Article

The Analysis of the Ski Slopes and the Degree of Economic Dependence Induced by Winter Sports Tourism. The Case of Romania

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Abstract: Winter sports are the main attraction for many tourist areas in Romania, contributing significantly to the development of local economies. Based on this, the study aims to analyze the ski areas in Romania, as well as the extent to which they contribute to the sustainable development of the local economy. This is particularly important as, in recent decades, climate change has significantly affected winter sports, especially skiing. Thus, an analysis of the physical characteristics of ski runs in Romania (number, length, width, level difference and slope) is accompanied with an analysis on the dynamics of the share of tourism in the local economy of winter sport locations, based on tourism turnover relative to total turnover in the local economy. Both graphic and cartographic methods were used in this study, based on an analysis of quantitative and qualitative data available for ski slopes in Romania and the host localities. We used ArcGIS 10.6 software for the preparation of graphical representations and other software to process large databases. The research results showed a great diversity regarding counties, localities and ski slopes depending on the characteristic features of ski slopes (number, length, width, level difference and slope). In our study, the evolution of the share of turnover in tourism in terms of total turnover presented several categories of localities based on their economic dependence on winter sports; the impact in this regard was found to be very differentiated between localities.

Keywords: economic dependence; sustainable tourism; skiing; winter sports

1. Introduction

Mountain tourism is one of the most common types of tourist activities and appeals to tourists due to the spectacular landscapes, unique natural beauty, wildlife, fresh air, cultural landscape and various types of landforms that are available [1–3]. The attraction for tourists relates to a wide range of activities and ways to spend leisure time [4], including outdoor recreation, hiking, climbing, health and wellness activities, as well as the possibility to practice winter sports [5]. Of all these, winter sports are among the most popular activities in mountain areas and are key factors for the booming development of mountain tourism in recent decades [6–8].

Lately, winter sports have experienced an impetus both at a global and a local level, as people of all age groups and professions practice these activities [9,10]. Among winter

sports, skiing represents a central element through which an entire industry has developed, acting as one of the most spectacular types of tourism activity [11–13].

In this regard, to meet the demand, the specific infrastructure for practicing winter sports has experienced a similar evolution. Romania is no exception to this trend, taking into consideration its permissive landforms. Therefore, the ski area and ski slopes have undergone an upward evolution, both vertically (spatial evolution in the territory) and horizontally (quantitatively and qualitatively). Romania's optimal geographic conditions have had an important contribution in this regard [14], and orography has also played a significant role. Overall, 27.91% of the landform units are characterized by mountains and depressions, of which approximately 90% have heights suitable for winter sports of under 1500 m [15–17].

The aim of the present study is to identify, quantify, assess and analyze five main indicators (number, length, width, level difference and slope) for the recreational ski slopes in Romania (homologated or not) at the levels of ski run, locality, county and country.

The ski slope is the fundamental unit, providing the basic cell for winter sports. In this study, we develop an understanding of the characteristic features of each ski run.

The locality was viewed in light of its role as a center of gravity for the flows of tourists looking to practice winter sports. Understanding the scale of the main indicators for the ski slopes at a locality level is crucial to conduct simulations, scenarios and proposals regarding the tourism carrying capacity for recreational ski areas, which is a factor that generates tourist motivation.

The county level proves to be significant in the profile analyses because it is a geographical, political, administrative, and sometimes decision-making element with major implications in terms of targeting all the flows to and from the county, including tourist flows.

An analysis of the main features of the ski areas in Romania offers a comprehensive image of their economic importance, as well as economic perspectives for the development of this sector.

In this context, analyzing the share of tourism turnover in total turnover and economic dependence can help to determine the evolution of tourism's contribution to the total turnover of local economies.

The spectacular development of winter sports in Romania, also stimulated by many opportunities offered by European funding systems, requires an interdisciplinary approach that analyzes the main features of the ski area in Romania, as well as the adaptive capacity of local economies based on winter sports to increase the complexity of tourist functions to offset the changes imposed by climate change.

Romania is almost unanimous, highlighting its special quality, and has all the necessary conditions to become an important European tourism destination. By exploiting its true value, this unique potential can provide the basis for both the diversification and differentiation of Romanian tourism to successfully compete in different segments of the international tourism market. The potential value of tourism in Romania can also generate tourist activity that can act as one of the main engines of sustainable economic development [18–21]. As part of the tourist potential of Romania—viewed in a general sense—the mountainous area is distinguished because it has many positive characteristics that can be premises for the intensification of the tourist activity, especially during winter. The Romanian tourism authorities try to communicate abroad that Romania “is an authentic country, with intact nature and with a unique cultural heritage”, and the key attributes of the national tourist brand “Explore the Carpathian Garden!”—intact nature authenticity, unique culture and safety are strongly related to the Carpathian Mountains [22]. This message matches perfectly the main attributes associated with the destination by foreign tourists who have visited it or who know persons who have visited it: authentic, rural, good hospitality and green [23]. The mountainous area of Romania has 74,000 km² and concentrates 3 million inhabitants. These data correspond to a share of about one-third—31%—of the country's total area. The Romanian Carpathians, both through their extensive

expansion and central position, the general and altitudinal configuration, impose themselves as a basic component in Romania's geographical and landscape structure. With the same importance, they are part of the tourist activity due to the richness and variety of their tourist potential [24,25]. Vanat [26], in his yearly international report on snow and mountain tourism, stated that in Romania, "snow conditions can be very good through the end of March or even April". This assertion is general and would require some refinements depending on the exposure, the runway, the altitude and the region concerned [27,28]. Romania has 44 ski resorts with about 150 ski lifts, of which 20% have been installed or renewed in the last 15 years. It is an attractive destination for foreign visitors as the prices are relatively low compared to most of Europe, and some ski slopes are lit for night skiing. However, lift permits are not considered to be cheap due to limited infrastructure and poor care [29]. In Romania, it is estimated that ski resorts attract approximately 1.2 million visits per year.

Romania is not yet an important destination for tourism and winter sports. The highest number of domestic or foreign tourists arriving in the Romanian mountain resorts is reached in the summer months, regardless of the weather. The lack of diversification regarding tourist infrastructure, ski facilities below the international standard and poor performance of tourist services are probably some of the main reasons that lead tourists to choose other destinations [30,31]. It takes time to change, but Romania is making major efforts to develop these sectors that will positively influence the evolution of winter tourism. Although there are no substantial increases in accommodation capacity, ski resorts have found solutions to attract visitors by building ski slopes near cities [32].

2. Materials and Methods

The necessary information for the current study was collected from the webpages of the National Authority for Tourism [33], "i-Tour Schi", "which is a national project to promote certified ski slopes across the country" [34], and of other bodies involved in the promotion of ski slopes and weather conditions for practicing winter sports in Romania [35,36], capturing the existing facts at the end of year 2020. Data regarding the turnover were retrieved from the UB1365 Project and from www.listafirme.ro [37,38]. The data were processed in Excel and ArcGIS 10.6. From a methodological point of view, the spatial analysis of the ski slopes in Romania was performed for each spatial point (ski slope, locality) and area (county, country) using the main indicators for the ski slopes: number, length, width, level difference and slope [39–42].

The turnover was used as an indicator for the analysis of the share of tourism in the local economy, thus, for all territorial administrative units in Romania with systematized ski areas, the share of turnover in tourism in total turnover of the local economy was analyzed for the period 2000 to 2018. This indicator shows the economic dependence of the analyzed localities on winter sports, with skiing as the dominant activity. Values below 24% show a low dependency, those between 25 and 49% indicate a high economic dependence and values over 50% denote a very high economic dependence.

Based on the average share of tourism contribution to the total turnover of the locality during the analyzed time interval, we decided to classify the localities into five distinct groups:

- $\leq 5\%$ (Borșa, Gura Humorului, Muntele Mic, Păltiniș, Bălea Lac, Râu de Mori, Joseni, Borsec, Câmpulung Moldovenesc, Mioarele, Valea Rece, Gura Râului, Azuga, Voineasa, Căpușul Mare, Mogoșa, Șuitor-Baia Sprie Area, Vârșag, Cavnic, Dealul Cozla, Băile Homorod, Poiana Brașov, Izvoare, Bistrița, Pojorâta-Valea Putnei, Harghita-Băi + Miercurea Ciuc, Ciumani, Areas-Parâng-Petroșani, Malini, Feleacu, Ciucea, Straja, Toplița, Cărlibaba, Mădăraș, Izvorul Mureșului, Comandău, Vulcan, Jina, Cheile Butii, Întorsura Buzăului, Lunca de Sus, Rodna Mountains—Sant, Râncă, Luna Șes, Șugaș Băi, Drăguș, Ghelnița, Valea Mare);
- Ranging from $>5\%$ to 10% (Areas-Muntele Băișorii and Băișoara, Bihor Mountains, Șureanu, Voievodeasa, Stâna de Vale, Mărișel, Piatra Fântânele, Ciceu, Vatra Dornei);

- Ranging from >10% to 20% (Bran-Poarta, Arieșeni, Sinaia, Durău, Sovata, Praid, Bușteni, Moieciu, Covasna);
- Ranging from >20% to 30% (Crivaia/Semenic, Slănic Moldova, Predeal/Pârâul Rece/Timișul de Sus);
- >30% (Băile Tușnad, Gărna—belonging to the commune Brebu Nou, Fundata, Gârda de Sus), the last ones are grouped as such given their small number.

We decided to use such a range-based classification because low levels of average weights were observed when analyzing the resorts, even in the most favorable cases. Additionally, we decided to take into consideration the groups with average weights exceeding 5% deemed to reflect a minimum acceptable threshold in this respect.

Afterwards basic descriptive statistics were used to detect some characteristics of the items belonging to each of the last four groups, such as mean, standard deviation, skewness and kurtosis.

3. Results and Discussion

3.1. The Number of Ski Slopes in Romania

The number of ski slopes is a fundamental indicator which, together with other main indicators (length, number of localities having ski slopes, etc.), provides information related to the size of fragmentation, spatial distribution, perspectives and possibilities for economic capitalization of these elements that generate tourist motivation.

The analysis of the scientific literature show that the number of ski slopes has been a frequently used indicator from various points of view, such as the analysis of the potential of mountain tourist destinations focused on winter sports [24,25], the investigation of the economic efficiency of skiing in close relation with the distribution of infrastructure and thickness with the persistence of the snow layer [27] and the impact on the environment [43,44].

In Romania, 242 ski slopes (of which only 205 were officially homologated) distributed in 78 localities from 20 counties were registered at the end of 2021.

The analysis of the number of ski slopes at county level has depicted five typical categories of such units: very large (7 counties, 161 ski slopes with a length of 168,259 m, distributed in 45 localities), large (3 counties, 42 ski slopes with a length of 40,317 m, distributed in 14 localities), medium (3 counties, 21 ski slopes with a length of 13,821 m, distributed in 8 localities), small (4 counties, 15 ski slopes with a length of 12,575 m, distributed in 8 localities) and very small (3 counties, 3 ski slopes with a length of 3764 m, distributed in 3 localities) (Table 1).

Table 1. The number of ski slopes in Romania at county level in 2021.

Number of Ski Slopes/Locality	Ski Slopes		Number of Localities	Number of Counties
	Length (m)	Number		
1	3764	3	3	3
2–5	12,575	15	8	4
6–10	13,821	21	8	3
11–15	40,317	42	14	3
>15	168,259	161	45	7
Total	238,736	242	78	20

The highest number of ski slopes was identified in Harghita county (30 ski slopes), followed by Prahova (26 ski slopes), Brașov (23 ski slopes), Maramureș (23 ski slopes) and Hunedoara (23 ski slopes). On the opposite, Argeș, Bacău and Satu Mare counties can be found, each having one ski slope (Figure 1).

Figure 1. The number of ski slopes on the Romanian territory in 2021.

The analysis of the number of ski slopes at locality level has delineated five typical categories: very large (Sinaia, 16 ski slopes with a length of 15,474 m), large (Staja, 12 ski slopes with a length of 20,680 m), medium (12 localities, 98 ski slopes with a length of 100,729 m, distributed in 10 counties), small (36 localities, 97 ski slopes with a length of 82,360 m, distributed in 15 counties) and very small (28 localities, 28 ski slopes with a length of 19,493 m, distributed in 12 counties) (Table 2).

Table 2. The number of ski slopes in Romania in 2021.

Number of Ski Slopes/Locality	Ski Slopes		Number of Localities	Number of Counties
	Length (m)	Number		
1	19,493	28	28	12
2–5	82,360	97	36	15
6–10	100,729	89	12	10
11–15	20,680	12	1	1
> 15	15,474	16	1	1
Total	238,736	242	78	20

The highest number of ski slopes was identified in Sinaia (16 ski slopes), followed by Staja (10 ski slopes), Şureanu (10 ski slopes), Poiana Braşov (9 ski slopes), Cavnic (9 ski slopes) and Semenic (8 ski slopes). On the opposite side, 28 localities are situated, each having one ski slope (Figure 1).

3.2. The Length of the Ski Slopes in Romania

The length of the ski slopes is important for the determination of both the status of winter sports resorts and the level of technical equipment. As in the case of the indicator

—number of ski slopes, their length was also analyzed from the following perspectives. The analysis of the potential of mountain tourist destinations focused on winter sports [24,25], the investigation of the economic efficiency of skiing [27,45] and the analysis of its impact on the environment [43,44].

At the end of 2020, Romania had 242 ski slopes with a length of 238,736 m, distributed in 78 localities from 20 counties.

The analysis of the length of the ski slopes at county level has indicated four typical categories of such units: very large (11 counties, 210 ski slopes with a length of 214,670 m, distributed in 59 localities), large (5 counties, 27 ski slopes with a length of 19,002 m, distributed in 14 localities), medium (3 counties, 4 ski slopes with a length of 4514 m, distributed in 3 localities) and small (1 county, 1 ski slope with a length of 550 m, in one locality) (Table 3).

Table 3. The length of the ski slopes in Romania at county level in 2021.

Length of Ski Slopes/County	Ski Slopes		Number of Localities	Number of Counties
	Length (m)	Number		
Under 1000	550	1	1	1
1001–2000	4514	4	3	3
2001–5000	19,002	27	14	5
>5000	214,670	210	60	11
Total	238,736	242	78	20

The county with the longest length of ski slopes is Caraş-Severin (16 ski slopes with a length of 30,226 m), followed by Braşov (23 ski slopes with a length of 28,247 m), Hunedoara (23 ski slopes with a length of 26,955 m), Prahova (26 ski slopes with a length of 25,248 m) and Maramureş (23 ski slopes with a length of 20,210 m), while on the opposite, Argeş county is situated, having 1 one ski slope (Chili Slope from Mioarele locality) with a length of 550 m (Figure 2).

The analysis of the length of the ski slopes at locality level has outlined 5 typological categories: very large (12 localities, 100 ski slopes with a length of 134,478 m, distributed in 9 counties), large (18 localities, 69 ski slopes with a length of 57,142 m, distributed in 12 counties), medium (22 localities, 42 ski slopes with a length of 32,310 m, distributed in 14 counties), small (17 localities, 22 ski slopes with a length of 11,566 m, distributed in 10 counties) and very small (9 localities, 9 ski slopes with a length of 3240 m, distributes in 5 counties) (Table 4).

The locality with the longest length of the ski slopes is Straja from Hunedoara County (12 ski slopes measuring 20,680 m), followed by Muntele Mic, Caraş-Severin County (6 ski slopes measuring 19,396 m), Poiana Braşov, Braşov county (9 ski slopes measuring 16,240 m) and Sinaia, Prahova County (16 ski slopes measuring 15,474 m), while at the opposite end, the localities Comandău from Covasna County (300 m) and Ciceu from Harghita county (270 m) were situated (Figure 2).

Table 4. The length of the ski slopes in Romania at locality level in 2021.

Length of Ski Slopes/Locality	Ski Slopes		Number of Localities	Number of Counties
	Length (m)	Number		
Under 500	3240	9	9	5
500–1000	11,566	22	17	10
1001–2000	32,310	42	22	14
2001–5000	57,142	69	18	12
>5000	134,478	100	12	9
Total	238,736	242	78	20

Figure 2. The length of ski slopes on the Romanian territory in 2021.

The analysis of the ski slopes in Romania has delineated five typological categories: very large (4 ski slopes with a length of 31,230 m, distributed in 4 localities, 3 counties), large (17 ski slopes with a length of 40,995 m, distributed in 13 localities, 9 counties), medium (51 ski slopes with a length of 69,452 m, distributed in 33 localities, 16 counties), small (107 ski slopes with a length of 77,642 m, distributed in 55 localities, 17 counties) and very small (63 ski slopes with a length of 19,417 m, distributed in 41 localities, 17 counties) (Table 5).

Table 5. The length of the ski slopes in Romania in 2021.

Length of Ski Slopes/Units	Ski Slopes		Number of Localities	Number of Counties
	Length (m)	Number		
Under 500	19,417	63	41	17
500–1000	77,642	107	55	17
1001–2000	69,452	51	33	16
2001–5000	40,995	17	13	9
>5000	31,230	4	4	3
Total	238,736	242	78	20

In terms of length, Molasa ski slope from Muntele Mic (12,000 m) ranked first, followed by the following ski slopes: Europarâng from Straja (8100 m), Semenik on Semenik Mountain (5800 m), Drumul Roşu from Poiana Braşov (5300 m), Telegondolă from Straja (3200 m), Subteleferic from Poiana Braşov (2860 m), Sulinar from Poiana Braşov (2820 m) and Rarău from Suceava (2850 m), while at the opposite end, Renul from Stâna de Vale (100 m), Icoană 4 from Cavnic (120 m), Telegondolă Northern variant from Voineasa (120 m) and Kicsi Sugo from Mădăras (140 m) were situated (Figure 3).

Figure 3. The characteristics of the top three ski slopes on the Romanian territory in 2021.

3.3. The Width of the Ski Slopes in Romania

Slope characteristics such as width or steepness are necessary indicators that need to be taken into consideration when analyzing ski runs, especially when investigating possible risk factors [46]. The width of the ski slopes is an essential indicator reflected in the degree of difficulty of the ski runs, on the one hand, and in the sizing of the accommodation capacity in correlation with the length and the correction index, on the other hand.

In this respect, the analysis of the width of the ski slopes in Romania, performed according to the correction factor [47], has outlined 8 typological categories with width values ranging from the following: under 19 m (3 ski slopes with a length of 4266 m, distributed in 3 localities, 3 counties); 20–29 m (25 ski slopes with a length of 29,216 m, distributed in 19 localities, 11 counties); 30–39 m (44 ski slopes with a length of 37,945 m, distributed in 28 localities, 16 counties); 40–49 m (74 ski slopes with a length of 68,022 m, distributed in 45 localities, 18 counties); 50–59 m (46 ski slopes with a length of 54,479 m, distributed in 24 localities, 12 counties); 60–99 m (39 ski slopes with a length of 35,412 m, distributed in 22 localities, 11 counties); 100–149 m (6 ski slopes with a length of 3629 m, distributed in 6 localities, 5 counties); 150–199 m (5 ski slopes with a length of 5767 m, distributed in 4 localities, 4 counties) (Table 6).

The widest ski slopes, of 150 m, were Cocos Pârâul Rece (Predeal), Veresvirag (Ciurmani), Teleschi/Prislop (Borșa), Curba de nivel (Bălea Lac) and Bălea Cascada (Bălea Lac), while the narrowest were Drumul Tătarilor—B (Valea Putnei, 19.8 m), Cazacu Bretea Legatura Telegondola (Azuga, 19 m) and Ghețarul 3 (Gârda de Sus, 15 m) (Figure 3).

Table 6. The width of the ski slopes in Romania in 2021.

Width (m)	Correction Factor	Ski Slopes		Number of Localities	Number of Counties
		Length(m)	Number		
Under 19	0.5	4266	3	3	3
20–29	0.67	29,216	25	19	11
30–39	1	37,945	44	28	16
40–49	1.33	68,022	74	45	18
50–59	1.67	54,479	46	24	12
60–99	2	35,412	39	22	11
100–149	3.53	3629	6	6	5
150–199	5	5767	5	4	4
Total	-	238,736	242	78	20

3.4. The Level Difference of the Ski Slopes in Romania

The level difference of the ski slopes is a primary indicator that offers important information regarding the ski slopes' rate and their degree of difficulty, as well as a central indicator used in the homologation standards for the ski slopes and leisure trails [48–50].

The analysis of the level difference of the ski slopes in Romania has indicated 4 typological categories ranging as follows: under 50 m (32 ski slopes with a length of 10,759 m, distributed in 26 localities, 14 counties), 51–200 m (132 ski slopes with a length of 91,567 m, distributed in 55 localities, 16 counties), 201–500 m (65 ski slopes with a length of 84,018 m, distributed in 35 localities, 18 counties) and 501–1000 m (13 ski slopes with a length of 52,395 m, distributed in 8 localities, 6 counties) (Table 7).

Table 7. Level difference of the Romanian ski slopes in 2021.

Level Difference (m)	Ski Slopes		Number of Localities	Number of Counties
	Length (m)	Number		
Under 50	10,759	32	36	14
51–200	91,567	132	55	16
201–500	84,018	65	35	18
500–1000	52,392	13	8	6
Total	238,736	242	78	20

The ski slope with the highest-level difference was Molasa from Muntele Mic (980 m), followed by Semenici (820 m), Europarâng/Straja (750 m), Lupului/Poiana Braşov (728 m) and Drumul Roşu/Poiana Braşov (715 m), while the lowest level differences were registered for Telegondolă Northern variant/Transalpina 6 (Voineasa, 6 m), Cazacu Beginners (Azuga, 10 m), Icoană 3 (Cavnic, 12 m) and Gondolă (Sinaia, 16 m) (Figure 3).

3.5. The Slope of the Ski Runs in Romania

The slope represents the inclination angle of the ski run with direct implications on the determination of the degree of difficulty, the carrying capacity and the ski slope rate for practicing winter sports [47]. As shown by previous studies, the degree of ski slope inclination is not a constant because it can be modified by a series of changes caused by the degree of soil stability [51], the characteristics of the snow and the presence of ice [52].

The analysis of the slopes in Romania, carried out according to the minimum approval criteria for the ski runs [48–50], has emphasized 4 typological categories as follows: under 10% (18 ski slopes with a length of 10,586 m, distributed in 16 localities, 13 counties), 11–20% (95 ski slopes with a length of 73,994 m, distributed in 53 localities, 17 counties), 21–30% (91 ski slopes with a length of 100,414 m, distributed in 46 localities, 17 counties) and over 30.1–41% (35 ski slopes with a length of 38,841 m, distributed in 27 localities, 13 counties) (Table 8).

Table 8. The slope of the ski runs in Romania in 2021.

Slope (%)	Ski Slopes		Number of Localities	Number of Counties
	Length (m)	Number		
Under 10	10,586	18	16	13
11–20	73,994	95	53	18
21–30	115,315	94	49	17
31–40	38,841	35	27	13
Total	238,736	242	78	20

The highest slope value was registered for Lorincz Zsigmond 2 from Covasna (41%), followed by Nagy Mihaly, Mădăras (39%), Rainer 2, Căvnic (38%), Târle, Sinaia (38%) and Special Piatra Grăitoare Slope from Bihor Mountains (37%), while the lowest level differences were registered for Telegondolă North/Transalpina 6, Voineasa (1.92%), Drumul Tătarilor—A, Valea Putnei (5%) and Clăbucet school, Predeal (7%) (Figure 3).

3.6. The Economic Dependence of Locations on Winter Sports

Previous studies have demonstrated the impact, either positive or negative, generated by tourist activity on local communities and their economy on various directions: economic, social, cultural and environmental. However, these types of impacts are different depending on the type of tourist activity, destination and context [53]. However, the tourism industry is fundamental for the economic and sustainable growth of societies [54]. Worldwide, where landforms and climate are favorable for practicing winter sports, the winter tourism industry contributes significantly to the local economy due to an increased added value and employment in related activities [55]. According to the World Tourism Organization [56] the Tourism Direct Gross Domestic Product in Romania, which is one of the most analyzed indicators used to measure the contribution of tourist activity in the total economy, has registered an ascending tendency over the last years.

The analysis of the share of the turnover in tourism in the total turnover of the localities with ski slopes highlights the low number of localities that are highly or very highly dependent on skiing; 11 localities register a general trend of increasing values. For the rest of the localities, the economic dependence of the local economies on winter sports is low (Appendix A-Table A1).

Unfortunately, but not at all surprising, the tourism contribution to the overall turnover of the related local economies registers, in most of the cases, insignificant values. The long list of resorts belonging to the first group, with average weights between 0% and 5%, confirms this aspect. More exactly, specific data were collected for about 49 units out of a total of 73.

The average values for the other 24 are all consistently spread upward up to the threshold of 5%, but without exceeding 57.68%: up to 10% for 8 resorts, up to 20% for 9 resorts, up to 30% for 3 resorts and over 30% for 4 resorts, despite some other higher isolated values reaching a maximum of 99% (Gârâna—2001) registered in some years, mainly for resorts ranked in the two best placed groups. Specifically, for the group with average values ranging from 5% to 10%, we obtained the statistical results presented in Table 9.

The results indicate extreme values for each unit across years, an aspect confirmed by the standard deviation levels, the minimum value being the null one, safe for two of them (Voievodeasa and Vatra Dornei) and the last ones with extremely low levels as well, of 2% and 3%; therefore, basing the budget on tourism might destabilize the local economy, so a prudent approach is recommended in such case.

Table 9. Descriptive statistics of the resorts with average values ranging between 5% and 10%.

	Areas—Băișorii Mountain and Baișoara + Bihor Mountains	Șureanu	Voievodeasa	Stâna de Vale	Mărisel	Piatra Fântânele	Ciceu	Vatra Dornei
Mean	8.894737	8.368421	8.315789	7.789474	7.052632	6.052632	5.947368	5.894737
Median	10.00000	0.000000	7.000000	2.000000	3.000000	2.000000	5.000000	6.000000
Maximum	22.00000	34.00000	21.00000	71.00000	20.00000	24.00000	16.00000	8.000000
Minimum	0.000000	0.000000	2.000000	0.000000	0.000000	0.000000	0.000000	3.000000
Std. Dev.	5.576685	13.01371	5.508101	16.15405	7.597322	7.374684	4.660397	1.370107
Skewness	0.272765	0.988179	0.802670	3.380422	0.366141	1.077069	0.460552	−0.606019
Kurtosis	2.763121	2.172505	2.811898	13.77695	1.510646	3.171472	2.199403	2.334018
Jarque-Bera	0.280024	3.634335	2.068231	128.1326	2.180577	3.696854	1.179098	1.514117
Probability	0.869348	0.162485	0.355541	0.000000	0.336120	0.157485	0.554577	0.469044
Sum	169.0000	159.0000	158.0000	148.0000	134.0000	115.0000	113.0000	112.0000
Sum Sq. Dev.	559.7895	3048.421	546.1053	4697.158	1038.947	978.9474	390.9474	33.78947
Observations	19	19	19	19	19	19	19	19

Std. Dev.—standard deviations, Sum Sq. Dev.—Sum of Squared Deviations.

The asymmetry of the central tendency is mostly positive for the sample from this group, showing that the higher values, with a stronger impact on the average, are reduced as the number within the overall range of values, a fact outlined more than in any other case by Stâna de Vale with a maximum of 71% (in 2000) and a minimum of 0% (in 2014, 2017 and 2018).

The statistics for the group with average values ranging from 10% to 20% are presented in Table 10.

Table 10. Descriptive statistics of the resorts with average values ranging between 10% and 20%.

	Bran Poarta	Arieșeni	Sinaia	Durău	Sovata	Praid	Bușteni	Moieciu	Covasna
Mean	19.47368	19.31579	18.63158	15.84211	15.05263	12.68421	10.94737	10.68421	10.21053
Median	24.00000	15.00000	15.00000	16.00000	15.00000	11.00000	7.000000	11.00000	10.00000
Maximum	37.00000	44.00000	35.00000	27.00000	19.00000	22.00000	29.00000	29.00000	15.00000
Minimum	3.000000	0.000000	10.00000	2.000000	10.00000	6.000000	3.000000	1.000000	7.000000
Std. Dev.	12.63315	13.10663	8.152781	5.610141	2.613505	4.876846	8.037922	7.688755	1.960129
Skewness	−0.047088	0.483496	0.813599	−0.305985	−0.231542	0.344553	1.020472	1.239504	0.198147
Kurtosis	1.318279	2.200231	2.270293	3.510991	2.116943	1.950868	2.773398	4.138033	3.502029
Jarque-Bera	2.246002	1.246639	2.517695	0.503198	0.787103	1.247305	3.338301	5.890472	0.323857
Probability	0.325302	0.536162	0.283981	0.777557	0.674657	0.535983	0.188407	0.052590	0.850502
Sum	370.0000	367.0000	354.0000	301.0000	286.0000	241.0000	208.0000	203.0000	194.0000
Sum Sq. Dev.	2872.737	3092.105	1196.421	566.5263	122.9474	428.1053	1162.947	1064.105	69.15789
Observations	19	19	19	19	19	19	19	19	19

Std. Dev.—standard deviations, Sum Sq. Dev.—Sum of Squared Deviations.

Additionally, significant differences between the minimum and the maximum values across years are present for each unit, as also clearly reflected by the standard deviation levels, while the null value is registered this time only for Arieșeni (in 2000 and 2001). Yet, Bran-Poarta, Bușteni and Moieciu register minimum values lower than 5%; this stands for the high volatility of the benefits expected in terms of contribution to the turnover in the case of related local economies.

For this sample, the asymmetry relating to the central tendency is bilateral (either positive or negative), both higher and lower values depending on the analyzed unit, with a higher impact on the average weight.

The group with average values ranging from 20% to 30% provided the basic statistics presented in Table 11.

Although we analyzed a group with an increased, low to medium, average contribution, the extreme values continue to be surprising. Crivaia/Semenic fluctuates across a period of 19 years from 0% to 60% and Slănic Moldova from 7% to 58%, Predeal/Pârâul Rece/Timișul de Sus being the only one with more acceptable differences between the lowest and the highest registered values.

Table 11. The slope of the ski runs in Romania in 2021.

	Crivaia/Semenic	Slănic Moldova	Predeal/Pârâul Rece/Timișul de Sus
Mean	27.57895	26.10526	24.42105
Median	18.00000	25.00000	21.00000
Maximum	60.00000	58.00000	35.00000
Minimum	0.00000	7.00000	14.00000
Std. Dev.	21.94011	14.93279	6.752084
Skewness	0.232501	0.507255	0.245123
Kurtosis	1.434418	2.489253	1.625887
Jarque-Bera	2.111591	1.021322	1.685084
Probability	0.347915	0.600099	0.430615
Sum	524.0000	496.0000	464.0000
Sum Sq. Dev.	8664.632	4013.789	820.6316
Observations	19	19	19

Std. Dev.—standard deviations, Sum Sq. Dev.—Sum of Squared Deviations.

The last group considered in our research, with average values exceeding 30%, therefore including resorts for which tourism represents a more significant contributor to the well-being of the local economies, generated the descriptive statistics rendered in Table 12.

Table 12. Descriptive statistics for the resorts with average values exceeding 30%.

	Băile Tușnad	Gârâna	Fundata	Gârda de Sus
Mean	57.68421	52.26316	48.31579	30.68421
Median	55.00000	56.00000	55.00000	28.00000
Maximum	80.00000	99.00000	78.00000	53.00000
Minimum	34.00000	10.00000	14.00000	15.00000
Std. Dev.	12.94026	22.67853	21.15565	11.01036
Skewness	0.083926	−0.022824	−0.528619	0.502796
Kurtosis	2.091676	2.470214	1.917973	2.035940
Jarque-Bera	0.675471	0.223849	1.811756	1.536328
Probability	0.713384	0.894112	0.404187	0.463864
Sum	1096.000	993.0000	918.0000	583.0000
Sum Sq. Dev.	3014.105	9257.684	8056.105	2182.105
Observations	19	19	19	19

Std. Dev.—standard deviations, Sum Sq. Dev.—Sum of Squared Deviations.

Unfortunately, this group does not deviate significantly from the already discussed ones as concerns the variation of values across years for the units contained therein. However, the minimum lower bound encountered in the currently analyzed group amounts to 10% (Gârâna), thus representing a low but acceptable level, while the upper values range from 53% (Gârda de Sus) to 99% (Gârâna).

4. Conclusions

The analysis of the indicators from the current study provides both a detailed image (at ski slope and locality level), as well as an overall picture (at county and country level) regarding the spread of winter sports practice in Romania. Our research data and results can be used to initiate and conduct other studies with direct theoretical and practical impact.

The obtained results are part of various studies on the development of territorial systems with a specific function, characterized by exposure to systemic risks which need permanent structural interventions to ensure a sustainable development [57–60].

Due to its situation and geographical conditions, Romania benefits from optimum circumstances to develop winter sports. In this respect, amid the growth of demand, the ski slopes seen as areas of convergence for those who practice winter sports have witnessed a steady evolution both quantitatively and qualitatively. The quantitative evolution, at a

spatial level, has targeted the increase in the number, length, comfort and equipment of the ski slopes.

Therefore, the analysis of the main indicators of the ski slopes in Romania has pointed out the existence of 242 ski slopes with a length of 238,736 m, distributed unevenly in 78 localities from 20 counties.

The counties with the most ski slopes were Prahova (26 units, 25,248 m), Harghita (23 units, 19,412 m) and Braşov (23 units, 28,247 m), while the counties with the longest ski slopes were Caraş Severin (30,226 m, 16 units), Braşov (28,247 m, 23 units), Hunedoara (26,955 m, 23 units) and Prahova (25,248 m, 26 units).

The localities with most ski slopes were Sinaia (16 units, 15,474 m), Straja (12 units, 20,680 m), Şureanu (10 units, 11,710 m), Poiana Braşov (9 units, 16,240 m) and Cavnic (9 units, 7770 m), while the longest ones were registered in Straja (20,680 m, 12 units), Muntele Mic (18,396 m, 6 units), Poiana Braşov (16,240 m, 9 units) and Sinaia (15,474 m, 16 units).

The longest ski slopes were Molasa from Muntele Mic, Caraş-Severin County (12,000 m), Europarâng from Straja Hunedoara County (8100 m), Semenice from Semenice Mountain, Caraş-Severin County (5800 m) and Drumul Roşu from Poiana Braşov, Braşov County (5330 m). Each slope is also characterized by a range of specific quantitative and qualitative features.

Although the quantitative analysis is restrained to a primary approach, as mentioned in the methodological part, given both the specificity of the data and the aim of this research, we can ascertain that there is no pronounced differentiation within and between the considered groups, all demonstrating a high volatility in terms of the evolution of tourism's contribution to the overall turnover of the related local economies due to a large variety of reasons that do not fall under the aim of this paper. It is precisely why, in addition to the overall rather low average benefits, such uncertainty that brought a prosperous evolution to the mentioned economies should inform the entitled entities (local authorities and, going upstream, regional and national authorities) about the urgency of taking steps into the right direction, identifying alternatives for a constant, stable and reasonably consistent provision of such benefits.

The investigation on the dependence of local economies on winter sports and the role of winter sports in the sustainable development of tourism in Romania requires complex research, which aims for both the development potential of winter bonuses as well as the exploitation of other resources [61,62] based on which to ensure an optimal complexity of the local economy.

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Appendix A

Table A1. Evolution of the share of turnover in tourism in total turnover of local economies in which there are arranged ski slopes (%) [37,38].

Localities	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Fundata	18	14	17	19	17	50	75	49	40	52	55	62	78	65	58	59	57	65	68
Băile Tușnad	77	80	75	70	68	67	65	62	50	44	34	40	46	52	49	52	53	55	57
Gârda de Sus	39	32	45	45	45	53	34	15	24	29	20	21	24	22	19	21	28	26	41
Slănic Moldova	8	7	31	7	24	28	35	53	37	15	30	58	25	12	15	12	22	39	38
Arieșeni	0	0	20	17	11	14	6	14	13	11	38	44	34	38	22	14	15	18	38
Bran-Poarta	3	4	4	7	5	8	8	11	14	24	30	28	30	31	26	30	36	34	37
Gârâna (belongs to Brebu Nou commune)	10	99	60	40	30	43	51	77	71	71	74	24	19	57	71	61	42	56	37
Sinaia	10	11	10	12	13	15	15	14	14	12	15	17	23	22	23	29	31	33	35
Șureanu	0	0	0	0	0	0	0	0	0	0	0	0	1	15	24	26	34	28	31
Predeal/Pâraul Rece/Timișul de Sus	35	34	24	21	19	16	20	20	20	19	21	31	34	31	30	18	14	26	31
Moieciu	1	2	4	6	11	4	6	7	5	10	12	13	12	11	13	16	12	29	29
Mărișel	0	0	0	0	0	0	0	0	1	3	12	12	10	19	12	13	16	16	20
Sovata	17	15	11	10	14	12	13	13	13	14	15	17	17	16	16	19	19	18	17
Voievodeasa	2	3	4	4	6	7	6	9	18	14	9	10	21	6	9	2	2	11	15
Covasna	11	11	10	10	9	7	7	7	10	9	10	10	12	12	10	11	11	12	15
Praid	18	20	22	18	18	15	16	14	11	10	10	11	7	6	6	8	9	10	12
Băișorii Mountains Area and Băișoara + Bihor Mountains	8	0	5	1	3	14	11	12	10	14	13	10	3	4	4	13	22	12	10
Durău	14	2	12	16	21	16	15	11	15	16	21	14	20	16	22	27	22	11	10
Crivaia/Semenic	0	0	5	12	18	41	60	33	42	46	53	58	59	47	8	9	11	12	10
Bălea Lac	0	0	0	0	0	0	0	0	0	0	0	0	0	34	3	1	3	3	9
Joseni	2	2	0	0	1	3	0	0	0	1	0	0	0	5	6	9	7	7	8
Ciumani	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	2	4	6
Ciceu	0	0	1	3	2	3	2	2	3	10	8	8	8	10	9	10	13	16	5
Gura Humorului	4	4	5	7	8	5	5	5	4	3	3	3	2	2	2	2	2	3	4
Vatra Dornei	5	6	8	6	7	7	6	7	7	7	7	6	7	6	5	4	4	3	4

Table A1. Cont.

Localities	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Bușteni	29	26	23	18	16	15	13	9	7	7	3	5	7	6	5	6	6	3	4
Muntele Mic	2	2	4	5	0	4	10	12	6	3	2	2	2	3	1	2	2	2	4
Borșa	6	5	4	5	6	7	7	6	6	6	3	3	4	3	2	6	3	3	3
Azuga	1	1	0	0	0	1	1	2	1	2	2	5	7	2	2	1	1	2	3
Câmpulung Moldovenesc	3	3	3	2	3	2	2	2	2	2	2	2	2	2	1	2	2	2	3
Mogoșă	0	0	1	2	1	1	1	1	2	2	3	2	2	2	1	2	2	2	2
Șuitor-Baia Sprie Area	0	0	1	2	1	1	1	1	2	2	3	2	2	2	1	2	2	2	2
Dealul Cozla	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	2	2	2	2
Băile Homorod	0	1	1	1	1	1	1	2	2	2	1	1	1	1	2	1	2	1	2
Valea Rece	0	0	0	1	2	1	2	2	2	2	1	2	7	6	2	2	2	2	2
Feleacu	0	0	0	0	0	0	0	0	0	0	0	0	2	3	3	2	1	2	2
Cavnic	2	1	1	1	2	2	2	5	1	1	1	1	1	0	1	1	0	0	2
Gura Râului	0	0	0	0	0	0	5	4	4	4	4	2	2	2	2	2	2	2	2
Voineasa	1	0	0	0	1	1	3	3	3	4	2	2	1	1	3	3	3	1	2
Parâng-Petroșani Area	1	2	2	1	1	1	0	0	0	0	0	1	0	1	1	1	1	1	2
Toplița	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
Păltiniș	4	3	6	7	6	5	5	4	3	4	3	3	3	3	2	2	2	1	1
Păltiniș	4	3	6	7	6	5	5	4	3	4	3	3	3	3	2	2	2	1	1
Pojorâta (Valea Putnei)	1	0	1	1	1	2	1	2	2	1	1	1	1	1	1	1	1	1	1
Bistrița	1	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Poiana Brașov	2	2	1	1	1	1	1	2	2	1	2	1	1	1	1	1	1	1	1
Jina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
Mădăraș	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1
Varsag	0	0	0	0	0	0	0	1	8	3	8	1	1	1	1	1	2	1	1
Izvorul Mureșului	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	1
Straja	0	0	0	0	0	1	1	1	0	1	1	1	1	1	1	0	1	1	1
Întorsura Buzăului	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Malini	2	1	1	1	1	1	1	2	3	1	1	0	0	0	0	0	0	0	1
Harghita-Băi + Miercurea Ciuc (the same territorial administrative unit)	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1

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