



The Impact of Winter Sports Events on the Local Snow and Ice Tourism Economy Opportunities and Challenges for Regional Economic Development

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Abstract. Winter sports events significantly impact local snow and ice tourism economies, driving tourism revenue, employment, and infrastructure development. This study examines these effects through the 2022 Beijing Winter Olympics case, highlighting benefits such as regional visibility and investment attraction while addressing challenges like seasonal limitations and infrastructure underutilization. Using the Integrated Snow Sports Economic Impact Model (ISSEIM), this research evaluates short- and long-term economic effects, emphasizing policy strategies like public-private partnerships (PPPs) and industry diversification. Findings suggest that optimizing post-event infrastructure and fostering sustainable tourism are key to maximizing economic benefits. This study provides insights for policymakers and businesses aiming to enhance the long-term impact of winter sports events. Overall, this study, using the 2022 Beijing Winter Olympics as a case, applies the Integrated Snow Sports Economic Impact Model (ISSEIM) to analyze the impact of winter sports events on local snow and ice tourism economies, covering revenue, employment, and infrastructure development. It suggests optimizing post-event facility use and promoting sustainable tourism to maximize long-term economic benefits.

Keywords: Winter sports, Local tourism economy, Economic growth opportunities and Challenges, Local economic development.

1 Introduction

1.1 Research Background

In recent years, the global ice and snow tourism industry has experienced rapid growth, emerging as a significant driver of regional economic development [1]. In particular, international winter sports events, such as the Winter Olympics and the World Championships in winter sports, have significantly boosted market demand for ice and snow tourism [2]. Following the successful hosting of the 2022 Beijing Winter Olympics, China has set an ambitious goal of “engaging 300 million people in ice and snow sports,” making the ice and snow economy a focal point for local governments and enterprises [3]. However, the seasonal nature of ice and snow tourism, coupled with the

periodic nature of sports events, introduces considerable uncertainties in the industry's development [4]. International experience suggests that winter sports events can drive infrastructure investment, enhance regional visibility, and increase tourist inflows, thereby fostering local economic growth [5]. Nevertheless, host regions often face sustainability challenges, such as underutilization of post-event infrastructure, low return on investment, and environmental pressures. Therefore, an in-depth study of the specific impacts of winter sports events on local ice and snow tourism economies is essential for optimizing industrial development strategies and maximizing the economic benefits of such events.

1.2 Research Aims and Significance

This study addresses three core questions: the short- and long-term impacts of winter sports events on local ice and snow tourism economies; the challenges and risks, including ROI and post-event infrastructure sustainability; and strategies to enhance sustainable development. It integrates theories from sports economics, tourism management, and regional development to fill research gaps. Practically, it provides policy recommendations for local governments and data-driven strategies for businesses. In terms of policy implications, it explores sustainable post-event infrastructure models and event planning guidelines, offering comprehensive academic and practical insights into maximizing economic benefits from winter sports events.

1.3 Research Method and Structure

This study is structured into five main sections: introduction, literature review, theoretical analysis, case study, and policy recommendations. The introduction outlines the research background, questions, and significance, followed by a review of domestic and international literature to identify existing research gaps. Theoretical analysis examines the economic mechanisms of winter sports events from both short- and long-term perspectives. Using the 2022 Beijing Winter Olympics as a case, the study empirically analyzes local economic impacts. Methodologically, it adopts the Integrated Snow Sports Economic Impact Model (ISSEIM), combining quantitative and qualitative approaches. Tools such as Input-Output (I-O) models, Computable General Equilibrium (CGE) analysis, ARIMA forecasting, endogenous growth models, and industrial cluster analysis are employed to assess both immediate and sustained economic effects.

2 Literature Review

Winter sports events generate considerable economic benefits for host cities, offering both short- and long-term impacts. In the short term, such events stimulate tourism revenue, elevate hotel occupancy rates, and boost consumption in the hospitality and retail sectors. They also create employment opportunities, particularly in the service industry, although these effects are often temporary due to the seasonal nature of winter sports.

Long-term benefits include enhanced international visibility, increased foreign investment, and improvements in infrastructure, particularly in transportation and sports facilities. However, insufficient post-event planning can lead to underutilized venues and increased fiscal pressures for local governments. To assess the multifaceted impacts of winter sports events, the Integrated Snow Sports Economic Impact Model (ISSEIM) is applied, incorporating both quantitative and qualitative methods to evaluate five dimensions: economic growth, infrastructure development, industrial linkages, environmental sustainability, and social impact. Theoretically, this study draws on multiple economic frameworks. Keynesian economics explains short-term demand stimulation through government expenditure and highlights the multiplier effect in local economies. Endogenous growth theory emphasizes the role of technological and human capital investments in sustaining long-term development. Spatial economics demonstrates how mega-events can accelerate regional integration and infrastructure expansion, while capitalization theory underlines the role of enhanced infrastructure and visibility in attracting high-quality investment and talent. However, opportunity cost theory raises concerns over resource allocation efficiency, and sustainable development theory stresses the importance of balancing economic growth with environmental stewardship. To guide host cities in maximizing long-term benefits, this study proposes a multi-framework policy strategy. The sustainable development policy framework emphasizes the triple bottom line—economic, social, and environmental gains. The city-size adaptive policy framework advocates infrastructure upgrades and post-event planning in large cities, while encouraging industrial specialization and investment incentives in smaller cities. Lastly, the fiscal and risk management framework calls for phased investments, public-private partnerships, and long-term financial planning to mitigate fiscal risks. Collectively, these frameworks aim to foster sustainable, inclusive, and resilient economic development through winter sports events.

3 Case Study Explanation: the 2022 Beijing Winter Olympics

The 2022 Beijing Winter Olympics were held from 4th February to 20th February 2022, making Beijing the first city in the world to have hosted both the Summer and Winter Olympic Games [6]. The event was not only a grand sports spectacle but also had profound economic implications for China, particularly in infrastructure development, tourism, and the ice and snow economy. According to the International Olympic Committee, the Beijing Winter Olympics attracted nearly 3,000 athletes from over 91 countries and regions, with a global audience reach exceeding 2 billion during the event [7]. Meanwhile, official Chinese data indicate that more than 300 billion RMB was invested in infrastructure, event organization, and supporting industries. Firstly, the hosting of the Olympics significantly benefited the tourism, hospitality, and food and beverage industries in Beijing and its surrounding cities. According to official statistics, Beijing and Zhangjiakou generated a total tourism revenue of 33.44 billion RMB during the Winter Olympics, reflecting an approximate 20% increase compared to 2021. The event also accelerated the rapid growth of China's ice and snow tourism market. Data from

the Ministry of Culture and Tourism show that during the 2021–2022 winter season, coinciding with the Winter Olympics, the number of ice and snow tourists in China reached 340 million, generating a revenue exceeding 475 billion RMB [8]. Furthermore, luxury hotels and boutique accommodations in Beijing, Zhangjiakou, and Yanqing achieved occupancy rates of over 90%, with four-star and above hotels experiencing a price surge of approximately 40%, some reaching an average nightly rate of over 2,000 RMB [9]. Additionally, according to data from platforms such as Meituan and Da Zhong Dian Ping, the volume of food orders in the vicinity of the Beijing Olympic Village increased by 35% compared to previous years, with restaurants specializing in Beijing roast duck, hot pot, and other local delicacies witnessing a 30% rise in average daily revenue. Secondly, the Beijing Winter Olympics served as a catalyst for major infrastructure advancements in China, enhancing transportation networks, modernizing sports venues, and promoting green and sustainable urban planning [10]. In preparation for the event, the government invested approximately 58 billion RMB in the construction of the Beijing-Zhangjiakou High-Speed Railway, a 174-kilometer-long railway that became the world's first intelligent high-speed rail operating at 350 km/h, reducing travel time between Beijing and Zhangjiakou to just 50 minutes [11]. Additionally, Beijing expanded its metro system by more than 100 kilometers, including the newly developed Winter Olympics branch line, which significantly improved urban transportation capacity [12]. Regarding venue construction, 12 competition venues were utilized, many of which were designed with sustainability in mind [13]. For instance, the National Speed Skating Oval, known as the "Ice Ribbon," implemented the world's most advanced carbon dioxide transcritical direct cooling technology, which is 30% more energy-efficient than traditional refrigeration methods [14]. After the conclusion of the Olympics, these venues will be repurposed for public fitness programs and future international competitions, such as the 2023 Winter Universiade [15]. Furthermore, the Beijing Winter Olympics marked the first time in history that 100% of all venues were powered by renewable energy, reducing carbon emissions by approximately 3.2 million tons [16]. Over 700 hydrogen-powered fuel cell vehicles were deployed for athletes and staff transportation, reinforcing the event's commitment to sustainability [17]. Thirdly, the Winter Olympics significantly boosted China's ice and snow economy. The Chinese government introduced the "300 million people participation in ice and snow sports" initiative, which substantially expanded the domestic winter sports market [18]. When Beijing was awarded the Olympic bid in 2015, China's ice and snow industry was valued at approximately 270 billion RMB; by 2025, it is projected to exceed 1 trillion RMB [19]. The number of ski resorts nationwide grew from 568 in 2015 to 803 in 2022, with a notable increase in indoor ski facilities [20]. Additionally, the Winter Olympics facilitated unprecedented growth in the domestic winter sports equipment and apparel industry. Chinese brands such as Anta reported over a 50% increase in sales in 2022 [21]. Meanwhile, Zhangjiakou, Hebei, has emerged as a major hub for ice and snow equipment manufacturing, with industrial parks receiving over 4 billion RMB in total investment and attracting collaborations with multiple international enterprises [22]. Lastly, the Winter Olympics created both direct and indirect employment opportunities, albeit with some temporary job fluctuations. According to official statistics, the preparation and hosting of the Beijing Winter Olympics generated approximately 840,000

jobs in various fields, including event operations, venue management, and volunteer services [23]. More than 20,000 volunteers were recruited, not only contributing to the event but also gaining valuable professional training and employment prospects. Additionally, the expansion of the ice and snow industry led to an increase in demand for specialized occupations. The number of certified ice and snow sports instructors in China surged from fewer than 5,000 in 2015 to approximately 50,000 in 2022 [24]. The growing number of ski resorts and ice rinks also fueled demand for ski instructors, equipment maintenance personnel, and event organizers, with overall employment in the ice and snow industry projected to exceed 1 million by 2025 [25]. However, following the conclusion of the Winter Olympics, temporary positions in areas such as event venue operations and volunteer roles were phased out, leading to short-term employment adjustments in certain regions [26]. Despite this, the long-term impact of the Winter Olympics on sports tourism and the ice and snow industry is expected to continue fostering employment growth and economic development in the future.

4 Case Study Analysis: the 2022 Beijing Winter Olympics

Large-scale winter sports events, such as the 2022 Beijing Winter Olympics, have significantly contributed to the short-term economic growth of host cities, particularly in the tourism, hospitality, and restaurant industries. This phenomenon aligns with Keynesian economic theory, which suggests that government investment in large-scale sporting events can stimulate aggregate demand, thereby driving short-term economic expansion. Furthermore, the successful hosting of the Winter Olympics has played a crucial role in promoting the local winter sports industry, expanding market opportunities, attracting foreign investment, and creating growth prospects for local ski equipment manufacturers, leading to increased sales revenue. In addition, such events directly or indirectly contribute to job creation, enhancing local employment opportunities, improving residents' satisfaction levels, and further stimulating economic growth in the short term. However, from a long-term economic perspective, large-scale winter sports events may pose potential economic challenges. For instance, during the preparation for the Beijing Winter Olympics, the government invested heavily in infrastructure and adopted sustainable development strategies in sports venue construction to ensure long-term post-event value. Nevertheless, significant risks remain, including economic pressure arising from the mismatch between investment and revenue, as well as financial losses due to venue underutilization and high maintenance costs. The Athens Olympic venues serve as a notable example of such risks. Moreover, the employment opportunities generated by these events are often temporary, disappearing as the season changes or as the event concludes. This results in seasonal employment fluctuations, requiring structural adjustments in the local labor market to maintain employment stability. From a long-term economic perspective, winter sports events may encounter challenges such as low infrastructure utilization rates, environmental pressures caused by large-scale construction, and fiscal burdens associated with the maintenance of sports venues. To mitigate post-event economic risks and optimize long-term economic benefits, host cities can implement several key strategies. First, optimizing venue

utilization by transforming Olympic venues into tourist attractions, public fitness centers, or commercial convention spaces can ensure sustainable revenue generation. Second, sustaining the development of the winter sports industry through continued government investment in winter tourism, sports training, and equipment manufacturing can promote long-term market growth. Finally, implementing effective fiscal planning, such as adopting long-term financial management strategies and introducing public-private partnership (PPP) models which involves collaboration between a government agency and a private-sector company that can be used to finance, build, and operate projects, can help balance investment and returns. By applying these measures, host cities can better manage economic risks and ensure sustainable economic growth after hosting large-scale winter sports events.

5 Conclusion

This study employs the 2022 Beijing Winter Olympics as a case to assess the economic impact of winter sports events on local snow and ice tourism, revealing significant short-term benefits in revenue, employment, and infrastructure, alongside enhanced regional visibility and investment. However, it also identifies challenges including seasonality, underutilized infrastructure, and fiscal pressures. Using the ISSEIM model, the research offers policy recommendations such as PPPs and industrial diversification. Limitations include reliance on a single case and short-term data. Future research should expand to multi-city, longitudinal studies, integrating environmental and technological dimensions for sustainable development.

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