Postprint: Construction of a Public Opinion Early Warning System for Quality Tourism

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Abstract

[Purpose/Significance] To construct a tourism public opinion early warning system from the tourist perspective, expound upon the particularity of this perspective, promptly capture tourist demands, and effectively enhance tourism quality. [Method/Process] Based on customer satisfaction and user experience theory, tourism supply chain theory, and public opinion crisis early warning and response theory, we construct a tourism public opinion early warning system comprising three modules: a real-time tourist public opinion information collection module, a tourism enterprise and industry public opinion analysis module, and a public opinion early warning level establishment module. Additionally, an empirical study using Suzhou's tourism industry as a case example is conducted to validate the effectiveness and practicality of the proposed system. [Result/Conclusion] Two recommendations are proposed for the effective implementation and utilization of tourism public opinion early warning: tourism enterprises should enhance quality control; industry management departments should clearly define safety bottom lines and strengthen departmental integration.

Full Text

Preamble

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Constructing a Public Sentiment Early Warning System for Quality Tourism
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Abstract

[**Purpose/Significance**] This paper constructs a tourism public sentiment early warning system from the tourist perspective, elaborates on the particularity of this perspective, and aims to promptly grasp tourist needs to effectively enhance tourism quality. [**Method/Process**] Based on customer satisfaction and user experience theory, tourism supply chain theory, and public sentiment crisis warning and response theory, we constructed a tourism public sentiment early warning system comprising three modules: real-time collection of tourist sentiment information, tourism enterprise and industry sentiment analysis, and establishment of sentiment warning levels. An empirical study of Suzhou's tourism industry was conducted to test the system's effectiveness and practicality. [**Result/Conclusion**] We propose two recommendations for effective implementation and utilization of tourism sentiment early warning: tourism enterprises should strengthen quality control, and industry management departments should clarify safety baselines and enhance inter-departmental integration.

Keywords: public sentiment; information organization; early warning system; tourism
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1 Introduction

With economic development, tourism has increasingly become a consumption activity for the general public. In 2014, domestic tourism expenditure per capita reached 839.7 yuan, representing a year-on-year increase of approximately 4.2%. Meanwhile, the number of domestic tourists has grown rapidly. According to the China Tourism Statistical Yearbook, domestic tourist visits exceeded 2.8 billion in 2012, roughly 1.3 times the figure in 2005. During the 2014 Spring Festival Golden Week alone, China received 231 million tourists, a year-on-year increase of 12.0%, with tourism revenue growing by 16.4%. By 2015, domestic tourist visits reached 4 billion, a year-on-year increase of 10.5%. However, rapid tourism development inevitably brings challenges. The MH370 incident on March 8, 2014, though ostensibly a transportation accident, generated continuous public debate due to intense public concern, ultimately leading to the suspension of Malaysia Airlines products and a sharp decline in Malaysian tourism. This demonstrates that tourism, as a comprehensive industry, is significantly influenced by public opinion. Although the Chinese government recognized the importance of public sentiment monitoring early on and incorporated it into government work—for example, National People's Congress delegates used Weibo to interact with citizens during the Two Sessions, and the Fujian Provincial Tourism Bureau launched a public sentiment monitoring system in February 2014 to enhance tourist satisfaction and build high-quality tourism—the appli-

cation of public sentiment monitoring in tourism industry management requires further strengthening.

To ensure healthy and sustainable tourism development, relevant tourism enterprises and industry management departments must pay timely attention to public sentiment information, reduce tourism disputes and safety incidents, and improve tourist satisfaction. In 2009, China promulgated the "State Council's Opinions on Accelerating Tourism Development," aiming to achieve world tourism power status in terms of industry quality by 2020. The policy emphasizes tourist satisfaction as the benchmark and informatization as the primary pathway to comprehensively improve tourism service quality. However, as tourism markets prosper, products diversify, and tourists' rights awareness strengthens, tourist needs have evolved from "sightseeing tours" to "in-depth tourism," with greater pursuit of personalized, diversified, and high-quality tourism products and services. Tourists are no longer passive recipients but active participants and experiencers in tourism activities. This requires constant attention to tourist dynamics, comprehensive capture of tourist information, effective analysis, and establishment of a complete public sentiment early warning system to foster a favorable industry atmosphere and create high-quality tourism products and services.

2 Research on Tourism Public Sentiment Early Warning System from Tourist Perspective

Current domestic and international research on tourism sentiment early warning primarily focuses on macro-level tourism warning mechanisms. For instance, Fan Zhiyong proposed establishing a comprehensive tourism early warning mechanism; Huo Songtao suggested building a tourism early warning indicator system based on ecology; Liu Hongfang proposed constructing a scenic area early warning system; and Xie Chaowu proposed building a tourism safety early warning system. A few scholars have constructed public sentiment monitoring indicator systems from the perspective of tourism crisis events, such as Fu Yeqin and Dong Jianfeng, who developed monitoring and early warning indicator systems from three dimensions: sentiment subject, sentiment object, and sentiment ontology. This paper adopts the tourist perspective, monitors tourist information in real time, and attempts to construct a comprehensive tourism public sentiment early warning system.

Throughout tourism activities, tourists play the central role, with all activities revolving around them. Tourist satisfaction directly determines tourism activity success and whether activities can continue. The process of government and enterprises implementing tourism development strategies is essentially the process of meeting tourist needs. Government departments play different roles in this process—for example, price bureaus monitor scenic spot ticket prices, and industrial and commercial bureaus review tourism business licenses. The absence of any department can plunge the entire tourism industry into difficulty. To improve overall tourism activity satisfaction, the different functions

of various management departments must be integrated, and the factor that can tightly unite these departments is "tourists," who occupy the central position in tourism activities. If we can instantly and deeply understand tourists' attitudes, emotions, and behavioral tendencies, we can timely and reasonably adjust the overall tourism production and service system to ensure that tourists' perceived value equals or exceeds their expected psychological value. Thus, grasping tourists' real needs is a key focus of tourism development. However, with rising income levels, improved modern transportation, and implementation of the Tourism Law of the People's Republic of China, tourism product prices have collectively increased, and group tours are shifting toward independent travel, making tourist needs more personalized and diversified and increasing the difficulty of understanding them in depth. This requires using tourists as an information source to collect various information reflecting their cognition, attitudes, emotions, and behavioral tendencies, and establishing a complete public sentiment early warning system to prevent tourism safety incidents and disputes and improve tourism quality.

3 Theoretical Analysis of Tourism Public Sentiment Early Warning System from Tourist Perspective

3.1 Customer Satisfaction and User Experience Theory

In 1965, R. N. Cardozo first proposed the concept of customer satisfaction, defining it as a quantitative description of customer satisfaction degree—the result of comparing actual feelings with expectations when receiving products and services. The concept of tourist satisfaction, derived from this root term, was first proposed by S. Hartman, who believed tourist satisfaction comprises cognitive, emotional, and systematic components. Subsequently, numerous scholars have elaborated on tourist satisfaction from psychological, economic, and management perspectives. Currently, domestic and international academia has not formed a unified definition of tourist satisfaction, with most existing definitions based on expectation-disconfirmation theory, which holds that tourist satisfaction results from comparing tourism expectations with tourism experiences.

The term "experience" first appeared in Alvin Toffler's book "The Future Economy," which pointed out that the experience industry would become a pillar of future economic development. As a typical representative of the experience industry, tourism quality directly affects tourist satisfaction. The concept of "user experience" was first proposed by user experience designer N. Donald. The ISO 9241-210 standard defines "user experience" as people's cognitive impressions and responses to products, systems, or services they are using or expect to use. It states that human-centered designed products have better usability and applicability, can better satisfy user needs, and contribute to objective sustainable development. Therefore, to achieve quality tourism, tourist experience must be prioritized. Numerous factors influence tourist experience, including personal factors such as education level, income, leisure time, and ability to accept new

things; destination image; tourist expectations; service quality; and price perception, covering accommodation, dining, transportation, scenic spots, shopping, entertainment, travel agencies, tour guides, and communications.

3.2 Tourism Supply Chain Theory

Currently, domestic scholars mostly adopt Professor Ma Shihua's definition of supply chain: a functional network chain structure that revolves around a core enterprise, controlling information flow, logistics, and capital flow from raw material procurement through intermediate and final product manufacturing, and finally delivering products to consumers via a sales network, connecting suppliers, manufacturers, distributors, retailers, and end users into an integrated whole.

However, in the tourism supply chain, the core is no longer simply an enterprise but rather all activities revolve around tourists. Therefore, all "logistics" flows center on "human flow." Compared with manufacturing or other service industries, tourism supply chains are more complex. From the operational perspective, tourism supply chains should include tourism product supply chains, tourism service supply chains, and related tourism industry supply chains. From the tourist experience needs perspective, the concept of tourism destination supply chain is proposed. This paper adopts the latter understanding, dividing the tourism supply chain into commercial service supply chains and public service supply chains, both forming a network structure centered on tourists.

The commercial service supply chain includes tourism service supply chains and tourism manufacturing supply chains, while the public service supply chain mainly comprises public service suppliers, government departments, communities and residents, and industry associations [Figure 1: see original paper]. As shown in the figure, the commercial service supply chain specifically includes tourism service suppliers, tourism service distributors, tourism service integrators, tourism manufacturing suppliers, tourism manufacturing distributors, and tourism manufacturing integrators. Tourism service suppliers primarily refer to enterprises providing food, accommodation, transportation, sightseeing, shopping, and entertainment services, such as hotels and airlines. Tourism service distributors mainly include retail travel agencies, tour wholesalers, and professional tourism websites. Tourism service integrators include tour operators, tourist service centers, and electronic network service integrators. Tourism manufacturing enterprises mainly provide consumer goods for tourism enterprises and tourists. The public service supply chain involves numerous government departments, including tourism bureaus, transportation bureaus, public security bureaus, urban management and sanitation departments, garden bureaus, industrial and commercial bureaus, and price bureaus.

3.3 Public Sentiment Crisis Warning and Response Theory

Public sentiment crisis warning refers to the necessary and effective actions taken to resolve and respond to crises from the appearance of crisis event signs until the crisis begins to cause perceptible losses. Specific warning methods include: sentiment tendency analysis-based warning, network public sentiment barometer-based warning, indicator-based warning systems, Web data mining-based warning, and fuzzy reasoning-based network public sentiment warning. Sentiment tendency analysis primarily analyzes sentiment from public statements to gauge subjective intentions, generally classifying attitudes into negative, positive, and neutral. The network public sentiment barometer warning method comprehensively considers the probability and impact of sentiment crises, dividing them into four levels from high to low danger: red warning, orange warning, yellow warning, and blue warning, with corresponding responses based on different danger levels and available human and material resources. The indicator-based warning system first establishes target layers based on needs, then filters and analyzes collected data to extract indicators, classifies them to derive criterion layers, and finally combines the Delphi method and Analytic Hierarchy Process to calculate weights for each criterion and indicator.

4 Construction of Tourism Public Sentiment Early Warning System

Based on the above theories, we constructed a tourism public sentiment early warning system. This system mainly includes three modules: real-time collection of tourist sentiment information, tourism enterprise and industry sentiment analysis, and establishment of sentiment warning levels. The ultimate goal is to send information to relevant departments before a crisis fully erupts, minimizing harm [Figure 2: see original paper].

4.1 Real-time Collection of Tourist Sentiment Information

Interactive sentiment early warning centered on tourists is primarily responsible for collecting information on tourists' "food, accommodation, transportation, sightseeing, shopping, and entertainment" experiences during travel, divided into horizontal and vertical dimensions.

Real-time collection of sentiment information is the first step in sentiment early warning. Using tourists as the information source, we must first identify monitoring areas—that is, channels for tourist information dissemination. These channels can be divided into online and offline dissemination. Online platforms include blogs, BBS forums, social networking sites (SNS), and third-party review websites. Offline platforms mainly refer to traditional media, including newspapers, books, radio, and television. Considering tourists' characteristics, sentiment dissemination features, and the real-time nature of sentiment information acquisition, tourist sentiment information monitoring areas can be approached from three main subjects—tourists, tourism enterprises, and relevant manage-

ment departments—with simultaneous online and offline monitoring. Tourist-centered sources include personal blogs, microblogs, and social spaces. Tourism enterprise-centered sources include professional tourism websites and tourism forums. Management department-centered sources include government portal websites such as tourism bureaus, tourist complaint hotlines, and mayors' mailboxes [Figure 3: see original paper].

4.1.1 Horizontal Collection of Tourist Sentiment Information Tourist activities constitute a complex process encompassing pre- and post-trip journeys and the "food, accommodation, transportation, sightseeing, shopping, and entertainment" aspects at destinations. Horizontal collection captures information from individual tourism activities, mainly including tourists' basic information, travel time, destination, travel duration, transportation mode, hotel accommodation, visited scenic spots, and shopping stores. For group tours, this should also include travel agency selection and tourism product prices.

This information collection primarily focuses on tourists. For group tour participants, collection is relatively simple and can be obtained directly from travel agency itineraries. However, for independent travelers, obtaining comprehensive and complete information is more challenging because their itineraries are self-determined and highly personalized. To collect horizontal sentiment information from independent travelers, it is necessary to search for their travel logs and other online content.

4.1.2 Vertical Collection of Tourist Sentiment Information Vertical collection essentially involves in-depth mining of evaluation information that reflects tourists' perceived experiences. This can generally be obtained through telephone follow-ups or satisfaction surveys, though these methods limit the survey subjects. Alternatively, it can be gathered from social networking sites, tourism websites, and third-party review websites. Since tourist reviews reflect experiential feelings, express emotions, and carry strong subjective tendencies, the collection process should first identify and eliminate false information, then extract sentiment-expressing words to determine whether tourist attitudes are positive, neutral, or negative, thereby assessing experience quality and identifying service deficiencies.

4.2 Tourism Enterprise and Industry Sentiment Analysis

For sentiment analysis of tourism enterprises and industry management departments, tourism supply chain theory is used to analyze interrelationships among tourism enterprises and the roles played by industry management departments in tourism development, clarifying their respective functions and interactive relationships with tourists. Using tourist needs as the criterion and combining the specific functions of tourism enterprises and industry management departments, we established an indicator system for tourism enterprise and industry sentiment analysis [Figure 4: see original paper].

4.2.1 Tourism Enterprise Sentiment Analysis From the perspective of tourism supply chain theory, tourism enterprises can be divided into two categories: service providers and manufacturers. Overall, tourism enterprises engage in commercial services with the fundamental purpose of profit. As they directly provide services and products to tourists, tourism enterprises should attach importance to both emergency incidents and routine evaluations, as both affect corporate image and reputation. Therefore, sentiment analysis for tourism enterprises focuses on tourist price perception and service quality. Price perception includes scenic spot ticket prices, accommodation prices, dining prices, souvenir prices, entertainment project prices, and travel agency prices. Service quality is divided into tourism dining, accommodation, shopping, entertainment, scenic spot services, travel agency services, and tour guide services. These seven aspects are further refined into specific indicators based on factors influencing tourist satisfaction. Tourism dining includes five indicators: service attitude, dining environment, dish quality, waiting time, and dish characteristics. Tourism accommodation includes five indicators: geographical location, room comfort, sound insulation, service attitude, and sanitation. Tourism shopping includes six indicators: shopping environment, product types, product characteristics, product quality, service attitude, and sales standardization. Tourism entertainment includes three indicators: entertainment facilities, entertainment content, and activity characteristics. Scenic spot services include five indicators: overall atmosphere, environmental sanitation, information consulting services, signage, and infrastructure (toilets, special access channels, etc.). Travel agency services include five indicators: storefront service, itinerary arrangement, process handover, service attitude, and contract fulfillment. Tour guide services include five indicators: appearance and behavior, professional ethics, interpretation ability, service attitude, and emergency response capability.

4.2.2 Tourism Industry Management Department Sentiment Analysis Tourism industry management departments mainly refer to government departments and tourism industry associations related to tourism. As tourism is a comprehensive industry encompassing six industrial elements—food, accommodation, transportation, sightseeing, shopping, and entertainment—numerous government departments and industry associations are involved, such as tourism bureaus, garden bureaus, public security, urban management and sanitation, transportation, industrial and commercial bureaus, price bureaus, hotel associations, travel agency associations, and tourism store associations. Government departments and industry associations primarily play auxiliary roles in quality supervision during tourism operations, aiming to create a safe, orderly, and civilized tourism market environment and promote the establishment of industry standards. Moreover, as tourist needs shift from superficial sightseeing to authentic in-depth experiences, the overall image of the tourism city significantly affects tourist satisfaction. Therefore, this paper analyzes sentiment early warning for management departments from three perspectives: tourism safety, tourism market order, and tourism city image. Tourism safety, the lifeline of

the tourism industry, includes four aspects: natural disasters, major accidents, public health, and social security, which are further refined into specific indicators. Tourism market order includes four aspects: tourism capacity, travel agency management, tour guide management, and market civilization management. Tourism city image mainly includes seven aspects: air quality, water environment, road traffic, urban greening, environmental sanitation, municipal management, and cultural landscapes.

4.3 Establishment of Tourism Sentiment Warning Level System

Based on public sentiment crisis warning and response theory, we established a tourism sentiment warning level system. First, tourist information is processed and classified according to the tourism enterprise and industry sentiment analysis indicators, while sentiment tendency is divided into three levels: positive, negative, and neutral. Positive sentiment generally does not trigger sentiment crises, so the focus should be on screening negative sentiment information. Second, warning values for each indicator are calculated. Information under a certain indicator is classified according to specific events, with information on the same event grouped into set X, and different events under a certain indicator represented by set Y, where Y = {X1, X2, X3, … Xn}. The warning value for a certain event is represented by Z, and the warning value for the indicator is represented by Q. The event warning value Z = E × P, where E represents the nature of the event and P represents the event's influence. Event nature can be divided into tourism safety, tourism disputes, and tourism image. As tourism safety is the lifeline of the tourism industry, sentiment information related to tourism safety is more important than the other two categories, followed by tourism disputes, and then tourism image. Tourism disputes often involve economic interests and sometimes even escalate to legal issues, while tourism image is more related to personal experience. Through investigation, we invited 20 tourism practitioners and academic researchers to score different event natures on a 0-1 scale, with higher values indicating greater harm. The average values were used to weight the three event natures: tourism safety events were assigned a weight of 1, tourism dispute events 0.75, and tourism image events 0.35. The influence of an event is represented by the number of negative information records related to that event, i.e., the number of elements in set X. The warning value for a certain indicator Q = [formula incomplete in original], where n is the number of events contained in indicator set Y. This can also be simplified as Q = 0.35 × N1 + 0.75 × N2 + 1 × N3, where N represents the number of negative information records corresponding to different event natures under that indicator. Finally, warning levels for each indicator are established by calculating the indicator's warning coefficient, represented by Yi, where Yi = [formula incomplete in original]. If the warning coefficient is between 0.75-1, the indicator is classified as red warning; 0.5-0.75 as orange warning; 0.25-0.5 as yellow warning; and 0-0.25 as blue warning.

5 Empirical Study: Suzhou Tourism Sentiment Early Warning

To further test the effectiveness and practicality of the tourism sentiment early warning system, we conducted an empirical study using Suzhou's tourism industry. We collected Suzhou tourism-related information, filtered and classified it according to the tourism sentiment early warning indicator system, and applied the warning level classification method to categorize sentiment into four levels. Due to the large volume of data, we selected several representative platforms: Sina Weibo, Hanshan Wenzheng (a local forum), and the Suzhou Tourism Complaint Hotline, extracting data from January 1, 2014, to February 28, 2014.

For Sina Weibo, we used its advanced search function with keywords "Suzhou," "Gusu," and "tourism," manually filtering irrelevant content to collect 1,424 valid data entries. Hanshan Wenzheng is an online forum hosted by the Suzhou government that has been popular among Suzhou citizens since its launch in May 2012. Using Python, we captured 42,189 forum topics and replies from January 1, 2014, to February 28, 2014, with 924 entries related to tourism. The Suzhou Tourism Complaint Hotline, operated by the Suzhou Tourism Quality Supervision Office, received 138 complaints during the research period. Combining results from the three platforms, we collected 2,486 valid data entries, of which 831 contained negative sentiment through manual indexing.

5.2 Suzhou Tourism Enterprise and Industry Sentiment Analysis

Based on the tourism sentiment early warning indicator system, we analyzed the collected data. The results showed 41 entries related to price perception, 380 related to tourism enterprise service quality, 148 related to tourism safety, 134 related to tourism market order, and 128 related to Suzhou city image.

In terms of price perception, tourists primarily expressed dissatisfaction with scenic spot ticket prices and souvenir prices. Some small gardens charged up to 40 yuan, with discounts canceled during holidays. Tourists noted high similarity in souvenirs sold in Zhouzhuang, Tongli, and Pingjiang Street areas. Regarding accommodation and dining prices, tourists had considerable choice and expressed fewer complaints. For entertainment project prices, some tourists found listening to opera and drinking tea in Pingjiang Ancient Street expensive and hoped for price reductions.

Among service quality indicators, tourism accommodation and travel agency services accounted for the largest proportions, followed by tour guide services, tourism shopping, scenic spot services, tourism entertainment, and tourism dining. In tourism dining, tourists were mainly dissatisfied with restaurant service attitudes and long waiting times. In tourism accommodation, complaints focused on sound insulation, sanitation conditions, and transportation inconvenience due to location. In tourism shopping, tourists expressed dissatisfaction with product characteristics, quality, and sales standardization, noting high similarity of products across scenic spots and lack of distinctive features. Some

tourists reported irregular price list designs at certain shopping points, with inconsistent units between price lists and printed receipts. In tourism entertainment, tourists expressed more dissatisfaction with entertainment content. Regarding scenic spot services, tourists had more complaints about signage establishment and infrastructure. Travel agency services had the most problems, particularly contract fulfillment, with tourists reporting that agencies deliberately arranged shopping stops, had price differences across storefronts, and inadequate handover work. In tour guide services, most complaints involved guides not following itineraries, arbitrarily changing schedules, forcing consumption, and poor service attitudes.

Tourism safety is everyone's primary concern, attracting widespread social attention once incidents occur. Based on tourist feedback, safety issues in Suzhou's tourism industry mainly included major accidents, public health, and public security incidents. Major accidents concentrated on scenic facility accidents and traffic accidents. Public health issues focused on infectious diseases and food allergies. Public security incidents concentrated on public order issues, with no social unrest, political events, or terrorist attacks reported.

Regarding tourism market order, tourists reported overcrowding at major Suzhou attractions during holidays and inconvenient urban transportation. Some travel agencies operated without licenses. Unlicensed tour guides solicited tourists near Dongbeijie, Hanshan Temple, and Tiger Hill. Some attractions featured pornographic performances. Regarding tourism city image indicators, tourists expressed more dissatisfaction with air quality, water environment, road traffic, and municipal management. They reported severe pollution and foul odors in Suzhou's ancient canals, suggested adding bus routes to some scenic areas, and noted that old buildings in Pingjiang Ancient Street had been artificially renovated, some parks were dark at night, and recommended installing landscape lighting.

5.3 Establishment of Suzhou Tourism Sentiment Warning Levels

Based on the tourism sentiment warning level establishment method, specific calculation results are shown in Table 1 . The table reveals that during this period, scenic facility accidents and public security incidents were at the red warning level; travel agency contract fulfillment, food allergies, and infectious diseases in public health were at the orange warning level; six indicators were at the yellow warning level; and the rest were at the blue warning level. Overall, Suzhou's tourism environment was relatively good.

Specifically analyzing the two red warning indicators: among 32 scenic facility accident records, although no serious incidents involving tourist lives occurred, the frequency of accidents such as tourist sprains and drowning was not low. Suzhou gardens generally feature rockeries and ponds that tourists consider dangerous, with old rockeries being slippery and lacking protective railings. Regarding public security, tourists reported rampant scalpers and unlicensed vehi-

cles at Suzhou Railway Station, Humble Administrator's Garden, and Hanshan Temple, pornographic performances at some attractions, and electric fishing in Yangcheng Lake, Jinji Lake, and some Suzhou canals. A large-scale fight occurred at Hanshan Temple entrance.

For the three orange warning indicators: regarding travel agency contract fulfillment, tourists reported agencies deliberately arranging shopping stops, price differences across storefronts, inadequate handover work, refusal to refund fees according to contract provisions when tourists couldn't travel due to accidents, and failure to follow itineraries with arbitrary changes and forced consumption. For food allergies in public health, tourists reported varying degrees of allergic reactions, possibly because some tourists are prone to allergies from osmanthus in Suzhou-style pastries. For infectious diseases, this was mainly due to H7N9 virus infections in the Suzhou area between January and February 2014.

Among the six yellow warning indicators: traffic accidents mainly involved safety issues with tourist buses and boats; in public health, some tour groups experienced collective food poisoning; travel agency management issues included unlicensed operations and irregular contracts; tour guide certificate management issues involved guides with fake or expired certificates; and regarding city image, air quality was poor due to smog.

6 Conclusion

The establishment of a tourism sentiment early warning system ultimately aims to effectively apply it in practice, identify problems in the tourism industry, pinpoint tourist dissatisfaction, and prescribe targeted solutions to prevent crisis outbreaks. This process requires implementation by specific relevant departments.

First, tourism enterprises should strengthen quality control, promptly respond to and improve upon issues raised by tourists. Tourism service suppliers should provide services based on meeting user experiences, and tourism service distributors (travel agencies) should standardize contract formulation and fulfillment. Tourism enterprises have the most direct contact with tourists, providing services directly or indirectly, and their service quality is directly perceived by tourists. Simultaneously, tourism enterprises should formulate tourism sentiment early warning and emergency response plans—the former fundamentally reduces sentiment crises, while the latter minimizes losses after crises occur.

Second, relevant government management departments should clarify tourism safety baselines, strengthen integration among tourism departments, standardize administrative actions, and improve law enforcement levels to create favorable conditions for healthy and sustainable tourism development. Although China has promulgated the Tourism Law, which clearly stipulates the legitimate rights and interests of tourists and tourism operators, provides legal basis for regulating tourism market order, and prompts tourism management departments to administer according to law, Chapter 6's provisions on tourism safety

are relatively broad. While the tourism sentiment early warning system is specific, it lacks legal force and serves only as an action guide and textual basis. Therefore, utilizing the tourism sentiment early warning system requires government power to formulate effective mechanisms and specific safety baselines.

In actual management processes, high-level integration among tourism departments is needed to achieve efficient joint governance. Beyond tourism bureaus, the Culture, Radio, Television, Press and Publication Bureau should plan and design cultural tourism products to enrich tourism entertainment content; planning and land departments should support project construction in tourism resorts; publicity and finance departments should support tourism marketing; water conservancy bureaus should intensify ancient canal landscape remediation; health bureaus should improve tourism emergency systems and supervise food safety; transportation bureaus should optimize bus routes to connect scenic spots; price bureaus should implement ticket discounts and scientifically manage scenic spot prices; industrial and commercial bureaus should conduct special advertising market rectification and review tourism business licenses; urban management and sanitation bureaus should crack down on illegal street vendors and leaflet distribution to beautify city image; meteorological and earthquake bureaus should conduct effective monitoring and real-time forecasting; and public security bureaus should deploy backbone forces to participate in joint law enforcement and market rectification.

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Dai Weiyi: Responsible for data collection and analysis, writing and revising the paper;

Li Chunmei: Responsible for data analysis and paper revision.

Note: Figure translations are in progress. See original paper for figures.