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Perceived Constraints to Winter Sports: A Segmentation of German Non-Participants and their Market Potential

https://doi.org/10.1515/tw-2025-0004

Abstract: Securing, retaining and attracting demand in winter sports tourism requires consideration of participants and non-participants in marketing efforts and product development. This study examined perceived constraints to winter sports among non-participants in the German winter sports source market. Constraints were assessed in a representative sample (n=704) using 15 pre-determined items on a five-point Likert scale. Four constraining factors were identified using principal component analysis (context, physical condition, cost, attitude). Five clusters were identified using segmentation analysis (most constrained, self- and context constrained, least constrained, cost-sensitive, disinterested). Significant differences in socio-demographic and behavioural characteristics were found between clusters. The findings suggested the least constrained and cost-sensitive segments to have the greatest potential for future participation.

Keywords: winter sports, tourism, consumer behaviour, leisure constraints, segmentation

Zusammenfassung: Zur Sicherung der Nachfrage im Wintersporttourismus sind Teilnehmende und Nicht-Teilnehmende für Marketingmaßnahmen und Produktentwicklung relevant. Diese Studie untersuchte hemmende Faktoren bei Nicht-Wintersporttreibenden im deutschen Wintersport-Quellmarkt. Gründe gegen das Betreiben von Wintersport wurden in einer repräsentativen Stichprobe (n=704) anhand von 15 Items auf einer fünfstufigen Likert-Skala bewertet. Mittels einer Hauptkomponentenanalyse wurden vier Hemmnisfaktoren identifiziert (Umfeld, Verfassung, Kosten, Einstellung). Die Segmentierung auf Basis der Faktoren ergab fünf Cluster (am stärksten gehemmt, selbst- und umfeldgehemmt, am geringsten

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gehemmt, kostensensibel, desinteressiert). Es zeigten sich signifikante Unterschiede zwischen den Clustern hinsichtlich sozio-demografischer und behavioraler Merkmale. Das größte Potential für eine künftige Teilnahme ergab sich für die Segmente „am geringsten gehemmt“ und „kostensensibel“.

Keywords: Wintersport, Tourismus, Nachfrage, hemmende Faktoren, Segmentierung

Introduction

Germany is one of the most important source markets for winter sports tourism in the Alpine region and German low mountain ranges (Roth et al., 2018; Roth et al. 2016; Steiger et al., 2021). According to a representative survey of the German population, 64 % of physically active Germans have participated in winter sports before, which equates to 23.2 million active winter sports participants (Roth et al., 2018). This economic cornerstone of winter tourism in Germany and in the Alps is, however, faced with demographic and climatic challenges (Roth et al., 2016; Steiger, 2012). An ageing population, projected decreases in natural snow cover duration, snow reliability and shorter windows for snow production (Olefs, 2023; Steiger, 2012; Steiger et al., 2019) are expected to change the demand structure and have triggered discussions about target group specific implications. The winter tourism industry has to respond to these challenges by developing adaptation measures and innovative offers to secure demand in the German source market and the associated value added in the destinations.

Key to this is a regular analysis of the demand structure, in particular socio-demographic, behavioural and motivational characteristics (Alexandris et al., 2009; Bausch & Unseld, 2018; Dolnicar & Leisch, 2003; Phillips & Brunt, 2013). Securing demand can take place at different levels and can mean retaining winter sports participants as well as attracting new winter sports participants. In marketing efforts to reach non-participants, it is less necessary to intensify efforts than to target specific market segments (Bausch & Gartner, 2020; Williams & Fidgeon, 2000). Market research can identify segments with future participation potential based on the characteristics mentioned above (driving factors), but a holistic understanding also requires an examination of inhibitors and barriers to participation. Theories of these, known as leisure constraints, are discussed in the literature (Crawford & Godbey, 1987; Crawford et al., 1991; Godbey et al., 2010; Jun et al., 2009) and applied in various recreational contexts (Carroll & Alexandris, 1997; Cho et al., 2017; Fredman & Heberlein, 2005; Lyu & Lee, 2018; Wood & Danylchuk, 2012). Research approaches can also be found in sports tourism (Hinch et al., 2005; Hudson et al., 2010) and winter sports (Alexandris et al., 2017; Hudson et al., 2010; Priporas et al., 2015).

Identifying constraints for non-participants can help to improve product development and the implementation of measures to overcome these constraints. In the Alpine region, there is a noticeable gap in research on constraints for non-winter sports participants. There is also a lack of studies that segment potential target groups in the German source market on the basis of constraints. The aim of this study is therefore to provide a representative analysis of constraining factors for non-winter sports participants in Germany, to cluster sub-groups and to identify potential target groups for generating future demand. The study is guided by the following research questions:

1. What perceived constraints can be identified in non-winter sports participants in the German winter sports source market?
2. Which market segments of non-winter sports participants can be formed on the basis of the identified constraints, and how do they differ in terms of socio-demographic and behavioural aspects?
3. Which segments have the greatest potential to attract new target groups and what are the characteristics of these segments?

By analysing these questions, a more differentiated understanding of constraints in the German winter sports source market will be developed and implications for management and future research will be derived. In addition, the methodological approach will contribute to the understanding of how perceived constraints can complement segmentation approaches in the context of sports tourism, using winter sports as an example. Furthermore observations concerning the applicability of leisure constraint theory to the winter sports context are expected.

Constraints in Leisure Research and Winter Sports

In leisure research, the concept of 'leisure constraints' provides a framework for analysing barriers to participation in specific activities. The approach focuses on identifying (perceived) factors that limit individuals' preferences for and engagement in leisure activities (Hinch et al., 2005). Research on leisure constraints takes different perspectives and considers non-participants as well as former and current participants. This multi-perspective approach is necessary for market orientation, product development and marketing strategy in winter sports tourism. Using the differentiation of skiing demand by Williams and Basford (1992), winter sports demand can be divided into effective and latent demand (Fig. 1). Similar to Williams and Basford (1992), this study aims to identify interested former and non-partici-

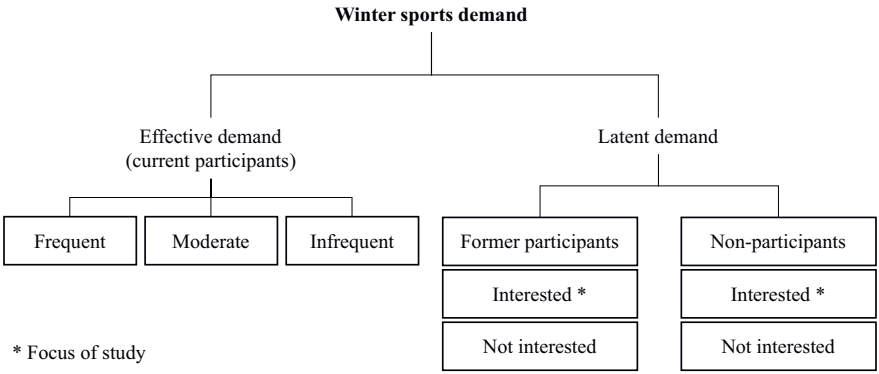

Figure 1: Differentiation of winter sports demand (adapted from Williams & Basford, 1992).

pants and provide a basis for reducing barriers and transforming latent demand into effective demand.

Barriers not only prevent people from taking up an activity, but also from maintaining and intensifying it (Backman, 1991; Gilbert & Hudson, 2000). Pioneering a classification of constraints to leisure activities, Crawford and Godbey (1987) differentiate three types of constraints: intrapersonal, interpersonal and structural constraints. Intrapersonal constraints are psychological in nature and influence preferences for leisure activities, such as needs, values or perceived attitudes and abilities. Interpersonal constraints are related to interpersonal relationships and interactions in the person's or activity's environment. Finally, structural constraints are those that stand between preference and participation, such as time or cost. In the context of winter sports, Andronikidis et al., (2007) found that intrapersonal and structural constraints had a particularly high impact among skiers in Greece. In German non-skiers Bausch and Unseld (2018) identified a mix of constraints, such as stress from extensive preparations, overcrowding in ski areas and the disappearance of snow-covered landscapes.

Constraints can be arranged hierarchically from proximal (intrapersonal) to most distal (structural) and have to be overcome sequentially for participation to occur (Crawford et al., 1991; Jackson, Crawford, & Godbey, 1993). This concept, called 'negotiation of leisure constraints', suggests that participation in leisure activities is not determined by the absence of barriers, but by being able to negotiate and overcome them (Jackson et al., 1993).

Consequently, constraints do not necessarily prevent participation, but rather confront individuals before deciding whether to participate (Hubbard & Mannell, 2001; Hudson et al., 2010; Jackson et al., 1993). The decision to participate in leisure activities is thus a dynamic negotiation process that balances perceived benefits

and constraints (Godbey et al., 2010; Jun et al., 2009). This process is shaped by the intensity of constraints, the interaction between constraints and motivation, and the strategies used to overcome them (Carroll & Alexandris, 1997; Jackson et al., 1993; Kim et al., 2000). Using the negotiation of leisure constraints model, Gilbert and Hudson (2000) analysed limiting factors among skiers and non-skiers in Canada, identifying economic constraints (structural) as the most significant for both groups. However, intrapersonal constraints were particularly relevant for non-skiers, whereas skiers faced interpersonal and structural constraints, such as family obligations and time limitations.

Segmentation Based on Constraints

Maximising market potential by matching consumer needs with offers requires targeted marketing (Dolnicar et al., 2018). Identifying and analysing these needs for selected customer segments in order to target them with specific marketing is an important part of a strategic marketing plan (Dolnicar et al., 2018). As such, market segmentation is an essential tool in determining the target market and a successful marketing process (Dolnicar et al., 2018). Segmentation is a common method for analysing demand and motivational structures related to winter sports tourism (Alexandris et al., 2009; Dolnicar & Leisch, 2003; Konu et al., 2011; Matzler et al., 2004; Priporas et al., 2015). The objective is to group customers with preferences and characteristics that are homogeneous within a segment but different from other segments (Kotler et al., 2022). Offering the right product to the right target group at the right time is essential for the competitiveness of winter sport destinations (Hallmann et al., 2014).

Although the importance of identifying constraints for a target group-appropriate development of tourism products and marketing is recognised, they have rarely been used as a basis for segmentation. Instead, the first step is usually to segment groups on the basis of geographical or socio-demographic characteristics, and then to analyse the differences between these segments in terms of (perceived) constraints. Exceptions can be found in the areas of cruise tourism (Zou & Petrick, 2016), wine tourism (Li et al., 2011), solo travel by Australian tourists (Yang et al., 2023), or exercise and public health among people of Latin American origin in North Carolina (Harrolle et al., 2013), all of which used leisure constraints for segmentation. Some approaches have also been made in research on winter sports. Priporas et al. (2015) segmented Greek winter sports tourists based on demographic, behavioural and constraining factors and identified four factors (intrapersonal constraints, financial cost constraints, friends and family con-

straints, winter sports constraints) and five clusters (overall constrained tourists, financially/ cost-related constrained, all but friends/ family constrained, least constrained winter sports resort tourists, winter sports enjoyers). While segmentation studies often focus on active participants, Williams and Fidgeon (2000) analysed the constraints and potential for future participation of non-skiers in Canada. After an initial segmentation based on socio-demographic characteristics, behaviour and attitudes, non-skiers were further divided into sub-groups based on perceived cost, difficulty, dangers, rewards and social benefits. The greatest potential was identified for the 'young family' and 'social adventurer' groups, with 'cost' and 'fear/risk' as the main barriers.

Methods

Measurement

The study is based on data collected through a Computer Assisted Telephone Interview (CATI) as part of the quantitative two-stage National Baseline Study Winter Sports Germany 2023 (Manuscript in preparation). First, respondents were asked whether they were active in sports in their leisure time or on holiday, and then whether they were active in outdoor or winter sports. In case of negation, reasons against practicing outdoor or winter sports were assessed using 15 items on a five-point Likert scale (Table 1). Responses were based on individual perceptions of barriers and thus a psychographic construct was recorded. The items corresponded to those of the previous National Baseline Studies Winter Sports 2012 and 2018 in order to enable comparative analyses (Roth et al., 2018; Roth et al., 2012). Socio-demographic (income, age, gender, level of education) and geographical data (postcode of place of residence) of the probands were collected.

Data Collection

The telephone survey (CATI) was conducted between 19 June 2023 and 26 June 2023 by various interviewers from the market research agency OmniQuest. A dual-frame approach was used, drawing and fusing a sample of landline and mobile numbers. The framework for selecting the gross samples was the ADM (Arbeitskreis Deutscher Markt- und Sozialforschungsinstitute e. V.) number space. Numbers listed in the telephone directory and numbers synthetically generated using the 'Gabler-Häder method' (Häder & Gabler, 1998) were included. A total of 2000 people

were interviewed as part of the CATI. The subsample of physically active people not participating in winter sports comprised 829 respondents. After screening the data for missing values and outliers, n=704 surveys were available for analysis. Only people aged 18 or older were surveyed. The net sample was structurally adapted to the population to be analysed and weighted on the basis of the current microcensus in order to be representative of the German population.

Data Analysis

SPSS 29.0 was used to analyse the data. First, a factor analysis was performed using a principal components analysis (PCA) with varimax rotation. Variables used for the PCA are shown in Table 1. The variables correspond to the items in question 6a of the questionnaire (see Appendix). Answers were converted into a numerical scale ranging from 1 to 5. The data were interval-scaled, and a sufficient sample size of more than 10 cases per variable was available. The Kaiser-Meyer-Olkin measure of sampling adequacy indicated that the sample was adequate, with a value exceeding 0.7 (KMO = 0.798) (Hair et al., 2019). Bartlett's test for sphericity was significant ($\chi^2(105)=2884.193$, $p<.001$), indicating that the variables were suitable for the analysis. Accordingly, the data were deemed appropriate for PCA.

The PCA revealed four factors with eigenvalues greater than 1.0, explaining a cumulative variance of 57,69 % (see Table 2). Despite the rather medium value for explained variance, in a four-factor solution all variables had a loading of at least 0.4 on the extracted factors, which is considered a threshold value for a meaningful assignment of variables to factors (Field, 2024; Tabachnick & Fidell, 2014). In addition to a four-factor solution, other potential solutions were examined using the scree plot and the interpretability of the results. Due to the eigenvalues >1.0, sufficiently high loadings of the items on the factors and plausible cross-loadings in terms of content, a four-factor solution was selected.

The average across all variables loading on each factor formed four new variables (see Table 3). Those served as segmentation variables for the hierarchical cluster analysis using Ward's method, which suggested a five-cluster solution. Thereupon a cluster analysis using the k-means technique and subsequent evaluation of the clusters using cross-tabulations were conducted.

Analysis of variance (ANOVA) was used to identify differences between the cluster groups. Scheffé's post-hoc test was used to specify these differences. Group characteristics were further analysed using cross-tabulations, and target group profiles were created. Significant differences between the clusters were tested using a chi-squared test. Socio-demographic and behavioural characteristics were also tested for significant differences using chi-squared. Following a multistep method

is consistent with previous segmentation studies in sports tourism (Hallmann et al. 2012; Priporas et al., 2015).

Results

The sample includes 49 % male and 51 % female respondents. The average age is 52 years. The age distribution is roughly even, with slightly higher proportions in the 50+ age groups. 45.9 % of people have a high level of education[1] and 16.3 % have a high income[2]. 70 % of the participants state that they engage in outdoor sports. More people practise outdoor sports in summer (69 %) than in winter (43 %). The most common activities are cycling (31.5 %), running/trail running (21.5 %), Nordic walking (10.9 %) and swimming (8.4 %).

The constraint variables with the highest mean agreement are 'Accessibility of winter sports areas is difficult' (3.39), 'No interest' (3.36), 'Not sufficiently trained to do winter sports' (3.21), 'Too expensive' (3.20) and 'Fear of injury' (3.03) (see Table 1).

Table 1: Perceived reasons against winter sports: Mean agreement with the variables (n=704).

Variables	Mean[a]	SD
Don't know where I can learn winter sports activities	2.11	1.39
Lack of sports partners	2.56	1.56
Partner prefers other activities	2.70	1.62
Friends don't have time	2.21	1.39
Accessibility of winter sports areas is difficult	3.39	1.54
Fear of injury	3.03	1.54
Health problems	2.37	1.50
Not fit enough	2.50	1.44
Not confident enough	2.49	1.49
Too expensive	3.20	1.54
Negative impact on climate change	2.48	1.49
Too much impact on nature and the environment	2.61	1.51
Not sufficiently trained to do winter sports	3.21	1.60
No interest	3.36	1.52
Tried it in the past and didn't like it	2.45	1.52

Note. Weighted on a 5-point Likert scale:1=does not apply; 5=applies.

1 High level of education refers to A-Levels or higher.
2 High income refers to a minimum net income of €4000 for one person or €5000 for two people.

Table 2: Results of the principal component analysis with varimax rotation.

Variables	Factor			
	1	2	3	4
Friends don't have time	.767	.212	.008	.072
Lack of sports partners	.764	.144	.128	-.043
Don't know where I can learn winter sports activities	.648	.202	-.012	.110
Accessibility of winter sports areas is difficult	.547	.105	.264	.017
Partner prefers other activities	.476	.029	.022	.392
Not fit enough	.275	.770	-.001	.022
Health problems	.147	.763	-.018	-.078
Fear of injury	-.030	.684	.202	.337
Not confident enough	.293	.645	.045	.242
Too much impact on nature and the environment	.049	.070	.907	.064
Negative impact on climate change	.103	.050	.901	-.002
Too expensive	.320	-.006	.425	.326
No interest	.033	-.007	.088	.787
Tried it in the past and didn't like it	-.013	.127	.020	.681
Not sufficiently trained to do winter sports	.304	.360	.032	.560
Eigen value	4.156	1.777	1.465	1.256
Variance explained in % (57.69)	27.705	11.845	9.766	8.376
KMO	.798			
Bartlett's Test for Sphericity	χ^2=2884.193*			
Chronbachs Alpha	.707	.748	.708	.554

Note. *p<.001. Factor 1: context; factor 2: physical condition; factor 3: cost; factor 4: attitude.

The principal component analysis revealed four factors as described in the section data analysis. The factor loadings and assignment of the variables to the factors are shown in Table 2. Based on the PCA and assignment of variables with cross-loadings, the four factors are defined as follows:

– Factor 1 – Context: This factor refers to the social and geographical environment and includes aspects such as lack of peers and local access. *How does my environment influence my participation in winter sports?*
– Factor 2 – Physical condition: This factor relates to the individual's constitution and includes aspects of fitness and uncertainty about one's own physical abilities. *Do I feel capable of performing the winter sports activity?*
– Factor 3 – Cost: This factor refers to the costs associated with practising the winter sports activity. It includes the monetary and environmental price paid for the activity. *At what cost do I practise the winter sports activity?*
– Factor 4 – Attitude: This factor refers to the individual's attitude towards practising a winter sports activity and includes aspects of interest and desire to engage in the activity. *Am I attracted to the winter sports activity and is it appealing to me?*

The highest average agreement is shown for the attitude factor (3.01), followed by the cost factor (2.76), the physical condition factor (2.60) and context factor (2.59) (see Table 3).

Table 3: Perceived reasons against winter sports: Mean agreement with the factors (n=704).

Factor	Mean	SD
Context	*2.59*	*1.01*
Physical condition	*2.60*	*1.12*
Cost	*2.76*	*1.19*
Attitude	*3.01*	*1.14*

Note. Weighted on a 5-point Likert scale:1=does not apply; 5=applies.

Five clusters were formed using k-means clustering on the identified factors. Table 4 shows the cluster centres and the mean factor agreement within clusters. The first cluster contains people who have above average values across all factors. This cluster is called 'most constrained' (15.9 % of respondents). The second cluster shows above average scores for all factors except cost. In particular, the individual physical condition (3.37), the attitude (3.35) and the context (3.19) prevent these people from participating in winter sports. This cluster is called 'self- and context constrained' (23.6 % of respondents). The third cluster is labelled 'least constrained' (22.3 % of respondents). All values are below average and, with the exception of the context factor, the lowest across clusters. The fourth cluster consists of people who consider the cost of participation (financial and environmental) too high. The cost factor is well above average (4.00), while all other factors are slightly below average. This cluster is described as 'cost sensitive' (19.4 % of respondents). People in the fifth cluster are inhibited by their own attitude (3.74) and give below average scores for all other factors. This cluster is therefore described as 'disinterested' (18.8 % of respondents).

The ANOVA showed that the clusters differ significantly. The largest F-value and thus the strongest difference was found with regard to the cost factor ($F(4)=404.211$, $p<.001$). The Scheffé post-hoc test revealed significant differences between the clusters for most factors.

The clusters were also examined for differences in their socio-demographic characteristics and sporting behaviour (Table 5). The segments do not differ significantly in terms of gender, origin (by federal state) and monthly net household income. There are significant differences in age by category ($\chi2(20)=45.882$, $p<.001$; Cramer's $V=.128$, $p<.001$) and in the share of people with a high level of education. As cell frequencies above five occurred and the sample was too large for an exact

Table 4: Cluster centres of the final solution according to k-Means with five clusters (n=704).

Factor	Cluster number					F-value	p-value
	1 (n=112)	2 (n=166)	3 (n=157)	4 (n=137)	5 (n=132)		
Context	**3.71**	**3.19**	1.99	2.25	1.97	140.761	<.001
Physical condition	**3.84**	**3.37**	1.94	1.95	2.04	171.180	<.001
Cost	**4.13**	2.48	1.71	**4.00**	1.94	404.211	<.001
Attitude	**4.15**	**3.35**	1.67	2.47	**3.74**	273.525	<.001
Share (%)	15.9	23.6	22.3	19.4	18.8		

Note. Cluster 1: most constrained; cluster 2: self- and context constrained; cluster 3: least constrained; cluster 4: cost sensitive; cluster 5: disinterested. Convergence after seven iterations. Above average values are printed bold.

Fisher's test, the Monte Carlo simulation was used ($\chi2(8)=36.110$, $p<.001$; Cramer's $V=.160$, $p<.001$). Significant differences were also found for practising outdoor sports ($\chi2(4)=40.103$, $p<.001$; Cramer's $V=.238$, $p<.001$) and with regard to the question of whether respondents could imagine practising winter sports in the future ($\chi2(12)=51.686$, $p<.001$; Cramer's $V=.156$, $p<.001$).

Potential for future demand was identified for two clusters: 'least constrained' and 'cost-sensitive'. People in the 'least constrained' segment gave below-average agreement to items relating to all constraining factors in relation to participation in winter sports (see Figure 2). The item 'Accessibility of winter sports areas is difficult' (2.82) received the highest level of agreement in this cluster. In comparison with the other segments, the highest number of respondents in this segment indicated that they could imagine engaging in winter sports in the future (43 %). More than half of these individuals are highly educated (54 %). The percentage of outdoor sports enthusiasts is also high at 77 %. Cycling (22.9 %) is the sport that people in this segment have done most in the last five years, followed by jogging (19.7 %), hiking (15.6 %) and (Nordic) walking (10.7 %).

Cost-sensitive non-participants perceive the impact on nature and the environment (4.16), the negative impact on climate change (2.97) and the financial cost (3.87) as constraining. They agree with all other factors (context, physical condition, attitude) to a below-average extent. The items 'Accessibility of winter sports areas is difficult' (3.41) and 'No interest' (3.08) achieve relatively high scores (see Figure 2). At 26 %, the proportion of those who can imagine practising winter sports in the future is the second highest after the 'least constrained' segment. People in the 'cost-sensitive' segment are on average 49 years old and therefore younger than the average of the overall sample. The proportion of people with a high level of education is the highest compared to the other clusters (63 %). In terms of income,

Table 5: Socio-demographic and behavioural characteristics of the clusters.

	Cluster number					χ^2	p-value
	1	2	3	4	5		
Age (%)						45.882	<.001
18–29	8	10	16	24	14		
30–39	15	18	16	10	18		
40–49	8	11	15	18	18		
50–59	20	16	18	19	24		
60–69	23	16	15	14	14		
>69	26	28	20	15	11		
Age (average)	56	54	51	49	49		
Gender (%)						7.212	<.001
male	48	54	47	45	47		
female	52	46	53	55	53		
Education (%)						50.174	.001
No school certificate	1	0	0	0	1		
Secondary school ('Hauptschule')	23	20	13	10	13		
Secondary school ('Realschule')	32	34	25	18	33		
Univ. of applied sciences entrance diploma	9	11	6	9	9		
A-Levels (university entrance diploma)	16	10	16	18	16		
Bachelors degree	14	19	28	29	20		
Master's degree	5	7	11	16	9		
High level of education (%)	34	35	54	63	44	36.110	<.001
Monthly net income per household (%)						40.405	.061
<500 euros	3	1	1	0	1		
500–999 euros	5	4	6	3	2		
1000–1999 euros	23	15	19	11	14		
2000–2999 euros	24	30	22	18	21		
3000–3999 euros	16	23	16	29	27		
4000–4999 euros	16	14	19	21	14		
5000–5999 euros	5	8	11	6	9		
>5999 euros	9	7	7	13	13		
High income (%)	13	15	17	17	21	3.312	.507
Active in outdoor sports (%)	51	61	77	80	79	40.103	<.001
Positive attitude to doing winter sports (%)	12	18	43	26	20	51.686	<.001

Note. Cluster 1: most constrained; cluster 2: self- and context constrained; cluster 3: least constrained; cluster 4: cost sensitive; cluster 5: disinterested. High level of education refers to A-Levels or higher. High income refers to a minimum net income of €4000 for one person or €5000 for two people. Origin (by federal state) not included ($\chi 2(20)=64.169$, $p=0.333$).

there is no significant difference to the other clusters. In this segment, the highest proportion of people engage in outdoor sports (80 %), in particular cycling (24.8 %), jogging (22.9 %) and hiking (21.1 %).

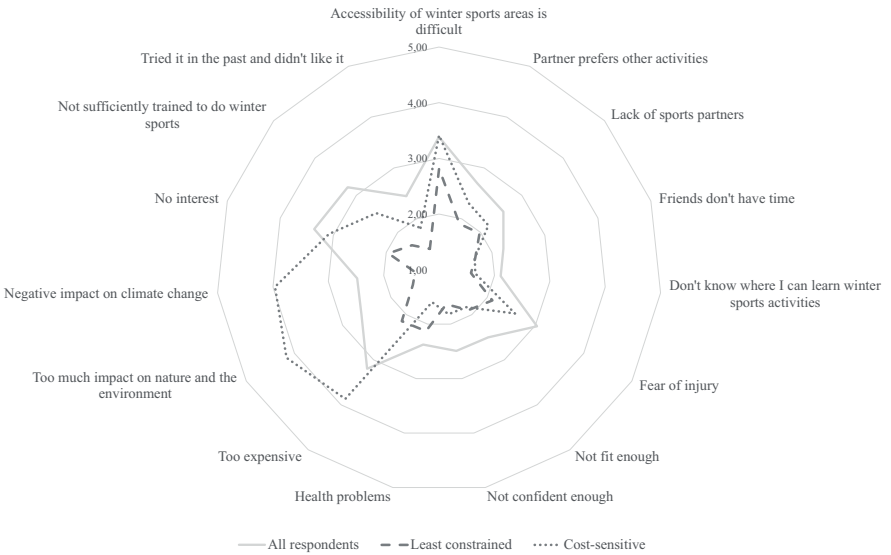

Figure 2: Agreement to survey items in the 'least constrained' and 'cost-sensitive' clusters.

Discussion

The results show that the most prevalent reasons against winter sports are the difficult accessibility of winter sports areas, lack of interest, lack of training, financial costs and fear of injury. This is mostly consistent with the data from the previous National Baseline Study Winter Sports Germany (Roth et al., 2018) and confirms the findings of other studies, who identified cost, accessibility and fear or risk as some of the most important constraints (Gilbert & Hudson, 2000; Priporas et al., 2015; Williams & Fidgeon, 2000). The results further confirm the consistency of certain inhibiting factors, particularly financial costs, across different social groups and contexts, as proposed by Jackson (2000) and Walker & Virden (2005).

While leisure research usually classifies three constraining factors (intrapersonal, interpersonal, structural) the survey items in this study were categorised into four factors: context, physical condition, costs and attitude. The division into constitution on the one hand and attitude on the other suggests that individual physical conditions are particularly important in relation to winter sports activities, which are not per se relevant for every leisure activity. Hinch et al. (2005) argue that while the existing body of research on leisure constraints provides basic theories on general patterns and factors such as time or cost, other variables regarding cultural influences or ski-related factors require further analysis. The occurrence of

high values for the physical condition and attitude factor in the most constrained segments nevertheless seems to support the concept of hierarchical constraints by Crawford et al. (1991), according to which intrapersonal constraints (such as constitution, values, interest) also impair the overcoming of other barriers and lead to a stronger inhibition.

The two segments with the greatest potential for generating demand were found to be the 'least constrained' and 'cost-sensitive' segments. These segments showed low scores for most constraining factors and a higher willingness to participate in winter sports in the future, which is, however, highest in the least constrained segment. The interest in winter sports might be favoured by high engagement rates in outdoor activities. Socio-demographics reveal a lower average age and a high proportion of people with a high level of education compared to the other segments. Despite the rather positive attitude towards winter sports and fewer health and safety concerns, the difficult accessibility[3] of winter sports areas limits participation. In the context of climate change and related changing natural conditions, particularly at lower altitudes, and the expected contraction of the winter sports market resulting in fewer winter sports areas being available (Steiger et al., 2021), the importance of accessible and innovative offers can be expected to increase. Implications for destinations and reactive behaviour of existing participants has been focus of several studies (Rohlfs & Pröbstl-Haider, 2021; Steiger et al., 2021; Witting et al., 2021). Reliable snow conditions have been proven to be one of the most important aspects for destination choice for winter sports participants (Roth et al., 2012; Roth et al., 2018; Unbehaun et al., 2008). Results of a discrete choice experiment reveal that the willingness of paying more and traveling further in order to reach a snow secure destination exists but is limited (Unbehaun et al., 2008). Accessibility, however, does not equal travel distance but is more complex and linked to mobility, infrastructure and connection to public transport. With increasing travel distances to more snow reliable destinations of the alps, destinations have to co-operate with local authorities and (national) transport companies in order to find solutions and overcome barriers of accessibility.

The 'cost-sensitive' segment has the largest share in the youngest age category (18–29 years). This may have an impact on the sensitivity to financial costs. However, this segment does not differ significantly in terms of income from the other clusters. Pröbstl-Haider et al., (2019) state that "income elasticity likely depends on ski resorts' characteristics and the range of offers available" (p. 117). Therefore pricing shows to be one, but not the only determining aspect. Williams and Fidgeon (2000)

3 Referring to how people reach winter sport areas, influenced by factors such as distance, transportation infrastructure and travel time. While accessibility in terms of equal access to facilities or services is also important, it is a separate issue.

suggest that the perception of an overpricing of skiing corresponds more to a vague feeling of non-skiers, and, does not only include the ski ticket but the total package of accommodation, travel, equipment and other costs. The authors recommend emphasising the value of the entire experience and presenting options for reducing financial expenditure on different levels. Destination management organisations (DMO) should therefore consider products in different price categories, dynamic pricing or approaches that turn participants into members (Pröbstl-Haider et al., 2019). Increasing prices are nevertheless a fact, as inflation affects not only travel expenses but mountain railway operators as well. That leads to an increase of prices for ski tickets of at least five percent for the season 2024/2025 in Germany, Austria and Switzerland according to a study of the German Automobile Club (ADAC) (Allgemeiner Deutscher Automobil-Club e.V. [ADAC], 2025). However, winter sport does not only consist of alpine skiing, but includes different forms requiring varying financial expenditures. In order to meet preconceptions and negative connotations the variety of winter sports activities should be promoted and serve for differentiated marketing measures. Combining different activities instead of focusing only on cost-intensive forms of winter sports such as alpine skiing could become a format people lean to in the future. Roth et al. (2018) already demonstrate an increasing tendency for multisportive winter sports participants.

Although monetary costs show an above average agreement, environmental costs gain even higher scores within the 'cost-sensitive' segment. Engagement in outdoor activities has been linked to environmental awareness (Eigenschenk et al., 2019; Moormann et al., 2022; Palmberg & Kuru, 2000; Zelenski & Nisbet, 2014). Thus, non-participation in winter sports may indicate a negative perception of the environmental impact of winter sports compared to other outdoor activities. Nevertheless, analysing the 'cost-sensitive' segment and deriving measures to utilise its potential offer opportunities for the future winter sports market. If this segment can be won over as winter sports enthusiasts and cost-induced constraints can be lowered, younger people in particular could be attracted to winter sports in the long term. Solutions addressing both the financial constraints and environmental sensitivity should be discussed, as findings suggest taking a more holistic view of the cost factor. Potential measures include, for example, cancellation insurance in case of insufficient snow conditions, or discounts for more environmentally friendly behaviour, such as travelling by public transport or carpooling. This can also help to address accessibility issues. Offering attractive conditions for longer stays instead of several short trips can further meet environmental concerns as well as put travel distances into relation. Williams and Fidgeon (2000) recommend low-cost packages for young and cost-sensitive target groups, including ski tickets, equipment hire, transport, further activities or group offers. This approach can be applied to winter sports tourism in general, and may include additional winter sports such as

cross-country skiing, sledding and snow-shoe hiking. Meeting financial concerns of young target groups should be seen as an investment in the future as "participation in winter sports in early life significantly influences later investment in winter tourism" (Pröbstl-Haider et al., 2019, p. 13).

Low potential for new target groups can be derived for the clusters 'most constrained', 'self- and context constrained' and 'disinterested'. Given that people in higher age categories tend to be represented in these segments, there may be a relation between age and constraints due to health and safety concerns. This is supported by Williams and Fidgeon (2000), who identified 'fearful elderly' as a segment. Further, significant differences in the age distribution between the segments support Jun et al.'s (2009) finding that constraining factors change throughout life, which should be considered in the development of measures to overcome constraints.

Conclusion

The aim of this study was to analyse reasons against participation in winter sports activities among German non-winter sports participants and to identify segments to derive potential target groups. The results allowed the conclusion that the identified segments differ in terms of their potential for future participation in winter sports activities and confirmed the relevance of market segmentation based on constraints in tourism. Whereas existing studies often focus on active participants, facilitating factors as well as socio-demographic or motivational segmentation variables, this study highlights the importance of segmenting non-participants using constraining factors and thus expands the existing literature in sports tourism. Instead of perceiving non-participants as a homogenous group with low potential, differentiation can identify potential target groups. Understanding and addressing heterogenous segments is key to derive tailored marketing measures to secure demand in a winter sports market facing diverse challenges. Two of the identified clusters showed potential for converting latent interest into actual demand. Marketing and product development in winter sports should focus on the characteristics of the 'cost-sensitive' and 'least constrained' segments. These segments are less inhibited by personal factors (e.g. constitution, attitude). This opens up the possibility of minimising the existing barriers (e.g. accessibility of the areas, monetary costs and environmental impact) by using levers in the product design and influencing the decision-making process for future participation.

Management implications

A differentiated approach to non-winter sports participants seems advisable in order to derive potential target groups and develop corresponding measures. While financial factors continue to have a strong leverage to influence demand, other implications can be drawn. Specifically, the high proportion of young people in segments with future demand potential underscores the importance of tapping into younger target groups. However, accessibility issues are a concern. Engaging young people through accessible offers to get them involved early on appears essential. Innovative near-residential products that work both on- and off-snow and are thus more resilient to varying snow conditions can also be used as a complementary tool, for example for teaching basic winter sports skills before going to the actual winter environment. Such approaches to hybrid winter tourism products are underpinned by a high level of participation in outdoor sports by these segments, and can offer flexible options for changing external conditions.

The cost-sensitive segment is particularly concerned about the environmental impact of winter sports and may therefore be receptive to offers and communication strategies that focus on climate friendly and sustainable development measures. This may also act as an incentive for a more environmentally friendly winter sports industry.

Limitations and Future Research

This study provides insights into constraints to winter sports in a representative sample of the German population. However, expanding the study design to both active and non-participants could provide further insights on negotiation processes and the influence of motives, as described by Jun et al. (2009). Moreover, the study design focused on quantitative methods. To identify specific (winter) sports tourism constraints that are not taken into account in quantitative survey items, further research should consider preceding qualitative approaches, as emphasized by Hinch et al. (2005).

Following on from the implications of this study, future research could also look at the motivations and constraints of children and young people in order to provide early opportunities to introduce them to winter sports and create long-term loyalty. In addition, a deeper understanding of how to address issues of affordability, accessibility and perceptions of a high environmental impact of winter sports could be further explored.

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Supplemental Material: This article contains supplementary material (https://doi.org/10.1515/tw-2025-0004).