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Authors: Chengcai, Tang, and Shiyi, Xu

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Sustainable Development of Ice and Snow Tourism—Theory & Empirical Studies: Preface

TANG Chengcai^{1,2}, XU Shiyi^{1,2}

1. School of Tourism Sciences, Beijing International Studies University, Beijing 100024, China;

2. Research Center of Beijing Tourism Development, Beijing 100024, China

Abstract: The Beijing Winter Olympics brought a historical miracle to the development of China's ice and snow tourism. It is both an opportunity and a challenge to reap the extra dividends of the times and to develop China's ice and snow tourism. By selecting 18 academic papers, this special issue deeply discusses the status quo and the future measures of ice and snow tourism in China from three aspects: ice and snow tourism development and management, the ice and snow tourism experience and its influencing factors, and ice and snow tourism impact assessment. Moreover, one part entitled "Tourism Culture and Ecotourism" has been set up to emphasize those cutting-edge research topics. It is worth mentioning that this issue is in-depth and has profound connotations. First of all, the research area ranges from national to regional to the city-level, including both longitudinal and horizontal research. In addition, the research methods are practical, innovative, and at the frontier of scientific research, and include industrial correlation analysis methods, kernel density, spatial autocorrelation and other geospatial analysis methods, content analysis methods, sentiment analysis methods, structural equation models, Delphi methods, spatial statistics methods, geographic detector method and many others. In general, this special issue combines qualitative research with quantitative research, provides a variety of theoretical perspectives such as perceived value theory, institutional evolution theory, etc., and builds various useful models like the pre-competition evaluation model for ice and snow tourism heritage, the consumption skill-travel radius decision-making influence model under the moderating effect of the ski resort comprehensive leisure environment, the evaluation model of the suitability of glacier tourism resource development, the model of the relationship between tourists' experience value and loyalty in the context of ice and snow tourism, among others. These studies are expected to provide theoretical and practical guidance for the development of ice and snow tourism in the post-Winter Olympics era, and help ice and snow tourism develop in a sustainable and high-quality direction.

Key words: ice and snow tourism; ice and snow economy; Beijing Winter Olympics; glacier tourism; heritage tourism; sustainable development; tourism ecological security; ecotourism; National Cultural Park

1 Introduction

Since 2015, Beijing has been awarded the right to host the 24th Winter Olympics, the Chinese government has prepared relevant policies to call for the expansion of ice and snow tourism, companies have responded by creating various ice and snow projects, and the public has participated actively. As a result, China has become the country with the

most ski resorts, and the demand for ice and snow consumption has also shown unprecedented expansion driven by the Winter Olympics. Given this background, ice and snow tourism in China is now bursting with strong vitality. According to data from the General Administration of Sports of China, the number of people participating in ice and snow sports nationwide as of October 2021 was 346 million,

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First author: TANG Chengcai, E-mail: tcc5808@163.com

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and the participation rate of residents reached 24.56%, which is a milestone in the history of ice and snow for China (General Administration of Sports of China, 2022). These figures suggest that China is about to usher in a great leap-forward in the development of ice and snow tourism, from a rapid development to a steady development stage. According to the data center of the Ministry of Culture and Tourism, the average annual growth rate of the national ice and snow leisure tourists from the 2016–2017 ice and snow season to the 2021–2022 ice and snow season was 12.5%. So far, China's ice and snow industry has entered an unprecedented golden development period. However, considering the short time frame and the rapid process of the development and utilization of ice and snow tourism, there are quite a few deficiencies in planning, development, and management (Tang et al., 2022). In general, China's ice and snow tourism is still in its infancy. Thus, the efficient use of ice and snow resources, improving the sustainable capacity of ice and snow tourism, and achieving high-quality development of ice and snow tourism have become long-term goals.

This issue "Ice and Snow Tourism" of *Journal of Resources and Ecology* focuses on the development and management of ice and snow tourism, the ice and snow tourism experience and its influencing factors, and ice and snow tourism impact assessment, which correspond to the supply, demand and effects of ice and snow tourism. We selected 14 representative articles to deeply interpret the status quo of ice and snow tourism and give useful suggestions for its development. In addition, we also set up one section on Tourism Culture and Ecotourism, which includes 4 excellent articles that share cutting-edge research in the fields of agricultural cultural heritage, national cultural parks, tourism ecological security, and China's flower viewing tourism.

2 Development and management of ice and snow tourism

From the perspective of supply, as of the beginning of 2021, China has 803 indoor and outdoor ski resorts of various types, covering 29 provinces, autonomous regions and municipalities, an increase of 41% over 2015 (Chen, 2022). Although the development of China's ice and snow tourism has entered the stage of rapid development, the on-going exploitation and management are still eternal issues. Chinese ice and snow tourism has various types of ice and snow tourism products because of the abundant ice and snow resources, and ice and snow tourism destinations have gradually spread all over the China (Tang et al., 2022). Unfortunately, problems such as insufficient planning in the early stage and weak follow-up in the later stage have also been exposed. As an ecologically fragile tourism resource, ice and snow resources are greatly affected by the external environment. Therefore, every step of ice and snow tourism development deserves a great deal of attention. As far as

"ice resources" are concerned, global warming is accelerating the melting of the glaciers, and unreasonable tourism exploitation will be fatal for glacier tourism destinations. Behind the blind development is a lack of early suitability assessment, in which the construction of an effective assessment system is the top priority. Considering ski tourism as the core of ice and snow tourism development, Wu et al. (2022) took 117 ski resorts in Beijing, Tianjin Province and Hebei Province as research objects, and explored the spatial and temporal distribution pattern of ski resorts through geospatial analysis methods such as kernel density and spatial autocorrelation. Furthermore, the influencing factors behind this distribution are deeply excavated, showing that the evolution of the distribution of ski resorts in the Beijing-Tianjin-Hebei region shows a significant Olympic event-driven characteristic, which also means it was greatly influenced by policies. Among other studies, Yu et al. (2022) selected four factors, including regional tourism resources, the natural environment of glaciers, service support, and market demand, to build a suitability evaluation model based on the situation in Tibet, China. The findings indicate that Tibet can be divided into four zones of suitable, relatively suitable, barely suitable, and unsuitable exploitation zones.

The reasonable development of ice and snow resources is the basis for the sustainable development of ice and snow tourism destinations. In order to improve the competitiveness of ice and snow tourism destinations, industry clustering is a significant approach. Meanwhile, another important indicator is measuring the development condition of related industries in a region. Based on the data of China's ice and snow tourism enterprises from 1985 to 2021 and using industrial cluster identification and industry correlation analysis methods, Song et al. (2022) made a deep analysis of the national ice and snow industry clusters, and identified six major industrial clusters: Beijing-Tianjin-Hebei region, Northeast, Yangtze River Delta, Pearl River Delta, Chengdu-Chongqing and Xinjiang. Further, the characteristics and influencing factors of these ice and snow tourism industry clusters were evaluated.

The 2022 Winter Olympics has definitely invigorated the passion of the public enthusiasm for ice and snow tourism. In the post-Olympic era, whether Beijing, as a rare city of double Olympics, can continue to sustain the enthusiasm for the Winter Olympics and revitalize the Winter Olympics legacy has attracted great attention. As tourism is the best way to revitalize heritage, Wang et al. (2022b) constructed a pre-competition evaluation model for ice and snow tourism heritage. Through the pre-competition summary and induction of the Beijing Winter Olympics heritage, they found that the Winter Olympics heritage has sound heritage planning in the early stage, and the factors such as the mature concept of the health of the public will contribute to the continuous development of ice and snow tourism in the

Jingzhang area in the future.

3 Ice and snow tourism experience and its influencing factors

From the perspective of demand, the big data of Tongcheng Travel shows that during the Spring Festival in 2022, the number of orders for ice and snow scenic spots across the China increased by 68% compared with the same period last year, which indicates powerful consumption enthusiasm and market potential (Zhang and Ni, 2022). Chen et al. (2022) took the whole Chinese ice and snow tourist population as the research object, and used the questionnaire analysis method and IPA analysis method to explore the satisfaction of ice and snow tourists. The results showed that most of the ice and snow tourists are “generally satisfied” with all the indicators, indicating that the current development of ice and snow tourism destinations just received passing scores, which means there is still a partial gap between the expectations and the satisfaction of ice and snow tourists. Unlike the developed countries which have a long history in developing ice and snow tourism, the vast majority of ice and snow tourists in China are beginners. Figuring out how to enhance tourists’ sense of experience and improve the satisfaction of ice and snow tourists is crucial to the long-term improvement of ice and snow tourism. Peng et al. (2022) took beginner skiers as the research object, and by analyzing the online reviews of beginners, five perception dimensions that affect the beginners’ experience were identified: interaction perception, price perception, reputation perception, risk perception and function perception. Furthermore, the positive and negative emotions were analyzed in detail. Consumers with different skill levels have different requirements for ice and snow tourism destinations. Liu et al. (2022) took the technical nature of skiing as the breakthrough point, constructed a consumption skill-travel radius decision-making model under the regulation of the comprehensive leisure environment of the ski resort, and discussed the regulatory effect of the ski resort environment on the skier’s travel radius. With the motivation of the Winter Olympics, the traditional ice and snow tourism destination of Zhangjiakou has become more energetic. Wang and Sun (2022) took Zhangjiakou City, the host city of the Winter Olympics, as the research object, and constructed a hypothesis and model of the relationship between tourists’ experience value and loyalty in the context of ice and snow tourism. There were three main discoveries from this analysis. Firstly, it verified that the functional value, emotional value and social value of ice and snow tourism resources have positive effects on tourist loyalty. Secondly, tourist satisfaction is a partial mediator between functional value, emotional value, social value and tourist loyalty, and a full mediator between cognitive value and tourist loyalty. With the implementation of the Chinese ice and snow campaign’s strategy of expansion, the south of China has already gotten

rid of the ice and snow dilemma, while Hubei, Sichuan, Wuhan, and other Provinces have become rising ice and snow consumption centers. Fu et al. (2022) focused on the southern ice and snow market, took the hierarchical model of leisure constraints as the theoretical framework, determined the constraint dimension of residents’ participation through factor analysis, and adopted Propensity Score Matching (PSM) to evaluate and compare the constraints of the participants and the non-participants.

Through research on consumers with different spending power and skill levels, five conclusions have been drawn in various studies. First of all, consumers can be divided into three types: comfort-pursuant, price-sensitive and safety-oriented (Xu et al., 2022). Secondly, for Chinese ice and snow consumers, the overall satisfaction perception is good (Tang et al., 2022). Thirdly, the negative emotions of beginners show a continuous downward trend, and the negative emotions are mainly related to price, low temperature and service (Peng et al., 2022). Fourthly, the higher the skill level of skiers, the more inclined they are to undertake long-distance skiing tourism, and vice versa. In addition, the positive adjustment effect of the snow field sports environment on the travel radius of high-tech consumers is more obvious (Liu et al., 2022). Finally, travel companions play a significant moderating role in the impact of emotional value on tourist loyalty (Wang and Sun, 2022).

4 Impact assessment of ice and snow tourism

From the perspective of effect, ice and snow tourism brings considerable economic benefits to the ice and snow industry, but it can also inflict powerful damage on the environment. Chongli District is a typical ice and snow tourism destination in the north of China with abundant natural resources, which is also one of the host cities for the 2022 Winter Olympics and was officially lifted out the poverty in 2019. Wang et al. (2022d) analyzed the degree of coupling by collecting the index data of the ski system and the local economic system in the Chongli from 2009 to 2019. Their analysis confirmed that ski tourism really helped the realization of poverty alleviation in Chongli District and promoted the healthy development of the Chongli economy. As we all know, the development of ice and snow tourism is directly affected by ice and snow resources, as it reacts to resources and they affect its environmental benefits. In order to reduce the negative impact of tourism activities on ice and snow resources, Wang et al. (2022c) started from the perspective of stakeholders, took Jade Dragon Snow Mountain and Hailuoguo as case studies, and built a responsible tourism system for glacier tourism destinations. That system focuses on the influence of the impact of tourism activities on glacier changes when the engaged stakeholders (mainly tourism enterprises, tourists, local governments, tourism associations and the central government) adopt responsible tourism strategies and measures.

5 Tourism culture and ecotourism

Compared with ice and snow tourism, cultural and ecological tourism have much longer histories of development, which makes them good examples to learn from. With the goal of providing scientific support for the sustainable management of tourism resources, Min et al. (2022) systematically analyzed the overall situation, research regions, developmental timeline trends, key fields and hot topics of resource evaluation research related to AHT over 2005–2020. From the perspective of system evolution theory, Zou et al. (2022) systematically sorted out the ideas related to international heritage management and the evolution process of the Cultural Relics Protection Unit System, in a bid to explore the origin, innovation and vision of the National Culture Park System. They found that the principle of heritage protection has developed from “authenticity” to “integrity”, and the focus of the protection object has also changed from “monism” to “diversity”, which provided a theoretical background for the burgeoning of the National Culture Park. Based on keyword discrimination of tourism ecological security (TES), tourism ecological risk and tourism ecological health, and from the perspective of ecological civilization construction, Han et al. (2022) used the databases of Web of Science and CNKI as data sources to systematically comb and analyze TES research from the aspects of development process, research methods and research content, and put forward the prospects for future research. Wang et al. (2022a) pioneered a systematic review of China’s flower-viewing tourism, and basically clarified the spatial and temporal distribution pattern and their influencing factors. They found that China has had two high-density aggregated areas, three medium-density aggregated areas and one general-density aggregated area. In addition, factors such as resource distribution and area resident population have a significant impact on the formation of the spatial and temporal differentiation pattern of flower-viewing tourism development.

6 Discussion and conclusions

We are pleased that this special issue is in-depth and profound in connotation, with both longitudinal and horizontal research. Specifically, the research areas range from national to regional to the city-level. The research methods are scientific, rational, cutting-edge and innovative, including industrial correlation analysis methods, kernel density, spatial autocorrelation and other geospatial analysis methods, content analysis methods, sentiment analysis methods, structural equation models, Delphi methods, spatial statistical methods, geographic detector methods and many others. It is worth noting that this issue combines qualitative research with quantitative research, and provides a variety of theoretical perspectives such as perceived value theory, institutional evolution theory, etc. It also builds various useful

models, including the pre-competition evaluation model for ice and snow tourism heritage, the consumption skill-travel radius decision-making influence model under the moderating effect of the ski resort comprehensive leisure environment, the evaluation model of the suitability of glacier tourism resource development, the model of the relationship between tourists’ experience value and loyalty in the context of ice and snow tourism, among others. The results of this special issue will contribute to our understanding of the development and research status of China’s ice and snow tourism, and provide a decision-making reference for the sustainable development of China’s ice and snow tourism in the post-Winter Olympics era. Furthermore, it will help readers understand the frontier trends and theories of ice and snow tourism research. The aim of this special issue is to arouse readers’ interest in ice and snow tourism research and to stimulate readers’ discussions on tourism culture and ecotourism, and ultimately provide suggestions for the high-quality development of ice and snow tourism, heritage tourism, and ecotourism.

Through the research reported herein, clearly the studies on ice and snow tourism are still in the basic stage with high repeatability. Development and construction are the mainstream issues of ice and snow tourism research. In the future, ice and snow tourism research should focus on two key aspects. On the one hand, we should focus on the natural ecological environment impact of ice and snow tourism, as discussed in Tang et al. (2021) and others. On the other hand, given the background of the post-Winter Olympics era, it is essential to consider how to promote the scientific approach to sustainable and high-quality development of ice and snow tourism, and how to keep tourists’ enthusiasm and travel motivation high, so as to maintain the current scale of China’s ice and snow tourism industry and realize the goals of 300 million people participating in ice and snow sports and 1 trillion yuan in the ice and snow economy.

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冰雪旅游可持续发展：理论与实证研究

唐承财^{1,2}, 徐诗怡^{1,2}

1. 北京第二外国语学院旅游科学学院, 北京 100024;

2. 北京旅游发展研究基地, 北京 100024

摘要: 北京冬奥会为中国冰雪旅游发展带来历史性奇迹。把握时代红利, 助力中国冰雪旅游发展是机遇, 也是挑战。本专辑通过优选 18 篇学术论文, 从冰雪旅游开发与管理、冰雪旅游体验及其影响因素、冰雪旅游影响评估三个方面深入探讨了冰雪旅游现状与未来; 同时也设立了“旅游文化与生态旅游”专栏, 分享旅游前沿研究热点。本专辑研究层次丰富, 内涵深厚。研究区域从全国到区域, 再到市县, 同时包括纵向研究和横向研究。研究方法具有实用性、前沿性、创新性, 包含产业关联分析方法、核密度、空间自相关等地理空间分析方法、内容分析法、情感分析法、结构方程模型、德尔菲法、空间统计方法、地理探测器方法等多种方法。本期专辑将定性研究与定量研究相结合, 提供了感知价值理论、制度演化理论等多种理论视角, 构建了冰雪旅游遗产赛前评估模型、雪场综合休闲环境调节作用下的消费技术-出游半径决策的影响模型、冰川旅游资源开发适宜性评价模型、冰雪旅游情境下游客体验价值与忠诚度关系的模型等多种模型。以期能够为后冬奥时代冰雪旅游发展提供理论和实践指导, 助力冰雪旅游朝着可持续和高质量方向发展。

关键词: 冰雪旅游; 冰雪经济; 北京冬奥会; 冰川旅游; 遗产旅游; 可持续发展; 旅游生态安全; 生态旅游; 国家文化公园