Influencing Factors of the Number of Tourists in Dark Tourism Destinations Based on Tourism Area Life Cycle Theory: The Cases of Earthquake Memorial Site

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Abstract. In recent years, earthquake disasters occur frequently in China and the world, forming many Earthquake Memorial Site. However, the number of tourists has quite difference in different site, so how to improve the number of tourists becomes very important. Based on Tourism Area Life Cycle Theory (TALC), we discuss the influencing factors of the number of tourists in Earthquake Memorial Site, so as to enrich the research of TALC and Dark Tourism and to provide management recommendations for the site. Taking Wenchuan Special Tourist Area and Beichuan Qiangcheng Tourist Area as examples, the annual tourist reception volume from 2013 to 2018 is selected as the research data, the life cycle curves of the two scenic spots are fitted by trinomial model, and the influencing factors of tourist amount of earthquake site tourist attractions are deeply discussed by analyzing and comparing the trend characteristics of the curves.

Introduction

In recent years, earthquake disasters have occurred frequently in China. In 2008-2018, the frequency of 5-level earthquake disasters in China was as high as 300. Earthquake disasters are difficult to predict and highly destructive. Therefore, the occurrence of major earthquake disasters often causes a large number of buildings to collapse and damage, leading to landslides and ruptures, forming traces of earthquake sites. These numerous relics are extremely visually stunning. They retain valuable disaster information, carry personal and collective emotions and memories and provide the most direct material for disaster prevention. [1]

From the perspective of the life cycle evolution of black tourism sites, we aims to find out the factors affecting the change of tourists in disaster-type scenic spots. Due to the lack of tourism area life cycle research in dark tourism, we use Wenchuan Special Tourist Area (WSTA) and Beichuan Qiangcheng Tourist Area (BQTA) as examples to select the annual tourist data and draw models through model fitting. Combining the theory of tourism life cycle evolution and dark tourism supply and demand research, we explore the influencing factors of tourists in disaster-type scenic spots and propose the management advice by analyzing the characteristics of the curves.

Literature Review

Dark Tourist Demand

Tourist demand research focuses on tourism motivation, tourism experience and tourism behavior. Tourism motivation is an individual's willingness and inner demand for tourism behavior, and is psychological driving force for tourism behavior. Li divided the motivation formed under the influence of the Wenchuan earthquake into five dimensions: “visiting and leisure enjoyment” and “social identity”, “tourism services”, “core tourism attractions” and “safety”. [2] Wang summarized the motivation of dark tourists in the Beichuan earthquake site area as “reminiscing and exploring local characteristics”, “public welfare and scientific research”, and “entertainment in
“Remembering and exploring local characteristics” and “public welfare and science education” are the main motivations. [3] In addition, Rittichainuwat demonstrates motivations for supporting post-disaster recovery, wanting to know disaster areas and curiosity. [4] Tang empirically studied the motives of Chinese tourists visiting the memorial site of earthquake sites after Wenchuan earthquake. [5] It was found that the decisive motivations of dark tourists were mainly obligations, commemoration and curiosity. In summary, dark tourism motivations mainly include “reminiscing and exploring local features”, “public welfare and scientific research”, and “entertainment in self-development”.

**Dark Tourist Destination Supply**

The existing research on the dark tourist destination supply mainly involves the development and management of dark tourist destinations. The study of the development mode of dark tourist destinations is hot. Liu and Tan proposed the mode of tourism development in Wenchuan earthquake site, [6,7] while Li proposed that in Beichuan earthquake site. [8] Dark tourist destination management involves tourist area management, and scenic area managers. For example, Zheng et al. discussed the “Intrapersonal Constraints” in people visiting the dark tourist area and found the stronger travel motivation, the weaker travel restrictions, the stronger willingness of tourists to revisit and recommend; [9] Frew's research indicates that heritage managers of major atrocities are responsible for ensuring that these sites are conservatively and sensitively presented to survivors, their families, and future generations. [10]

**Tourism Area Life Cycle Theory**

Butler advanced “tourism area life cycle” and TALC in 1980. [11] Butler drew the “S” model of evolution of a tourist area, which has six stages, based on the number of tourists. Some scholars have discussed different types of tourism area. Therefore, this study will discuss the tourism area life cycle of earthquake memorial site.

The evolution of the tourism area is influenced by many factors. Many scholars put forward three main viewpoints, 1) external cause theory, referred to the external market factor of the tourism area, 2) internal cause theory, referred to the environmental factor and 3) comprehensive factor theory. This study will draw tourism area life cycle curves for 2 earthquake memorial sites formed by the Wenchuan earthquake, and discuss the factors which make their curves different.

**Dark Tourist Destination Life Cycle Curve**

**Life Cycle Curve Fitting**

In the existing research on the life cycle of tourist destinations, most scholars use mathematical models to fit the life cycle curve of tourism destinations. The data used in this study for mathematical simulation is mainly the time series of the tourist volume of the scenic spot. Therefore, this study intends to use the commonly used Logistic model, Index model, Gompertz model and Multinomial model to fit the life cycle curve and select the most suitable one.

![Figure 1. Scenic Area Variation Curve and Trinomial Fit Curve.](image)

Due to the limited amount of data, the trinomial model with the highest model fitting degree was
selected as the fitting model of the life cycle curve after the analysis of SPSS.23, as shown in Fig 1. The curve fitting formula of the two scenic spots and the adjusted goodness of fit is as follows.

\[
\text{WSTA: } y_1 = 14.493x^3 - 175.82x^2 + 634.95x - 233.45 \quad (x = 1,2,3...) \quad \text{Adjusted R}^2 = 0.77
\]

\[
\text{BQTA: } y_2 = 5.3449x^3 - 53.363x^2 + 143.7x + 97.513 \quad (x = 1,2,3...) \quad \text{Adjusted R}^2 = 0.4656
\]

**Classification of Tourism Life Cycle Stages**

The tourism life cycle theory curve model only qualitatively describes the characteristics of the tourism destination development stage, and the stage division lacks detailed quantification. In order to avoid the excessive subjectivity of the stage division, this study refers to the research methods of some domestic scholars, combining with the tourism growth rate of each life cycle stage proposed by Butler (see Table 1) \[11\] and the characteristics of the tourism life cycle stage to divide the stages of WSTA and BQTA's tourism life cycle. \[12,13\]

<table>
<thead>
<tr>
<th>Stage</th>
<th>Growth Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exploration</td>
<td>Irregular changes in the initial stage of development</td>
</tr>
<tr>
<td>Involvement</td>
<td>Growth exceeded 5%~10%</td>
</tr>
<tr>
<td>Development</td>
<td>Growth is less than 10%~15%, table between 5%~10%</td>
</tr>
<tr>
<td>Consolidation</td>
<td>Stable between 0%~5%, and constantly fluctuating</td>
</tr>
<tr>
<td>Stagnation</td>
<td>Negative value</td>
</tr>
</tbody>
</table>

The annual data of WSTA and BQTA is provided by the Sichuan Culture and Tourism Department. Due to objective reasons, we only obtained the annual tourist amount data from 2013 to 2018, as shown in Table 2. Considering that Yingxiu Memorial and Beichuan Earthquake Site are the core tourism resources of WSTA and BQTA in the early stage of their establishment, and fully opened in May 2012 and Oct 2011, respectively. The interval is short, so it is feasible to use the 2013 data as the starting point for life cycle observation.

<table>
<thead>
<tr>
<th>Year</th>
<th>Total tourists (million persons)</th>
<th>Annual tourist growth rate(%)</th>
<th>Total tourists (million persons)</th>
<th>Annual tourist growth rate(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>2.3632</td>
<td>-</td>
<td>1.8847</td>
<td>-</td>
</tr>
<tr>
<td>2014</td>
<td>4.7371</td>
<td>100.45%</td>
<td>2.2313</td>
<td>18.39%</td>
</tr>
<tr>
<td>2015</td>
<td>4.2069</td>
<td>-11.19%</td>
<td>2.0434</td>
<td>-41.55%</td>
</tr>
<tr>
<td>2016</td>
<td>4.9105</td>
<td>16.72%</td>
<td>1.1944</td>
<td>-41.55%</td>
</tr>
<tr>
<td>2017</td>
<td>3.1712</td>
<td>-35.42%</td>
<td>1.8538</td>
<td>55.21%</td>
</tr>
<tr>
<td>2018</td>
<td>3.8642</td>
<td>21.85%</td>
<td>1.8315</td>
<td>-1.20%</td>
</tr>
</tbody>
</table>

Yingxiu Memorial and Beichuan Earthquake Relic Area are the core tourism resources of WSTA and BQTA in the early stage of establishment, and they fully opened in May 2012 and Oct 2011. The interval is short, so it is feasible to use the 2013 data as the starting point for life cycle observation. By 2013, the number of tourists had reached 1.8847 million. In May 2013, another core tourist resource in the tourist area called Wenchuan Earthquake Memorial Hall was fully opened. It can be inferred that from 2012 to 2013, the number of tourists in BQTA has increased substantially, and the growth rate is relatively fast, which is in development stage. In 2014, the growth of tourists in BQTA slowed down, and the growth trend tended to be stable, entering to consolidation stage. From 2015 to 2016, the number of tourists in scenic spots has decreased significantly, showing a negative growth, and the scenic spots have entered a short period of...
decline. From 2017 to 2018, the number of tourists in BQTA has increased significantly, reaching 55% in 2017, and the scenic area has entered a preliminary recovery stage.

**Differences in the Life Cycle between Two Scenic Spots**

There are still significant differences in the two scenic spots. In the development stage, the growth of tourists in WSTA is much higher than that of BQTA. In the consolidation or stagnation stage, the number of tourists in WSTA tends to be stable, about twice as much as that in BQTA. From the full opening of the core tourism resources of dark Tourism to the recession in the scenic spot, the BQTA has experienced 39 months, and the WSTA has experienced 56 months. It can be seen that the former took the lead in the recession phase in advance of the latter for 17 months. In terms of the average annual recession, WSTA is higher than the BQTA. After experiencing a brief recession, the two scenic spots ushered in a preliminary recovery, except that the increase in the number of tourists in the BQTA is slightly higher than that in the WSTA.

**Management Implication**

In terms of theoretical significance, the study on the TALC in the earthquake memorial site in the dark tourist destinations is extended. The model is used to calculate the tourism life cycle curves of the two scenic spots, and the different development stages are divided. The tourism life cycle theory curve model not only qualitatively describes the characteristics of the tourism destination development stage, but also describes the detailed quantification of the stage division. Besides, the demand for dark tourists and the supply of dark tourist destinations analyze the influencing factors at different stages, further enriching the evolution of tourism life cycle and the study of dark tourism supply and demand.

In terms of practical significance, the tourist motivations of black tourism destinations are mainly divided into three aspects: “remembering and exploring local characteristics”, “public welfare and scientific examination education”, “entertainment and self-development”. There is a single motivation in different development stages of the scenic spot. The transition to a compound motivation. Therefore, the marketing personnel of the black tourism destination should design a diversified tourism product marketing plan according to the different travel motivations of the tourists, satisfy the individual needs of different black tourists, and improve the perceived value of the tourists' experience. Accurate emotional marketing at different stages of the life cycle to increase the attractiveness of the potential tourist source market.

**Limitations and Further Research**

The research object of this study is the earthquake ruins category. The selected case is WSTA and BQTA, all located in Sichuan and ruin in Wenchuan earthquake. The influence factors of tourists are more clear, but the representativeness may be poor. Future research can select earthquake scenic spots in other countries and regions to increase the universality of research.

This study is based on TALC to study the change of tourists in earthquake scenic spots. Although the selected cases can reflect the life cycle of each stage to a certain extent, the development time of the two places is short and cannot fully reflect the characteristics of each stage. Future research can choose tourist destinations with longer development time and increase the integrity.

**Conclusions**

From the life cycle of two dark tourist destinations in Wenchuan and Beichuan, the supply factors affecting the number of tourists in earthquake-like scenic spots mainly include: “marketing strategy”, “development model” and “infrastructure construction”. The marketing strategy has the most activities and the greatest impact. Specifically, two scenic spots actively participated in various marketing activities and held a variety of tourism activities, and publicized the evaluations obtained. The impact of “infrastructure construction” is second, and the “development model” has
the least impact, mainly in the development and rehabilitation of scenic spots. In the “marketing strategy”, Wenchuan mainly participated in the promotion conferences in various places and promoted themselves in large-scale activities, while Beichuan mainly went to various places to participate in small publicity activities. In terms of “infrastructure construction”, Wenchuan is located on a number of major transportation routes. Beichuan relies mainly on the development of Mianyang traffic. In addition, other infrastructure in Wenchuan is spontaneously upgraded, and Beichuan is more dependent on the reform of the entire county.

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