

The Research on the Application of Metaverse in the Cultural and Tourism Industry

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Abstract: This research discusses the concept and characteristics of the Metaverse and the features and development of the cultural tourism industry. The Metaverse, originating from science fiction literature, is a virtual reality (VR) or augmented reality (AR) world that goes beyond the physical universe, created by technologies such as cloud computing, blockchain, big data, and the Internet of Things. The Metaverse features self-configuration, immersive experiences, and a blend of virtual and real-world elements. Meanwhile, the cultural tourism industry is the third industry developed based on cultural and ideological concepts, emphasizing the integration of culture and tourism. With the support of national policies, the industry is continuously expanding, with new cultural products and themes emerging. However, current cultural tourism develops towards homogenization and still relies on 2D methods such as videos and audio, the use of technology in the industry mainly focuses on digitization and convenience. The potential use of the Metaverse in the cultural tourism industry can enhance the immersive experiences for users and create interactive environments to bring great development impetus to the cultural tourism industry, which is also a practical way for the Metaverse technology.

Keywords: metaverse, cultural and tourism industry, interaction, virtual reality, augmented reality

1. Overview

1.1. Concept and Characteristics of the Metaverse

Metaverse, or the "metaphysical universe," refers to a virtual world that goes beyond the physical universe, with "meta" meaning "beyond" and "verse" referring to the universe [1]. Therefore, the Metaverse is often translated as a "beyond universe." The concept of the Metaverse is believed to have originated from Neal Stephenson's novel *Snow Crash*, published in 1992, some scholars trace its roots back even earlier to Vernor Steffen Vinge's 1981 novel *True Names*, which proposed the idea of using a "brain-computer interface" to enter another space to gain a virtual experience. From a technological standpoint, the Metaverse is not just simple virtual reality, but a three-dimensional virtual world created by the technology. It is a highly accurate copy of the real world, and in some ways even transcends the real world in which people can get immersive experience.

1.2. The Relationship between the Metaverse and the Cultural Tourism Industry

Cultural tourism industry is based on the development of cultural tourism resources. It is a tertiary industry developed on the basis of relevant humanistic spirit and cultural ideas which pursues a high degree of integration with cultural background and themes. Only by allowing tourists to immerse themselves in the experience, can they deeply understand the culture and depth of it. This coincides with the Metaverse's ability to create immersive, integrated virtual worlds based on the real world [2].

2. The Present Situation of Metaverse and Cultural and Tourism Industry

2.1. The Homogenization Dilemma of the Cultural and Tourism Industry

The creation of cultural and tourism industry intellectual property (IP) is a critical factor in attracting tourists. It requires sufficient time and effort, injected with ingenuity, to form unique cultural accumulation of IP, enhance interaction between tourists and IP, and provide tourists with an ultimate experience. Throughout the cultural and tourism industry, most tourist attractions rely on their natural or cultural resources and build complete infrastructure such as dining, lodging, transportation, etc., based on these resources. The homogenization is serious, and there is a lack of uniqueness and freshness. In addition, tourists just visit and sightseeing, which only satisfies visual feelings and has weak interaction with IP.

In recent years, with the continuous improvement of consumer levels, consumers pay more attention to the quality of consumption. Tourists' demands for the cultural and tourism industry are not only focused on destination-based purchases but also more on experiential purchases, pursuing functional, emotional, and spiritual all-round enjoyment of cultural and tourism products. Secondly, the rise of the internet celebrity economy, an economic form that requires less investment and yields quick returns, is highly sought after by tourism companies. Most tourism companies directly use the project concepts of some internet celebrity IPs in their own tourism projects or imitate similar tourism projects. The repetition rate between scenic spots is high, and the degree of homogenization is strong.

The contradiction between supply and demand is driving structural reform in the cultural and tourism industry. In the internet age, if the cultural and tourism industry wants to innovate and break the deadlock of homogenization, it must rely on scientific and technological transformation and innovation. As the saying goes, "the times create heroes", and the metaverse has been hot in China in recent years, which is a new dawn of innovation and development for the cultural and tourism industry. Relying on the metaverse to create unique cultural and tourism IPs, enhancing the uniqueness of IP and increasing the interaction between IP and tourists is the key to structural reform in the cultural and tourism industry. The cultural and tourism industry is the best field for the application of the metaverse.

2.2. The Current Status of the Combination of the Metaverse and Cultural and Tourism Industry

2021 is referred to as the "Metaverse" year, yet the application of Metaverse is still in the concept research and trial operation stage, staying only at simple AR, VR, 3D applications. "Roblox", the world's largest multi-player online creation game, utilizes the Metaverse concept to develop games, and by 2019, over 5 million teen developers have used Roblox to develop 3D, VR, and other digital content, attracting over 100 million monthly active players [3]. In recent years, more than ten movies with Metaverse as their theme, such as "Ready Player One", have been warmly welcomed. However, the feedback from the audience is limited to 3D and VR, lacking more diverse ways to

present Metaverse. The present application of Metaverse in the tourism industry is mainly the digitization of cultural relics, such as Digital Dunhuang, as well as the virtualization of cultural and tourism spots, which are still in the concept and development stage.

Also, the concept of the Metaverse is still in its infancy and the underlying technologies such as hardware, software, algorithms, and content ecology needed to realize its vision are still at a bottleneck. In terms of hardware, there are issues of comfort, convenience, and durability of the wearable devices, health risks and consumer resistance associated with the brain-computer interface, whether the resolution of the images can meet the desired effect, and whether the data transmission is high-speed and low-latency; in terms of software, there are issues of moral review and intellectual property protection; and in terms of content ecology, there are issues such as unclear underlying protocols and platform barriers. These are all potential technological obstacles for the Cultural and Tourism Industry to enter the Metaverse [4].

3. Future Expectations

3.1. Improving the Basic Framework of the Metaverse

The Metaverse cannot be just a beautiful imagination; it also needs a solid technological foundation. Advanced network communication technology is an important infrastructure for the Metaverse. To achieve true immersion in Metaverse construction, more advanced communication technology is needed to improve resolution and frame rate and refine video compression algorithms. 5G communication technology has the characteristics of high speed, low latency, and large connectivity, making it an important communication technology for building the Metaverse. According to statistics from the Ministry of Industry and Information Technology, as of the end of 2022, China has built and opened 2.312 million 5G base stations, laying a good foundation for the Metaverse. However, the large-scale development and innovation of the Metaverse may require support from 6G or even higher communication technology to meet the requirements of high-speed information transmission in Metaverse construction. Additionally, Metaverse construction requires a large amount of data and massive computing power, as well as enhanced efficiency and algorithm optimization for data processing in artificial intelligence and cloud computing.

VR (Virtual Reality) and AR (Augmented Reality) are seen as the "most promising" and "most realistic" entrances to the Metaverse (Shi Peihua, Wang Yijun, Li Zhong, 2022). VR technology first provides a virtual reality scene visually, creating a platform for displaying the Metaverse, and then extends to human hearing and touch to achieve an immersive effect. AR+VR uses multimedia, 3D models, music, and video to enhance reality and improve the realism of the virtual world. The Metaverse has a huge demand for VR and AR, and the structural reform of the cultural and tourism industry requires the deep and extensive development of the Metaverse, which demands higher requirements for VR and AR technology.

The construction of the Metaverse cannot be separated from IP shaping. It is necessary to combine the characteristics of the times, changes in consumer levels and consumer groups, and create IP with attractiveness, uniqueness, and cultural heritage, combining technology with culture, and coexisting with hardware and software, which can undoubtedly unleash tremendous creativity.

Finally, we need to consider what kind of economic model is suitable for the development of the Metaverse.

3.2. Building Legal Norms and Governance Systems to Address the Issues Brought by the Metaverse.

The Metaverse is a product that has emerged with the development of technology and changes in people's needs. The emergence of new things not only brings new power but also gives rise to many

problems. From outside the Metaverse, what is created is a virtual reality world that exists independently, with high openness, high degree of freedom, and uncertainty. The diverse content is easily lacking in norms. Moreover, the application of various virtual technologies can provide a legitimate cloak for illegal activities of lawbreakers, enhancing the difficulty of supervision [5]. The large-scale construction of the Metaverse requires more market supervisors and technology, which increases the cost of regulation.

In addition, the immersive experience of the Metaverse, if not moderated, will also pose a risk of addiction. Two-dimensional online games have already become the new generation's spiritual opiate. Under the strong supervision of the state, strengthening the supervision of underage accounts, controlling game time, and reducing the adverse effects of online games on minors have been achieved. However, the Metaverse has stronger freedom and still faces regulatory barriers. If a risk of addiction system is not established, it will become another black hole that devours time and controls the spiritual opiates of teenagers.

From within the Metaverse, people enter the virtual world from the real world, escaping from the real world, without legal norms and constraints. It is still worth our consideration how to maintain the social ecology within the virtual world, establish reasonable moral and legal norms, and manage the Metaverse appropriately.

4. Conclusion

In the face of the homogenization of the cultural tourism industry and the increasing demand of consumers for the tourism industry, science and technology is the first way to solve this dilemma. The emergence of the Metaverse coincides with the development direction of the cultural tourism industry, which is a new dawn of the reform and development of the cultural tourism industry. The deep integration of Metaverse and cultural tourism industry can not only bring great development impetus to the cultural tourism industry, but also provide a practical way for the Metaverse technology.

To solve the homogenization dilemma, cultural tourism industry developers should improve the uniqueness of IP and pay attention to cultural accumulation and connotation, so that the IP can withstand the test of the fast-paced era and the competition of Internet celebrity attractions. At the same time, strengthen the deep integration of cultural tourism industry and Metaverse, enhance the interaction of cultural tourism products and improve the sense of experience of tourists [6].

The integrated development of Metaverse and cultural tourism industry which is inseparable from the hardware and software construction of the Metaverse and need to break the bottleneck of a series of underlying technologies related to Metaverse hardware and software, algorithmic computing power, and content ecology. Carry out technical research and technical exchanges, strengthen exchanges and cooperation between domestic and foreign technology giants to improve the maturity of underlying technical architecture of the Metaverse. In the aspect of software, strengthen the protection of intellectual property rights to improve the enthusiasm and orderliness of scientific and technological personnel in software development.

The Metaverse is a virtual world born out of the real world, which is a reproduction of the real world and even surpasses reality in some ways with divers and complex content. Therefore, the construction of a complete and mature Metaverse is inseparable from the norms of legal and moral systems, so that users are surprised pleasantly but not surprised horribly. First, strengthen the market supervision of the Metaverse to avoid the monopoly of the internal circulation of the Metaverse and promote healthy competition; In addition, strengthen the encryption and protection of private information to reduce the risk of private information exposure; finally, the insert the legal and ethical norms into the underlying structure of the Metaverse, making it develop healthily and sustainably the Metaverse and avoid addiction and illegal behavior.

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