
Case Study Paper

The strategy and analysis of optimizing lugu lake tourism Image

based on online travel data

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Abstract

Tourism image is of great significant to construction of scenic areas and enhancement of scenic competitiveness. However, many scenic areas are facing problems such as ignoring their own cultural values, homogenization and self-positioning. It is meaningful to define what the tourism image actually is. For the past few years, the number of internet users are increasing dramatically, whose comments boost the progress of intelligent tourism. The utilization of these online information now becomes an important way for tourists to generate how the destinations look like. In the age of big data, analysis of online comments is helpful to explore cultural features, shape the scenic areas' image and improve tourists' satisfaction.

This essay takes Lugu lake scenic area as an example, consist of three parts. The first part focus on comments extraction about tourism resources, infrastructures and service. After that, the second part mainly deals with the analysis of tourists' behaviors and perception. Lastly, the third part proposes the optimization strategy in scenic marketing and precision services, scenic image creation, facilities improvement, linkage development with surrounding attractions and other perspectives.

Online travelling comments are encouraged to spread among tourists, as a result, either good or bad reviews will lead to exponentially influence and exposure. Tourism image optimization based on internet reviews is the embodiment of public participation in the new era, which is helpful to realize the application value of big data in the field of urban planning, shape scenic image and enhance its competitiveness.

Keywords

Online comments data, Lugu lake scenic area, Tourism image

1. Research review

Scenic tourist image is the overall perception and a series of impressions, views and emotional expressions of the scenic spot, which is formed by normal and potential tourists dealing with information from various channels. Good scenic image can not only improve the

tourist revisit rate, enhance the satisfaction and loyalty of tourists, but also affect the travel willingness of potential tourists. It is also considered as an important basis for scenic planning, activity creation and visitor management.

There are several ways to analyze traditional tourism image, such as face-to-face interviews, questionnaire surveys, secondary data released by government or tourism organizations, observation, and mobile tracking devices, most of these data collection methods are generally costly and time-consuming, and have limitations in getting samples and information. In comparison, Online travelling data, which is published by tourists on social media spontaneously and records the actual behaviors of tourists naturally, provides a more effective way to analyze tourists' travelling activities and preferences. Online travelling data is sizeable and cost-effective. In addition, it contains various information such as text description, geographical location, travel time, pictures and so on, which can reflect the tourists' needs in real.

Based on the perspective of scenic spots, online travel analysis can be used to design scenic spot accurately and enhance the tourism image. It also provides the possibility for incorporating the public's will into the spatial planning, and promotes the transformation of urban research and urban planning in terms of technical means and value orientation. Therefore, this article takes Lugu lake scenic area as an example, trying to explore the public demand and proposes the optimization strategy of tourism image by analyzing the online travel data, which may provide reference for other related planning.

2. Research Background

2.1. Overview of Lugu lake Scenic Area

Lugu lake is located at the junction of Yunnan and Sichuan Province, where the beautiful plateau lake (Figure 2-1) blends with the mysterious Mosuo matriarchal culture (Figure 2-2), making it an important attraction. As a national scenic spot and provincial nature reserve, lake lugu has high ecological and cultural value. From 2015 to 2017, the number of visitors to Lugu lake Scenic Area was showing a rapid upward trend, which was about 0.38 million, 0.42 million, and 1.07 million, respectively. The prospect of Lugu lake Scenic Area is optimistic. In recent years, with the rapid growth of tourism and the amount of tourists, as an emerging scenic spot, Lugu lake is suffering pollution and destruction. Furthermore, its tourism infrastructure fails to satisfy the tourists demand, which leads the abundant resources lake to a AAAA-level rating merely, This is why it needs to be optimized.



Figure 2-1: Beautiful scenery of lugu lake



Figure 2-2: Mosuo architecture and decoration

2.2. Travels data discussion

The online travel notes contain various data types such as text, photos, videos. Many travel notes also include the user's geographic information, travelling time, and travelling ways. Those datas, which contain tourists' travelling behaviors and resources, form tourist's digital footprints. Integrated travel data can be used to explore the space path and travel methods of tourists. In addition, we can keep abreast of tourists' preference for scenic resources and tourism products, as well as the satisfaction degree of the scenic management and service quality.

The travel data has been a hot topic since this year, with the characteristics of high accuracy, wide coverage, timely update, large amounts of information and various types. The research in the planning field mainly includes the following three aspects: The first category is about the image research of tourism destinations. This kind of research builds out tourist image by grasping the key words of online travel records and analyzing the tourists' perceptions and emotions. The second category considers more about tourists' behaviors, including motivation, activity routes, visiting places, and Interested contents. By the study of tourist behaviors, it can analyze the attraction of tourism destinations, the passenger flow of different travel routes, and then adjusts the planning. The third category is the study of tourism satisfaction, determining the factors that affect the satisfaction of tourists, and the satisfaction of different tourists on the same destination. However, there is less analysis at the scale of the scenic spot and few optimization strategies. For this purpose, Taking Lugu lake scenic spot as an example, this article studies the image based on online comments and proposes strategy for optimizing tourism image.

3. Case study

3.1. Data acquisition and organization

3.1.1 Data Sources

Network travel data is an important source of big data, As a large online travel agency in China, Ctrip.com has the most recorded online comments and the most active users for Lugu lake scenic spots. Therefore, this paper searches for tourist reviews with Lugu lake based on Ctrip online travel data. Write code in Python to crawl the contents of the travel page. In addition to the travel text material, structured tag data such as travel time, cost, dwell time, associated destination, and author's permanent city are also captured.

3.1.2 Data sorting and cleaning

Considering the timeliness, this paper selects a 36-month tourist review from March 17, 2017 to March 17, 2019. The initial data is 6,697, and 4,276 valid data are obtained through screening. The data screening principle is to eliminate meaningless content such as a large number of missing basic information, too short or pure symbols, repeated publication by the same visitor, too extreme or exaggerated, obvious commercial propaganda.

3.1.3 Text segmentation

This paper uses the content mining software ROSTCM6.0, which integrated with automatic word segmentation, word frequency analysis, co-occurrence matrix analysis, social network analysis, sentiment analysis, to sort travel comment data. The principle of this method is mechanical word segmentation, that is, applying Chinese dictionary to match Lugu lake scenic area comments. If a string is found in the dictionary, Then the match is successfully recorded.

3.1.4 Semantic Analysis

Semantic analysis mainly includes semantic network structure and sentiment analysis. The principle of the semantic network structure is to analyze words' relevance and show it with topology diagram. According to the high-frequency vocabulary generated by the text segmentation, the article counts the co-occurrence frequency of these words, obtains word co-occurrence matrix and uses Gephi to visualize it. Emotional analysis mainly explores the emotional tendency of travel texts. The mood index of each review is generated by ROSTCM6.0 software. The larger the value, the more positive tourists are.

3.2. Tourist characteristics analysis

3.2.1 Tourist source

In order to get the proportion of tourists' sources , this paper counts the permanent city of tourists who comment on Ctrip about Lugu lake scenic spots. The data indicates that the tourists source can be divided into 4 levels according to the commentators number, such as Table 3-1. The first level is from the first-tier cities like Beijing, Shanghai and Guangzhou, which occupies the largest number of tourists source, followed by Southwest regions such as Lijiang, Chengdu, cities of higher economic development, and other cities. The result shows that the tourist source of lugu lake scenic spot is closely related to spatial distance, economic level and traffic. The closer space distance, higher level of economic development, and more convenient traffic, lead to more tourists.

Number	City	Proportion	Number	City	Proportion
1	Shanghai	12%	13	Xi'an	2%
2	Beijing	10%	14	Changsha	2%
3	Guangzhou	7%	15	Xiamen	2%
4	Lijiang	4%	16	Tianjing	2%
5	Chengdu	3%	17	Suzhou	2%
6	Shenzhen	3%	18	Gulin	1%
7	Nanjing	2%	19	Qingdao	1%
8	Chongqin	2%	20	Zhenzhou	1%
9	Kunming	2%	21	Ningbo	1%
10	Wuhan	2%	22	Dongguan	1%
11	Hangzhou	2%	23	Dalian	1%
12	Foshan	2%	24	Zhuhai	1%

Table 3-1 The proportion of tourists sources

3.2.2 Tourist behavior patterns

The analysis of tourists' behaviors such as travel time, travel mode, average cost and stay time are shown in table3-2 to table 3-5. The highest travel rate is in spring and autumn, about 31.13% and 33.77%. By contrast, the summer travel rate is the lowest, only 13.90%, which indicates that the activity level of Lugu lake scenic area is greatly affected by seasons.

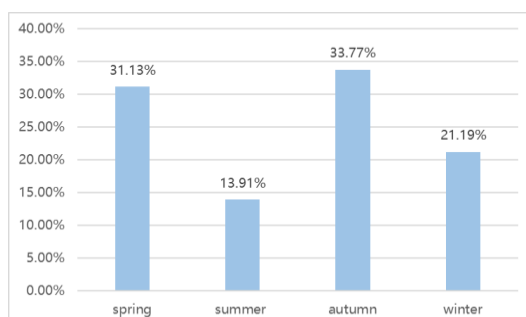


Table 3-2: Travel time distribution of tourists

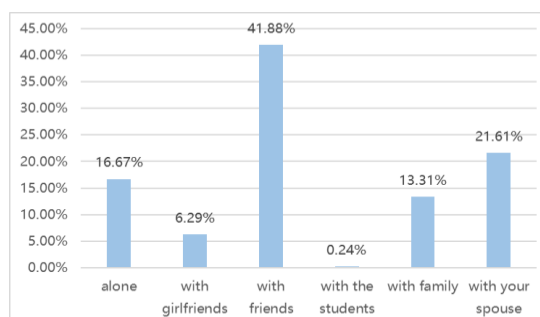


Table 3-3: Tourist play mode

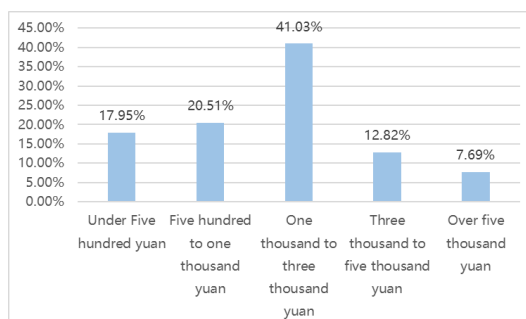


Table 3-4: Per capita expenditure of tourists

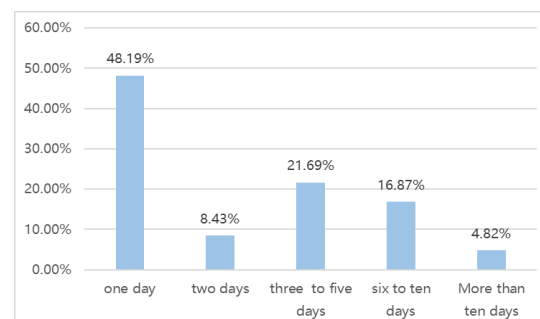


Table 3-5: Tourist time

3.3. Keywords analysis

First dimension deals with tourist resources. The keywords of Lugu lake tourism resources include "fresh water", "sunrise", "Mosuo walking-marriages", "bonfire", "The goddess mountain". It shows that tourists' perception in Lugu lake is consistent with natural resources, which is consistent with the field survey. As for Mosuo matrilineal culture, it is only mentioned by two keywords: walking-marriages and bonfire. The cultural experience floats on the surface.

In terms of environmental atmosphere, words such as “mystery”, “like”, “feeling” and “quietness” come out in front. This shows that beautiful landscape and Mosou culture are not only important atmospheres to attract tourists, but also environment feelings which we need to closely surround and cannot break.

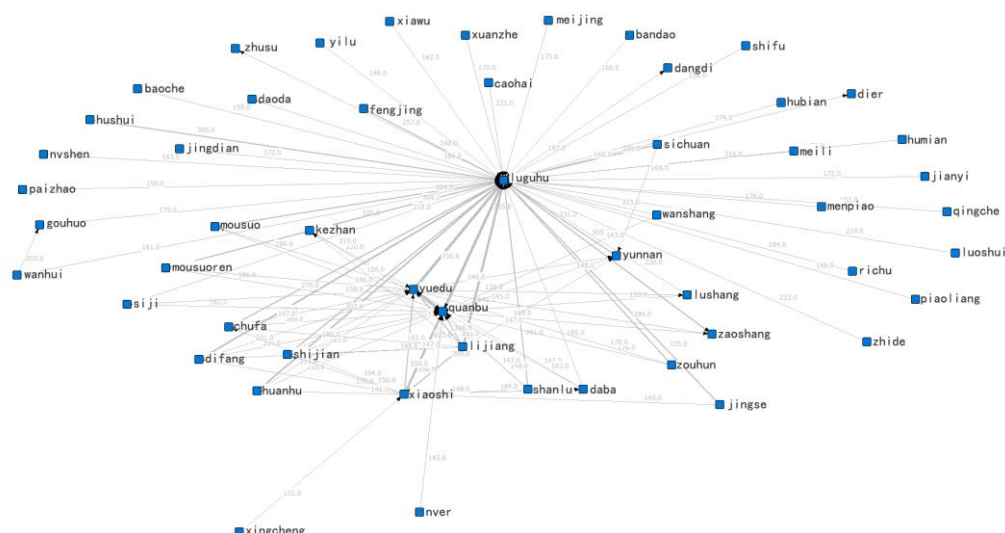


Figure 3-1: Semantic network analysis diagram of some high frequency feature words

rank	key words	frequency	rank	key words	frequency
1	Lugu Lake	3675	26	bonfire	164
2	sunrise	706	27	lake surface	161
3	league	546	28	quietness	151
4	The goddess mountain	538	29	observation deck	149
5	around the lake	497	30	Accommodation	149
6	scene	473	31	range of driving	148
7	inn	466	32	tickets	147
8	fresh water	446	33	lover	145
9	lake water	389	34	so beautiful	142
10	Luoshui	321	35	carsickness	141
11	scenery	311	36	very good	140
12	peninsula	245	37	have gone	137
13	ghat	237	38	weather	135
14	feel	237	39	goddess	132
15	driver	226	40	jolt	131
16	kingdoms of females	226	41	wharf	130
17	beauty	214	42	photograph	130
18	Mosou walking-marriages	213	43	hotel	123
19	lakeside	194	44	Mountain Kinabalu	121
20	traffic price	193	45	the most beautiful	118
21	compare	192	46	journey	118
22	fine view	189	47	Recommend	116
23	particularly	178	48	mystery	114
24	limpid	174	49	plateau	111
25	evening	169	50	hotel	107

Table 3-6: Text ranking top 50 high frequency keywords

3.4. Tourist satisfaction

This article conducts on emotional analysis of review data, among which 1,760 are positive , 1,074 are neutral and 220 are negative, as shown in table 3-7. On the whole, tourists' emotional tendency is optimistic, however, the negative emotion in tourists' evaluation still needs to be paid full attention. According to the content analysis, it can be seen that the

dissatisfied aspects of tourists focus on traffic, high ticket prices, garbage, catering, over-commercial experience, less cultural experience and so on.

The analysis of negative emotion is consistent with actual situation. In terms of traffic, it takes 4~6 hours from Lijiang to Lugu lake with rough mountain roads, dominated by private cars and bus. Ninglang airport is less efficient. The transportation mode in Lugu lake scenic spots is mainly by self-driving, carpooling, bike-riding and walking. Insufficient public transport and inadequate basic service facilities are major factors which limit the development of lugu lake. In order to create travelling stunts and make more profits. Mosuo matriarchal culture is over-publicized, and losing its mystique. In addition, the original Mosuo buildings have been replaces by various hotels and shopping malls. Mosuo family structure and rural landscape gradually collapse, the disappearance of cultural authenticity and over-commercial atmosphere affect the tourism image.

type of emotion	number	percentage	remark
positive emotion	1760 items	57.63%	Among them, the sectional statistics of positive emotions are as follows: common (0—10marks) : 236 items 7.72% medium (10—20 marks) : 433 items 14.19% higher (beyond20 marks) : 1091 items 35.72%
Neutral emotion	1074 items	35.17%	
Negative emotion	220 items	7.20%	Among them, the sectional statistics of negative emotions are as follows: common (-10—0 marks) : 149 items 4.89% medium (-20—-10 marks) : 71 items 2.31% higher (under -20 marks) : 0 0.00%

Table 3-7: Statistical analysis of tourists' emotions

3.5. Associated destination

With the improvement of transportation and the rapid development of tourism, the links between different tourist attractions are getting closer and closer, and the tourist route presents networked characteristics. The article sorts out the structured related destination in the network comment of lugu lake scenic area, obtains a list of surrounding tourist attractions cored with lugu lake, and analyzes the correlation strength.

Through the semantic network diagram, it can be seen that the external attractions of lugu lake scenic area are mainly Lijiang, Shuhe, Lashihai, Dali, Yulong snow mountain, Tiger leaping gorge, Shangri-La, Erhai, Mufu. At the same time, "Lijiang--Yulong snow mountain--lugu lake--Lashihai" and "Lijiang--lugu lake--Erhai--Shangri-La" form two important relationship chains in the entire network.

In lugu lake scenic area, the core tourist route forms competitive advantage around the two important distribution centers namely Luoshui and lugu lake Observation Deck, as well as four tourist attractions such as Liwubi Island, Gem Goddess mountain, Lovers Beach and Caohai. The network status of other tourist attractions is relatively poor, the competitiveness is weak, and tourists are rarely attracted.

rank	keyword	word frequency	rank	keyword	word frequency
1	Old Town of Lijiang	4149	11	observation deck	730
2	Lijiang	2880	12	Liwubi Island	625
3	Shuhe ancient town	1408	13	Square Street	550
4	Tiger Leaping Gorge	1266	14	Shangri-La	501
5	Lashi Lake	961	15	Erhai	478
6	Caohai	950	16	Mufu	386
7	Dali	861	17	The CangShan Mountain	266
8	Gem goddess mountain	821	18	Lovers Beach	247
9	Yulong snow mountain,	815	19	Blue Moon	232
10	Kunming	785	20	White river	169

Table 3-8: Correlation analysis of scenic spots

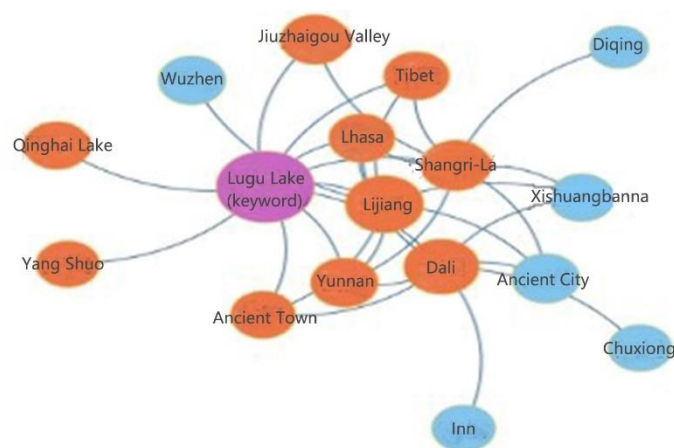


Figure 3-2: Correlation analysis of scenic spots

4. Suggestions on Tourism Image Optimization

4.1. Scenic marketing and precision services

This paper puts forward the precise service strategy and carries out targeted promotion according to different tourist source. First of all, for the first-tier urban agglomerations, the publicity strategy advocates the concept of relaxing life. Secondly, as for the surrounding southwestern areas such as Lijiang and Chengdu, The publicity strategy emphasizes the unique environmental atmosphere of lugu lake, which combines nature and culture characteristics, and distinguishes it from the surrounding attraction such as Erhai lake and Fuxian lake. Moreover, For the new first-tier and second-tier cities with great development potential, although they are not the main force of lugu lake tourism market at present, their consumption capacity cannot be underestimated. Scenic spots should increase publicity, build high-profile attractions and activities, and expand the popularity of Lugu lake.

The Lugu lake scenic area should promote tourism self-service and intensify supervision and management. Independent travel such as self-driving trip, couple trip, family trip has a growing proportion in Lugu lake scenic spot. Therefore, managers should build a circular bus system, self-guided tour system, self-help explanation system, and provide diversified, personalized and independent scenic products and services .Lugu lake is a place to promote relaxation, where tourists are immersed in nature for a long time. However, it can be seen that tourists stay in Lugu lake for a short time generally from the statistics of tourists' comments. It is the key issue in promoting the development of scenic spots to keep tourists, enrich scenic spots activities and Increase the surrounding tourist attractions.

4.2. Destination image creation

The planning and design of Lugu lake Scenic Area revolve around the combination of nature and humanities closely in recent years, which matches the tourists' feelings of tourist image. However, it can be seen from tourists comments that the understanding of Mosuo culture is superficial, and the cognition of “matriarchal Culture” and “walking-marriage” is exparte. The mysterious Mosuo culture has become the gimmicks of tourism development. The protection and inheritance of Mosuo culture should be highly valued. Managers may prevent the existing Mosuo residents and Mosuo culture from being excessively interfered by the tourism development, preserve the authenticity, meanwhile, Mosuo culture can be displayed in public spaces to increase visitors' understanding. Infrastructure should respond to the environment atmosphere, which can guide visitors to experience the beautiful scenery.

4.3. Improvement of scenic facilities and service levels

The article summarizes the sources of negative emotions of tourists further. Firstly, the infrastructures such as transportation facilities and service facilities are insufficient. Secondly, the cultural inheritance and expression are insufficient. Thirdly, the scenic spot is too commercial and lack of tourist experience activities. Therefore, we propose suggestions for improving tourist satisfaction.

As for transportation, The distance around lugu lake is 76 kilometers. Public transportation such as sightseeing vehicles are required. The traffic organization plans to set up bus stops between scenic spots, build sightseeing sidewalks and bicycle trails around the lake, so that visitors can experience the beauty of Lugu lake at close range.

Improve supporting facilities and carry out scientific management. The scenic area should increase the restroom and improve the guiding facilities such as traffic signs. The high price of accommodation, meals and tickets is also an important issue for tourists to have negative emotions. Managers should strengthen the supervision and management. It is also necessary to provide tourists with good experience and lower price.

Pay more attention to the protection and inheritance of Mosuo culture and add experiential activities. In addition to the bonfire evenings, more cultural and folk activities should be shown. The design of the scenic spot should extend the activity brands such as Hualou Love Song, highlight the cultural atmosphere and weaken the commercial atmosphere.

4.4. Linkage development with surrounding attractions

The multi-destination selection of tourists prompts the possibility of regional cooperation development between Lugu lake, Lijiang, Dali and Kunming. At the same time, the Lugu lake scenic area should highlight its own characteristics in the development of entire areas, especially compared with the similar scenic area such as Lashi lake, Erhai and Fuxian Lake. What are the characteristics of Lugu lake? From the comments of tourists such as "the landscape is more natural", "Mosuo culture", "there are many small fresh places in Erhai, the scenery of lugu lake is particularly beautiful, very romantic", "the traffic of Erhai lake is more convenient," "Lugu is farther away from urban life", we can see that the landscape environment away from nature, landscape proportion, Mosuo culture and beautiful scenery are prominent features of Lugu lake from the perspective of tourists. Therefore, in the coordinated development of the scenic spot, Lugu lake should ensure its natural and cultural integration, adhere to the naturalized landscape features, preserve the mysterious Mosuo culture, and avoid excessive artificial design traces.

In Lugu lake scenic area, it is recommended that the scenic spots should be jointly developed, around more mature attractions such as Lugu lake observation seck, Liwuibi Island, Gem Goddess Hill, Strengthen scenic spots with excellent development potential but insufficient network competitiveness, such as Liger island, Mosuo House, ZamiLama Temple, Rani Island. In the linkage development of scenic spots, couples' tour lines, friends' tour lines and cultural landscape tour lines are set up to provide richer choices, increase the long-term travel.

5. Conclusion and discussion

Tourism image is an important factor influencing tourists' intentions and decision-making. It is also a key aspect of tourism destination marketing and improving the core competitiveness of the destination. This paper attempts to explore the tourists' real experience and feelings on Lugu lake Scenic Area by taking online travels as an analysis object, proposes optimization strategies from the aspects of scenic image creation, promotion of tourism infrastructure and supporting services, and linkage development with surrounding scenic spots. But the research still has some shortcomings. For example, the inadequate sample size may lead biased results. The review tourists are mostly aged from 20 to 40, and some older people who cannot use the review software are not included. In addition, social network data is still based on historical information feedback with certain delays. If the timely feedback can be established dynamically in the future, it will be beneficial for scenic management to provide precise services. However, as a new way to

analyze the tourism image of scenic spots, the analysis process and results of Lugu lake Scenic Area have certain values in innovations and references, which may provide new ideas for the optimization of scenic tourism image. In the post study, in order to obtain more general conclusions and verification, the research will focus more on the cross-validation of travel big data and traditional statistics.

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