

# Innovation and Development in The Metaverse under The Digital Economy — Takes Tencent as An Example

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**Abstract.** In the era of digital empowerment, technology has changed dramatically, new digital technologies have exploded. Big data, blockchain, artificial intelligence and other technologies have begun to occupy a large part of technological development, focusing on customers and meeting people's needs while constantly presenting new forms of expression, metaversity, blockchain, AR, VR, 5G technology gradually into people's vision. More and more countries and enterprises have begun to enter the meta-universe field, especially game companies such as Tencent, and have made many breakthroughs in the meta-universe field in recent years. The metaverse will have more possibilities in the combination of innovation in various fields, and the future metaverse may change people's lifestyles, bring technological innovation, or bring disaster to mankind. Therefore, breaking through technical limitations and improving the management system have become urgent problems that the metaverse needs to solve.

**Keywords:** Metaverse; Digital Economy; Artificial Intelligence; Tencen.

## 1. Introduction

Human beings always seek a convenient way of life, and explore more optimized solutions. In the process of meeting people's living needs, science and technology continue to develop and progress, and now science and technology has become a vital part of the development of all countries. In the past few decades, the Internet has been closely related to the development of the times from its generation, development, gradual maturity to continuous breakthroughs and innovations. In the context of the Internet, various digital technologies have emerged, and these technologies have brought new development space to people. In the era of the epidemic, digital ecological environment has become an important way of life for us. The digital economy, online social networking, and remote work have gradually become an indispensable part of our lives, and the digital society is developing rapidly. In addition, digital technologies are constantly innovating as the digital society matures.

In the study of Dionisio et al., it was found that the metaverse formed a convergent virtual world from an independent and scattered virtual world. In this era of artificial intelligence explosion, the development of the digital economy is seeking a new direction of development, and wanting to adapt to the development of the AI world, the metaverse has gained people's attention on the economic track. At present, the metaverse is constantly changing under the support of technology and culture, but there are still many factors that limit the development of the metaverse, so that the metaverse is not what we expect. Although the developers of the metaverse are always constantly understanding and meeting the needs of users, there are still many problems between the two that are still difficult to solve in this process, which are worth exploring and studying, in addition, technological breakthroughs, risk control, and management system specifications have also become problems to be solved [1,2].

The metaverse is still a concept of continuous development and evolution, and in the future, it has many possibilities, which may break through the virtual world of real life, break through the combination of reality and virtual, and be combined with more fields.

## 2. A new field for the development of the digital economy - the metaverse

### 2.1 The concept of the metaverse

The "metaverse" has attracted the attention of many people in the context of the current era. Although the metaverse was already created and described in Neal Stephenson's novel *Avalanche* in 1992, the concept was really understood and recognized in 2021 when Roblox went public. After the metaverse gradually entered the public's vision, the "metaverse" has become the trend of the current development, it is a new concept born with the support of technology, media, and the Internet, why can the metaverse become the "leader" in this more efficient society? What exactly is the metaverse? These become questions worth exploring [3].

In the past few decades, the vigorous development of social productive forces, the continuous innovation of science and technology, social production has become more and more efficient, and different countries and enterprises are constantly looking for powerful measures to enhance their competitiveness in this technological background. Under the collision of technology and the background of the times, the metaverse has become a new product of the era, and many countries and enterprises even regard the metaverse as the key to achieving advantages in this "metaverse" era.

The metaverse is a virtual space created on the basis of the real world, which is a virtual display of the real world, a further innovation of the real world, and a space that integrates with the real world. The concept of metaverse and its connotations have always developed and evolved with the background of the times, and in this era, we have defined the metaverse: The metaverse is a kind of digital semi-virtual field produced under the development of science and technology, which is a kind of mutual integration and symbiotic development of the real world and the virtual world. From a technical point of view, the core of the metaverse is the blockchain, which is a new application form developed under the support of hardware technologies such as science and technology and digital technology, and is also a "new world" formed under the combination of different reality scenarios and traditional soft power. Metaverse integrates the real world and the virtual world based on extended reality, digital twin, and blockchain technology. From the perspective of humanities, the metaverse is a new form of expanding the real world, through the combination of the virtual world and society, forming the integration and development of the virtual world and the real world in many aspects such as social, entertainment, and economics. The metaverse was constructed under the support of technology and the influence of human factors [4,5].

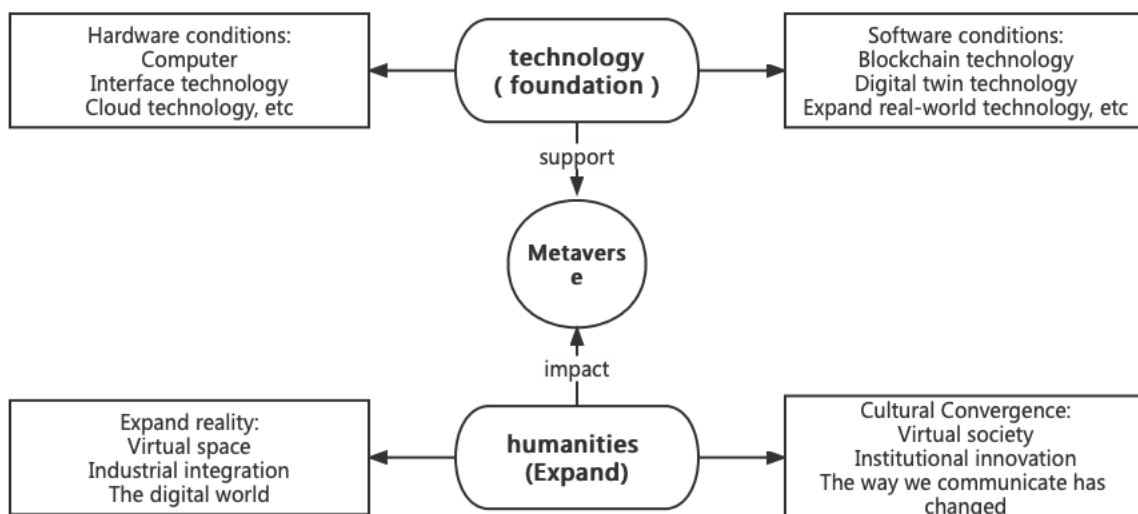


Figure 1. The construction basis of the metaverse

## 2.2 The development of the metaverse under the digital economy

From the Internet to the digital economy, continuous digitization of data and information makes the digital economy a major core of economic development, and digitization also makes information from decentralized to centralized. In many reports from different governments, "digital economy" has been discussed as a popular word, especially in the current epidemic era. In the era, online office, distance education and other ways have become the new norm of social development, and the metaverse is undoubtedly crucial. As a new path for the development of the digital economy, the metaverse is triggering various industries to enter. In the context of "Internet +", the birth of the metaverse has made the development of the digital economy go in a new direction [6].

The development of the digital economy is essentially to serve the economic development of the society, which needs to be truly reflected in the real world, and the metaverse has a deep connection with the real world, so the metaverse has a promoting effect on the development of the digital economy. With the emergence of Internet algorithms, blockchain, AI and other technologies, the metaverse has become an achievable future, the metaverse has provided a new development direction for the development of the digital economy through its own unique digital and virtual conditions, and the metaverse has shown new vitality in the development process of the digital economy.

At present, the development of the metaverse in digital economic activities is still in a relatively early stage, that is, digital assets and digital currencies can only circulate in the virtual world, and can only circulate in the same virtual world, forming an economic system in this virtual world, such as assets in games. However, now we are also constantly exploring new areas of development, such as the assets can be interconnected and exchanged between different metaversms, so that assets in the virtual world and real assets can be interconnected. this process is the process of continuous innovation and development of the metaverse in the digital economy [7].

## 2.3 The necessity of metaverse development

There are now two voices for and against the development of the metaverse. Opponents believe that the metaverse is a virtual, non-existent world, and that it arises because people meet their needs through the virtual world in order to escape reality, and many people are addicted to the virtual world without facing real life. However, reality shows that most people support the development of the metaverse, and many enterprises and countries have formulated a series of guidelines and policies in the metaverse, maintaining an optimistic attitude towards the future development of the metaverse, which shows that the development of the metaverse is necessary.

First of all, the development of the metaverse is a very important part of the digital transformation. In today's highly competitive social environment, digital transformation seems to have become a part of every enterprise must pay attention to, non-transformation of the enterprise in the market may face elimination, therefore, in the metaverse development has become the trend of the era theme, the various enterprises, countries began to develop to the metaverse. The metaverseity is a development direction that provides a way for modern society and enterprises to transform, using various digital technologies to continuously improve business operations and social progress.

Secondly, the development of the metaverse has led to great progress in human civilization and society. The development of the metaverse breaks through the traditional way and produces a new social culture, while inheriting traditional culture in innovation and updating people's understanding of the development of science and technology. The metaverse promotes economic development and social progress in a new way, with the characteristics of breaking through limitations, equality, humanism, and pluralism, combining reality with the virtual world, and avoiding many problems that may be about to occur in real life.

Finally, the metaverse provides a new form for the development of future science and technology, making the development of scientific and technological innovation have a new direction. Metaverse is an innovative development based on the development of science and technology, which needs the support of advanced technology, and its development may also become the technical basis for the development of new technologies in the future.

### **3. Innovative development of Tencent Group in the field of metaverse**

#### **3.1 Overview of the development of Tencent Group**

Tencent was established in November 1998, mainly engaged in software, e-commerce and Internet services, diversified business scope, including social communications, games, information technology industry, etc., to provide value-added services for the majority of Internet users, at present, in China's Internet integrated service industry in a leading position.

Tencent, as one of the forefronts of China's top 500 enterprises, has diversified service projects, such as QQ, WeChat and other social platforms that we are familiar with, and entertainment service software such as Tencent Video and King Glory are all products of Tencent. Tencent has diversified its industries in the development of the company, and its economic development is still developing at a rapid pace today, when the competitive pressure is very large. In the new economic era, new technologies and new business models have spawned a large number of distinctive new companies, whose revenue sources, profit models, and asset structures are unique and distinctive. Tencent's development is profoundly affecting the living habits and communication methods of tens of thousands of netizens, opening up broad prospects for the development of China's Internet industry.

#### **3.2 "Meta-universe" new track of economic development**

The internet era is gradually moving forward, and we have created virtual environments for various computer intermediaries, including social networks, video conferencing, virtual 3D worlds (such as VR chat), augmented reality applications. Such a virtual environment, although it is not eternal and disconnected, brings us different degrees of digital transformation. The term "metaverse" has been coined to further facilitate the digital transformation of all aspects of our material lives. The development of the network has spawned many new forms of economic development, and the birth of the metaverse has created a new environment for the development of the digital economy. With the participation of emerging technologies and the gradual development and refinement of ecosystems, our virtual world will look very different in the coming years. Now, thanks to the presence of powerful computing devices and smart wearables, our digital future will be more interactive, more vivid, more embodied, and more media. However, there are still many challenges to overcome before the metaverse can be integrated into the real world and our daily lives [8].

In this context, the "metaverse" as a relatively novel concept, the discrete, decentralized Internet together, in the real space combined with the virtual world, in the process of technology integration to break through the traditional manpower, time, geography and other limitations, the metaverse in the economic and social applications make the metaverse has become a focus of attention, more and more countries for this can be applied to many fields of emerging technology attracted. In the past few years, the governments of the United States, South Korea, Russia, Japan, China and many other more developing countries have begun to support the exploration of the metaverse, and in 2021, the United States will rename Facebook to Meta, causing a wave of metaversics in the world. South Korea has also had a high interest in the meta-universe field, the South Korean government in South Korea led the establishment of the meta-universe association, the Seoul municipal government will create a "meta-universe platform", with the support of the government, the combination of Korean tourism and meta-universe, meta-universe ETF flourished in South Korea, and made great progress. Russian President Vladimir Putin has also demonstrated his determination to develop and break through the metaverse. Japan also showed the Japanese government's layout and thinking on the development of the metaverseology in the report [9]. For the development of the meta-universe, with the support of the government, China is also holding the determination of development and challenges, in July 2022, Shanghai issued the "Three Action Plans for Promoting the Development of Green and Low-Carbon Industries, Cultivating the New Track of "Meta-Universe", and Promoting the High-quality Development of Intelligent Terminal Industry" to promote the new layout of Shanghai's green and intelligent development, clarify the strategic direction of China's digital economy and green and low-carbon national key layout, and promote the transformation and upgrading of the real economy

through the combination of "meta-universe" virtual and real model to give many industries breadth. At the same time, through the "meta-universe" and intelligent terminals to continue to increase the speed of production and development. In this action plan, it is clear that the three industries of green and low-carbon, "meta-universe" and intelligent terminal are the new tracks of development in Shanghai, and also China's emphasis on meta-universe and breakthrough development [10]. In addition, Companies such as Tencent and ByteDance in China are also intent on turning the company into a meta-universe company.

Today, when the development of the meta-universe has become a trend, Tencent is not far behind and has begun to enter the meta-universe field. Tencent has applied for the registration of nearly 100 meta-universe related trademarks, such as "Anti-War Meta-Universe", "Tencent Music Meta-Universe", "Peace Elite Meta-Universe", "Oasis Qiyuan Universe", "King Meta-Universe", "Tian dollar universe" and so on. to adapt to the development of the "metaverse" era.

### 3.3 The combination of Tencent Games and the metaverse

In today's metaverse era, game companies have a strong room for development in this field. Since Roblox first introduced the metaverse into the game field and achieved good results, the world's major game companies have also begun to follow the pace of the times to enter the meta-universe field. Since then, many companies at home and abroad have chosen to lay out Yuanyu, including Tencent, which has a deep relationship with Roblox. After more than ten years of accumulation and precipitation, Tencent has rapidly developed into a leading enterprise in the domestic game industry, and through continuous product output and drastic overseas investment and mergers and acquisitions, it has become the largest game company in the world, and has absolute influence and discourse power in the industry [11,12].

From a technical point of view, among the many Internet head companies, Tencent is obviously one of the most advantageous. Due to the need to create a rich social ecosystem, Tencent has invested a lot of research and development in AI, UGC, PGC tools and community servers, which are also the key technologies needed to build the metaverse. At the investment level, in addition to Tencent's "first stock in the meta-universe" Roblox, other meta-universe "seed players" at home and abroad also have a certain relationship with Tencent. For example, Tencent currently holds a 40% stake in EPIC Games, an AR/VR game developer, and the mini-play technology company behind the meta-universe game Mini World has also invested tencent. That said, Tencent has been involved in three of these games, such as Roblox, Epic, MiniPlay, and Code Qiankun, which are considered to be the closest to the concept of the metaverse.

Tencent already has an absolute dominance in the current gaming space, with huge social networks and countless commercial investments. In a way, Tencent's chances of dominating the metacosm in the future are even greater than Facebook's announcement of a full metacosmic company. The meta-universe world seems to be open, as if all Internet companies have the opportunity to participate in it and make profits, but in the face of large factories with profound strength in technology, capital, talent, and other aspects, it is difficult for ordinary companies to have the opportunity to become famous and can seize market opportunities. As a new field, the people and markets that the metaverse can cover will be very broad, that is to say, in order to experience mature metaverse games, VR technology is one of the indispensable technologies. As the entrance to the metaverse, the progress of its optical technology, sensors, real-time interaction and other technologies determines whether the player can have a perfect immersive experience when entering the metaverse world [12].

"Metaverse+" has become a trend. At present, the combination of metaversity and finance, media, social networking, production, games and other industries is promoting the progress of society. Under the continuous maturity of technology and the continuous change of people's needs in the future, the metaverse still has great prospects for development, and the vitality it shows has great attraction for us in the 21st century.

## 4. Prospects for the development of the metaverse

### 4.1 The combination of Tencent Games and the metaverse

#### 4.1.1 Impact of the metaverse

##### (1) Impact on existing industries

The metaverse is produced under the innovative development of the Internet, because the concept of "Internet +" makes it possible to "metaverse +", as a virtual world parallel to the real world, it has the possibility of combining with various industries. The metaverse is now combined with many industries such as media, social networking, education, and games, so that these existing industries have a new direction of development. This combination helps the development of traditional industries, promotes industrial transformation, and provides new possibilities for future production development.

##### (2) Impact on related technologies

The development of the metaverse is not only to promote the development of existing industries, but also to promote the development of technologies related to the development of metaverseities, such as blockchain, artificial intelligence and other technologies, as well as the development of some hardware devices. For example, to meet the development of the interface industry in and out of the metaverse, the metaverse is a virtual world that promotes the development of various industries and different technologies on the basis of its own development, which also promotes the emergence of future combined development with other industries.

#### 4.1.2 Opportunities of the "metaverse"

In the past two years, the metaverse has received a lot of attention, which means that the metaverse has great possibilities for innovation in the existing development, and it is of great significance in application and era change, and this virtual world has brought infinite possibilities to our future.

##### (1) Promote economic development and achieve scientific and technological change

Metaverse was born from technology, in the upgrading and transformation of technology to promote economic development, in this process, metaverse is constantly moving towards the second stage, from AR, VR to the realization of XR, from the virtual world born in the real world to a plurality of virtual worlds that can blend with each other, the metaverse is constantly promoting technological innovation and upgrading. Artificial intelligence plays a very important role in this process, which is the key technology connecting reality and virtuality, and the metaverse needs to adapt to social development in order to become a mature technology in the future, and it is likely to achieve a new round of technological change in the process.

##### (2) Promote digital urban governance and achieve high-quality economic development

The design and production optimization of the application of related technologies in the industrial metaverse can be completed in the virtual space, and then deployed in the real world according to the optimal solution, thereby shortening the innovation cycle and driving the intelligent upgrading of the whole process. In the industrial field, China can give full play to the advantages of rich industrial scenarios, promote the integration of artificial intelligence and industrial software, and achieve more accurate digital twins and more effective risk prediction. In the field of agriculture, the agricultural picking machine developed by Alibaba's Dharma Academy has reduced the cost of orchard management by modeling the orchard environment, carrying out motion planning in the virtual space, guiding the picking work in the real world. In terms of urban digital governance, the urban metaverse obtains the refined operation parameters of the city in real time, and through simulation and simulation, empowers urban scenarios such as park management, energy conservation and emission reduction, drainage and flood control, and improves the efficiency of urban resource allocation.

##### (3) Innovate new forms of life

The metaverse will change the traditional living space and trigger a revolution in human survival and working space. By mapping out digital twins and digitized bodies in the digital space, the metaverse provides accurate personalized services for people's work and life, doubling work

efficiency, creating new economic value and improving people's well-being. For example, virtual reality conferencing provides people with an experience close to face-to-face communication and improves office productivity; The interactivity of "digital people" technology lowers the threshold for older people to access virtual services and narrows the digital divide faced by older people; 3D virtual modeling and virtual trials empower e-commerce to efficiently facilitate transactions [13].

## **4.2 Challenges facing the development of the "metaverse"**

Although the metaverse is booming, it is still in the initial stage of development. If the metaverse wants to achieve the innovative development we expect, it still needs a long period of exploration, and at the same time, we must also have a certain understanding of the challenges that may be faced by the future development of the metaverse, and take corresponding measures to avoid the risks that may arise.

### **4.2.1 High technical requirements**

As a product of technological development and integration, the metaverse is very demanding in terms of technology, and it needs advanced technical support and sophisticated algorithms to meet its requirements, but from the current technological development point of view, the existing technology can only support the relatively initial development of the metaverse, and technological development has become the biggest challenge facing the metaverse. The limitations of technology make the development of the metaverse only in the initial stage, without breaking through the second stage of the combination of different metaversms. Although the vertigo problem of VR, AR and other products has been improved compared with the original product, the improvement of the sense of vertigo is also a technical problem that needs to be continuously improved. In addition, the metaverse products are less product due to the immaturity of underlying technologies such as artificial intelligence, computing power, and blockchain, and the number cannot meet our needs for the development of the metaverse. The development of digital technology is the foundation and key to the development of the metaverse. Therefore, in order for the metaverse to be well developed, it is necessary to continuously improve the underlying technology to meet the needs of the metaverse operation [14].

### **4.2.2 Face great risks**

As an emerging product in the 21st century, the metaverse is not yet mature. The development of the meta-universe has not yet improved the industry standards and management system, compared with the Internet industry that has long had a unified industry standard, the development of the meta-universe has not been regulated, and it will take a long time to develop in the future if you want to enter the international world. The metaverse has not yet been legally regulated, and it is difficult to avoid someone using the legal loopholes of the metaverse to do illegal things in the development environment, in such a development environment, we need to clearly understand the risks that the development of the metaverse may face. First, the metaverse boundary is not strong. The metaverse is a kind of virtual world, which cannot demarcate the boundaries of various countries like the governance of the country, and now the wave of international metaverse development is rising and the international situation is turbulent, and this virtual universe integrated with reality continues to innovate and develop with finance, culture and other fields, and there is a risk of national sovereignty and development being violated. Second, there are risks in the digital economy. Under the metaverse, the economy is gradually moving towards virtualization, that is, the limitation of no time and space, and there is no subject limitation, and now the development of the metaverse in the field of digital economy is not mature, which may make the real economy develop to virtualization, launching a new challenge to the development of the real economy, in addition, in the case of imperfect legal management, economic fraud has also become a greater risk in the metaverse. Third, the security of the metaverse is at risk. metaverse is a new product of Internet innovation and development, which is not yet mature, coupled with its characteristics of de-ZTE, making the metaverse has the risk of network security, and the management of the metaverseic order is also one of the security risks.

### **4.2.3 Low public awareness**

Metaverse is based on the innovative development of the Internet, with higher requirements for users, users need to be familiar with the use of the Internet and electronic equipment and a certain understanding of the metaverse, however, the metaverse is in 2021 gradually into the public's vision, people do not know much about the metaverse, or even have not heard of this concept. In the early days of the metaverse, there were fewer users of the metaverse, which also limited the development of the metaverse. Therefore, the development of the metaverse still needs a certain amount of time, and improving the public awareness of the metaverse is also a major challenge facing the metaverse [15].

## **5. Recommendations for the future development of the metaverse**

At present, the meta-universe is still in the stage of concept improvement and product exploration, there is still a big gap from the formation of a complete digital ecology, it is necessary to rationally look at the commercial value of the meta-universe, not only to grasp the development opportunities of cutting-edge technologies and emerging fields, but also to match the necessary supervision and guidance, overall development and security, based on the current situation of China's electronic information industry, focusing on the security risks that the meta-universe may bring advanced layout and preparation in advance, in order to break through the existing Internet industry development bottleneck, Promote the modernization of the cyberspace governance system and governance capabilities to provide practical support.

### **5.1 Enhance technical support and break through technical limitations**

Adhere to independent innovation and open integration, and stimulate the high-quality development potential of China's meta-universe industry. Relying on China's commercial advantages and development potential in 5G, online games, online social networking, smart wearables, etc., we will steadily improve the technological maturity of related industries, participate in promoting the formulation of industries and international standards in related fields of meta-universe, accelerate the pace of internationalization of China's Internet and high-tech enterprises, and create a digital industrial cluster with global competitiveness and innovation.

### **5.2 Establish a digital governance regulatory system**

Adhere to the unity of promoting development and management according to law, and build a digital governance supervision system for the metaverse. Continuously improve the relevant legislative work of the state in the field of digital governance, especially in the fields of artificial intelligence, big data, blockchain and other information technology, combined with the practical experience of front-line judges, lawyers and other legal staff, and establish a set of legal rules that adapt to the development of the meta-universe. Strengthen the review and supervision of investment and financing in meta-universe related fields, effectively curb capital manipulation, and maintain the order of market competition. Construct the ethical framework and moral code of the metaversic from multiple perspectives and levels.

### **5.3 Consolidate network information security support**

Adhere to the open environment to ensure security, improve the network information security research and support capabilities for the metaverse. In view of the multi-modal, deep-level, ultra-real-time, large-capacity, cross-platform and other information communication and interaction modes of the metaverse, in-depth research and analysis of various network security risks that may arise from the application of new technologies for metascopic integration, especially the threats and hidden dangers of information content security, focus on dealing with key issues such as virtual technology security defense and interconnection privacy protection between platforms, and gradually build a comprehensive network and data security guarantee system for metascopic functions. Promote the



establishment of metasytem security laboratories or security engineering centers in a timely manner, strengthen relevant network information security technology research and reserves, and build a security assessment and test verification environment for metasytem software and hardware and related products and services.

## 6. Conclusion

The metaverse is essentially a virtualized, digitized process of the real world. Metaverse high real-time, high interaction and high immersion requires that the virtual space can accommodate massive users' real-time online communication, the future metaverse may be based on social, game and content experience as the main carrier. Consumption, finance, life services and other real-world elements will continue to integrate into virtual life, the virtual economic system is also gradually formed a closed loop, and the new virtual economic ecology will be further formed. At present, the metaverse is in the early stage of development, and domestic and foreign science and technology enterprises are also actively laying out and building a "metaverse" ecology, and the "metaverse" may become the outlet of the future industry and develop into a form beyond people's imagination. With the development of technologies such as virtual reality, artificial intelligence, blockchain, big data and 5G, the metaverse will usher in its own industrial development, bringing people a richer, more convenient and intelligent life.

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