Exploring the Implications of Blockchain Technology to the Development of Rural Tourism in China: a Future Research Agenda

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Abstract: As a new type of information science and technology, blockchain technology breaks through the limitations of traditional central technology and creates broad development prospects. It has been gradually applied to all fields of social life. The development of rural tourism in the new era needs to integrate advanced technology and to seek new development ideas. This paper discusses the wide application of blockchain technology in promoting rural tourism management service, perfecting user evaluation system, and helping farmers to increase their income. The application of blockchain technology can reduce the cost of equipment operation and maintenance and enhance the openness and transparency of information and transactions making up for deficiencies of the current industry, which has a positive impact and practical significance for the development and revitalization of Chinese rural tourism.

1. Introduction

Blockchain technology has developed rapidly in recent years and is listed as one of the top 10 technology development trends in 2018 by Gartner, the most authoritative IT research and consulting company in the world. Blockchain technology is considered to be one type of distributed ledger technology, which is formed by when entries and information are distributed to different sites rather than being kept in a central location and relies on a computing paradigm that can also be considered a chain data structure (Ministry of Industry and Information Technology). In addition to the well-known virtual currency and other simple applications, blockchain as a new technology has wider applications and unlimited potential. The Chinese government has begun to actively explore the application of blockchain technology. The State Council listed it in the “14th Five-Year” national informatization plan. The Digital Currency Research Institute of the People's Bank of China is also based in Beijing. By October 29, 2020, 19242 related articles were found by searching the key word “blockchain” in CNKI database, mainly in the fields of Technical Research (1171), Applied Research(AR) (306), Social Development (SD)-policy research(223), Applied Research-Policy research (212) and other fields(Figure 1). Most of the industries involved in these applications are in finance, health care, education, Internet of Things, financial auditing, copyright protection, information security, social management and other fields. Compared with other fields, the financial field is one of the most important application fields. However, there is little attention paid to its agricultural economy, rural revitalization and other fields. Only a few news reports were identified in the search for “blockchain agriculture”.

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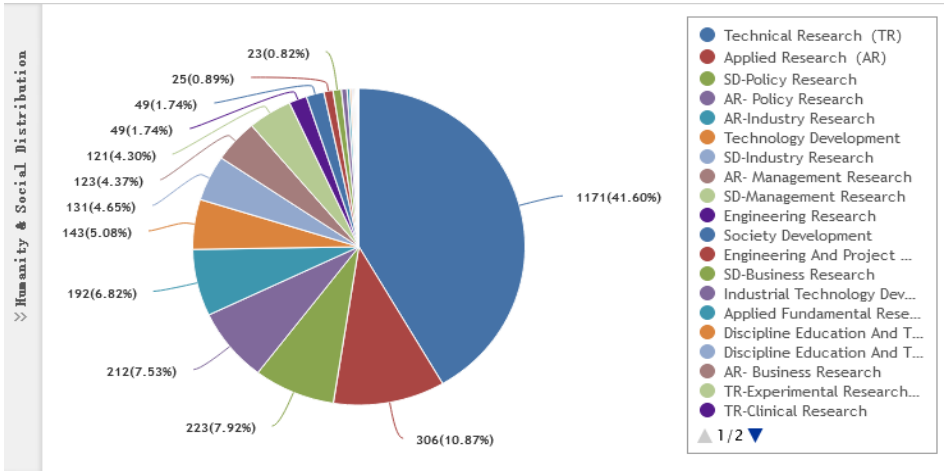

Fig.1 Cnki Data Search Results

The 19th National Congress of the Communist Party of China put forward the strategy of rural revitalization for the first time. Issues of agriculture, rural areas, and the situation of farmers are fundamental to the national economy and people's livelihood. Issues involving agriculture, rural regions, and farmers should have the top priority in the Party's work. With today's cutting-edge technology, there is no reason that blockchain technology should not be included in research efforts. Research on blockchain technology can promote sustainable development of rural areas. This technology can contribute to the development of rural tourism. It may also affect internal market structures and trigger a new round of industrial value chain adjustments.

Most academic researchers, however, have been slow to study blockchain technology and to investigate its potential impact. This lack of attention can be attributed in part to the lengthy publication cycle for new information, but it can also be attributed to the novelty of the material for the top journals and the resulting difficulty many researchers face in efforts to incorporate new concepts into existing research agendas.

The paper aims to suggest that blockchain technology is appropriate for rural tourism. It will consider implementation approaches for the creation and development of this sector, through the analysis of the characteristics of blockchain technology, by exploring the role of blockchain technology in promoting rural tourism management services, perfecting an evaluation system for users, and to help farmers increase income. The potential for concrete applications provides a direction for future research.

2. Blockchain

Blockchain comprises a point-to-point technology that is introduced as a solution to the so-called “double spending problem” (that is, a potential flaw in digital transactions where money can be spent more than once, and where sending duplicates over the Internet is not unique)[6]. The definition of a blockchain is rather complicated. Its origins can be traced back to Satoshi Nakamoto’s (2008) original white paper. Blockchain is a large, distributed digital database that stores transaction records in an ever-growing “block” of records and data, connected in blocks of secure encryption[8].

Blockchain plays a role in digital platforms, using cryptocurrencies for transactions[10]. Currently, one of the best-known examples of a cryptocurrency is Bitcoin[9]. Nakamoto (2008) proposed that Bitcoin can support the blockchain by enforcing irreversible transactions. With the advent of Bitcoin, platforms such as Ethereum have emerged and built on blockchain technology by deploying so-called smart contracts. Smart contracts allow both parties to sign trusted online agreements without even knowing each other.The combination of digital currency and smart contract performance will create more favorable conditions for many industries, thus promoting sound business development[1][10]. For example, the use of blockchain intelligent contract technology can protect organizational assets and corporate business architecture, and set organizational boundaries between relevant stakeholders involved in business contracts, agreements and other transactions, so as to prevent the company's

commercial secrets from being destroyed. The underlying technical system establishes and authenticates the identity of participants and records events. In short, blockchain platforms securely manage the interactions among companies, organizations, communities, stakeholders and even countries[9]. Not only that, blockchain enhances trust among those participating ends in transactions arranged through computer networks between different stakeholders. All members of the organization can simultaneously access the transaction records or asset ownership status of a blockchain platform. Independent transactions on blockchain platforms are verified by agreement and determined in advance by participating members, without the intervention of third-party arbitrators such as banks. Last but not least, By eliminating the risk of fraud and error, blockchain can improve the efficiency and security of transactions, reduce related costs, and establish a sustainable safety supervision system to promote the sound development of business.[5][14]

The technical concepts behind blockchain are very similar to those of a database[11]. It is a decentralized database that records transactions and shares data with multiple participants over the network.In essence, blockchain participates in the business platform by integrating many of today's advanced cryptography technologies, such as cryptography, distributed ledgers, consistent algorithms, and decentralization.

3. The Implications of Blockchain in the Development of Rural Tourism

Rural tourism development can effectively promote rural resources, increase the employment opportunities for farmers, and revitalize rural economy. The commercialized application of information and communication technologies combined with the integration of tourism industry can not only change the mode of tourism consumption and supply, but also lead to innovation of commercial opportunities for the tourism industry and lead to major reforms of industrial organization methods. The intensive development of the tourism sector needs to be placed in the vanguard of current development efforts in the rural sector. As a potential breakthrough at the frontier of information technology, there has been relatively little attention paid to specific business models that apply the blockchain approach to the tourism industry. The popularity of global tourism, intensive efforts to promote global tourism, the possibility of benefits and consideration of risks that come with the combination of blockchain and rural tourism, and the most recent developments of information technology integration into commercial opportunities are all worthy of discussion, consideration and systematic research. By analyzing the characteristics of block chain technology, we will explore the role of block chain technology in promoting rural tourism management services, improving user evaluation system, and helping farmers to increase income, and consider the implementation approaches for the creation and development of this field (as shown in Figure 2).

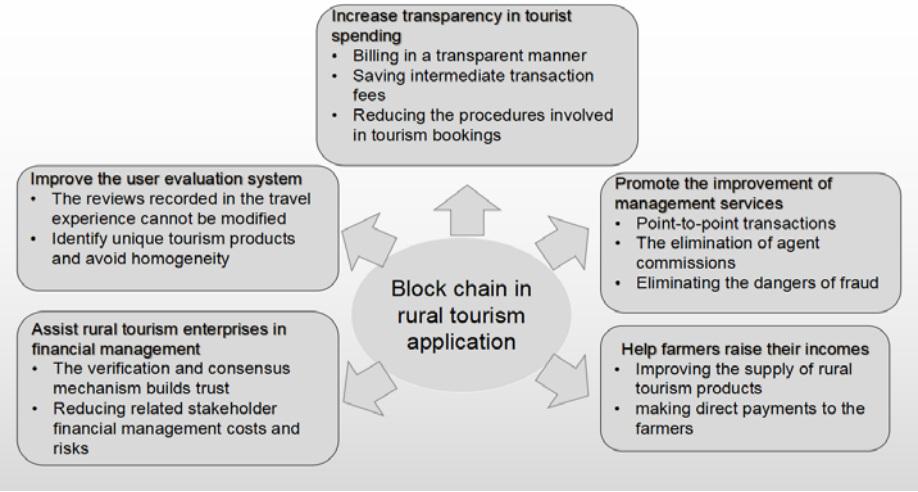

Fig.2 The Applications of Blockchain in Rural Tourism

3.1 Promote the Improvement of Management Services

Financial efficiency linked to the use of cryptocurrencies and blockchain transactions has been widely studied[2][4]. Removing intermediaries from point-to-point transactions through digital and real-time payments reduces transaction costs. Because blockchain technology allows for the completion of transactions without the need for a trusted intermediary, the risk of fraud is virtually eliminated. The system will authenticate transactions and enable payment for services. In fact, efficient transactions in the agricultural food supply chain can promote financial inclusion and rural business development.

From the perspective of managing tourism destinations, the elimination of agent commissions with blockchain technology can reduce overall operating costs. The specific multiplier effect from these savings will depend on the distribution of the additional funds spent in the host country. Thus, local travel service providers (such as travel agencies, restaurants and hotels) can increase their offerings and create mutual benefits for consumers and for those operators involved in the tourism sector in the host country.

Currently in the rural tourism sector, there is a lack of active and effective communication among the government, tourism enterprises and tourists as consumers who are the main participants in the transactions. The publicity linked to governmental tourism policy can be better coordinated with the actual management and service provided by tourism entrepreneurs and villagers. The traditional tourism model relies on advertising and other publicity to attract visitors, but at the present time there remains insufficient coverage from advertising, false promotion, and other problems. Large companies rely on their own capital and the advantages of greater resources to frequently generate greater opportunities. Blockchain technology is a technical tool that can eliminate the drawbacks present in the traditional management in the tourism industry. If a complete rural tourism style block can be established, each village and family can launch a tourism promotion block with its own characteristics and advantages detailed on the block, and other chain individuals can also obtain relevant information. The participants can also have direct contact with each other, eliminating certain labor costs, management expenses, costs of equipment operation and maintenance, advertising costs, and other expenses. The blockchain users can then effectively interact with each other, and at the same time eliminate the dangers of fraud that could be caused by a third-party participant. The blockchain can not only reduce the unnecessary expenditure of consumers, but also maximize the income for the tourism enterprises. After their stay, the visitors can provide comments based on their evaluations of their experiences in a specific site. The data available on the blockchain is transparent and traceable. It is convenient for tourists to make choices, and the management and supervision from relevant government departments are more explicit.

The blockchain can also be linked to the “two-right mortgage” model. This model refers to the mortgage right of rural contracted land and the mortgage rights of housing property rights of farmers. This model involves the “two rights” mortgage financing function wherein farmers can use their own housing property rights to support mortgage loans. They can then participate in the rural tourism sector where they can benefit from the inherent value of rural assets, but they can also contribute to the promotion of rural economic development. The successful experiences of Factom and Little Ant blockchain suggest that blockchain technology can register entity assets as equity digital assets in the two-right mortgage loan situation, provide a decentralized network for agreements for financial business for such activities as registrations and permit issuances, and provide for transfer delivery and transaction settlement. Blockchains can, in addition, establish a new two-right mortgage contract registration and transaction system, and the blockchain technology can be used to track all the transactions involving two-right mortgages, which would effectively solve issues with the “two-right mortgage” situation. The addition of blockchain technology thus is the appropriate direction for the development of the rural property rights trading market.

3.2 Increase Transparency in Tourist Spending

In the field of blockchain technology, anyone can participate. Each electronic access device can act as a node, and each node is equal in the system. The absence of any centralized equipment requirements and organization reduces administrative costs. With distributed accounting,

non-tampering controls, strong traceability, low costs for guaranteeing trust, and other technical features[12]. Since the technology provides a detailed record of the time and content of each transaction, investors can clearly understand the flow of funds and all the transactions become more transparent.

In the traditional tourism model, the travel agency is profit-oriented, with incentives to maliciously guide consumers to high consumption or high-priced products and could contain unclear expenses in the total costs. If a billing system is created with the blockchain, detailed expenses for transport costs, accommodations, and meals will be billed in a transparent fashion. Expenses are accurately recorded in time, place, and purpose. Users can access their financial details and bills, and they can make more rational judgments about travel expenses. In the current internet environment, once a data center comes under attack, it is possible for the whole network to be brought down. Further, in the traditional data query mode, only the manager can see all the data information, while the consumer can only see the individual transaction information. The blockchain, however, adopts distributed accounting where the participants all have open and equal access via the internet, and each node has a backup of all the transaction information[3]. No single node is able to tamper with the data, nor can the accounts that are created be altered by all the parties acting in consort, thus ensuring a high degree of transparency and openness for the data. on blockchain platforms, consumers and service providers also waive commissions charged by the platforms based on point-to-point transactions, saving intermediate transaction fees and reducing the procedures involved in tourism bookings.

3.3 Improve the User Evaluation System

The blockchain technology provides diversified means to protect the currency and strengthen the banking security system. Financial institutions in member countries are highly dependent on corresponding financial institutions. Blockchain technology, in addition to minimizing the compliance costs required for organizations to maintain their operations, will also establish a more robust mechanism for monitoring compliance[13].

Effective sharing of information among users can increase the ability of potential tourists to increase their knowledge of previously unknown attractions, and tourists will have a greater ability to choose scenic spots and tourism products. The administration of a questionnaire survey after any trip can be used to evaluate the travel satisfaction of the consumer. The evaluation can provide ratings and reviews on the tourism website and provide personal travel notes via social media. Questionnaires and other input forms, however, may not capture the full experience necessary for planning a next trip. Information websites, news media, Weibo, WeChat and other media platforms are also one-sided and opaque, and not all tourists can conscientiously provide comments or ratings. The current review scoring system is more easily manipulated by commercial competitors and can result in a major information blind spot. Storing user information for “sale” has become commonplace, and the lives of users can be affected by a few negative comments. Any arbitration of the breach of confidentiality or the misuse of information contained on the website is often time-consuming and effective enforcement is difficult.

The blockchain can be used to establish a new evaluation system that can have several components. Trivial details in the tourism experience, such as the time spent at each scenic spot, the perceived value of the experience, the amount spent on each meal, etc., may be included in the evaluation system. Prices and tastes are stored and available in the blockchain system, making it easier for objective evaluations, and the recorded evaluations cannot be modified. Anonymous accounts protect the personal information of the users[2]. Through a more transparent evaluation system, problem areas will be exposed, prompting district, county, township and rural tourism practitioners to establish brand awareness, to improve infrastructure construction, to promote better service quality, to actively innovate, and to develop tourist opportunities that respond to local conditions. The technology can identify unique tourism products, avoid homogenization, and improve the attractiveness and competitiveness of rural tourist destinations. In addition, the development of featured tourism products, tourism festivals, and private residences can be promoted. The system will permit the display of rural tourism characteristics, and this type of tourism experience can be developed in order

to attract tourists to this type of activity.

3.4 Assist Rural Tourism Enterprises in Financial Management

The No. 1 document of the CPC Central Committee has focused on issues concerning agriculture, rural areas and farmers., These documents have repeatedly stressed the need to strongly support the rural financial infrastructure and promote rural financial innovation and reform. Rural project financing and farmer loans in the rural credit and financial system, however, are difficult to revitalize. Rural construction involves all aspects of rural economy and society, and it is difficult to complete the necessary changes by relying solely on financial funds and the resources of any department. Third party institutions such as banks that rely on traditional financial services must develop the trust of the community. The agricultural credit business has been difficult due to a lack of effective guarantees, insufficient credit data, information asymmetry, high management costs, limitations on the ability of financial institutions to collect data on borrowers for processing loans, a lengthy chain of elements for collection, high costs, the uploading of public information and reimbursement information to the central bank's credit reporting systems, and the need to download data from the central bank system for dealing with queries on credit requests.

The verification and consensus mechanism builds trust between the nodes of the blockchain based on the distributed system[7]. Trust does not need to rely on third parties in advance as long as the established operating rules of the system have been legally established. The rules for manipulating data between chains and nodes are open and transparent. There is no way for outsiders to tamper with a block of data. While it has traditionally been difficult to establish trust between those who do not know each other. A blockchain for a user only has public key address, and not the user's real identity[5]. Users do not need to reveal their real identity to complete the transaction, which also greatly reduces the costs and risks for financial management of enterprises that are involved with the stakeholders connected with rural tourism.

3.5 Decentralization of the Blockchain Helps Farmers Raise Their Incomes

Cryptocurrencies based on blockchain technology allow currencies to be freely convertible without the need for a trusted third party, thus creating a new form of customer-to-customer transactions in the travel product market.

In the current development of the internet farmers as the direct provider of the product often lack information, and do not have access to sales channels. Other problems include the profit diversions to dealers, the fact that prices for providing profits for those referring tourists, a tendency to increase profits at the expense of tourists, increasing profits without reductions in demand, low profits for the farmers, and instability in the income of the farmers. Farmers in a blockchain can record product information and provide a fair competition platform, which will provide the producers with more convenient access to the customer. The technology can improve the provision of rural tourism. The use of blockchain technology will make it possible for tourists will skip agents, make direct payments to the farmers, simplify the market process, reduce transaction costs, and directly increase the income of farmers.

4. Conclusion

The purpose of this study is to promote academic discussion on the adoption of blockchain technology in China's rural tourism industry, especially in reference to future applications. Since blockchain technology is still in its infancy and its market applications are relatively dispersed, successful connectivity within and between industries requires substantial cooperation among tourism stakeholders (governments, tourists, enterprises, and destination marketing organizations). This paper makes use of the existing limited knowledge on the adoption of blockchain, discusses the specific application of blockchain technology in rural tourism, and provides directions for future research in an effort to contribute to the application of blockchain technology in the rural tourism

development literature.

The use of an encryption algorithm, consensus mechanism, distributed accounting and other characteristics of blockchain technology reflect its prospects for more extensive applications in the field of rural tourism development, promotion of the construction of a rural tourism information sharing platform, and a solution to the practical problem of information asymmetry Resolving the practical problems of rural tourism development through blockchain, however, requires the joint efforts of the government, relevant financial institutions and society at large.

This paper addresses the lack of specific information on development of rural tourism and argues for the need to develop empirical studies and applications of blockchain technology in this area. Blockchain technology investment in rural tourism and regional financial development is a process involving the full implementation of the design and implementation of related derivative function, laws and regulations, standard system, supervision system, etc. The effective creation of a functioning system will require a lengthy period of time to perfect and deepen the processes involved.

At the same time, as an innovative technology, the widespread adoption of blockchain technology in rural tourism may face several obstacles. First, the level of consumer knowledge and market maturity play a decisive role in the adoption of blockchain technology. It is a two-way street that depends on tourists' understanding of the technology and the possibility of domestic businesses accepting it, rather than simply relying on the efficiency and ease of use that it provides. At the same time, the use of blockchain technology will be limited to those who understand the technology and its mechanisms, limiting its use to a small percentage of the population.

Political issues are still one of the major issues facing the development of blockchain technology[4]. Central banks generally control the money supply through open market operations, discount rates, and reserve requirements to ensure that inflation does not devalue the currency. For its part, actors in the larger economy might object to something like Bitcoin because it is independent of existing institutions. They will complicate the process of creating such a procedure to facilitate rural tourism. If central banks see the potential of blockchain technology, however, may begin to favor state-owned digital currencies. Moreover, in addition to protecting the privacy of personal records, blockchain technology will also need to address security issues (hacking, identity theft, loss of private keys and misplaced tokens). In addition, the transactions with this technology usually cannot be canceled or reversed providing no recourse if there are errors.

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