



## Research article

# Revisiting tourism in the post-pandemic era: An evaluation study of China's 5A-Class scenic spots

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## ABSTRACT

The emergence of the COVID-19 in 2019 has unquestionably had a profound and transformative effect on the tourism industry. Following the easing of COVID-19 prevention and control measures in China, there has been a significant increase in travel demand. Representing the epitome of excellence in Chinese scenic spots, 5A-class scenic areas are primary destinations for travelers. The assessment of these scenic spots plays a crucial role in shaping their tourism reputation. Currently, there is a regional focus in research on the evaluation of 5A-class scenic spots exhibits regional characteristics, with limited attention given to a nationwide assessment. In this study, we collected over 410,000 online comments were gathered from 256 scenic spots classified as 5A-class. Employing the Latent Dirichlet Allocation (LDA) topic model, this study conducted a thematic exploration and applied Grounded Theory for qualitative analysis of evaluation themes. This study focused on analyzing scenic spot evaluations by examining three dimensions: the scenic spot itself, the surrounding facilities, and the perspective of tourists. Study findings reveal: (1) Tourist evaluations of 5A-class scenic spots by tourists undergo changes from the inception of the journey to its conclusion. (2) Tourist assessments of these scenic spots are not confined solely to the attractions themselves, the quality of peripheral amenities also has a significant impact on their assessments. This study differentiates itself from traditional regional analysis and perceptual image perspective analysis by employing a process-oriented approach from the perspective of the tourist. The utilization of text-mining techniques enables the identification of coexisting universal and regional tourism evaluation indicators. The present study makes a valuable contribution to the existing body of knowledge by providing insights into the intricate nature of the tourist evaluation process and the interrelationships among different factors.

## 1. Introduction

The tourism industry, being a crucial component of the national economy, not only fulfills the increasing material and spiritual demands of individuals but also plays a significant role in the overall economic progress of a country. According to the "2022 Statistical Bulletin of Cultural and Tourism Development" published by the Ministry of Culture and Tourism of China, the domestic tourism industry witnessed a significant downturn in market performance from 2019 to 2020 as a result of the COVID-19 pandemic outbreak [1]. Thanks to the implementation of effective government measures in pandemic control, the tourism industry in China experienced a rapid resurgence in the year 2021. Regrettably, a resurgence of the novel coronavirus in 2022 resulted in a decrease in tourist

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expenditure and tourism-generated income (Fig. 1). By the conclusion of 2022, the nation had a cumulative count of 14,917 Class-A scenic spots. These establishments provided employment opportunities for approximately 1.47 million individuals and welcomed a staggering 2.63 billion tourists over the course of the year. Consequently, this influx of visitors resulted in a substantial tourism revenue of 181.85 billion yuan. In the year 2022, the number of domestic tourist arrivals amounted to 2.53 billion, indicating a significant decline of 22.1 % in comparison to the preceding year. Domestic tourism revenue, also known as total tourism consumption, reached 2.04 trillion yuan, indicating a significant decrease of 30.0 % compared to the previous year [2,3].

Tourism, which is characterized by experiential consumption, utilizes data crawling techniques to overcome the temporal and spatial constraints that are inherent in traditional survey methods like questionnaires, field inspections, and on-site interviews. This enables the acquisition of genuine firsthand data. In the current era of big data, various internet-based tourism platforms have accumulated vast repositories of tourism review data, which capture authentic feedback from travelers after their experiences. This feedback encompasses a range of dimensions, including accounts of personal experiences, evaluations of destinations, assessments of processes, and recommendations for picturesque locations. These unstructured textual data, after undergoing appropriate data pre-processing, enable the efficient and precise extraction of crucial information. Processed unstructured data is subjected to the development of thematic models, with the objective of revealing latent themes present in reviews. LDA, which is an unsupervised learning technique founded on a three-tiered Bayesian probability model, is recognized as a highly popular approach for text-mining topic modeling. It is extensively utilized in diverse domains. Grounded Theory is a highly effective methodology for extracting fundamental concepts from unprocessed data, establishing connections among these concepts, and developing a comprehensive theoretical framework [4].

The existing body of research on the evaluation of sustainable tourism destinations has predominantly concentrated on a range of macro-level factors. These factors encompass policy frameworks, tourist sites, spatial considerations, institutional factors, economic dimensions, and cultural elements. Additionally, several studies have been conducted to assess tourists' perceptions and awareness of tourism sites [5–8]. The concept of the "post-pandemic era" has been widely embraced in the field of tourism research, resulting in an increased focus on the obligations faced by tourists who have been impacted by the pandemic. This encompasses various elements, including gender dynamics, psychological factors, risk perceptions, and the sense of responsibility held by individuals within the context of the changing tourism landscape [9–11]. The COVID-19 pandemic has had significant and far-reaching impacts on various industries, including supply chain management, logistics, and tourism. In the field of supply chain management, the COVID-19 pandemic has highlighted the utmost significance of supply chain resilience. Disruptions in global logistics, resulting from the implementation of lockdown measures and supply shortages, have compelled companies to adopt a strategy of diversifying their supply sources and maintaining elevated inventory levels. The process of digitalization has experienced a rapid acceleration, as companies have increasingly embraced advanced technologies in order to improve the visibility of their supply chains. The tourism sector has experienced significant repercussions. The implementation of travel restrictions, quarantine protocols, and the decrease in consumer confidence have resulted in a substantial decrease in the demand for travel. Airlines, hotels, and travel agencies have encountered unparalleled difficulties, resulting in severe financial strain and workforce reductions. Tourism management currently places a high priority on implementing safety and health measures. Hygiene protocols, social distancing measures, and stringent health regulations have emerged as crucial factors in rebuilding tourist trust and ensuring public safety [12].

Anticipating the relaxation of pandemic control policies and the subsequent surge in tourist demand, it is foreseeable that the tourism market in China will undergo a significant period of rapid growth [2,3]. The 5A-grade scenic spots represent the most prestigious classification of tourist attractions in China, encompassing five distinct levels: AAAAA, AAAA, AAA, AA, and A. If 4A-grade

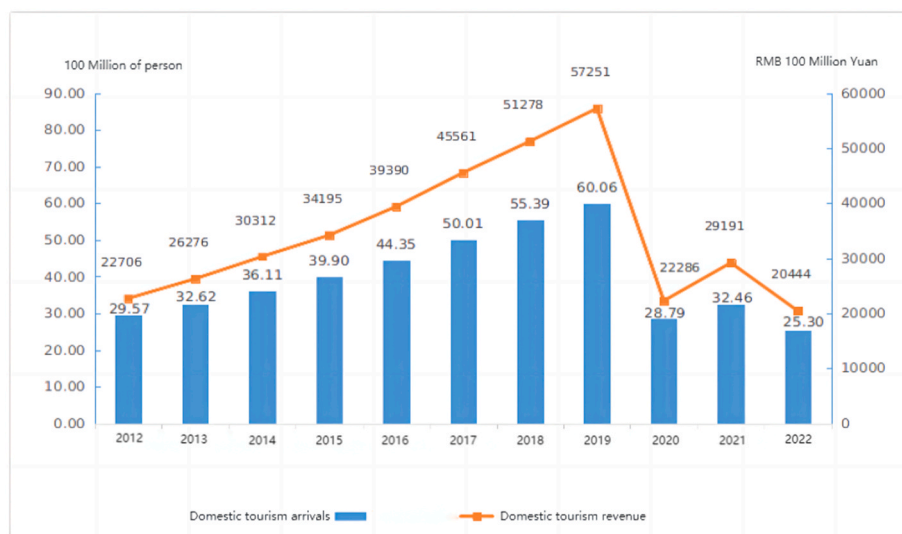


Fig. 1. Domestic tourism development from 2011 to 2022.

spots symbolize scenic areas that meet national-level standards, then 5A-grade spots indicate exceptional quality on a global scale. In relation to the necessary infrastructure, the 5A standard necessitates greater levels of specificity and quality in comparison to the 4A standard. However, the fundamental difference is rooted in cultural and distinct requirements. The 5A criteria places significant emphasis on the "people-oriented" service concept, which is integral to its core principles. 5A-grade scenic spots prioritize humanization and meticulous attention to detail, implementing a multitude of specific guidelines to cultivate a comfortable and visually appealing environment for tourists. These 5A-class scenic spots are renowned for their historical, cultural, scientific, or globally significant values, serving as exemplary representations of China's most exceptional scenic destinations. Amidst the increasing demand for tourism, it is crucial to achieve a harmonious equilibrium between the preservation of natural resources and the development of these picturesque regions. This calls for a reassessment of tourist assessments of these destinations, which in turn requires the development of an objective and scientific evaluation framework to facilitate targeted enhancements.

The majority of previous studies conducted on 5A-level scenic spots have exhibited a regional perspective and have been customized to cater to specific demographic segments. Typically, studies have traditionally relied on localized questionnaire surveys or interviews conducted within specific geographical areas, primarily due to constraints in funding and space availability. In recent years, there has been a growing emphasis on the assessment of scenic spots through network-based evaluations and text-mining techniques, driven by the progress in information technology. Hongsheng Xu [13] utilized text classification and sentiment analysis techniques to conduct a comprehensive evaluation of both scenic spots and hotels. They developed composite evaluation metrics to assess five fundamental aspects of service and utilized these comprehensive rankings to identify scenic spots and hotels of superior quality. Yuyan Luo [14] utilized sentiment analysis techniques to establish evaluation criteria for tourist attractions based on online reviews. However, the focus of these studies was primarily on examining the characteristics of scenic spots and their geographical advantages, while neglecting to adequately consider evaluation dimensions pertaining to economics, culture, and the visitor experience.

The LDA model and sentiment analysis remain the prevailing approaches for assessing scenic spots. In their respective studies, Ruoyu Zhang [15] and Nailin Gong [16] employed different models to establish evaluation criteria for scenic spots in different regions. Zhang utilized an LDA model and sentiment analysis to establish evaluation criteria for scenic spots in Jiangxi Province, while Gong employed Bidirectional Long Short-Term Memory (BiLSTM) and LDA models for the selection of evaluation criteria for scenic spots in Chongqing Municipality. BiLSTM, a type of recurrent neural network architecture, consists of two separate Long Short-Term Memory networks that are combined to effectively model sequence data in both forward and backward directions. This bidirectional approach facilitates the model in acquiring information from both preceding and subsequent contexts at each timestep, thereby enabling a more comprehensive comprehension of the sequence. In their respective studies, Zheng Liu [17] and Changli Huang [18] utilized the LDA model and sentiment analysis, as well as the LDA model and grounded theory, to investigate the evaluation criteria for scenic spots in Shandong Province and the perceived image of scenic spots in Guilin Province, respectively. Ruolin Hao [19] employed the LDA model and sentiment analysis to develop a comprehensive evaluation criteria system for 5A-level scenic spots in Sichuan Province. Furthermore, Shuang Cao [20] conducted an evaluation of A-level scenic spots in the Qinling region of Shaanxi Province using spatial analysis techniques, including global autocorrelation and kernel density. However, it is important to acknowledge that these approaches do have certain limitations. The majority of research in the field of text mining analysis tends to focus on surface-level analysis, resulting in straightforward conclusions without exploring the underlying logic of the factors that influence the outcomes.

In the current global post-pandemic era, it is evident that the approaches being employed lack universality and comprehensiveness [12–14]. Within the realm of research, a significant gap exists in the development of a universally applicable evaluation framework for assessing scenic spots on a nationwide scale. In order to effectively meet the current demands, especially those of China's scenic area evaluation system, it is crucial to modify the existing criteria. The current evaluation standards are insufficient in effectively addressing the hygiene and human-centric demands of the post-pandemic era on a global scale. In light of this, our study is based on the utilization of big data mining techniques to examine evaluation indicators for 5A-level scenic spots. This approach has the potential to effectively address the existing gaps and deficiencies, providing a more comprehensive and globally applicable assessment. The study stands out due to its distinctive features, which encompass a comprehensive evaluation process, the incorporation of perceived value, and its potential for broad applicability. While previous studies have examined related topics, this research effectively combines these elements in a manner that has the potential to yield significant advantages for various scenic locations. The text presents a synthesis of theoretical perspectives and offers practical recommendations for stakeholders involved in the tourism industry.

For the ease of readers, a concise overview of the subsequent organization of the paper is provided below: Chapter 2 provides an introduction to the data sources and research methods employed. Chapter 3 outlines the modeling process of the LDA model and grounded theory. Chapter 4 comprises the discussion section, while Chapter 5 serves as the conclusion.

## 2. Data sources and method selection

### 2.1. Data sources

This study focused on the selection of three well-known mainstream travel websites, namely Ctrip, Qunar, and Tongcheng Travel. The Octopus web scraper was employed to collect an extensive dataset comprising 417,000 reviews spanning from 2019 to 2022, obtained from 256 scenic spots classified as 5A-class. Between 2019 and 2022, a period characterized by the most severe outbreak of the pandemic in China and the implementation of the strictest control measures, there were significant restrictions imposed on individual travel activities. Therefore, this study gathered comment data from this specific timeframe as a representative sample for subsequent analysis. The summarized results of the data collection process are presented in [Table 1](#).

## 2.2. Data preprocessing

"Comment data" refers to the information or content generated through user comments on various platforms such as social media websites, forums, blogs, news articles, product reviews, or any platform that allows user engagement and interaction. This category of data includes text-based content, subjective opinions, user feedback, or reactions that individuals submit in response to a specific post, article, product, or discussion topic. Comment data can vary significantly in terms of length, content, sentiment, and relevance, reflecting the diverse range of perspectives and expressions from platform contributors. Businesses and researchers often analyze comment data to gain valuable insights into public opinion, customer sentiment, emerging trends, consumer preferences, and levels of engagement. Sentiment analysis, natural language processing, and data analysis techniques can be used to extract valuable information, detect patterns, sentiments, or themes in comments, and gain insights into users' overall perceptions or attitudes towards a subject or product.

As comment data is considered unstructured textual data, it requires preprocessing prior to conducting computer-based analysis. The initial steps of the data analysis process include data cleansing, which involves deduplicating the data from the three travel platforms separately, removing empty entries, and filtering out short sentences. Given the prevalence of instances in which comments are manipulated by individuals who are compensated for their comments, the process of deduplication is conducted independently for each platform. Empirical observations indicate that comments consisting of less than four characters generally represent default positive evaluations or lack substantial content. Therefore, it is advisable to filter out these short sentences. Subsequently, the process of stop-word processing is conducted in order to eliminate insignificant particles and conjunctions, such as "ah", "oh", and "um", from Chinese comments. To achieve this objective, the Baidu Chinese stop-word library is utilized. Lastly, the process of comment segmentation is carried out to address the variation in sentence lengths and to facilitate the analysis by dividing them into individual terms. In the present study, the process of segmentation is carried out utilizing the Python "jieba" package, which is widely recognized as a prominent tool for Chinese word segmentation. The "jieba" package is proficient in segmenting lengthy text and utilizes the "SnowNLP" package to discern positive and negative sentiment outcomes.

## 2.3. Method selection

### 2.3.1. The LDA topic model

The LDA model, based on the bag-of-words framework, is a Bayesian probabilistic topic model consisting of three tiers. It is extensively employed for extracting thematic insights from textual data. Notably, LDA does not necessitate manual data annotation during the training process, rendering it highly effective in uncovering latent semantics within vast textual sources such as e-commerce website reviews. Furthermore, LDA is favored among topic modeling methods due to its utilization of established tools and processes, making it the predominant choice [21].

The bag-of-words model's exclusive emphasis on word frequencies, however, brings about certain limitations. Frequently utilized terms tend to demonstrate elevated frequencies, whereas specialized terminology typically exhibits lower occurrence rates. The presence of this inherent imbalance necessitates an assessment of the modeling of rationality. To tackle this issue, the research paper presents an innovative methodology that integrates the TF-IDF technique to augment the LDA model.

### 2.3.2. Term frequency-inverse document frequency

Term Frequency-Inverse Document Frequency (TF-IDF), a statistical measure, is utilized to assess the significance of a term within a collection of documents or a corpus. The aforementioned metric serves to magnify the importance of a term in relation to its frequency within a specific document, while simultaneously diminishing its significance in relation to its occurrence across the entire corpus. By incorporating the weighted methodology of TF-IDF into the construction of the bag-of-words representation in LDA, this approach effectively preserves specialized terms, giving them higher importance, while also taking into account commonly used words [22].

Term frequency (TF) represents the frequency of a term appearing in a document and is denoted as  $f_{i,j}$ . Its calculation formula is:

$$f_{i,j} = \frac{n_{i,j}}{\sum_k n_{k,j}} \tag{1}$$

In equation (1),  $n_{i,j}$  is the count of term  $t_i$  appearing in text  $d_j$ . The denominator represents the total count of all terms appearing in document  $d_j$ .

Inverse Document Frequency (IDF) is a measure of the generalization of a term, indicating its discriminative power. It is represented as  $q_i$  and Its calculation formula is:

**Table 1**

Number of data collected for some scenic spots.

scenic spot	the Imperial Palace	the Potala Palace	Jade Dragon Snow Mountain	heaven lake of Tian Shan	West Lake
Number of comments	2953	2888	2819	2560	2989

Online review texts display diverse lengths and comprise unstructured textual data. A single text has the potential to incorporate various aspects of a picturesque location, along with the inclusion of emotional expressions. Consequently, when conducting an analysis of review data, a mere sentence-level examination is insufficient. Therefore, it becomes necessary to segment review texts by means of tokenization.

$$q_i = \lg \frac{|D|}{|\{j : t_i \in d_j\}|} \tag{2}$$

In equation (2),  $|D|$  represents the total number of documents, and the denominator counts the number of documents containing term  $t_i$ .

The TF-IDF value is obtained by multiplying the  $f_{i,j}$  value with the  $q_i$  value and is denoted as  $s_{i,j}$ . Its calculation formula is:

$$s_{i,j} = f_{i,j} q_i \tag{3}$$

In equation (3), if a term that appears frequently in a specific document appears infrequently in the entire collection of documents, it can be assigned a higher weight in the TF-IDF measure. As a consequence, these terms are chosen for their heightened ability to differentiate, thereby being recognized as salient discriminative terms.

This study utilizes consistency as a criterion to determine the optimal number of topics. The coherence architecture is depicted as follows:

$$C(z; S^z) = \sum_{n=2}^N \sum_{l=1}^{n-1} \log \frac{D_2(w_n^z, w_l^z) + 1}{D_1(w_l^z)} \tag{4}$$

In equation (4), given an aspect  $z$  and a set of top  $N$  words related to  $z$  denoted as  $S^z = \{w_1^z, \dots, w_N^z\}$ , where  $D_1(w)$  stands for the document frequency of word  $w$ , and  $D_2(w_1, w_2)$  represents the co-occurrence document frequency of words  $w_1$  and  $w_2$ . A higher consistency score indicates better interpretability of the aspect, implying greater significance and semantic coherence.

### 2.3.3. Grounded theory

Grounded Theory, as a qualitative research approach, encompasses a three-tiered coding process for the purpose of data collection. This study employs a three-stage method, namely open coding, axial coding, and selective coding. After preprocessing the data, sentiment differentiation is conducted using the SnowNLP package to create separate lexicons for positive and negative sentiments. The given parameters stipulate that sentiment scores, also known as "coms," that are equal to or greater than 0.9 are classified as positive, whereas scores that are equal to or less than 0.1 are associated with negative sentiment.

The implementation of the LDA model is carried out using the Python Gensim library, which provides a convenient framework for conducting topic modeling. For the purpose of improving comprehension, the LDAvis visualization library is utilized to conduct LDA visualization. To facilitate concise elucidation of individual topics, the primary four keywords pertaining to each topic are extracted and subsequently presented. This comprehensive approach guarantees the efficient interpretation and presentation of themes derived from LDA.

## 3. Model calculation results and analysis

### 3.1. Topic recognition

Following the preprocessing of the data, sentiment differentiation is conducted by utilizing the SnowNLP package in order to establish separate lexicons for positive and negative sentiments. The given parameters stipulate that sentiment scores, also known as "coms," that are equal to or greater than 0.9 are classified as positive, whereas scores that are equal to or less than 0.1 are associated with negative sentiment.

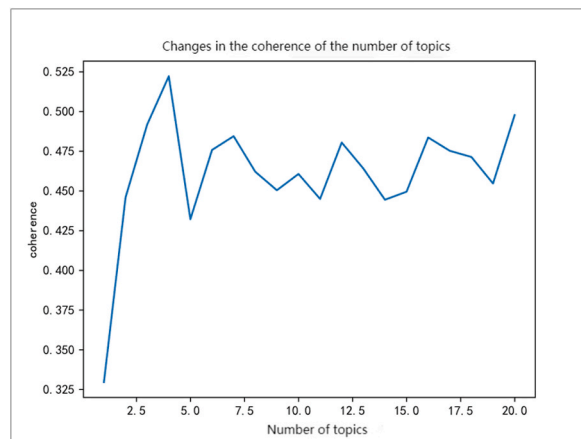


Fig. 2. Positive attitude consistency evaluation.

The implementation of the LDA model is carried out using the Python Gensim library, which provides a convenient framework for conducting topic modeling. To facilitate better understanding, the visualization of LDA is performed using the LDAvis visualization library. In order to offer concise explanations of specific topics, we extract and present the top four keywords associated with each topic. This comprehensive approach guarantees the efficient interpretation and presentation of themes derived from LDA.

### 3.2. Determine the number of topics

According to Stevens K, the utilization of consistency has emerged as a prominent measure of topic quality, as evidenced by recent studies conducted within the past two years [23]. The level of coherence directly influences the degree of semantic relevance observed among words within a given topic, thereby augmenting the interpretability of the model. Roder's study on coherence measurement issues presented an architectural framework and suggested multiple measurement methods [24].

Conducting separate consistency analyses on positive and negative sentiment comments, the study employs an iterative approach that encompasses topic numbers ranging from 1 to 20. Consequently, the determination of the optimal number of positive sentiment topics has resulted in identifying 4 topics, while 3 topics have been identified for negative sentiment. Fig. 2 illustrates that the maximum coherence score of 0.523 is attained when the positive sentiment comments are divided into 4 topics. The aforementioned statement highlights the adequate training and effective preservation of high-frequency semantic similarity within the model. Similarly, Fig. 3 demonstrates that the coherence score reaches its peak at 0.601 when utilizing 3 negative sentiment topics. This result suggests that the model has undergone sufficient training and exhibits a consistent high-frequency semantic coherence.

### 3.3. Topic modeling

The visualization of topic outcomes is achieved using LDAvis, which offers a comprehensive framework for gaining a global perspective of the LDA model. This feature enhances the examination of the distinctiveness and interrelationships of topics. Each circle depicted in the visualization represents a distinct topic, and the size of the circle as well as the extent of overlap between circles indicate the strength and coherence of the topic model. The central point of each circle is projected onto the two-dimensional space defined by PC1 and PC2, with the distances between circles determined by the topic dimensionality reduction matrix [25,26]. The results clearly illustrate a consistent level of autonomy across the different subjects, as depicted in Figs. 4 and 5.

To address the potential bias caused by comments from specific scenic spots, a relevance parameter, denoted as  $\lambda$ , is established with a value of 0.6. This approach guarantees the maintenance of inter-topic independence while concurrently enhancing the importance of specific words that are exclusive to each topic.

A compilation of the top 20 frequently used terms from both positive and negative comments is presented in Table 2. This table represents the high-frequency vocabulary associated with positive and negative sentiment expressions. The examination of word frequency statistics uncovers shared factors that impact both positive and negative feedback from travelers. These factors encompass terms such as "ticket," "time," and "tour guide," among others. The aforementioned findings highlight the significance of factors such as ticket pricing, waiting times, tour guide explanations, and the behavior of scenic area staff in shaping the overall tourist experience.

The significance of the historical and cultural aspects, architectural wonders, and natural landscapes of the scenic area in shaping tourist satisfaction is emphasized by positive terms like "history," "China," and "cost-effectiveness."

Conversely, the presence of negative terms such as "get tickets," "line up," "ropeway", and "parking lot" highlights specific aspects that contribute to traveler dissatisfaction. These terms collectively suggest that various factors such as waiting times, the quality of tourism facilities, and the pricing of products and services within the scenic area play a significant role in causing dissatisfaction among tourists.

The results of the LDA theme modeling are presented in Table 3, and the theme clustering is relatively clear.

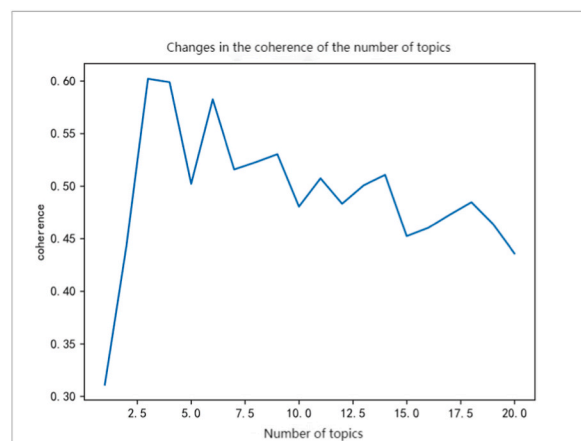


Fig. 3. Negative attitude consistency assessment.

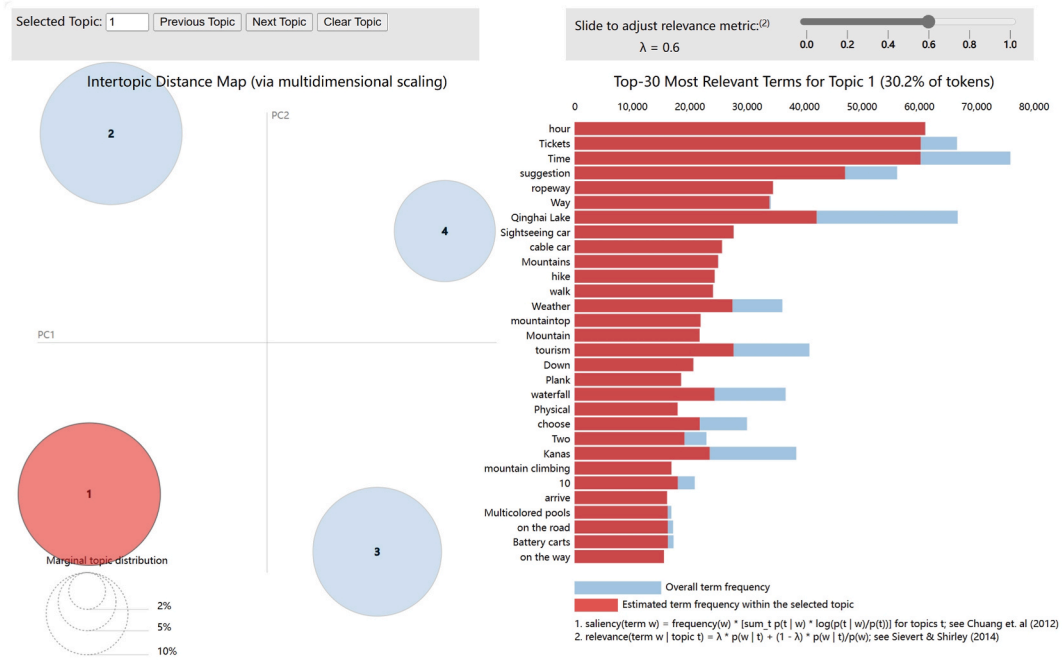


Fig. 4. LDA positive reviews topics.

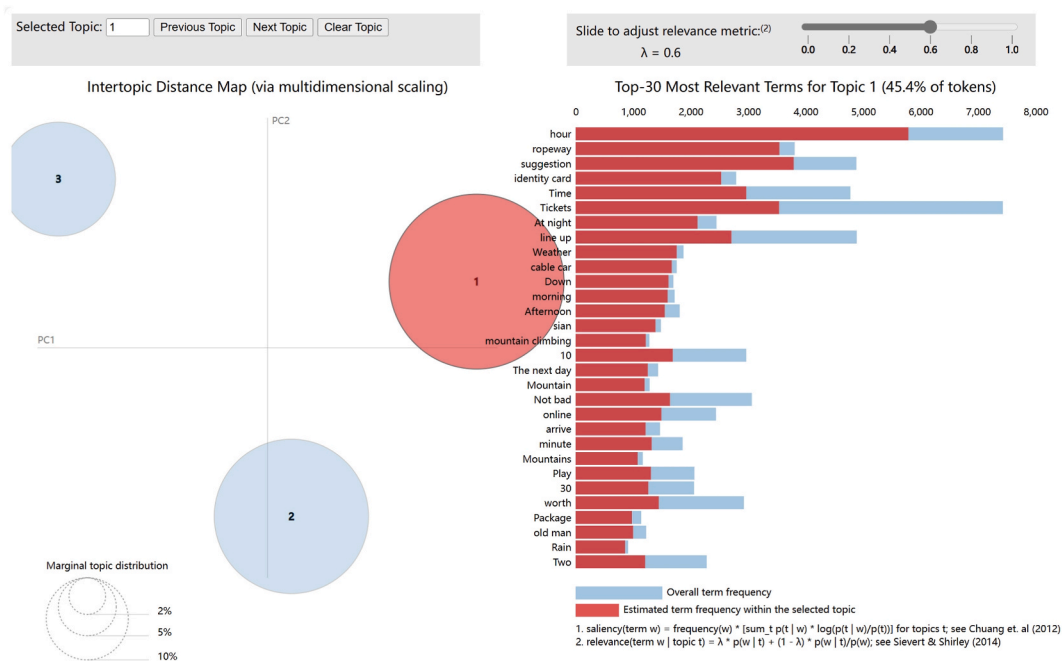


Fig. 5. LDA negative review topic.

### 3.4. Theme 1: tourist experience

This theme encompasses various facets of the tourist experience, including waiting times, the process of purchasing and collecting tickets, and the amenities provided in sightseeing vehicles or cable cars. These facets are indicative of tourists' subjective evaluations of their overall travel experiences.

**Table 2**  
Top 20 high-frequency words.

Top 20 positive words							
word	frequency	word	frequency	word	frequency	word	frequency
history	14821	hour	11993	experience	11385	cost-effectiveness	9858
ticket	13922	explain	11783	recommend	11254	enjoy	9694
notice	13722	China	11529	child	10902	ensemble	9477
convenient	13659	suggest	11496	fun	10717	architecture	9143
tour guide	12480	tour	11475	culture	10466	ropeway	8902
Top 20 negative words							
word	frequency	word	frequency	word	frequency	word	frequency
ticket	7483	ropeway	4020	Ctrip	2462	only	2034
hour	6131	waterfall	3457	entrance	2366	sightseeing	2032
line up	4748	get tickets	2739	staff	2247	minute	1991
time	4271	buy tickets	2652	parking lot	2082	ID card	1964
advise	4222	tour guide	2613	couple	2042	downhill	1963

**Table 3**  
LDA topic feature words.

The division of the positive topic feature word				The division of the negative topic feature words		
Topic 1	Topic 2	Topic 3	Topic 4	Topic 1	Topic 2	Topic 3
Tourist Experience	Scenic Charm	Tourism Services	Tourist Attitudes	Tourist Experience	Scenic Charm	Tourism Services
Hour	history	enjoy	correct	hour	waterfall	Shanxi
ticket	Zhenyuan	tour guide	worth	ropeway	Hukou Waterfalls	service
Time	China	explain	cost-effectiveness	advise	the Yellow River	staff
suggest	locate	good	ensemble	ID card	Ctrip	tour guide
ropeway	culture	night scene	fun	time	Zhenyuan	parking lot
throughout the journey	global	child	interesting	ticket	regret	management
Qinghai Lake	architecture	at night	Jiuzhai Valley	at night	Shaanxi	line up
sightseeing bus	nature	experience	beautiful	weather	China	ticket
cable car	relics	deserve	recommend	cable car	Jixian	experience
top of the mountain	wall	movie	awesome	downhill	yellow	time

### 3.5. Theme 2: scenic charm

This theme effectively captures the captivating qualities of the landscape, incorporating both cultural and natural components. The study explores the allure of indigenous customs and picturesque landscapes, reflecting tourists' perspectives on the intrinsic attractiveness of the travel destination.

### 3.6. Theme 3: tourism services

The theme of this discussion centers around the services offered, encompassing elements such as explanations provided by tour guides and presentations of local programs. The study provides valuable insights into the perceptions of tourists regarding the quality and effectiveness of services offered within the scenic area.

### 3.7. Theme 4: tourist attitudes

This theme predominantly encompasses feelings of contentment, self-value, and pleasure. The text emphasizes the positive assessments made by tourists, indicating their recognition and favorable attitudes towards the picturesque location.

The utilization of LDA modeling enables the successful implementation of thematic segmentation, which in turn enhances comprehension of diverse dimensions present in tourist feedback. Consequently, this approach contributes to a more intricate analysis of their perceptions and sentiments.

### 3.8. Topic extraction

After acquiring thematic terms, noun phrases are extracted as features and encoded utilizing the grounded theory methodology. The process involves two sequential steps that adhere to the principles of objectivity and scientific rigor: concept formation, followed by categorization and abstraction. The iterative process employed in this study led to the identification of 52 concepts and 15 categories from the extracted features. These findings are presented in Table 4 [27–30].



### 3.9. Open coding

In the initial phase, open coding employs the identified characteristics to conceptually structure the collected data. This study employs a two-step methodology that involves the process of concept formation followed by categorization. Through this approach, a total of 52 concepts were identified and subsequently grouped into 15 distinct categories. This process facilitates the systematic summarization of the underlying patterns and relationships present in the data.

### 3.10. Axial coding

Building upon the findings obtained through the process of open coding, a total of 15 categories have been synthesized and organized into three overarching primary categories. These categories can be classified as follows: (1) "Scenic Perspective," which encompasses various aspects such as tourism resources, local culture, the economic impact of scenic areas, ticketing channels, services, and facilities; (2) "Peripheral Facilities Perspective," which includes the surrounding economy, the completeness of facilities, and thematic aspects; and (3) "Tourist Perspective," which covers tourist behavior, motives, satisfaction, loyalty, and perceptions. The process of axial coding serves to establish a fundamental framework for organizing the evaluation of tourism, categorizing it into three distinct roles: scenic area, peripheral facilities, and tourists. The alignment of the six dimensions of tourism evaluation, which include dining, accommodation, transportation, shopping, entertainment, and exploration, is depicted in [Table 4](#).

### 3.11. Selective coding

Through a thorough analysis and comparison of the three main categories and their corresponding subcategories, the "Scenic Perspective" emerges as the central category in this study. The central category plays a pivotal role, encompassing the perspectives of both peripheral facilities and tourists, which are integrated within the framework of the "Process Theory" perspective. The central category of the narrative thread unravels as tourists engage in tourism evaluations, which are influenced by three primary subjects. Firstly, the scenic area itself plays a crucial role in shaping these evaluations. Additionally, peripheral facilities and tourists' experiences contribute to the formation of secondary factors that impact the evaluations. The evaluation of tourists begins prior to their arrival at the scenic area, as factors such as transportation, accommodations, and local culture have an impact on their initial impression. Upon evaluating the resources, services, management, and facilities of the scenic area, tourists form judgments regarding their satisfaction and loyalty. These judgments can lead to positive or negative emotional evaluations.

This methodology offers a systematic framework for conducting a thorough analysis and synthesis of different elements within the realm of tourist evaluations. As a result, it enhances our comprehension of the complex interconnections and dynamics that underlie the tourist experience.

## 4. Discussion

### 4.1. Tourist evaluation process and factors

The process of generating tourist evaluations begins with the commencement of the journey and concludes upon its completion. The evaluation of a scenic area by tourists is a comprehensive and time-consuming process that begins with pre-arrival experiences, including transportation, accommodation, and ticket acquisition. Critical factors that impact evaluations of scenic areas encompass the effectiveness of ticket retrieval and the duration of waiting in queues for attractions, despite the fact that these elements are separate from the scenic area itself. Impressions derived from the scenic beauty, architectural marvels, and cultural essence of the region can be eclipsed by external factors, resulting in unfavorable evaluations. Guided tours and specialized products offered within the scenic area,

**Table 4**

The code of the main element of tourism evaluation.

primary categorie	categories	concept
Scenic spot	sightseeing resource	Featured Scenery, Featured Building
	local culture	History, humanistic atmosphere, Folk customs
	Scenic area economy	Ticket, special local product, commodity
	Ticket purchase channels	Online, platform,offline
	Scenic area service	tour guide, explain,convenient store
	Scenic area facilities	cable car,ropeway, sightseeing bus
	Scenic area management	Management, line up,suggest, staff
surrounding facilities	The surrounding economy	Price,cost-effectiveness,brand, level
	Perfect degree of facilities	Convenient, complete,developed, comfort
	body of facilities	Hotel, restaurant,airport, railway station, parking lot
perspective of tourists	Tourist behavior	Recommend, share,experience, evaluate
	Types of tourists	Adult, child,the old
	Tourist satisfaction	Good,fun,awesome, negative comment
	Tourist loyalty	come again, take friends together
	Tourist motivation	study abroad,parent-offspring,in love, relax,shopping

which are frequently contracted out to external entities, have a significant impact on visitor experiences. The perceptions of tourists are significantly influenced by the quality of guide commentary, tour routes, product pricing, and content. This statement is in line with the research conducted by Jinjie He [31], which involved questionnaire surveys and interviews. The research findings highlight the idea that tourists evaluate the quality of scenic spots through a comprehensive evaluation process that takes into account multiple perspectives. This evaluation encompasses a wide range of aspects, including the quality of tour facilities, tourism services, experiential activities offered within the scenic area, and the ability to cater to personalized demands. It goes beyond simply appraising the inherent attributes of the scenic resource itself.

Additionally, the study conducted by Xiaohui Deng [32] examines the influence of ticket prices on tourist satisfaction, emphasizing the notion of perceived value dissemination. Perceived cost value, perceived service value, and perceived emotional value have all been recognized as significant factors that impact tourist satisfaction. In order to establish a comprehensive framework for evaluating scenic spots, it is crucial to consider the various dimensions of tourist demands, capitalize on the opportunities offered by the digital economy, and shift the developmental paradigm of scenic areas. By addressing the specific needs and preferences of tourists and improving the perceived worth of their experiences, these initiatives have the potential to play a crucial role in developing a comprehensive and flexible evaluation framework for tourist attractions.

#### 4.2. Influential factors and holistic enhancement

Through the analysis of thematic elements, this study examines the various factors that influence tourist evaluations. These factors primarily encompass tourism resources, local culture, scenic area economics, ticketing channels, services, facilities, management standards, peripheral economy, and peripheral facility adequacy. The enhancement of tourist evaluations necessitates not only improvements within the scenic area itself, but also enhancements in the surrounding facilities. Enhancing visitor satisfaction and fostering loyalty requires comprehensive enhancements that go beyond the physical attractions, encompassing improvements in auxiliary facilities and related services.

This observation aligns with the research conducted by scholars such as Yuanhong Qiu et al. [33], who have investigated the temporal and spatial dynamics. Similar to the research conducted by Xu et al. [12,34], the evaluation method's comprehensiveness demonstrates regional peculiarities as a result of the limitations imposed by the chosen online review texts, making it unsuitable for all tourist destinations. However, the current study is based on an analysis of comments regarding national 5A-level scenic spots. It is supported by grounded theory, which helps to establish the internal logic of the study. As a result, the study has identified three dimensions, fifteen categories, and fifty-two concepts, making its findings more widely applicable. Nevertheless, it simultaneously lacks specificity in addressing the unique characteristics of local regions and distinct folk cultures.

In conclusion, this study highlights the intricate nature of the tourist evaluation process, which encompasses the entire journey from its initiation to its conclusion. The text sheds light on the substantial influence of diverse factors, encompassing both inherent and external elements, on the perceptions and evaluations of tourists. Additionally, the research findings underscore the interdependence of various factors, including transportation, accommodation, ticketing, services, and facilities, which collectively shape the overall experiences of tourists. In order to enhance tourist evaluations and promote continuous growth in the tourism industry, it is imperative for stakeholders to embrace a holistic approach that encompasses not only the fundamental characteristics of scenic areas, but also peripheral factors, thereby facilitating an integrated and gratifying tourist experience.

### 5. Conclusions

In contrast to conventional regional analysis and perceptual image perspective analysis, this study aimed to explore the comprehensive and multifaceted nature of the tourist evaluation process by adopting a process perspective that focuses on tourists. The study took into account various factors that extend beyond the inherent characteristics of tourist destinations, including transportation, lodging, ticket procurement, guided tours, and individualized preferences. The study highlights the significance of a comprehensive assessment that encompasses multiple dimensions of the tourist experience. The study aimed to develop an evaluation method that could be applied universally, while also acknowledging the regional variations in tourist evaluations. The study extracted dimensions, categories, and concepts from comments on national 5A-level scenic spots, thereby enhancing its applicability to a wider array of tourist destinations. The research has successfully addressed the prevailing shortcomings in the assessment of contemporary scenic areas at the 5A-level. The recently implemented evaluation indicators demonstrate a more appropriate alignment with the human-centric requirements. This study has successfully addressed a significant gap in the existing literature by proposing a universally applicable framework for evaluating national scenic areas.

#### 5.1. Enhancing scenic area services and management capabilities

Scenic areas should endeavor to fulfill the reasonable expectations of visitors by implementing strategies to enhance the efficiency of visitor services. The utilization of automated ticket vending machines or third-party platforms for self-service ticket retrieval has the potential to mitigate queuing times and improve the overall visitor experience [35]. It is advisable to contemplate the augmentation of the frequency of amenities such as sightseeing vehicles, cable cars, and ropeways in order to accommodate the sightseeing requirements of visitors. These facilities have a significant impact on influencing both positive and negative sentiment in reviews [36], therefore necessitating careful consideration. Administrators ought to enhance their supervision of staff and third-party entities, elevate the service standards of personnel, improve the channels for guest complaints, and establish effective feedback mechanisms to

address visitor concerns.

### 5.2. *Enhancing peripheral facility adequacy*

Beyond the boundaries of the picturesque area, the caliber of peripheral amenities plays a crucial role in shaping visitors' choices regarding their travel plans. The sufficiency of facilities in the vicinity of the picturesque location has a direct influence on visitors' considerations regarding lodging, transportation, and daily essentials [37]. It is imperative for relevant authorities to strengthen the regulation and oversight of accommodations and transportation services associated with 5A-rated scenic areas. This measure is necessary to address various issues, including misleading pricing, aggressive solicitation, and refusal to provide refunds. Ensuring that peripheral facilities adequately meet the reasonable daily needs of visitors during their stay contributes to the development of a sustainable and harmonious tourism environment.

### 5.3. *Crafting distinctive products aligned with scenic area features*

5A-rated scenic areas possess a profound historical and cultural importance, as well as breathtaking natural landscapes. The identification and exploration of distinctive attributes can provide a basis for developing unique products that are infused with significant content and branding [38]. Developing a line of products that closely aligns with the core characteristics of the scenic area has the potential to enhance visitors' perceptions. The implementation of specialized initiatives, advancement of inventive tourism options, and promotion of engaging encounters for tourists can effectively cater to the preferences of educational and family-oriented travelers. By augmenting the visibility of the historical and cultural legacy of the scenic area, the overall experiences of visitors can be enhanced and enriched [39–43].

In conclusion, the successful implementation of these recommendations holds the potential to greatly enhance the overall tourist experience within scenic areas that have been rated as 5A. The amalgamation of enhanced services, inclusive peripheral amenities, and the fostering of unique products collectively contribute to the establishment of a more remarkable, gratifying, and all-encompassing experience for tourists [44–46].

### 5.4. *Limitations and future research avenues*

This study primarily concentrated on national 5A-level scenic spots, which hold significant recognition in China. However, the study failed to sufficiently take into account various other categories of tourist destinations, including rural tourism, urban tourism, and eco-tourism. Future research has the potential to expand its scope in order to achieve a more comprehensive understanding of tourist evaluations across various types of destinations.

The primary data source utilized in this study consisted of online review texts, which may possess certain limitations such as text length, content, and subjectivity, as influenced by various tourists. Future research has the potential to integrate additional data sources, such as surveys or in-depth interviews, in order to acquire a more comprehensive dataset.

Despite recognizing the presence of regional idiosyncrasies, there are still constraints associated with regional variations. Different regions and cultures may exert diverse influences on tourist evaluations, thereby necessitating further comprehensive investigation.

Future research should further explore the impact of cultural factors on tourist evaluations. This encompasses the cultural attributes of tourist destinations, the cultural backgrounds of tourists, and the influence of cultural experiences on tourist satisfaction.

With the emergence of sustainable tourism as a significant trend, there is a need for further investigation into the impact of sustainability factors on tourist evaluations. The aforementioned encompasses the eco-friendly practices implemented by the destination, its commitment to social responsibility, and the level of awareness among tourists regarding sustainability [47–49].

In conclusion, it is recommended that future research endeavors broaden their scope, delve deeper into various factors, and employ multiple data sources in order to enhance the comprehensiveness of their findings and provide more robust guidance. This initiative is expected to contribute to the development of the tourism industry by improving its ability to meet the diverse needs of tourists and ultimately enhancing their overall satisfaction.

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## **Data availability statement**

Data sharing is not applicable. Data will be made available on request.

## CRediT authorship contribution statement

**Hanqing Hu:** Writing – review & editing, Validation, Supervision, Resources, Project administration, Funding acquisition, Formal analysis, Conceptualization. **Hao Lu:** Writing – original draft, Visualization, Software, Resources, Methodology, Investigation, Formal analysis, Data curation, Conceptualization.

## Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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