

The application of statistics in tourism industry and its impact on the tourism market

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Abstract: *With the rapid development of global economy, science and technology, tourism industry which is full of vitality and development potential, has gradually become one of the pillar industries in the world. Statistics, as one of the science branches which studies the collection, analysis, interpretation, representation and prediction of data, plays a vital role in the tourism industry. Thus tourism statistics came into being. This article aims to explore the application of statistics in the tourism industry and its impact on the tourism market, providing useful references for the development of the tourism industry, thereby assisting tourism industry to better utilize statistics-related knowledge whether to make tourism plans and designs, finalize tourism decisions or improve the quality of tourism services.*

Keywords: *Statistics, Tourism Statistics, Tourism Industry, Tourism Market*

1. Introduction

Tourism is one of the important driving forces of global economic growth and is of great significance to the development of countries and regions. The tourism industry is a comprehensive industry involving many fields, including food, housing, transportation, tourism, shopping, entertainment and other aspects. With the development of information technology, the amount of tourism industry data has experienced explosive growth, which provides a broad space for the application of statistics. Through in-depth analysis of historical data of the tourism industry, it not only helps tourism-related practitioners better understand the needs, trends and changes of the tourism market, but also optimize the allocation of tourism resources and product structures. On the other hand, the quality of tourism services, tourism risk evaluation, prediction and manage will get promoted. Provision of data support and relevant predictions for the future development of tourism industry somehow boosts its development. To achieving sustainable development of the tourism industry through formulating effective marketing development strategies is another beneficial outcome.

1.1. Tourism statistics

Tourism statistics is a methodological science that studies the overall quantitative characteristics and quantitative relationships of tourism economic phenomena.

1.2. Research objects of tourism statistics

1.2.1. From a qualitative perspective

The research object of statistics is the overall quantitative relationship of natural and social objective phenomena. Socioeconomic statistics studies the overall quantitative relationship of phenomena in the socioeconomic field. Tourism statistics studies the overall quantitative relationship of tourism economic phenomena.

Everything has two aspects: quality and quantity. They jointly determine the nature of the objective and are closely related. A certain quality determines a certain quantity, and a certain quantity reflects a certain quality. Understanding the quality of the objective is inseparable from its quantity. Certain numbers are used to reflect the quantity order, size and relationship of the object, thereby mastering the internal connections and properties of objects. The quantity of objects is an essential aspect of understanding objective reality. Tourism statistics is to achieve the purpose of understanding the quality of tourism phenomena through the study of its quantity.

1.2.2. From an operational perspective

Understanding the quantitative relationships and internal connections of social and economic phenomena requires a series of activities through investigation and research. A correct understanding also requires statistical work, statistical methods, statistical processes and statistical theories. Tourism statistics is a methodological science that studies the overall quantitative characteristics and quantitative relationships of tourism economic phenomena. It is a branch of socioeconomic statistics and it is departmental statistics. Guided by the theory of statistics, it is a science that focuses on the study of the quantitative characteristics and quantitative relationships of various economic phenomena in tourism economic activities.

1.3. Research methods of tourism statistics^[3]

There are specialized methods for each stage of tourism statistics. In the stage of tourism statistical survey, the main methods include statistical report system, key survey, typical survey, sampling survey, census and so on. In the stage of tourism statistics compilation, there are statistical distribution, statistical grouping, distribution sequence, statistical table, technologies in statistical chart production, etc. In the stage of tourism statistical analysis, various methods can be adopted, including comprehensive index method, dynamic sequence method, index method, sampling method, correlation analysis method, etc. These multiple methods contain mathematical statistical methods and socioeconomic statistical methods as well.

2. The application of statistics in tourism^[2]

Statistics is the science which studies the collection, analysis, interpretation, representation and prediction of data. The application of statistics in tourism industry mainly comprise the following aspects: (1) predictive analysis of tourism market demand; (2) research on the optimal allocation of tourism resources and structural upgrade of tourism products; (3) planning and protection of tourism resources; (4) assessment of the economic contribution from tourism development; (5) assessment, prediction and management of tourism risks; (6) evaluation of tourism services quality and provision of relevant improvement suggestions, etc.

2.1. Survey and analysis of tourism market demand

The application of statistics in tourism industry reflects first in the investigation and research of market demand. Market research is an important task in the tourism industry. Statistics collects relevant information about the tourism market through questionnaires and interviews. Then descriptive statistics, cross-analysis and other methods are adopted to deeply analyze these data, thereby providing targeted market information for tourism companies and facilitating them to better meet consumer needs. For instance, through statistical analysis, we can comprehend tourists' basic information such as age, gender, occupation, income level, as well as their needs and preferences for tourism products, which will help tourism companies adopt marketing and promotion strategies based on local conditions, design and provide distinctive tourism cultural products. On the other hand, by investigating and analyzing tourism revenue, number of tourists and other data in the past few years, we know the changing trends of the tourism market and make relevant demand predictions towards future market. Therefore data support will be provided to formulate relevant policies for the tourism industry.

2.2. Research on the optimal allocation of tourism resources and structural upgrade of tourism products

The application of statistics in tourism also reflects in the research on the optimal allocation of tourism resources. Statistics provides a solid base for the optimal allocation of tourism resources through quantitative analysis of those resources. For example, statistical analysis can be used to evaluate the tourist flow, tourists satisfaction and other indicators to determine the development priority of each tourist attraction. It can provide reference for the innovation of tourism products through comparative analysis of tourism resources in different tourist destinations. What's more, with the help of data analysis of tourism resources, the advantages and disadvantages of tourism resources can be pointed out, providing data support for reasonable allocation of tourism resources. For instance, by analyzing the passenger flow, accommodation facilities, traffic conditions in tourist spot, we can find out the strengths and weaknesses of local tourism-related service facilities in order to provide factual basis for the reasonable allocation of

tourism resources, supplement the weaknesses, and further amplify its strengths.

Statistics can provide a basis for the design and pricing of tourism products through the analysis of tourists' consumption behavior, demand characteristics and other data. Analyzing the consumption preferences of tourists under different age groups, genders, and income levels does assist tourism companies to design products that are more in line with market demand and formulate reasonable pricing strategies.

2.3. Planning and protection of tourism resource

Scientific grounds will be provided in the process of tourism resources evaluation and planning when data analysis of tourists attractions' flow, environmental quality, and facility perfection are fully taken into consideration. In addition, the usage of statistics does work for the analysis of historical data of tourism resources, the prediction of future development trends, and the provision of scientific guidance for the protection and utilization of tourism resources.

2.4. Assessment of the economic contribution from tourism development

Based on the relevant statistical data in the tourism industry, quantitative and qualitative research methods are employed to establish the Cobb-Douglas production function of tourism revenue with GDP to study the contribution of national economic growth from tourism industry.

2.5. Assessment, prediction and management of tourism risks

Through the evaluation and analysis of historical data, statistics affords a ground for the prediction and management of tourism risks. Statistical analysis can be adopted to predict the safety status of tourist destinations and the impact of climate change and other factors on tourism activities. Tourists' behavioral data can also be analyzed to offer reference for tourism safety management. These statistical assessments are beneficial to reducing tourism risks and ensuring the smoothness and safety of tourism activities.

2.6. Evaluation of tourism services quality and provision of improvement suggestions

The application of statistics in tourism industry fosters the improvement of tourism service quality. Statistics conducts data analysis on the evaluation of tourism service quality under different tourism enterprises to find out the various factors that affect the quality of tourism services, providing targeted measures and suggestions for improving the quality of tourism services and products. For instance, statistical analysis can be used to evaluate the service quality of travel agencies, hotels, scenic spots and other tourism service providers so as to provide consumers with more satisfactory services. Moreover it can analyze tourists' evaluations and feedback to figure out the weak points and factors that affect tourism services. Corresponding improvement measures shall be taken to tackle those issues. Another example is that tourism companies can identify and target existing problems and deficiencies and then take measures to make improvements by collecting and analyzing data on tourist satisfaction survey.

3. The impact of statistics on the tourism market

3.1. Improve the market competitiveness of tourism industry

The application of statistics facilitates tourism companies to be more accurately when grasping market demand and competition trends and meeting consumer needs. The analysis of market demand, tourism resources, service quality assist tourism practitioners to formulate more reasonable marketing strategies, enhance the market competitiveness and profitability of the tourism industry, and stabilize the market position of tourism enterprises. An example is that only through data analysis of tourism market demand can tourism companies launch tourism cultural products which are more in line with market demand in order to improve market competitiveness.

3.2. Improve the economic benefits of tourism enterprises

The application of statistics in tourism industry definitely increases the market economic benefits of tourism enterprises. Through the analysis of relevant market data, tourism companies shall formulate strategies that are growing in accordance with times to reinforce economic benefits of the tourism

industry. For example, tourism companies can launch multiple tourism cultural products that are more in line with economic benefits through data analysis of tourism market demand, tourism resources and service quality. Therefore the economic benefits and profitability of the tourism industry will relatively get promoted.

3.3. Enrich tourists' travel experience and improve travel satisfaction

Statistics provides data support for enriching tourists' travel experience through analyzing tourist behavior data. An example is that statistical analysis can be used to differentiate tourists' travel needs and preferences, so as to provide them with more personalized tourism products and services. What's more, it can analyze the evaluation and feedback of tourists' satisfaction to continuously optimize the tourism environment and services so that the quality of tourism service will keep updating. Statistics offers tourism companies with quantitative evaluation indicators on service quality, enables tourism companies to discover problems and improve services for the sake of improving tourist satisfaction.

3.4. Monitor tourism risks and maintain the development of tourism market

Statistics can not only facilitate tourism companies to identify potential tourism risks, analyze and evaluate tourism business risks, but also predict tourism market changes and trends through relevant statistical data analysis. So effective measures will be taken to lower tourism company business risks and to ensure that the development of tourism market activities go smoothly and safely.

3.5. Promote the sustainable development of tourism market

Analyzing statistical data on tourism resources and environment does provide scientific basis for the sustainable development of the tourism market. For instance, statistical analysis can be adopted to evaluate the impact of tourism activities on the environment of tourist destinations, thereby formulating environmentally friendly tourism development strategies and launching tourism cultural products that suit for the sustainable development of the tourism market. Moreover, it supplies guidance on the structural adjustment and optimization of the tourism industry via the prediction of the tourism market. All these measures are beneficial to allocate tourism resources more rationally and improve resource utilization efficiently so as to achieve the sustainable development of the tourism market.

4. Case study analysis

4.1. Case introduction^[1]

For better discussion about the application of statistical methods in tourism industry, the Guifeng Mountain Scenic Area located in Macheng, Hubei Province is taken as an example. Guifeng Mountain Scenic Area is located in Guishan Town, Macheng City, Hubei Province, which is 25 kilometers away from the downtown area of Macheng City. It is a world geological park, a national 4A-level scenic spot, Hubei provincial tourist resort, as well as a patriotic education base in Huanggang City. It has the reputation of world's first turtle and the first mountain of azaleas in China. Guifeng Mountain has both the characteristics of the north subtropical continental monsoon climate and the characteristics of the mountainous microclimate which is warm in winters and cool in summers. Rainfall is abundant in this region together with clouds and mist. With a forest coverage rate around 98%, the negative oxygen ion content is nearly 10,000 per cubic centimeter, making it perfect for healthcare vacation.

In 2006, the Government of Macheng City established the Guifeng Mountain Scenic Spot Management Office under which there is a tourism development company who is responsible for the overall and specific operations of the Guifeng scenic spot. In April 2016, the Macheng government reached a strategic cooperation with Hubei Communications Investment Group Co., Ltd (shortened form as Hubei Communications Investment Group), a state-owned enterprise in Hubei Province. In 2017, Hubei Communications Investment Group took over the control on the operation and management of Guifeng Mountain Scenic Area, changing the previous management system in which the area was managed by the government, and ushering in a good opportunity for development. Hubei Communications Investment Group has invested heavily in the past three years to improve the infrastructure of the scenic spot and enhance the quality of tourism services. New tourism projects have continuously arisen for construction, and the development of the Guifeng Mountain Scenic Spot has gradually moved towards a healthy development track.

4.2. Statistical data analysis

Statistics can not only facilitate tourism companies to identify potential tourism risks, analyze and evaluate tourism business risks, but also predict tourism market changes and trends through relevant statistical data analysis.

4.2.1. The male to female ratio of online ticket purchasers

From the perspective of consumer psychology, we often create “portraits” for target consumers while in search of tourists’ behaviors. Statistical methodologies provide us with a vivid description. As is shown in the Figure 1 below, it can be seen that from April 1 to May 31, 2020, the male to female ratio of online ticket purchasers in Guifeng Mountain Scenic Area, the majority of which are men. This does not simply mean that men dominate the flower-viewing tourists. Due to the pandemic in 2020, the government restricts group tours of travel agencies. Tourists basically travel by themselves while driving with someone else whether with couple, friends or family. When traveling together with other people in China, men are always the one who pay the bills.

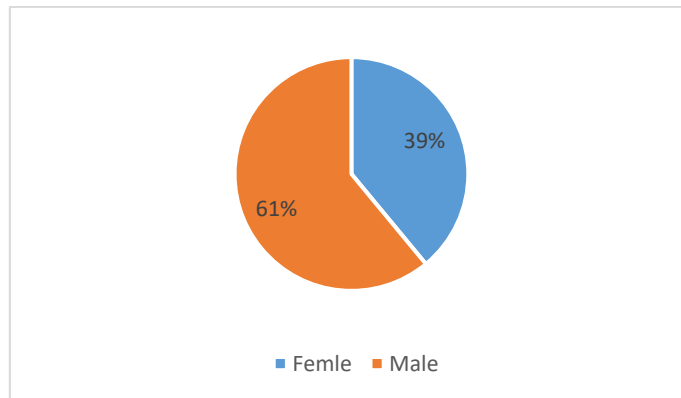


Figure 1: The male to female ration of online ticket purchasers.

4.2.2. The age group of tourists who buy tickets online

As can be seen in the Figure 2, the age group of tourists who buy tickets online vary. Young tourists aged from 26 to 35 account for about 33%, and those who is between 41 to 50 years old account for 25%. This represents that the younger visitors are more likely to go to Guifeng Mountain Scenic Area. Considering that the number of online ticket purchasers is only half of the total visitors, the sample is not completely representative. Because most of the tourists who buy tickets offline are elderly people.

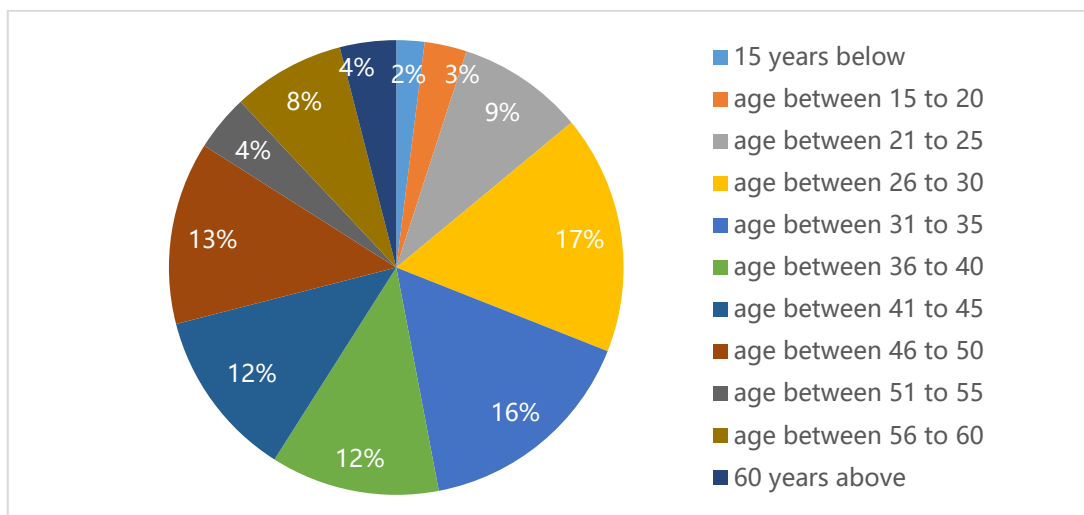


Figure 2: The age group of tourists who buy tickets online.

4.2.3. Tourism quantity and revenue

Statistical methods offer strong support to master the development trends of the tourism industry. As shown in the Figure 3 below, domestic tourism revenue increased from 3.03 trillion RMB in 2014 to 5.73

trillion RMB in 2019. The trends of domestic tourism revenue and tourist numbers indicate that the development of tourism industry in China continues to grow and improve, which has enhanced the confidence of tourism practitioners in Chinese tourism market.

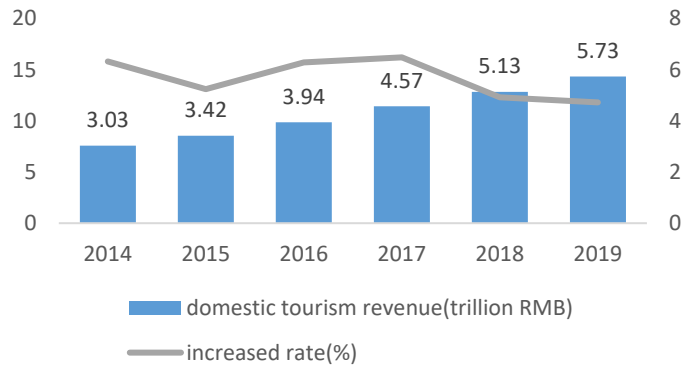


Figure 3: Tourism quantity and revenue.

4.2.4. The current listing price and comparison

Figures 4 points out that the current listing price of Guifeng Mountain Scenic Area is 110RMB/person in peak season and 70RMB/person in off-season. The average ticket price of China's 5A-level scenic spots was 96RMB, but the average ticket price in central and southern Guifeng Mountain was 98RMB. Compared with the surrounding tourist destinations of the same type, ticket prices in Guifeng are a little bit higher, especially in peak seasons. Take flower-viewing tours as an example. Yunwu Mountain in Huangpi is listed at 65RMB/person. The flower sea in Yingshan is 70RMB/person. Wuhan Flower Expo is 60RMB/person. As scenic spots in the Dabie Mountains, the listing price of Luotian Tiantangzhai is 80RMB/person while that of Luotian Bodao Peak is only 65RMB/person. Horizontally compared, it can be found that the ticket price of Guifeng Mountain Scenic Area is higher than that of similar competitors and higher than the average price of other 5A-level scenic spots.

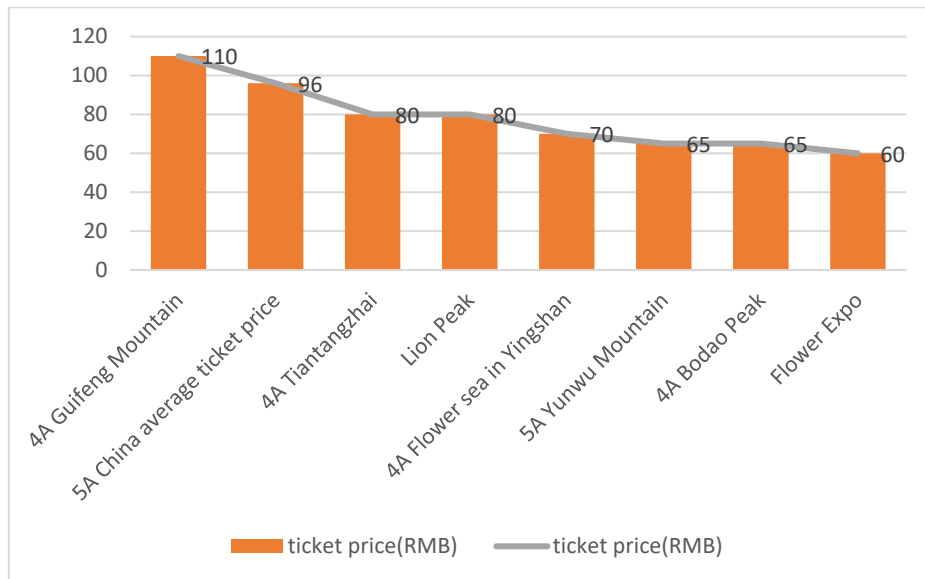


Figure 4: The current listing price and comparison.

4.3. Statistical conclusion and suggestion

Taking Guifeng Mountain Scenic Area in Macheng, Hubei as a case sample, trend analysis, correlation analysis and other methods in statistics are adopted to provide support for the formulation of marketing strategies of Guifeng Mountain Scenic Area. Through case analysis, it can be seen that statistical methods play a vital role in tourism management. From tourism market research to target-market determination, industry trend research to consumer behavior research, there are chances for statistics to work for tourism industries. It is recommended that tourism enterprises attach great

importance to the application of statistical methods. First, they shall concentrate on data collection and statistical analysis during the process of market research. Second, personnel training on statistical knowledge should be strengthened and fortified. Third, the usage of statistical methodologies are under correct guidance. The application of statistical methods facilitates tourism-related work to be carried out more scientifically and rigorously. Moreover the development of the tourism industry can be further promoted.

5. Conclusion

There are broad prospects and great potential in the application of statistics in tourism industry. With the advent of the data era and the development and application of science and technology, statistics will play a vital role in tourism industry and provide strong data support for its development. Tourism enterprises and government departments shall fully understand and attach importance to the application of statistics in tourism industry, strengthen the study and application of statistics, enhance data analysis capabilities, and achieve rapid and sustainable development of tourism and hospitality industries.

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