Research on the Application of Big Bata Technology in Tourism Industry

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ABSTRACT: As a new technology and industrial form, big data promotes the integration and innovation of Internet and industry, and further promotes the upgrading of traditional tourism industry to intelligent tourism. This paper expounds the function mechanism of big data in promoting the development of tourism industry from the aspects of big data technology and economic characteristics, examines the application characteristics of big data technology in tourism industry, and analyzes the problems faced by big data technology in the application of tourism industry. Finally, the paper gives some policy suggestions to strengthen the development of big data technology in China's tourism industry from the aspects of promoting the establishment of big data plan, encouraging the development of tourism industry big data, promoting the construction of big data cloud base, and improving the security sharing mechanism of big data.

KEYWORDS: big data technology; tourism industry; application；countermeasure

1. Introduction

With the development of Internet technology and the advent of a new generation of information technology innovation era, data storage and processing and analysis in the application of the industry have become more and more important. The characteristics of big data are large data volume, fast growth rate, wide sources and variety. It is the main function of big data technology to make significant improvement in the utilization value of data through in-depth mining and analysis of data with professional technology, so that big data has become a strategic resource for economic growth of various industries. Big data technology has permeated all walks of life. Victor Mayer-Schönberger and Kenneth Cukier(2013) introduced big data technology into the tourism industry, established a big data platform for

regional tourism prediction and feedback mechanism by using cloud computing and cloud storage functions, and formed a "cloud guarantee" for the healthy development of regional tourism[1]. The massive data in the front and end of the tourism industry chain are stored and analyzed by using the emerging computing function to provide decision-making suggestions for stakeholders such as tourism related enterprises, governments, tourists, etc., which is helpful to realize the sharing of tourism information and promote the rapid development of tourism industry and tourism destination economy. Under the background of economic globalization, China is also actively advocating the extensive application of big data technology. Scholars have made extensive discussions on the application of big data technology in industry. From the perspective of rural tourism, Wenlin Gu and Min Ren(2015) use big data technology to analyze the market demand of rural tourism based on rural tourism data, and then develop tourism products that are popular with consumers[2]. From the perspective of tourism enterprises, Yi Lin and Linyan Zhang (2016)innovate the communication and communication methods with potential customers, such as customized differentiated products, by making use of the characteristics of convenient access to mobile network terminal information and timely communication, so as to promote the promotion of tourism information interaction platform in scenic spots [3]. From the perspective of tourism industry cluster, Jinhua Yu et al.(2014) think that the governance mode of tourism industry has been optimized and the collaborative innovation of tourism enterprises has been improved by introducing big data technology into the industry cluster[4].

With the transformation from traditional tourism to intelligent tourism, the application of big data technology has a positive impact on the development of tourism industry. Therefore, it is particularly important to analyze the mechanism of big data technology promoting the development of tourism industry and its application characteristics. The application of big data technology is conducive to promoting the optimization of tourism industry, promoting the upgrading of tourism industry cluster, and promoting the humanized, intelligent and personalized development of tourism industry. The next arrangement of this paper is as follows: the second part is to investigate the mechanism of big data technology promoting the development of tourism industry, the third part is to analyze the application characteristics of big data technology in tourism industry, the fourth part is to explore the challenges of big data technology in the application of tourism industry,

and the last part is the conclusion and relevant countermeasures and suggestions.

2. The mechanism of big data technology promoting the development of tourism industry

2.1 Big data technology promotes the transformation from traditional tourism to Intelligent Tourism

As the key technology source of intelligent database, big data plays a strong role in promoting the transformation from traditional tourism to intelligent tourism. In the traditional tourism industry, there are some shortcomings of homogeneity, extensive and single tourism products and services. With the rapid development of information technology, it cannot meet the diversified needs of today's consumers. Due to the homogeneity of products in the market, offline travel agencies use low prices to attract consumers and play a price war, which makes the industry fall into vicious competition, which not only has a negative impact on tourism enterprises, but also reduces the experience satisfaction of tourists. Therefore, it is the key to improve the experience of tourists to deal with the massive information of tourists through big data technology and do a good job in data integration and analysis. Big data records the information of tourists' needs and preferences. Through the user database, it pays attention to tourists' behaviors and user experience, establishes tourists' portraits, grasps tourists' consumption habits more accurately and quickly, ensures the quality of tourists' tourism activities and personnel safety, improves the tourism experience, carries out refined Market operation, and transforms into intelligent tourism [5]. On the basis of the development of traditional tourism industry, big data technology integrates with tourism related industries to make elements of different industries cross penetrate, change market demand, promote the efficient allocation of elements in the development of tourism industry, and enhance the competitiveness of intelligent tourism industry.

2.2 Big data technology promotes the development of tourism industry to cluster innovation

The innovative application of technology plays a key role in the development of any industry. As a new technology and strategic resource, big data technology

provides technological innovation and support for tourism industry, promotes the integration of industries, and promotes the formation of tourism industry cluster. In the scope of regional economy, tourism related industries form industrial clusters through agglomeration. There is not only competition but also cooperation among enterprises [6]. There are many crisscross industrial chains in the tourism industry. The distribution of information resources among industries and the innovative application of technology promote the win-win cooperation among enterprises in the industrial chain. Big data technology makes use of the reserve function and analysis function to analyze the complex data generated from the beginning to the end of the industrial chain. Through the integration with the tourism industry cluster, the tourism enterprises are integrated with each other to give full play to the advantages brought by the cluster.

2.3 Big data technology promotes the integration of Internet and tourism related industries

In the process of development, tourism industry will encounter various problems, resulting in development bottlenecks. Through big data technology, promoting the integration and innovation of Internet and industry, it has brought revolutionary impact on the development of traditional tourism industry and enhanced the international competitiveness of China's tourism industry. With the continuous promotion of the Internet, tourism industry, through big data technology, cloud computing, Internet of things services and other business models, drives the development of modern service industry, cultural creativity and other related industries and economy, and realizes the integration and coordinated development of related industries. Big data technology expands business intelligence and industrial intelligence, decomposes the production of related products in the tourism industry chain into many independent new industries, uses new data collection technology, develops new products through technological innovation, promotes the improvement of the core competitive advantage of enterprises, and drives the investment boom of emerging industries. Big data technology covers a wide range, which makes the Internet highly related to tourism related industries and spreads to other industries and fields, integrates with traditional industries, and optimizes industrial structure [7].

3. Analysis of application characteristics of big data technology in tourism industry

With the further strengthening of the demand for big data services in various fields of the economy, the application of big data technology in the industrial field is further deepened. Through the deep integration of big data technology and various industrial fields, the application ability of big data is constantly improved, the big data industry is combined with the real economy, the data is turned into effective resources, emerging products and formats are generated, and industrial productivity is improved. According to the evaluation report on the development level of China's big data industry (2018) issued by China Electronic Information Industry Development Research Institute, the industry big data development evaluation index consists of three first level indexes and eight second level indexes: basic environment, data collection and industry big data application. The basic environment indicators include industry policies and infrastructure, among which industry policy indicators refer to whether to issue the industry's big data industry and application development policies, and infrastructure indicators refer to the industry's informatization development level. Data collection indicators include data automatic collection rate, data aggregation and data circulation, among which data automatic collection rate refers to the average automatic collection rate of various types of data in the industry, data aggregation index refers to the number of cabinets in the industry data center, and data circulation index refers to the trade volume of industry data. Industry big data application indicators include market scale, enterprise investment and big data platform. Market scale indicators refer to the business scale of big data industry in the industry, enterprise investment indicators refer to the proportion of capital investment in big data field of leading enterprises (Institutions) in business income, and big data platform indicators refer to the number of big data platforms in the industry. Figure 1reports the comparison of industry big data development evaluation indicators of big data industries in 2017.

According to the evaluation results in Figure 1, the total application index of big data industry is 124.84, with an average index of 12.48. By comparing various indicators, finance, telecommunications and government affairs won the top three in the development of big data industry. Among them, the tourism industry application index is 11.3, accounting for 9.05% of the overall development index, ranking the

7th in 10 industries, slightly lower than the average level. It can be seen that the development of big data of China's tourism industry is still in its infancy. By comparing the sub indicators and average values of big data of various industries in Table 1, it is found that the difference between the basic links, data collection, industry application and average value of tourism industry is 2.01, 3.12 and 1.18 respectively, with the largest data collection index gap. The level of data sharing and data quality to a certain extent restrict the development of big data industry applications, which is the focus of future development.
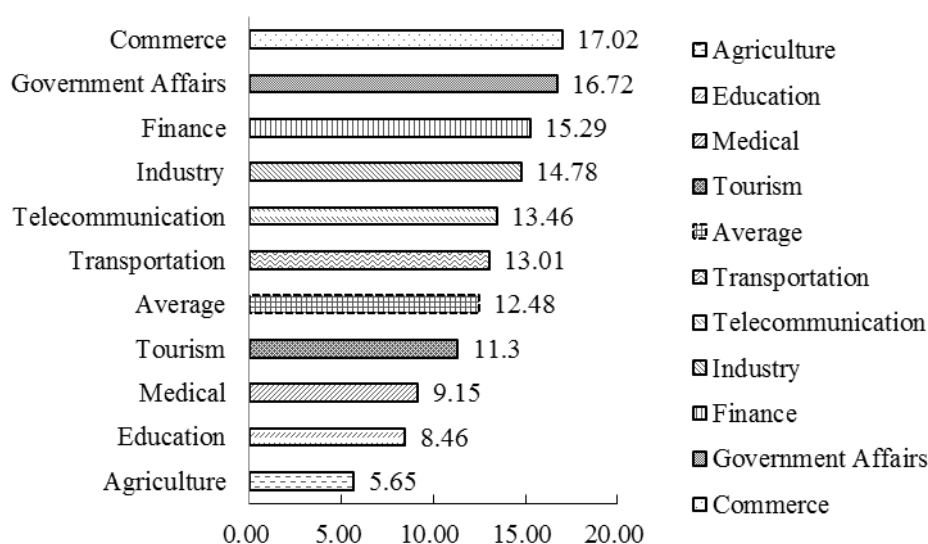

Figure. 1 Application index evaluation chart of big data industry in 2017

Table 1 Index ranking of big data and indicators of various industries in China in 2017

industry	Industry application index	Basic environmental index	Data aggregation index
Medical	9.15	10.83	10.6
Government Affairs	16.72	11.27	11.45

Transportation	13.01	8.98	13.57
Telecommunication	13.36	8.12	21.11
Finance	15.29	8.04	22.02
Commerce	17.02	7.14	9.53
Industry	14.78	6.88	2.62
Education	8.46	6.79	8.96
Tourism	11.30	5.45	5.67
Agriculture	5.65	1.55	1.2
Average	12.48	7.46	8.79

The above analysis shows that the application of big data technology in China's tourism industry still has a lot of room for improvement, and the role of big data in the development of tourism industry needs to be fully released. At present, big data technology is mainly used in market positioning, marketing diagnosis, dynamic prediction and monitoring in tourism industry. First, in terms of tourism market positioning, using big data technology to mine and collect massive data can provide enough sample size and data information, such as population, potential consumers, consumption level and habits, product awareness, etc., so as to establish a mathematical model based on big data to predict the future market. The market positioning process is to store, analyze and integrate market research data [8]. Second, in terms of tourism marketing, it is mainly to obtain the consumption characteristics of tourists according to the data to fully understand the transformation of tourists' actual needs, grasp the dynamic of tourists' tourism, combine and design differentiated tourism products, and form appropriate marketing strategies. In addition, new media clients such as microblog, website and self-Media are used to pay attention to the tourism mode, destination selection and source structure of potential tourists, innovate tourism products in time, and carry out accurate marketing according to the differences of tourists' hobbies of different ages. Thirdly, in the aspect of tourism industry prediction and monitoring, demand prediction is to make tourism enterprises master and understand the potential market demand of tourism industry by statistics and analysis of big data and adopting scientific prediction methods. By analyzing the sales volume and price trend of the products in the future market segments, we can manage the tourists, stimulate the tourism demand, adjust the balance between the supply and demand of the tourism

flow and the tourism scale market, and implement dynamic pricing and differential pricing. At the same time, the use of big data for public opinion monitoring has the advantages of fast discovery, complete information and accurate analysis. For emergencies, tourism enterprises can jointly respond, and timely find and stop the wrong information on the Internet [9]. In a word, the integration of big data technology, Internet and traditional tourism industry can effectively improve the efficiency of all economic subjects in the whole society. It is an effective means to promote the innovation of China's tourism industry and the adjustment of industrial structure.

4.Problems faced by big data technology in the application of tourism industry

China's big data technology is becoming more and more mature, and information technology platform is getting more and more attention, but there are still many problems restricting the sustainable development of big data technology in the tourism industry. This is mainly manifested in the lack of infrastructure construction of big data technology, insufficient depth of information mining in tourism industry, different degree of informatization in tourism industry, and conflict between openness and privacy.

4.1 Insufficient infrastructure construction of big data technology

Big data technology promotes the intelligent development of tourism industry, but because the development of intelligent tourism management mode cannot keep up with the rapid development of tourism industry, many enterprises do not invest enough resources in the application process of big data technology[10]. Due to resource constraints, enterprises lack the power to invest in infrastructure construction, and the implementation of supporting public services cannot keep up，which makes the advantages of big data technology on tourism industry cannot be fully exerted. Big data and the Internet are inseparable, but some tourist attractions are relatively complex and blocked, which cannot achieve the full coverage of the network in the scenic spot, which will reduce the experience of tourists, making the demand of tourism industry decline[11].At the same time, it cannot monitor the scenic spot in real time, and the system of maintaining the security of tourism information is weak, which makes the risk of personnel security and property

increase, and there are security risks, which will slow down the pace of tourism industry informatization.

4.2 Insufficient depth of information mining in tourism industry

In the era of big data, the data is massive. At present, the application of big data technology needs the help of Internet platform. Because some tourist attractions are distributed in remote areas, the utilization of Internet technology is not high, and regional data sharing is not possible. At the same time, tourism data is generally messy, with the characteristics of wide sources, low value density, and more complex data forms. The data collection channel is single, and the data collection lacks unity and standardization, which is not conducive to data processing and unified analysis, reducing the data utilization [12-13]. In order to find out the association between big data, big data technology must adopt data mining, information processing and other scientific technologies to mine, analyze and distinguish data, which requires professional technical talents. At present, the training of talents in this area fails to keep pace with the needs of the industry, which brings difficulties to the mining of tourism information for tourism enterprises[14].

4.3 Conflicts between openness and privacy of tourism information

From the perspective of enterprises, the maturity and security of current big data technology are still imperfect, and different tourism enterprises have closed management of their own tourism information. Enterprises with data advantages are not willing to disclose the data they have because of their interests[15].At the same time, because the information of tourists' travel mastered by tourism enterprises includes "eat, live, travel, travel, purchase, entertainment", etc., these data may contain a large number of privacy issues related to individuals or enterprises, such as tourists' current location, personalized demand, historical consumption preference, etc., and enterprises are not willing to disclose data for the sake of safety, this makes it far away from the real-time and personalized requirements of the tourism industry. Therefore, how to deal with data security and privacy, and how to balance data disclosure and privacy are the problems faced by smart tourism [16].

5. Conclusion and suggestion

This paper discusses the application of big data technology in China's tourism industry. Firstly, it analyzes the mechanism of big data technology promoting the development of tourism industry, and then it studies the application characteristics of big data technology in the development of tourism industry, On this basis, the paper analyzes the problems faced by big data technology in the application of tourism industry, and finds that the infrastructure construction of big data technology in China's tourism industry is insufficient, the depth of information mining in tourism industry is insufficient, the potential of tourism demand cannot be fully exploited, and the openness of tourism information conflicts with privacy. Therefore, in order to promote the faster and better development of tourism industry and give full play to the role of big data technology in tourism industry, this paper puts forward the following policy recommendations:

First, integrate the relevant elements of big data of tourism enterprises and establish a big data plan. In the tourism industry chain including transportation, housing, food, tourism, shopping, entertainment, etc., all relevant units need to establish big data planning, fully apply big data technology to all aspects of enterprise operation, increase investment in technology, capital, policy preferences, etc., in order to better develop the tourism industry[17]. Further optimize enterprise data management, formulate professional big data management methods, such as using scientific professional methods, establishing corresponding big data management and application platform, introducing professional data mining team, cultivating enterprise "big data awareness", and seizing the opportunity in the process of big data application. At the same time, we should establish a big data talent training system. With the continuous development of the application of big data technology in various industries, the requirements of big data related talents on the professional and technical ability of deep data mining are constantly improved, so all industries have launched a fierce talent scramble for big data talents. Therefore, it is necessary to strengthen cooperation in production, teaching and research. Enterprises and institutions of higher learning exchange information, enterprises put forward the demand for big data talents. Colleges and universities train students to combine big data academic theory with practical operation, and cultivate comprehensive high-level professionals.

Second, encourage the development of big data in tourism industry and promote the construction of big data cloud base. In order to solve the "information island" of tourism information construction, according to the needs of various enterprises in the industry, the big data of enterprises are connected to form a big data thinking mode, integrate the big data of the development of the whole tourism industry, and rely on modern scientific and technological means, such as cloud computing, cloud storage, Internet of things, to establish a platform for basic data sharing and data exchange. It is not only the individual enterprises and each department of the enterprise need to establish the corresponding big data cloud base, but also the tourism enterprises, tourists and government departments need to work together. Relying on the big data cloud base, adhering to the combination of local government guidance, enterprise investment and market-oriented operation, to realize the accurate push of information to tourists and improve the tourism information collection path, so as to make the marketing more accurate.

Third, improve the security sharing mechanism of big data and promote the technical guarantee facilities of big data security. The information sharing mechanism based on big data platform is based on serving tourists. It is not only to collect relevant data information and store data, but also to require the information of stakeholders to circulate with each other. The government, tourism departments, tourists and tourism enterprises actively participate in the information sharing mechanism. Through the analysis and mining of massive data resources, they can promote the data sharing and data sharing of enterprises in the industry, make the tourism industry informatization and innovation upgrading, and realize the effective sharing of information resources. At the same time, it is necessary to establish a network security system, improve the big data security protection system, and improve the data protection technology to ensure the safety of the whole data sharing process. Carry out data security training for enterprises, encourage more investment in data security, and improve the ability of big data security protection.

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Province".

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