A Multicriteria Satisfaction Analysis Approach in the Assessment of Sustainable Tourism Development in Mountainous Regions in Greece: The Case of Voras Ski Resort

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Abstract. A key measure for the formulation of a new policymaking and governance for sustainable tourism development at the local level is the exploration of current tourism conditions and views in terms of their environmental, social and economic characteristics. According to the new strategy set by the Hellenic Ministry of Environment, Energy and Climate Change, particular attention is placed on the relationship between the natural environment and tourism development following the Special Framework for Spatial Planning and Sustainable Development for Tourism and the poles for the intensive development of specific forms of tourism. By creating integrated tourism management development plans, the design of mountainous areas will highlight both the environmental protection and the improvement of special tourist resorts within the framework of sustainable spatial development. It is for these reasons that the present research has been initiated, exploring the attitudes and views of the visitors of the Ski Center of Kaimaktsalan with the aim of providing a Multicriteria Satisfaction Analysis-MUSA of the recreational value of the area, which is a pole of alternative tourism options for Northern Greece. The results indicate how Mount Voras can be sustainably managed through different scenarios of tourism intervention, following the European model and the strategies set by the European Commission on Climate Change.

Keywords: Mountainous Tourism; Ski Centers; MUSA system; Multivariate Statistics; Count Data Models.

1 Introduction

Tourism can prove a key component with a social, economic and environmental impact, also can, offer employment opportunities for the young people as well as upgrade existing infrastructure and attract investment (Apostolidis and Latinopoulos, 2015). In addition, the recreational activities and recreational value of a region can determine the quality of human life both at the level of visitors and the local population (Arabatzis and Grigoroudis, 2010). In effect, the Greek Government needs to set a collective and national goal of stability and development of tourism in

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Greece along with political and institutional change at all levels (Greek Ministry of Environment Energy and Climate Change, 2013). This shift is reflected in the expanded tourist demand in Greece, especially during the summer months, leading to viable alternative forms of tourism and the reconstruction of the winter tourist product of the country.

The purpose of this paper is to investigate the attitudes and opinions of visitors in mountainous areas with the aim of presenting new spatial tourism interventions, especially in recreational areas that bear a strong connection with the environment, the culture, and the sustainable development agenda. The ultimate aim of the research is the development of an integrated basis and a system of impact assessment in the Greek portfolio of tourism, with dimensions of indicators and systems of knowledge of tourist landscapes for decision making and selection of optimal scenarios for the best sustainable management of such areas.

2 Statistical and Econometric Methodology

Questionnaires completed by the visitors to the Ski Center of Kaimaktsalan-Voras Mountain (Greece) were used during the winter period of 2015-2016 to conduct the present research. The sample size (n=323 guests) is considered as representative, and the use of results met the necessary statistical conditions. The research tool, a questionnaire, was developed to be filled on site with the investigator conducting personal interviews of the respondents-guests. The Haphazard Sampling method was used and the statistical package IBM SPSS v.20. for the processing of the results and the analysis of the data (Apostolidis 2017b, 2017a).

The Method of Factor Analysis in Principal Component Analysis was used to reduce the large number of criteria set on the respondents and to form new parameters. Also, the Rotation Method: Varimax with Kaiser Normalization was used (Arabatzis and Myronidis, 2011; Tsiantikoudis et al. 2013; Galatsidas et al. 2015a, 2015b; Nilashi et al. 2015; Radeljak, 2016). Additionally, Hierarchical Cluster Analysis was employed (Andriotis et al. 2008) to create a typology (Sharma, 1996; Rencher, 2002; Johnson and Wichern 2007; Grigoroudis et al. 2012; Galatsidas et al. 2015a, 2015b). The reliability of optimum scores, in the sense of internal consistency, was tested and evaluated for the factors that emerged using the Cronbach coefficient α (Tsiantikoudis et al. 2013). Reliability indicators are generally considered to be satisfactory when higher or equal to 0.70. In some cases, confidence indicators are also considered satisfactory or sufficient when they exceed or equate to 0.60, especially when a questionnaire-tool criterion is implemented with a population sample (Meulman and Heiser, 2005; Tsiantikoudis et al. 2013).

The Poisson models are the most widespread models for economic and environmental valuation techniques Therefore, the Poisson and Negative Binomial Models were used to evaluate the study area (Apostolidis, 2017a).

3 Field of Research

The research area selected was the Voras Mountain Range due to its environmental significance. The wider region is becoming a tourist resort, which according to the Special Framework for Spatial Planning and Sustainability for Tourism (Greek Ministry of Environment, 2013) belongs to the category of Intensive Development of Special Forms of Tourism. Specifically, the area identified for analysis (valuation survey) is the Kaimaktsalan Ski Center (highest altitude ski center in Greece-2500m).

4 Multivariate Statistical Analysis

4.1 Development of Tourism Visits Typology in the Area

The Factor Analysis provided significant results, indicating that the analysis is crucial for research. The KMO index is very high 0.907 (sig. = 0), which means that the exploratory work is almost excellent. Of the 31 eigenvalues exported, only six are larger than the unit, and they account for 61.875% of the variance. The results are presented in the scree plot in which there is an absolute alignment of the curve with the horizontal x-axis (figure 1). With the final separation and creation of the new factors after the rectangular rotation, the fitting of the variables within the recreational activities with the extraction of natural resource elements was as follows: 1) Fly Fox-Lake Passage, Kayak, Rafting, Boating-Eco-touring, Horseback Riding, Mountain Biking, Paragliding, Cycling and Archery, are the first factor (activities related to water resources in the countryside, the flora and fauna). 2) Aviation-Air sports, Climbing, Controlled Fishing, Professional Winter Sports, Camping, Guided tour of the Prophet Elijah's Church, Mountaineering and Jogging are the second factor (activities related to the atmosphere and climatic conditions). 3) Nature walks, Forest exploration, Mountain Trekking, Trekking, Hiking, and Picnic are the third factor (recreational activities related to forest resources). 4) Family walks, adventure games in nature, landscape observation and cultural events contribute to the fourth factor (activities related to cultural resources). 5) Motocross, Racing Motorcycle, and 4x4 Routes are the fifth factor (activities related to grassland, land use and ground cover). 6) Spa therapy and Massage Spa are the sixth factor (recreational activities related to the Therapeutic Natural Resource). The most significant load was presented between the second and fourth factors with an 0.595 index.

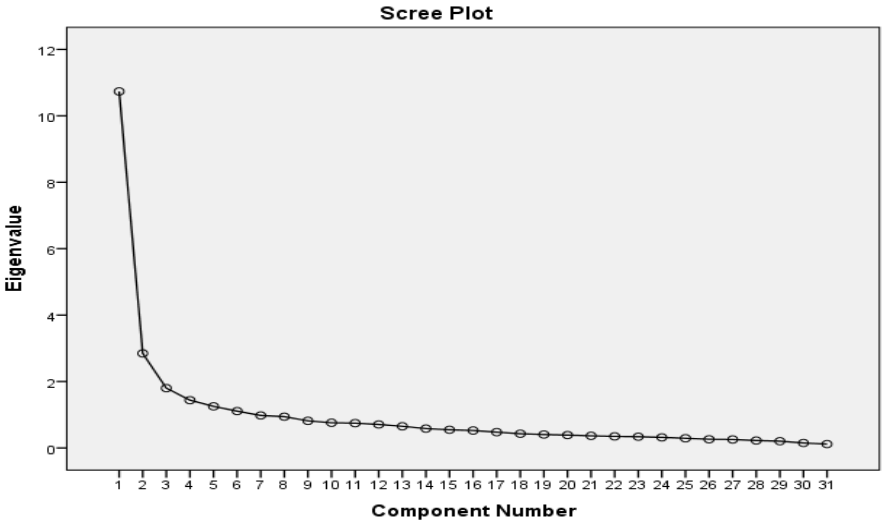

Fig. 1. Diagram of Components.

Table 1. Rotation Matrix.

Criteria	Component					
	1	**2**	**3**	**4**	**5**	**6**
Fly Fox – lake passageways	**0.664**	0.232	0.140	0.166	0.271	0.070
Kayak	**0.837**	0.265	0.157	-0.068	0.009	0.114
MotoCross	0.129	0.281	0.036	-0.056	**0.802**	0.031
Rafting	**0.804**	0.164	0.206	-0.073	0.101	0.059
Motorcycle racing	0.315	0.182	0.091	0.019	**0.774**	0.025
Aviation – air sports	0.296	**0.710**	0.031	0.090	0.156	0.068
Climbing	0.316	**0.651**	0.277	-0.016	0.200	0.026
Boating – ecotourism	**0.642**	0.159	0.138	0.240	0.198	0.095
Walk with the family	0.043	-0.080	0.400	**0.502**	0.135	0.028
Walk in nature	-0.055	-0.060	**0.698**	0.461	-0.039	0.045
4x4 routes	0.503	0.098	0.113	0.163	**0.531**	-0.005
Controlled fishing	0.325	**0.516**	-0.026	0.164	0.307	0.123
Forestry exploration routes	0.355	-0.001	**0.534**	0.035	0.086	0.142
Professional winter sports	0.141	**0.635**	-0.105	0.155	0.175	0.017
Horse riding	**0.655**	0.101	0.059	0.255	0.052	0.065
Camping	0.275	**0.651**	0.358	0.107	0.077	0.019
Balneotherapy	0.120	0.058	0.118	0.156	0.050	**0.890**
Massage and spa	0.146	0.144	0.127	0.227	0.013	**0.867**
Tour of the chapel of Prophet Elias	0.052	**0.483**	0.092	0.464	-0.075	0.218
Mountain climbing	0.301	**0.632**	0.451	-0.133	0.024	0.036
Trekking	0.136	0.439	**0.644**	-0.003	0.065	0.087
Mountain Bike	**0.597**	0.419	0.186	0.112	0.285	-0.011
Adventure games in nature	0.304	0.198	0.103	**0.684**	0.105	0.132
Paragliding	**0.510**	0.442	0.051	-0.018	0.120	0.042
Observing the landscape	0.001	0.090	0.291	**0.658**	-0.110	0.173
Hiking	0.165	0.250	**0.698**	0.203	-0.033	0.063
Picnic in nature	0.181	0.143	**0.503**	0.317	0.218	0.053
Cycling	**0.567**	0.378	0.167	0.216	0.079	0.047
Cultural events (fairs, festivals)	0.377	0.155	0.040	**0.637**	0.043	0.115
Jogging	0.143	**0.555**	0.401	0.280	0.121	0.129
Archery	**0.717**	0.215	0.004	0.184	0.183	0.068

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

For the reliability of the results, Cronbach's alpha indices were estimated (Ca1=0.906; Ca2=0.852; Ca3=0.754; Ca4=0.704; Ca5=0.742; Ca6=0.847). The results show that the highest index is presented in the first dimension with 0.906, which implies that the results are reliable and researchable with an optimistic application. The lowest index was presented in the fourth component with 0.704, which is statistically acceptable as it is higher than the base threshold of 0.6. The first factor, which presents a positive combination of recreational tourism activities in the region, can have economic and social implications for the development of the wider region with social, economic and environmental impact.

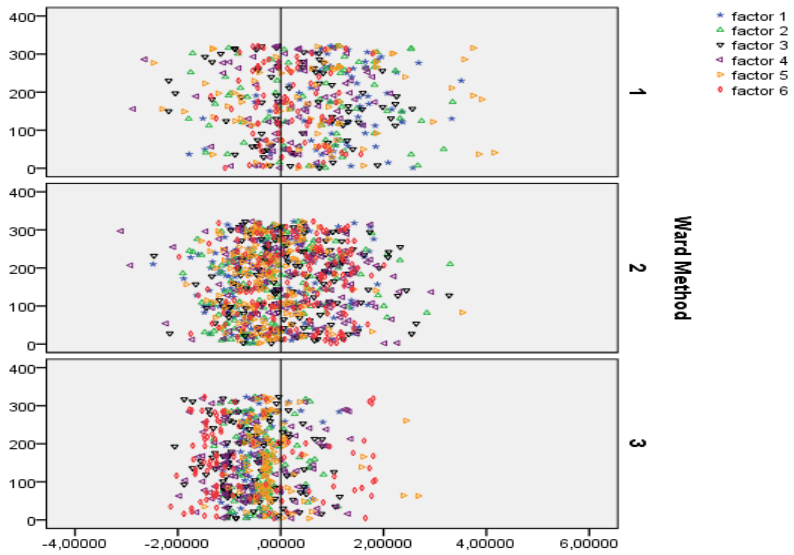

Fig. 2. Visualization Factors Vs Clusters of Multicriteria Satisfaction Tourism Visits in the wider Area.

The above diagram shows the combination of factors within the clusters that were created in which the final spatial planning includes: a) Cluster1 (3rd factor outperforms) = Green Tourists with a motivation for the mountain and the forest (23.5%), b) Cluster2 (the 6th factor is the most important) = Tourists looking for spa tourism and health reasons (46.1%), c) Cluster3 (5th factor is superior)=Alternative adventure tourists (30.3%).

Table 2. Typology of Tourists.

Cluster1	Cluster2	Cluster3
3rd Factor outperforms: Green Tourists with a motivation for the mountain and the forest (23.5%)	6th Factor is the most important: Tourists looking for Spa Tourism and health reasons (46.1%)	5th Factor is superior: Alternative adventure tourists (30.3%)

4.2 Factor Analysis-(PCA) and Development of a Typology for Recreation options at the Ski Center

The results from the questionnaires which were collected during the sampling period are presented below through the application of the factorial analysis in the principal components with the primary purpose of designing the alternative forms of tourism developed in the Ski Center. The KMO and Bartlett's Test show the adequacy of sampling, and reveal that in this research the analysis is appropriate, and there is statistical significance and correlation between the variables with KMO = 0.788 (df = 66, sig = 0 and Approx. = 764,621) being statistically significant at a baseline level of statistical significance sig = 0.05. From the correlations that have arisen between the recreational activities, the correlation between the Variables Skiing and Cross-county Skiing is highlighted, which underlines the correlation between two extreme and risky recreational activities. The eigenvalues of the first three factors that meet the statistical criteria and are higher than the unit explain the 52.372% of the fluctuation. Therefore, the three components were chosen for the course and continuity of the new dimensions. The Communalities indices of the components were exported for each variable highlight that some variables are more related to a factor such as Skiing with 0.687 while others are less related such as Snowboarding with 0.349.

The final formation of new dimensions of recreational activities is presented in the Rotated Component Matrix after rotation. The first factor (Snow Cat, Snowboard, Ski Jumping, Freestyle Ski, Mountaineering Ski and Cross-Country Ski) is strongly linked to the values: 0.529-0.576-0.794-0.596-0.721-0.764. The second factor (Skiing courses, playing games in the snow -Snowballing, Bobsleigh and Rides on the lift) is strongly linked to the values: 0.626-0.754-0.502-0.639. Finally, the third factor (Meeting other skiers and ski) is strongly linked to the values: 0.739 and 0.825. In turn, according to the present configuration and formation of factors, the new dimensions are identified as follows: a) Extreme leisure activities (high-risk sports which are related to the visitor's considerable experience with snow and excitement, adrenaline, adventure, and action) (b) Low-risk recreational activities (related to and associated with the visitor’s acquaintance and familiarity with snow); (c) Leisure activities of developing relationships and expanding-shaping personality through the sport (related with the visitor’s friendly attitude and activity in specific areas). Finally, the highest correlation between the newly created dimensions occurs between the first and the second factor with an index of 0.317, which is characterized by a low correlation, so there is no great connection between the two dimensions.

For the reliability of the results, Cronbach's Alpha indices were exported. The results show that the highest index is presented in the first dimension with 0.727, which implies that the results are reliable and interpretable with the optimism of application. The lowest index was presented in the third component with 0.561 which is not statistically acceptable as it is less than the base threshold of 0.6. The first factor, which presents a positive combination of recreational tourism activities in the region, can have economic and social implications for the development of the wider region with social, economic and environmental impact. Applying the Hierarchical Cluster Analysis shows that the sample of the present survey can be grouped into two groups or clusters of visitors based on the chances of engaging in

recreational activities during their visit to the Pozar Thermal Baths combined with their socio-economic characteristics (gender, age, marital status, income). These groups are Cluster1 (31%) and Cluster2 (63.8%). The next table shows the analysis of the results using the method of Ward. The scatter plot shows the distribution of visitors based on the factors created within the clustered space. The results of the analysis show that the first cluster the first dimension (High Adrenaline Recreation Activities) outweighs, while in the second cluster the third dimension (Relationship Development Activities).

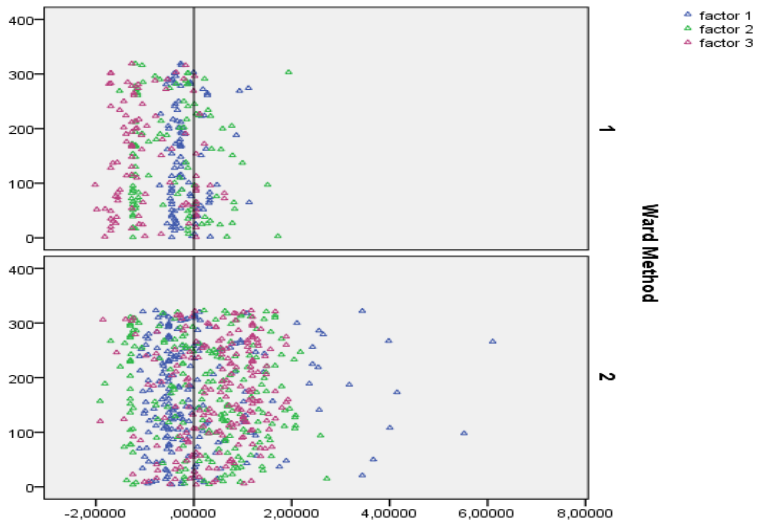

Fig. 3. Visualization of Factors Vs Clusters of Multicriteria Satisfaction for Recreation options at the Ski Center.

5 Econometric Analysis

This section presents the basic econometric models used to calculate the Consumer Surplus and the Recreational Value. We note that all criteria values in the Good Adaptation Test are statistically significant in degrees of freedom 283, and the Likelihood Ratio Chi-Square is statistically significant, too. Furthermore, data from the Poisson model shows significant sampling adequacy and suitability for the model under consideration. From the economic results of the Poisson Log Function model it can be drawn that the fixed term is not statistically significant at significance level α=0.05. The remaining variables, which are of less than 0.05 significance, are significant with the most important one the climatic conditions (sig=0). That is, the variation in temperature affects the skiing conditions at the ski resort but also the potential future travel prospects. Other important aspects are familiarization with the area, the possibilities for recreational activities as well as the short travel distance from the place of residence to the recreation area.

Table 3. Poisson Model-Log Function.

Parameter	B	Std. Error	Hypothesis Test		
			Wald Chi-Square	df	Sig.
(Intercept)	0.370	0.2160	2.932	1	0.087
SnowBoard	0.330	0.1193	7.666	1	**0.006**
Sightseeing Tour	0.187	0.1155	2.615	1	0.106
Becoming familiar with the area	-0.622	0.1396	19.855	1	**0**
Ski	0.184	0.1017	3.264	1	0.071
Relaxation-vacation-recreation	-0.153	0.0882	3.028	1	0,082
Potential for recreation activities	0.455	0.1183	14.791	1	**0**
Ski Facilities	-0.323	0.1130	8.175	1	**0.004**
Climatic Conditions	0.428	0.0881	23.653	1	**0**
Great Slopes	-0.083	0.1183	0.496	1	0.481
Highest altitude in Greece	0.009	0.0890	0.009	1	0.923
Short distance from your place of residence	0.427	0.0801	28.432	1	**0**
The beauty of the countryside – the landscape environment	0.031	0.0891	0.120	1	0.729
Organized and adequate accommodation facilities (accommodation, food, entertainment)	-0.290	0.1077	7.250	1	**0.007**
Combination with other travel destinations in the region (e.g. Pozar, Agios Athanasios, etc)	-0.182	0.0815	4.983	1	**0.026**
FACTOR Dimension1	0.032	0.0367	0.743	1	0.389
FACTOR Dimension2	0.105	0.0362	8.408	1	**0.004**
FACTOR Dimension3	0.158	0.0459	11.795	1	**0.001**
TOTAL COST	-0.001	0.0003	5.615	1	**0.018**
Level of Education	0.020	0.0278	0.511	1	0.475
Annual net personal income	0.059	0.0234	6.317	1	**0.012**
Age	0.027	0.0448	0.361	1	0.548
Gender	0.079	0.0772	1.058	1	0.304

Table 4. Negative Binomial Model-Log Function.

Parameter	B	Std. Error	Hypothesis Test		
			Wald Chi-Square	df	Sig.
(Intercept)	0.333	0.4378	0.579	1	0.447
SnowBoard	0.246	0.2427	1.028	1	0.311
Sightseeing Tour	0.169	0.2133	0.628	1	0.428
Becoming familiar with the area	-0.553	0.2290	5.837	1	**0.016**
Ski	0.105	0.2079	0.255	1	0.614
Relaxation-vacation-recreation	-0.210	0.1730	1.472	1	0.225
Potential for recreation activities	0.203	0.2547	0.633	1	0.426
Ski Facilities	-0.202	0.2108	0.916	1	0.339
Climatic Conditions	0.376	0.1764	4.538	1	**0.033**
Great Slopes	0.022	0.2347	0.009	1	0.925
Highest altitude in Greece	0.054	0.1823	0.088	1	0.766
Short distance from your place of residence	0.386	0.1569	6.046	1	**0.014**
The beauty of the countryside – the landscape environment	0.013	0.1740	0.006	1	0.940
Organized and adequate accommodation facilities (accommodation, food, entertainment)	-0.224	0.1983	1.280	1	0.258
Combination with other travel destinations in the region (e.g. Pozar, Agios Athanasios, etc)	-0.161	0.1630	0.971	1	0.324
FACTOR Dimension1	0.071	0.0850	0.707	1	0.400
FACTOR Dimension2	0.076	0.0739	1.048	1	0.306
FACTOR Dimension3	0.128	0.0901	2.025	1	0.155
TOTAL COST	-0.001	0.0004	1.765	1	0.184
Level of Education	0.036	0.0561	0.406	1	0.524
Annual net personal income	0.057	0.0462	1.529	1	0.216
Age	0.107	0.0869	1.513	1	0.219
Gender	0.011	0.1553	0.005	1	0.945

The Negative Binomial model which is being developed, presents less statistical significance than the previous one, but it is worth noting that the criterion of climatic conditions continues to play an important role. It is worth mentioning that with the development of this econometric model, fewer statistically significant variables are presented compared to the original Poisson model. Additionally, from the implementation of the models, the consumer surplus was estimated at 1,000€ while the tourist value of the area to 15,067,000€ and the total value of the special forms of the tourism pole was calculated at 143,543,000€, for the first time in Greece, according to the strategy of the (Greek Ministry of Environment Energy and Climate Change, 2013). These values are of major significance for planning the tourism development of a region since they assess the existing demand for recreation and the aesthetic value of the landscape environment in the study area. Within this framework, it is important to take into account all the values which are associated with the areas under consideration as well as the possible change in these values

under different circumstances (e.g., demand conditions, environmental conditions, infrastructure, climate, among others).

6 Conclusions

The present research, presents a new spatial tourist package for the wider region of the Ski Center of Kaimaktsalan, focusing on the basic and most widespread leisure activities that are being developed in centers of alternative forms of tourism by exploring the attitudes and opinions of the visitors in the area. Using MUSA methodology for recreation activities in this research, the critical variables and respectively the forms of development of alternative tourism were selected. In turn, there is a great need for socio-economic assessment in similar areas and recreation centers at the National Level, to introduce green investment and sustainable development of the protected areas, as well as the design of the sustainable regional development. Alternative tourism development activities have a high impact on the attitudes of visitors to the area, create new tourism behaviors and relationships of interdependence and interaction between man and the natural environment, with social, environmental and economic impact.

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