Application of Blockchain Technology in Smart Tourism

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ABSTRACT

Smart tourism comes into being with the development of information technology. With the help of modern science and technology, smart tourism can realize service wisdom, management wisdom and marketing wisdom, which can not only further improve the tourist experience, but also enhance the international market competitiveness of China's tourist attractions, and at the same time enhance the protection of tourist attractions, thus helping China's tourism industry to achieve rapid development. At the same time, the extensive application of blockchain technology also provides technical support for the development of the tourism industry, making it possible to build a smart tourism platform based on blockchain. This paper briefly introduces the basic principle of blockchain and analyzes the application scenarios of blockchain in tourism, so as to discuss the practical significance of blockchain and smart tourism, and provide reference for future related research.

Keywords: Blockchain; Smart travel; Internet of things

1. INTRODUCTION

In recent years, with the rise of big data technology, the well-known characteristics of blockchain, such as high transparency, security and credibility, big data, immutability and traceability, have attracted much attention. Tourism has played an important role in developing economy, promoting employment and improving people's living standards and happiness. In recent years, the development of information and communication technology has promoted the transformation of tourism management mode and management concept, which not only reshaped the interactive mode of tourism enterprises and their stakeholders, but also played a key role in improving the quality of tourism experience [1]. The author thinks that the combination with information technology is only the technical basis for realizing smart tourism, and a deeper discussion of knowledge sharing behind smart tourism can promote the destination to realize smart tourism.

2. ANALYSIS OF THE PROBLEMS IN THE DEVELOPMENT OF SMART TOURISM

2.1 Information sharing is difficult

As the service objects of smart tourism involve scenic spots, travel agencies, tourists, tourism supervision departments and other objects, the information construction is independent, with an independent information system, and the phenomenon of information islands is serious [2-3].

According to the statistics of Micro Hotspot Big Data Research Institute, during the period from January 1 to March 31, 2021, the information related to the national tourism industry reached 51,114,700. Among them, 37% of the information comes from the Weibo platform, 34% from the client platform, and the amount of information in other platforms is relatively small. It can be seen that Weibo and the client have become the main communication platforms for information related to the tourism industry (Figure 1).
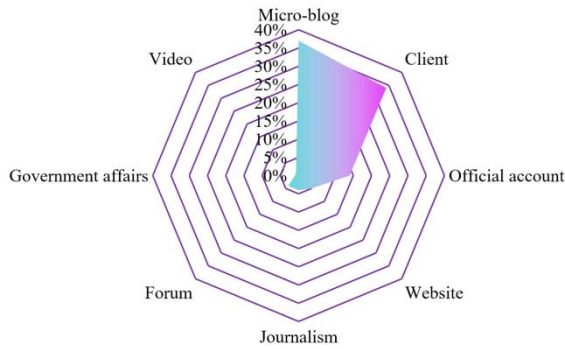
Figure 1 Weibo and the client have become the main platform for netizens to discuss tourism-related letters

How to reduce the cost of information construction in the construction of smart tourism, how to maximize the use of the existing information system, and how to achieve uniform standards and information sharing are obstacles to the construction of smart tourism.

2.2 The tourism information management system is not perfect

The tourism information management system is not perfect, and the management subjects are not unified. This makes the construction of smart tourism appear the phenomenon of multi-head co-management, which is difficult to implement smoothly. For example, in China, the main body of resource management of public scenic spots, the Constitution stipulates that the supervision and management work is mainly under the unified responsibility of the national construction department, but it also stipulates that other relevant departments should supervise and manage the work of scenic spots according to the regulations, and at the same time implement territorial management, which leads to the unclear main body of resource management of public scenic spots and the phenomenon of compartmentalization [4].

2.3. Lack of standard specification system

A sound standard system can reasonably plan the layout of the platform and effectively improve the service level of the platform. However, in the process of building the public service platform for smart tourism, there is a lack of relevant standards and norms system, which only pays attention to the construction of the application layer of the platform and neglects the construction of the standards and norms system. There is a situation of "emphasizing construction, neglecting standardization", and lack of standardized standards to guide it, which will surely lay hidden dangers for the development of future platforms [5-6].

In the first quarter of 2021, due to the strong recovery of the domestic tourism market, Ctrip, as one of the leading tourism giants, continued to lead the online travel industry with a heat of 32.91, becoming the hottest online travel platform. In addition, the Weibo lucky draw organized by Ctrip Tourism and various marketing activities launched by Ctrip car rental are also the main sources of Ctrip information during the statistical period (Table 1).

Table 1 Public opinion attention

Popular tourist events	Heat index	Network-wide information	Media coverage
Ctrip plans to go public in Hong Kong for the second time in April	0.85	13060	9829
Ctrip launches the strategy of "Tourism Marketing Hub"	0.33	15009	3435
The overseas orders of Ctrip are expected to gradually recover in the second half of 2021.	0.21	3032	2487
Ctrip released "Tourism Revival 2.0" plan	0.09	2922	933
Ctrip plans to build "Ctrip Holiday Farm"	0.08	1151	981

Overall, compared with the same period of last year, the amount of tourism information increased significantly in the first quarter of 2021, the tourism economy is recovering in an orderly manner, and the tourism market is also facing a steady recovery. The second quarter may usher in a comprehensive recovery of the tourism market. According to the forecast of china tourism academy, the number of domestic tourists in the first half of this year is about 1.722 billion, and the domestic tourism income may reach 1.28 trillion yuan. Especially during the May Day holiday, the domestic tourism market may approach or recover to the pre-epidemic level. All those information needs standard specification system.

2.4 The authenticity of big data

Under the big data, while the smart tourism is

developing rapidly, it also faces great challenges. The built smart tourism information platform can collect a large number of tourists' information in the background, which has the characteristics of large quantity and variety, but the data with application value only accounts for a small part. In particular, some negative comment data will gradually spread with the spread of information. If the enterprise fails to process these comment data in time, it will reduce the corporate image.

Besides sorting and collecting data, the challenge of big data to tourism platform is whether effective data can be quickly obtained to reduce the negative impact of network data on enterprises. When visitors browse the website of the travel platform, they usually judge whether the product meets their own needs through text introduction or pictures. However, in reality, after purchasing products online, some tourists will find that there is a big gap between them and the description on the website, thus reducing their trust in the website, which shows that online publicity is highly false. In view of this situation, in order to eliminate the differences between online and offline as much as possible, the tourism platform should humbly listen to tourists' suggestions and demands, optimize products and improve services according to specific conditions, so as to realize the seamless integration between online and offline.

3. FEASIBILITY OF APPLICATION OF BLOCKCHAIN TECHNOLOGY IN SMART TOURISM

Blockchain technology, as an important component of new infrastructure in the digital economy era, is an important breakthrough for independent innovation of China's core technologies and will play an important role in the future urban economic development. Blockchain technology will bring considerable commercial benefits to tourism enterprises. Its potential applications range from digital payment, business process reengineering, promotion of disintermediation level, tourism supply chain management and construction of tourism credit system, covering the core elements of tourism enterprises, tourism transportation, accommodation, catering, tourist attractions and tourism shopping.

The essence of blockchain technology is a complete, distributed and unchangeable continuous account database, which involves many key technologies, including consensus mechanism, hash algorithm, public key encryption and peer-to-peer network, among which the most representative technologies are distributed storage and random hash algorithm of peer-to-peer network.

Blockchain technology creates a relatively credible technical environment, ensures the integrity and invariance of data, makes the tourism business system more transparent, further optimizes business processes

and ensures transaction security. With the help of smart contract, tourism enterprises and their stakeholders can automatically implement the contract content without human interference [7]. The investment and construction of tourist attractions often need the help of financial intermediaries such as banks to realize large-scale fund transfer and payment. With the support of encryption technology, tourism enterprises can create exclusive tokens to maintain the historical reputation record of enterprise online transactions. Blockchain account book will record the transaction information of tourism products in detail, and make all nodes in the system share the records to help tourists identify the service level of tourism suppliers.

Smart tourism is a tourism chain integration service that provides smart tourism construction, destination operation and interactive marketing for destination governments and cultural tourism enterprises around "internet plus Global Tourism Destination". A user's trip may involve different enterprises such as tour agencies, wholesale agencies, land agencies, hotels, scenic spots, performing arts, etc. Together with blockchain, an alliance chain will be formed, so that related enterprises can combine their own application scenarios to realize the sales promotion and more possibilities from tickets to distribution systems.

4. BLOCKCHAIN TECHNOLOGY CAN BE APPLIED BY USING THE INTERNET OF THINGS IN THE CONSTRUCTION OF SCENIC SPOTS

4.1 The Internet of Things technology will run through the whole construction of tourist attractions

The Internet of Things collects the sensing data of scenic spots through the sensing system, transmits the data through the network transmission layer, then systematically analyzes the data, and finally guides the practice of scenic spots through the application layer. The whole application content is shown in Figure 2:
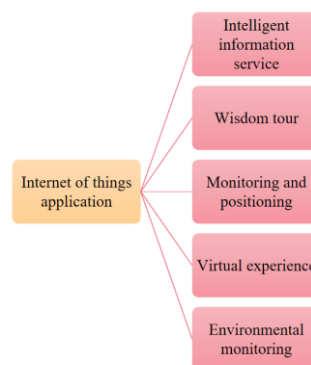

Figure 2 Internet of things application content

Smart scenic spots make use of LED display screens to publicize the collected important information, so as to provide high-quality services for tourists to quickly and timely grasp relevant tourist information and choose the best tourist routes. Scenic spot tourism system mainly combines RFID technology and video-oriented technology organically, and can provide intelligent self-help tour explanation service for tourists.

Smart scenic spots can not only provide virtual experience for tourists, but also integrate scenic spots' tickets, catering, transportation and other resources in a centralized way, providing one-stop service for tourists, so that tourists can truly feel the value for money, thus forming a strong siphon effect among tourists and significantly improving the benefits of scenic spots.

Smart scenic spots can organically integrate video surveillance technology and identity tracking system. By using wireless network technology, real-time positioning of scenic spot tourists and service personnel can be realized, and tracking of scenic spot staff at fixed time can realize real-time voice conversation with staff and provide necessary high-quality services for tourists in time. Using the intelligent technology of Internet of Things, you can also timely and accurately broadcast the weather conditions of scenic spots to tourists. Visitors can learn the environmental quality and weather conditions of scenic spots in real time when they play in scenic spots, truly realize the intelligence and automation of environmental monitoring of scenic spots, and provide advanced technical support for the intelligent management of scenic spots.

4.2Blockchain technology embedded in Internet of Things

In this era of data centralization, users' personal data is easily leaked and invaded, and there are security risks and loopholes in data storage and access. How to enable users to effectively transmit, store and manage personal data is an important issue at present. The decentralized and distributed storage mode of blockchain technology can solve these problems well, allowing users to set up their own nodes and to join the blockchain network for data synchronization, so that users can query data anytime, anywhere.

Visitors can query or upload the word-of-mouth status of scenic spots and merchants in scenic spots in real time through the word-of-mouth service portal based on blockchain (as shown in Figure 3), and evaluate and score their service quality, while scenic spots and merchants in scenic spots can check their own evaluation through the word-of-mouth service platform. Word-of-mouth service based on blockchain, which can't be tampered with, provides a trustworthy word-of-mouth feedback for tourists and urges the improvement of service quality of scenic spots and merchants.
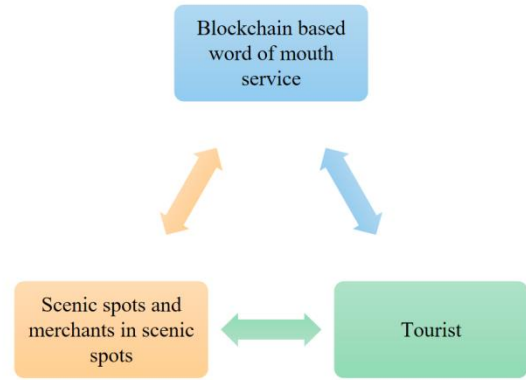

Figure 3 Blockchain-based word-of-mouth management service model

Blockchain can make entities reach consensus and maintain integrity without any trusted third party. According to its decentralized and unalterable characteristics, a secure and reliable data sharing system can be developed to ensure the real-time performance of shared data and provide transaction privacy in blockchain network. In addition, with the increasing demand for data exchange in the Internet of Things, a number of Internet of Things data exchange platforms have emerged, which are dedicated to connecting various distributed data sources. And service providers can search and exchange the data sets they need through the platforms.

However, due to the distrust of this centralized platform, most users are reluctant to share their data sets on the platform, which can not meet the actual needs. Therefore, researchers put forward a decentralized solution of trusted data exchange in the Internet of Things based on blockchain, and realized a transparent system prototype by using the blockchain of Ethereum and smart contract, which greatly improved the trustworthiness of data exchange. Compared with central institutions, the speed of blockchain processing transactions is too slow, which will seriously affect the transaction. Therefore, improving the throughput of blockchain will be one of the key research directions in the future.

5. CONCLUSIONS

Blockchain technology provides solutions to the problems of trust, authenticity and incentive distribution of knowledge sharing in tourism. With the rapid development of Internet of Things, with the increasing demand of people and the maturity of technology, blockchain technology can bring more advantages of security, privacy, controllable data, convenience and rapidity to Internet of Things in different application environments. In view of this, Chinese tourism enterprises need to rebuild the organizational structure of enterprises and cooperate with blockchain technology enterprises externally, comprehensively consider the application cost of blockchain technology, reasonably

learn from the development experience of international tourism enterprises, build a standardized and shared blockchain system with the core of improving tourists' tourism experience and quality, and build a digital economic ecosystem in which tourism and technology are interconnected.

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