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Spatial-Temporal Characteristics of Internet Attention Towards Coastal Tourist Destinations in Jiangmen City

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Abstract: *This study, based on the Baidu Index, delves into the spatiotemporal characteristics of Internet attention towards coastal tourist destinations in Jiangmen City. Through an analysis of data from 2016 to 2020, it was found that the Internet attention towards Jiangmen's coastal tourist destinations increased in 2017 compared to 2016 but showed a negative growth trend starting from 2018. Moreover, the study reveals that Internet attention is primarily concentrated in the pre-holiday period of the "May Day" and "National Day" holidays, with the lead effect being more noticeable for the "May Day" holiday. Spatially, core cities in the Pearl River Delta such as Guangzhou and Shenzhen are identified as primary tourist source markets for Jiangmen. Based on these findings, it is recommended that Jiangmen City strengthen marketing efforts in areas with low levels of attention, leverage big data for precise market targeting, and enhance tourism cooperation with neighboring cities to improve the overall competitiveness of the regional tourism industry.*

Keywords: *Internet Attention; Tourist Destination; Spatio-temporal Characteristics; Jiangmen City*

1. Introduction

With the rapid proliferation and development of the Internet, the number of netizens reached 989 million as of December 2020, an increase of 85.4 million compared to March 2020. This figure not only reflects the widespread adoption of the Internet in China but also underscores its influence across various industries, particularly in tourism. The Internet has not only become an important channel for promoting tourist attractions and enhancing their visibility but also serves as a primary platform for travelers to access information and plan their itineraries. In recent years, the global tourism industry has garnered unprecedented attention and rapid growth, especially in China, which is one of the world's largest tourism markets. Coastal tourism, with its unique natural landscapes and rich cultural content, has gradually become one of the most attractive and promising sectors within the tourism industry. As an important city within Guangdong Province, Jiangmen City boasts abundant coastal tourism resources and is increasingly becoming a popular destination for both domestic and international tourists.

However, despite the growing attention towards Jiangmen City's coastal tourist destinations, research on the spatiotemporal characteristics of their Internet attention is relatively scarce. Internet attention not only serves as a significant metric for gauging the popularity of a tourist destination[1-2] but also reflects the dynamic nature of the tourism market in different temporal and spatial scopes[3-6]. Therefore, this study aims to fill this research gap by conducting an in-depth analysis of the Internet attention towards Jiangmen's coastal tourist destinations, as well as their distribution characteristics in time and space. This will not only provide scientific decision-making foundations for Jiangmen City's tourism management departments but also offer more precise and personalized travel information for a broad range of tourists.

2. Materials and Methods

2.1. Data Sources

The data for Internet attention towards tourist attractions in this study is sourced from the Baidu Index platform, which tracks user attention towards specific keywords. The keywords related to tourist

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attractions in Jiangmen City were extracted using a combination of the "Direct Keyword Extraction Method" and the "Range Keyword Extraction Method" . Initially, the scope was defined within Jiangmen City and the keyword "Jiangmen tourism" was used to obtain other keywords related to it. Subsequently, keywords specifically related to Jiangmen's tourist attractions were extracted. The next step involved individually searching the extracted keywords to continue keyword extraction until no new keywords emerged. The final list includes 17 attractions with their corresponding keywords, as shown in Table 1. The keywords for tourist attractions were searched to collect daily search index trends within the province for the period from January 1, 2016, to December 31, 2020, which serves as the base data for this study.

Table 1: Keywords Corresponding to Tourist Attractions.

Serial Number	Area	Attraction Name
1	Pengjiang District, Xinhui District, Jianghai District	Guifeng Mountain National Forest Park
		Bird Paradise
		Former Residence of Liang Qichao
		Gudou Hot Springs Resort
		Baishuidai Scenic Area
2	Heshan City	Gulao Water Village
		Dayan Mountain Forest Park
3	Kaiping City	Chikan Film and Television City
		Kaiping Diaolou
		Liyuan
4	Taishan City	Mei Family Compound
		Chuan Island Tourist Resort
		Langqin Bay
		Heisha Bay
		Kangqiao Hot Springs Resort
5	Enping City	Jinjiang Hot Springs Resort
		Didi Hot Springs Resort

2.2. Research Methods

2.2.1. Seasonal Concentration Index

The Seasonal Concentration Index (I), also known as the Seasonal Time Intensity Index, is used for the quantitative analysis of the seasonal concentration of Internet attention towards tourist destinations. The formula for its calculation is as follows:

$$I = \sqrt{\frac{\sum_{i=1}^{12}(x_i - 8.33)^2}{12}} \tag{1}$$

In this formula, x_i is the proportion of the Internet attention for each month compared to the total annual Internet attention. A higher Seasonal Concentration Index indicates that the Internet attention towards the tourist destination is more seasonally concentrated and has larger seasonal differences. Conversely, a lower index suggests that the seasonal distribution of Internet attention is more evenly spread.

2.2.2. Weekday Distribution Skewness Index

The Weekday Distribution Skewness Index (T) is used to reveal the distribution characteristics of Internet attention towards tourist destinations within a weekly time frame[7]. The formula for its calculation is as follows:

$$T = 100 \times \frac{2}{n}\left(\sum_{i=1}^{n} i \cdot P_i - \frac{n+1}{2}\right) \tag{2}$$

Here, P_i is the proportion of the Internet attention on the *i*-th day relative to the total weekly Internet attention, and *n* is the number of days measured, generally extending 3 days before and after official holidays. If T<0, it indicates that the Internet attention is biased towards the earlier part of the week; if T>0, it shows a bias towards the latter part of the week; and if T=0, it suggests that the Internet attention is evenly distributed throughout the week.

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3. Spatiotemporal Characteristics of Internet Attention towards Jiangmen's Coastal Tourism Destinations

3.1. Temporal Distribution Features

3.1.1. Interannual Variation Features

By summing up the daily attention data for each tourist attraction, we obtain the annual Internet attention data for each year from 2016 to 2020, as shown in Figures 1 and 2.

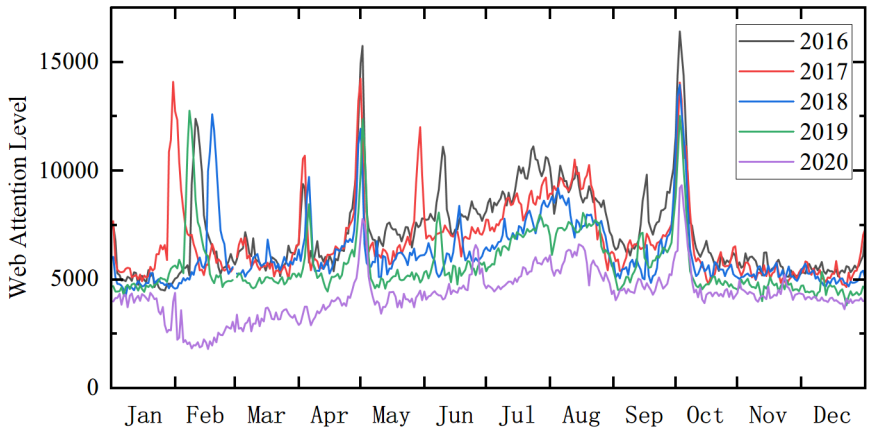

Figure 1: Interannual Variation Curve of Internet Attention towards Jiangmen's Coastal Tourism Destinations from 2016-2020.

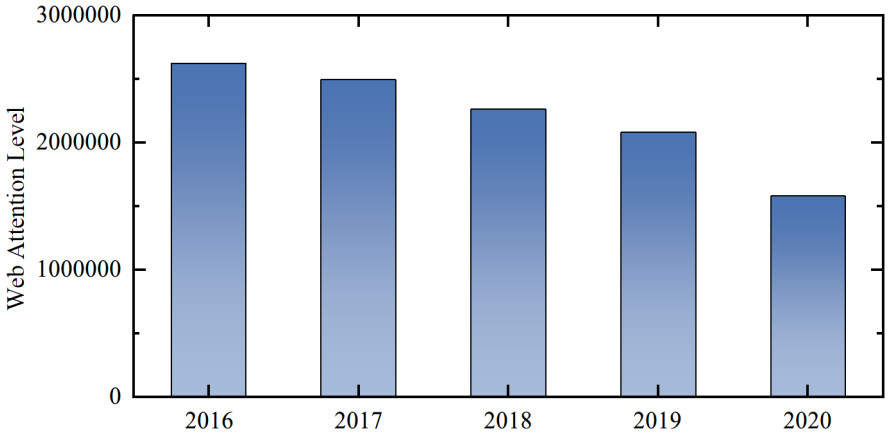

Figure 2: Internet Attention towards Jiangmen's Coastal Tourism Destinations from 2016-2020.

According to Figures 1 and 2, we can see that the annual Internet attention in 2017 increased by 8.6% compared to 2016. Starting from 2018, there was a negative growth trend with a steady annual decline of about 17.6%, except for 2020. Although the overall annual Internet attention shows a steady decline, the intra-annual features have not changed significantly. The trend of intra-annual Internet attention remains highly similar, presenting a "five peaks and five valleys" pattern. The "five peaks" are distributed in February, early April, early May, June to August, and early October, corresponding to the Spring Festival, Qingming Festival, Labor Day, summer vacation, and the National Day holiday respectively. This also shows that Internet attention can fairly accurately reflect the state of public tourism demand.

3.1.2. Quarterly Variation Features

Tourist flow varies in different seasons, and this imbalance is also one of the main characteristics of the tourism industry. Tourist attractions and tourist cities can make reasonable adjustments to the allocation of resources for peak and off-peak tourism seasons to achieve better management and business objectives. According to meteorological division methods[8], Jiangmen City can be divided into four seasons: spring (March to May), summer (June to August), autumn (September to November), and winter (December to February). The monthly data of Internet attention towards tourist attractions are processed seasonally, and the seasonal proportion of Internet attention is depicted in Figure 3.

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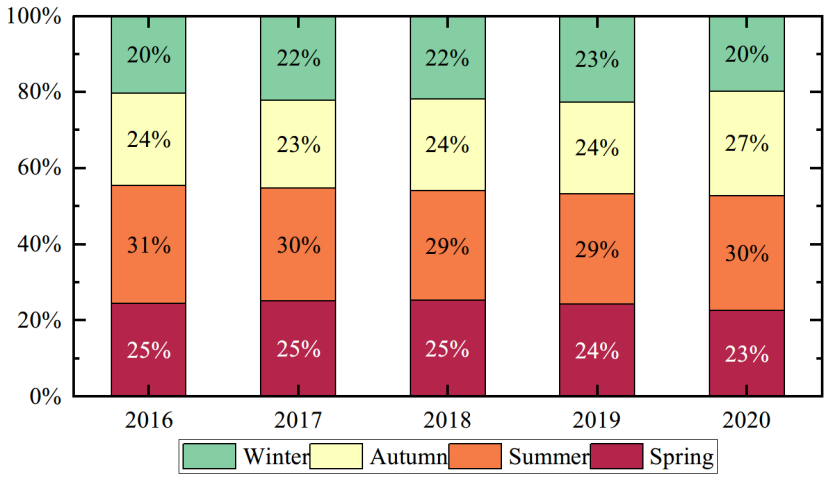

Figure 3: Seasonal Distribution of Internet Attention.

As can be seen from Figure 3, the seasonal distribution of online attention to coastal tourist destinations in Jiangmen City from 2016 to 2020 is relatively stable. The proportions of online attention across the four seasons are roughly distributed at 25%, 30%, 24%, and 21% respectively. The highest proportion of online attention to tourist sites occurs in the summer, which is also when Jiangmen City sees its peak in tourist traffic, specifically in July and August. Both the spring and autumn seasons have an online attention share of 24%, and this aligns closely with the average temperatures in Jiangmen City for these seasons between 2016 and 2020. The online attention in winter accounts for 21%; starting from December and lasting until the end of February the following year, the average highest temperature in Jiangmen City does not exceed 20℃. During this period, there is a gradual decrease in tourist traffic and a corresponding decline in online attention.

Further quantitative analysis was conducted using the Seasonal Concentration Index for the years 2016-2020 to measure the degree of seasonal focus in online attention towards tourist sites in Jiangmen City. The results are presented in Table 2.

Table 2: Keywords Corresponding to Tourist Attractions.

Region	2016	2017	2018	2019	2020
Jiangmen	2.4	1.6	1.35	1.36	3.05

The data in Table 2 shows that the Seasonal Concentration Index is generally low, indicating that the range of seasonal fluctuation in online attention is small. Starting from 2016, the index has been gradually decreasing for tourist destinations in Jiangmen City. However, impacted by the COVID-19 pandemic, the public's "compensatory consumption" led to a sudden significant increase in the index in 2020. Excluding the effects of the pandemic, the index for Jiangmen City should have continued to decline over the past five years. This suggests that online attention is increasingly distributed across different seasons, indicating a noticeable reduction in seasonal differences.

3.1.3. Monthly Variation Features

The paper calculates the total online attention for tourist sites in Jiangmen City for each month and presents the results in a monthly distribution graph of internet attention (Figure 4).

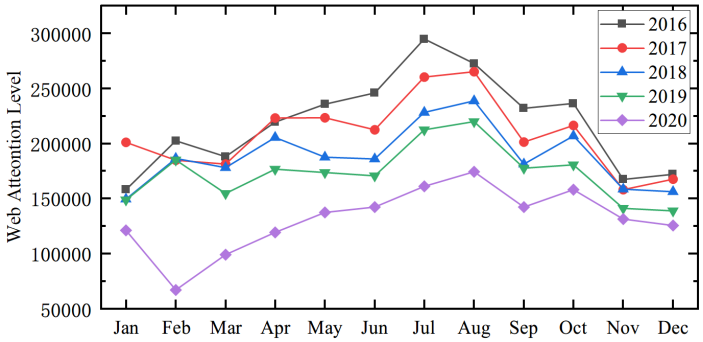

Figure 4: Monthly Distribution of Internet Attention.

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From Figure 4, it can be observed that although the Internet attention to tourist sites in Jiangmen City has been declining annually, the past five years have shown a "single-peak" fluctuation pattern. Except for 2020, which was affected by the COVID-19 pandemic, the patterns and trends in Internet attention from 2016 to 2019 have been largely consistent. Over these five years, the attention to tourist spots in Jiangmen City peaks in July and August, showing a bulging shape. Except for 2016, the other four years all reached their highest point in August, marking it as the peak month. Starting from March and lasting until August, there is a slow-growing trend, which then rapidly declines after reaching the peak in August.

3.1.4. Holiday Variation Features

Over the 40 years since the reform and opening-up, China has achieved historical leaps from insufficient basic needs to moderate prosperity, leading to a tremendous leap forward in the nation's wealth. In contemporary times, people have more leisure time and better material conditions, and there is a general need for tourism activities. In practice, the public usually chooses to travel during holidays. As can be observed from Figure 1, both the "May Day" (May 1st) and "National Day" (October 1st) holidays have formed a relatively stable flow of tourists. To make the study on Internet attention of Jiangmen City's tourist sites during holidays more general, the paper only selects the daily Internet attention during the holidays and the three days before and after as the subjects of study. This includes the periods from April 28 to May 6 and September 28 to October 10. Line graphs have been drawn to display these (Figures 5 and 6).

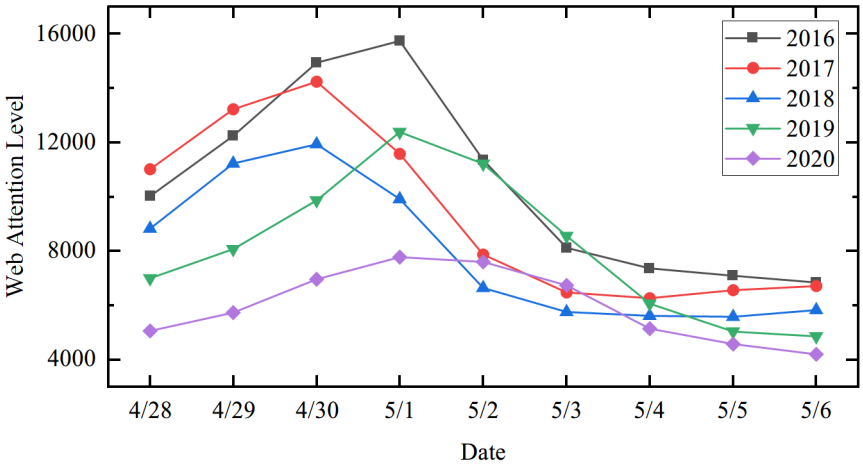

Figure 5: Daily Internet Attention During the "May Day" Holiday.

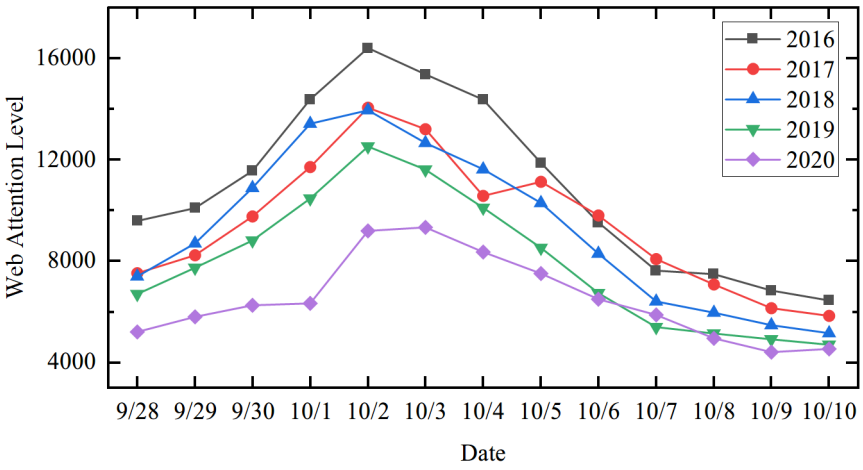

Figure 6: Daily Internet Attention During the "National Day" Holiday.

As can be seen from Figure 5, the trend of Internet attention during the "May Day" holiday from 2016 to 2020 has remained largely consistent. The peak of Internet attention occurred on May 1st in 2016, 2019, and 2020, while it occurred on April 30th in 2017 and 2018. There has been no noticeable shift forward or backward in the peak times of Internet attention over these five years. Thanks to the effective leadership of the Chinese government, the COVID-19 pandemic was well-controlled before the "May Day" holiday in 2020. During this period, Internet attention dropped only 26.34% compared to the

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previous year, showing a significant improvement from the Spring Festival period.

From Figure 6, it can be seen that the trend of Internet attention around the "National Day" Golden Week from 2016 to 2020 has also been largely consistent, with the peak generally occurring on October 2nd. Unlike the "May Day" holiday, where the peak of Internet attention tends to be before May 1st, the peak during the "National Day" Golden Week tends to occur after October 1st. This is likely due to the longer holiday period for the Golden Week, which allows travelers to avoid peak tourist flow for a better travel experience. Data suggest that the idea of traveling during off-peak times is commonly accepted. In 2020, the Internet attention during the "National Day" Golden Week dropped 18.47% year-on-year, with the negative effects of the COVID-19 pandemic continuing to decline.

By calculating the skewness index for the distribution of Internet attention within the week for both the "Spring Festival" and "National Day" Golden Week, we can analyze the concentration of attention. If the index is greater than zero, it indicates that the Internet attention is concentrated later in the holiday; otherwise, it's concentrated earlier. The results are shown in Table 3.

Table 3: Skewness Index for Internet Attention During "May Day" and "National Day" Holidays.

Year	2016	2017	2018	2019	2020
May Day Holiday	-12.06	-15.39	-14.22	-8.84	-4.77
National Day Holiday	-9.66	-6.58	-10.73	-10.49	-4.52

From Table 3, it can be seen that Internet attention during both the "May Day" and "National Day" holidays is primarily concentrated in the early part of the holiday. Relative to the "National Day" holiday, the skewness index for the "May Day" holiday is smaller, indicating a more pronounced front-loading of attention, which quickly drops afterward. This is because the "May Day" holiday is shorter, and tourists often prepare travel plans in advance. During the holiday, most tourists are in transit, leading to a quick drop in Internet attention. In contrast, the "National Day" holiday is longer, and many travelers opt to delay their travel to avoid early crowding, resulting in a gradual increase in Internet attention during the early part of the holiday.

3.2. Spatial Distribution Features

3.2.1. Spatial Distribution of Internet Attention

This section focuses on the Chuan Island Tourist Resort, one of the most representative coastal tourist destinations in Jiangmen City, to analyze the spatial distribution features of Internet attention from various cities within Guangdong Province. The data for Internet attention is the annual average from 2016 to 2020. Details can be seen in Figure 7.

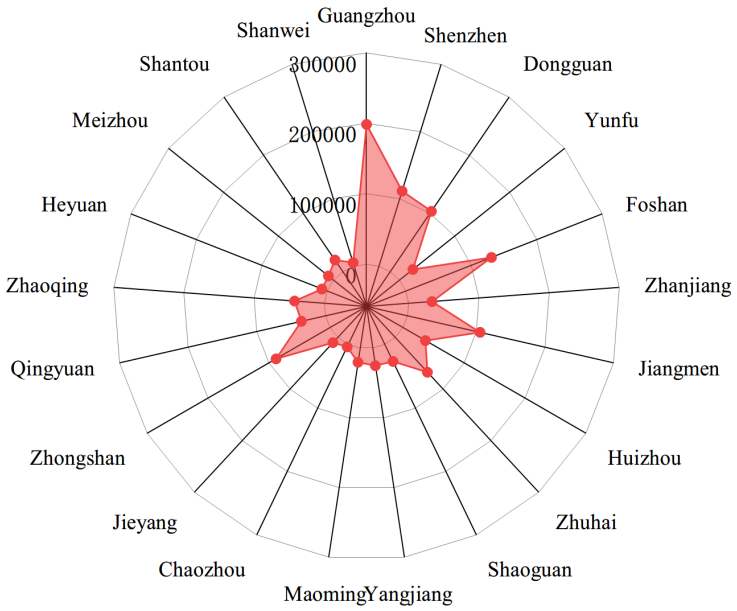

Figure 7: Internet Attention for Chuan Island Tourist Resort from Cities within the Province

Based on research from numerous scholars, Internet attention to tourist destinations tends to be a

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precursor to actual tourist flow, and the two are highly correlated. From Figure 7, it can be seen that the main source markets for the Chuan Island Tourist Resort are relatively economically developed regions, including Guangzhou, Shenzhen, Dongguan, Foshan, Jiangmen, Zhuhai, and Zhongshan. In contrast, cities like Chaozhou, Heyuan, Meizhou, and Shanwei have lower levels of Internet attention. Macro-economic data from recent years, such as Internet penetration rates, permanent population numbers, per capita disposable income, and distance to Jiangmen, all affect the levels of Internet attention. Cities like Guangzhou, Shenzhen, Dongguan, Foshan, Jiangmen, Zhuhai, and Zhongshan have per capita disposable incomes exceeding 30,000 yuan, showing higher potential for tourist consumption and therefore higher levels of Internet attention. On the other hand, Chaozhou, Heyuan, Meizhou, and Shanwei are further away from Jiangmen and are relatively economically undeveloped, resulting in lower Internet attention.

3.2.2. Classification of Source Markets

To analyze the grading of source markets in terms of Internet attention for Chuan Island Tourist Resort, this paper adopts the criteria proposed by Ding Zhengshan for classifying source markets. Areas where Internet attention accounts for more than 5% of the provincial total are categorized as first-tier markets; those accounting for 1% to 5% are second-tier markets, with those taking up 5%-2.5% considered strong second-tier markets, and those taking up 2.5%-1% as weak second-tier markets; areas accounting for less than 1% are categorized as third-tier markets. The classification of the market levels is shown in Table 4.

Table 4: Classification of Source Markets.

City	Market Level	City	Market Level	City	Market Level
Guangzhou	First-tier	Zhaoqing	Second-tier	Maoming	Weak Second-tier
Foshan	First-tier	Huizhou	Strong Second-tier	Shantou	Weak Second-tier
Shenzhen	First-tier	Qingyuan	Strong Second-tier	Jieyang	Third-tier
Jiangmen	First-tier	Zhanjiang	Strong Second-tier	Meizhou	Third-tier
Dongguan	First-tier	Shaoguan	Weak Second-tier	Heyuan	Third-tier
Zhongshan	First-tier	Yangjiang	Weak Second-tier	Shanwei	Third-tier
Zhuhai	First-tier	Yunfu	Weak Second-tier	Chaozhou	Third-tier

According to Table 4, cities that are first-tier source markets for the Internet attention of Chuan Island Tourist Resort include Guangzhou, Shenzhen, Dongguan, Foshan, Jiangmen, Zhuhai, and Zhongshan. These first-tier cities are all core cities in the Pearl River Delta region and share multiple significant characteristics: high economic development levels, wide Internet penetration, and favorable geographical accessibility and transport convenience to Jiangmen. These factors collectively make these cities stable sources of visitors for Jiangmen.

Strong second-tier markets primarily consist of Zhaoqing, Qingyuan, Huizhou, Jieyang, and Shantou. Except for Huizhou, these cities generally have GDPs at a moderate level within Guangdong Province. Residents of these areas have clear tourism consumption motives and demands. Huizhou, despite its strong economic capabilities, has a wealth of local coastal tourist resources, fulfilling local tourism needs to a large extent.

Weak second-tier markets are mainly concentrated in the western part of Guangdong, including Zhanjiang, Yangjiang, and Maoming. These regions have economic levels comparable to strong second-tier markets but have lower external tourism demand due to their own coastal tourist resources. Especially in Yunfu, the only fifth-tier city in Guangdong Province, the economic capability is relatively weak, and residents are more focused on productive labor, resulting in lower tourism demand.

Third-tier markets are primarily distributed in the eastern part of Guangdong, including Meizhou, Shanwei, Heyuan, and Chaozhou. These areas have relatively low GDP, ranking only above Yunfu and are among the lowest in Guangdong Province. The geographical distance and poor transport convenience to Jiangmen also contribute to their low Internet attention.

Overall, the first-tier and strong second-tier source markets are mainly concentrated in central Guangdong and serve as the primary source markets for Jiangmen's coastal tourist attractions. The third-tier and weak second-tier markets are mainly concentrated on the eastern and western wings of Guangdong, and their low Internet attention is mainly related to geographical distance, economic development, and population size.

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4. Conclusion and Suggestions

4.1. Conclusion

Based on Baidu Index, this study analyzes the spatiotemporal features of the internet attention to Jiangmen's coastal tourism destinations at different levels, and concludes the following:

(1) The internet attention to Jiangmen's coastal tourism destinations shows a year-over-year declining trend. Although there was a slight increase in 2017 compared to 2016, a negative growth has been observed since 2018 with a stable rate of decline. On a monthly basis, the internet attention shows a single peak distribution over the past five years, with the peak appearing in July and August. During holidays like May Day and National Day, the internet attention obviously increases and advances, especially more noticeable for the May Day holiday.

(2) From the perspective of internet attention from cities within the province, the more economically developed a city is, the higher its attention to Jiangmen's coastal tourism. Core cities in the Pearl River Delta, such as Guangzhou and Shenzhen, form Jiangmen's first-tier tourism source markets. Economically well-developed cities are important potential customers due to their higher income levels and stronger tourism demands. Cities with fewer local tourism resources are more willing to focus on external tourism resources.

4.2. Suggestions

Based on the research findings, this study offers the following suggestions:

(1) Jiangmen's tourism department should enhance marketing promotion efforts in areas with low internet attention. This could be achieved through online advertising, special discount policies, etc., to attract tourists from these regions and turn them into important second or third-tier source markets.

(2) Tourism resource allocation should be planned rationally based on trends in internet attention. The development of thematic activities and differentiated tourism products should be prioritized to enrich the tourist experience.

(3) A comprehensive internet attention statistical system should be established. Using big data analytics, precise and targeted market promotions should be carried out.

(4) Jiangmen should strengthen tourism cooperation with surrounding cities, jointly developing tourism resources in the Pearl River Delta region. This will facilitate mutual benefit and enhance the overall competitiveness of the regional tourism industry.

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