



Research on Tourism Image Perception of the Beibu Gulf Urban Agglomeration in China

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Abstract. In the digital economy era, more opportunities and challenges for the sustainable tourism have been recognized by major economics. As the core of regional economic integration, improving tourism image for the urban agglomerations has been considered as a critical thrust in driving regional tourism economy. The studies of tourism image are of the great significance for guiding corresponding construction practices. Trying to bridge the theoretical discussion and regional policy practice, our research is hereby taking the Beibu Gulf urban as a travel destination for a comprehensive tourism image perception analysis. The network analysis and the text mining devices are combined to analyze the tourism image perception characteristics of the selected urban agglomeration. The result reveals that the cognitive tourism image perceptions of the Beibu Gulf urban agglomeration can be divided into multiple dimensions. The coastal tourism resources are the most distinctive in the urban agglomeration. We hereby suggest the policymakers should take the result into account in practice for promoting the high-quality tourism development.

Keywords: Tourism Image Perception; Text Mining; Travel Destination; The Beibu Gulf Urban Agglomeration.

1 Introduction

The overall evaluation of a destination's landscape quality and service level by tourists constitutes its destination image ^[1], which plays a significant role in influencing tourists' decision-making behavior and destination marketing efforts ^[2]. Consequently, the research on the tourism image perception of the destinations has become the crucial area of inquiry in the field of tourism destination branding and competitiveness enhancement, and it has consistently garnered considerable attention from the tourism scholars

[3-4]. In recent years, due to the increased accessibility of the tourist reviews and travelogues on tourism platforms, the research pertaining to the perception of tourism image has been further enriched [5-7].

The urban agglomerations are the main carriers for the development of the national economies in China. They also represent the highest spatial organizational form achieved when urban clusters reach a mature stage of development, thereby playing a vital role in enhancing national competitiveness [8]. As a strategic pillar industry of the nation, tourism constitutes a crucial component of the development process within urban agglomerations [9]. Cultivating the positive tourism images for these urban agglomerations are deemed to be of paramount importance in disseminating Chinese culture, fostering national self-confidence, and elevating the nation's image on the global stage. The previous research on tourism image has predominantly focused on spatial units such as the provinces, the cities, and the scenic spots, while neglecting the studies of inter-provincial urban agglomerations. This limitation hinders the ability to provide guidance for the development of the large-scale destinations that possess similar tourism resources.

The Beibu Gulf Urban Agglomeration, which was officially approved for establishment in 2017, spans across three provinces (Guangxi, Guangdong, and Hainan). It is backed by the southwestern region of China, adjacent to the cities of Hong Kong, and Macao, and facing Southeast Asia. Serving as a crucial hub along the Maritime Silk Road, it represents a convergence zone for China's coastal and border opening-up initiatives, holding significant strategic importance within the context of the Western Development strategies and China's open cooperation with ASEAN. The Beibu Gulf Urban Agglomeration boasts a rich and diverse array of tourism resources, characterized by its profound historical and cultural heritage, vibrant folk customs, and unparalleled potential for tourism development. The statistical data reveals that, as of 2024, this urban agglomeration encompasses 261 tourist attractions rated as 4A or above. However, despite the abundance of tourism resources, challenges such as the relatively weak brand influence of the Beibu Gulf Urban Agglomeration as a tourism destination remain prominent. Therefore, this study focuses on the Beibu Gulf Urban Agglomeration as the research area, aiming to investigate the characteristics of its tourism image perception. It is anticipated that the findings of the study will contribute valuable insights to the sustainable development of the tourism industry within the Beibu Gulf Urban Agglomeration, thereby further promoting the coordinated development of that regional economy.

2 Research Design

2.1 Overview of the Research Area

The Beibu Gulf Urban Agglomeration is located in southern China, including the Nanning City, the Beihai City, the Qinzhou City, the Fangchenggang City, the Yulin City, and the Chongzuo City in the Guangxi Zhuang Autonomous Region; the Zhanjiang City, the Maoming City, and the Yangjiang City in the Guangdong Province; and the Haikou City, the Danzhou City, the Dongfang City, the Chengmai County, the Lingao

County, and the Changjiang Li Autonomous County in the Hainan Province. It has a land area of 116600 square kilometers, a coastline of 4234 kilometers, and corresponding sea areas.

2.2 Data Sources and Collection

The tourism network, which is named Mafengwo, is a representative tourism website in China. As of now, Mafengwo has accumulated over 200 million users, and the total amount of travelogues and comments have reached millions. To improve the timeliness of data, this study used the collector which named Bazhuayu to capture travelogues and comments from the sample scenic areas from January 2019 to December 2023. To ensure the accuracy of the data, pure images, blanks, duplicates, and irrelevant travelogues were removed, and the data of 3.887 million words of travelogues and comments were retained.

2.3 Research Methods

The text mining analysis can transform nonsystematic and qualitative symbolic content into systematic and quantitative data, thereby objectively and systematically describing the content of the text. It is especially suitable for analyzing and perceiving the tourism image perception related researches^[10]. Based on the "Cognitive—Affective" model, the text analysis was used to investigate the tourism image perception of the Beibu Gulf urban agglomeration.

3 Results Analysis

3.1 Analysis of the Cognitive Tourism Image Perception

The word frequency analysis of the travelogues and the comments pertaining to the Beibu Gulf Urban Agglomeration was conducted employing ROST CM6 software. A frequency threshold of 200 was set, resulting in the filtering out of the words deemed irrelevant or exhibited weak connections to the study. A total of 142 high-frequency features were identified. These words were then categorized into attributes based on their characteristics. Finally, the table outlining the dimensions of the cognitive tourism image perceptions of the Beibu Gulf Urban Agglomeration were compiled. This table encompasses eight categories: natural resources, cultural resources, management/services, tourism activities, reception facilities, geographical location, environmental ambiances, and cuisines. Details can be found in Table 1.

According to the Table 1, the cognitive tourism image perceptions of the Beibu Gulf Urban Agglomeration are primarily concentrated on natural resources and geographical location. The word frequency proportions for the natural resources and geographical location are 33.04% and 31.8%, respectively. With their combined proportion exceeding 60%, it can be inferred that the tourists exhibit the greatest interest in natural and

geographical attractions. Notably, the coastal tourism landscapes hold a particular allure for tourists visiting the urban agglomeration, with "sand beach" being the core of the tourists' perception of the image of the natural resources. The inclusion of coastal attractions such as "the Weizhou Island" "the Hailing Island" and "Beihai Silver Beach" in the image perception dimension table underscores the profound impression left by the coastal scenery of the urban agglomeration on tourists. "The Haikou city" stands out as the central tourism city in tourists' perception of the urban agglomeration, while "the Nanning city" "the Beihai city" and "the Zhanjiang city" are also identified as the important tourism cities. Furthermore, "the Yulin city" "the Guilin city" "the Guangzhou city" "the Wanning city" and "the Sanya city" are recognized as the major tourist source markets, the transportation hubs, or the nodes along tourist routes within the urban agglomeration.

Table 1. The Analysis Results of the Cognitive Tourism Image Perception of the Beibu Gulf Urban Agglomeration

Dimension	Proportion	High-Frequency Feature Words
Natural Resources	33.04 %	Sand beach, the Weizhou Island, Seaside, Park, the Hailing Island, Weather, the Detian Waterfall, the Beihai Silver Beach, Antarctic Village, Ocean, Sunset, the Qingxiu Mountain, the Shili Silver Beach, the Crocodile Mountain Scenic Area, Volcano, Mainland, Dishui Danping, the Dajiao Bay, the Mangrove Forest, the Volcano Park, the Mingshi Countryside, the Wucui Beach, the Huguangyan Scenic Area, Beach, the Yanzhou Island, the Shiluokou Beach, the Mawei Island, Sunrise, Seawater, the Chess Bay Tourist Resort, the Techeng Island, Wanwei Jintan, the Haihua Island, the Guishan Ancient Fishing Village, the Beike Beach, the Sanniang Bay, Romantic Coast, the Guanlan Lake, Coast, Sea Water, Environment, the Beibu Gulf
Cultural Resources	10.11 %	Arcade Street, Culture, the Beihai Old Street, Architecture, the Qiaogang Style Street, Museum, the Hainan Provincial Museum, the Dongpo Academy, Lighthouse, the Nanhai No.1 Museum, the Catholic Church, the Chikan Old Street, Guishitan, the Fish Scale Island Scenic Area, the Dongxing Port, the Haikou Bell Tower, the Three Streets and Two Alleys, the Wugong Temple, the Old Street, the Hainan University
Management/Service	1.31 %	Ticket, Ferry Ticket
Tourism Activities	4.37 %	Self Driving, Experience, Beach comb, Swim, Eat, Walk
Reception Facilities	7.19 %	Homestay, Train, Highway, Square, Airplane, Electric Vehicle, Road, Swimming Pool, Duty-Free, Free, Poly Apartment, Seafood Market, Sightseeing bus, Night Market

Geographic Locations	31.8 %	The Haikou City, The Nanning City, The Beihai City, The Zhanjiang City, The Hainan Province, the Yangjiang City, The Guangxi Province, The Fangchenggang City, Vietnam, China, The Maoming City, The Danzhou City, The Gaozhou City, The Qinzhou City, The Xuwen County, The Dongxing City, The Guilin City, The Guangzhou City, The Dongfang City, The Chongzuo City, The Yulin City, The Zhao Town, The Leizhou City, The Wanning City, The Changjiang County, The Chengmai County, The Rongxian County, The Sanya City
Environmental Ambiances	5.12 %	Characteristic, Convenient, Natural, Practical, Traditional, Comfortable, Millennial, Lively
Cuisines	7.06 %	Seafood, Delicacies, Crabs, Coffee, Wenchang chicken, Coconut, Coral, Oysters, Sugared water, Snacks, Refreshing, Pineapple, Kapok, Fruit

Data source: The research results of this study

The Cultural resources are also recognized as an image dimension of considerable interest to tourists, with its high-frequency words accounting for 10.11%, ranking third among the eight perceived dimensions. "Arcade street" is identified as the central resources of the tourists' perception of the cultural resources, while the words such as "the Beihai Old Street" and "the museum" reflect the tourists' emphasis on the historical heritage and the cultural connotations of the urban agglomeration.

In addition, the tourists demonstrate relatively lower levels of the attention towards the other five image dimensions: management/services, tourism activities, reception facilities, environmental ambiances, and cuisines. Among these, "ticket" is identified as tourism expenses that garner considerable attention from the tourists. The words such as "self-driving" and "beach comb" indicate that the tourists place value on the entertainment and freedom associated with tourism activities. The words like "homestay," "train," and "highway" suggest that the tourists are particularly concerned with the accessibility of transportation and accommodation infrastructure at the scenic spots. Furthermore, the words like "unique" and "convenient" imply that the tourists express satisfaction with their overall tourism experience in the urban agglomeration. Finally, the words such as "seafood" and "delicacies" highlight the tourists' interest in the culinary traditions and the characteristic foods of the destination.

To further identify the deep-level connections within the tourism image perception of the Beibu Gulf Urban Agglomeration, its social network semantic network was constructed using Gephi software (Figure 1). Within this network, the nodes with larger font sizes and darker background colors indicate the closer proximity to the core position within the network. The thicker arcs between the nodes signify a higher degree of association between them. As depicted in Figure 1, "sand beach" is primarily anchored as the principal tourism resources in the Beibu Gulf Urban Agglomeration, radiating outwards to encompass the coastal scenic spots such as "the Weizhou Island" and "the Silver Beach", the cultural scenic spots such as "wharf" and "arcade street", the leisure tourism activities like watching the "sunrise" and "sunset". Additionally, "seafood" is

quality, and the quality of foods and beverages may be the principal influences leading to negative evaluations from the tourists.

Table 2. The Analysis Results of the Affective Tourism Image Perception of the Beibu Gulf Urban Agglomeration

Affective level	Proportion (%)
Positive Emotions	96.43
Neutral Emotions	0.54
Negative Emotions	3.03

Data source: The research results of this study

Table 3. The Analysis Results of the Positive and the Negative Affective Characteristics of the Beibu Gulf Urban Agglomeration

Affective Tendencies	Characteristic Morpheme
Positive	Romantic, Delicious, Enthusiastic, Beautiful
Negative	Expensive, Uninteresting, Underweight, Dirty

Data source: The research results of this study

4 Conclusions and Suggestions

4.1 Research Conclusions

The tourism image perceptions of the Beibu Gulf Urban Agglomeration, which included the cognitive tourism image perception and the affective tourism image perception, were measured in this study. From a holistic standpoint, the cognitive tourism image perception of the Beibu Gulf Urban Agglomeration can be categorized into 8 dimensions: natural resources, cultural resources, management/services, tourism activities, reception facilities, geographical locations, environmental ambiances, and cuisines. Among these, the coastal tourism resources emerge as the most salient, while the arcade street culture of the urban agglomeration also hold significance. The Haikou city, the Nanning city, the Beihai city, and the Zhanjiang city are identified as pivotal tourism nodes within the Beibu Gulf Urban Agglomeration. The affective tourism image perception of the Beibu Gulf Urban Agglomeration is predominantly positive, although a limited number of negative evaluations are also observed.

4.2 Development Suggestions

Firstly, strengthen regional collaborative cooperation and brand building. The Beibu Gulf Urban Agglomeration, characterized as a typical cross-provincial tourism space, boasts a wealth of coastal and cultural resources. However, its current tourism development faces challenges such as fragmentation and product homogenization. The urban

agglomeration should proactively respond to market dynamics and seize the strategic opportunities presented by collaborative development. By reinforcing regional cooperation, facilitating resource integration and innovation, and overcoming the bottlenecks of fragmented tourism development and product homogenization, a collective effort can be made to forge a tourism brand with distinctive regional characteristics. This would foster a tourism development landscape marked by differentiated competition and complementary advantages, thereby providing tourists with a diversified and high-quality coastal tourism experience.

Secondly, deepen tourism product development and innovation. To ensure the long-term prosperity and sustainable development of the tourism industry, the Beibu Gulf Urban Agglomeration must adhere to the principles of green, low-carbon, and environmentally friendly practices. It is imperative to accurately grasp market demands and prioritize the differentiation and uniqueness of tourism products. Continuous efforts should be dedicated to exploring and innovating the content and forms of tourism resources, while also leveraging modern technology to enhance the interactivity and experiential quality of tourism products. Simultaneously, the digital marketing of tourism products should be intensified, utilizing internet platforms for targeted promotion to expand the visibility and influence of these products.

Thirdly, strengthen online reputation management and tourism evaluation supervision. Given the critical role of tourism evaluations in shaping the destination's tourism image, management entities need to attach paramount importance to online reputation monitoring. Establishing rapid response mechanisms to capture and analyze user feedback is crucial, particularly negative comments. Prompt and appropriate measures should be taken to address such feedback, mitigating any adverse impact on the tourism destination's image. Furthermore, the in-depth analysis of the underlying reasons behind negative evaluations should be conducted, serving as a valuable foundation for improving tourism services and optimizing the provision of tourism products. This proactive approach will ensure the continuous maintenance and enhancement of the positive image and reputation of the tourism destination in the minds of tourists.

Fourthly, enhance tourism infrastructure construction and service quality. The current landscape of the tourism industry in China has transitioned from the phase of rapid growth to the high-quality development. Management and service standards constitute pivotal factors in achieving high-quality development for tourism destinations, and also exert the significant influences on the tourism image perceptions. For the Beibu Gulf Urban Agglomeration, it is imperative to earnestly advance the standardized and normalized development of the tourism management system. Increasing investment in tourism infrastructure is essential to comprehensively elevate the management and reception quality of the tourism destination, thereby fostering a safe, comfortable, and convenient tourism environment.

Fifthly, promote the integrated development of tourism with multiple industries. With the continuous innovation and integrated development of the tourism industry, the "Tourism +" development model has emerged as a potent force in driving economic transformation and upgrading, as well as facilitating the convergence of multiple industries. The Beibu Gulf Urban Agglomeration should capitalize on its inherent industrial advantages to propel the integration of tourism with agriculture, culture, sports,

healthcare, and other sectors. By cultivating novel tourism formats such as rural tourism, cultural tourism, sports tourism, and healthcare tourism, the tourism product can be enriched, and the tourism industry chain can be extended. Simultaneously, fostering cooperation and exchange between industries is crucial to achieve resource sharing and complementary advantages, thereby collectively propelling the comprehensive development of the tourism industry within the Beibu Gulf Urban Agglomeration.

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Reference

1. Hunt J D. (1975) Image as a factor in tourism development[J]. *Journal of travel research*, 13(3): 1-7. <https://doi.org/10.1177/00472875750130030>.
2. Lee S W, Xue K. (2020) A model of destination loyalty: Integrating destination image and sustainable tourism[J]. *Asia Pacific Journal of Tourism Research*, 25(4): 393-408. <https://doi.org/10.1080/10941665.2020.1713185>.
3. Styliadis D. (2022) Exploring resident–tourist interaction and its impact on tourists’ destination image[J]. *Journal of Travel Research*, 61(1): 186-201. <https://doi.org/10.1177/0047287520969861>.
4. Afshardoost M, Eshaghi M S. (2020) Destination image and tourist behavioural intentions: A meta-analysis[J]. *Tourism management*, 81: 104154. <https://doi.org/10.1016/j.tourman.2020.104154>.
5. Abbasi A Z, Tsiotsou R H, Hussain K, et al. (2023) Investigating the impact of social media images’ value, consumer engagement, and involvement on eWOM of a tourism destination: A transmittal mediation approach[J]. *Journal of Retailing and Consumer Services*, 71: 103231. <https://doi.org/10.1016/j.jretconser.2022.103231>.
6. Meng L , Liu Y , Wang Y ,et al. (2021) A big-data approach for investigating destination image gap in Sanya City: When will the online and the offline goes parted?[J].*Regional Sustainability*, 2(1):98-108. <https://doi.org/10.1016/j.regsus.2021.02.001>.
7. Hou Z, Liu B, Liu S, et al. (2024) How Does the Knowledge Association of Online Travel Reviews Affect Tourism Purchase Behavior? An Empirical Study Based on Knowledge Network Perspective[J]. *Journal of the Knowledge Economy*, 1-28. <https://doi.org/10.1007/s13132-024-02186-3>.
8. Fang C, Yu D. (2017) Urban agglomeration: An evolving concept of an emerging phenomenon[J]. *Landscape and urban planning*, 162:126-136. <https://doi.org/10.1016/j.landurbplan.2017.02.014>.
9. Li L S Z, Yang F X, Cui C. (2019) High-speed rail and tourism in China: An urban agglomeration perspective[J]. *International Journal of Tourism Research*, 21(1): 45-60. <https://doi.org/10.1002/jtr.2240>.
10. Huang X, Han Y, Meng Q, et al. (2022) Do the DMO and the Tourists Deliver the Similar Image? Research on Representation of the Health Destination Image Based on UGC and the Theory of Discourse Power: A Case Study of Bama, China [J]. *Sustainability* 14: 953. <https://doi.org/10.3390/su14020953>.

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