technology has the characteristics of

unforgeability, traceability, and persistent retention, it has advantages those traditional methods do not have. Due to this advantage, people have developed many blockchain applications, including some cryptocurrencies and blockchain games, which have built a platform for the current development of metauniverse. People can buy and sell, talk with others, and even try to build a real world. According to the current development, with the support of various technologies, the Metaverse can make further development and form a truly extensive and rich world.

1.2. Related Research

There is a considerable of literature on Metaverse development. Dionisio et al. focused on the current state of Metaverse and its potential future growth. A complete metaverse world should involve realism, universality and interoperability.[1] Besides, Collins mentioned few CIOs are currently prioritizing the exploration of virtual worlds, but it seems safe to predict that within the next three to five years[2]. Metaverse games have grown in the last few years. Papagiannidis et.al stated that people

were in the early days of the Internet, and the great majority of signs indicate that its popularity will skyrocket [3]. A series of recent studies have indicated that Metaverse has a lot of attention in the market and some investment.

Metaverse has received a lot of attention from the investment community, but there are still issues limiting its growth. Dionisio et al. Argued that the first pertains to current limits in computational methods related to virtual worlds. [1] The second is economic and political barriers. Bourlakis et al. pointed out that the urgent need for policy-making. Specifically, if the retailers selling in the second life do not transfer their funds outside the virtual world, whether their professionals will be taxed and how to ensure the good operation of meta universe retailers is a very key issue [4]. Thus, several questions regarding the limitations of Metaverse remain to be addressed.

Several theories have been proposed to the application areas of Metaverse. Bourlakis et al. claimed that the introduction of Metaverse is an important extension of the traditional retail business environment [4]. Duan et.al. focused on university campuses and discussed Metaverse how applied on campus. Duan et.al. focused on university campuses and discussed Metaverse how applied on campus. MacCallum and Parsons focus on AR and Metaverse on the learning aspect [5]. Besides, Siyaev, A., & Jo focus on the application of new technology in aircraft maintenance [6]. Based on the research of scholars, this paper will propose a new path for the future development of the Metaverse, namely industry convergence.

1.3. Objective

From the perspective of the current development of the Metaverse, it is still in the initial stage and has high development potential. To further understand the Metaverse and find its advantages and problems, it is going to sort out the status quo of the meta-universe and find its current achievements and future directions to support its better development.

2. THE CONCEPT OF METAVERSE

2.1. INTRODUCTION

2.1.1. Origin

In 1992, the science fiction novel "Snowstorm" was published, which first mentioned the metaverse [7]. In the book, Neil Stephenson describes a networked world parallel to the real world and names it "meta boundary". All people in the real world have a "network separation" in the yuan world. This "Yuan Jie" is called "Metaverse" in the original English book. It is composed of two roots, meta, and verse. Meta means "transcendence" and "meta", and verse means "universe". Thirty years later,

ROBLOX, a sandbox game platform, became the first METAVERSE concept game stock to be listed on the New York Stock Exchange, and its $40 billion valuation set the tech and capital circles on fire [8]. Since then, the concept and articles about the "metaverse" appeared in a large number of reports from the media, attracting the attention of all walks of life and even government departments, forming the "meta-universe" phenomenon..

2.1.2. Development

2.1.2.1. Capitalist Investment In The Meta Universe

"Meta universe" originates from games, surpasses games, on the one hand, the infrastructure and framework of "meta universe" dominated by games tend to be mature; On the other hand, the boundary between games and reality began to melt. The creator was only the earliest player, not the owner. The rules were decided by the community.

In 2003, Linden Lab, an American Internet company, launched the "second life" based on open3d, which is a landmark event. Later, in 2006, Roblox released a game Roblox that is compatible with the virtual world, casual games, and user-built content at the same time; In 2009, Mojang studios in Sweden developed Minecraft, a game; In 2019, Facebook announced that Facebook horizon has become a social VR world; Decentral and, which supports users to own and operate virtual assets on the platform of Ethereum in 2020, constitutes the main historical node of the historical stage of the "meta universe". In China many companies also notice the Metaverse effect. Tencent, for example, bought Epic and increased its investment in Metaverse. Alibaba also advances layout in NFT [9].

2.1.2.2. What Is Metaverse

Based on the TIAN's three theorems, it can see that the player and the system are closely linked, this is an open and shared virtual community. At the same time, Tianyi Ai's paper also proposed four stages of Metaverse development, including External Product Internal Consumption, Internal Product Internal Consumption, Internal Product External Consumption, and Anywhere Product.

2.1.3. Characteristics

And a real meta universe product should have eight elements: identity, friends, immersion, low delay, diversification, anywhere, economic system, and civilization. Identity: players can have a virtual identity, which has nothing to do with the real identity. It can be a president or a beggar. Here are seven traits that are widely agreed upon.

(1) Friends: users can have real or AI friends and socialize, whether users know them or not in reality.

(2) Immersion: users can immerse in the experience of the meta universe and ignore everything else.

(3) Low delay: everything in the meta universe happens synchronously, without asynchrony or delay, and the experience is perfect.

(4) Diversification: the meta universe can provide rich and differentiated content, including playing methods, props, etc.

(5) Anywhere: users can log in to the metauniverse anytime, anywhere, without space constraints.

(6) Economic system: like any complex large-scale game, the meta universe should have its economic system.

(7) Civilization: people gather together to create a unique virtual civilization and digital civilization [6].

With the development of digital technology, human beings will complete the digital migration from the real universe to the meta universe in the future. The whole migration process is divided into three stages: Digital twinning, digital primordial, and virtual reality. After digital migration, a complete set of economic and social systems will be formed in the digital space (meta universe), resulting in a new money market, capital market, and commodity market. The digital separation of human beings in the meta universe will live forever.

3. THE CONSTRUCTION OF METAVERSE

3.1. The Technical Support Needed for Metaverse

The Metaverse concept originated from the American Science Fiction Novel "Avalanche", that is, the concept of surpassing the universe, a man-made space that is running parallel to the real world. The technical perspective of the technology, the main divided into six major support technologies, there is the Internet, display technology VR, AR, MR, XR, blockchain technology, video game, artificial intelligence, interactive technology, and network and calculations.

To come to immersion, the Metaverse needs to apply VR technology. At this stage, most platforms have not yet used VR, but with the progress of qualified VR equipment, the price reduction, the binding of the Metaverse and VR is just a time problem. To achieve persistence, metamorphic needs to ensure a similar, smooth experience with edge computing techniques.

To support identity and economic systems, the Metaverse needs to establish credibility using blockchain technology. The application of edge computing and blockchains is mainly the task of the platform; the application of VR should cooperate with the user and platform.

3.2. Current Developments In Metaverse

The Metaverse is a very big system, and the company has explored and layout in the fields such as AI, cloud computing, AR / VR. In the past, Metaverse stayed in the concept stage. Now, with the continuous development of the digital age and an internet giant, the distance from the virtual concept and reality is shrinking. The Metaverse originated from the game, and future increases with the main body of the Metaverse participation in the main body of social, remote office and other fields will further explosion. Currently, many venture capital institutions have called the Metaverse the next generation of the Internet.

The metaverse achieves the promotion and support of the molecular universe in the long term. Metaverse is expected to bring the innovation of the virtual world, promote the game content, community, education, commodity trading, artificial intelligence, VR / AR, blockchain, and other industrial chains All links are glorious, which will bring new increments. At present, Tencent, Xiaomi, Apple, Facebook, and other domestic and foreign technology companies have started layouts and investments in cosmic association equipment and technology.

The Metaverse will accelerate and may become an important part of future life, and promote the careful integration of the entity economy and the digital economy. Perhaps shortly, everyone can freely roam in another parallel world.

3.3. Feasibility

3.3.1. Capital Layout of The Metaverse Industry

As the VR/AR hardware, content, and blockchain industries continue to improve and mature, the "Metaverse" is rapidly gaining popularity in the capital sector due to its promising future, attracting the attention of investment institutions and entrepreneurs. The Metaverse has attracted the attention of a wide range of investment institutions and entrepreneurs, and the domestic and international investment community has made additional investments in the Metaverse. From the listing of Roblox to the RMB 9 billion acquisition of Pico by Bytedance, and the series of Facebook's moves, major capital companies have been making frequent moves in the Metaverse.

3.3.2. The Dawn of A New Internet Era

The "flywheel effect" and "network effect" are becoming more and more prominent, and the world is

accelerating into the virtual interconnection era of networking and virtualization. At the same time, the mobile internet has been in development for a decade and many major players are preparing for the next era of interactive experiences. Tencent CEO Ma Huateng has mentioned that the era of the mobile Internet has passed and the future is the era of the all-real Internet. The Internet has provided the physical network foundation integrating network and arithmetic power for the birth of the Metaverse and has also generated a large amount of native quality content, thus forming the infrastructure for the virtual interconnection of the Metaverse. This has also greatly accelerated the development of the Metaverse.

3.4. Limitations

3.4.1. Inadequate Development of Metaverse Infrastructure

In addition to value delivery and ensuring credible security, blockchain can also form the underlying technology of the meta-universe together with cloud computing, 5G, and artificial intelligence. Further applications of the Metaverse will certainly require a large supply of infrastructure, relying on underlying software technologies to solve a range of problems that currently arise, such as transmission performance, high latency, etc [10]. In addition to breakthroughs in the convenience and stability of VR, AR, and MR technologies and wearable devices, the construction of large internet platforms is also a pressing issue, such as modeling and rendering, device parameters, 6G networks, etc.

3.4.2. Lack of High-Level Cross-border Cooperation

The concept of Metaverse is hotly debated by industries such as investment, gaming, information technology, blockchain, cloud computing, artificial intelligence, and virtual reality. Only when all participants are in the same environment and discussing in-depth and continuously will the Metaverse application scenarios be born and perfected on a large scale.

4. FUTURE TRENDS AND OUTLOOK FOR THE METAVERSE

The Metaverse will eventually build a world with a fully functioning economy, spanning both physical and digital. The current digital assets, virtual content, IP, and digital currencies can all pass within the Metaverse, and this world will also have the ability to be fully self-driven and iterative.

Technology is evolving rapidly, just as the internet has already connected 63% of humanity in just half a century, with the iterations of 5G, AR, VR, MR, and other technologies and terminal devices, the Metaverse may change far beyond people's expectations in terms of building a new internet form with multi-interface, full-sensory immersive human-computer interaction, which will hopefully become a reality.

4.1. Regulation

It is not only the technical and content challenges that are still to be overcome but also the regulatory aspects that need to be addressed. The Metaverse is a virtual world separate from the real world, but what happens in this virtual world can have an impact on the real world, and at the same time it has its independent economic system to support the rules of the virtual world, but here the question arises as to who will make the rules, who will design the code, whether the transmission of information will be regulated enough, whether there will be money laundering and fraud, and so on.

4.2. Investment Diversification

The growth of the Metaverse will lead to a surge in investment in more sectors. Firstly, it will lead to a further boom in the virtual goods market. The current size of virtual goods is around US$50 billion and is expected to grow to US$190 billion by 2025. Secondly, it can drive the rapid development of AR/VR. the global AR/VR market will have an associated expenditure of US$12 billion in 2020 and is expected to grow at a CAGR of 54% over the five years of 2020-2024; the total number of AR/VR devices shipped reached 5.12 million units in 2020 and is expected to reach 43.2 million units in 2025. Thirdly, it will further promote the rapid development of cloud computing, as the realization of the Metaverse will require more massive data storage and computing needs. Fourthly, for the content or platform builders themselves, they can build an immersive virtual world that integrates social, entertainment, advertising, e-commerce, and other functions, and their business value speaks of a geometric increase with the extension of the user value chain.

4.3. Industry Integration

2021 is known as the first year of the Metaverse. At this time, in the new spacious navigation era, human beings are striving to walk into the digital world. Metaverse is composed of numerous technologies, and it is now in the early stage of Metaverse, but Metaverse is still far from human beings, and Metaverse's implementation requires multiple techniques such as 5G, VR / AR, cloud computing, etc., and core technology AR / VR has not yet formed a clear business model. These technologies are also just entered the door and channel of Metaverse, and the real Metaverse requires more things. If the current Internet can complete the office online, complete the shopping, complete the teaching, then the

development of the Metaverse era should be complete penetration and integration, real all the Internet interconnection, technology interoperability, and even realize true in the 3D world. In the immersion experience, connect the real and the virtually connected to the Internet. Recently, China's leading mobile development service provider. Aurora Mobile successfully implemented the push function in the self-developed game demo on the Roblox platform. With this feature, the virtual information in the game can break the secondary wall, transfer it to the real world, not only let the virtual world and the real-world dialogue be possible, more "Metaverse" development provides a new practice.

4.4. Related Technological Breakthroughs

In the world of Metaverse, people can not only complete the online chat but also through VR, AR, MR, and other technologies, immersion experience in the virtual world. The content of future Metaverse will be cross-platform, completely created by users, can complete the line, can experience and feel the results in reality in the world of Metaverse, people can be given a fully immersing experience. Without the limitations of geographical space, people can accommodate countless virtualization. People can build an economic system through the intelligent contract of blockchain technology, and the virtual world is closely fit with the real world in economic, social, and identity systems to ensure the authenticity of the content. Through the Internet of Things, let digital life is embedded in daily lives. In the future, everyone will participate in the Metaverse's world, through a virtual identity, earning a variety of asset revenues in the virtual world, can create, own, and even sell a wide variety of virtual items. Intelligent equipment will be integrated with the human body in the shape, allowing human spiritual thoughts to bloom in the Metaverse.

Metaverse has a beautiful vision and future, but it requires the development of hardware and technology to accomplish commercial landing applications. It looks forward to receiving the day of Metaverse.

5. CONCLUSION

With the rapid development of digital technology, all areas of society may accelerate their entry into the virtual world, thus blurring the boundary between the physical and digital worlds and promoting a Metaverse. The Metaverse will become an important public infrastructure.

This paper provides an in-depth overview of the Metaverse, outlining and analyzing several aspects of its concept, background, construction, and future trends. Even if the Metaverse does not live up to the fantasies of science fiction writers, it has the potential to generate trillions of dollars in value as a new computing platform

or content medium. However, in its entire vision, the cosmic space will be the gateway to most digital experiences, a vital component of all physical experiences, and the following excellent labour platform. Nevertheless, the current development of the Metaverse still suffers from a poorly developed meta space infrastructure and a lack of high-level cross-border collaboration.

From an overall perspective, the Metaverse is still at a preliminary stage of development due to the lack of technology, imperfect industry knowledge, and expensive hardware and software. However, with the development of communication, cloud computing, AI, blockchain, and other technologies, the real world, and the virtual world will gradually be connected, and all aspects of daily life, such as entertainment, education, work, and trading, may be integrated into the Metaverse system, and eventually form a wide and rich digital world.

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