

## Research Article

# Big Data and Tourism Competitiveness Evaluation in the New Media Environment

Xiaofei Han,<sup>1</sup> Yi Li ,<sup>2</sup> Xiyue Wu,<sup>1</sup> and Wei Chen<sup>3</sup>

<sup>1</sup>Sanya College, Sanya, 572022 Hainan, China

<sup>2</sup>School of Tourism, Nanchang University, Nanchang, 330006 Jiangxi, China

<sup>3</sup>Hunan Normal University, Changsha, 410081 Hunan, China

Correspondence should be addressed to Yi Li; [liy@ncu.edu.cn](mailto:liy@ncu.edu.cn)

Received 19 January 2022; Revised 12 February 2022; Accepted 3 March 2022; Published 1 April 2022

Academic Editor: Chia-Huei Wu

Copyright © 2022 Xiaofei Han et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

The rapid development of science and technology has prompted human beings to continuously update the technical means of disseminating information. Nowadays, new media based on the Internet and mobile terminals have become an indispensable tool for the public to receive and disseminate information. Tourism informatization is an important means to promote the development of tourism and an important way to enhance tourism competitiveness. With the support of new media technology, the “audience” is gradually changing from the passive and silent “recipient of information” under the traditional media to the active intervener, which independently receives and feeds back information, and the flow of information is more free. New media has promoted the development of a “user-centered” communication model, presenting a situation in which “information receivers have the right to choose media, and channels have become the center of communication.” Studying the effect of regional tourism image dissemination under the background of new media and finding out the factors that affect the effect of tourism image dissemination under the background of new media are the magic weapon for the further development of the current tourism industry. These have completely overturned the traditional communication format. In the era of new media, what kind of changes the tourism image will bring in the process of shaping, dissemination, and promotion is a question worthy of our deep consideration. With the rapid development of information technology and the widespread use of modern communication equipment, human beings have entered the era of big data with the core value of mining data. At present, people no longer only use intuition and experience as the basis for making decisions, but more importantly, based on big data technology to analyze the relationship between data and then make scientific decisions. The advent of the era of big data has caused a corresponding change in the evaluation criteria for informatization of tourist destinations. Therefore, for tourism destinations, reexamining the evaluation criteria of informatization and establishing a reasonable evaluation index system have become a realistic problem in the development process of tourism destination information. Under this circumstance, strengthening the research on the evaluation of tourism destination information is of great significance to the healthy and rapid development of tourism destination informationization. This study proposes the background and significance of the research and discusses the relevant theoretical basis. The paper establishes three levels of indicators from the three aspects of core competitiveness, basic competitiveness, and environmental competitiveness and selects nonquantitative processing methods for data processing. After comparison, it comprehensively analyzes the tourism situation under big data. In connection with the actual situation under big data, it puts forward targeted countermeasures and safeguard measures for the improvement of tourism competitiveness under big data and provides reference for relevant departments to formulate relevant policies. Only government departments and relatives and friends have an average credibility of more than 3, and the average credibility of relatives and friends has reached 3.71.

## 1. Introduction

Digital technology is a science and technology that accompanies electronic computers. It refers to the use of certain

equipment to convert various information, including pictures, texts, sounds, and images, into binary that can be recognized by electronic computers. It is a technology that can calculate, process, store, transmit, propagate, and restore

numbers. In the new media, the use of digital technology, interactive communication forms, and nonlinear communication modes makes current narrowcasting, broadcasting, time-shifting, interactive, and other communication methods coexist; the release of the same content cannot rely on a single path; it will be multiple modes, multipath, and multicomination conditions. With the continuous growth of the national economy and per capita disposable income, the people's yearning for a better life is increasing. Tourism has become the choice of more and more people. The domestic and overseas travels are developing rapidly, and the number of tourists is showing a blowout situation. At the same time, as an important part of the national economy, tourism is supported by more and more localities as pillar industries. The economic and social benefits brought about by tourism and the linkage of related industries are highly valued by everyone [1–3] and also prompted many regions to focus on the development of tourism. Many areas with rich tourism resources, such as Lijiang, Guilin, Sanya, and other cities, as well as many provinces and cities, have adopted the tourism industry as a pointed out industry to plan for more support and attraction. Although there are differences in tourism resources, location, national economic development, and environmental conditions in various regions, the attractiveness of tourism and tourism has also declined in recent years. The tourism industry has shown a trend of homogenization and development. The competition is increasingly fierce. I have further elicited the content of tourism communication. New media has promoted the development of a “user-centered” communication model, showing a situation in which “information receivers have the right to choose media, and channels become the center of communication,” which has completely overturned the traditional communication format.

The new media has promoted the development of a “user-centered” communication model, showing a situation in which “information receivers have the right to choose media, and channels become the center of communication,” which has completely overturned the traditional communication format. In the era of new media, what kind of changes will the tourism image bring in the process of shaping, disseminating, and promoting is a question worthy of our pondering. With the gradual increase in the proportion of new media technology diffusion and adoption, how to integrate information through channels and follow the information consumption habits in the new media communication environment to achieve the communication effect has become a research hotspot. Discuss why the tourism image has a huge impact in the application of new media technology, so as to promote the process of shaping the regional tourism image and realize the upgrading of the tourism industry in the tourism destination, and the tourism image with the responsibility of expanding regional influence in the background of new media how to better perform its new functions; that is, new development ideas and strategies are needed in the spread of tourism image. The importance attached to tourism in various regions is increasing, and many regions hope to stand out from this competition and gain a better competitive advantage [4, 5].

Under such circumstances, many regions have begun to increase investment in tourism, some have developed new tourism resources, some have implemented advertising marketing in depth, and some have continuously explored cultural connotations. Tourism not only serves as a single sightseeing but also forms a new system of eating and living and culture. In this case, research on the competitiveness of regional tourism has also begun to enrich. Based on the theory of competitiveness, these studies measure regional tourism competitiveness from various indicators such as regional tourism resource advantages, tourism industry development potential, market development and support energy, and related industries, in order to gain competitive advantage and stand out [6–8]. In this context, under the big data, as an excellent tourist city in China, a national historical and cultural city, it has also become a tourism and leisure resort satellite city.

The development of tourism relies on the city, which makes the tourism industry play a major role in the development process of the city. Urban tourism image is the “business card” of a city, which will affect tourists' emotional attitude towards the city to a certain extent and also affect tourists' desire to purchase tourism products and even further affect tourists' willingness to recommend tourist destinations and revisit the city. The earliest origin of the theory of tourism competitiveness can be traced back to the theory of comparative advantage. It was proposed by the famous scholar David Ricardo that each country should concentrate on producing and exporting products with comparative advantages and importing products with comparative disadvantages. It is from the theory of comparative advantage that the theory of industrial competitiveness has evolved, also known as the theory of competitive advantage [9–12]. Professor Porter of the United States officially put forward the concept of industrial competitiveness theory in his book “National Competitive Advantage.” Professor Porter of the United States officially puts forward the concept of industrial competitiveness theory in his book “National Competitive Advantage.” In his years of research, he has carried out statistics on 100 industries in more than ten countries in Europe and the United States and established an indicator system based on six factors: production factors and demand conditions. The analysis shows that this is the famous “diamond model” [13]. Industrial competitiveness is actually a comparison between each other [14–18], and the theory that one party has certain advantages will eventually turn into development advantage or market benefit. It can be said that the theory of competitive advantage is not only the inheritance of comparative advantage theory but also greatly expands the scope of its coverage and becomes the theoretical basis of current competitiveness research. The competitiveness of tourism, as its name suggests, is the specific expression of competitiveness theory in tourism [18, 19]. Chinese scholars have explained its concept and scope in the study. Based on these studies, the tourism competitiveness includes the following contents: In a narrow sense, it includes scenic spots, scenic spots, and all the tourism resources of a region [20]. In a broad sense, it is not only the pros and cons of tourism resources but also its ability

to open up markets, attract tourists, and generate benefits [13, 21–25].

Big data is closely related to human beings, and more and more problems can be solved by big data. Not only at the level of data science and technology but also at the level of business model, industrial structure, ecological value, and education, big data can bring new ideas and new thinking. Based on the existing competitiveness theory, this paper builds a scientific and reasonable competitiveness evaluation index system based on the existing competitiveness theory, which comprehensively demonstrates the relationship between tourism and related industries. And the result of this relationship is ultimately in the tourism competition. It is necessary to conduct in-depth analysis on this, use the method of trend forecasting to estimate the future, and propose targeted measures. These studies can further enrich the theory of regional tourism competitiveness, especially in the case of less research in relatively small areas, which has special significance. The first section of the study presents the background and significance of the study and discusses the relevant theoretical basis. The paper establishes three levels of indicators from the three aspects of core competitiveness, basic competitiveness, and environmental competitiveness and selects the non-quantitative processing method for data processing. After comparison, it comprehensively analyzes the tourism situation under the big data.

## 2. Proposed Method

**2.1. The Connotation of Big Data.** Regarding the concept of big data, the academic community has not yet formed a unified understanding. From the meaning of big data, the data itself is of no value. Its value lies in the information behind the data. To obtain the information value behind the data, it is necessary to apply new information technology to mine and analyze it, in order to discover the data behind it. Information to create new values and new knowledge. Big data from data sources through analysis and mining to final value generally has five steps, namely, data preparation, data storage and management, data processing, data analysis, and knowledge display as shown in Figure 1.

Informatica, a professional data integration management software company, has been working on data management. It also interprets the concept of big data. It believes that big data is a general term for large transaction data, large interaction data, and big data processing and can be at a reasonable cost and data sets that are captured, managed, and processed within the time limit. The academic community has formed a unified understanding. In general, the characteristics of big data can be summarized by “4 V”: volume, velocity, variety, and value.

**2.1.1. Volume.** The amount of data is huge. With the rapid development of information technology, the scale of data is also expanding. According to statistics, the amount of data stored in the world has jumped from terabytes to petabytes and even to EB and ZB. For example, the capacity of personal computer hard drives can now reach the terabyte level.

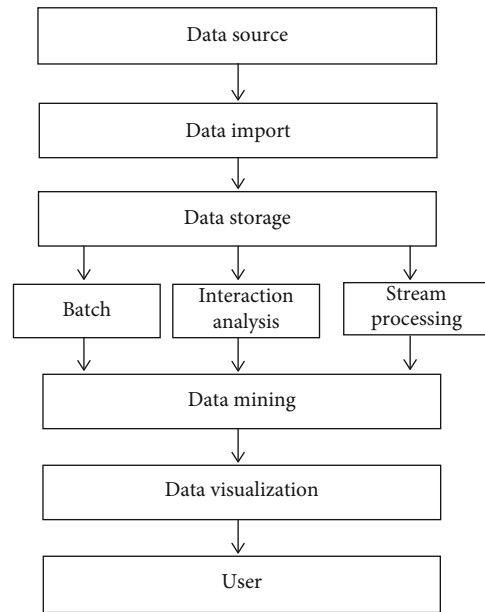


FIGURE 1: Big data technology framework.

Video surveillance in a medium-sized city can generate tens of terabytes of data per day. The data volume of some groups or organizations is close to EB.

**2.1.2. Velocity.** Processing and analysis are fast. The industry has a special name for the processing power of big data, “1 second law,” which fully illustrates the speed of big data processing and analysis of data, and the ability of big data to quickly process and analyze data is also different from traditional data mining. Because of the real-time nature of data creation, the speed of data generation, processing, and analysis is increasing, and the data flow is also increasing. Therefore, when facing huge data volume, the efficiency of data processing and analysis plays a vital role.

**2.1.3. Variety.** The data types are diverse. In the past, the types of data we generated or processed were relatively simple, and most of them were structured data based on text. Nowadays, with the emergence of emerging technologies such as information technology and the Internet and the Internet of Things, coupled with the explosive growth of sensors and smart devices, a large amount of semistructured or unstructured data has gradually generated, resulting in a sharp increase in data types. This also puts higher demands on the processing power of data.

**2.1.4. Value.** The value density is low. In general, the unit data value density is inversely related to the total amount of data. Therefore, as the total amount of data continues to increase, the value density of unit data is continuously decreasing. Despite this, the overall value of the data continues to increase, and even the infinite value of the value can be mined.

**2.2. SCP Theory.** SCP theory is the industrial organization theory founded by the Harvard school. It analyzes the

internal organization of the industry according to the structure, conduct, and performance. By constructing the SCP analysis framework, it is from the three aspects of market structure, market behavior, and market performance. Interpret the market relationship of companies within the industry. The market structure is the factor and characteristic of the enterprise market relationship. The enterprise market relationship includes the relationship between buyers, between buyers, between buyers and sellers, and between existing traders and potential traders. According to the classification of Mrs. Robinson, it can be divided into four market structures: perfect competition, complete monopoly, oligopoly, and monopolistic competition; that is, the market structure fundamentally reflects the relationship between market competition and monopoly. The main factors determining the market structure include market concentration, product differentiation, and barriers to entry and exit. Market concentration refers to the market share of buyers or buyers in the industry, reflecting the concentration and scale structure of enterprises within the industry, usually expressed by the absolute concentration index  $CR_n$ , and the calculation formula is

$$CR_n = \frac{\sum_{i=1}^n X_i}{\sum_{i=1}^N X_i}. \quad (1)$$

Among them,  $CR_n$  represents the market concentration of the top  $n$  enterprises in the industry.  $X_i$  is the output value, sales, total assets, number of employees, etc. of the  $i$ -th name in the industry, and  $N$  is the total number of enterprises in the industry. Product differentiation means that the company differentiates customers' demand in terms of price, brand, service, promotion, etc., thereby gaining an advantage for the company in the market competition. Entry and exit barriers are obstacles for companies to enter the industry and exit barriers. The components of barriers to entry include economies of scale, product differentiation, policies and regulations, etc. The components of exit barriers include asset specificity, silent cost, and policy and regulatory restrictions. Market behavior refers to various decision-making behaviors adopted by enterprises on the basis of market structure. The goal is to maximize profits or higher market share, generally including price behaviors and nonprice behaviors, where nonprice behaviors include product differences, strategy, advertising strategy, brand strategy, etc. Market performance is the effect of market operation under the conditions of market structure and market behavior and is usually expressed by indicators such as profit rate, resource allocation efficiency, economies of scale, and technological progress. Industry structure mainly refers to the possible impact of various external environmental changes on the industry in which the company is located, including changes in industry competition, changes in product demand, changes in market segments, and changes in marketing models. Using SCP theory to analyze the tourism industry, we can clearly understand the development status of the internal organization of the tourism

industry and provide a certain reference and basis for improving the competitiveness of the tourism industry. Figure 2 shows the influencing factor model of tourism image communication effect under the background of new media.

$$g(b) = \sum_{i=1}^m f_i h_i, \quad (2)$$

$$e_i = v^{-rt} [s_1 v_s + s_2 v_E + s_3 v_0].$$

In the context of new media, the propagation process of tourism images shows a multiring shape  $v(X)$ :

$$b = n_i + \sum_{m=t}^b \alpha_n \frac{c}{c_m}, \quad (3)$$

$$v(X) = c^\lambda \prod_{n=1}^b X_b^{z_n}.$$

Industrial integration can increase the number of enterprises within the integration and thus change the competition and cooperation between enterprises, so that enterprises pay more attention to industrial innovation and promote enterprise innovation and flexibility to a strategic high position. Third, industrial integration breaks the boundaries between traditional enterprises and industries and between regions, thereby accelerating the flow of resources, realizing the reorganization and sharing of resources, improving the trade effects and competition effects between regions, and promoting regional economic integration. In short, industrial integration can effectively integrate various resources among industries. By giving full play to the advantages of resource integration, the economic effect of "1 + 1 > 2" is produced, and the overall function is greater than the sum of the functions of each part. Figure 3 shows the propagation process of tourism image in the context of new media.

$$\frac{d}{d_i} = \phi_i + \sum_{n=1}^d n_n \frac{s}{s_i}, \quad (4)$$

$$x_i(X) = d^\lambda \prod_{n=1}^v X_n^{a_n}.$$

Tourist destinations rely on tourist resources, tourist facilities, tourist products, and other attractions in a specific space and integrate them in a specific way to form a space area that is attractive to tourists  $z_t$ .

$$c = \lambda_i + \sum_{n=1}^v x_n a, \quad (5)$$

$$z_t = z_{i,t+1} - z_{i,t},$$

$$m_i = m_{t+1}.$$

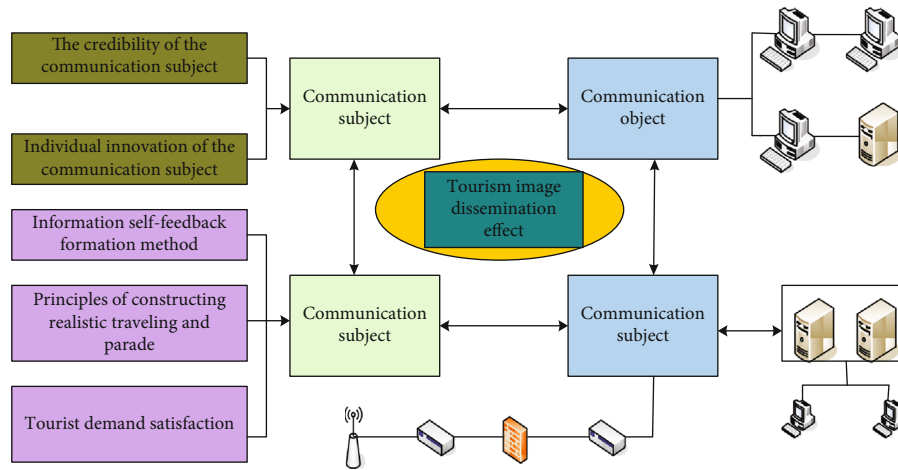


FIGURE 2: Influencing factor model of tourism image communication effect under the background of new media.

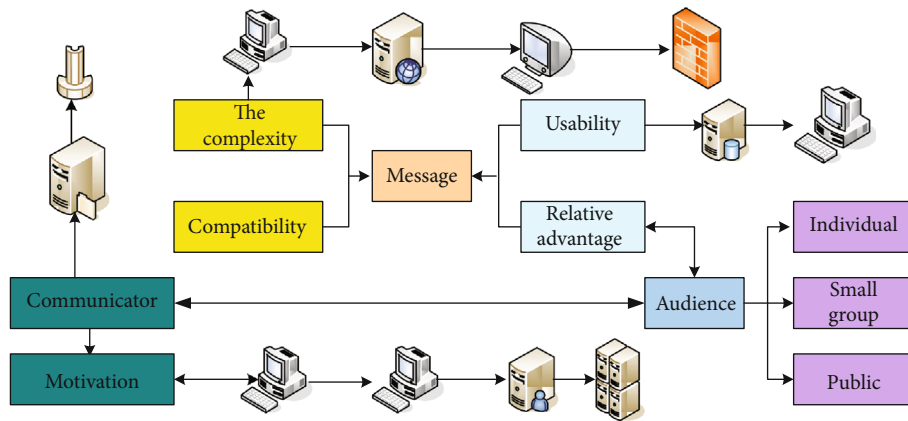


FIGURE 3: Propagation process of tourism image in the context of new media.

2.3. *Tourism Big Data Application.* Big data has many successful cases in the practical application of tourism at home and abroad. Integrating domestic Baidu data, city data, netizen data, and scenic spot data, analyze the tourism target source market, and increase various marketing investments in the source market, and compare and analyze the source market data and other data of the tourism bureau to guide the industry forecasting and marketing activities of tourism destinations. In addition to the tourism bureau's use of Google search, Google Alliance, and YouTube's big data technology to accurately advertise, making tourism overseas marketing has a broader influence. Using cellular data, Antema Travel Network first provides key data from travel notes written by tourists, then classifies, analyzes, and edits them to form travel guides, guides or reports, and provides decision-making reference for other tourists or other travel companies and at the same time, through the big data to depict the characteristics of tourists, explore their potential needs, and predict their consumer preferences, and then achieve anticustom sales. In foreign countries, the Hopper travel website searches for "tourism" related information data from blogs every day and summarizes them to provide tourists with the best recommendations for tourist attrac-

tions. The data in the tourism big data includes what the tourists are doing, what they are thinking, what they are interested in, the travel sensation, and the amount of consumption, as well as the personal information such as the age, gender, location, and occupation of the tourist. Each tourist's trajectory can determine each traveler's consumer ability, income level, propensity to consume, and interest preferences, as well as analyze each traveler's social relationships, personality, hobbies, and privacy scandals. At the same time, through the search of tourists before the tour, the sharing of the tour, and the analysis of the review data after the tour, it is possible to predict the traffic of the tourist destination and the traffic of the tourist destination in the future and find out the source market of the tourist destination, which is effective. Improve the management, service, and marketing capabilities of tourism companies, and analyze the feasibility of new products or projects through feedback data from tourists. At present, big data and the tourism industry closely cooperate with the following aspects.

2.3.1. *Monitoring Passenger Flow in Scenic Spots and Improving Management Level.* Through big data technology to analyze the multiparty data mining of the Internet,



operators, and tourist destinations, it is possible to predict the passenger flow and traffic flow of the scenic spot in the future and prepare for operation and reception in advance. At the same time, big data technology can also collect and analyze the data of the scenic spot population heat map, access control ticketing system and real-time monitoring system in real time, timely channeling and warning the crowded areas to avoid emergencies, and also help the scenic area to make reasonable predictions in the future. Big data scenic area monitoring is shown in Figure 4.

$$n_q(X, t) = \int_0^l e^{-rt} [c_1 v_1 + cA_2 v_2 + c_3 v_3] Fdl + bk,$$

$$x = \left[ \frac{f_i}{d^{\lambda, t} \prod_{n=1}^v (z/z_i \rho)} \right]^F, \quad (6)$$

$$\frac{s}{s_i} = \frac{e_1}{e_m} + \frac{q}{q_m}.$$

Tourist destinations  $d_E$  can achieve the purpose of attracting tourists through their unique advantages and enable them to carry out tourism activities.

$$d_E = \frac{1}{\sum_{n=1}^1 g_n} \left( \frac{k}{k_m} \sum_{m=1}^m c + \sum_{n=1}^N \frac{v_i}{v} + a \sum_{n=1}^N \frac{c}{c_i} + l \right), \quad (7)$$

$$\Delta c = x_t + \Delta z_t + f_t = x_t + \frac{f_1}{f} \Delta f + z_t.$$

**2.3.2. Real Map, All-Round Display of Tourism Products.** The development of big data technology enables visitors to travel around the world without leaving their homes. Many companies at home and abroad have launched “real maps” with the help of the Internet and big data technologies, such as Baidu maps, Google maps, and high German maps. These real-life maps can display the tourist destination in front of the visitors, giving visitors a real understanding of the tourist destination, initiating the driving motivation, and providing a better display platform for the tourism product suppliers.

$$j_{jk} = \frac{j_{jk}}{\sum_{l=1}^m j_{lk}}, \quad (8)$$

$$d_j = \frac{\sum_{n=1}^m b_{jl}}{n}.$$

If the tourism industry is to comply with the requirements of the development of the times and realize the sustainable development of the tourism industry  $\lambda(n)$

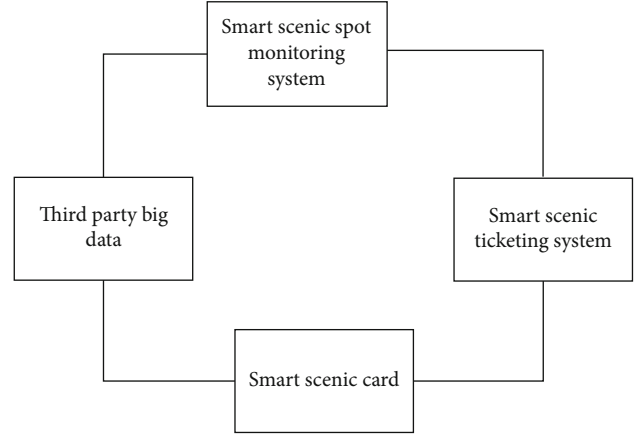


FIGURE 4: Big data scenic area monitoring.

, it must vigorously promote the construction of informatization  $hj(k)$ .

$$t(m_i) = m(v_i) \times x^{-\beta b g e(c_i)},$$

$$\lambda(n) = \ln \left( \kappa + \sum_{y \in \{m, n, l\}} \rho_X \cdot \sum_{v_i \in HV_x(S)} s(f_i) \right), \quad (9)$$

$$hj(k) = \ln \left( \sum_{S_i \in \text{Service}(a)} c^{HVM(b_i)} \right).$$

**2.3.3. Monitoring Tourism Sensation.** Monitor visitors' praise, criticism, and grievances in the forums, microblogs, WeChat, reviews, and other communities. Use unstructured data processing technologies such as web text and image mining to provide information on tourists' travel, tourism product quality, tourist services, and provide positive and negative feedbacks on tourist attitudes, and track and analyze the resulting data in real time. For negative public opinion, timely improvement, and control, eliminate the tourist's dissatisfaction and unsafe hidden dangers; for positive sensation, you can use it to enhance the brand image through the use of tourists. The analysis of the scenic spot network is shown in Figure 5.

$$q_c(h_i) = m_{S_i} \times d[v_{S_i}],$$

$$bs = \ln \sum_{S_i \in d} e^{bn(S_i)}, \quad (10)$$

$$Q_{S_i} = Q(d_{S_i} \leq K) = N_{d_{S_i}}(T) = 1 - \phi^{-\lambda K}.$$

In the context of the rapid development of information technology and Internet technology, informatization  $dq$  has become a brand-new development trend, and it is

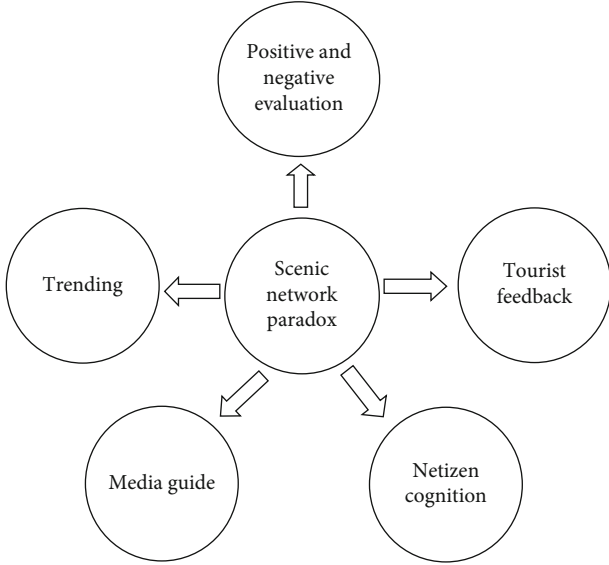


FIGURE 5: Analysis of Internet public opinion in scenic spots.

playing an increasingly important role in the development of various industries  $V_{S_i}$ .

$$dq = f(dm, dn, dp),$$

$$V_{S_i} = D(S_{S_i} \leq M) = B_{d_{S_i}}(M) = \frac{\sum_{x \leq T} F_i(Y)}{\sum F_i(Y)}. \quad (11)$$

**2.4. Indicator System for Tourism Competitiveness.** The abundance of tourism resources and tourism resources can only talk about tourism competition. This is the basic factor. In addition to transportation, accommodation, etc., are the basis of competitiveness. Secondly, the number of tourists and income is a direct manifestation of tourism competitiveness. Finally, the regional economic and social development, the quality of the masses, and the weather and climate are all factors that influence the choices made by tourists. Based on this idea, this paper classifies the competitiveness indicators into three levels: environmental competitiveness, basic competitiveness, and core competitiveness.

**2.4.1. Core Competitiveness Factors.** Core competitiveness is also a direct manifestation of the strengths and weaknesses of regional tourism competitiveness. For the existing industry indicators, it is mainly divided into three levels. The first level is income, such as tourism income, the growth rate of tourism income, and the proportion of tourism income in GDP. In short, it is income. The higher, the stronger the competitiveness of the first region. The second level is the source of tourists, such as the total number of tourists and the increase in the total number of tourists, in addition to the per capita tourism consumption of indicators that are often forgotten. Per capita tourism consumption, representing the depth of tourism development in a region, is also a core indicator of competitiveness. The third level is services, such as the number of complaints. In the modern development of network technology, tourists' complaints and some

vicious cases often become the vane of public opinion, affecting the tourism competitiveness of an area.

**2.4.2. Basic Competitiveness Factors.** Basic competitiveness is the synthesis of the basic factors that constitute the development of tourism in a region. The basic competitiveness of tourism is the first to be a tourist resource. For example, the reason why Dujiangyan became a tourist city is because of the existence of two major heritages. However, tourism resources are not the only factors that constitute the basis of tourism competitiveness. In addition, there are two very important indicators; one is the reception capacity, and specifically, it is divided into hotels, travel agencies, licensed tour guides, and tourism practitioners. The other is the ability to transport, that is, whether it allows passengers to have relatively convenient transportation conditions during the tour.

**2.4.3. Environmental Competitiveness Factors.** Environmental competitiveness factors are, in a nutshell, a combination of economic, social, and natural environments in a region. It can fully reflect the degree of integration of the tourism industry with other industries in the region, and the environment is also an important factor for tourists to choose a region. The tourism economic environment includes per capita GDP and regional GDP. The former is more representative of the economic development of a region. The natural environment includes forest cover, air quality, and in the current highly valued environment; these two factors are important factors in the choice of tourists. The tourism social environment, including the total retail sales of consumer goods and fixed asset investment, can reflect the level of infrastructure construction in a region and reflect the ideas of people in a region.

### 3. Experiments

**3.1. Research Ideas.** Firstly, this paper discusses the research status and theoretical basis at home and abroad and then makes a comprehensive evaluation and comparative analysis of the present situation of Dudu's tourism competitiveness. On this basis, it puts forward relevant countermeasures and suggestions for improving the competitiveness of Dudu's tourism industry.

#### 3.2. Research Methods

- (1) *Literature Survey.* By reading the literature, collecting data, classifying, and comparing them, we can sort out the research ideas and provide theoretical support for the whole paper
- (2) *Expert Investigation Method.* To seek the opinions of relevant professionals through written and telephone forms and make quantitative estimates of a large number of nontechnical factors that can not be quantitatively analyzed
- (3) *Empirical Analysis.* Emphasis is laid on the empirical analysis of Dudu's tourism competitiveness, and a complete evaluation index system is established to

comprehensively evaluate Dudu's tourism competitiveness, find out the weaknesses, analyze the reasons, and put forward targeted countermeasures

- (4) *Quantitative and Qualitative Analysis.* Combining qualitative analysis with quantitative analysis, qualitative analysis runs through the whole text. At the same time, the analytic hierarchy process will be used to analyze and study the various factors affecting the comprehensive competitiveness of tourism industry

## 4. Discussion

*4.1. Environmental Competitiveness Evaluation.* This paper uses KMO and Bartlett spherical test to judge whether the relevant indicators are suitable for factor analysis. The KMO test was used to study the partial correlation between variables with values between 0 and 1. Generally, the closer the KMO statistic is to 1, the better the effect is, the more suitable for factor analysis; the KMO value is above 0.7, indicating that the effect is better, and the factor analysis can be done; the KMO value is between 0.5 and 0.6, indicating that the effect is average. For factor analysis, when the KMO value is less than 0.5, it means that the effect is poor, and it is not suitable for factor analysis. The KMO spherical test verifies whether the correlation coefficient matrix is an identity matrix. When the Sig of the KMO statistic is less than 0.01, the correlation matrix can be denied as the null hypothesis of the unit matrix; that is, there is a significant correlation between the variables.

Table 1 shows the KMO and Bartlett spherical tests for the relevant indicators of environmental competitiveness. It can be seen from the table that the KMO statistic is  $0.731 > 0.7$  and  $\text{Sig}0.000 < 0.01$ , so there is a significant correlation between the variables.

It can be seen from Table 2 that from the comprehensive score of tourism industry competitiveness, the eastern part has an absolute advantage, the top seven are in the eastern provinces, and the west is only ranked in the middle four provinces. From a national perspective, the overall strength of the eastern region is higher than that of the central region.

*4.2. Evaluation of Resource Competitiveness.* The first common factor is the education factor, which mainly reflects the information on the number of students in tourism colleges and tourism colleges. The score of the educational factor is -0.537, which is the 20th in the country. It is significantly different from the top three Guangdong (3.015), Sichuan (1.962), and Jiangsu (1.284). With the rapid development of the tourism industry, the tourism education industry has also been developing continuously, and the scale of tourism colleges has been expanding. More and more students choose tourism majors, but as shown in Figure 6.

Improve the core operational capabilities of tourism companies. For tourism enterprises, from the innovation of enterprise development model, the change of management structure to the launch of innovative tourism products, it is closely related to planning ability, and the core operational

TABLE 1: Inspection of KMO and Bartlett.

Sampling enough Kaiser-Meyer-Olkin metrics		
	Approximate chi square	531.41
Bartlett's sphericity test	df	102
	Sig	0.000

capability is high-level corporate planning ability. Therefore, tourism enterprises must improve their core competitiveness. It is necessary to improve the core operational capabilities. Tourism enterprises should effectively link the planning department with the R&D and sales departments. Through open communication channels, the planning plan can be combined with the actual situation to realize model innovation, marketing innovation, and technological innovation, so that the planning scheme is both feasible and attractive. So that tourism enterprises can obtain greater economic benefits and achieve sustainable development of tourism enterprises.

*4.3. Performance Competitiveness Evaluation.* The first common factor is the tourism enterprise performance factor, which mainly reflects the profit rate of tourism enterprises, the operating income of tourism enterprises, the operating income created by fixed assets per 100 yuan, and the labor productivity of all employees in tourism enterprises. As shown in Table 3, it is rotated into a share matrix ratio.

Table 3 is the rotation component matrix of each index of resource competitiveness. It can be seen from the table that the first common factor has a large load on X1, X2, X3, and X5, indicating that the common factor mainly reflects the information of these indicators. The connotation of the index can be named as the education factor F1, and the second common factor has a large load on X6, X7, X8, and X14, indicating that the common factor reflects most of the information of these indicators, which can be named as technology. With the talent factor F2, the third common factor has a large load on X9, X10, and X12, which can be named as tourism attraction factor F3.

While increasing financial input, we must also pay attention to the performance of financial input, establish a scientific and reasonable performance appraisal and evaluation mechanism by improving the financial input structure of the tourism industry, and strictly pass the performance appraisal results of the development of tourism industry at all levels of finance. Control the use of funds, make the financial funds more rationally applied to the places that are really needed, and improve the efficiency of financial funds to support the development of the tourism industry.

Among the valid questionnaires, young people aged 26-35 were the main ones, accounting for 54.79%, followed by 18-25 years old, accounting for 39.47%; the group over 35 years old was the least, accounting for only 4.04% of the total. This shows that the majority of new media users are mainly young people aged 26-35. The young people at this stage usually have relatively stable jobs, relatively high incomes, and high requirements for the quality of life and



TABLE 2: Score and ranking of comprehensive competitiveness of tourism industry in many places.

Region	Score	Ranking	Region	Score	Ranking
Guangdong	1.51	1	Fujian	0.641	8
Beijing	1.01	2	Chongqing	0.532	9
Jiangsu	0.951	3	Shanxi	0.431	10
Zhejiang	0.902	4	Tianjin	0.385	11
Shanghai	0.861	5	Guizhou	0.312	12
Shandong	0.832	6	Jiangxi	0.239	13
Sichuan	0.731	7	Heilongjiang	0.201	14

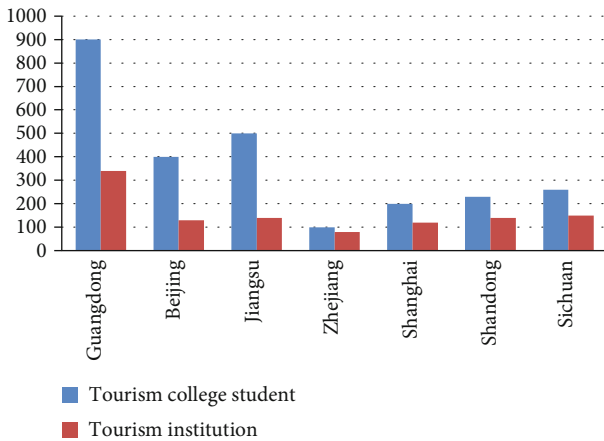


FIGURE 6: Proportion of students in local colleges and universities.

TABLE 3: Rotation component matrix.

Ingredients	Ingredients			Ingredients	Ingredients		
	1	2	3		1	2	3
X1	0.23	-0.41	0.124	X8	0.143	0.151	0.145
X2	0.123	0.131	0.41	X9	0.162	0.146	0.171
X3	0.141	-0.419	0.24	X10	0.154	-0.141	0.154
X4	0.201	0.123	0.231	X11	0.131	0.16	0.162
X5	0.212	0.143	0.251	X12	0.891	0.01	0.145
X6	0.013	0.181	0.712	X13	0.761	-0.14	0.156
X7	0.187	0.412	0.161	X14	0.512	0.152	0.143

are willing to accept new things and dare to try. The age distribution is shown in Figure 7.

It can be seen from the questionnaire’s educational distribution map that the number of respondents with a bachelor’s degree/college’s degree is the largest, accounting for 57.33% of the total. This is followed by a master’s degree and above (33.56%), followed by high school/technical secondary school (6.37%). Junior high school and below have the least number of people, accounting for only 2.74%. Therefore, it can be seen that the current youth groups who pay attention to and use new media are mostly those with higher educational backgrounds. The distribution of academic qualifications is shown in Figure 8.

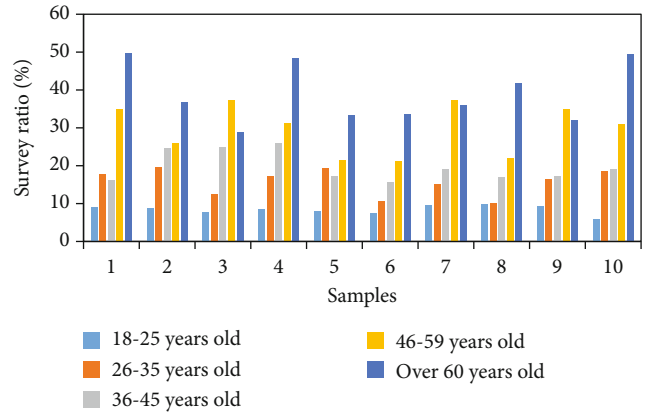


FIGURE 7: The age distribution.

In terms of the average number of trips, the average number of trips a year is higher, accounting for 54.11%, followed by an average of 3-5 trips a year, accounting for 27.39%, and the average annual number of trips is more than 6 and less than once the tourists accounted for less. It can be seen that in the new media receiving group with youth as the mainstay, tourism has become a necessary way of life for them, and most of them are based on an average of 1-5 times a year. The statistics of travel times are shown in Figure 9.

In order to ensure the rationality and scientificity of the questionnaire, this study mainly adopted Cronbach’s alpha reliability as the measurement reliability standard and tested the reliability of the questionnaire data. In this study, the SPSS19.0 statistical software was used to analyze the reliability of the questionnaire data. The results of the reliability analysis are shown in Table 4.

It can be seen from Table 5 that only government departments and relatives and friends have an average credibility of more than 3, and the average credibility of relatives and friends has reached 3.71, which is far greater than the credibility of government agencies, which shows that the current tourism image. In the process of communication, interpersonal communication is more persuasive than other communication in terms of emotions, so it gains a higher degree of trust. The descriptive statistics of the credibility of the dissemination subject are shown in Table 5.

Users most want to get experience through travel, of which 89.73% are relaxed, 63.01% are gaining insights, 59.59% are seeking freshness, 52.05% are experiencing life, and only 15.75% are choosing to visit relatives and friends. This shows that traditional tourism for the purpose of visiting relatives and friends has gradually been replaced by individualized purposes such as relaxation and gaining knowledge. The experience analysis is shown in Figure 10.

From Figure 11, it can be seen that users’ overall evaluations of the tourism image of Guizhou Province are mostly unique, primitive, and mysterious, and each evaluation has a choice, which shows that individuals’ perceptions of the tourism image of Guizhou Province tend to be consistent, but due to individual differences, and there is diversity of cognition. The user’s overall evaluation of the province’s tourism image is shown in Figure 11.

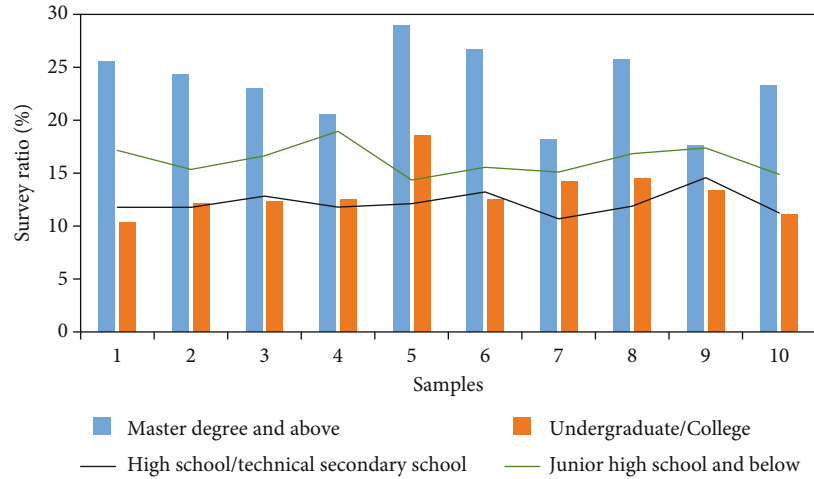


FIGURE 8: The distribution of academic qualifications.

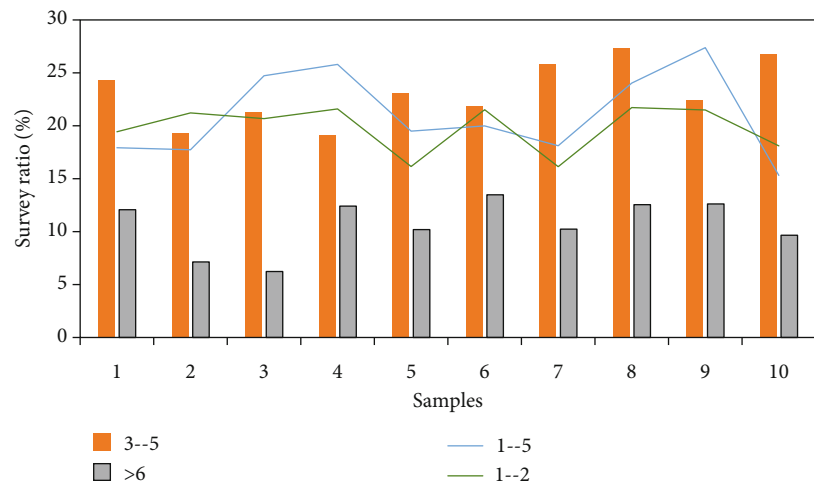


FIGURE 9: The statistics of travel times.

TABLE 4: The results of the reliability analysis.

Variable	Cronbach's alpha	Cronbach's alpha based on standardized items
Whole scale	0.921	0.890
Image communication subject	0.687	0.624
Image communication object	0.974	0.975
Image communication channels	0.566	0.524
Image communication effect feedback	0.751	0.608

TABLE 5: The descriptive statistics of the credibility of the dissemination subject.

Credibility of travel image communicator	Minimum	Maximum
Government department	-2	5
Tourism companies or other business units	-2	6
Tourism association or related social organization	-1	8
Media agency	-2	5
Interpersonal communication such as relatives and friends	-1	3

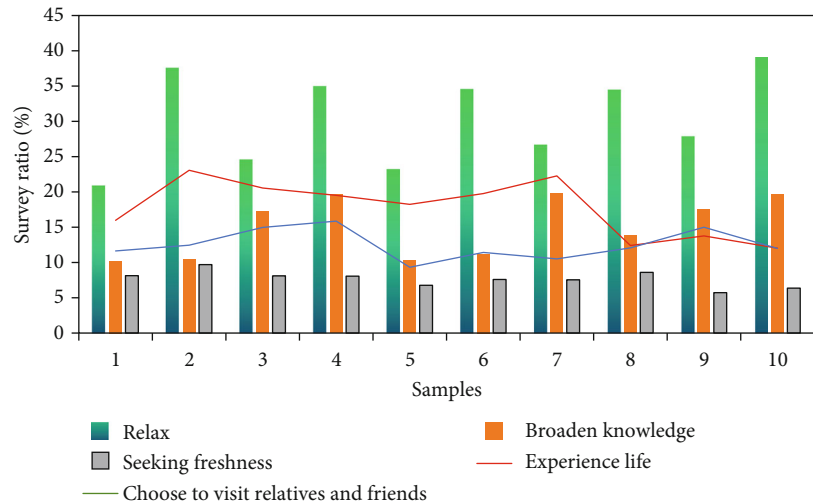


FIGURE 10: The experience analysis.

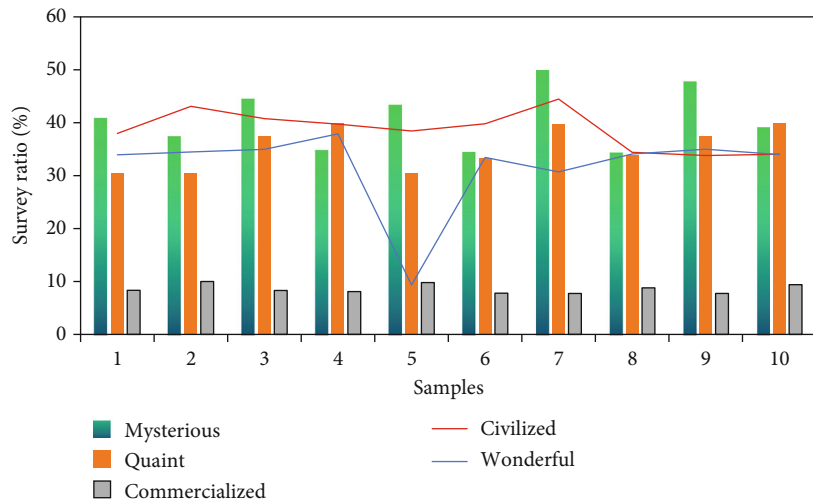


FIGURE 11: The user's overall evaluation of the province's tourism image.

62.33% of people chose trust; 56.85% of people chose that their needs were met; half of them chose emotional connection; only about 40% of people chose acceptability, innovation, and reputation; and 18.49% of people chose with authoritative recognition; it can be seen that in the process of receiving tourism image information, most users pay more attention to the satisfaction of their own individual feelings and needs rather than the acceptability and innovation of the tourism image itself. The factors affecting tourism image information are shown in Figure 12.

Social media (56.16%) is the medium that users currently have the highest contact intensity in the process of obtaining the tourism image of the province, followed by interpersonal communication such as relatives and friends (45.21%), and the adoption of instant communication tools and blogs is the lowest, and users have the highest contact intensity in daily life. The new media are social media (64.38%) and search engines (48.63), followed by instant messaging tools

and official websites. It shows that the current channel selection of tourism image communication in the province is not in line with the user's habits, and the choice of media needs to be further optimized to achieve the effect of tourism image communication. The contact intensity analysis in the process of tourism image in the province is shown in Figure 13.

The situation of users browsing local or professional tourism information websites, 63.7% of occasional visits, frequent browsing and indifferent accounting for about 6.8%, indicating that current users are more active in seeking information, and they are concerned about tourism image information. Degree is low. The user browses a local or professional travel information website as shown in Figure 14.

The provincial tourism image has a small degree of influence on their behavior, and the degree of dispersion is low; for users who have not been there, the degree of influence of the provincial tourism image on their behavior is average,

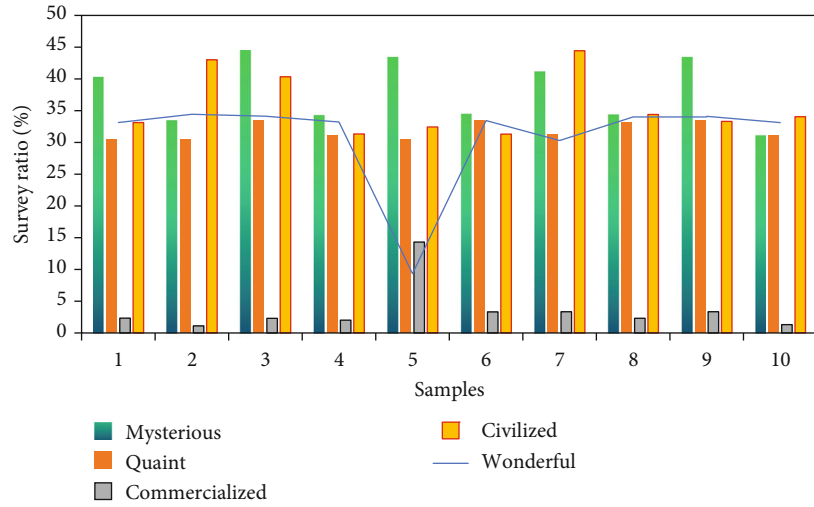


FIGURE 12: The factors affecting tourism image information.

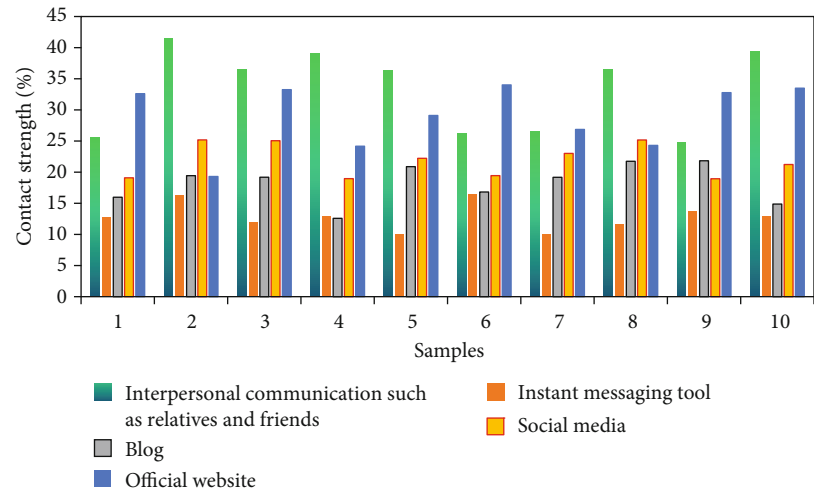


FIGURE 13: The contact intensity analysis in the process of tourism image in the province.

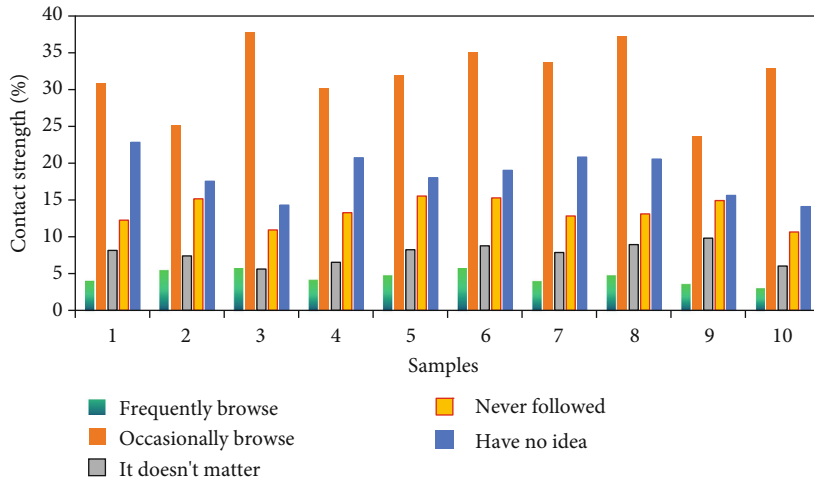


FIGURE 14: The user browses a local or professional travel information website.



TABLE 6: The statistics of the influence of provincial tourism image on their behavior.

Behavioral influence	Minimum	Maximum
Government department	-1	5
Tourism companies or other business units	-1	5
Tourism association or related social organization	-2	6
Media agency	-1	6
Interpersonal communication such as relatives and friends	-2	6

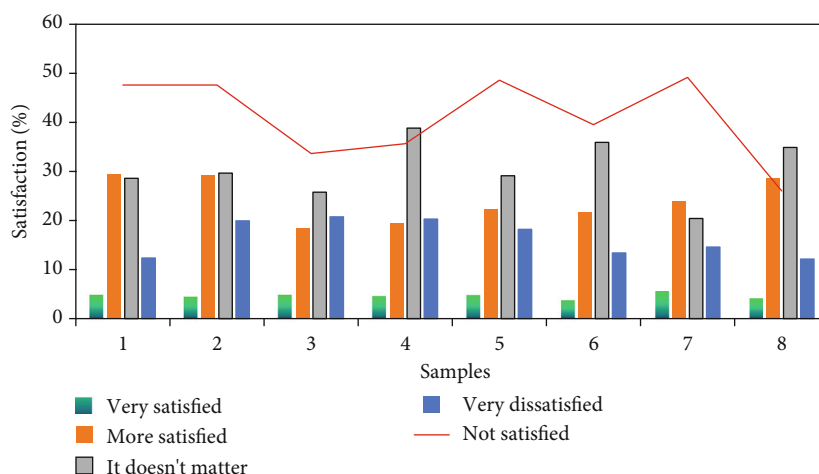


FIGURE 15: The tourist information satisfaction situation.

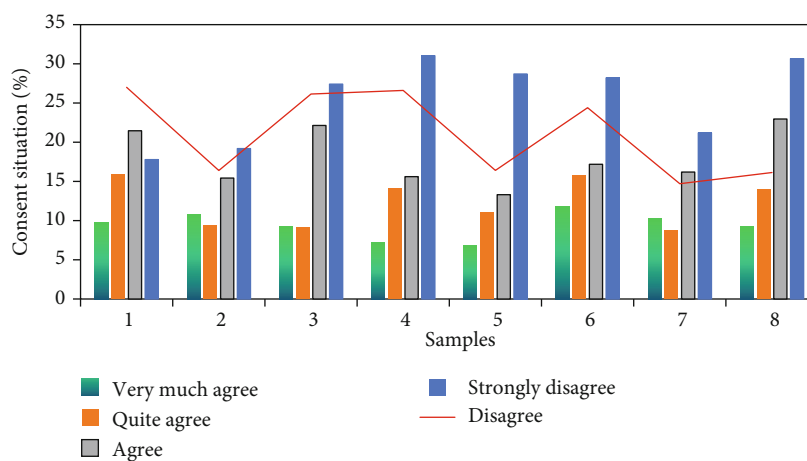


FIGURE 16: Statistics on whether the wider population situation has been paid attention to in tourism image dissemination.

TABLE 7: Factor analysis of the credibility of the communication subject.

Problem scope	DF	Extract
How credible is the travel image communicator? (Government department)	1	0.414
How credible is the travel image communicator? (Tourism enterprise or other business unit)	1	0.543
How credible is the travel image communicator? (Tourism association or related social organization)	1	0.682
How credible is the travel image communicator? (Media agency)	1	0.534
How credible is the travel image communicator? (Interpersonal communication such as relatives and friends)	1	0.526

TABLE 8: This part explains the extraction of total variance.

Ingredients	Total	Initial characteristics	
		Variance (%)	Accumulation (%)
1	2.699	53.976	53.976
2	0.846	16.910	70.887
3	0.649	12.987	83.873
4	0.451	9.020	92.893

and the degree of dispersion is higher than that of users who have traveled; that is, it shows that the current tourism image promotion under the new media has a greater impact on the behavior of actual or potential tourists who have not visited the province. The statistics of the influence of provincial tourism image on their behavior are shown in Table 6.

Through the analysis of the questionnaire, we found that the degree of satisfaction with the provincial tourism image information is more satisfied, accounting for 45.22%, and very satisfied only accounting for 3.18%. The second is the indifferent state, accounting for 24.84%, and the unsatisfied state accounting for 19.11%. The tourist information satisfaction situation is shown in Figure 15.

Figure 16 shows the statistics on whether a wider range of population conditions are paid attention to in the tourism image dissemination. Strongly agree accounted for 13.69%, strongly disagree accounted for 9.23%, and the state of agreement accounted for more, 28.03%, which shows that the current tourism image publicity is still relatively narrow; there is still greater potential for tourism image publicity under new media.

The factor analysis of the credibility of the communication subject is shown in Table 7. The commonness of the extracted variables is greater than 0.4, indicating that the factor has extracted most of the information in the variable and can represent the variable for subsequent analysis.

The eigenvalue of the previous factor is greater than 1, and the accumulation accounts for 53.976%. Therefore, a factor is extracted as the main factor of the variable. This part explains the extraction of total variance as shown in Table 8.

## 5. Conclusions

Under the background of new media, people pay more and more attention to the research of tourism image communication effect, which mainly includes the following questions: how the tourism image communication process, what effect will be produced by the communication activities, what are the factors that affect the communication effect, how to get the best spread effects, etc. With the development of the world today, the links between various industries are becoming more and more close. The competitiveness of any industry is not only related to an industry but to other related industries. Through investigation and research, this paper draws the following basic points and conclusions: (1) By reading the literature, it summarizes the definition of tourism under big data and the domestic development status of tourism system under big data. Combined with mobile

Internet, it will be “cloud computing” and “big.” Technologies such as data are used in the tourism department of big data. This paper establishes a model system suitable for the accurate evaluation of competitiveness. The model is divided into three aspects, core competitiveness, basic competitiveness, and environmental competitiveness, and is composed of corresponding secondary indicators and tertiary indicators, using objective empowerment. The principal component analysis method processes the data in a related way, and it is easier to eliminate the error caused by the large difference in the absolute value of the data. (2) Establish a set of regional tourism competitiveness evaluation index system suitable for the situation. The basic indicators are represented by specific data. A large amount of data is derived from local government work reports and relevant department statistics, accurate and reliable, and compared through data processing. The advantages and disadvantages of various influencing factors are obtained. At the same time, the development trend of tourism is predicted scientifically by fitting the function. (3) A series of specific countermeasures to improve the level of tourism competitiveness have been put forward, which has strong operability.

## Data Availability

The data that support the findings of this study are available from the corresponding author upon reasonable request.

## Conflicts of Interest

The authors declare that they have no conflicts of interest.

## Acknowledgments

This work was supported by the Hunan Province Education Department Project, subject number, 18C0052; the Hainan Province Philosophy and Social Science Planning Project (discipline coconstruction), subject number, HNSK (GJ) 19-14; and the 2021 National Social Science Foundation Western Project, subject number, 21XSH020.

## References

- [1] S. Huang, Y. Li, and P. Dai, “Evaluation of tourism competitiveness of Chinese smart tourism city,” *Acta Geographica Sinica*, vol. 72, pp. 242–255, 2017.
- [2] Y. Zhu, Q. Zhu, and Z. Zhu, “Modeling, evaluation and analysis of tourism destination competitiveness: a case study of the Yangtze River Delta of China,” *Asia Pacific Journal of Tourism Research*, vol. 19, no. 8, pp. 932–949, 2014.
- [3] Z. Xu, J. Shen, B. Liu, and L. Tang, “Study on TOPSIS-based evaluation of urban tourism competitiveness,” *Journal of Chemical & Pharmaceutical Research*, vol. 6, no. 7, pp. 1843–1846, 2014.
- [4] Z. Hong, “Research on Four Dimensional Model of Evaluation on Tourism Survey Quality in the Big Data Age,” *International Symposium-International Marketing Science & Information Technology*, 2014.
- [5] C. Peiran and Z. Luocheng, “Evaluation and strategy for urban tourism competitiveness of Guangdong Province,” *Journal of*

- University of Chinese Academy of Sciences*, vol. 34, no. 6, pp. 701–711, 2017.
- [6] Y. L. Bao and H. F. Hua, “Research on evaluation index system of tourist hotels’ competitive intelligence ability,” in *International Conference on Computer Science & Network Technology*, Harbin, China, 2016IEEE.
- [7] M. Kubickova and H. Li, “Tourism competitiveness, government and tourism area life cycle (TALC) model: the evaluation of Costa Rica, Guatemala and Honduras: tourism competitiveness, government & TALC,” *International Journal of Tourism Research*, vol. 19, no. 2, 2017.
- [8] W. Gao, Q. Zhang, Z. Lu, D. Wu, and X. Du, “Modelling and application of fuzzy adaptive minimum spanning tree in tourism agglomeration area division,” *Knowledge-Based Systems*, vol. 143, pp. 317–326, 2018.
- [9] M. Xiuhong, “Research on competitiveness of Suzhou City tourism,” *Journal of Chongqing Normal University*, vol. 31, no. 6, pp. 139–144, 2014.
- [10] C. Qian and F. Lin, “Competitiveness evaluation model and empirical research of cultural tourism creative industry in Yangtze River Delta based on ecological niche,” *Economic Geography*, vol. 35, no. 7, pp. 183–189, 2015.
- [11] X. J. Hu, “Research on ecological tourism competitiveness of sustainable development strategy - a case study of Wanlv Lake,” *Advanced Materials Research*, vol. 1073, 2014.
- [12] A. Cibinskiene and G. Snieskiene, “Evaluation of city tourism competitiveness,” *Procedia-Social and Behavioral Sciences*, vol. 213, pp. 105–110, 2015.
- [13] H. Li and Y. Yu, “Research on the evaluation of expert scoring method in the competitiveness of high colleges and universities of Jiangxi province,” in *International Conference on Information Management*, Xi’an, China, 2014IEEE.
- [14] E. G. Carayannis, F. A. F. Ferreira, P. Bento, J. J. M. Ferreira, M. S. Jalali, and B. M. Q. Fernandes, “Developing a socio-technical evaluation index for tourist destination competitiveness using cognitive mapping and MCDA,” *Technological Forecasting and Social Change*, vol. 131, pp. 147–158, 2018.
- [15] M. Tao and Z. Li, “Research on the Construction of Enterprise Brand Competitiveness Evaluation System Based on the Integration of SWOT and AHP Model,” in *Recent Developments in Data Science and Business Analytics*, pp. 55–62, Springer, Cham, 2018.
- [16] Z. Zhiyuan, Z. Yanning, Z. Xiaoyuan, and J. Yamin, “Research on the evaluation of enterprise competitiveness based on the wavelet neural network forecasting system,” in *2016 Chinese Control and Decision Conference (CCDC)*, Yinchuan, China, 2016.
- [17] X. Wang, J. Liu, and C. Ma, “A research on the cluster competitiveness evaluation of the Chinese automobile industry based on cuckoo-AHP,” *Chinese Management Studies*, vol. 10, no. 4, pp. 746–769, 2016.
- [18] W. Bian and T. Yu, “Research on evaluation of innovative enterprise competitiveness,” in *The 27th Chinese Control and Decision Conference (2015 CCDC)*, Qingdao, China, 2015IEEE.
- [19] G. Kai, “Evaluation research on competitive ability of volleyball player based on fuzzy set of evaluation index and weight,” *Journal of Applied Sciences*, vol. 14, no. 20, pp. 2547–2551, 2014.
- [20] W. Li, “Comparative study of the ancient capital city perspective elements of urban tourism competitiveness - Luoyang and Xi’an as an example,” *Journal of Xinyang Normal University*, vol. 27, no. 3, pp. 359–362, 2014.
- [21] D. X. Niu, Q. Wang, P. Wang, S. Y. Zhou, W. D. Liu, and X. Y. Yu, “Electricity competitiveness evaluation research based on principal component analysis,” *Advanced Materials Research*, vol. 960-961, pp. 1467–1472, 2014.
- [22] Z. Yinping, “The Research of the Enterprise Financial Model Based on Information Entropy and Correlation Model Reorganization Theory,” in *2015 International Conference on Intelligent Transportation, Big Data and Smart City*, Halong Bay, Vietnam, 2015IEEE.
- [23] C. Estevão, J. Ferreira, and S. Nunes, “Determinants of tourism destination competitiveness: a SEM approach,” in *Marketing Places and Spaces*, Emerald Group Publishing Limited, 2015.
- [24] Y. Y. Zhang and F. Z. Luo, “Industrial cluster competitiveness evaluation model research based on entropy weight TOPSIS method,” *Applied Mechanics and Materials*, vol. 584-586, pp. 2676–2680, 2014.
- [25] P. Zhang, J. Yang, X. Zhao, and F. Chen, “Evaluation and research of container harbors competitiveness based on evaluation method of discrete mutation - topsis matter element,” in *International Conference on Transportation Information & Safety*, Wuhan, China, 2015.