# Regional Economic Effects of Ski Resorts in the Post-Winter-Olympics Era: A Case Study of Nanshan Ski Resort, Beijing

**Fashun Yu**[1, a,*]

[1]University of Science and Technology Beijing, No. 30 Xueyuan Road, Haidian District, Beijing 100083, China
a.18613323079@163.com
***Corresponding Author**

**Abstract:** Ski resorts function as sports consumption facilities, not tourism attractions. Their economic effects on host regions follow a different logic from that of conventional scenic spots. This study treats Nanshan Ski Resort in Beijing's Miyun District as a case, drawing on three sets of materials: the annual China Ski Industry White Paper, the Miyun District statistical communique, official pricing data from the resort, and six semi-structured interviews conducted on-site in January 2025. Three findings emerge. First, the resort sold 84,000 tickets via Meituan in December 2024, an increase of roughly 26% year-on-year, generating approximately 33 million RMB in monthly direct consumption. This revenue base rests on high-frequency sports participants, not one-time visitors. Second, the resort's economic radiation follows a pattern of sports consumption circle attenuation: consumption pull is concentrated within roughly 2 km of the resort [Note 1], with limited penetration across Miyun District as a whole. This attenuation cannot be reduced to geographic distance alone; the purpose-specificity of sports consumption is the central behavioral mechanism. Third, the national skier conversion rate stands at roughly 3% (77.4% of participants ski only once or twice per year), which fundamentally constrains the resort's contribution to sustained regional growth. The paper argues that industry subsidies should be tied to sports participation quality indicators rather than raw visitor counts, that year-round operation should be guided by sports complementarity rather than product substitution, and that regional planning should acknowledge circle attenuation as an empirical fact rather than a problem to be engineered away.

**Keywords:** Sports Economics; Ski Resort; Sports Consumption; Regional Economic Effect; Sports Consumption Circle

## 1. Introduction

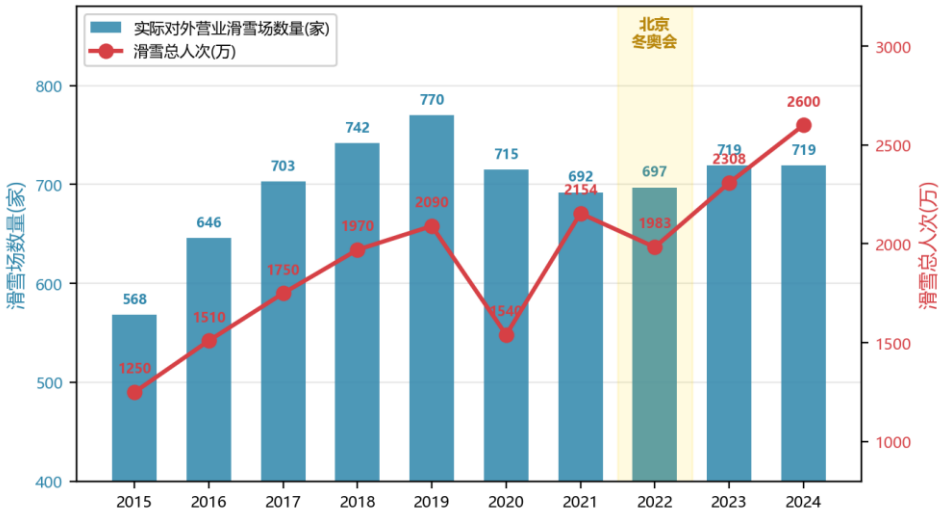


Figure 1. Ski resort counts and total ski visits in China, 2015-2024.

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In the two snow seasons following the 2022 Beijing Winter Olympics, China's ski industry has registered sustained growth across headline indicators. Wu Bin's 2023-2024 China Ski Industry White Paper reports 719 ski resorts in actual operation nationwide (excluding dry slopes and simulators), with total visits reaching 23.08 million--surpassing the Olympic-season peak (Figure 1). Participation stood at approximately 12.80 million skiers, yet the average number of visits per person was only 1.80 [1]. At the industry level, the total scale of China's ice and snow sector was projected to reach roughly 970 billion RMB in 2024 [2], with seasonal consumption estimated at 78.61 billion RMB, up 12.88% year-on-year [3].

Table 1. Core indicators of China ski industry, 2023-2024 season.

| Indicator | Value | YoY Change | Source |
|---|---|---|---|
| Ski resorts in operation | 719 | +3.16% | [1] White Paper |
| Total ski visits | 23.08 million | +16.3% | [1] White Paper |
| Ski participants | 12.80 million | +14.49% | [1] White Paper |
| Avg visits per person | 1.80/year | +1.69% | [1] White Paper |
| Indoor ski resorts | 60 | +20% | [1] White Paper |
| Destination-type resorts | 29 (6.6M visits) | +52.87% | [1] White Paper |
| Industry scale | ~970 bn RMB | +22.5% | [2] CTA |
| Seasonal consumption | 78.61 bn RMB | +12.88% | [3] GAS |

Aggregate growth masks a structural problem. Mob Research Institute's national survey found that 77.4% of Chinese ski experience participants ski only once or twice per year, with a conversion rate to sustained participation of roughly 3%, against 10-15% in developed countries [4]. The gap means that most resorts' visitor growth comes from one-time experience traffic rather than from a returning core sports population. For local governments that have folded the ice and snow industry into regional development strategies, this is a nontrivial constraint.

Existing studies have largely treated ski resorts as tourism destinations, applying tourism multiplier or input-output frameworks. Liang et al. (2023) estimated Xinjiang's ski industry output multiplier at roughly 2.3, with the strongest effects on transport, accommodation, and catering [5]. Wang, Jiang et al. (2022) used a coupling coordination model for Chongli and confirmed that ski tourism contributed to regional economic improvement, while documenting significant urban-rural disparities in the spillover effects [6]. These studies provide a methodological base, but they miss a distinction that matters: ski consumption is sports consumption, not tourism consumption. The two differ along four dimensions--skill threshold, equipment dependence, participation inertia, and spatial specificity--that jointly determine how economic effects transmit and what constrains them (Downward et al., 2009; Li, 2019) [7-8].

International empirical work points in a similar direction. Lasanta et al. (2007) tracked ski resorts in the Spanish Pyrenees over three decades and found that economic effects concentrated spatially: nearby municipalities benefited, distant ones continued to decline [9]. Flagestad and Hope (2001) argued from a sustainable value-creation perspective that a winter sports destination's competitive advantage depends on the fit between natural endowments and operational capability, not on expanding visitor volume alone [10]. Domestically, Zhang et al. (2020) reviewed methodological debates in event economic impact assessment and identified the shift from event-effects to facility-effects as a productive direction for empirical sports economics [11].

The paper is organized as follows. Section 2 builds the sports consumption circle framework from the four characteristics above and distinguishes it from the tourism-economics core-periphery model along three dimensions. Section 3 takes Nanshan Ski Resort as the case, layering pricing data, district-level statistics, and six interviews to examine consumption structure, contribution scale, and radiation attenuation. Section 4 turns to seasonal rigidity as a structural constraint. Section 5 summarizes the findings and draws out policy implications.

Nanshan was chosen for three reasons. It is the largest resort in the Beijing area (over 266 hectares, 23 trails, more than 500,000 visits annually), giving it case typicality. It sits in Miyun District, whose 2024

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GDP was 45.71 billion RMB with the tertiary sector at 74.8%--and whose culture, sports, and entertainment subsector grew 39.5% year-on-year [12] (Table 2). And the author had already collected six in-depth interviews at the site, covering three core sports participants and three beginner or family-experience visitors, which can calibrate the macro-level statistics.

Table 2. Key economic indicators, Miyun District, Beijing, 2023-2024.

| Indicator | 2023 | 2024 | YoY Change |
|---|---|---|---|
| GDP | 37.40 bn RMB | 45.71 bn RMB | +4.2% |
| Tertiary sector value-added | 26.56 bn RMB | 34.18 bn RMB | +4.6% |
| Tertiary sector share | 71.0% | 74.8% | +3.8 pp |
| Culture, sports & entertainment VA | Not separately reported | 0.76 bn RMB | +39.5% |
| Leisure agriculture & rural tourism revenue | 0.84 bn RMB | 0.84 bn RMB | +0.2% |

## 2. Analytical framework: ski resorts as sports consumption facilities

### 2.1. Sports economics characteristics of ski consumption

In sports economics, four features distinguish sports consumption from general leisure consumption: skill threshold, equipment dependence, participation inertia, and spatial specificity (Downward et al., 2009; Li, 2019) [7-8]. Skiing scores high on all four, and empirical data are available to back each dimension.

Skill threshold. Skiing requires systematic learning. Beginners typically need three to five coached sessions before skiing independently. National survey data put training expenditure at roughly 10.96% of total ski consumption, with the share higher among first-timers [3]. Four of the six interviewees had purchased coaching; one reported paying 400 RMB per hour. Beyond the ticket price, coaching fees act as a hidden entry cost that lifts the baseline spend per visit.

Equipment dependence. Skiing ranks near the top among sports in equipment intensity. Basic rental (skis, boots, poles) is bundled into the ticket at Beijing-area resorts, but adding ski clothing (about 35 RMB per set) and helmet, goggles, gloves (about 50 RMB per set) adds roughly 85 RMB per visit. A full entry-level self-purchased kit runs about 10,000 RMB. The structural split matters: low-frequency visitors rent (85-250 RMB per trip); high-frequency visitors buy (10,000 RMB upfront plus annual maintenance). The two paths have different economic footprints--the former is tied to ticket revenue, the latter can support a standalone equipment retail sector around the resort.

Participation inertia. The national average of 1.80 visits per year [1] conceals two very different populations. Core sports participants with their own gear make 6-15 visits per season; the 77.4% experience-type population rarely returns. I call this the dual structure of ski consumption: a small high-frequency segment drives most of the resort's revenue, while a large low-frequency segment drives the visitor count. Section 3 disaggregates this empirically.

Spatial specificity. A ski resort cannot relocate. It requires slope, snowfall, and winter cold. The resorts around Beijing sit in suburban mountain terrain--Nanshan is roughly 62 km from the city center, Jundushan about 40 km, Yuyang about 80 km. This distance band falls within a self-drive, same-day-return radius, which supplies the geographic basis for suburban ski consumption. It also sets an outer boundary on economic radiation: the interview data in Section 3.3 will show that beyond a certain distance from the resort, consumption pull drops sharply [Note 1].

[Note 1] The approximately 2 km attenuation boundary reported in this paper is inferred from the consistent negative evidence across all six interviewees (none reported consumption anywhere in Miyun outside the resort) combined with the geographic distance of roughly 1.5-2 km from the resort to the nearest off-site consumption location. It is an approximate empirical boundary, not a precise measurement; the exact position and shape of the attenuation threshold require spatial econometric calibration in future work.

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### 2.2. The sports consumption circle framework

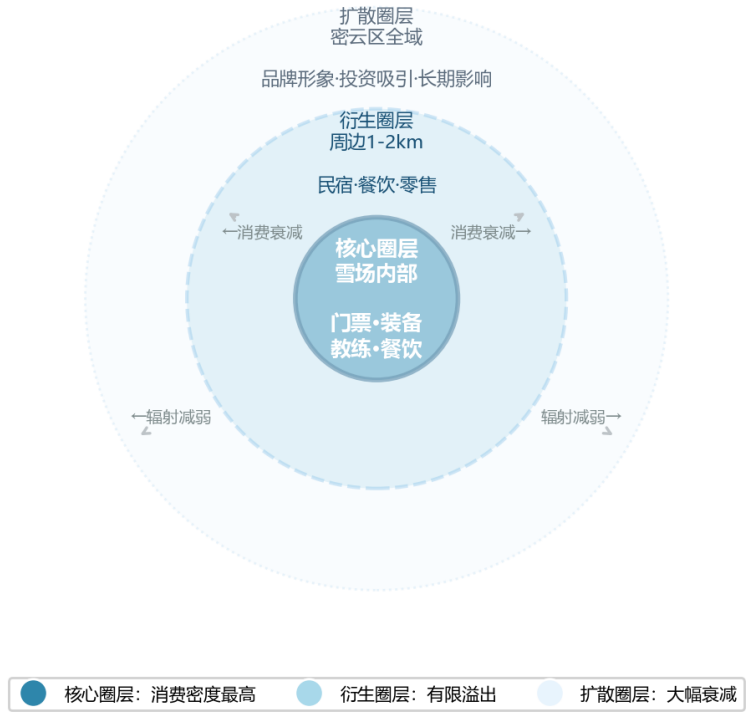


Figure 2. Schematic of the sports consumption circle.

Taking the four characteristics as premises, Figure 2 sketches the analytical framework--three concentric circles mapping how the resort's economic effects transmit through space.

Core circle (within the resort). Ticket sales (weekday 210 RMB / weekend 350 RMB / holiday 380 RMB, per the resort's published pricing [13]), equipment rental, coaching (roughly 300 RMB/hour), and on-site dining and lodging. The primary consumers here are high-frequency sports participants and leisure-experience visitors. Consumption density is highest in this circle and takes resort operating revenue as its principal form.

Derivative circle (roughly 1-2 km surrounding the resort [Note 1]). Guesthouses, farmhouse restaurants, retail dining, and ski equipment shops and repair services. Beneficiaries are mainly local residents and small businesses in Miyun. The scale of consumption in this circle depends on how long core-circle visitors stay and whether they are inclined to spend beyond the resort.

Diffusion circle (Miyun District at large). The resort's brand effect on regional image, indirect stimulus to off-season tourism, and potential to attract outside investment. Effects in this circle are indirect, long-term, carried through extended transmission chains, and inherently difficult to quantify precisely.

The framework resembles the core-periphery model of tourism economics in spatial form, but differs in three substantive ways. The first is the driving mechanism. The core-periphery model relies on spatial gradients in transport costs and land prices to account for the distribution of economic activity. The sports consumption circle instead emphasizes purpose-specificity: the skier's behavioral logic is "participate in skiing → incidental ancillary consumption," not "take a trip → try skiing along the way." Ancillary spending is not an autonomous expansion of tourism behavior; it is auxiliary attachment to sports consumption. The second difference is the attenuation pattern. The core-periphery model predicts a gradual, continuous gradient along transport corridors. The interview data here point to a nonlinear break: ancillary consumption drops to near zero at roughly 2 km [Note 1]. The third difference is in policy implication. The core-periphery model implies that improving transport access can smooth the attenuation curve. This framework predicts that transport improvements alone cannot overcome purpose-specificity: unless the outer area provides complementary products with independent draw (rather than parasitic offerings that depend on ski traffic),

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the radiation radius will not expand much with better roads. These three distinctions carry the paper's theoretical contribution.

## 3. Sports consumption structure and economic contribution of nanshan ski resort

### 3.1. Visitor segmentation and consumption differentials

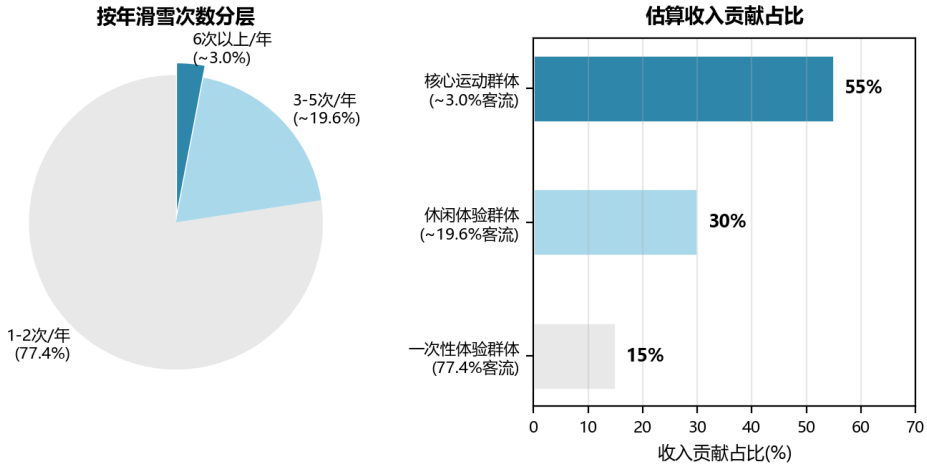


Figure 3. The scissors gap between visitor segmentation and revenue contribution.

The segmentation draws on two data sources, cross-checked. At the macro level: Mob Research Institute's (2024) large-sample survey yields the 77.4% figure for one-to-two-time visitors and the roughly 3% stable conversion rate [4]; the General Administration of Sport (2025) consumption survey supplies consumption structure data by visit frequency [3]. At the resort level: Nanshan's own pricing of multi-visit passes (a 10-visit day pass costs 3,080 RMB, about 308 RMB per visit--a price structure that embeds a commercial assumption about the size of the high-frequency customer base) [13]; the author's on-site observation of visitor composition and interview respondents' self-reported behavior; and the full consumption records of the six interviewees in Table 4 below. The two data sources align on key parameters: the national 77.4% experience share corresponds in order of magnitude to Nanshan's combined share of one-time plus part of the leisure-experience segment (roughly 65-75%); the national 1.80 average visits per year sits at the weighted mean consistent with a visitor structure dominated by low-frequency segments.

To be clear: the segment shares reported below (core sports 25-35%, leisure-experience 40-50%, one-time 15-25%) are not direct extractions from resort internal data. They are cross-inferences from the two data sources described above. Two sources of uncertainty are acknowledged. Nanshan has not disclosed actual season-pass or multi-visit-pass issuance, so the core segment's precise size is unknown. The boundary between leisure-experience (1-5 visits) and one-time (1 visit) is coarse--a three-visit skier and a one-visit skier have meaningfully different consumption patterns, and finer data would be needed to separate them cleanly. The economic contribution estimates in Section 3.2 use intervals rather than point estimates, and Section 5.3 returns to the implications of this uncertainty.

With those caveats on the table, the segmentation yields three tiers (Figure 3). The scissors gap between visitor share and revenue share is visible at a glance.

Core sports participants. Operationalized as six or more visits per season, partial or full ownership of equipment, and independent skiing ability. The three interviewees in this category reported per-visit spending of 600-800 RMB and annual spending of 8,000-15,000 RMB. At a 30% visitor share (roughly 150,000 person-visits) and a median annual spend of 10,000 RMB, this segment injects about 150 million RMB per year. The value goes beyond that number: once a skiing habit forms, the consumption decision shifts from whether to go to how often, and the marginal customer-acquisition cost declines.

Leisure-experience participants. Operationalized as one to five visits per season, predominantly renting equipment, and typically purchasing coaching. Their per-visit spending is actually higher than the core

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segment (800-1,200 RMB, including coaching fees), but low revisit frequency caps their annual spend at roughly 1,500-3,500 RMB. Consumption is concentrated on holidays and weekends--one interviewed coach noted that "queuing over 30 minutes is the norm on weekends, but on weekdays there is basically no wait." At a 45% share and median 2,000 RMB per year, this segment contributes roughly 50 million RMB.

One-time experience participants. Operationalized as one visit per season, no owned equipment, spending limited to the basic ticket and minimal extras. Per-visit spend is 300-500 RMB, and the revisit rate is very low--matching the national 77.4% figure for one-to-two annual visits. At a 20% share and 400 RMB median, this segment contributes roughly 40 million RMB annually. Its per-capita annual output is about one-twentieth that of the core segment. The segment's primary value is not immediate revenue but the conversion pool it supplies: roughly 3 out of every 100 one-time visitors become sustained participants the following year.

The segmentation surfaces a tension: growth in total visitor volume can mask dilution of visitor quality. If a resort pursues volume expansion by pulling in large numbers of one-time visitors, per-capita spending may actually decline. This directly challenges the prevailing policy approach that evaluates ice-and-snow industry performance on visitor-count metrics alone--a framework that, in effect, rewards resorts for chasing footfall rather than cultivating a stable sports consumer base.

Table 3. Visitor segmentation, operational definitions, and estimated contribution.

| Segment | Definition | Share (est.) | Annual/capita (RMB) | Est. contribution |
|---|---|---|---|---|
| Core sports | 6+ visits/season, owns equipment | 25-35% | 8,000-15,000 | ~150M RMB |
| Leisure-experience | 1-5 visits/season, mainly rents | 40-50% | 1,500-3,500 | ~50M RMB |
| One-time experience | 1 visit/season, no owned gear | 15-25% | 300-500 | ~40M RMB |
| Total | - | 100% | - | ~240M RMB (range: 180-330M) |

### 3.2. Economic scale: estimates from public data with sensitivity analysis

Without access to Nanshan's internal financials, the estimates below are built from publicly available information, using intervals and scenario analysis.

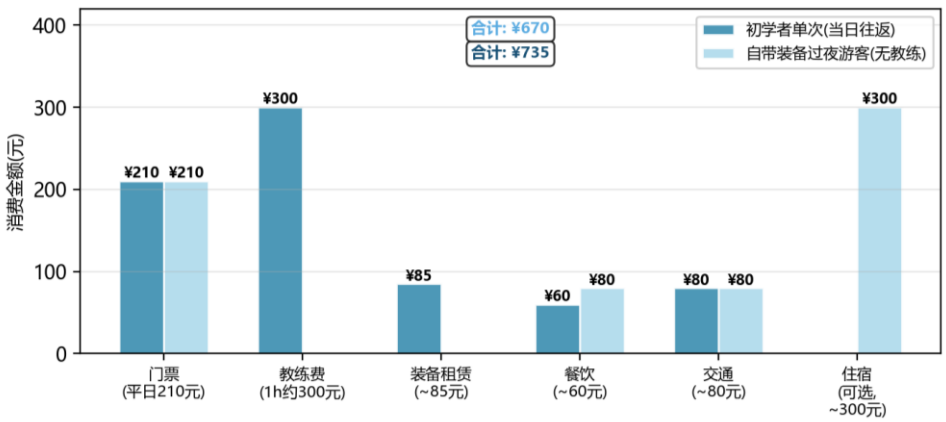


Figure 4. Per-visit ski consumption structure (based on Nanshan 2024-2025 pricing).

Ticket revenue (Figure 4). Guotai Junan Securities' 2024 industry report records Nanshan selling 84,000 tickets via Meituan in December 2024, up 26% year-on-year, for monthly ticket revenue of roughly 33.6 million RMB [14]. Across a full season (late November to early March, about 100 operating days), accounting for peak (December-February) versus shoulder (late November and early March) flow differences, a conservative estimate puts seasonal ticket revenue at 100-150 million RMB.

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Ancillary consumption. The estimates in Table 3 are derived from the segmentation; parameter shifts move the results materially. Three scenarios were run. Baseline: core 30% / 150,000 visits / median 10,000 RMB + leisure 45% / 250,000 / 2,000 RMB + one-time 20% / 100,000 / 400 RMB = roughly 240 million RMB. Conservative: core share pushed down to 25% and annual spend to 8,000 RMB, one-time share raised to 25% = roughly 180 million RMB. Optimistic: core share raised to 35% and annual spend to 15,000 RMB, one-time compressed to 15% = roughly 330 million RMB.

The estimated annual direct consumption injection from Nanshan Ski Resort into Miyun District therefore lies between 180 and 330 million RMB, with a baseline of roughly 240 million. This estimate excludes the indirect effects of the resort's brand on land values and outside investment (the diffusion circle), so the actual total contribution is likely higher.

For reference, Miyun District recorded leisure agriculture and rural tourism revenue of 84 million RMB in 2024 [12]. If the estimates are in the right order of magnitude, Nanshan and the consumption it induces represent roughly 21-39% of Miyun's annual tourism revenue. Since ski consumption is compressed into roughly five winter months, the relative share for the winter slice alone would be higher.

Miyun's culture, sports, and entertainment subsector recorded value-added of 760 million RMB in 2024, up 39.5% year-on-year--the fastest growth among all 19 tertiary-sector subcategories [12]. This statistical classification covers a much wider scope than ice and snow sports (it includes cultural services, sports training, film exhibition, performing arts, and tourist attractions), and the resort is only one component. The 39.5% figure aligns temporally with the post-Olympics expansion of the ice and snow industry, but low-base effects from 2023 and post-pandemic cultural consumption rebound cannot be ruled out as contributors. The paper treats this statistic as a macro-level reference point, not as causal evidence. Isolating the resort's specific contribution would require more granular sub-sectoral value-added data.

### 3.3. Circle attenuation: spatial boundaries of consumption radiation and alternative explanations

In January 2025, the author conducted six semi-structured interviews at Nanshan Ski Resort, each 15-25 minutes. Respondents covered core sports participants (three persons, 3-5 years of skiing, all with owned equipment) and leisure-experience or beginner visitors (three persons, one year or less of skiing, all full-rental). Questions focused on visit frequency, consumption structure, equipment ownership, and the spatial range of spending in Miyun District. Table 4 summarizes the complete information for all six respondents.

Table 4. Interviewee profiles and consumption characteristics.

| Respondent | Occupation | Ski experience | Owns gear | Visits/yr | Spend/visit (RMB) | Annual spend (est.) | Spent elsewhere in Miyun? | Consumption detail in Miyun |
|---|---|---|---|---|---|---|---|---|
| Mr. Zhang | Product manager, internet | 5 yrs, enthusiast | Full own | 8-10 | ~800-1,000 | ~10,000 | No | On-site dining only, no overnight |
| Mr. Ye | SOE staff | 3 yrs, enthusiast | Owns skis | 5-6 | ~600-800 | ~4,000 | No | On-site dining, occasional nearby B&B |
| Mr. Zhao | Marketing director, MNC | 3 yrs, enthusiast | Partial own | 4-5 | ~700-900 | ~4,000 | No | On-site dining + parking, no overnight |
| Ms. Wang | School admin | Beginner (family) | None, full rental | 2-3 | ~1,000-1,200 | ~3,000 | No | Resort + coaching + dining, no overnight |

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Mr. Tang | Travel consultant | Beginner | None, full rental | 1-2 | ~800 | ~1,200 | No (industry obs.) | Industry observation: clients come only for skiing |
| Mr. Liu | Sports goods channel mgr | Beginner | None, full rental | 1-2 | ~500-800 | ~800 | No | On-site only, tried gear, did not purchase |

When asked whether they had spent money anywhere else in Miyun District beyond skiing, all six respondents answered no. The last two columns of Table 4 record this uniformly. The convergence itself is a fact worth examining carefully.

Why does consumption not occur beyond the immediate vicinity of the resort? Four explanations can be identified and their explanatory power assessed in this case.

Explanation one: supply-side insufficiency. Miyun's urban core and surrounding area lack consumption venues with independent appeal for ski visitors--hot springs, quality dining, cultural facilities. The result is that spending gets locked inside the resort. This explanation has some empirical grounding: respondent Mr. Tang stated directly that "nothing else attracts them." But supply insufficiency cannot fully explain why all six people had zero external consumption. Miyun has mature tourist attractions such as Gubei Water Town and Chateau Changyu Afip Global. If ski visitors had demand for ancillary tourism consumption, these destinations are visible and accessible on search platforms. Supply limitations may be a necessary condition, not a sufficient one.

Explanation two: geographic distance. Nanshan is roughly 15-20 km from downtown Miyun, beyond the psychological radius for a casual detour. The explanation has some plausibility and theoretical backing--the distance-decay principle in tourism economics predicts that consumption density falls monotonically with distance. However, for self-driving visitors, a 15-km detour to Miyun on the return trip carries low time cost. Distance alone cannot account for why all six chose to skip.

Explanation three: trip-mode constraint. Nanshan's main customer base consists of Beijing residents making self-drive day trips. The daily time window is roughly 8-10 hours, of which skiing occupies 4-6 hours on snow and round-trip travel consumes 2-3 hours. The residual time budget is insufficient to support autonomous additional tourism activity. Four of the six respondents explicitly stated they did not stay overnight (Table 4), directly corroborating the time-window constraint. But there is a boundary here: this explanation handles "why not go sightseeing" reasonably well, but handles "why not even have a proper dinner outside the resort" less well. The latter may involve information search costs and habitual path dependence in consumer behavior.

Explanation four: the purpose-specificity of sports consumption--the mechanism this paper proposes. In the skier's utility function for the trip, skiing duration is assigned the highest weight. Any activity that is not skiing--even a 15-minute detour for a meal--gets pushed down in the utility ordering. The implication: even when time is sufficient, destinations are available, and distance is short, as long as the decision structure organized around "the sport itself is the point" does not loosen, ancillary consumption will not extend outward. Unlike the first three explanations, this one is demand-side. It does not deny that supply and geography contribute to attenuation; it argues that these factors are systematically weakened under a consumption-decision structure in which sports participation has lexical priority. Skiers do not refrain from spending because they cannot--they refrain because it is not the priority.

These four explanations are not competing hypotheses. They form a layered attribution framework for circle attenuation. Supply insufficiency and geographic distance supply the floor condition for attenuation: even if skiers had the motivation to spend, objective conditions would not support it. The trip-mode constraint sets the temporal boundary: under same-day-return travel, the consumption window is naturally compressed. Purpose-specificity is the behavioral core: even when time, supply, and distance conditions are all met, as long as the sports-first decision logic holds, the spatial extension of ancillary consumption remains sharply bounded. Of the four, the first three are mitigable under specific conditions (improving supply, shortening distance, encouraging overnight stays). Purpose-specificity is structural--it is rooted in

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the experiential nature of skiing itself. Products and services detached from that experience do not gain priority in the skier's consumption ordering.

The distinction carries direct policy meaning. If the dominant driver of attenuation were supply deficiency and distance, government infrastructure investment and market development could widen the radiation radius. If the core mechanism is demand-side purpose-specificity--skiers simply lack the motivation for ancillary spending--then improving peripheral supply alone will produce limited effects. One empirical strategy for distinguishing the two: observe whether skiers' off-site consumption increases after transport conditions improve or peripheral consumption supply is directly augmented. If off-site spending does not rise with supply improvements, the demand-side mechanism is favored. If it does, the supply-side mechanism is favored. Testing this requires longitudinal or natural-experiment data--a task this single-case study cannot perform, but one it leaves for subsequent research.

## 4. Seasonal rigidity and structural constraints on regional economic contribution

### 4.1. Pulsed economic contribution and temporal waste of sports human capital

The resort's economic contribution exhibits a pronounced pulse: roughly 100 days of ski season concentrate virtually all annual revenue. One interviewed ski instructor had to switch to casual labor in other sectors during the off-season. This is more than a seasonal consumption fluctuation--it is structural waste of sports human capital in the temporal dimension. Professional ski instruction skills take years of training and practice to develop (senior instructors at Nanshan command hourly rates up to 450 RMB). For roughly seven months of the year, this human capital is nearly unrealizable in the market.

At the district level, Miyun's tertiary sector contributed 34.18 billion RMB in value-added in 2024, 74.8% of GDP [12]--services are the dominant economic sector. The ideal distribution of service-sector contributions would be relatively even across the year, but the service increment generated by the ski resort is compressed into roughly five winter months. When guesthouses around the resort cycle between fully-booked winters and idle summers, and the catering sector hires at the start of the ski season and lays off at its end, what the regional economy receives is a highly uneven, pulsed injection--not a structure that can function as a stable growth anchor.

### 4.2. The sports-product supply dilemma of year-round operation

Sun (2022) and Ye (2024) have argued that ski resorts should pursue multi-format year-round operation [15-16], and Nanshan has experimented with summer outdoor development, mountain biking, and leisure vacation products to extend its operating period. Viewed through a sports-economics lens, however, year-round operation faces a structural supply constraint: the sports experience that off-season products deliver does not substitute for the core value of skiing. That core value comes from a bundle of sensory elements--the speed of descent, the centrifugal force and weightlessness in turns, the visual impact of snow-covered mountain scenery, the sense of achievement from technical progression. Summer mountain biking can partially replicate the speed element; climbing and trekking can partially replicate the physical exertion element. No single off-season product covers the full bundle. The systematic gap between off-season and winter-season visitor volumes and consumption levels is not an operational failure. It is a ceiling set by the irreplaceability of the sports experience itself.

A sports-product differentiation perspective suggests a more productive strategy: instead of trying to replace ski products with summer products, develop products that are technically complementary to skiing--dry-slope training facilities, indoor ski simulators, ski-specific physical conditioning camps, sports video analysis and technical diagnostic courses. These products can draw on the resort's existing ski instruction system, trail design expertise, and event operations capability, and they target the core sports participant segment during the off-season. The honest acknowledgment is that the market ceiling for such complementary products is far lower than for winter skiing--a constraint rooted in the irreplaceability of the skiing experience, not one that policy instruments can overcome.

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### 4.3. Constraint or advantage? a conditional reconciliation

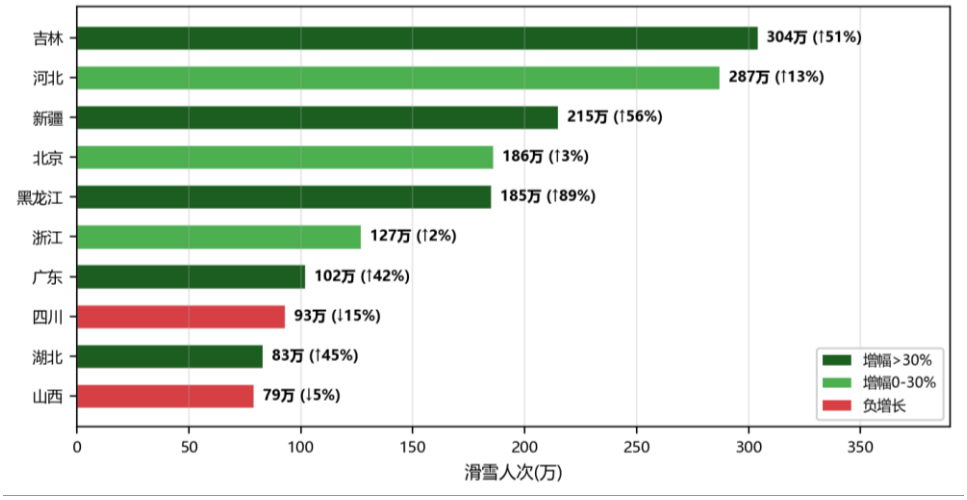


Figure 5. Ski visits by province and year-on-year growth, 2023-2024 season.

The preceding two subsections have documented the constraint side of seasonal rigidity: pulsed economic contribution, temporal idling of human capital, the natural ceiling on off-season products. But seasonal rigidity is simultaneously the source of scarcity value: precisely because of the high natural threshold (winter cold, mountain terrain with adequate slope), locations that can host skiing possess an irreplaceable locational value. Miyun's winter temperatures and hilly topography constitute its sports comparative advantage within the Beijing-Tianjin-Hebei region.

These two opposed empirical claims--seasonality as constraint and seasonality as advantage--can coexist under a conditional proposition. Seasonal rigidity manifests as constraint when within-season consumption absorption efficiency is low. Consumption efficiency here is defined as consumption output density per unit of ski-season time. When efficiency is low--cable-car capacity is inadequate and visitors spend precious snow time in queues, or trail structure is misaligned and specific skill-level segments attrit--seasonal rigidity works against the resort: a window that is already short is not being fully used. When efficiency is raised--queues shorten, trail progression matches skier needs--seasonal rigidity converts into effective comparative advantage: the irreplicability of natural conditions gives an efficiently operated resort a stronger market barrier that late entrants must overcome on two fronts simultaneously.

The empirical data are consistent with this framing. Beijing recorded 1.86 million ski visits in the 2023-2024 season, ranking fourth nationally, but the year-on-year growth rate was only 3.06%--far below Jilin (51.24%), Xinjiang (56.48%), and Heilongjiang (88.65%) [1] (Figure 5). Beijing's low growth rate is directly linked to capacity saturation at its suburban resorts: with lift capacity and trail area approaching their ceilings, further volume expansion is limited. The pattern matches the conditional proposition: Beijing's suburban resorts are still constrained on within-season consumption efficiency (by lift capacity, trail capacity), and growth has already decelerated. In contrast, Jilin, Xinjiang, and Heilongjiang are still in the phase where new resort supply and capacity expansion are releasing.

The strategic implication for Nanshan at the current stage is not to pursue further visitor volume growth--with capacity constraints unresolved, the marginal space for scale expansion is narrow. The higher-priority items are: lift capacity improvements to reduce queuing time, trail gradient optimization to match the progression paths of skiers at different ability levels, and differentiated events and brand activities to consolidate the engagement stickiness of the core sports segment. The logic is to convert the limited 100-day ski-season window into higher per-visitor consumption quality. This strategy of maximizing the ski season is bounded by the current stage at which resort capacity is not yet fully utilized. If and when within-season consumption efficiency reaches the capacity ceiling, further economic effects will require either spatial expansion (new resorts) or temporal expansion (a second growth curve from complementary four-season products).

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# 5. Conclusions and policy implications

## 5.1. Principal findings

This paper has approached ski resorts as sports consumption facilities rather than tourism attractions, using Nanshan Ski Resort as a case, and drawing on industry statistics, published pricing data, and six in-depth interviews. Three findings stand out.

Finding one: the sustainable increment of a ski resort's economic effect comes from the repeat consumption of the core sports segment, not from growth in total visitor volume. The national skier conversion rate is roughly 3%. Nanshan's visitor base exhibits a clear three-tier structure (Table 3), with the core sports segment contributing over 60% of direct consumption through roughly 25-35% of visitor volume. Sensitivity analysis shows that even under conservative parameters, the core segment's annual contribution exceeds 120 million RMB. An industry assessment regime that uses visitor counts as the sole metric may, in effect, be incentivizing resorts to pursue low-quality volume expansion--total footfall rises, but per-capita spending can go the other way.

Finding two: the resort's economic radiation exhibits sports consumption circle attenuation (Figure 2). The consumption behavior of all six interviewees converges on spending confined to the resort interior and its immediate vicinity (Table 4). Four explanations were examined for attenuation: supply insufficiency and geographic distance supply the floor condition, the trip-mode constraint sets the temporal boundary, and the purpose-specificity of sports consumption constitutes the behavioral core. Purpose-specificity is structural and not readily alterable through conventional policy instruments. Miyun's 39.5% growth in the culture, sports and entertainment subsector is industrially correlated with resort operations, but ski visitor flows do not automatically convert into district-wide tourism visitor increments.

Finding three: seasonal rigidity is a structural attribute of skiing, not an operational deficiency. The paper proposes a conditional proposition to reconcile the two faces of seasonality: whether it manifests as constraint or advantage depends on the level of within-season consumption absorption efficiency. The deceleration of Beijing's ski-visit growth to 3.06% (Figure 5) signals that capacity constraints at suburban resorts are beginning to bind. The appropriate direction at this stage is to raise the consumption absorption efficiency of the existing ski season, not to search reluctantly for off-season substitutes in the broad-spectrum outdoor market--an endeavor whose ceiling is set low by the irreplaceability of the skiing experience.

## 5.2. Policy implications

One premise should be stated before the specific suggestions. The policy discussion below rests on a normative position: if the positive externalities of ski resorts (employment, consumption injection, brand enhancement) warrant public expenditure, then the design task is to make that expenditure as efficient as possible. The paper does not presume that resorts should be subsidized--that judgment depends on local government fiscal capacity, public preferences, and policy priorities. It addresses the narrower question: if subsidies are provided, how should the mechanism be designed to improve efficiency?

Suggestion one: reorient industry support from visitor-volume metrics to visitor-quality metrics. Miyun's current support instruments for the ice and snow sector include fiscal subsidies, tax preferences, and infrastructure investment [12], with performance assessment tied primarily to visitor counts and resort scale. The segmentation analysis indicates that a volume-only orientation can incentivize resorts to chase one-time experience traffic rather than cultivate a stable sports consumer base. Adding quality-dimension indicators--season-pass and multi-visit-pass sales, total coaching hours delivered per season by the ski school, core-customer revisit rates--would tie subsidies to sports participation quality. Implementation could proceed in three phases: near-term, add a ski-specific survey module to the existing tourism statistics framework to capture the visit-frequency distribution; medium-term, link survey-derived quality indicators to subsidy calculations; long-term, construct a differentiated subsidy standard based on sports participation quality. The main resistance will come from resorts' commercial sensitivity about disclosing operating data--a matter to be resolved in the negotiation between government subsidy design and firms' information protection.

Suggestion two: acknowledge circle attenuation and implement differentiated spatial planning. The attribution analysis in Section 3.3 points to purpose-specificity as the core behavioral mechanism driving

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attenuation; improving transport access or expanding peripheral supply alone will not fundamentally alter the radiation radius. A more operational spatial strategy is: within a 1-2 km radius of the resort, concentrate sports-derivative services with direct technical links to skiing--equipment retail, sports rehabilitation, ski training--which have a higher probability of entering the skier's consumption decision during a sports-motivated trip. In the outer zone, develop independent attractions with complementary (not parasitic) relationships to skiing--hot-spring wellness, cultural experiences, mountain sports--creating a bifurcated combination of sports consumption plus leisure consumption, rather than the inefficient strategy of forcibly converting ski visitor flows into tourism visitor flows.

Suggestion three: year-round operation should follow sports logic, not tourism logic. Section 4.2 established that the strategy of replacing ski products with summer products is bounded by the irreplaceability of the sports experience. A more productive path is to encourage resorts, in partnership with sports universities and ski industry associations, to develop off-season product sequences with technical links to skiing--dry-slope training, indoor simulation, physical conditioning camps--locking in the core sports segment, the most valuable consumer niche, within the limited off-season market. Policy instruments that could support this include: including such technically linked product development within the funding scope of sports industry development special funds; lowering the technical entry threshold for resort-university collaborations; and providing facilitation in land-use conversion approvals for off-season sports training facilities.

### 5.3. Research limitations and future directions

This study rests on a single case and six interviews. The external validity of the findings is limited by sample size and geographic specificity. Whether the core proposition--sports consumption circle attenuation, with purpose-specificity as the central behavioral mechanism and the roughly 2 km attenuation breakpoint [Note 1] as an empirical observation--holds in larger samples (multi-resort comparative designs, large-N skier surveys) requires independent testing and calibration in subsequent research. The segment-share estimates and the derived economic contribution estimates are bounded in precision by the unavailability of resort-internal operating data--an information-asymmetry constraint common in single-case research.

Three specific directions are proposed for future work. First, obtain granular operating data to improve segmentation precision. If researchers can establish data-sharing arrangements with resorts to access anonymized records of season-pass, multi-visit-pass, and single-ticket sales, the segment structure can be derived directly from purchase behavior, replacing the indirect cross-inference method used here.

Second, conduct cross-resort comparative research to test the generality of circle attenuation. A synchronous comparative design across Nanshan, Jundushan, and Yuyang in the Beijing-Tianjin-Hebei region could test whether the spatial pattern of consumption circle attenuation--and the roughly 2 km attenuation breakpoint in particular--is replicable across resorts with different locational conditions and scale grades. Comparative findings would supply stronger empirical support for the purpose-specificity hypothesis than a single case can provide.

Third, subject the purpose-specificity hypothesis to formal statistical testing. The hypothesis can be operationalized into three testable empirical propositions for subsequent research: (a) after improvements in transport access to the ski destination, skiers' ancillary consumption beyond the resort (>2 km) does not show a statistically significant increase--if this proposition is rejected by data, the explanatory weight of supply-side and geographic mechanisms rises; (b) after the addition of consumption supply around the resort that has no skill-based association with skiing (e.g., general retail, food services), skiers' off-site consumption does not show a statistically significant increase--if this proposition is confirmed, the robustness of the purpose-specificity mechanism is strengthened; (c) after the addition of consumption supply around the resort that has direct technical association with skiing (e.g., equipment retail, sports rehabilitation, ski training), skiers' off-site consumption does show a statistically significant increase--if supported, the purpose-specificity mechanism would be refined into a technical-association constraint, meaning that the boundary of ancillary consumption is set not by spatial distance per se but by the technical distance between the ancillary product and skiing. These three propositions form an interlocking set of testable claims whose joint testing can adjudicate among supply-side, demand-side, and mixed explanations. The empirical execution of this testing framework is a core task this paper leaves to subsequent research.

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Fourth, extend the temporal dimension of the research design. The interview data are cross-sectional (single-point collection in January 2025) and cannot capture the dynamics of ski consumption behavior over time--for example, whether the spatial range of ancillary consumption systematically expands as skiers accumulate years of experience. Longitudinal tracking or retrospective survey designs could supply evidence on this temporal question.

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