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GEOTURISM AND ITS SUSTAINABLE PRODUCTS IN DESTINATION MANAGEMENT

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Abstract: Geographical knowledge of the country can be one of the leading assumptions that allow the tourism development. It enables a more detailed specification of the dominant potential for its further development. Considering the current significant need to create a sustainable product, the natural conditions together with destination management can be key elements for the future course of the tourism sphere. The aim of the study was to find out the preferences of visitors to selected geolocations in the Spiš region, specifically within the offered geotourism products. To fulfil the goal, the questionnaire as a key method was used and subsequently tested by the Kolmogorov-Smirnov test, Spearman's Rho test, coefficient of determination R2, F-test with Fisher's criterion. It can be concluded that the potential of the Spiš region is perceived as attractive. Based on results, the uniqueness of the main geoproduct offer is in montanistics.

Key words: tourism development, sustainability, geotourism, tourism product, Spiš region, destination management

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INTRODUCTION

Tourism is basically a mass industry. Its products and services are aimed at enabling the regeneration of body and spirit, getting to know, and experiencing something new, interesting to as many people as possible. However, the present shows that, as in other sectors (for example the economy), it is necessary to apply elements of sustainability in tourism as well.

Sustainability in tourism takes many forms, making it a flexible and well-applicable industry. It is possible to focus on the distribution of tourist flows, support of communities, but the most attention is focused on the environment in which tourism takes place (Kyriakaki and Kleinaki, 2022). Environmental protection and sustainability are associated with the reasonable use and enjoyment of natural and cultural resources and the support of new types of tourism and their products (Dzurov Vargová, 2021) for the benefit of residents as well as visitors. The essence of sustainability is to convince society that all resources on our Earth are exhaustible and need to be conserved. Geotourism represents a relatively new direction in tourism. Its products in the form of activities are closely connected mainly with natural potential. Geotourism is one of the types that significantly supports sustainability in tourism in different forms. It is focused on the geology of the country, getting to know geoheritage and geosites, but especially it is an important part of supporting nature conservation. In addition to contributing to greater geological knowledge, geotourism also helps promote the local tourism industry and thereby strengthens community identity (Newsome and Ladd, 2022). For the development of geotourism in accordance with the requirements of sustainability, it is necessary for destination management to develop its activities in the region, which will support and coordinate the activities of business entities and organizations to create geotourism products by:

- opposes community involvement as local tourism businesses and tourism organizations join forces to provide a unique and authentic geotourism product aimed at visitor experience,
- inspires a sense of pride when visitors discover and consume geotourism products (i.e., geoactivities) that are interesting to them,
- improves the local economy as tourism businesses hire local workers and use local services and supplies to build geotourism products,

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- creates respect for local culture and traditions, by presenting not only natural attractions, geological phenomena, but also, for example, the history and culture of the region associated with geological activities (Yang and Su, 2021).

In general, the essence of destination management can be defined as the process of creating, directing and adapting factors involved in the creation of a unique tourist product of a destination, in which individuals, working together in groups, effectively realize set socioeconomic goals (Gato et al., 2022). In addition to the basic tasks and functions of management, destination management focuses on staff training, defining quality standards and manuals, equipment certification, building customer satisfaction, marketing efficiency, knowledge of competition, innovation and development projects of the destination, networking of business entities. One of the focal activities is the coordination of the creation of tourism products as a result of the cooperation of the business entities of the destination (Dzurov Vargová et al., 2020).

In the scientific literature, it is possible meet the interest in the issue of geotourism and its sub-geoproducts. Németh (2023) examines volcanoes as an object of interest of geotourists, while Tiago et al. (2021), mentions volcano tourism as a specific part of geotourism. The attention of a significant part of the literature is devoted to geotourism within the problematic of national parks (Matsuha et al., 2021), Xi and Wu (2022) pay attention to geoparks as an innovative protection of geoheritage and an important element in the development of geotourism. Their research results demonstrate that the geopark is an example of a sustainable approach to advancing earth protection and point to the fact that it can support local economic development. Their results further emphasize the importance of sustainable management in geotourism. Maghsoudi et al. (2021), pointed out in the study the connection of earth science, geotourism and aviation together. For the first time, they come up with the term aerial geotourism, which, according to the authors, encompasses various aspects of tourism, recreation, aesthetics, education, interpretation, understanding, geohistory and geoconservation by flying over geological landscapes in natural, urban and rural areas. The result of the study is the introduction of a new geotourism product - aerial geotourism, whose key role will be in geoprotection and geoeducation.

Geotourists as a specific segment are also the object of researchers' interest. Dowling et al. (2021) study visitors with different interests, especially geotourists, while Suhud et al. (2019) further divided them into tourists based on their interest in volcanic and geothermal resources, while the result was an increase in geotourists' interest in volcanoes as a product of geotourism. Kubalíková et al. (2020) focus on the challenges and opportunities of urban geotourism, while offering solutions and guidelines for identifying, inventorying, and evaluating geotourism and geo educational resources in urban areas.

It is still possible to find areas of research that are not sufficiently developed and where the potential in the field of research can be seen. In professional studies, we also find an assessment of the issue of the potential of geolocation, but to a lesser extent with an accent on the opinion of the tourists themselves about the offered geoproducts. Miśkiewicz and Poros (2022) addressed the issue of geoproducts, mapping the Polish scientific literature that lists typical geotourism products, such as geotourism guides and boards, geo educational games, heritage-inspired souvenirs, geology, geological museums, geocenters, dino parks, lapidaries, mining heritage sites, geological picnics, geotourism guide services and geotourism trails.

As part of the results of the project, they emphasize the need for cooperation and combining scientific knowledge with practical experience. They recommend even a national agreement of interested entities. As an output of his findings, he mentions, for example, the importance of supporting geotourism by destination management, which must cooperate not only with regional entities but also with government entities. He also declares it by asserting that the biggest opportunity in the case of his study is precisely the support of the Saudi government through the diversification of sources of national income, as part of the 2030 vision. Babiker and Abualyazed (2022) focus on the evaluation of well-known geolocations in Saudi Arabia, through a SWOT analysis, but from the point of view of a scientist (the opinion of subjects active in geotourism and geotourists is absent). They identified five geosites, three of which had significant potential for the development of geotourism. The outputs of the SWOT analysis indicated the need to create development plans and policies for geotourism in the region to ensure the sustainable use of resources.

Krishna et al. (2019) focused on investigating geoproducts in the Belitong Geopark in Indonesia and what role geoproducts play in geotourism. The focus of the research is on producers of geoproducts, small and medium-sized enterprises (local crafts and gastronomy). The research results point to the attractiveness of geoproducts for tourists, their difference in terms of quality and nature of the products, and at the same time the impact on the local population in the form of additional income. A certain gap in the market as shortly mentioned before, is the evaluation of the offered geoproducts by the users themselves - visitors to the geolocation and geotourists. The paper points out the importance of sustainability in tourism and its significant relation with geotourism.

The study focuses on the tasks and visions of destination management in the conditions of the Slovak Republic while monitoring selected geotourism products that are offered to visitors in the form of geoactivities. Subsequently, the research is focused on the visitors' opinions on the selected geolocalities and their geotourism products. As a research area chosen for the research needs was Spiš region, which is a potential leader in the development of geotourism in Slovakia.

Theoretical Background

Geotourism as a model accepting sustainable tourism

A favourable ecological environment is the cornerstone of supporting healthy development and sustainable tourism (Yang and Su, 2021) and an important part of increasing the attractiveness of tourism (Šenková et al., 2020). Achieving sustainable tourism is a continuous process and requires constant monitoring of impacts, implementation of necessary preventive and/or corrective measures whenever necessary. Sustainable tourism should also maintain a high level of satisfaction among destination visitors and provide them with a meaningful experience, raise their awareness of sustainability issues and promote sustainable tourism practices among them (UNWTO, 2005). Some practices typical for

sustainable tourism are supporting community conservation projects, recycling and waste treatment, sourcing local products for restaurants and souvenir shops, conserving water and energy, and hiring, training, and paying staff from the local community (Karagiannis and Andrinos, 2021). In the long term, sustainable tourism must therefore be ecologically durable, economically feasible, but also socially and ethically fair in relation not only to the destination and to objects of tourism, but also to the local population (Hassan et al., 2022).

Geotourism allows visitors to get to know the local geology, but also to better understand that this geology is closely related to all other assets of the territory (for example, biodiversity, archaeological and cultural values, gastronomy, etc.) (Welc and Miśkiewicz, 2020). Geotourism is a relatively new form of tourism, growing in popularity and becoming a new global phenomenon. It can be understood as a special form of tourism in a natural environment with a special interest in geology. The uniqueness of geotourism is supported by the sustainable use of natural heritage, raising awareness of nature through new and engaging ways of interpreting knowledge to the public (Geotour, 2019; Gałka, 2019). Fonseca-Filho and Ribeiro (2016) claim that it is the trend of tourism in natural areas, which prioritizes the evaluation of geodiversity. Like ecotourism, both are embedded in the context of tourism in natural areas and value the preservation of natural heritage, and these segments complement each other, although they differ, as they have specific characteristics (Vu et al., 2022). From an economic point of view, geoheritage (geosites) is considered the basis of tourism development; geolocalities contribute to the original (or primary) and derived (or secondary) tourist offer (Štrba et al., 2020). Fonseca and Ribiero (2016; Rodrigues et al., 2021) they draw attention to the negatives of geotourism (for example, growing inflation, rising land prices, seasonality of product creation, low return on investment or reducing the quality of life of the local population) in the case of unmanaged development, poorly formulated development visions, wrong decisions by businesses and tourism organizations.

Rodriges et al. (2021) state that geotourism products provide geotourists with new experiences and at the same time contribute to the development of the local economy. Fonseca and Ribiero (2016) determined the criteria for geotourism products, where in the first place it should be from local products (created from the local potential of the region), which will then allow it to become a symbol of the geological and geomorphological heritage of the region. They further state that it must not only provide an experience but also be a commercial and pedagogical tool that integrates local traditional products with concepts and interprets the geosciences in an appropriate way. Finally, it should be created, and function based on the principle of sustainability, which once again proves the favourable connection between sustainability and geotourism.

Newsome and Ladd (2022) focus on the destination (natural environment) in which geotourism products can be provided. They point out that its product can only be created in a destination that has unique characteristics. Information exchange can be done by telling short stories instead of scientific explanations (Gałka, 2019). Such destinations can connect the past and present of the region. Basi Arjana et al. (2018), perceive the geotourism product from three aspects:

• form aspect (landscape, landforms, sediments, rocks, fossils, etc.), i.e., geological forms,

• process aspect (tectonic activities, weathering, erosion, etc.), represents the main attraction of geotourism,

• tourist aspect (attractions, activities, accommodation, trips, interpretation, management, etc.), i.e., tourism business activities, the result of which is a product.

These authors analyse geotourism as a system composed of three subsystems:

- forms (landscapes, landforms, sediments, rocks, fossils),
- processes (tectonic activity, volcanic processes, weathering, erosion, deposition),
- tourism (attractions, accommodation, tours, activities, interpretation, planning and management) (Basi Arjana et al., 2018; Rodrigues et al., 2021).

Getting to know the country as part of geotourism can be done through several available so-called of geoactivities, which, based on marketing theory, can in this case also be considered as geoproducts (selected products for the purposes of the study):

- *Geocaching* - tourism navigation game, which is based on the fact that a box (cache) is hidden in an unknown place. The information and navigation are published and coordinated through the internet. People try to search for the box using the navigation devices- GPS (Referowska-Chodak, 2019).
- *GeoRafting* – as an activity it provides more information about nature and the geopark, the region, biodiversity, geological and cultural heritage during rafting, while at various stops and geological points of interest, rafting guides tell guests interesting geological and other facts about the area (Andrășanu and Ciobanu, 2018).
- *Montanistics (mining tourism)* – it is based on the fact that geological development of the Earth and its rock composition was a necessary prerequisite and still has an irreplaceable role in the further development of human society (they influenced human activities in the country - establishing settlements, building roads, growing crops and ensuring livelihoods, extracting minerals, using energy resources, etc.) and at the same time represent each country's geological heritage (Weis, 2021). Montanists also includes activities such as:
  - visiting open-air mining museums, museums, old mining buildings, shafts, tunnels, and the mines,
  - panning for gold and individual collection of minerals,
  - tastings of mine cuisine and samples of miners' life,

  mining workshops, exhibitions and creative workshops for children, educational mining trails, Slovak mining route (SBC) (Rodrigues et al., 2021; Andrășanu and Ciobanu, 2018).

MATERIALS AND METHODS

Study area

The Spiš region is one of the places in the Slovak Republic with the greatest potential for the development of geotourism. The region, with its direction and activities in tourism, develops and declares an interest in the development of geotourism and

can be considered the flagship (representative) of Slovakia in the implementation of geotourism. The Spiš region is located in the northeast of the central part of Slovakia, on the east and south of the High Tatras. The highest point in the Spiš region is Gerlachovský štít, which reaches a height of 2655 metres above sea level and the lowest point in the region lies on the Ružín reservoir at an altitude of 330 metres above sea level. The total area of the region is approximately 4,115 km^2 (Kopanic, 2011).

The territory of the Spiš region has a diverse character in terms of terrain, its geological structure, lush vegetation, and conditions, as well as economic use. In the middle of the area stretches the Hornád basin, bounded in the south by Hornád, in the north by the foothills of the Levočské vrchy. It has the character of a hilly area consisting of flysch clays, sandstones, and slates. Travertines were formed by precipitation from mineral springs that spring up along faults, which in the form of typical mounds stretch along the basin from Hôrka near Gánovce, through Skalka, to Pažica and Dreveník. At the Sivá Brada travertine mound, travertine is still being formed today, and in other places, travertine is already formed (Jančura, 2019).

The region is traditionally divided into Dolný Spiš (Gelnica and Spišská Nová Ves districts), Middle Spiš (Levoča and Poprad districts and a larger part of Kežmarok district) and Horný Spiš (Stará Ľubovňa district and part of Kežmarok-Zamagurie district). The natural potential is of exceptional quality. In addition to national parks (TANAP, Pieniny National Park, National Park Slovak Paradise and National Park Low Tatras), there are also several protected natural areas. The territory is relatively densely covered with coniferous forests, rich in animals, mushrooms, and medicinal plants. The rivers are clean and suitable for fishing and water sports (Prekopová, 2022). A significant part of the natural wealth of Spiš was made up of copper, silver and iron ores. The centre of Spiš mining and the bearer of special mining rights was the city of Gelnica (Jiroušek, 2011). The Spiš region has many interesting sites of geological importance, attractive for tourists and visitors:

- Dreveník national nature reservation (NPR Dreveník)- a tall natural travertine formation. It was created in the younger period of the Tertiary period. In the cracks of the slopes (especially on the western edge) there are smaller caves with sinter and sometimes ice decoration. Remains of a settlement from the Stone Age were found here (wooden treasure - it contained bronze needles, rings made of double wire, pendants for head decoration, etc.).
- Travertine mound Sivá brada (grey Beard)- is about 10,000 years old. It is a rarity in the whole of Slovakia, because unlike similar mounds (such as Dreveník, Spišský hradný vrch), it is still a living mound. Strongly mineralized water springs up from the depths in several places. In miniature lake, springing mineral water with a lot of mineral substances, aerated with carbon dioxide, continuously bubbles. The area around Sivá brada is also known for its mineral springs, which are widely used by visitors (Saxová, 2014).
- Mining open-air museum in Gelnica- is an extended exposition of the Mining Museum and consists of attractions of a mining nature. In the immediate vicinity of the open-air museum is the hereditary tunnel Jozef (a symbol of the golden era of the Dolný Spiš locality). It is opened again with interesting exhibits from the life of the miners. Another part of the open-air museum is the Pochwerk (historical crushing mining machine), the melting furnace (replica on a scale of 1:2, from 1738). In the future, more attractions will be added (crushing tables, knockers, mining stands, mining house or train) (Prekopová, 2022).
- Národný park Slovenský raj - the limestone mountain range, inconspicuous on the outside, has exceptional natural and aesthetic values, with the character of a karst plain, enchants with gorges and ravines, the massiveness of stone formations, the vastness of the highlands, the depth of waterfalls, fauna and flora. Tomášov výhlad (Thomas´ view) is also accessible by bicycle via the cycle path, the rock walls of Tomášov výhľad are sought after by climbers (Šupšáková, 2019).

Rotenberg educational geotourism trail in Smolník - is a self-service, linear, two-way, pedestrian, and year-round trail that introduces the rich history of the former mining town of Smolník in an interesting way. There are benches, information boards and QRC posts on the sidewalk. It leads through beautiful nature and a mining tunnel (tunnels and mines are among the rarest preserved relics of historical mining in Slovakia) (Tourism portal of Košice region, 2022).

Methods

The aim of the paper is to specify the visitors´ preferences of individual geolocations in the Spiš region (in Slovakia) while analysing the available and provided activities focused on geotourism fundamentals.

The main research aim was to find out the preferences of visitors to selected geolocations in the Spiš region and the geotourism products offered within them.

Among the methods used for the purposes of the paper can be included:

- field research - used to evaluate secondary information about the Spiš region,
- individual interview – used for guided interviews with tourism organizations that focus their products and activities on geotourism,
- questionnaire - research sample consisted of visitors of the Spiš region with the motive of participating in geotourism or knowledge of the Spiš region as well as knowledge of geotourism products, while the respondents plan to visit the region in the near future for the purpose of participating in geotourism (210 respondents),
- Kolmogorov-Smirnov test, Spearman's Rho, coefficient of determination R2, F-test of Fisher's criterion - used to evaluate the hypothesis,
- correlation matrix.

Questionnaire method was used as a primary data collection, in order to fulfil the research objective. Hypothesis H1 was established, to which the null hypothesis was established for testing purposes.

H1: There is not a significant statistical relation between the chosen characteristic of Spiš region visitors and their active participation in geotourism.

Despite the assumed potential of the Spiš region for geotourism, we assume that visitors prefer, in addition to geotourism, other types of tourism such as natural, cultural, historical, etc.

Data

Of the total number of respondents (n=210), 74.29% (n=156) were women and 25.71% (n=54) were men. It follows from the Graph (Figure 1) that respondents aged 14-72 took part in the research. The statistical average was at the level of 35.27±14.55 years, but the median age of the respondents was 29 years. The most numerous age group consisted of respondents in the age category around 21-30 years, the second most numerous groups were the respondents aged 51-60 years. The respondents' education according to individual categories is shown in Table 1.

Table 1. Respondents according to highest level of education (compiled by the authors based on data obtained in 2022)

Level of education	frequency
Basic	8
secondary complete education	81
vocational education	13
University education I. degree	42
University education II. degree	62
University education III. degree	3
other	1

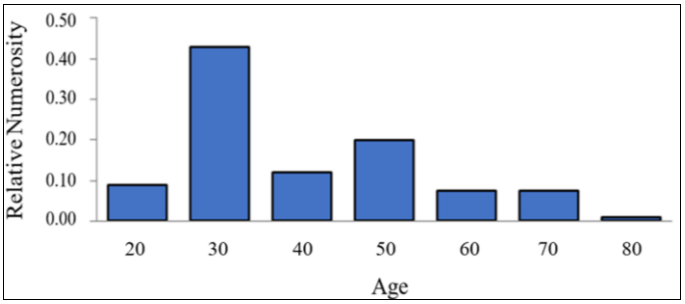

Figure 1. Histogram of the relative frequency of respondents in individual age categories Source: authors´ processing based on data obtained in 2022

RESULTS AND DISCUSSION

Respondents were asked about their preference for types of tourism, their relationship to the environment and sustainability. From the mentioned part of the questionnaire following conclusions can be presented:

- respondents mainly prefer nature tourism (n=134), followed by cultural and educational tourism (n=54), spa tourism (n=13) and adventure tourism (n=9). While under nature tourism they included (in the open question) sports-nature tourism, birdwatching and geotourism,
- all respondents stated a positive attitude towards the protection of nature and the environment, while according to them, activities related to tourism seriously threaten the state of the environment (n=59), slightly threaten the state of the environment (n=138), do not threaten the state of the environment (n=13),
- respondents who expressed concern about the environment in the natural environment under the influence of tourism development (n=197), take care to protect the environment during their stay in nature and behave sustainably (e.g. quiet behaviour in the forest, taking away their own waste) (n =87), they are interested in participating in environmental protection and behaving sustainably in the destination, if they receive instructions / briefing (n=71), they like to familiarize themselves with the slings of sustainability and try to keep them in order to protect the environment (n =39).

The respondents answered the questions whether they had ever participated in geotourism on purpose (primary motive) or vice versa, or even though they had not participated in geotourism but had already heard about its products (in other words, geo activities) and were going to try them in the close future (secondary / unintentional motive).

The answers showed that 58.10% (n=122) of the respondents knew and tried geotourism products (i.e., were active in their consumption), but 41.90% (n = 88) answered that they had not yet tried geotourism products, but they plan to do it in the close future. Subsequently, the respondents were asked which geotourism products in the Spiš region they had already tried (i.e., which geo activities they had participated in). The question offered the indication of several options, but also the possibility of the open part of the question, where the respondents could add additional information. Based on the above mentioned, there was no point in examining the relative frequency of responses (Figure 2 and Figure 3).

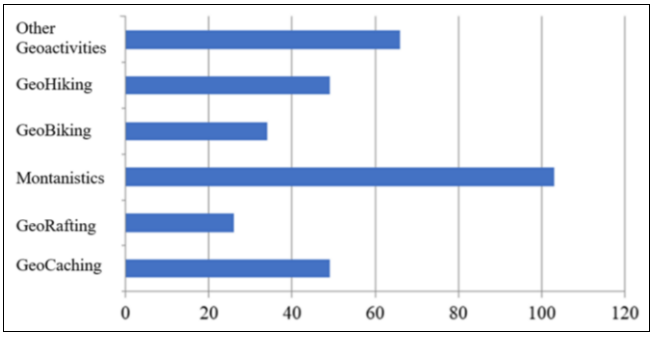

Figure 2. Respondents according to participation in the consumption of geotourism products (Source: authors´ processing based on data obtained in 2022)

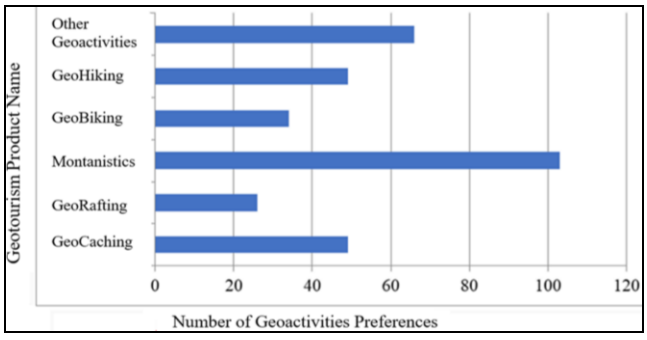

Figure 3. Respondents according to interest in geotourism product without previous experience (Source: authors´ processing based on data obtained in 2022)

Figure 2 shows that the largest number of responses appeared in the case of the product of mountainistics (mining tourism), which has already interested respondents in the past (n=103). The second highest frequency was in the case of labelling another geotourism product (n=66). A total of 49 responses chose to the GeoCaching and GeoHiking products, which can basically be done simultaneously. The number of responses belonged to Geobiking (n=34) and GeoRafting (n=26). Figure 3 shows a selection of multiple answers for one respondent in the framework of determining interest in

geotourism products offered in the Spiš region, without previous experience (absolute expression of the number). Respondents who have not yet used any geotourism product were interested in the GeoRafting product (n=26), followed by the mountaineering product (n=16), the Geohiking product (n=13), and the same number of responses occurred again with GeoCaching products and GeoBiking (n=6). Two respondents expressed that they welcomed another geotourism product, citing the GeoFestival product (held for example in Australia).

In Figure 4, respondents evaluated the attractiveness of selected locations in the Spiš region in relation to geotourism and the geoproducts offered by it, which are carried out there. The locations were: Tomášovský výhľad, Sivú Bradu, Banský skanzen (mining open-air museum) and Slovenský raj (Slovak paradise), Dreveník national nature reservation and Rotenberg educational geotourism trail in Smolník. In the evaluation, they were supposed to indicate the attractiveness of the location by scoring from 1 to 5, with 1 = unattractive, 5 = attractive. The least attractive for the respondents were the Rotenberg educational geotourism trail in Smolník and the Dreveník national nature reservation. On the contrary, the natural locations Slovenský raj and Tomášov výhľad have the greatest degree of attractiveness. The mining open-air museum Gelnica is also attractive from the point of view of the respondents.

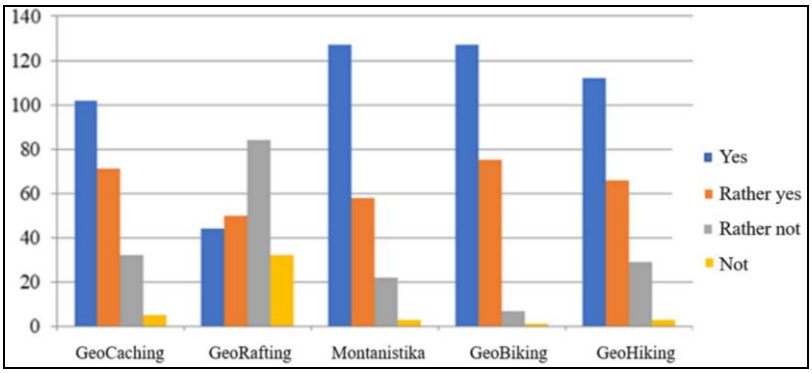

Figure 4. Summary chart of respondents' preferred geolocations
Source: authors´ processing based on data obtained in 2022

Figure 5 shows the potential of the offer of geotourism products according to the respondents in the Spiš region. Geoproducts such as GeoBiking, Montanistics, Geohiking and GeoCaching have considerable potential in the given region. The GeoBiking product was evaluated as the most attractive, and on the contrary, the GeoRafting geoproduct was evaluated as the least active. The rating was 1-5, where 1= yes, the geoproduct has high potential, 5= no, the geoproduct has almost no potential. As part of the established hypothesis, it was determined whether the number of respondents who visited the Spiš region is related to the number of respondents who expressed active participation in geotourism. The Kolmogorov-Smir test was used to examine the data from the questionnaire, used in testing the hypothesis, and it was found that the data of the variables are not normally distributed (Figure 6).

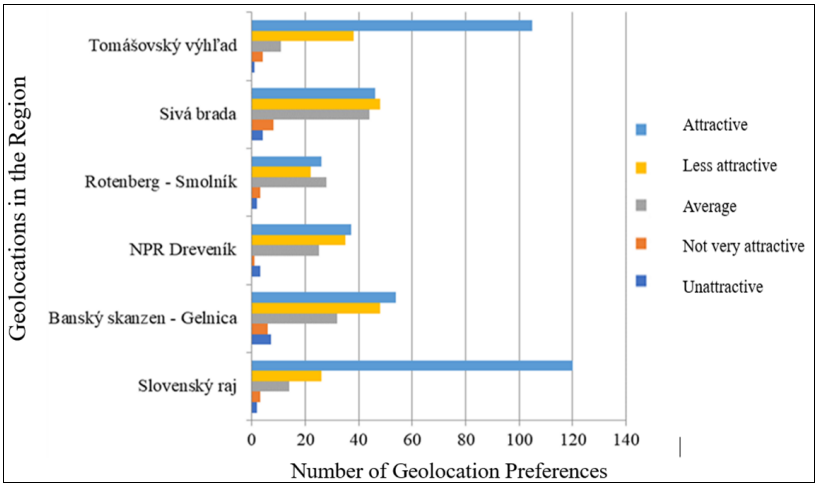

Figure 5. Distribution of geotourism products according to respondents' perceived potential (Source: authors´ processing based on data obtained in 2022)

Table 2. Selected indicators of statistical analysis
(compiled by the authors based on data obtained in 2022)

Indicators	Values
Spearman´s rho	0.08864004
Determination coefficient R^2	0.012113
F- test of Fishers´ criterion (1. 110)	1.128030
P-value	0.3956
Bootstrap 95 % interval of reliability	-0.0582902 < β1 < 0.251192

The possible existence of a statistical relationship was investigated due to the nature of the data by Spearman's rho indicator. Based on the significance level of 0.3956, it is possible to state that the hypothesis H0 is accepted, given that it is true that if "H0: $\rho = 0$" we can claim that there is no statistically significant relationship between the variables and vice versa if "H1: $\rho \neq 0$" we can claim that there is a statistically significant relationship between the variables.

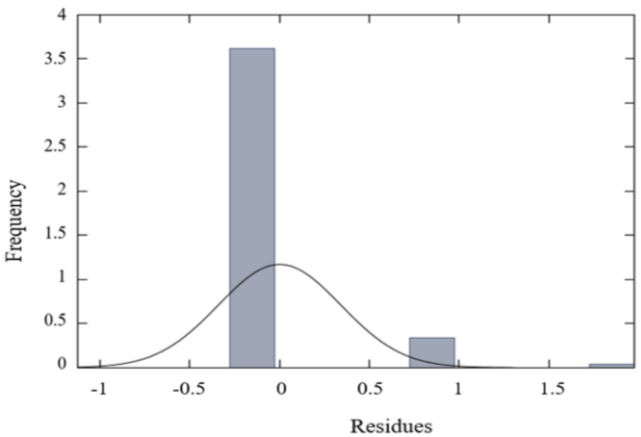

Figure 6. Data distribution normality
(Source: authors´ processing based on data obtained in 2022)

Considering the results of the testing (shown in table 2), it can be concluded that there is no statistically significant relationship between the selected variables. Considering another defined indicator, the coefficient of determination R2, it is

possible to interpret that the investigated relationship between participation in geotourism explains only 1.2% of the variability of the respondents' visits to the Spiš region. The investigated indicator F-test of the Fisher criterion, where the chosen level of significance is F = 1.128030 > 0.05, again considering the rules of the test, it is necessary to reject the alternative hypothesis and accept the hypothesis H0 about the absence of a statistically significant relationship between the selected aspects. In conclusion, it can be summarized that the existence of a statistically significant relationship between visiting the Spiš region and participation in geotourism was not proven in the hypothesis.

It is possible to lean towards the justification of hypothesis H1 in the methodology, and to state the assumption that the Spiš region is still considered as „a cultural treasure" potential. However, this does not mean that nature tourism and its development is less important, possibly not a secondary motive for visiting the region. Given that it was not possible to confirm the existence of a statistically significant relationship, in the next step a possible relationship between the variables was identified using a correlation matrix. Individual examined data in rows and columns are marked with the serial number of the question from the questionnaire, and the resulting values are shown in Table 3.

Table 3. Correlation matrix of perception and evaluation of selected geolocations
(Source: compiled by the authors based on data obtained in 2022) Legend: Edu. – Education

	Gen	Age	Edu	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Gen	1.000																										
Age	-0.047	1.000																									
Edu	0.265	-0.125	1.000																								
4	0.063	0.245	0.041	1.000																							
5	0.076	-0.095	0.340	0.073	1.000																						
6	0.089	-0.190	0.367	0.117	0.000	1.000																					
7	0.125	0.066	0.161	-0.114	0.113	0.092	1.000																				
8	-0.002	-0.017	-0.103	0.066	0.468	0.201	-0.111	1.000																			
9	0.046	0.064	-0.065	-0.016	-0.818	-0.001	-0.090	-0.343	1.000																		
10	0.002	0.211	-0.119	-0.191	-0.290	-0.246	-0.082	-0,22	0.372	1.000																	
11	-0.148	0.271	-0.098	-0.103	-0.012	0.070	0.096	0.053	0.026	0.294	1.000																
12	0.080	0.088	0.003	-0.003	-0.084	0.008	-0.159	0.018	0.056	-0.038	0.000	1.000															
13	-0.039	-0.044	0.035	0.013	0.196	0.007	-0.089	0,178	0,041	-0,101	0,199	0,130	1.000														
14	0.008	0.031	-0.007	-0.026	-0.062	0.212	-0.027	0.099	-0.079	-0.151	0.262	0.114	0.382	1.000													
15	-0.007	-0.095	-0.011	0.034	-0.030	0.241	-0.103	0.080	-0.052	-0.019	0.252	-0.114	0.180	0,32	1.000												
16	0.129	-0.131	0.116	-0.020	-0.011	0.153	0.120	0.032	0.048	-0.255	-0.088	0.019	-0.060	0.109	0.197	1.000											
17	-0.119	0.020	-0.072	-0.047	0.089	-0.667	-0.007	-0.045	0.092	0.137	-0.038	0.118	0.120	-0.163	-0.211	-0.060	1.000										
18	0.043	0.194	-0.072	-0.058	-0.232	-0.257	0.122	-0.125	0.123	0.085	-0.070	0.181	-0.121	-0.158	-0.219	0.142	0.438	1.000									
19	-0.207	0.271	-0.162	-0.192	-0.105	-0.385	0.150	-0.232	0.152	0.281	0.128	0.282	-0.068	-0.113	-0.319	-0.077	0.554	0.515	1.000								
20	-0.036	0.277	-0.244	-0.143	-0.413	-0.365	0.021	-0.198	0.233	0.408	-0.087	0.320	-0.250	-0.183	-0.301	0.230	0.466	0.787	0.732	1.000							
21	-0.065	-0.011	-0.170	-0.197	-0.040	-0.286	-0.029	-0.013	-0.012	-0.032	0.071	0.166	-0.020	-0.065	-0.051	0.031	0.500	0.591	0.675	0.665	1.000						
22	-0.100	0.100	-0.182	-0.022	-0.021	-0.508	-0.149	-0.111	0.125	0.069	0.042	0.160	-0.080	-0.158	-0.176	-0.034	0.489	0.374	0.567	0.622	0.588	1.000					
23	-0.034	0.102	0.140	0.027	0.052	-0.137	0.025	0.037	-0.066	0.079	0.107	-0.130	0.159	0.142	0.025	0.092	-0.014	-0.143	-0.214	-0.122	-0.223	-0.123	1.000				
24	-0.010	-0.077	0.292	-0.004	0.202	0.141	0.105	-0.072	-0.039	-0.035	0.010	-0.095	-0.024	-0.002	0.050	0.003	-0.292	-0.220	-0.056	-0.180	-0.184	-0.155	0.041	1.000			
25	0.231	-0.101	0.834	-0.047	0.300	0.277	0.231	-0.179	-0.054	-0.249	-0.182	-0.060	0.060	0.110	-0.222	0.108	0.055	0.024	0.167	0.038	-0.011	-0.115	0.132	0.233	1.000		
26	-0.046	-0.009	-0.115	-0.039	0.052	-0.177	-0.079	0.078	0.029	0.214	0.051	0.141	0.024	0.051	-0.055	0.011	0.021	-0.152	0.132	0.171	0.043	0.272	-0.021	0.080	-0.176	1.000	
27	-0.081	-0.150	-0.185	-0.102	-0.046	-0.047	-0.064	-0.036	0.004	-0.130	0.039	0.141	0.128	0.248	0.146	0.146	0.054	-0.122	-0.004	0.154	-0.107	-0.051	0.049	-0.019	-0.115	0.069	1.000

The first variable is presented in parentheses by a questionnaire question vertically; the second variable is presented by a questionnaire question horizontally. The result of the investigation was the finding of the existence of a weak relationship between the investigated aspects, which are listed in descending order according to the expected intensity of the relationship:

- barriers of geotourism development in Spiš region (25) and education (Edu),
- evaluation of geolocations of National nature reservation Dreveník (19) and geolocations Slovenský raj (17),
- evaluation of the Rotenberg geolocation (20) and evaluation of the Banský Skanzen geolocation (18),
- evaluation of the Rotenberg geolocation (20) and geolocation evaluation of the National nature reservation Dreveník (19),
- evaluation of the geolocality Sivá Brada (21) and Banský Skanzen (18),
- evaluation of the geolocality Sivá Brada (21) and National nature reservation Dreveník (19),
- evaluation of the Sivá Brada (21) and geolocality Rotenberg (20),
- evaluation of the Tomášovský výhľad geolocality (22) and the National nature reservation Dreveník (19),
- evaluation of the geolocality Tomášovský výhľad (22) and the geolocality Rotenberg (20),
- evaluation of the geolocality Tomášovský výhľad (22) and the geolocality Sivá brada (21).

In the mentioned points, it is mainly an expression of weak relations between the evaluation of individual geo-locations. This means that the respondents tended to express themselves in a similar way within the selected pairs. Therefore, these aspects were not further analysed within the scope of the investigated issue. In the final summary, it can be stated that there are possible aspects in the investigated issue that were not the subject of the research or were not included in it. At the same time, this does not mean that there is no interest in geotourism or the development of this issue in the given location. Once again, space is created for further investigation of this issue, avoiding problematic aspects, and trying to examine more closely individual aspects of the selected topic. The secondary goal was to evaluate the activities of organizations focused on creating products, in the form of geotourism products. Several organizations operate in the monitored location. Three organizations can be considered leaders in the activities and creation of geotourism products and its development. The

answers to the interview were summarized and evaluated. By analysing the answers received, it can be concluded that there are enough people in the Spiš region, joining together in various associations and organizations, who understand the importance of the development of individual forms of geotourism for the development of the region and who understand how important it is to preserve the monuments of the past for future generations. At the same time, it was found that:

- the surveyed subjects see the potential in the development of mountain tourism products, which can build on the rich history of the region and use it for the benefit of the development of the region,
- the project activity of the surveyed organizations is mainly focused on the creation of geotourism products in the villages of the Hnilecká dolina (Hnilecká Valley) (Gelnica, Helcmanovce, Smolník, Žakarovce, Hnilčík) and in the villages of Poráč and Dobšiná,
- in the current activities and in the creation of geotourism products, closer cooperation between the individual affected municipalities and organizations is absent,
- the implementation of projects of more global significance with an impact on a larger number of potential geotourists is planned,
- awareness of the need to offer complex and attractive geotourism products is essential,
- the interest of the interviewed organizations in engaging young people in their activities and creation of geotourism products,
- emphasize the lack of funds or inappropriate offer of published subsidy schemes, absent coordination of the development of tourism and geotourism by the central destination management organization – DMO.

CONCLUSIONS

The Spiš region has very good prerequisites for the development of not only nature tourism, for which it is known (for example, hiking), but also individual forms of geotourism. By its very nature, geotourism can fulfil people's modern interests, and what is even better, it contributes to the sustainability of tourism, to the protection of natural heritage, and at the same time educates. Through geotourism, it is possible to learn about the creation of the planet, about the life of ancestors, about various traditions and customs. Spiš abounds in beautiful and diverse nature, which in many places is still untouched by mass tourism and which offers many possibilities for active relaxation in nature through geohiking, geobiking or even geocaching. Deposits of copper and iron ores, mainly in the lower Spiš, played an extremely important role in the history of this region. The exploitation of ore deposits in Spiš was not only an impetus for the development of mountain production in the mining area itself, but also influenced to a large extent the development of business towns and towns north of the said mining area in the direction of the traditional export of mining production to Poland and the Baltics. The wealth and importance of the region is underlined by many places with historical and cultural significance that could interest tourists. This is another area on which regional organizations supporting tourism are working - sufficient promotion and customization of the offer for visitors.

The research pointed out the interest and knowledge of the respondents regarding locations suitable for geotourism, including the popularity and attractiveness of the offered geotourism activities. The natural and cultural heritage of the region in connection with the varied geological structure and also in the effort to preserve life and promote the elements of environmental sustainability are the main arguments for the development of montanistics in Spiš.

Despite not confirming the hypothesis, it can be stated that the Spiš region is the "Jewelry of Slovakia" with cultural and historical beauties and monuments, as well as a lot of natural beauty, but above all an interesting and rich mining heritage.

Currently, cycling is very popular, which was also proven by the research, as GeoBiking is one of the leading activities that the respondents identified as interesting with potential in the given region. Mountaineering and its unique products could represent an attraction for the Spiš region, which would motivate visitors to spend their holidays in the given region.

In the future, it is necessary to define the district of Gelnica as a tourism destination, possibly to be specified more precisely as a geotourism destination, both in the Development Action Plan and in the involvement of the district in the activities of the regional organization. As part of the definition of the territory of tourism development, it is necessary to define the destination places or tourism centres in more detail. Currently, the Gelnica district lacks a conceptual approach to the management of tourism development, as well as joint marketing and information services and activities. The territory does not have established destination management principles managed by one destination organization (regional tourism organization).

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