

Metaverse and Business Economics: Theoretical Foundations and Research Prospects

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Abstract: The metaverse has become a hot topic driven by the scientific and technological foundation and actual needs. It has received widespread attention in the scientific community, the media, and the private sector. Some studies believe that the metaverse may completely change life patterns. Theoretically, theories related to the metauniverse emerge in an endless stream, but the combination of theory and industry is still in its infancy. This paper analyzes the current situation and development prospects of the metaverse industry from the three properties of the metaverse itself. The metauniverse has broken through the limitations of time and space and has a certain industrial foundation in entertainment, education, and psychotherapy. Human-machine integration is another property of the metauniverse itself. Reality is mapped to the virtual world and combined with virtual natives to bring a new sense of somatic feedback. The third point is the unique economic value of the metauniverse. Decentralized cryptocurrency is widely used, and digital collections are used as commodities in the virtual world to promote monetary circulation. At present, the data of the metaverse industry is relatively small. To analyze the value of the metauniverse more specifically, we need to summarize the data.

Keywords: metaverse, business economics, foundations and research prospects

1. Introduction

With the rapid development of computer information technology, the world is entering the Web 3.0 era, and many changes have occurred in the economy, industry, education, and other fields, showing: the development trend of intelligence and automation. Back in the Web 2.0 era, people realized the connection between two visual and auditory senses at the two-dimensional level on the Internet. At the same time, there were barriers to tactile and deeper perceptual interaction because of time and space limitations. In today's increasingly open-minded world, while enjoying the significant development of globalization, human beings have deepened their thoughts on the inequitable distribution of resources in the real world. In such a context of the times, a vision of realizing shared three-dimensional space in the virtual world: metaverse, has become the world's focus. It is a product of the third Internet technology revolution, integrating blockchain technology, Internet of Things technology, interaction technology, video game technology, and artificial

intelligence technology to realize immersive virtual-real interaction. Relying on the metaverse's communal, interactive, and creative nature, humans can build utopias that are difficult to understand in reality and cure the sense of social alienation caused by excessive urbanization. People access the decentralized digital world with their unique virtual identities, detach themselves from the shackles of their real identities, experience a different life, Re-realize self-worth, and build psychological recognition. In this three-dimensional virtual world, which is mapped out based on the real world, there are opportunities for bold and novel ideas to be realized by taking the initiative. Relying on today's advanced computer technology, with the support of the Internet of Things, cloud computing, big data, blockchain, and other technologies, Metaverse will break the time and space limitations, create a new life model and effectively improve the development of society.

Based on the above background, this article will take the three characteristics of the metaverse as the starting point and analyze the situation and development prospects of the metaverse in education, medical care, entertainment, and other industries, which will be expanded in the third chapter. By analyzing the existing projects in the market, we explore the prospect of metaverse development. This paper will conduct a literature review in Chapter 2 to introduce the relevant theoretical foundations. The third chapter performs the main part of the study. Chapter 4 concludes and gives recommendations.

2. Literature Review

There has yet to be an agreement on the definition of the metauniverse in the academic circle, and the term metaverse is known to most people thanks to Zuckerberg. He renamed Facebook Meta, leading the company to Embodied the internet and Committed to immersive interaction between the virtual and the real. According to Li, from Xinjiang University, the metaverse is a virtual universe created based on artificial intelligence, digital twin, and interaction technology, which is parallel to each other and reality. It is closely intertwined with real society and has a certain degree of independence, which is used to meet human needs for a surreal and highly immersive world [1].

Guo conducts an in-depth study of the development process of the metaverse, and he believes that it can be divided into three stages: the virtual stage, the object-computer integration stage, and the N parallel universe [2]. The first stage is the initial stage of development, relying on comprehensive reality technology, digital twin, blockchain-based economic architecture, artificial intelligence technology, Internet of Things, and entertainment technology to project reality into parallel universes. However, the sign of the realization of the stage of integration of things and machines is that the five senses can be fully transplanted, and it will take a long time to reach this stage.

3. Metaverse and Business Economics

3.1. Theoretical Foundations

The metaverse is a virtual world that interacts with the real world using six supporting technologies: blockchain technology, the Internet of Things, interactive technology, video game technology, network and computing technology, and artificial intelligence technology. Prof. Yang from Tsinghua University suggests that the meta-universe can be summarised as “three threes”. It is also called the “three natures” of the meta-universe, i.e., spatiotemporal expansion, human-computer integration, and economic value-added. Expandability, human-computer integration, and economic value-address. The metaverse was not originally built to make humans dependent on virtual worlds that interact with the natural world but to use virtual worlds to feed immature technology, engineering, industry, etc., in the real world [3].

3.2. Research Prospects

3.2.1. Education, Psychotherapy: Breaking through time and space.

The metaverse is not a single model; it relies on various technologies such as XR technology, digital twins, arithmetic technology, blockchain, communication technology, and artificial intelligence. Bringing these technologies together at scale is the application of multiple emerging technologies in a unified imagination [4]. The metaverse is “three-dimensional” in terms of spatial and temporal scales; based on the application of extended reality and digital twin technology, the boundaries between time and space become more blurred, i. e. the metaverse is spatiotemporally expansive [3]. As technology continues to mature, the metaverse is rapidly growing in the education sector.

For example, American High School, the world’s first virtual reality high school, was established in the US [4]. “Virtual University,” an open and meta-universe platform jointly created by XiYong and the School of Animation and Digital Arts of the Communication University of China, etc. They are breaking the shackles of inequitable distribution of educational resources, promoting equality of teacher strength and educational resources in different schools, realizing the common sharing of educational resources, eliminating the wall between school and society, and changing the traditional form of education. Therefore, based on the spatial and temporal expansion of the metaverse, metaverse education can help learners access information and practice across platforms and resources, thus achieving equality and sharing of educational resources [5]. In addition, learners can be anyone and are no longer limited to student status or location, and there are no longer clear boundaries between school and society. With the support of Meta-Universe Education, proper lifelong education and a learning society will become a reality [4]. The education metaverse is still in the embryonic stage of development. The education metaverse can break the limitations of time and space, manifest the essence of education for people, and allow learners to access diversified educational resources and diverse learning styles.

With the development of the Internet, access to information and knowledge is no longer difficult. People’s attitude towards mental illness has gradually changed, and their understanding has gradually deepened in that it has become a socially focused issue. Metaverse psychotherapy relies on spatiotemporal expansion to create an immersive experience and to construct a comfortable and stable “mental haven” in three dimensions to treat psychological problems. In the case of depression, for example, Escitalopram (ES) is currently used for contextual induction using the VR-CBT technique to reduce depression in patients, with the result that this is significantly more effective, safer, and has a lower rate of impaired cognitive function than traditional CBP therapy [6]. Sun’s team used VR combined with psychological interventions can directly improve depression in depressed patients in the post-stroke department and facilitate the patient’s return to normal daily life [7]. In addition, the application of spatiotemporal expansion in the spiritual dimension can also be used to meet emotional needs, using technology to read the memories of meaningful scenes in the brain or the memories of loved ones and friends to recreate them as virtual images. A South Korean technology team used HTC VR glasses to reunite a mother successfully, Jang, with her three-year-old deceased daughter between reality and virtual reality [8]. In the future, the de-realization of spatiotemporal extensibility combined with digital twin technology and XR technology can build scenes and characters in different physical spaces and timelines, transcending the limitations of time and space, enabling interaction between reconstructed virtual people and objects, and realizing beautiful visions in virtual space that are difficult to achieve in real life at a much lower cost.

3.2.2. Human-machine integration.

The metaverse has the triple property of the “natural body,” “virtual body,” and “machine body”, and the relationship between the three is intertwined, constituting relationship between the three is intertwined, constituting the “triad” of the metaverse. The metaverse is the result of the combination of AI technology and the Internet of Things, enabling natural people to be liberated from real-world life, i. e. the human-computer fusion of the metaverse [3]. Meta-Universe has already made significant achievements in the virtual human segment, namely virtual digital humans and humanoid robots. For example, the latest big US meta-universe web series of the year, *Fringe World*, embodies humanoid robots in Avatar mode, which has had a significant impact (Research Report on Metaverse Development by Metaverse Culture Lab); A virtual digital person in the mode of Luo Tian Yi, launched by Bilibili Company in 2012, whose breakout hit “Powerful World” has been broadcast 5.94 million times on the B station and has a total social media following of 7.931 million; Ltd.

Launched the Aiga model in 2020 with virtual digital people as spokespersons and 3D presenters with guided tours (Tsinghua University School of Journalism and Communication New Media Research Center Virtual Digital People Comprehensive Assessment Index Report, 2022). The development of applications in virtual humans can thus be seen. Still, virtual digital humans are mainly used to replace real people for simple communication and exist principally for business consultation. In the future, avatars can be further extended with personalized avatars in marketing, hosting, teaching, fitness, etc. With the rise of the “her economy”, women’s demand for beauty products is increasing, and make-up trials can no longer be limited to the real natural body. Currently, avatars are becoming deeply rooted in our lives. With the gradual maturation of AI technology, XR technology, and the Internet of Things, natural people will be able to find solace and relief in a more immersive virtual world.

The world faces an aging population and a need for healthcare resources. In addition to the needs of the elderly for daily medical visits, there is a strong demand in the market for daily caregivers who are expensive to hire and in short supply. At present, some technology companies have already invested in related industries. Roschelle uses AI technology to develop artificial intelligence nurses for home care, which can take care of the elderly in a more scientific, timely, and effective manner in a close way around the clock, reducing the problem of people consuming much energy in caring for the elderly [9]. In China, technology companies contribute to aging appropriateness, and excellent works such as intelligent care robots and non-contact vital sign detectors emerged from the first National Light Industry Ageing Appropriate Innovative Products and Intelligent Health Solutions Competition held in 2021 [10].

In intelligent health care, artificial intelligence technology and Internet of Things technology should be combined to enrich the research and development and industrialized production of equipment to help the elderly. Currently, the intelligent Japanese Toshima Ward Library in Tokyo successfully applied the intelligent AI vision equipment Or Can My Reader [11], which significantly facilitates the process of reading for the elderly, saves time and costs, and improves the well-being of the elderly group. For elderly people who live alone with limited mobility, KRG, France, has developed an AI+ intelligent monitoring system to remotely assist the elderly with Sigfox IoT technology, which can prevent the elderly from accidents [12]. Based on the existing foundation, developing core technologies such as medical imaging and super AI doctors with more specialization can also be promoted in the future.

3.2.3. Economic value.

The prototype of the meta-universe originated in video games. [13] Minecraft is a sandbox game in which users have a high degree of freedom, in which players can collect a variety of resources and simulate the realization of realistic scenarios such as farming and livestock production, construction of buildings, and transportation construction. Experienced players earn money through the game. Its high playability and freedom have brought over 100 million monthly active users. The game Sandbox began to use blockchain technology in 2018, and the freedom mode, the official launch of digital real estate. Players can obtain the game currency Sand by renting or selling land, selling personally created digital artwork, and sharing self-created games. Users can exchange Sand for U.S. dollars, ethereum, and other cryptocurrencies [14]. Not only are there market demands, commodities, production, and transactions within the game, but also the interoperability of the virtualized metaverse economy with the real economy. Travis Scott, a famous American rapper, held a virtual concert Astronomical in the game "Fortnite" in 2020. This futuristic event attracted millions of players; Travis traveled through various cyber scenes with visual and auditory impact. This futuristic event attracted millions of players, and Travis traveled through different cyber locations. The dual effect of sight and sound left a deep image on the audience.

The economic value of the metaverse relies on blockchain, digital collections, and web 3.0 to achieve. Since the introduction of Bitcoin, proposed by Satoshi Nakamoto, digital cryptocurrencies based on blockchain technology has been sought after in the market, some countries recognize digital cryptocurrencies as legal tender, but most are skeptical and place restrictions on virtual currencies in financial transactions. The development of virtual currencies, which have existed for more than a decade, is still stuck in financial instruments. Therefore some experts question the usefulness of virtual currencies: the value of a virtual currency is anchored by arithmetic power, but there is no other entity against which to compare them [15]. In such a market context, non-homogenized passwords (NFT) will become a market hit in 2021. Its essence is a trusted digital equity credential with unique characteristics in the blockchain network. This data object can record and process multi-dimensional and complex attributes on the blockchain.

Celebrities such as Justin Bieber and Takashi Murakami have already launched personal NFT collections, works with prominent cultural symbols, and a form of personal brand value deposition. Digital displays have become an essential part of the meta-universe, which has ornamental value, group identity recognition, and collection value, perfectly assuming the identity of a commodity in the metaverse economy. The virtual native and virtual reality symbiotic NFT is the entity in the virtual world to solve the problem of cryptocurrency circulation.

As an emerging model, the metaverse fuses many fragmented points into several networks, which will give rise to many new businesses and life patterns, and it will profoundly change the current digital economic system. Currently, the metaverse economy is in the initial development stage, and the generic equivalents to maintain the operation are still legal currencies such as US dollars and Euros. However, with the perfection of the metaverse economy, the status of digital cryptocurrencies will significantly increase along with the elevated demand for transactions. It will form a two-way cycle of the combination of digital cryptocurrency transactions in the virtual world and legal currency transactions in reality [16].

3.3. Development Proposals

The metaverse concept has been prevalent in recent years, and there is a growing demand for combining the metaverse with entire industries or building metaverse virtual digital worlds. In 2021 the world's first digital currency company, Coinbase (COIN) USA, entered the Nasdaq market through a direct listing (DPO) [17]. Because the main factor that affects the smooth development of

the metaverse+ industry in the future is capital, direct listing through DPO is conducive to solving the capital chain to conquer technical difficulties, and investing capital in the research and development of metaverse digital twin, expanded reality and other technologies to lay a solid foundation for the realization of the metaverse, using advanced technologies to occupy the market first, which can further form the competitiveness of the metaverse+ industry within the market. DPOs differ from traditional IPOs in that they are direct public offerings of the company's shares without using investment banks or brokerage firms. Companies in industries that go public with DPOs are less likely to have a diluted shareholding in the company. This "pure technology" structure benefits emerging industries where technology is the core focus.

In summary, a direct listing as a DPO is advantageous to developing the metaverse industry with abundant capital and solid technology. In addition, it is recommended that intellectual property rights be improved in sectors such as digital collections to preserve the rights of creators. In the financial aspect in the form of cryptocurrency, to avoid the negative impact of the government monopoly on monetary over-issuance.

4. Conclusion

From the 1990s to the present, there have been numerous theories about the metaverse, but there is still a large blank in metaverse technology and practical industry. This study summarizes the prospect of metaverse technology + practical sector. Metaverse technology breaks through the limitations of space and time and seeks to achieve an immersive experience that is infinite to the real and endless to the virtual. The field of education promotes the sharing of educational resources and the flow of information. In psychotherapy for the treatment of chronic mental illness and to satisfy emotional comfort. The metaverse technology realizes the parallelism of the three bodies. This study focuses on the expression of the needs of the female population on the metaverse technology, and the new technology makes it more convenient for women to demand beauty products and enjoy a perfect service. The study also focuses on the needs of the aging population for intelligent age-appropriate products which will provide more comprehensive care for the health of the elderly. Metaverse has a unique economic value-added, using virtual native and virtual symbiotic NFT, forming a two-way circulation combining virtual digital currency and actual legal tender transactions. However, there is still a large blank in the research of the metaverse and the entire industry based on a large amount of data. There is no regular model and specific data to present what kind of impact and problems metaverse technology will have when applied to real industry, so in the future, if we want to study the impact and significance of metaverse technology and real industry more objectively and specifically, we have to draw objective conclusions from data and theoretical analysis. Finally, this study proposes the following recommendations to promote the combination of metaverse technology and honest industry. Firstly, it is suggested that direct listing in the form of DPO; secondly, for better development of the virtual metaverse market, a perfect intellectual property law should be formulated, and at the financial level, in the form of cryptocurrency to avoid the negative impact caused by the government monopoly of monetary over-issuance.

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