

A STUDY OF FUNCTIONAL AND SPATIAL VECTORS OF TOURISM DEVELOPMENT IN THE SELECTED BORDER REGION

Ewa JARECKA-BIDZIŃSKA ^{a*}, Maciej IZDEBSKI ^b, Oksana KASHUBA ^c

^aDr. Eng. Arch., Assistant Professor; Warsaw University of Technology, Faculty of Geodesy and Cartography, room 301, Pl. Politechniki 1, 00-661, Warsaw, Poland
ORCID: orcid.org/0000-0002-1289-9784

*Corresponding author. E-mail address: ewa.bidzinska@pw.edu.pl

^bMSc Eng., Assistant; Warsaw University of Technology, Faculty of Geodesy and Cartography
ORCID: orcid.org/0009-0004-2713-3695

^cDr Eng. Arch., Assistant Professor; Lviv Polytechnic, National University, Institute of Architecture and Design, Ukraine
ORCID: orcid.org/0000-0003-1181-5320

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Abstract

The article presents research on selected border regions. The Carpathian Region in Central Europe constitutes a critical and familiar environment in nature, society, economy, culture, and recreation. The research examines the primary connections, conditions, and potential of areas. It considers, in general, tourism attractions, natural and cultural values, heritage, accommodation facilities, public transport, and services. The results present several GIS analyses and other research methods. The discussion describes the main vectors of development related to several aspects of spa, sport, recreation, culture, spirituality, and entertainment. That led to the hypothetical ideas of enhancing the regional spatial and functional tourism development, which could increase borderlands' and associated regions' values, including new services and urban renewal. That might bring an opportunity to generate a common structure of recreational facilities and preserve more of the natural landscapes and the authenticity of heritage. Conclusions summarize the vision of hypothetical vectors leading to development enhancement based on tourism and recreation, as well as their potential impact.

Keywords: Beskydy; border region; Carpathian; regional development; tourism.

1. INTRODUCTION

The Carpathian Mountains are Europe's vital heart for the eight countries in terms of geographical, natural [1], economic, cultural, social, and recreational environments. This is why it is so important, on a European and regional scale, to protect the potential of this area and, at the same time, find proposals for sustainable development. The research described in this paper focuses on the regional spatial and functional development enhancement of the southern Polish border region of the Wooded Beskydy, part of the Eastern Beskydy Mountains (known as Bieszczady

in Poland), based on selected and tailored research with several analyses of connections and potential. The area's old development history and wealth result from its location on important historical international trade routes. From the 14th to the beginning of the 18th century (due to the partitions of Poland), the area belonged to Poland, then became part of Galicia under Austrian rule, only to return to a reborn Poland in 1918-39 [2]. After World War II, as a result of a change in borders, the area was divided between Poland and the former Union of Soviet Socialist Republics (USSR) [3], changing the identity of the region and breaking the spatial connections that had

been created naturally over the previous centuries. Though densely populated before 1945, the Beskydy became scarcely inhabited, which, along with the low economic development in the area, paradoxically determined their significant ecological and cultural values. The housing and service facilities, Greek Orthodox Churches, sawmills, and mills, along with the fields and pastures of the abandoned villages, began to be taken over by nature. The mountain ridges became covered with forests, and the fields became fallow land. On the Ukrainian side, the changes have been minor. It is still the centre of authentic life for the Boykos ethnic group. Less urbanization and preserving the natural landscape have created the basis for a tourism-based economic model. At the same time, knowledge of the local area is often the basis for cooperation [4].

This article, taking into account the stabilization of the geopolitical situation, attempts to analyze the connections, conditions, and potential of this extremely attractive area in terms of nature, landscape, and culture. The research thesis was adopted that the area is attractive for tourists and, at the same time, poorly integrated functionally and spatially, which means that its potential is not fully used. The hypothetical vision of regional spatial and functional development enhancement must increase tourism potential, recreational infrastructure, natural resources, biodiversity, cultural heritage, ecological stability, forms of nature protection, landscape, and sustainable development. Therefore, this research study examines the primary connections, conditions, and potential of areas, considering their tourism aspects, natural resources, related transport, and service in the border region. The aim is to identify the driving forces behind this process and the challenges encountered. The study contains 1. opportunities and functional needs, multi-sector centers or other services, 2. ways and principles to strengthen the potential of tourism and social services sustainably based on the three pillars of social, economic, and environmental, 3. the sustainable use of natural values for the development of tourism, e.g., the development of health resorts based on mineral and thermal water and tourist links to places of natural value, 4. the general possibilities of using cultural heritage to develop tourism.

This paper is organized as follows. First, it reviews previous studies on the general role of border regions in socio-economic, tourism, ecological, natural resources, cultural, heritage, functional, spatial, and infrastructure values. That can be analysed concern-

ing the border regions' frame for determinants and development. The subsequent section outlines the research procedure adopted in this paper. Then, GIS analyses examined areas' primary border connections, conditions, and potential, considering their tourism aspects, natural values, and services. The discussion places the findings in the context of existing literature, documents in open public access, and other materials studied. The article ends with conclusions and recommendations based on the results obtained in various research methods. It fills the gap in scientific research through conclusions regarding the spatial and functional development of the border region in Poland based on complex research methods from the analysis of strategic documents to unpublished studies for this area using GIS tools and the possibility of analyzing two criteria simultaneously, i.e., accommodation facilities and tourist attractions. This indicated the deficits and potential of the research area in south-eastern Poland, identified in earlier methods. International cooperation on this article also enabled preliminary recognition and understanding in terms of cultural and natural relations of the external context of the research area, i.e., the areas of western Ukraine, which have many common cultural heritage and geographical conditions.

2. ROLE OF THE BORDER AREAS, DETERMINANTS, AND DEVELOPMENT

The studied subject's extensive literature covers many aspects broadly divided into sociology [5], cultural studies [6], anthropology [7], economy, political science [8], geography, history, strategic documents, and functional and spatial aspects. National borders are usually places where differences between communities are identified because neighbourly contacts often result in an awareness of these differences [9]. In their description of the borderlands of Western Europe, authors Boesen and Schnuer present an attempt to move from conflict to harmony in research on everyday life [10]. Nowadays, borders are conceived in a broader context, not only as a barrier or administrative division but also as a space for integrating communities and territories [11]. Border processes are often referred to as processes of cross-border hybridisation. In this place, borders are involved in creating new quality and processes like "debordering", and "rebordering" [12,13,14,15], and are often a reflection of globalisation processes [16]. Quoting from Fellner: "Borderlands have therefore become the focus of interest in Literary and Cultural

Studies, as they can represent places of creativity, hybridity, and avant-garde aesthetic spaces. In spatial Border Studies, the concept of borderlands has come to refer to globalized, transnational, and transcultural spaces, which are ruled by complex interrelationships between space, state, society, culture, and borders" [17]. According to Rumford (2014), border changes are more significant and multifaceted, and the division process is more important than the border itself [18].

The processes that symbolized historic European political changes appear in the Polish-German [19], and the wave of democratization was significant at the inner-German border related to the former division between the East and the West [20]. Numerous integration processes intensified significantly after Poland became a member of the European Union on 1 May 2004. This phase was characterised by creating ideas or structures encompassing territories crossing national borders: Euroregions, Eurocities, and the concept of a common cultural heritage of post-German borderlands. The cities and regions in this area were called "laboratories of European integration" [21]. The background of EU border cooperation, links between the border areas under transitions, and some main directions of development adopted in the research of the Polish-German border are described by F. Weber et al., which was done by the CONSORTIUM OF THE LINKING BORDERLANDS PROJECT [22]. It investigated the possibilities and forms of coexistence between Poles and Germans in a functionally inseparable space where they would cooperate to solve problems related to satisfying everyday needs [21,22]. Cooperation on a historical and symbolic level (common heritage), as well as on a functional level (joint management of specific public tasks instead of autonomy), is included in the concept of the non-classical management of public affairs, of which multi-level governance is an example [23].

Mutual cross-border cooperation is called cross-border governance [24] and is the foundation and first step for developing Euroregionalisation processes. These processes may include joint action between authorities and local communities, entering into an agreement, and implementing common tasks and objectives. Border areas also have great potential in many aspects, not only economic ones [25]. The studied area is located in the Carpathian Euroregion, a specific Euroregional structure and, according to M. Greta, "The territory of the Euroregion Carpathians is a microcosm of the new Europe, containing a mix-

ture of nations and religions, a mosaic of national minorities...[author's transl.]" [4]. As a result of concluding agreements, border regions are identified over time and designated as areas of regular cooperation and socio-economic activity [26]. In the literature on the subject, borderlands are regarded as "laboratories of differentiated integration" that show the processes of multiculturalism and multilingualism in Europe at a micro-level [27]. Perera refers to borderlands as "borderscapes", places of transition where time and space mix and hybridize [28].

The issue of tourism in the Podkarpackie voivodeship is covered in numerous scientific publications [29]. J. Kostecka and A.W. Kostecki discussed the importance of tourism clusters [30]. An interesting interdisciplinary reading merging the issues of medicine, administration, marketing, and spatial economy is provided in the publications from the XVIII Congress of Polish Spas 2009. A. Miszczuk also described the conditions of the Polish-Ukrainian borderland, including cross-border attractions, border crossings, and traffic [31]. The non-existent culture of Boykos, with the whole Boikivshchina land, was covered in the post-conference materials 2018 with the title: "About the land that ceased to exist [author's transl.]" [32]. On the Ukrainian side, the aspects of recreational use and naturally attractive areas at the regional level have been studied by many scientists [33, 34, 35]. On the other hand, the architectural and urban context of international automobile checkpoints was presented in the publication by O.M. Kashuba [36].

The role of the border or border zone in urbanism and spatial planning is covered in numerous scientific publications on the continental scale and regional scales [37,38,39]. Global research on border urbanism and interdisciplinary collaboration at the intersection of architecture, urban planning, and other related disciplines, including socio-political, economic, historical, and cultural, was presented at the international conference "Urbanism at Borders" in Aberdeen, Scotland, in 2018 and the related publication *Border Urbanism: Transdisciplinary Perspectives* [40]. M. Neuman describes the frontier zone as a field of variable energy, where everyday opportunities may be limited by accessibility related to transportation or socio-economic factors related to services such as education [41]. I. Soi and P. Nugent describe peripheral urbanism in African border towns using two case studies along the Uganda/Kenya and Ghana/Togo borders. They note the existence of twin cities and asymmetries in different border towns, resulting from

various historical, administrative, and commercial aspects that influence urban expansion [42]. Sometimes, in various places worldwide, border areas – frontier zones, contrary to their historical significance for economic, administrative, or other reasons, become derelict, sometimes contested, or no-entry areas. On the other hand, Decoville, Durand, & Sohn describe the potential for cross-border planning and symbolic meaning in the urban landscape of the border as a connecting boundary, visible and invisible [43]. According to F. Durand and A. Decoville, “cross-border spatial planning is a means to regulate spatial dynamics and the effects induced by the cross-border integration process that impact territories and the socio-spatial practices of border residents” [43].

Documents in an open public access setting out visions for the development of border areas and regional policy strategies in this respect must consider the provisions of various international agreements and documents. These include the Council of Europe Landscape Convention (2000) [45], which refers to policy on planning solutions for landscape protection, and the Council of Europe Framework Convention on the Importance of Cultural Heritage for Society (2005), which refers to the importance of heritage as a resource for social development, the promotion of cultural diversity and the dialogue inherent in this [46], as well as an essential element of sustainable development [47]. Due to the limited publication volume, the authors will only refer to selected, publicly available, important national and international documents or planning studies that refer to the national spatial development of border areas [48]. The Concept of National Spatial Planning 2030 (KPZK) [author’s translation] provides a national analysis in an international context, such as spatial policy and its determinants in the future perspective, sustainability, improving accessibility, competitiveness, and cohesion, as well as the quality of the natural environment, better protection against natural hazards, energy security, and defence [49].

Strategic documents and programs provide much more detailed data on the challenges in various areas of existence, including socio-economic, functional, and environmental (including climate change), investment, security of the region, and forms of financing and implementation mechanisms [50]. The development vision encompassing both sides of the Polish and Ukrainian border is described in the strategic documents of both countries’ voivodeships and border districts [51]. Detailed data on the existing conditions in the study area were obtained from

“The Beskydy – the state of recognition of geological structure and occurrence of thermal waters”, “The Beskydy and renewable energy sources” [52] and public open access from planning documents of municipalities and maps of natural resources including thermal waters, among other things. The development of the study area can be inspired by specific spatial solutions applied in the Polish-Slovak borderlands, the development of which is enshrined in many strategic documents between Poland, Slovakia, and Germany [53].

The tourism potential of the analysed area includes elements of the geographical and anthropogenic environment (e.g., heritage), tourist infrastructure, transport, and availability of services and products that determine tourism development in the analysed area [54]. This publication supplements the gap in the existing research by showing, graphically and descriptively, an own analysis of connections and potential, such as never seen before in scientific research, multi-criteria analyses covering the relation of the existing hotel base to the location of tourist attractions. Analyses are also developed and presented as common for the Polish Bieszczady Mountains concerning relationships and similarities in Ukraine, based on publicly available methods and databases. The result is based on previously unpublished, original research proposals of the hypothetical integrated vision of enhancing the regional spatial and functional tourism development of the Beskydy. The research enabled an interdisciplinary approach and proposed solutions.

3. SCOPE AND METHODS OF THE STUDY

The scope of the study is the selected southern fragment of the Eastern Wooded Beskydy, located in the Outer Carpathians along the Polish-Ukrainian and Polish-Slovak border. The last southernmost road border crossing, Krościenko-Smolnica, becomes an important point. The research area is the Beskydy and covers the entire Lesko and partly the Sanok districts in Poland. Outside the research area, in the territory of Slovakia, there are such administrative units as Prešovský kraj and Snina okres. Among the villages closest to the border, Nova Sedlica, Runina, Proslop, and Osadne are worth mentioning. Outside the research area, beyond the Polish-Ukrainian border, there is a fragment of the Užuphrad district in the Zakarpattia region and a fragment of the Samborov region in the Lviv region, with the Turka

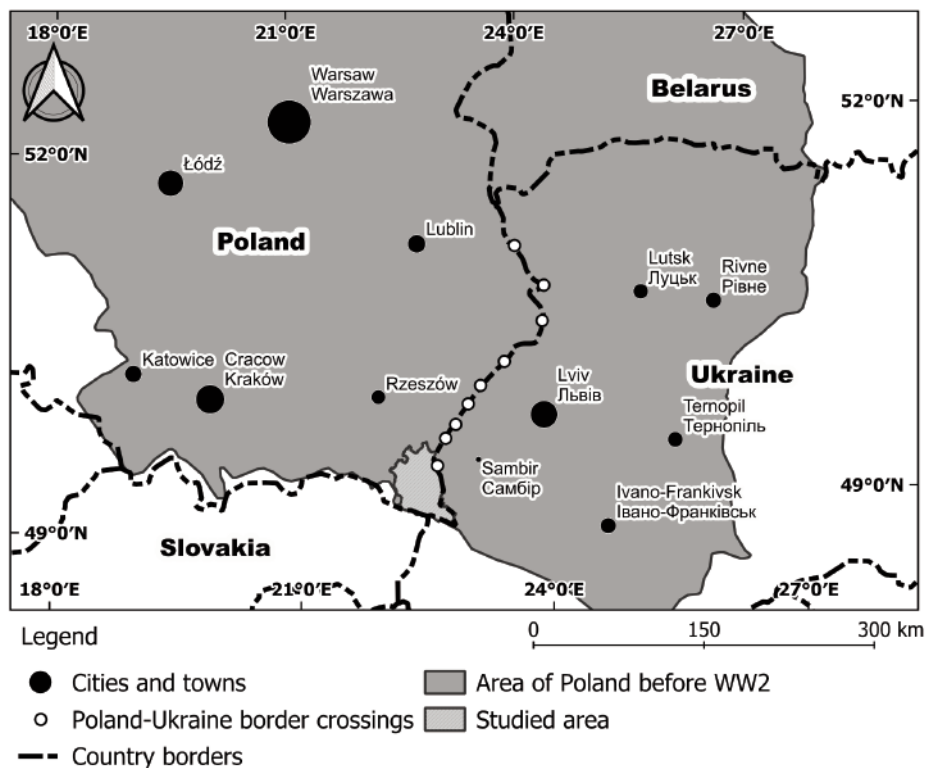


Figure 1.
Map showing the location of the study area, source: own work

municipality, the closest one to Poland. The author's location map shows border crossings, the border, large cities (Warsaw, Rzeszów), and medium-sized towns of the region (Lublin) (Fig. 1).

This case study article includes many research methods and tools to explore a specific area and its potential development vectors. The diagram below presents the general course of the research procedure (Fig. 2). Due to the limited volume of the article, it was impossible to present all the numerous scientific studies, methods, and techniques in the content. Therefore, the most significant elements of the research procedure were selected and described (Fig. 2). It is, therefore, possible to deepen the study in subsequent scientific publications devoted to this topic. The research contains an analysis of the most important open public access: current and historical maps and cartographic studies, planning studies, documents regarding regional development, conference materials, geological and eco-physiographical studies, official websites of public authorities, and public institutions related to regional cooperation, tourism, transport, and associated services, as well as the collection data from other sources like publications, other websites, good practice studies, interactive

maps, etc. All these studies covered a wide range of topics, so a selected categorized data synthesis was performed into individual subsections. In this way, several detailed aspects were taken into account: the general history of the area and its regions, accommodation facilities, tourist and service infrastructure, tourist attractions, transport and road network, cultural heritage, green natural protected and unprotected valuable green areas, like national parks, landscape parks, forests, rivers, or mountain ridges attractive for tourism.

First, an analysis of available literature on the subject, contemporary planning documents (discussed in detail in Chapter 2, paragraphs 5 and 6), and a geographic query were performed. The next task was the functional and spatial interpretation of the region, including archival elements concerning its historical development, archival cartographic plans, and iconographic sources, as well as analysis of contemporary cartographic data, Spatial Information Infrastructure Services (Geoportal.gov.pl – Geoportal Infrastruktury Informacji Przestrzennej) [55], interactive maps and panoramic photographs with descriptions.

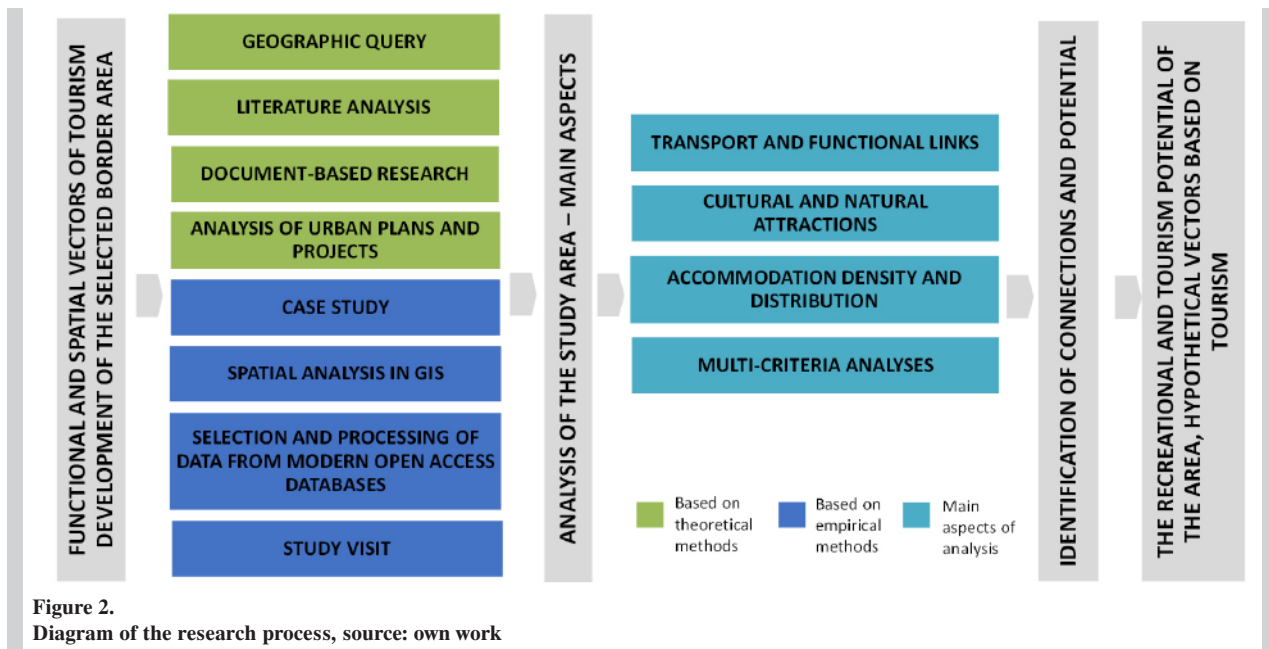


Figure 2.
Diagram of the research process, source: own work

Based on the results of these analyses (described in detail in the following paragraph), a case study was conducted – a diagnosis of the existing recreational and tourist infrastructure was made, along with an essential concentration of accommodation facilities on the Polish side in the delimited border region. Public and road transport availability was analysed within an hour's travel from the border. Communication that connects places – tourist attractions, and accommodation facilities was considered. A comparative analysis of materials obtained from the study visit and publicly available archival resources was also used here.

Among the tools used in the study concerning the territory of Poland were modern spatial databases (OSM, BDOT, BDOO) and QGIS software for cartographic analysis. Based on detailed research, existing development, distribution, and concentration of accommodation facilities and tourist attractions, tourist infrastructure was determined in the territory of Poland. The cartographic analyses were primarily based on the selection and appropriate data visualization. The comparative method and elements of multi-criteria analysis with raster algebra were also used. The data collected this way was compared with the existing tourist infrastructure to determine its current use and potential possibilities. This analysis used numerous Internet sources, tourist maps, and spatial databases. The identified objects were categorized and re-verified before creating a cartographic visualization of the obtained data. This analysis was

the basis for further steps. Based on complex research methods and not presented before cartographic analyses, hypothetical vectors for strengthening spatial and functional development in the study area based on tourism were determined.

4. RESULTS – SPATIAL, TOURISM, AND FUNCTIONAL LINKS IN THE STUDY AREA

The analysis of public and road transport within an hour from the Polish-Ukrainian border clearly shows that the last south road border crossings are the Ustrzyki-Krościenko (on the Polish side) – Smolnica (on the Ukrainian side) road, pedestrian, and railway crossing (Fig. 3). The nearest road border crossings on the Polish-Slovak border are Palota – Radoszyce and Komarnik – Barwinek, and operating on a limited scale and rather seasonally railway Medzilaborce-Łupków, historically built as Transcarpathian Railway Route to connect Hungary with Galicia, the cities of Budapest – Lviv. There was also a former pedestrian border crossing, Przełęcz nad Roztokami Górnymi. However, many tourist trails and links run across the Polish-Slovak border, which allow for free and easy transboundary hiking or even cycling, e.g., Rabia Skała, Przełęcz nad Roztokami Górnymi with R61 Greeway Eastern Carpathians – a bicycle trail. The trail runs along a historical route and mountain pass, which has been used since the 16th century as an important trade route and link between Lesser

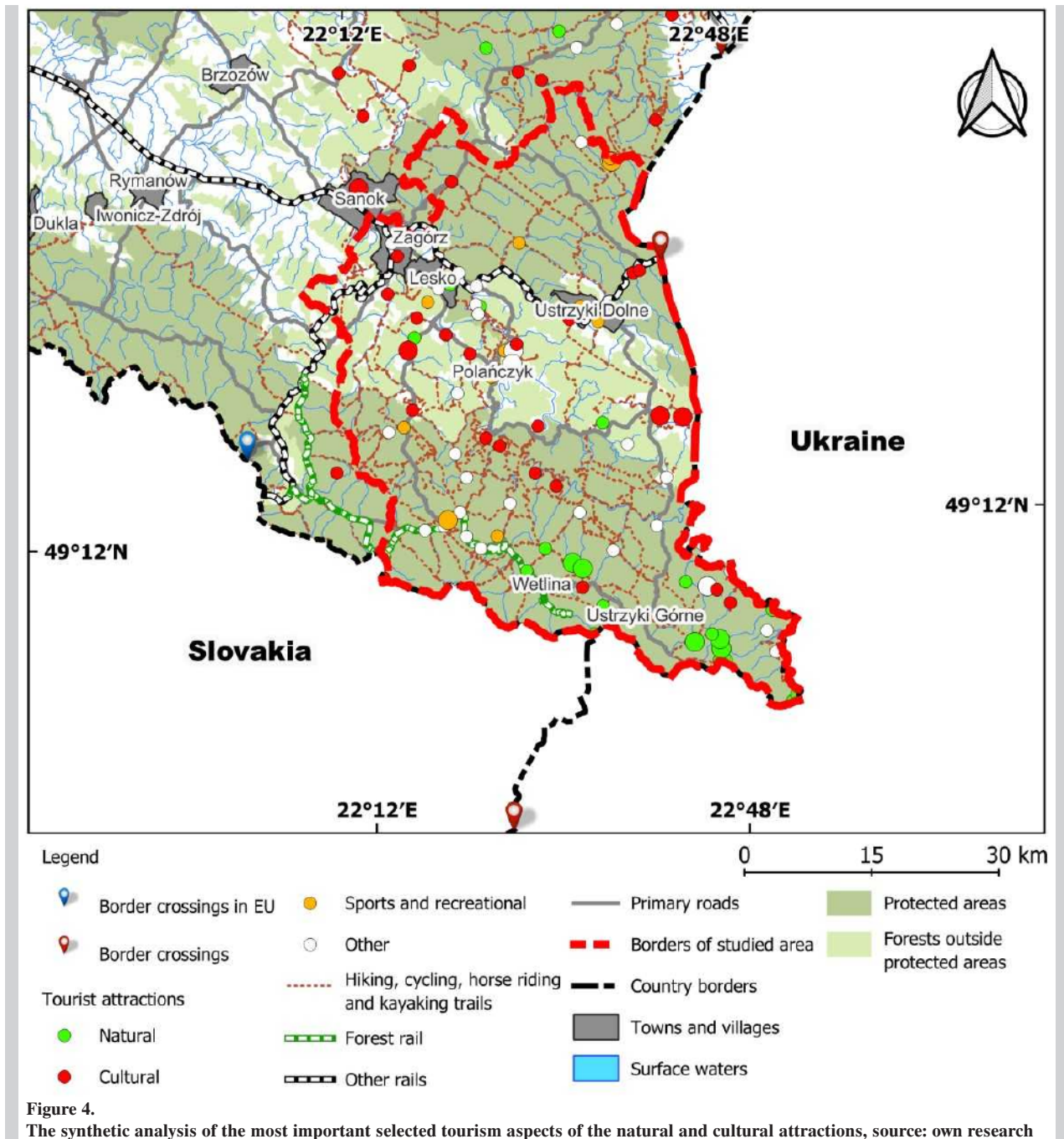


Figure 3. The map with an analysis of the main transport elements in the study area, source: own research

Poland and Hungary, historically known as Porta Rusica. Nowadays, it connects the popular tourist village of Cisna, on the Polish border, through Roztoki Górne, to Slovakia to Runin. Another one is the more westerly route that crosses the border through Balnica.

Moreover, the region’s most essential road transport link is the M11 road running north between Lviv and Przemysl via the Medyka-Shehyni border crossing. The best-connected localities in Ukraine are those along the Sambor-Turka national road. Beyond Poland’s borders, there is an international road from Ukraine to Slovakia, the M06, which runs along Lviv-Stryi-Mukachevo-Uzhhorod through the Lviv and Zakarpattia regions. The nearest international airport is Rzeszów-Jesionka, and the international railway station is in Przemysl. Unfortunately, Ustrzyki Dolne is the last southernmost railway station serving

regular passenger connections. The potential of the narrow-gauge Beskydy Forest Railway is also unused, as it provides only recreational connections and only on a small section of the existing infrastructure. The remaining area on the Polish side is served by buses, though these only stop in larger towns. Apart from cities such as Sanok, Zagorz, Lesko, Polańczyk, and Ustrzyki Dolne, public transport poorly serves this area. On the Ukrainian side, the availability of local public transport is even more inefficient, which may be related to the fact that the border areas are less urbanised. It is worth mentioning that the spa city, Truskavets in Ukraine, is one of the largest in the Carpathians and has been famous for its medicinal values since pre-war Poland times.



The synthetic analysis of tourism and the most important natural and cultural elements showed that the studied area holds high tourism potential, mainly related to the extensive forests and natural aspects and the balneological, recreational, sport, landscape, and cultural values (Fig. 4). This is the area of the most wild and valuable natural areas in Europe. WWF has recognized the Carpathians as one of the world's 200 most valuable natural places [56,57,58],

and the Beskydy Mountains are part of the Carpathians with the least impact of anthropogenic pressure. The Carpathians are a European haven of biodiversity, primarily natural and primeval forests and wildlife sanctuaries for large predators like bears, wolves, and lynx, but also birds of prey, e.g., the golden eagle [59]. It is a unique landscape in Europe with such a large, coherent forest enclave of nature [60,61]. The study area includes valuable natural



Figure 5.
Polonyna Wetlińska, August 2024, source: own work



Figure 6.
Polonyna above Cisna village, August 2024, source: own work

zones and forms of protection, such as the Bieszczady National Park and the San River Valley Landscape Park on the Polish side. Outside the borders of Poland and the studied area, there are also other nearby valuable green areas on the Ukrainian side: the Yavoriv National Nature Park, the Skolskie Beskids National Park, the Royal Beskids, the Boikivshchyna National Nature Park, the Uzhanskyi National Nature Park, the Nadsianskyi Regional Landscape Park and the Verkhnodnistrovsky Beskids Regional Landscape Park. The nearby valuable green area on the Slovak side is Narodny Park Poloniny. The Polish-Slovak border is bordered by the following nature reserves: Stuzica, Skala, Jaraba, Sipkova, Udava, and Beskyd [62]. The international forms of protection include the International Biosphere Reserve “Eastern Carpathians.” An unquestionable attraction is the characteristic Beskydy Polonynas, particularly Polonyna Wetlińska (Fig. 5), Polonyna Caryńska, and Polonyna above Cisna village (Fig. 6), as well as the numerous peaks like Wielka Rawka, with the highest one, Tarnica. In the Beskydy Mountains, you can even admire picturesque waterfalls: those in the Sine Wierchy reserve and those named Siklawa Ostrowskich stand out. Also attractive are the numerous picturesque mountain shelters, such as the BDPN “Chatka Puchatka”, located at the highest of all the shelters in the Bieszczady Mountains (1,232 m above sea level).

The region offers many natural attractions on various scales, including natural monuments, hiking, cycling, horse-riding, canoeing trails, and even a Bison Showground in Muczne or an alpaca farm in Stężnica. Moreover, the city of Ustrzyki Dolne and villages Cisna, Kalnica in Wetlina, Brzegi Dolne, the Bieszczady Active Tourism and Sports Centre in Wańkowa, and Lesko – Ski Lifts – Wermień showed the highest attractiveness regarding winter sports. According to the analyses, the largest concentration of tourist attractions in the study area is located on the Polish side around Lake Solina (Fig. 7-11). These are mainly related to the spa city of Polańczyk and the nearby village of Solina. This region also has a historical heritage, with rich and varied spa functions before World War II [63].

The studied area is a concentration of multiculturalism and a borderland with a culture “woven” on the border of two civilizations: the Latin West and the Byzantine East, which interpenetrate each other. Quoting Professor Grażyna Stojak: “The Carpathians, as a vast mountain range in the Central European region, were in their way an extraordinary

“bastion” for the ethnic groups living on its slopes. The Carpathian mountain slopes provided shelter and material living conditions but separated the groups of highlanders living here with ranges of stony hills and mountain passes covered by the Carpathian Forest [author’s transl.]” [64]. Despite the impassable spatial barriers created in this way and with many ethnic differences, the Eastern Carpathians became an extraordinary wealth of cultures. The highest number of cultural institutions, a diverse offer of cultural events, and available heritage sites were found in Lesko, Ustrzyki Dolne, and Sanok. In addition, the study area has numerous monuments related to sacred architecture. The ethnically distinct Boyko culture was reflected in architecture. These were mainly sacral buildings, including the Greek Orthodox Church, characterized by a towerless, tripartite layout, one or three slender octagonal and repeatedly broken domes, and an exposed main nave. Three functional parts were placed along the longitudinal axis: the women’s gallery, the main nave, and the presbytery. The bell tower was a separate building. The most notable monuments of the Boyko culture are in the Sanok’s open-air Folk Architecture Museum – the largest open-air museum in Poland, the Museum of Boyko Culture in Myczków, as well as wooden Boyko Greek Orthodox Church of the Protection of the Mother of God from the 18th century Równia, and especially two wooden Boyko Greek Orthodox Church on the UNESCO World Heritage List the Greek Orthodox Churches of St. Michael the Archangel in villages Smolnik and near study area one from the 18th century in Turzańsk. The centuries-old history of the region is also recorded in the Orthodox churches located on the wooden architecture tourist trail in Żłobek, Chmiel, Czarna, Rzepedź, Bystre, Łopienka, and Michniowiec.

In addition, you can admire religious monuments from later periods, Baligród the 19th-century brick Greek Orthodox Church of the Dormition of the Blessed Virgin Mary, and an old Jewish cemetery established in the 18th century. In addition, Lutowska has a neo-Gothic church from the early 20th century and an old Jewish cemetery. In the studied area, the Boyko culture dominates, while in the western part, one can encounter heritage related to the Lemko culture near the study area in Komańcza. There is a wooden, originally Greek Orthodox church of the Protection of the Mother of God, reconstructed in the early Lemko style after a fire in 2006. The original building dates back to 1802. Tourist values are also created by valuable contemporary architec-



Figure 7-8. Połańczyk City, a gazebo referring to the regional architecture and old trees in the Spa Park, August 2024, source: own work

ture, which refers to ethnicity but constitutes a modern approach to design (Fig. 7).

The Bieszczady Mountains also have an industrial heritage related to crude oil extraction, including the village of Czarna. Near the study area, the Bóbrka crude oil mine is still operational and is now the home of the Ignacy Łukasiewicz Oil and Gas Industry Museum. One of the symbols and tourist attractions of the Bieszczady Mountains is the burning of charcoal, which takes place in retorts. One of the last ten active bases is near Łopienka, where you can talk to a working charcoal burner. At the firing site on the Stuposiany – Muczne road, foresters built the Open-Air Museum of Charcoal Firing, which consists of a fragment of a charcoal kiln, a retort, and a charcoal burners' hut.

The medium-sized cities with the most significant cultural heritage attractions are Lesko with the Kmita Castle, the Church of the Visitation of the Blessed Virgin Mary, the Synagogue, and the Jewish Cemetery. The next is the city of Ustrzyki Dolne with the Museum of Nature of the Bieszczady National Park, the Church of Our Lady of Bieszczady, the Museum of Milling, and the Countryside in a former steam mill. One of the medium-sized cities near the studied area is the culturally attractive Sanok, which has a market square and a town hall from the 18th century and a neo-Romanesque Franciscan church, the Royal Castle rebuilt since the Middle Ages, today the location of the Historical Museum, and the Holy Trinity Cathedral from the mid-18th century.

In order to describe the external context of the study area, the tourist potential of the border areas of Ukraine was also mentioned in general terms. In the border area on the Ukrainian side, there are numerous architectural monuments, especially wooden churches, old Jewish cemeteries, and picturesque ruins. The spiritual and historical-architectural pride of the region is shown through the majestic churches and temples on the high hills and in the valleys (Matkiv, Komarnyky, Isaii, and Turka), built in the classical Boyko style (the Museum of Construction and Folklife in Lviv, located the wooden Orthodox Church of the Holy Mother of God of Krzywka from 1793, a wooden church from the 16th century in the village of Isaii). The most attractive tourist destinations are the spas and towns with medicinal values: Truskavets, Skhidnytsia, Morshyn, Lubien, Rozluch, Stara Sol, Bolechiv, the outskirts of the town of Turka, and a little further away, Shklov and Nemirov, where there are medicinal springs including “Naftusya” and “Sodova”. These areas historically

had many medicinal and recreational values known long before World War II, including mud, a natural remedy used to treat rheumatism. There are also areas with potential for winter sports: Truskavets, Rozluch, Boryslav, Oriavchyk, Drohobych, and Skole (in Ukrainian: Скóле), and historically also in Sianki – one of the largest ski resorts before WWII in Poland, as well as slightly further afield in Slawsko.

In the cities on the Ukrainian side, in addition to the many spas mentioned above, a more comprehensive cultural offer and a more significant number of monuments can be found in Sambor, Khyriv, Dobromil, and the town and municipality of Turka. Turkivshchyna region nurtures tourism development. The village of Rozluch is the largest tourist center in the Turka region, with a tourist base. In Yavorov, the “Western Rehabilitation Centre” was opened. An essential factor in the attractiveness of the Turka region is the cultivation of the traditions of the old Boykos at the World Boykos Festivals, Congresses, and “Dniester Day,” which have been held since 1992. One of the most crucial village traditions is the “Festival of Bread,” which has always symbolized life, happiness, and well-being. The biggest attractions on the Slovak side include the Thermal Sirava Spa, a thermal spa with healing properties at Lake Zemplinska Sirava, and the ruins of Brekov Castle. Numerous hiking and cycling trails, including the R61 Greenway Eastern Carpathians, are of great tourist value.

A spatial analysis was performed using GIS tools to study the degree to which the existing tourist potential is used. Two rasters with a spatial resolution of 100 meters were created to conduct the study. In the first one, each pixel was assigned several tourist attractions located within a radius of 10 kilometres from a given pixel. In the second one, each pixel was assigned a number representing the sum of square meters of hotel building area within a radius of 10 kilometres. The raster's values were then normalized to be in the range of 0 to 1. They were then compared with each other by multiplying their values. In this way, an area with a high availability of hotel services and tourist attractions was designated (marked in orange in Figure 9). Then, the hotel rasters were processed into a form in which the value 0 meant the best access and the value one the worst. The raster obtained in this way was multiplied by the raster of tourist attractions, thus designating areas with high tourist attractiveness and low availability of hotel services (green in Figure 9). This type of research has not been published in this area so far.

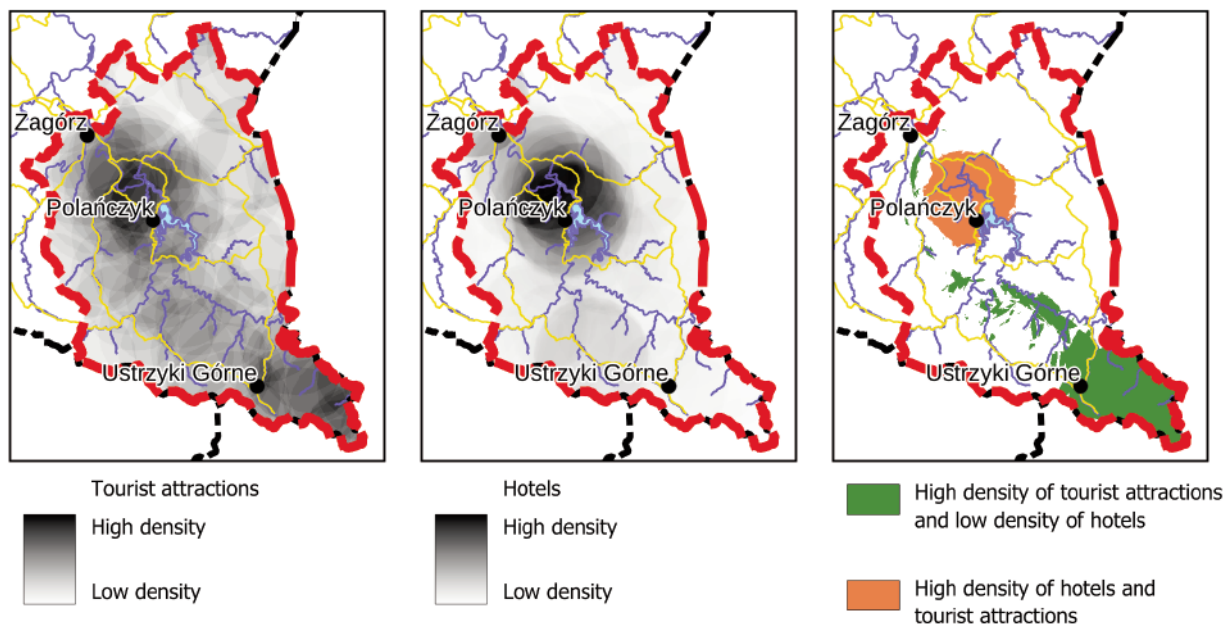


Figure 9. Analysis of the density of tourist attractions, the density of accommodation, multi-criteria analysis, source: own research

The analysis of the accommodation facilities (Fig. 9, left side) and density in the distribution of hotels and tourist attractions (Fig. 9, middle one) showed that the study area has one main center of the hotel's concentration and services (around Polańczyk and Solina Lake). Among the attractions around Lake Solina are (Fig. 10-11) medicinal values associated with the therapeutic sanatorium and spa activities, the possibility of visiting the most significant water dam in Poland, the Solina Hydroelectric Power Plant, a gondola lift to the Jawor mountain, the Mysterious Solina amusement park dedicated to the whole family, numerous marinas and water equipment rental options, the availability of passenger ship cruises on the lake, a spa park with a gym (Fig. 7-8.), an amphitheater, beaches, a rope park and bike rentals (including electric bikes).

The analysis of the density in tourist attractions distribution (Fig. 9 left side) has a second concentration point besides the Solina Lake area, which is located in the southeastern part of the study area related to the natural and landscape values and tourist trails of the Bieszczady National Park (the eastern part of the Bieszczady National Park). It is also clear that the eastern part of the analyzed area has low resources in the accommodation base and is often underdeveloped in infrastructure (Fig. 9, right side). However, this may be an essential aspect for the comfort and safety of potential travellers. In turn, improving the technical condi-

tions of mountain shelters or better marking trails, along with new infrastructure, could be modeled on solutions found in the Małopolska Province.

The analysis of the density in accommodation distribution (Fig. 9, middle one) shows another place with a concentration of facilities in a strip of villages on the line: Wetlina, Smerek, and Cisna, which, together with Brzegi Górne and Ustrzyki Górne, are among the southernmost villages with access to roads and public transport as well as essential services such as a grocery store, school, playground, or restaurant, and even small cultural or social welfare facilities. This "functional strip" is located on the Wielka Pętla Bieszczadzka route [author's trans. The Great Bieszczady Loop] is also related to cross-border tourism between Poland and Slovakia.

In the multi-criteria analysis (Fig. 9 right side), there is a high concentration of accommodation facilities and a high density of tourism attractions in two places. The first one is around Lake Solina. The second one had slightly lower multi-criteria results (so they were not visible in the image, but still high in both parameters) around Ustrzyki Dolne. This may be due to the accessibility to the railway line and the proximity of the southernmost border crossing, Krościenko-Smolnica.

The results of the analyses are consistent with the results of previous studies (Fig. 9., right side), also showing that there are several places (one primary



Figure 10-11.
Polańczyk city, The Jawor Mountain with gondola lift and observation tower, Polańczyk city view to marina at Lake Solina, August 2024, source: own work

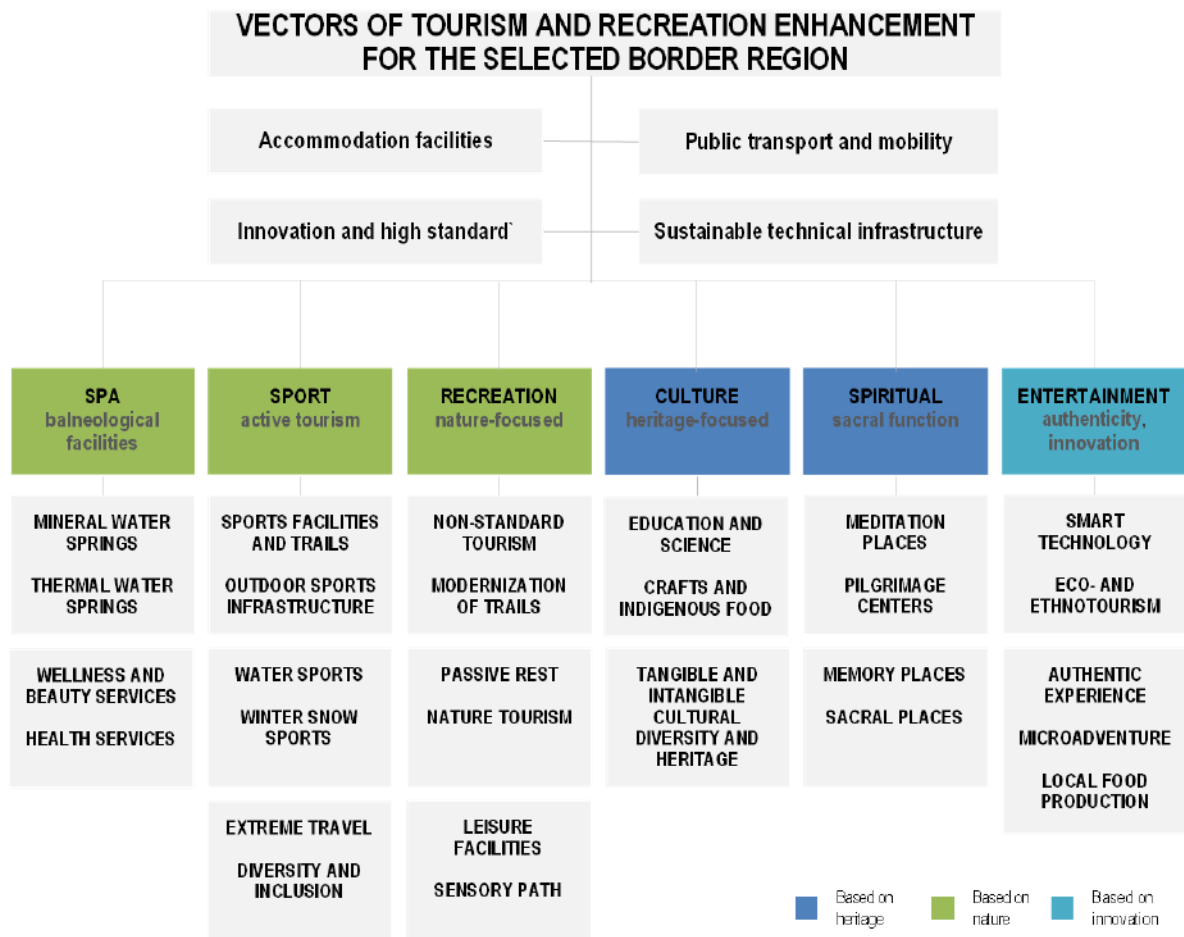


Figure 12. Flowchart with functional and spatial vectors of tourism and recreation enhancement for the selected border region, source: own research

and four more minor, but still important) with the most significant tourist attractiveness, insufficient accommodation facilities, and availability of various services. The main zone is the extreme southeastern part, which has functional deficits and accommodation facilities resulting from the location being protected naturally. The second one shows the great attractiveness of the strip areas along the San River from the Polish-Ukrainian border to the western side through small bays to Lake Solina. This is a range where the first inhabitants historically settled, taking advantage of the access to drinking water. That is why there is valuable cultural heritage, like relics of old villages, churches, cemeteries, and even later pre-war palaces. A road with public transport stops runs along the river. In connection with them, there are a few accommodation facilities such as a scout base, a hunting lodge, mountain equestrian tourism centers, or holiday homes. Among the tourist attractions, it is

worth mentioning the ethnographic and regional historical chamber Chata Bojkowska and the historic wooden Greek Orthodox Church in Smolnik from 1791, which is on the UNESCO list. The third one is south of Lake Solina, the no longer existing historical village of Łopienka, whose inhabitants were evicted in 1946-1947 and whose buildings were subsequently demolished. Among the monuments is the 18th-century brick Greek Orthodox Church of St. Paraskeva, and the only accommodation base is a student tent base. The last studied zone in the upper part of the studied area, shown in the multi-criteria analysis as a high density of attractions and low accommodation facilities, is around Tarnawa Górna village, where the hotel base is poorly developed. However, we can observe attractions such as the Regional Chamber, a historic palace from the first half of the 19th century, a Greek Catholic Church from 1817, and even the tourist Papal Trail.

5. DISCUSSION – PROPOSALS FOR A HYPOTHETICAL VISION OF SPATIAL AND FUNCTIONAL ENHANCEMENT VECTORS OF TOURISM DEVELOPMENT IN THE SELECTED BORDER REGION

The potential for tourism and recreation and the directions for development enhancement in the area can be obtained through several vectors (Fig. 12, Tab. 1):

- a. Spa – (balneological) facilities were established based on the existing mineral water springs in the region, the sector of wellness, beauty, and health services.
- b. Sport – creating conditions for developing active and outdoor sports infrastructure. Different disciplines cover different seasons: water sports, orienteering sports, winter snow sports, outdoor sports, and target sports. Examples include fishing, active tourism, rafting, canoeing, cycling, hiking, and skiing.
- c. Recreation – developing nature-focused recreational spaces and modernizing trails (landscape parks, mountain shelters, nature reserves, arboretum gardens).
- d. Culture – the construction of cultural and educational facilities for ethnographic festivals, learning about the history, culture, folk, and tangible and intangible cultural heritage of the region;
- e. Spiritual – the creation of trails to discover the region's religious heritage, ethnographic villages, sacred sites, and other monuments. The sector of pilgrimage centers or meditation places.
- f. Entertainment – using innovative virtual technologies to promote regional tourism and modern ways of presenting cultural heritage, such as survival, ecovillages, and ecomuseums.

Such enhancement must consider sustainable development [65, 66, 67, 68, 69, 70], modern technical infrastructure, high standards of various services, development of effective public transport and mobility, and improvement of adequate accommodation facilities, especially in areas with a deficit. The vectors described above are the key elements – the proposed, hypothetical vision of directions of regional spatial and functional enhancement of the southern border areas of Poland in the context of tourism, including cultural values and natural ecosystems (Tab. 1).

5.1. Conditions for spatial and functional enhancement

Quoting from Lohmann & Duval: “The interconnectedness between transport and tourism remains perhaps one of the more important relationships within the wider tourism system” [71]. Research shows that the infrastructure and transport links in the study area are less developed than in other parts of Poland, which might delay the integrated development of this border region. This may result from the unsatisfactory socio-economic situation in the mountain area. Effective spatial, functional, and infrastructural mechanisms are essential to exploit the recreational potential and protect natural ecosystems.

A new perspective on a comprehensive strategy to protect and enhance the region's potential, cultural and natural values, transport connections, and service infrastructure is a great challenge there.

Considering the conditions, the special economic and political relationship between Poland and Ukraine, and the high interest in border traffic, various solutions have been proposed to support the area's development. New border crossings might be needed to provide better connections to towns to the south, such as Turka, spas, resorts, Schodnica, and Truskavets, and the Ukrainian national road H13 towards the Slovak border. New seasonal tourist pedestrian and bicycle border crossings may be considered to supplement the road border crossings. The introduction of solutions such as new border crossings is associated with regulations on border controls and the involvement, consideration, and compliance of many institutions and stakeholder groups: Bieszczady National Park (BdPN), Bieszczadzkiego Oddziału Straży Granicznej [author's translation: Bieskydy Border Guard Unit] (BOSG), local authorities (e.g., Ustrzyki Górne village), various interest groups (tourists, ecologists), local community, and state institutions [72].

Taking the solutions popular in the region of the Swiss Alps as an inspiration, it is suggested that the potential of the Beskydy Forest Railway and several new connections within the narrow-gauge railway be used effectively. Such connections could run parallel to the border, as at the Swiss-Liechtenstein border, for example, the railway from Azmoos-Sevelen-Buchs and on to Obersee. In the case subject to this study, the solution is a railway connection running along roads or even an extension to Ustrzyki Górne and further to Wetlina, with the possibility of closing a loop with the Beskydy Forest

Railway. An interesting idea seems to be fostering and extending the international Poland-Slovakia railway connection Łupków – Palota – Medzilaborce, which could make the areas of the Polish Beskydy Mountains available to tourists from Slovakia and southern Europe during the tourist season. This would enable a connection to the existing cross-border railway line and larger cities. To develop the “Blue San” trail, it is proposed to introduce small river harbours on the San River, with a beach and small infrastructure near Smolnik, Chmiel, Sękowiec, and Rajskie. Rafting on the San River in wooden boats or rafts could be a significant tourist attraction.

It is also essential, partly correlated with the narrow gauge railway stations, to identify new transport solutions in the region, such as locating new bus stations, even locally, but according to modern standards and accessible to people with disabilities [73, 74]. Necessary bicycle infrastructure should appear at the stations, including repair stations, gazebos, stands, rentals, toilets, maps, and links to the international cycle routes [75]. Developing the R61 Greenway Eastern Carpathians international cycling route is recommended, which currently runs from Krościenko (the border crossing) over Ustrzyki Dolne via Lesko, Solina, Polańczyk, and Cisna, then runs down to the border with Slovakia, to the crossing point at Roztoki Górne (the mountain pass over Roztoki Górne). The new route could connect with the current one by Lake Solina and further towards the border with Ukraine using the existing cycle route. Further, on the Ukrainian side, the route might run across the valley areas of the former villages up to the border crossing in Krościenko. Additionally, to improve individual transport and the possibility of changing to public transport, the following improvements should be considered: intermodal transport, collective parking systems, petrol stations, and car rental near transport nodes. Many of the investments mentioned are worth considering as part of public-private partnerships. Moreover, car parks should not be made entirely of paved surfaces, as this prevents rainwater retention, raises air temperatures, and reduces aesthetics and the value of amenities. Furthermore, it is suggested that driving tourists into the center of towns and villages by car should be restricted. Any developments in the risk of flood and landslide-prone areas must be eliminated. The revitalisation of mountain pastures is also needed and is essential to reduce the effects of climate change.

5.2. Vectors based on nature

The green and natural resources could be used to develop tourism, e.g., new spas or therapeutic destinations based on mineral and thermal water deposits can be used for tourism purposes. It is essential to link them with new routes and proposals to new functions, making them more available. The revitalisation efforts require specifying the ways and regulations aimed at strengthening the potential of the tourism infrastructure in the area, including new hiking, cycling, horse riding, canoeing, and skiing trails with available infrastructure suitable for the forms of protection in the area. Nowadays, the non-standard preparation of trails is becoming quite popular, where the trails focus on the type of activity, the nature of the users, and their more specific needs, for instance, a well-being trail or a trail for seniors. Tourist routes should meet high standards and offer additional facilities and attractions such as viewpoints and towers, rope parks, treetop walks, gondola trains, lookout towers, jetties, swimming areas, etc. In addition, deficits in hotel facilities (new campsites, hostels) and infrastructure (health care, retail, catering) should be identified regarding attractions such as natural, sports, and heritage resources. A transparent system of tourist trails is needed to connect places of natural value, together with appropriate infrastructure, e.g., shelters, viewpoints, shepherd's huts, signposting of trails, information boards, hostels, camping sites, and leisure centers. It is essential to identify the optimal location of service complexes of supra-regional importance, such as year-round sports centers, healthcare services, sports, and recreation facilities, e.g., swimming pools, multi-sector centers, mini-zoo, or open-air astronomical observatories. Recreational and sports activities greatly influence regional tourism (horse riding, bicycle, canoeing, skiing, shooting, hunting, fishing, trekking, paragliding) [76], adventure or extreme tourism such as survival. Large-scale facilities, including high-mountain ski resorts, should be avoided, as they can destroy wildlife habitats and the ecological coherence of this area. Such constructions, among others, include ski resorts in the highest mountain areas, which means cutting down primary and natural forests and destroying the nature of mountain meadows and pastures [60]. However, recreation like orienteering or fishing increases the need for specialised facilities, animal rescue parks, mini-zoos, or fish-stocking ponds.

Despite its extensive natural resources, the area has few services of supra-local importance, offering

indoor services related to spa, beauty, wellness, or health care. Healing and mineral waters of the highest quality in Europe are essential for many towns in the eastern Beskydy. According to available geological studies and development strategies, towns with mineral water potential in Poland include Rabe, Komańcza, Prełuki, Polana, Czarna, Lesko, Cisna (brine springs), and Lutowiska, with the potential for thermal sources in Wetlina and Ustrzyki Górne. In the vicinity of the study area, on the Ukrainian side, there are cities with a historical spa tradition that existed before World War II, like Truskavets (in Ukrainian: Трускавець) mineral and thermal water springs, while Schodnica (Східниця), Morshyn, and Lubień offer waters with healing and recreational potential. New spa services in the research area could include healing centers, clinics, spa parks, graduation towers (thorn-houses), thermal baths, swimming and mineral pools, hotel spas, health paths, and shaded exercise areas in summer.

5.3. Vectors based on heritage

The issue of the relation between culture and cooperation in Europe's Borderlands is presented by Anderson et al. in a multidisciplinary manner from various "perspectives, on cultures of co-operation, co-operation about culture, and the impact of culture on forms of co-operation" [77]. The study area is distinguished by its rich tangible and intangible cultural heritage and diversity. Bottom-up activities in rural areas are required, activating the members of local communities and enabling them to improve their skills in providing tourism services and promoting heritage. One-day tourism without accommodation might be considered in this region. This requires interesting facilities related to education, art, culture, culinary, and even spiritual tourism or meditation. Spiritual tourism may also play an important role, namely, rediscovering forgotten places of worship and religious sites, pilgrimage routes to contemporary places of worship or memory (also for different denominations), and discovering and experiencing monuments like wooden Greek Orthodox churches, cemeteries, or ruins.

Rural areas must develop as multifunctional areas with basic first-level social infrastructure and accompanying functions such as basic retail commerce, restaurants, and access to modern amenities like ATMs. A good practice here is the market square in the village of Cisna, located in the studied area, at the junction of important roads leading towards Komańcza, Lesko, and Wetlina. The newly created

public space includes several small shopping pavilions with a common economic and cultural space and a small amphitheater with an audience [78]. The studied area also requires investment in first-level services dedicated to residents and their quality of life. Essential functions should be linked to small public spaces – a marketplace, square, or spa park with well-kept green areas, as a local center where fairs, exhibitions, concerts, and entertainment can also occur internationally. Such a centre of local activity could constitute an attraction and have cultural facilities on a supra-local scale, such as local museums, community centres, creative work centres, craft centres, open-air museums, or local educational centers.

5.4. Vector based on innovation

Quoting Zrobek: "Implementing economic activities that will result in an innovative offer of goods and services in response to the developing demand will create a new opportunity for the rural environment" [79]. Innovations that bring economic success to a commune may concern agriculture and non-agricultural activities. Today, we live in both the physical and virtual dimensions. Virtual tools play a huge role, including communication and information with a contemporary, inclusive approach to the recipient with different needs, the desire to experience something unique, a new experience, and to feel exceptional care and safety [80]. They should certainly be concerned with partnerships between various entities, developing and strengthening their cooperation, and additionally consider modern technical infrastructure. For example, eco-villages would be an interesting inspiration for rural areas, where agrotourism, local crafts and cuisine, creative workhouses, open art and craft studios, and markets are promoted as venues for local trade. A place historically associated with trade is the Polish village of Lutowiska near the border. Modern directions of action may also be related to new functions related to science, for example, ornithology institutes or astrotourism facilities and small planetariums, enabling the potential of the unpolluted sky to be exploited and developing the offer of the Beskydy Starry Sky Park with shows.

The research area could be designated for revitalisation/ regeneration/reclamation or as a special economic zone. Undoubtedly, sustainability and monitoring are worth considering while developing tourism. It must not result in the deterioration of the living conditions of residents and the quality of the

environment. It may be essential to impose certain restrictions and increase investment in environmental protection, e.g., building new sewage treatment plants or improving the quality of the river waters. New tourist infrastructure in the Beskydy should be built close to stops on the proposed narrow gauge railway – to maximise its use and to avoid generating the need for new roads and car park connections. Introducing such a principle could also help to reduce anthropopressure in protected areas and stop unnecessary development. It is essential to preserve the current values of the studied area, which are romantically described in a poem by Grażyna Jarzyńska, writing about the majesty of the mountains, “the vastness” of space, nature hiding ethnic culture, “onion” temples “creaking” with shingles, and a place that allows for reflection [81].

The proposed transport and recreation could provide an opportunity to fulfill the potential of the area and increase its attractiveness, socio-economic development, new structures of supra-regional tourism and accompanying facilities, thereby allowing for more excellent preservation of natural landscapes, blue-green infrastructure links and the authenticity of traditional settlements, while also using the space for recreational purposes. New infrastructural solutions could boost the border regions’ sustainable economic and social development.

The potential to exploit existing opportunities in creating structures requires multi-level governance, an examination of ideas, interests, and decision-making in local government institutions and communities, and supranational institutions, whose activities provide the context for border research. Business entities were not detailed in the analyses due to the general nature of the research. Due to their activities’ specific nature, they should be the subject of separate studies [82].

6. CONCLUSIONS

The Carpathian Mountains are vital to Central Europe’s natural, social, economic, cultural, and recreational environment. The area of the Beskydy Mountains, selected for this study, located near the Polish-Ukrainian border, needs a comprehensible holistic approach to create an integrative development program for tourism and the protection of cultural heritage. The need to expand international cooperation in the development of tourism and recreation in the Carpathian region and the implementation of joint projects to increase the recreational potential and ecological stability of the territory can be achieved by using Poland’s experience in shaping the structure of recreational facilities that will optimise and integrate the region and increase its economic potential.

Spatially and functionally integrating this borderland will help to enhance its enormous potential, not only on a regional level. In the study area, there are still some parts where the touristic values of the region are insufficiently promoted, used, and available, mainly due to the politics before the post-1989 political transformation in Poland. The bridging of old divides and broad international cooperation in tourism, transport, and service infrastructure might become a developmental stimulus for the region. Enhancing tourism in Beskydy and enhancing appropriate sustainable spatial and functional development might provide the opportunity to generate a common structure of recreational facilities, making it possible to preserve more of the natural landscapes and save from oblivion the authenticity of the disappearing heritage of the Boyko and the Lemko ethnic groups. Creating new linked functions will facilitate the development of recreational spaces and stimulate the border region’s economy, ensuring its sustainable development.

Table 1.

Summary table with functional and spatial vectors of tourism and recreation enhancement for the selected border region and related suggested actions, source: own research

Vector	Suggested action
Spa	New spa services include healing centers, clinics, spa parks, graduation towers (thorn-houses), thermal baths, swimming and mineral pools, hotel spas, health paths, and shaded exercise areas in summer.
Sport	New year-round sports centers include horse riding, bicycling, canoeing, skiing, shooting, hunting, fishing, trekking, and paragliding.
Recreation	New recreation services include swimming pools, multi-sector centers, mini-zoo, open-air astronomical observatories, and extreme tourism such as survival.
Culture	New facilities related to local culture, such as education, art, or culinary. For example, centers of local activities such as local museums, community centers, creative work centers, craft centers, or open-air museums.
Spiritual	Enable and promote rediscovering forgotten places of worship and religious sites, pilgrimage routes to contemporary places of worship or memory, cemeteries, or ruins.
Entertainment	Local events with a multicultural character, such as concerts and exhibitions.

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