

Quantitative Analysis of Tourism Economic Contribution Degree Based on Big Data Information and Time Series Model

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Abstract

Information technology is changing the tourist behavior, through the construction of intelligent tourism and large data mining; tourism enterprises can get more information about the potential value, and thus will greatly enhance the competitiveness of the tourism market. In this paper, the authors analyze the tourism economic contribution degree based on big data information and time series model. At present, with the increasing of the tourism economy, the contribution of tourism to the economic society continues to increase. Through empirical analysis, we find out the factors that affect the economic performance of the tourism industry, and measure the correlation degree of the tourism industry.

Keywords: Intelligent Tourism, Big data, Tourism economic, Contribution degree

1. Introduction

Intelligent travel and big data era has come, we have a finger, the use of smart phones and related equipment will be able to understand the world, experience tourism. With the excavation depth, application of tourism data in the tourism industry more and more widely, the potential value of information contained in the time for us to use, tourism data will enter the fresh blood into the wisdom of tourism development, the development prospects of the wisdom of tourism is full of vitality, will be more rich and colorful than the traditional tour [1]. China's tourism industry since the reform and opening up development, with the continuous development of its own strength, the role of tourism industry in China's social and economic, social and cultural undertakings by once with a strong administrative color and height dependent resources, has already become an indispensable system of national economic accounting in part, and the development of the third industry has become an important focal point around [2-3]. With the increase in people's income and common people's increasingly rich material and cultural needs, the total economy around the tourism industry is flourishing, the tourism industry as an economic category and its contribution to national economy and the status of continuous improvement, some developed coastal areas to invest huge funds to give priority to the development of Tourism industry and the exhibition industry, in some areas, the tourism industry has become a pillar industry [4]. From an economic point of view, the contribution of tourism to regional economic development can be summarized as the key to promote the development of related industries and the total economy growth and contribution to revenue contribution and create employment opportunities.

The status of tourism industry in the local economy continues to improve, achieve the objectives, the core is to grasp the Chinese tourism industry structure optimization, transformation and upgrading, promote the development of strong, from extensive growth to intensive growth from quantity to quality improvement, to meet the basic needs of the deep connotation of service transformation, at the same time, we should pay more attention to the tourism industry. The social function and economic function of both, to

promote tourism development [5]. The rapid development of tourism activities and popularization of the tourism industry, the tourism economy has become an important part of the world economy, tourism economy like other sectors of the economy, is actively involved in all tourist destinations in social and economic activities in the operation. Because tourism is a social economic activity involving a very wide range, there are the economy is inextricably linked with the whole national economy and people's life, so its operation is bound to produce a variety of social and economic effects of tourism destination economy [6]. Correctly understanding and grasping the social and economic effects of tourism activities and its characteristics, contribute to more rational development of the corresponding development strategies of Tourism and tourism development planning, and to promote the development of tourism destination of social economy [7]. Therefore, must take the combination of theory and practice, the objective evaluation of the economic performance of the status quo of China's tourism industry, and further To promote the performance of the play.

2. Big Data Mining and Intelligent Tourism

2.1. The application of big data in Tourism

Since twenty-first Century, tourism has become an important part of people's life, and tourism has become one of the fastest growing and most important service industries in the world. Global tourism hot to promote the rapid development of tourism information. Since 1980s, information and communication technology has completely changed the business model and structure of tourism [8-9]. Especially in the past 10 years, the rapid development of cloud computing, networking, Internet and mobile terminal and other information technology to further upgrade the tourism information, but also to the traditional tourism management mode, marketing mode, tourist demand and consumption patterns changed subversive. Information communication technology has completely changed the efficiency of tourism organizations, tourism market driven mode and the interaction between tourists and tourism organizations. To provide quality service and management decision to meet the tourists, multiple real-time personalization demand, improve efficiency, improve the tourism consumption of tourism resources and the efficient allocation of social resources and sustainable utilization has become the tourism industry is facing the most serious challenge.

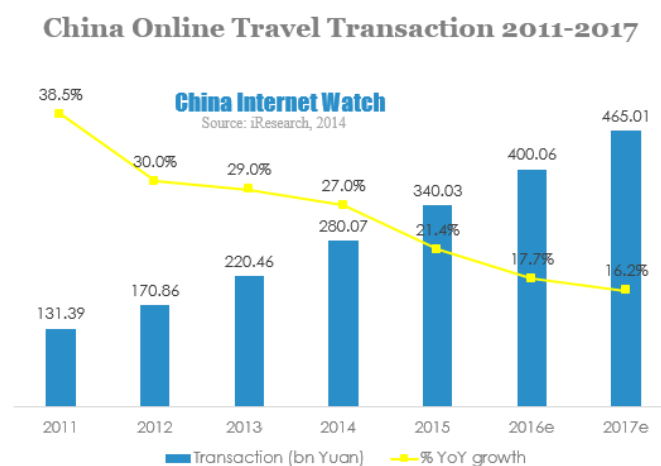


Figure 1. Online travel industry development trend

The tourism industry as the current hot service industry, the data also has all the characteristics of big data, is one of the important sources of big data. However, the application of big data in the tourism industry is far behind other industries, such as biological medicine, aerospace technology, e-commerce, *etc.* In our opinion the reason is in many aspects, such as the late start of the tourism industry, the application of new information technology related to the tourism industry and no other industry widely, at present the tourism industry with respect to influence people's life and social development in other industries is relatively low, the degree of attention of national government data on tourism industry and related economic and technological investment and so on. The arrival of the era of intelligent tourism promotes the development of information communication technology, such as cloud computing, Internet of things, mobile intelligent terminals, *etc.*, also just to meet the development of large data in the tourism industry. But so far few scholars discuss the application of big data in the tourism industry, so it is accompanied by the wisdom of tourism to solve many new problems of big data should be, in our opinion, the most fundamental problem is the definition of the wisdom of tourism needs the integration of large data, related architecture of smart travel needs the integration of large data core. The wisdom of tourism is the big data mining.

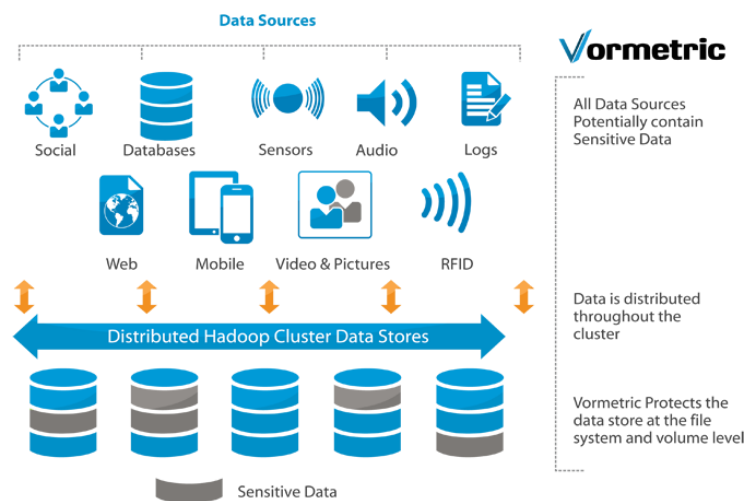


Figure 2. Tourism big data

2.2. Tourism information construction

From the aspects of tourism information, wisdom tourism is the highest mode of tourism information development. Tourism information construction needs to improve the original digital based on the further construction of mobile communications network, Internet of things and tourism cloud platform. The mobile Internet is a bridge between the link tourists' mobile intelligent terminal and the data center of tourism cloud platform, which is the foundation of the Internet of things. Visitors can enjoy real-time information about the whole process of tourism services, the demand for information of the real-time transfer of tourists, all kinds of interactive transmission of tourism data information, cannot be separated from the quality of mobile communications network.

We believe that the essence of the wisdom of tourism is the upgrading of traditional tourism, or a service. All the information of tourism management and tourism resources information, tourism economic operation optimization are ultimately for the tourism consumers and the various interest groups to service, personalized service, to better promote the tourists customized profit group interests, improve management decision-making level. The arrival of the era of big data, but also marks the arrival of the era of large services, smart travel is also the case. Intelligent tourism services is the process of large data collection, storage, management, mining process, and this process is the most

critical and big data mining, other aspects of the data mining services. Only by fully exploiting various types of tourism and the source of all the information in the data, supplies and transportation scheduling coordination, understanding the behavior of tourists and provide better quality of service, to promote sustained and healthy development of tourism service industry.

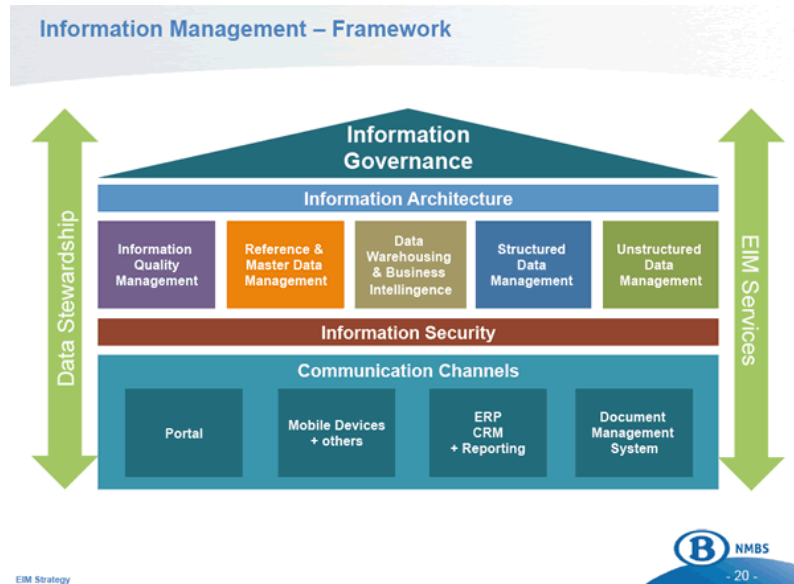


Figure 3. Tourism Management Information

Experimental platform is the basis of data mining, big data mining is more. Traditional data mining data structure is simple, easy to collect management, mining tools on the computer processing power requirements are low, usually on personal computer or small computer cluster can carry on the experiment. The massive data, structural complexity and the huge amount of space makes big data requirements for the experimental platform is much higher, it is impossible to carry out the traditional experimental platform. The effective way is to collect and analyze large data mining management in the cloud platform or large-scale computer integration.

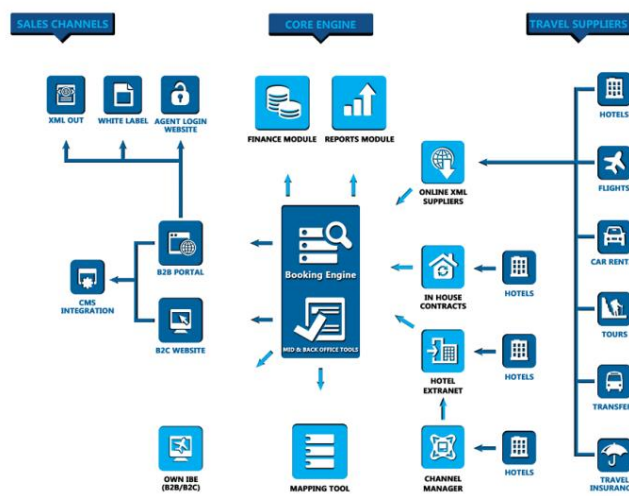


Figure 4. Travel network platform design

3. The Economic Impact of Tourism Industry

3.1. Tourism economic growth factors

The direct factors that promote the growth of tourism economy include the input of production factors, the growth of knowledge and application and the increase of human capital. At the same time, the system has a profound impact on them. For the tourism industry, its development also directly depends on a number of special factors.



Figure 5. Tourism economic growth

- **Tourism resource abundance:** The situation of tourism resources endowment determines the development degree of the tourism industry to a great extent. The more abundant tourism resources, the greater the market demand, the higher the grade of tourism resources, the greater the potential market. In the world, the developed countries are relying on their rich and high quality tourism resources. Although the theory of economic growth is still lack of attention and Research on natural capital, the contribution of tourism resources endowment should be discussed in the analysis of tourism economic growth.
- **Accessible property:** One of the important characteristics of the tourism industry and the general resources industry and the traditional industry is that the tourism resources and the tourism products which are attached to the development of the tourism industry are fixed in space. In tourism, the flow of people (tourists) rather than goods. Therefore, geographical location and access to the destination of tourism development has a very important impact
- **Regional economic development level:** As far as demand is concerned, tourism is the pursuit of higher levels of culture, spirit and material experience after meeting the basic needs of life. This feature determines the scale of tourism demand and regional economic development level has a significant positive correlation. As far as supply is concerned, the development of tourism needs to carry out large-scale infrastructure and service facilities, only the economically developed areas, to have a larger scale of investment capacity. Thus the level of local economic development has restricted the development of the tourism industry.
- **Destination price level:** Tourism demand has a greater price flexibility. Homogeneous in the same destination, the lower the price level, the more competitive; otherwise, it is the opposite. This feature is the same as all trading products. But the difference is that the world's tourism resources are always

different, more or less with a certain degree of monopoly. The price level has become the embodiment of the destination resource monopoly or attractive strength to a certain extent, affect the price level of the destination for the level of tourism development is uncertain, so it is necessary to discuss the proposed special.

- **Environment atmosphere:** The clean air, clean, without the luxury of the streets, beautiful buildings in itself can become attractive. Many tourists, especially those who are leisure travelers, are the pursuit of the whole environment. Some scholars even take the environment as an important part of tourism products.

3.2. Tourism related industry association

Tourism intermediate input rate refers to in a certain period of time for intermediate input production of tourism products and tourism. The total investment ratio of intermediate input rate calculation method, calculation of tourism industry directly affects the intermediate input rate.

$$F_j = \frac{\sum_{i=1}^n x_{ij}}{X_j} = \sum_{i=1}^n \alpha_{ij} \quad (1)$$

Calculate the intermediate input rate of Tourism:

$$F_j = \sum_{i=1}^n \alpha_j F_j \quad (2)$$

A direct impact on tourism industry tourism intermediate input rate is high, the tourism industry shows the added value rate is lower. It can be seen that the direct effects of tourism industry in the tourism development. Tourism intermediate demand refers to the social rate of tourism products and the intermediate demand and social total demand for tourism product ratio. The calculation method and the calculation of the above, the first tourism industry directly affects the intermediate demand rate:

$$G_i = \frac{\sum_{j=1}^n x_{ij}}{X_i} = \sum_{j=1}^n d_{ij} \quad (3)$$

Tourism industry association effect, tourism directly affect the final product with dynamic analysis:

$$\delta_j = \frac{\bar{b}_{oj}}{\frac{1}{m} \sum_{i=1}^m \sum_{j=1}^n \bar{b}_{ij}} \bar{b}_{oj} = \sum_{i=1}^n \bar{b}_{ij} \quad (4)$$

Tourism consumption as the final product of the increase, with the power coefficient can be calculated with the:

$$\bar{\delta} = \sum_{j=1}^m \beta_j \delta_j \quad (5)$$

Tourism direct impact on the final product of the industry together with dynamic analysis:

$$\bar{b}_{oi} = \sum_{j=1}^n \bar{b}_{ij} \quad (6)$$

Calculated homogeneous coefficient:

$$\theta_i = \frac{\bar{b}_{oi}}{S} = \frac{\overline{mb}_{oi}}{\sum_{i=1}^m \bar{b}_{oi}} \quad (7)$$

Tourism employment multiplier refers to full-time employment change unit of tourism consumption completely by quantity. We use the following method to calculate the tourism employment multiplier, tourism industry directly affects the employment effects of tourism spending completely CL:

$$CL_i = O_i \alpha_{ii} + \sum_{k=1}^n CI_{ki} \quad (8)$$

4. Empirical Analysis

4.1. Variable selection

The performance level of tourism economy is by the external physical factors of tourism resources, tourism service infrastructure and internal tourism service quality, especially the effect of various factors affecting the play are not independent. Mainly selected the TFP reflect the total characteristics of the development of the more representative of the tourism income and reflect the quality of income the development of; including the factor endowment in the development of the tourism industry tourism resources resource, tourism industry and tourism industry practitioners labor, fixed assets investment capital. other factors, given the economic environment good or not directly related to the quantity and types of tourism products, which directly determines the size of the tourism market. Furthermore, most can reflect the basic characteristics of the economic environment development is the size of the market, or the scale of demand.

Table 1. Descriptive statistics

variable	sample	mean value	standard deviation	minimum value	Maximum value
pgdp	120	8.142	1.158	7.024	12.143
struc	120	0.087	0.307	-0.597	0.872
income	120	6.538	1.127	2.243	9.142
tfp	120	2.486	0.452	0.287	3.352
resource	120	3.487	0.589	3.654	5.587
labor	120	2.587	0.748	0.486	5.701
capital	120	5.369	1.028	1.652	8.641
rinv	120	-0.875	0.304	-1.427	-0.175

Tourism industry is an industry and related industry strong industry, if a region has a good infrastructure, can in the raw materials, tourists and other aspects to better support tourism enterprises. At the same time, from the supporting factors and resources possess practical significance, such as the residents consumption level and good foundation the construction of infrastructure facilities, tourism can increase greatly the tourist attraction; optimization of tourism enterprise based and business environment, conducive to tourism

enterprises to enhance operating efficiency. The factors measured by the area around the fixed assets investment in the proportion of GDP, abbreviated as rinv.

From here the various factors and the tourism industry economic performance of all aspects of the correlation coefficient of composition can be found of tourism resources were negative correlation, although significant aspects of the tourism industry, the influence of its economic performance are not significant. Other factors, mostly through a significant test and positive the correlation coefficient between these factors. The largest is no more than 0.8 levels, in general, can be considered co linearity problem may not be very prominent.

Table 2. Correlation analysis

variable	pgdp	struc	income	tfp	resource	labor	capital	rinv
pgdp	1.000							
struc	0.157*	1.000						
income	0.741**	0.134*	1.000					
tfp	0.589**	0.118**	0.684	1.000				
resource	-0.124**	-0.342**	-0.03	-0.11	1.000			
labor	0.587**	0.323*	0.632*	0.413*	-0.17*	1.000		
capital	0.689**	0.345**	0.805*	0.645*	-0.205*	0.518*	1.000	
rinv	0.242**	0.041*	0.328**	-0.24*	0.217*	0.330	-0.05	1.000

4.2. Environmental Quality Evaluation and Analysis Discussion

The economic performance of the tourism industry is affected by its industrial development related aspects such as factor endowments, directly affect the level of management, at the same time, the effect of size and significant development and macroeconomic environment closely, the effect of better play depends on the above aspects. In order to further explore the development of the tourism industry in the process. The mechanism play the role of factor endowment effect or characteristic. In this paper, through introducing the relevant cross variable cross analysis to inspect. An important advantage is the ability to study the relevant factors of influence by common variables, or it can be understood as a factor to satisfy the conditions in another factor, the level of influence. This paper from here specific analysis, i.e. to understand the effects of social economic development, related factors and tourism industry factor endowment conditions on the economic performance of the tourism industry of the total, or the conditions in the social development of macro economy related conditions, tourism industry development factor endowment on economic performance of the tourism industry of the total impact.

From table analysis results, including the tourism industry's development conditions and the development of society and economy factors related cross. Equation 1 to focus on the tourism resources in the conditions of various social macro economic development, affect the composition characteristics of action. The first thing to note is that in consideration of the tourism resources and macro the economic development of the cross term, directly affect the tourism resources becomes significantly negative at the 10% level. The corresponding cross terms, the variables in the 1% level is significantly positive, indicating that the market scale is larger, the higher the level of service oriented economic structure, infrastructure construction more perfect, more conducive to mining the tourism resources in the promotion of economic performance of the tourism industry to enhance the total potential effects of tourism resources is relatively direct effect.

Table 3. Analysis on the economic performance of tourism industry

variable	equation 1	equation 2	equation 3	equation 4	equation 5
pgdp	0.014* (1.47)				
struc		-0.042 (-1.12)			
income			0.025 (1.20)		
rinv				0.513* (5.08)	
tfp					0.602** (9.15)
resource	0.345** (7.42)	0.312*** (7.63)	0.304*** (7.86)	0.358** (7.35)	0.314*** (7.45)
labor	0.044* (1.24)	0.058** (2.12)	0.038* (1.25)	0.057* (1.85)	0.036** (2.69)
capital	0.156** (7.14)	0.175** (7.24)	0.124*** (7.75)	0.135** (7.38)	0.168* (6.12)
_con	0.534*** (14.35)	0.576** (15.17)	0.564** (18.20)	0.625** (15.14)	0.543** (12.06)
Wald	0.646** (2.25)	0.837*** (2.68)	0.886*** (2.75)	0.779** (2.14)	1.479*** (4.18)*
LogL	-94.14	-90.68	-102.56	-105.17	-82.19
Sample	120	120	120	120	120

Equation 2 regression results mainly investigated the development of the tourism industry, the mechanism of labor factor endowment effect on the economic performance of the tourism industry of the total amount. It can be seen that the labor factor endowment direct effect in consideration of the cross after the impact is no longer significant. The cross terms in lab variables through a significant test and is, in line with expectations, the larger market size means that the tourism industry in the broader market, relatively easy to form scale economy, economy of scale effect makes the marginal labor output maximization in cost under the condition of a certain service output, which is obviously on the economic performance of the tourism industry of the total lift has a very good role in promoting. From the future development trend of tourism industry, competition is increasingly reflected in knowledge, information technology competition. Human capital status of tourism industry on economic performance. The regression results in the same ring, taking into account the cross effect of human capital, direct impact is not significant. That the market scale is larger, the economic structure of the service industry level is higher, the higher the quality of human capital, the human capital level of the tourism industry in improving effect on economic performance is more significant from here. The influence mechanism of conduction is also observed in the open environment, the total effect on the economic performance of the tourism industry in human capital is significantly negative; and the higher degree of market system, more conducive to play the role of human capital influence on the economic performance of the tourism industry of the total.

4.3. Promotion strategy of economic performance of tourism industry

- 1) **Clear government guidance functions:** China has a vast territory, rich in tourism resources, regional tourism industry have a brilliant future. In the southeast coastal areas, further development of regional tourism industry, enhance its economic performance, help the local industrial upgrading, so as to promote the

transformation of China's economy as a whole. While the relatively backward western regions, the development of regional tourism industry will help in the local poverty, which is helpful to achieve the overall goal of building a well-off society in our country. So to talk about how to improve the economic performance of regional tourism industry strategy, the relevant administrative departments of our government must first in the concept to attach importance to the development of the regional tourism industry, especially in the condition of the development of regional tourism area, the local government responsibility and the obligation to take the initiative to guide the development of the local tourism industry.

- 2) ***Strengthen the construction of tourism market:*** First, to strengthen the construction of market economy expanding tourism. Because tourism industry's total economic size reaches a certain threshold, is a prerequisite for the tourism industry have a positive impact on our national economy and promote the role, this time in order to measure the tourism industry has an obvious effect on the national economy. As the life style of people this option will travel into consideration, tourism economy gradually can maintain the corresponding share in the GDP, and the total economy of tourism industry this time often will feature with a stable one of the factors, and continuously to our country economic system have a positive effect, promote the healthy and orderly development of the national economy. The research focus on. The tourist distribution of local tourism market and consumption habits to have a clear understanding of the principle of market segmentation, the effective of tourist market To be arranged for the purpose of subdivision, promotional activities strong.
- 3) ***Optimization of tourism consumption structure:*** The tourism market is showing and consumption carrier of tourism products, the economic performance of high market, the products must meet the needs of consumers, so it has a strong market competitiveness and higher profit margins. Therefore strengthening the fundamental goal of the construction of the tourism market, is to optimize the structure of tourism consumption of consumers is the first from the perspective of consumers. To ensure the consumption structure of tourists attention at any time, efforts to increase tourism to shopping! Non basic consumption entertainment consumption and other tourism products, to improve the quality of tourism at the same time, the specific content can greatly enrich the tourism consumption, to bring tourists abundant tourism experience; secondly, the relevant departments should strengthen the local tourism the guidance of consumption and education, improve the level of consumption and help visitors, provide appropriate facilities where possible, up to To the goal of improving the level of tourism development.
- 4) ***Improve the tourism management system:*** At present, China's tourism legal system mainly includes the regulations promulgated by the State Council level! The National Tourism Administration issued regulations and the local regulations, from the hierarchy, these laws and regulations are not enough to meet the needs of local laws and regulations due to the lack of national comprehensive legal framework guidance, legislative level differences, the specific effects of the implementation of down is not satisfactory. The development of the tourism industry needs to introduce a national level tourism law, as the highest standards of conduct. In order to reflect the characteristics of tourism integration, tourism law need comprehensive interests of all parties and the laws of the market to form the legal norms. As the tourism industry benchmark for tourism enterprises, China's travel agency to its inherent the management system for proper reform, establish vertical system model, in this system, by the large travel agency! Medium scale characteristic of travel agency Small scale travel agency and network management together. The following advantages: the system of large

travel agency group relying on its superior capital strength's ability to withstand market risks, so as to effectively stabilize the tourism market.

5. Conclusions

Intelligent travel and big data era has come, we have a finger, the use of smart phones and related equipment will be able to understand the world, experience tourism. Intelligent tourism is quietly changing the behavior of tourists, but the wisdom of tourism is still in its infancy, the application of large data mining in the tourism industry has almost No. But the huge value will big data contains a management revolution, big data will also affect a trend which cannot be halted on the wisdom of tourism, tourism hot tourism market competition becomes increasingly fierce, the construction of the wisdom of tourism and large data mining, to obtain information more potential value, will greatly enhance the competitiveness of the tourism market. At present, the development of large data in the wisdom of tourism although there are a lot of obstacles, but the data are worthy of our attention, the tourism industry of big data should be transformed into full attitude for mining applications.

The modern tourism will bring the whole tourism industry to further upgrade, adding a new generation of information technology, makes the tourists dependent on tourism information gradually improve, tourists behavior needs more individuality and diversity, more and more complex structure of the tourism market, tourism resources sustainable development and utilization is very important. This will lead to the tourism industry need to integrate and share many aspects of data information, innovative management mode, the conversion of operational thinking, are not separated from the big data mining tourism.

Acknowledgments

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