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Sustainability of tourism initiatives in national parks on the tri-border of Slovakia-Poland-Ukraine as a stimulus for tourists' interest

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Abstract
Initiatives for sustainable destination management have long been a hot topic of the day. The tourism industry is no exception to the setting of strategies and solutions. In terms of ensuring long-term sustainability, many destinations are turning towards setting rules and limits that will be in line with nature conservation. Appropriately applied strategies eliminate the currently widespread phenomenon of over-tourism and, on the other hand, help travellers and local residents get the most out of the destination while minimizing damage to its natural resources.
The paper provides a perspective on the implementation of sustainable initiatives in national parks. Using the example of visitors, he analytically evaluates the perception of the approaches to sustainable initiatives for the development of national parks in the tri-bordered area of Slovakia-Poland-Ukraine (Poloniny National Park, Bieszczady National Park, Uzhanskyi National Park) as a potential stimulus for increasing the visitors' rate and the repeated visits of the parks. Using the questionnaire methods survey, it evaluates the attitudes of tourists/visitors in three national parks and compares them with each other in terms of determinable principles and activities that can be implemented in the parks, as well as their motivation to visit again under the conditions of applying sustainability strategies.
The results of the research in all three parks point to the fact that these national parks need more significant settings regarding the principles of sustainability, as well as educating the public about their benefits.

Keywords
Tourism sustainability. National parks. Sustainable development. Tourists perception. Poloniny National Park. Uzhanskyi National Park. Bieszczady National park.

Introduction

We live in a dynamically changing society that is constantly evolving. In the world, there are individuals who ignore the importance of relationships with people or the environment and irresponsibly destroy their surroundings, as noted by Hickmann (2021). On the other hand, there are people who represent the opposite approach, striving for a sustainable lifestyle that promotes the health and well-being of the environment in which we live. These individuals are the driving force that leads our society in the right direction, and it is crucial that their numbers grow. As emphasized by Huang et al. (2022), this global trend is essential for the future, and its maintenance and support are indispensable (Hampton, 1995). Their approaches and initiatives can inspire others to adopt more responsible behaviour and to engage more actively in protecting and improving our shared environment (Gaston et al., 2006). Mutual cooperation among all sectors of society is essential to achieving sustainable outcomes that will support not only the current generation but also future ones (Offertálerová, 2017). Sustainability involves studying natural systems, preserving their diversity, and ensuring the necessary resources to maintain ecological balance (Hickel, 2019). The concept of sustainable development, as pointed out by Blanc & Cotella (2022), can be interpreted in various ways, but at its core, it is an approach that seeks to balance different, often conflicting demands, considering the environmental, social, and economic constraints we face as a society (Collins-Kreiner & Wall, 2007). Sustainable tourism can be understood as a tool for implementing sustainable conditions for development (Streimikiene et al., 2021), which focuses on preserving the ecological, economic, and social aspects of the future (Matolo et al., 2021).

National parks worldwide face numerous problems and challenges related to nature conservation. The primary role of a national park is to protect the unique natural resources of a region or area, while additional roles include recreation, information, sports, tourism, and order (Mitríková & Dzurov Vargová, 2019). The best options for maintaining, managing, and enhancing the protection of biological diversity and ecosystem processes, including cycles, should be selected to contribute to sustainable tourism (Rhama, 2020). Therefore, the concept of sustainable tourism is expected to be fundamental in addressing the various challenges faced by national parks (Glenn, 2020). National parks play a crucial role in biodiversity conservation worldwide (Gaston et al., 2006). As part of the tourism sector, national parks focused on developing protected areas bring several challenges related to land development, indicators, and their impact on the environment, culture, and local economy (Hampton, 1995). The issue becomes more complex when social, geographical, psychological, and infrastructural factors are also considered (Collins-Kreiner & Wall, 2007). Nevertheless, efforts are being made to increase activity in protected areas to achieve sustainable tourism development (Rhama, 2020). With sustainable tourism development in protected areas, many destinations, including national parks, face sustainability challenges (Hakim, 2020) and problems caused by the growing number of tourists visiting these places, while the available space and time are simultaneously shrinking (Gleen, 2020). Some national parks are implementing a zoning system in response to the pressures of tourism, which requires more space to meet the needs of ecotourism rather than nature conservation (Matolo et al., 2021). The current challenge they face is the large number of tourists coming to areas with high biodiversity that are ecologically and culturally vulnerable (Hakim et al., 2009). As Matušíková et al. (2020) note, tourists generally prefer destinations with high biodiversity, long-standing existence, larger spaces, easier and quicker access from urban to regional areas, and higher altitudes.

In the tri-border area of Slovakia, Poland, and Ukraine, national parks represent significant potential for sustainable tourism development. With well-implemented sustainable tourism initiatives, these regions can become attractive destinations for tourists seeking responsible travel experiences. The tri-border area of Slovakia, Poland, and Ukraine is a unique region where not only the borders of three countries converge but also diverse cultural and natural heritage. This area is rich in national parks that offer a wide range of opportunities for nature-focused tourism and active recreation (Štrba et al., 2018).

Sustainability in these contexts means balancing environmental, social, and economic aspects to protect natural resources while providing opportunities for local communities (Kioupi & Voulvoulis, 2020). Implementing sustainable tourism requires cooperation across multiple sectors, including public institutions, private enterprises, and non-profit organizations (Rodríguez-García et al., 2019). This approach allows for the development of infrastructure and services that minimize negative environmental impacts while enhancing the quality of visitors' experiences. Sustainable tourism activities should be designed to promote biodiversity conservation while encouraging visitors to engage with local culture and appreciate natural beauty (Mason, 2020).

Supporting sustainable tourism in the tri-border area also involves investments in education and awareness (Banfi et al., 2005). It is crucial that both tourists and local residents understand the importance of protecting the natural environment and are informed about best practices in environmental sustainability (Blasco et al., 2014). Such initiatives can contribute to the long-term sustainable development of the region, thereby increasing its attractiveness and competitiveness in the tourism market (Dołzbłasz, 2018). As part of these efforts, involving local schools and community organizations is important and can play a key role in raising awareness about nature conservation. Additionally, the development and implementation of ecological programs and tourism strategies should be a priority for local and regional authorities. Supporting environmentally friendly infrastructure, such as

recycling systems and energy-efficient buildings, is another step towards achieving sustainability. It is also important to raise awareness among visitors about responsible behaviour in protected areas, for example, through informational campaigns or guided services (Blasco et al., 2014). Local residents should be motivated to participate in these initiatives, either through economic incentives or educational programs. Effective cooperation between the public and private sectors is crucial for successfully implementing these measures. Sustainable tourism is not only about protecting nature but also about ensuring economic benefits for local communities, which can lead to an improvement in the quality of life across the region (Matolo et al., 2021).

These approaches and efforts to harmonize tourism with nature conservation are the cornerstone for building a tourism model that respects and protects unique natural and cultural values (Vašaničová et al., 2021), while providing positive and enriching experiences for all stakeholders involved (Kałuski, 2006). The tri-border area offers a unique combination of natural beauty, cultural diversity, and historical landmarks, making it an attractive destination for various types of tourists (Kolosov & Morachevskaya, 2020). On the Slovak side of the tri-border area lies the Poloniny National Park, which is part of the Eastern Carpathians (Štrba et al., 2020). This park is renowned for its extensive old-growth forests, home to many endangered species of flora and fauna. Poloniny is also part of the UNESCO World Heritage site known as the "Primeval Beech Forests of the Carpathians" (UNESCO, 2020). The park offers opportunities for hiking, bird watching, and other ecotourism activities that attract nature enthusiasts from around the world. The Polish side of the tri-border area includes the Bieszczady National Park, also part of the Carpathian mountain range (Kolosov & Wierckowski, 2018). The park is known for its wild nature, deep forests, and mountain meadows, ideal for hiking and cycling (Riley, 2000). Bieszczady is particularly popular for its scenic views and tranquil atmosphere, making it an ideal place for rest and relaxation (Kurowska-Pysz, 2016). On the Ukrainian side is the Uzhanskyi National Park, which is also part of the Carpathian park system. The park is noted for its well-preserved ecosystems, including wetlands, forests, and mountainous areas. Uzhanskyi Park provides a haven for numerous species of wildlife and is popular among tourists seeking authentic natural experiences and opportunities for ecological education (Prokkola & Lois, 2016). Collaboration between the three countries in the field of tourism can significantly contribute to the sustainable development of the region. The development of cross-border tourism, the improvement of tourist infrastructure, and joint marketing strategies can enhance the attractiveness of this region on an international level (Weiland et al., 2021).

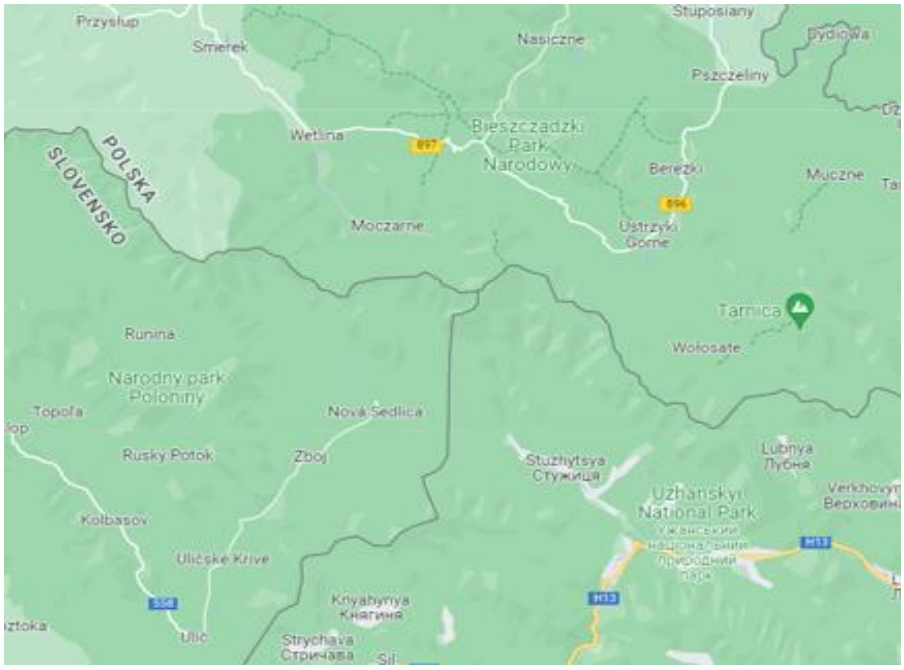

Fig. 1. Slovakia-Poland-Ukraine tri-border area

RQ 1: Do the visitors/tourism in selected national parks on the tri-border of Slovakia-Hungary and Poland perceive the development of those parks towards sustainable principles?

RQ 2: Do the visitors/tourism in selected national parks on the tri-border of Slovakia-Hungary and Poland treat the sustainably oriented activities to be attractive?

RQ 3: Would future sustainable interests motivate/inspire them to spend repetitive visit/stay in the national park?

Material and Methods

The triple border of Slovakia, Poland, and Ukraine, along with its natural heritage, has significant potential for nature tourism development. According to global initiatives, there is a big need to implement activities that are based on sustainable principles that can simultaneously protect natural areas and develop tourism activities for the future.

The aim of the paper is to analytically evaluate the approaches to sustainable initiatives for the development of national parks in the tri-bordered area of Slovakia-Poland-Ukraine (Poloniny National Park, Bieszczady National Park, Uzhanskyi National Park) as a potential stimulus for increasing the visitors' rate and the repeated visits of the parks.

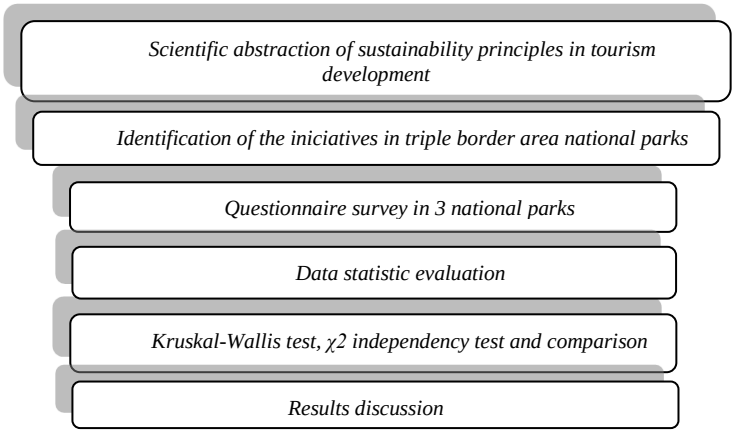

Fig. 1. Methodology steps of the research aim

The main research was a questionnaire research. The author's questionnaire was focused on tourism participants- visitors of national parks. Its main objective was to research the attitudes towards sustainable tourism development in protected areas. As mentioned before, for the purpose of this research, three national parks were chosen because of their linkage with the area where they are located. Overall, the questionnaire consisted of two parts. The first part focused on the respondents' opinions in the context of implementing sustainable principles in national parks related to their visitors. The second part of the questionnaire researched the opinions in more context within the selected parks. The goal was to find out their perception of the sense of sustainable activities development and, consequently, the related increase in the attractiveness of the parks. The data collection was held personally in all three parks in April and June 2024 (since the beginning of the main season). Obtained data were evaluated by the statistical program Gretl. The main methods for data evaluation were comparison, Kruskal-Wallis test and $\chi 2$ independency test. Method of comparison was used to compare the obtained data among three national parks as an area of the research. The Kruskal-Wallis test was used to verify hypothesis 1, and the $\chi 2$ independency test helped to evaluate the second hypothesis.

Results

At the beginning of the implemented plan was identifying the territories of selected national parks on the border and their activities and events that they implement for sustainable development.

Poloniny National park

Poloniny National Park is located in eastern Slovakia, at the easternmost tip of the country, near the borders with Poland and Ukraine. It was established in 1997 and covers an area of approximately 298 km². This national park is part of the larger Eastern Carpathians Biosphere Reserve, including protected areas in Poland (Bieszczady National Park) and Ukraine (Uzhanskyi National Park). The Natura 2000 system in Poloniny National Park consists of two types of areas: bird-protected areas and areas of European importance (Tab.1). Poloniny is known for its extensive primaeval forests, which are home to many rare and endangered species of plants and animals (Solár et al., 2016). Among the most notable species found here are the brown bear, wolf, lynx, and European bison. The park boasts one of the best-preserved primaeval forests in Europe, which is part of the UNESCO World Heritage site under the name "Primeval Beech Forests of the Carpathians and Other Regions of Europe." Poloniny National Park offers visitors numerous opportunities for hiking, cycling, bird watching, and other forms of ecotourism. Due to its low population density and pristine nature, the park is ideal for those seeking peace and a

retreat from civilization (Šoltés & Bural', 2012). Among the most famous tourist attractions are the Stužica and Havešová primaeval forests, the Bukovské vrchy mountains, as well as several wooden churches that are listed as UNESCO World Heritage sites (Tab. 2). Poloniny is also an important site for nature conservation and scientific research, particularly in the fields of ecology, forestry, and biodiversity protection. The park actively collaborates with other national parks within the Eastern Carpathians Biosphere Reserve to protect the natural heritage of this unique Carpathian region (Olah et al., 2006).

Tab. 1. Types of the area of Poloniny National Park

Type of the area	Area name	Reason of protection	Area	Level of protection
Protected bird territory	Bukovské vrchy	protection of bird species	40 932 ha	
Territory of European importance	Bukovské vrchy	habitat protection	29 215,13 ha	3, 5
Territory of European importance	Stinská	habitat protection	1 532,79 ha	3, 5
Territory of European importance	Ulička	habitat protection	101,81 ha	2, 5

Tab. 2. Sustainable activities in Poloniny National Park, Slovakia

Sustainable activities-Poloniny			
Hiking trails	Geological site Dara, Carpathian ridge, Russian road, Ascent to Kremenec, Walk along the Bukovské vrchy ridge.	**Eco-tourism trips**	Excursions to the Stužica and Havešová primaeval forests, Visit to the Rožok Primeval Forest, Guided tours with experts on local flora and fauna, Trips to the easternmost part of Slovakia focused on traditional agriculture.
Educational trails	Footpath to Merganc's stone, Icon trail, Path around the Starina Reservoir, Educational trail "Primeval Forests of Poloniny".	**Cultural activities**	Visit to UNESCO wooden churches, Participation in local folk festivals, Visit to the museum in the village of Nová Sedlica, Visit to traditional village settlements.
Cycling trails	Carpathian cycling trail, Cycling route Stakčín - Runina, Border cycling route, Cycling route through the villages of Nová Sedlica and Zboj.	**Water activities**	Canoeing on the Starina Reservoir, Fishing in local streams, Swimming in natural lakes, Bird watching near water bodies.
Wildlife observation	Observation of wolves, bears, and birds, Photo hunts for deer and bison, Observation of rare bird species in the primaeval forests, Overnight stay in alpine meadows with the possibility of stargazing.	**Astronomical observations**	Poloniny Dark Sky Park, Night hikes with stargazing, Workshops with astronomy experts, Photography of the Milky Way and night sky.

Uzhanskyi National Park

Uzhanskyi National Park is located in western Ukraine, in the Zakarpattia region, and is part of the broader Carpathian Biosphere Region. It was established in 1999 and covers a total area of approximately 39,159 hectares. The park is part of the cross-border Eastern Carpathians Biosphere Reserve, which connects protected areas in Slovakia (Poloniny), Poland (Bieszczady), and Ukraine. Uzhanskyi National Park is known for its well-preserved ecosystems, which include dense forests, mountain meadows, wetlands, and rivers (Tab. 3). This park is home to many rare and endangered species of plants and animals, including large carnivores such as the brown bear, wolf, and lynx, as well as various species of birds and amphibians (Convention on Biological Diversity, 2023). The park offers a wide range of opportunities for hiking, ecotourism, and natural science education (Tab. 4). It is also a significant site for research on natural ecosystems and biodiversity conservation. Uzhanskyi National Park is a popular destination for tourists seeking authentic natural experiences and wanting to explore the richness of the Carpathian nature (Heryak, 2013). Collaboration with national parks in Poland and Slovakia allows for a coordinated approach to nature conservation and supports cross-border sustainable tourism development in this unique region (Neto, 2003).

Tab. 3. Types of the area of Uzhanskyi National Park

Type of the area	Area name	Reason of protection	Area	Level of protection
Protected bird territory	Užanský national park	protection of bird species	39 159 ha	2
Territory of European importance	Užanský national park	habitat protection	29 000 ha	3, 5
Territory of European importance	Strymska	habitat protection	1 500 ha	3, 5
Territory of European importance	Užok	habitat protection	102 ha	2, 5

Tab. 4. Sustainable activities in Uzhanskyi National Park, Ukraine

Sustainable activities- Uzhanskyi National Park			
Hiking trails	Ascent to the peak of Pikuj, Route across the Poloniny Runa ridge, Walk along the Uzh River, Hike to the summit of Stinka, Trek through the Stužica primaeval forest.	**Eco-tourism trips**	Excursions to the Stužica primeval forest, Nature tours of wetlands, Visits to historical wooden churches, Guided tours with experts on flora and fauna.
Educational trails	Educational trail "Primeval Forests of Uzhansky Park," Historical Landmarks Trail, Trail through Wetland Ecosystems, Route Dedicated to Traditional Crafts.	**Cultural activities**	Participation in local folk festivals, Visit to the museum in Uzhhorod, Visit to wooden churches, Traditional craft workshops.
Cycling trails	Cycling route "Uzhanskyi Loop," Route from Velikiy Berezny to Uzhok, Mountain cycling route in the Runa Polonina area, Border cycling route between Ukraine and Slovakia.	**Water activities**	Canoeing on the Uzh River, Fishing in mountain streams, Swimming in natural lakes, Bird watching.
Wildlife observation	Observation of wolves, lynxes, and bears, Photo hunts for bison and deer herds, Observation of rare birds, Night observation of wildlife.	**Astronomical observations**	Night stargazing, Workshops with astronomy experts, Night sky photography, Astronomical tours in areas with low light pollution.

Bieszczady National Park

Bieszczady National Park is located in south-eastern Poland, in the Podkarpackie Voivodeship, and is one of the largest national parks in the country. It was established in 1973 and covers an area of approximately 292.02 km². The park is part of the larger "Eastern Carpathians" biosphere reserve, which also includes protected areas in Slovakia (Poloniny) and Ukraine (Uzhanskyi National Park) (Kukuła & Bylak, 2009). The park is known for its wild and untouched nature, which includes dense forests, mountain meadows (known as "poloniny"), and rich biodiversity (Tab. 5). The park is home to many rare and endangered species of animals, including the brown bear, wolf, lynx, and European bison. In addition, a wide variety of birds, amphibians, and plants live here, contributing to the uniqueness of this ecosystem (Cater et al., 2015). The park is a popular destination for tourists seeking peaceful and picturesque surroundings. It offers opportunities for hiking, cycling, bird watching, and other forms of ecotourism (Tab. 6). The scenic views from the mountain ridges, particularly from the peaks of Tarnica and Halicz, are among the main attractions for visitors. Bieszczady National Park is also an important site for nature conservation and scientific research (Kukuła, 2000). The park actively participates in international conservation projects and collaborates with national parks in neighbouring countries to protect the natural values of the entire Carpathian region (Lukoseviciute et al., 2022).

Tab. 5. Types of the area of Bieszczady National Park

Type of the area	Area name	Reason of protection	Area	Level of protection
Protected bird territory	Bieszczady	protection of bird species	29 202 ha	1
Territory of European importance	Tarnica	habitat protection	13 463 ha	3, 5
Territory of European importance	Połoniny Wetlińska	habitat protection	9 776 ha	3, 5
Territory of European importance	Bukowe Berdo	habitat protection	7 634 ha	2, 5

Tab. 6. Sustainable activities in Bieszczady National Park, Poland

Sustainable activities- Bieszczady			
Hiking trails	Ascent to Tarnica (the highest peak of the Bieszczady), Route through Połoniny Wetlińska and Caryńska, Crossing the Szeroki Wierch ridge, Hike around Lake Solina, Ascent to Smerek.	**Eco-tourism trips**	Excursions to the Bukowe Berdo primeval forest, Nature tours across the Połoniny meadows, Visit to UNESCO wooden churches, Guided tours with local biodiversity experts.
Educational trails	Educational trail "Beech Forests," Historical and Cultural Landmarks Trail, "Bieszczady Wooden Churches" Trail, Trail Dedicated to Local Flora and Fauna.	**Cultural activities**	Participation in local folk festivals, Visit to the museum in Sanok, Visit to traditional village settlements, Traditional craft workshops in local villages.
Cycling trails	Cycling route "Bieszczady Loop," Route around Lake Solina, Border cycling route between Poland and Slovakia, Cycling route in the Ustrzyki Górne area.	**Water activities**	Canoeing and sailing on Lake Solina, Fishing in mountain streams, Swimming in natural lakes, Bird watching in wetlands.
Wildlife observation	Observation of bears, wolves, and bison, Photo hunts for deer and lynxes, Observation of eagles and other birds of prey, Night wildlife observation in the Bieszczady forests.	**Astronomical observations**	Night stargazing from the summit of Połonina Wetlińska, Photography of the Milky Way, Workshops with astronomy experts, Astronomical tours in areas with minimal light pollution.

Description of the research sample

The main object of the research was visitors to the national parks on the triple border of Slovakia-Ukraine and Poland. Through the questionnaire, his questions aimed to find out the opinion towards applying sustainable tourism principles and interest in these initiatives.

A total of 420 respondents took part in the survey (Tab. 7). A total of 150 respondents took part in the example of the Poloniny National Park. The same was the case with the Uzhanskij National Park in Ukraine, a total of 150. In the Polish Bieszczady National Park, there were a total of 120 respondents.

In terms of gender, the Slovak sample was dominated by women (57.3%), Ukrainian men (54.7%) and Polish men (57.5%) (Tab. 8). Despite the fact that in all national parks, it was not only a domestic sample, but foreign visitors also participated in the questionnaire research, they were not subsequently divided into specific categories according to nationality. The reason was the high diversity of nationalities, which would not bring relevance to the analytical evaluation of the results. The youngest respondent was 18 years old, and the oldest was 64 years old. Due to the inhomogeneity of the age categories, age was not evaluated as a relevant variable. The reasons for visiting and staying in the national parks in all three parks were comparable.

Table 7. Number of respondents in selected national parks

National park	Frequency	Cumulative frequency	Relative frequency %	Cumulative relative frequency %
Poloniny National Park- Slovakia	150	150	35,71%	35,71%
Uzhanskyi National Park- Ukraine	150	300	35,71%	71,42%
Bieszczady National Park- Poland	120	420	28,58%	100,00%

Table 8. Gender of respondents of the research sample in selected national parks

	Women		Men	
Gender	Frequency	Relative frequency %	Frequency	Relative frequency %
Poloniny National Park- Slovakia	86	57,30%	64	42,70%
Užanskij National Park- Ukraine	68	45,30%	82	54,70%
Bieszczady National Park- Poland	51	42,50%	69	57,50%

Table 9. Perception of sustainable principles implementation into the national parks

I perceive the need for the future direction of the national park towards to sustainable principles

Gender	Frequency	Cumulative frequency %	Relative frequency %	Cumulative relative frequency %
Agree	398	398	94,77%	94,77%
rather agree	20	418	4,77%	99,54%
nor agree nor disagree	1	419	0,23%	99,77%
rather disagree	1	420	0,23%	100%
Disagree	0	420	0%	100%

The current offer of the activities of the parks can be perceived as „sustainable friendly"

Gender	Frequency	Cumulative frequency %	Relative frequency %	Cumulative relative frequency %
Agree	32	32	7,62%	7,62%
rather agree	81	113	19,29%	26,91%
nor agree nor disagree	94	207	22,38%	49,29%
rather disagree	175	382	41,67%	90,96
Disagree	38	420	9,04%	100%

Promoting awareness and the concept of sustainability in national parks can improve the attitude towards pro-environmental behaviour of tourists

Gender	Frequency	Cumulative frequency %	Relative frequency %	Cumulative relative frequency %
Agree	205	205	48,80%	48,80%
rather agree	125	330	29,76%	78,56%
nor agree nor disagree	20	350	4,76%	83,32%
rather disagree	47	397	11,20%	94,52%
Disagree	23	420	5,48%	100%

Promoting the concept of sustainability in national parks can have a positive impact on future visitors rate

Gender	Frequency	Cumulative frequency %	Relative frequency %	Cumulative relative frequency %
Agree	172	172	40,95%	40,95%
rather agree	125	297	29,76%	70,71%
nor agree nor disagree	23	320	5,48%	76,19%
rather disagree	47	367	11,19%	11,19%
Disagree	53	420	12,62%	100%

Expanding the park's portfolio of sustainable activities would inspire tourists to visit the park repeatedly

Gender	Frequency	Cumulative frequency %	Relative frequency %	Cumulative relative frequency %
Agree	159	159	37,85%	37,85%
rather agree	132	291	31,43%	69,28%
nor agree nor disagree	36	327	8,58%	77,86%
rather disagree	42	369	10%	87,86%
Disagree	51	420	12,14%	100%

Table 9 presents the results of the perception of the visitors/tourists in National parks towards implementing sustainable principles at the example of 5 chosen questions from the questionnaire. In partial conclusion, according to the general opinion of the tourists, there is an evident understanding of sustainability.

H1: There exist differences in the evaluation of satisfaction with sustainable principles in terms of selected activities in national parks.

H1.1: There exist differences in the evaluation of satisfaction with sustainable principles in terms of selected activities in Poloniny National Park.

H1.2: There exist differences in the evaluation of satisfaction with sustainable principles in the sense of selected activities in the Uzhanskyi National Park.

H1.3: There exist differences in the evaluation of satisfaction with sustainable principles in the sense of selected activities in National Park Biesczcady.

Partial evaluation of hypothesis 1. H1: There exist differences in the evaluation of satisfaction with sustainable principles in terms of selected activities in national parks.

Table 10 Contingency table for hypothesis 1.1

Poloniny national park	***Satisfaction***					
Activities	*Very Unsatisfied*	*Unsatisfied*	*Nor satisfied nor unsatisfied*	*Satisfied*	*Very satisfied*	***Total***
Cycling paths	*1*	*8*	*1*	*22*	*9*	***41***
Swimming in wild nature	*0*	*1*	*0*	*0*	*0*	***1***
Cultural potential	*0*	*4*	*5*	*14*	*4*	***27***
Walking paths	*0*	*10*	*13*	*9*	*4*	***36***
Animal observation	*1*	*15*	*9*	*14*	*6*	***45***
Total	***2***	***38***	***28***	***59***	***23***	***150***
Kruskal-Wallis test						
chí-square=13.5732, df = 5, p-value = 0.0185603						

According to the results of the contingency table no. 10, it is possible to evaluate that the *p*-value is 0.0185603; this is less than the significance level of 0.05. It is possible to evaluate that there are statistically significant differences in the evaluation of the satisfaction of visitors to the Poloniny National Park in relation to the selected attractions in the park.

Table 11 Contingency table for hypothesis 1.2

Uzhanskyi national part	***Satisfaction***					
Activities	*Very Unsatisfied*	*Unsatisfied*	*Nor satisfied nor unsatisfied*	*Satisfied*	*Very satisfied*	***Total***
Cycling paths	*1*	*3*	*0*	*9*	*10*	***23***
Swimming in wild nature	*0*	*0*	*0*	*7*	*0*	***7***
Cultural potential	*1*	*2*	*1*	*16*	*5*	***25***
Walking paths	*0*	*3*	*3*	*48*	*7*	***61***
Animal observation	*0*	*4*	*0*	*23*	*7*	***34***
Total	***2***	***12***	***4***	***103***	***29***	***150***
Kruskal-Wallis test						
chí-square=6.5959, df = 4, p-value = 0.158848						

According to the contingency table 11, it can be concluded that the p-value is 0.158848; that is more than 0.05. We can say that there are no statistically significant differences in the evaluation of the satisfaction of visitors to the Uzhanskyi National Park in relation to the selected attractions in the park.

Table 12 Contingency table for hypothesis 1.3

Bieszczady national part	***Satisfaction***					
Activities	*Very Unsatisfied*	*Unsatisfied*	*Nor satisfied nor unsatisfied*	*Satisfied*	*Very satisfied*	***Total***
Cycling paths	*0*	*52*	*7*	*10*	*0*	***69***
Swimming in wild nature	*0*	*0*	*0*	*3*	*0*	***3***
Cultural potential	*0*	*4*	*0*	*5*	*1*	***10***
Walking paths	*0*	*13*	*0*	*16*	*0*	***29***
Animal observation	*0*	*2*	*0*	*3*	*0*	***5***
Total	***0***	***71***	***7***	***41***	***1***	***120***
Kruskal-Wallis test						
chí-square=35.6431,p-value= 0,00000111943						

According to the contingency table 12, the *p*-value is 0.00000111943, and this is less than the significance level of 0.05. We can say that there are statistically significant differences in evaluating visitors' satisfaction with the Bieszczady National Park in relation to selected attractions in the park.

H2: There is a significant relationship between the evaluation of satisfaction with the implementation of sustainable approaches of national parks and the planned repeat return of visitors to national parks.

H2.1 There is a significant relationship between the evaluation of satisfaction with implementing sustainable approaches of the Poloniny National Park and the planned repeated returns of visitors to the national park.

Table 13 Contingency table for the hypothesis 2.1

Poloniny National park	***Satisfaction***			
Return	*Satisfied*	*Nor satisfied nor unsatisfied*	*Unsatisfied*	***Total***
No	*52*	*14*	*27*	***93***
Yes	*30*	*14*	*13*	***57***
Total	***82***	***28***	***40***	***150***
χ^2 independency test				
Value χ^2 = 2,2946; p-value = 0,3175				

The results for the hypothesis H2.1 are presented in contingency table 13. Based on a *p*-value greater than the 0.05 significance level, we can say that there is no statistically significant relationship between the evaluation of satisfaction with the implementation of sustainable approaches of national parks and the planned repeat return of visitors to the national park.

H2.2 There is a significant relationship between the assessment of satisfaction with the application of sustainable approaches of the Uzhanskyi National Park and the planned repeated returns of visitors to the national park.

Table 14 Contingency table for the hypothesis 2.2

Uzhanskyi National park	***Satisfaction***			
Return	*Satisfied*	*Nor satisfied nor unsatisfied*	*Unsatisfied*	***Total***
No	*58*	*0*	*11*	***69***
Yes	*64*	*0*	*3*	***67***
Total	***122***	***0***	***14***	***136***
χ^2 independency test				
Value χ^2 = 4,8382; p-value = 0,0278				

The results for hypothesis H2.2 are presented in contingency table 14. Based on a *p*-value that is less than the 0.05 significance level, it can be concluded that there is a significant relationship between the assessment of satisfaction with the application of sustainable approaches of the Uzhanskyi National Park and the planned repeated returns of visitors to the national park.

H2.3 There is a significant correlation between the satisfaction assessment with implementing sustainable approaches of the Bieszczady National Park and the planned repeated returns of visitors to the National Park.

Table 15 Contingency table for the hypothesis 2.3

Bieszczady National park	***Satisfaction***			
Return	*Satisfied*	*Nor satisfied nor unsatisfied*	*Unsatisfied*	***Total***
No	*22*	*0*	*49*	***71***
Yes	*30*	*0*	*19*	***49***
Total	***42***	***0***	***68***	***120***
χ^2 independency test				
Value χ^2 = 19,877; p-hodnota = 0,0000				

The results for hypothesis H2.3 are presented in contingency table 15. Based on a *p*-value that is less than the 0.05 significance level, we can say a significant correlation exists between the assessment of satisfaction with the implementation of sustainable approaches of the Bieszczady National Park and the planned repeated returns of visitors to the National Park.

Based on the results obtained, we can say that we confirm hypothesis No. 1.1 and hypothesis No. 1.3, but we do not confirm hypothesis No. 1.2. We used the Kruskal-Wallis test to verify H1. According to the results for hypothesis H2, we can say that we confirm hypothesis no. 2.2 and hypothesis no. 2.3. We used the $\chi 2$ test of independence to verify H2.

The research results confirmed that visitors/tourists in national parks perceive differences in evaluating satisfaction with sustainable principles in terms of selected activities in national parks. This was especially the case with the Poloniny National Park in Slovakia and the Bieszczady National Park in Poland. In the case of the Ukrainian national park Uzhanskyi, the differences were not confirmed. In the case of the results of hypothesis 2, the results were similar only in the case of the Bieszczady National Park in Poland. A significant relationship between the evaluation of satisfaction with the implementation of sustainable approaches of national parks and the planned repeat return of visitors to national parks was confirmed. The change occurred among visitors to national parks in Slovakia and Ukraine. Slovak visitors did not confirm the thesis that the evaluation of satisfaction with the implementation of sustainable approaches of national parks can influence their repeated visits to the park. On the contrary, Ukrainian visitors might be motivated more if the activities in the national park follow sustainable principles more dominantly.

Conclusions

The sustainability of tourism initiatives in the national parks on the Slovakia-Poland-Ukraine tri-border is crucial for the preservation of natural systems, their biodiversity and ecological balance. In order to prevent ecological depletion, strategic planning solutions for destinations need to be developed. This concept, although interpretable in different ways, essentially means balancing different, often conflicting requirements, taking into account environmental, social and economic limits. It is precisely in national parks such as Poloniny, Bieszczady and Uzhanskyi, where three countries meet, that the importance of integrated and well-managed sustainability is shown, which ensures not only the protection of nature but also the development of tourism. Here, sustainable tourism activities can serve as a significant incentive for tourists looking for authentic and ecologically responsible experiences. The involvement of local communities and the use of sustainable technologies are essential to ensure that tourism contributes to the prosperity of the region without negatively affecting its natural and cultural heritage. According to the World Commission on Protected Areas, the management of protected areas is central to legal, political, institutional and practical conservation efforts worldwide. Therefore, preserving these protected areas for future generations should be our top priority by ensuring they are managed sustainably. This is especially important for natural parks, which are prized ecological hotspots and some of the world's most valuable tourist destinations. Also, for this reason, it is important to lead the public to the knowledge of the importance of sustainability as well as management with its principles.

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