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The selected factors influencing tourism and recreation development in the Tatra Mountains

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ABSTRACT

Mountaineering, including the Tatra Mountains tourism, has extremely complex and complicated specifics. In this paper it was made its analysis in the context of the impact of various natural and anthropogenic factors. It was assigned the specific elements of nature to the behavior, actions and plans of tourists, pursuing their passions in the Tatras. The author distinguished both positive and negative environmental influences on tourism. The analysis of the studies allowed foreseeing of the expected changes.

Keywords: tourism, recreation, Tatra Mountains, rest

1. INTRODUCTION

The Tatra Mountains are a mountain range that form a natural border between Slovakia and Poland. The above mountains are considered to be the areas which are the most important from nature and tourist points of view and thus, have an important significance for the economy. The entire territory of the Tatras has been included to the European Union since 1 May 2004 - the date of joining the European Union by Poland and Slovakia. [Nyka 2005].

The Tatra Mountains occupy an area of 785 square kilometres forming a regular oval range of 51.5 x 15-20 km. Poland occupies a northern territory of the Tatra Mountains with a total area of 175 km², that constitutes less than 25% of the total area of the range. Polish Tatras cover a large territory of the main ridge between the east Rysa and Wołowiec in the west. Slovak part of mountains covers the area which is three times larger. One can find here the longest and the most extensive valleys as well as the highest peaks. The boundary between Poland and Slovakia in the territory of the Tatra Mountains is of complex character and its location has a corrugated surface. So, from the border line in Lysa Polana, that is from the north-east region of mountains, it goes almost centrally to the south of Dolina Bialka, then rises sharply in Żabia Grania, which separates the Rybi Potok Valley (Poland) from the Biała Woda Valley (Slovakia) to get through the peak of Niżni Rysy (2,430 m) to reach Rysy (2499 m) - the highest peak of Poland and, at the same time, the highest point located in the border line of the states. From this point the boundary coincides with the main ridge of the Tatras. [Tatry Wysokie. 2005/2006; Tatry Zachodnie. 2005/2006; Buchwał i Fidelus 2008].

Taking into account the forms of nature protection, it should be noted that the Tatras area is the most important one. That is why, the entire territory of the mountain range is managed by two national parks: the Polish and the Slovak one.

The territory of a national park should not be less than 1000 hectares. National parks are created in the areas of specific natural value. The entire natural environment and specific aspects of the landscape should be subject to protection. National parks are created for educational, scientific, cultural, tourism and sports purposes and to satisfy the needs of people with nature and provide the aesthetic experience at the appropriate level. The parks are created to preserve the biodiversity as well as to preserve resources and elements of inanimate nature and landscape.

The aim of national parks is to restore the proper state of resources and elements of nature and restore the natural habitats that have been distorted to some extent. All kinds of activities within the park must be fully subordinated to the above objectives and assumptions, park visitors must not have a negative influence on nature [Strzałko and Mossor-Pietraszewska, 2005; Migoń 2012].

The Tatras tourism industry has been initiated in Spisza, especially in Kežmarok. The oldest records indicate that still in 1565 Beata Kościeleckich- Łaska had to go for a trip with her husband, probably it was the trip to Zielony Staw Kieżmarski. The earliest notable information regarding entering the high peaks of more than 2400 m above the sea level is dated to XVII century. The first mountain hike was probably made in 1615 Kieżmarski Peak (2558 m above sea-level) and the Slavkovský Peak (2452 m above sea level) was certainly conquered in 1664. Going for a trip has been flourished since the beginning of the nineteenth century. In 1803-1805 the Tatra Mountains were also visited by Stanisław Staszic (two parts). His climbing the Slavkovský and Kołowy Peaks, as well as Krivan and Lomnicy filled everybody with admiration, because of low development of tourism industry at that time.

The tourists from Poland have begun to climb the Slovakian Tatra Mountains (Hungarian at that time) since the mid of the nineteenth century. They were accommodated in inns and lodges. In 1806 the first undeveloped shelters for tourists were set up in Polana Krywańska. XX century was the beginning of sports development in the Tatras resulted in breaking the relationship between a tourist and a guide (it was a local mountaineer in many cases). Since that time tourists began to climb high peaks of the High Tatras covering more

and more difficult routes. The development of mass tourism in the Tatra Mountains began after World War II. Rallies and trips were widely organized [Lewkowicz 2011].

Since joining Poland and Slovakia to the European Union (1 May 2004), people are entitled to cross the border with an identity card or a passport. After accession of Poland and Slovakia to the Schengen area the border policy has completely changed. One can cross the border on tourist routes in order to remember the provisions of security services of national parks and submit to them [Nyka 2006; Lewandowski and Pavlovich 1997; Nodzyński and Zygmańska 2006; Pinkwart and Długołęcka-Pinkwart 2003; Kroh 2002]

The aim of this study is to analyze the selected factors determining the conditions for getting into the leisure and tourism industry. To facilitate the interpretation of the above factors, it is used the division into natural factors and anthropogenic ones. The study is based on own research made in 2013-2015 and due to the reports of other authors.

2. NATURAL FACTORS INFLUENCING TOURISM AND RECREATION INDUSTRY IN THE TATRA MOUNTAINS

2. 1. Microclimate and weather

The Tatras climate is that of mountains in the temperate zone. There are five climatic belts in the Tatras. The climate is moderately cold from the foot up to approximately 1150 meters above sea level. The belt of cold climate stretches up to the end of the forest, that is approximately, 1550 meters above sea level. The next belt is very cold which becomes moderately cold at 1850 m above sea level. There is snow during all seasons at the altitude of 2200-2250 m above sea level. Because of lack flat surfaces, one cannot find glaciers here. The region with eternal snow occurs only in high shaded gullies. The cold belt is over the above altitude. [Lewandowski and Pawłowicz 1997; Karolczuk 2011].

Due to high altitude above sea level and the most varied mountain range of the Tatras, there is a huge differentiation of climate and its unique local variation. The high mountain climate of the Tatras is very harsh. In the troposphere, the temperature decreases as altitude increases, and that is particularly noticeable in the Tatras. It is assumed a decline of approximately 0.6 °C per 100 m increase in altitude. This difference is caused by an average annual temperature at various mountain peaks. For example, an annual average temperature at Kasprowy Peak (1987 m above sea level) is 0.8 °C, while the Łomnicý Peak (2634 m above sea level) has a temperature which is three degrees lower -3.8 °C. The warmest month here is July, the coldest one - February. Winter lasts usually for a very long period of time, it starts in November and ends in March. More than 2000 m above sea level the winter lasts from mid-October to early May. The summer lasts for a short period of time, it is often cloudy here. It lasts from mid-June to the end of August. This period of year is characterized by heavy rainfalls. The spring is generally cool and the mountains peaks are covered with heavy snow.

Autumn is definitely more attractive, it is relatively warm and sunny, even at high altitude. A characteristic feature of the Tatras climate are winter temperature inversions. The essence of this phenomenon lies in the fact that the normal decrease in air temperature with increasing altitude is reversed and air above the ground is warmer than the air below it. It occurs when a cool layer of air close to the Earth's surface is covered by a warm layer above. [Nyka, 2005; Nyka 2006; Nodzyński and Zygmańska 2006; own research 2013-2015].

Another feature of alpine mountains - drastic differences in atmospheric pressure. There is only 84% of pressure at sea level on the outskirts of Szczyrbskie Lake (1350 m above sea level), while at Lomnica (two times higher) - 72%. Consequently, the winds in the Tatras are very strong and frequent. The gusty north-west winds prevail here. Halny – foehn type wind blowing from the south, becomes gradually warmer, as it falls in the Podtatrzański Rów. It is a destructive phenomenon, influencing particularly, the northern slopes. A foehn type wind is a result of humid air masses moving from the south to the north under the influence of a large difference in atmospheric pressure. Being cold and condensed, the above air mass sharply fall, being warmed up with the loss of altitude. Spring foehn winds in the Tatras can cause rapid snow melting. The speed of halny wind can reach up to 300 km/h. It is also followed by considerable increase in the air pressure and dry air [Nyka, 2005; Nodzyński and Zygmańska 2006; Kotarba 1992; Kotarba and Długosz 2010].

The above mentioned microclimate and weather in the Tatra mountains is the basis for considerations to find an answer to the question: what does all this have to do with tourism and recreation? It is not a complicated task to find joint features in the above cases. One should consider the above phenomena and connect it with a human being. Speaking about people living in the mountains, one should remember about the important thing relating to a human being, that is, health. It should be emphasized that health is a condition of the sound body of the person and it is not only influenced by his/her physical, mental and social state. People can also deal with the sensitivity to weather conditions. Harsh climate of the Tatras can result in strengthening the immunity system of the meteoropaths - people sensitive to weather conditions. Taking into account, that tourism and recreation activities in the open air in the Tatras, one should focus on the impact of weather and climate on the potential tourist activity. [Kolendowicz 2008; own research 2013-2015].

We must bring to the fore the temperature, conditioning the spread of best practice within the tourism industry. Five climate belts and rapid decrease in temperature are favorable for mountain hiking and climbing. For example, going from Kuznic through Hala Gąsienicowa to Świnica (2301 m above sea-level), we can observe changes in the climate zones, it looks as if we travelled from the zone of Niziny Środkowopolskie to the northern ends of the Scandinavian Peninsula [Kroh 2002]. Each tourist must, therefore, be prepared for such journey, both physically and mentally (to have sport facilities). The body must be examined from one to three days for acclimatization in such conditions. You cannot immediately climb the highest peaks, you need to gradually increase the altitude to be adjust to the harsh Tatra microclimate [own research 2013-2015].

As the weather in the Tatras is unpredictable, we can always expect condensation precipitation. In such cases one can use a very good "invention" of recent years, the so-called, gaiters or protectors worn over the shoe and lower pants leg. In addition, the above gaiters protect from broken rock fragments at the base of crags (scree) and the destruction of the legs in the rocky terrains.

The above mentioned elements of the equipment, even if they were the lightest, would represent a total of bulkiness. It is therefore, necessary to have a large, capacious backpack with a comfortable chest strap and hip belt. Even in the middle of summer the hikers and mountaineers, who are eager to cover unmarked paths, may need ax and crampons which help to navigate the alpine snow patches [Lewandowski and Pavlovich 1997; own research 2013-2015].

2. 2. The geological structure and landform

The Tatra mountains are core-mountains in the Western Carpathians, and at the same time, the highest and the most beautiful ones. The mountain range borders with low-lying basins: Liptowsko-Spiska Valley in the south and Podhalańska Valley in the north. The above valleys with shales and flysch sandstones comprise an extraordinary beautiful alpine landscape of the Tatras [Passendorfer 1978; Kotarba 1984].

Comparing the northern and southern parts of the Tatra mountains, one can make some interesting conclusions. So, Polish and Slovakian parts of the mountains are completely different. In the south, Tatra mountains rise directly over Liptowska Valley in a form of a very steep (sometimes vertical) wall, consisting of such peaks as Lomnický (2634 m), Kieżmarski (2558 m), Gerlach (2655 m), Slavkovský (2452 m) Krywań (2495 m). Firstly, one can see small subalpine forests, such as: Wielki Kopieniec, Gęsia Szyja, Nosal, Wielka Krokiew, Sarnia Skała, Hala Stoły. Then, it can be seen white precipitous limestone cliffs of Czerwony Wierch and the northern wall of Giewont, and only in the background, it can be noticed dark emerald granite massif of Kozi Wierch, Świnica, Granaty or Żółta Turnia. Certainly, it is closely connected with the asymmetric location of the Tatra Mountains [Passendorfer 1978; own research 2013-2015].

Even little knowledge about the Tatras landscape seems to be sufficient to differentiate some natural units which differ greatly in the shape and sculpture. A common feature of all parts of the Tatras is the crystalline massif which is a kind of bulwark (in common language), making ridges. It is made of (generally speaking) crystalline and sedimentary rocks [Nyka 2006]. The wildest, most wonderful and, of course, the highest settlement of the Tatras are the High Tatras. They are built out of solid granite. The High Tatras combine all the highest peaks (from Jagnięcy Peak in the east to Krywania in the west). [Passendorfer 1978]. That is granite and other crystalline rocks of the High Tatras that had created steep peaks (eg. Zamarła Turnia) and ridges (eg. Grań Baszt) under the influence of frost weathering (eg. Zamarła Turnia); a great activity of glaciers transformed the river valleys both the crosswise and lengthwise and made many verges. The old cracks of granite massif in the form of intersecting lines of cracks on which many mountain passes were formed have formed current High Tatras (eg. Krzyżne Pass within two major fault zones). The great tectonic dislocations designated directions to some valleys, for example, Białki and Waksmundzka [Midriak 1996; Kondracki 2000; Kotarba and Długosz 2010].

The diversified location of the Tatra Mountains (small in area) is a peculiar phenomenon among the mountains of the world. Another key issue is that the most important structural elements of almost the entire area of the Tatras have a parallel run (east - west), and main valleys are with a southerly aspect, that means that they are perpendicular to the main ridge of the Tatras. [Nyka 2006]. The additional feature of the mountains was caused by a relatively recent glaciation, due to which the massif of the Tatras was enriched with the alpine forms; emerged the valleys and magnificent corrie lochs. [Passendorfer 1978].

Although the postglacial relief is of great importance, one should remember the processes that occurred in the Holocene epoch and last nowadays. As a result of rocks erosion, the talus rocks grow, falling from the gullies and often the enormous debris fields stretch down from the pass – for example, from the Ice Pass (2376 m above sea level). More and more screes lie behind the granite walls of peaks. The falling of rocks (coarse material) has become normal. One can observe even big rock blocks at the bottom of valleys and lakes. [Lewandowski and Pavlovich 1997; Kroh, 2002; Buchwał and Fidelus 2008].

The climate, as well as the relief and geological structure of the Tatras are closely connected with tourism. A primary issue is the existence of the Tatras valleys, encircling the range from all the sides, and hence, a great difference in altitude which is characteristic to the Tatra Mountains from the foot to the peaks and passes. This aspect is reflected in a number of forms of tourism.

You should start with the obvious aspect, that is the alpine skiing. Due to high elevation, there could arise attractive ski slopes - not only for beginners or intermediate, but also for skilled skiers who are eager to overcome technical difficulties. For this reason, more and more Tatras skiers come here, but ski-mountaineering is mostly popular on the southern slopes of the mountains. It goes without saying that issues of skiing and relief are very close.

Hiking and cycling (partially) are more influenced by denivalation. Hiking trails which lead to the peaks and passes are very long, because the tourists must overcome an extremely high elevation. For example, the tourists who want to climb the Slavkovský Peak (2452 m above sea level) and start from Stary Smokovec (the beginning of the trail) must cover an elevation of 1,440 meters. It influences the body of the ambitious tourist who climbs laboriously to achieve a goal. Precisely speaking the landform of the Tatras and hiking are connected with physical exercises. In this case, the most important thing is to supply energy to the body. Anticipating too extended divagations about a person's motility, I would like to mention two types: aerobic and anaerobic; and in the case of climbing the mountains, we have to deal only with the aerobic system. An aerobic system supplies energy to perform tasks with moderate effort, but a long-term, performed for a long time [own research 2013-2015]. "In typical aerobic efforts, complex metabolic changes taking place in the cells of your working muscles are implemented in full satisfaction for oxygen demand" [Osinski 2003].

Mountain hiking and cycling tourism are the example of such aerobic effort. Much stamina and efficiency which are proposed by the mountain hiking tourism in the Tatras tend to consider the natural determinants of the body which should possess the tourist. By motoric skills efficiency it is understood the possibility to combat fatigue and long-term ability to perform a specific job [Osinski 2003; own research, 2013]. Generally speaking, the most important element of the human body, in this regard, will be the cardio-respiratory efficiency. In what way, then, one should be prepared to overcome quickly difficult Tatra mountain routes? The most appropriate thing - to prepare the body in advance at the place of living, at least a few weeks before starting the journey. Cycling, swimming, running (except for sprints) or even the Nordic walking, which is very popular nowadays, will be the most suitable in this case. All these activities cultivate aerobic skills of the body. When you arrive at your place of destination, you should start with a few smaller trips. After such preparation, one should cope with even the longest distances of the Tatra mountains. We should keep in mind, the better our physical condition, the more mountainous landscapes we can admire and come back home unhurt[own research in 2015].

It should be noted, that even after a few days stay in the mountains and reaching peaks, the circulatory and respiratory systems of the body are improved considerably. The cardiorespiratory function is considered to be the most important element of health-related physical fitness. "Improvement of cardio respiratory function is conducive to the reduction of a number of cardiovascular diseases, improves the ability to work and makes it easier to resist the fatigue. The cardio respiratory system works to deliver oxygen in the quantities necessary to make effective muscle work and longer-lasting physical activity. The proper functioning of the cardio respiratory system (eg. heart and blood vessels) is necessary for the supply of

oxygen and nutrients, as well as for elimination of waste products from the body” [Osinski 2003]. So, in addition to fresh air, it is the second aspect of health tourism relating to the Tatra Mountains.

Using a top-down approach in understanding the specific connections of the topography and geological structure of the Tatra Mountains with tourism, we must divide the range in accordance with the earlier defined units. You should start from the Tatra Mountains zones which are located between the crystalline massif and the Zakopane valley and are of great importance for hiking. The above zones constitute a good base for a proper warm-up running and acclimatization. In many cases they are used by tourists without much experience and by people with young children who want to experience the beauty of mountain panoramas without endangering themselves to excessive fatigue or exhaustion. In addition, the mountain zones are excellent for weather, which can be unpredictable or not very suitable for long hikes. You can enjoy here, even when it drizzles in the morning and the body can be deprived of excessive stagnation. The paths through the mountain zones do not require any particular specific labeling and artificial protection. There are no technical difficulties and exposure here [own research 2013-2015].

The other part of the Tatras is a mountain range called the Bielianskie Tatras. Its relief and geological structure are used for various forms of tourism and are almost identical to the mountain zones. But one can need here more efforts to overcome the steepness of the mountains as the altitude absolutely grows. The hiking trail to the Szeroka Przelecz Bielskawide gives the possibility to use an artificial protection in the form of chains. And as a result, one can have a good view on the east part of the High Tatras, Lomnica, Kieżmarski, Lodowy and Kołowy Peaks. One can also see the Polish Tatras with Wołoszyn in the background. Due to its relief, the above places are incomparable with the mountain zones. The clearly visible paths do not require more labeling and the technical difficulties are not significant [own research 2013-2015].

Due to the fact that the Western Tatras and Belianske were formed from the rocks which are less resistant to erosion, its massifs consist of real network of caves. The geological structure of the above mentioned mountain zones is favorable, therefore, for the speleological tourism, caving and speleology. Speleology deals with scientific exploration of natural underworld, studies its origin and natural environment. Sports cave activities are called mountain climbing or caving. By using climbing equipment and techniques it is possible to get to hard-to-reach caves and discover new places. Traversing of the above caves requires proper equipment and high qualifications which one can get upon completion the appropriate special courses. Even if you intend to explore the common horizontal cave passage, you face the threat to life and health. The risk increases if you explore the vertical cave passage. It worth noting, that in many cases one needs a permission for entering the caves in the Tatra mountains, the cavers can get a permission at the speleo clubs. Caving is the safest kind of tourism and a lot of people can be keen in it. Visiting the caves with an artificially light is of great educational and aesthetic value [own research 2013-2015]. It should be also added that caving is one of the most dynamically developing branches of qualified tourism [Szewczyk and Szewczyk 2009]. In many caves one can see the typical forms of karst with stalactites, columns – stalagmites and columns of stalagmite formations [Karolczuk 2011].

The glacial landscape of the High Tatras is unique in Poland and all over the central Europe, it is one of the most attractive places [Kondracki 2000]. The geodiversity of the Tatra Mountains is the basis for functioning of the geological tourism, that is - geotourism. The

main purpose of geotourism is not only getting to know the geological places, but also the processes that formed the above places in the past and continue to form it. [Migoń 2012]. That is the way of developing tourism in the Tatras nowadays. [Fidelus 2014a, 2014b].

2. 3. The resources of geothermal waters

The northern foreground of the Tatras is very specific. Beneath the flysch layers one can find the resources of hot springs of meteoric origin which create a kind of artesian basin [Nyka 2006]. The Slovak Tatras range is not worse in this regard. The Orava, Liptov and Spisz cavities are famous for great outflows of hot waters. It is estimated that Polish energy resources of geothermal waters are equivalent to 1.2 billion tons of coal, and the natural outflows of Jaszczurówka and Slovak Oravica made it possible to make small hot water pools with temperature 20 °C [Nyka 2006]. So, this is another component of nature favorable for being into tourism, especially, into recreational activities in the Tatra Mountains.

It is true that hot springs of Jaszczurówka disappeared approximately in 1957 because of drilling for hot waters. Due to drilling at a depth of 1000 m and later - at 1400 -1500 m for water with a temperature – 38 °C, appeared bigger swimming pools in 1961-1963 in Antalówka in Zakopane. Nowadays, there is here a modern swimming pool complex, the so-called, aqua park. In 1981, near Banska, that is approximately 12 km from the foot of the Tatra Mountains, flew water from the well 5261 m deep, the temperature of the water raised to 72 °C. As a result, the company "Geotheria Podhalańska" was set up here, its activity was aimed at the effective use of economic wealth. At the same time the drilling for water was carried out in other places of the basin. In 1994 approximately 150 households in Banska area used the thermal waters network. The cooled water flows surely back into the reservoir.

It is pressed by drilling in Biały Dunajec completed in 1988. Recently a pipeline in Zakopane was built, while the central geothermal gas boiler started in Nowotarska Street in 1998. Today, all large buildings located in the town are connected with the network, a lot of individual consumers use this network too [Nyka 2006]. Nowadays, thermal waters of basins are used in economy and are very useful for recreational activities, spa, agricultural tourism. Thermal waters in Podhale are dynamically used not only by aqua park on the slopes of Antałówka, but also in Bukowina Tatrzańska; here one can see hot water beating from the ground. [Chyliński 2009]. It can be also clearly seen on the southern slopes of the mountains. The best known spas in the Tatra Mountain zone are in Liptovský Ján and Oravice; while the largest water park is in Slovakia - the "Tatralandia", near Liptovský Mikulás. In the nearby Tatra Mountains there is Aqua City Poprad and the complex of pools in Vrbov and Bešeňová. Aqua City Poprad was opened in July 2004. There are 4 swimming pools here in the open air with water cooled to 38 °C and 28 °C, slides and an indoor complex (50 meters long), Olympic swimming pool with iodized water.

The water temperature in the basin of the swimming pool is always 27° C. You can find here also a children's pool and modern rooms where you can enjoy the aquatic treatments for getting beauty and relaxation. Another swimming pool complex is located in Vrbov, 7 km from Kieżmark. It was built in 1983-85 due to artificial flow of geothermal waters. For the tourists who want to take advantage of water recreation, it is also worth visiting Beszeniowa, lying in the valley of the river Wag, below the basin of the Liptovsky Lake. The village has been known since ancient times for its thermal waters. The real quality of deep and warm waters gave artificial drilling, the depth of which constitute 1987 m. It opened the powerful springs with the temperature of 62 C. Water has a rusty color and contains iron, potassium,

magnesium and calcium. After cooling to a temperature in the range of 30 - 40 °C, it flows to the seven pools [own research 2013-2015].

Great natural resources of geothermal waters in the Tatra Mountains make the recreation industry the primary and most prosperous one. Thermal waters of the Tatras basins flow here all year round [Pinkwart 2003].

2. 4. The hydrological network

The Tatra Mountains zone has a great amount of water resources. There are dozens of large creeks flowing through the main valleys of the Tatras. In terms of catchment and discharge, one can single out Białka creek, which connects waters of Rybi Potok, Roztoka and Biała Woda. The temperature of water in summer raises up to 10 °C and in winter it drops to 1 °C. The magnificent waterfalls are formed on the rocky thresholds of valleys and are called „siklawy” or „wodogrzmosty”. The most popular are Mickiewicz Waterfall in Roztoka Valley Siklawica in Strążyska Valley, as well as Buczynowa Siklawka. The highest waterfall of the Tatra Mountains is Wielka Siklawka of cascading type created by the flow of the River Roztoky, the height of the waterfall is 70 meters. The most beautiful waterfalls are in Staroleśna Valley and Zimna Woda. Wyżni waterfall, which is also called Olbrzymi, is the most amazing one.

Looking at the crowds of people, going to the Valley of Pięć Stawów in July or August (they cover the distance of 9 kilometers – the asphalt road) or climbing the moraine of Czarny Staw Gąsienicowy, it is not difficult to draw the conclusions regarding the hydrological conditions for tourism in the Tatras. The water in the mountains, to a large extent, creates the landscape, it is the component of aesthetics. Finally, it gives a sense of calm and reflection, creates a climate conducive to isolation of thought from reality. The glacial character of tarns inspires the tourists to look for something special in the nature of the Tatras. Ponds, waterfalls and creeks are combined with a static scenery of valleys and peaks. They make an element of movement and life in the abiotic environment. It is worth amazing its purity, depth, cyan surface of water and unusual environment [own research 2013-2015].

2. 5. Fauna and Flora

There are approximately 5500 - 8000 species of animals in the Tatras. The diversity of species results from specific conditions of high altitude inherent in the Tatras [Karolczuk 2011]. It's difficult to find common features for the (alpine) fauna in the Tatras. Nevertheless, most of the animals of the mountains of the alpine orogeny are adapted to receive or retain as much heat as possible. Mammals tend to have thicker fur to keep warm during the icy nights and winter. The distinguishing feature of the mountain animals is its mutual isolation. The number of animals are separated by vast plains, so many species evolve independently. They are considered to be separate subspecies [Pullin, 2007]. For example, only in the Tatras you can meet a chamois and marmot which form specific Tatra subspecies that differ them from the alpine species. [Karolczuk 2011].

The largest mammal of the Tatra Mountains – a brown bear that appear to have survived from historic times to modern times [Pęksa 2009]. It is a species related to the original wilderness, but often comes up to the upper line of the forest. In many cases bears eat plants, mainly herbs, berries, fruits, rowan. They also like the larvae of ants and wasps. In spring bears go to the avalanche places and penetrating steep gullies, they look for dead goats, which

are a valuable component of the diet. In winter bears stay in its dens made of branches and moss or in small cavities made under the tree trunk. During winter the bears hibernate, but can wake up and troll. Bears cubs are born in dens in late December and early January. There are approximately 50 species of bears in the Tatras today, including 15-20 species on Polish territory. [Nyka 2006, Karolczuk 2011]. You can often meet large forests animals in the Tatras - deers, hares, foxes, pine martens, stoats, weasels. In the Tatras you can observe more than 200 species of birds, half of which weave nests here. The reptiles occur not very often. The above area is dominated by viviparous lizards and common adders, except grass snakes and sand lizards. There are seven species of amphibians here. You can see ptychadenas more frequently (live on the top of the mountains as well as in the mountains meadows). The Tatras creeks are rich with various kinds of fish - mostly one can find here Siberian bullhead and minnows, as well as trouts [Karolczuk 2011].

In the lakes you can find invertebrates. One species, *Branchinecta paludosa*, occurred in Dwoisty Staw Gąsienicowy, but unfortunately the species became extinct in the second half of the twentieth century. This tiny crustacean still can be found in Wyzni Mały Furkotny Staw in the Furkotna Valley (Slovak Tatras). The imperceptible invertebrates account for almost 97% of species of animals living in the Tatra Mountains, the most beautiful vertebrates constitute only a small fraction of a percent of the total fauna of the Tatra Mountains [Karolczuk 2011].

The Tatras flora plant can be classified as autogenic community. These are natural communities influenced by natural factors as original combinations of species. According to its preservation, the autogenic community is classified into two groups: primary community and natural community [Falińska 2004].

A lot of plants in the Tatra Mountains are unique. The characteristic feature of this ridge is the selection of species with the increasing altitude above the sea level. This results in singling out of 6 plant altitudinal zones. Foothills (of farmland) - the area extends from an altitude of 700 m above the sea level, the above zone is less important (many scientists ignore this zone of the Tatras), only Nyka distinguishes it [2006]. Then follows a forests region which includes 2 altitudinal zones. The lower forest belt comes up to, on the average, an altitude of 1250 m above sea level and it mainly consists of such forest stands as beech and fir, spruce and sycamore.

The upper zone - extends up to 1550 m above sea level – it is exclusively the land of spruce. The boundary line between the altitudinal zones is not visible, as in fact, a spruce can be seen everywhere. The upper forest belt is important because of lessening spruce, Silesian willow, Carpathian birch, mountain ash and Swiss pine. The next zone is the alpine range extending from an altitude approximately 2300 m above the sea level. It consists of natural mountain meadows, including grasslands and flowering herbals. One can also find here blueberry, heather, mountains juniper, dwarf willows. The last altitudinal zone – the subnival one, extends to the highest summits and is peculiar only for the High Tatras. The advantage of the granite rock formations and harsh climate result in poor vegetation and only consists of the alpine and northern species adapted to the sub-polar conditions. This altitudinal zone includes approximately 120 species of flowering plants, including 40 species mounting in the highest summits [Nyka, 2005; Nyka 2006].

3. ANTHROPOGENIC FACTORS INFLUENCING TOURISM AND RECREATIONAL INDUSTRY IN THE TATRAS

3. 1. TPN and TANAP activity

The entire territory of the Tatra Mountains is covered with national parks. The regulations dealing with parks are of great importance for tourism industry and are strictly connected with tourism services. Among anthropogenic factors determining tourism engagement and recreational activities in the Tatras, the above regulations are considered to be the most important ones. One can state continuous improvement of legal instruments referring to TPN (Tatra National Park in Poland) and TANAP (Tatra National Park in Slovakia). Some regulations, however, are fixed and are not expected to be changed in the nearest future. In this part the author presents the most important aspects and activities of the national parks in the context of tourists benefiting from the wealth of the Tatras nature.

The protection of the environment is the most important and overriding objective at both sides of the border. Within the TPN and TANAP all human activities and all economic activities (taking into account the conduct, the nature, scope) must be tailored to the needs of environment protection and be consistent with its objectives. In fact, this part could be completed regarding the above regulation, as all the issues have been already discussed, but one should also know the benefits of tourism. Firstly, according to the above regulation, the tourists visiting national parks have an enormous responsibility – they are prohibited to pollute the territory, water and to hunt for wild animals. It is absolutely forbidden to cut trees and destroy other plants, devastate caves, destruct or remove transfer the animal remains and minerals and mine the silt of caves. The entire territory and natural landscapes must be protected. It is forbidden to collect geological specimens (rocks and minerals), destroy the soil, pluck the plants and collect seeds, gather mushrooms and fleece. It is forbidden to make noise and make a fire (only in cases, if it is necessary for safety of human life). You cannot use vehicles and horses, except the roads designated by the managers of the parks [own research 2013-2015].

3. 2. Tourist trails and its current state

Hiking plays a key role in the Tatra Mountains (especially in summer). As going for a hiking within the TPN and TANAP is possible only due to hiking trails, it is important that they should constitute safe and attractive transport corridors.

Surface routes are varied. The valleys are usually lined with gravel or coarse stone roads; while upwards one can see the narrow stone walkways and there are inconspicuous steep mountain passes with natural ridges, often artificially secured in abortive or carved, but a steep cliff. Chains, buckles and sometimes, even ladders can be used for it and are of great importance for tourists. On both, the Polish and Slovak sides, one can see wooden tables and benches dotted under the cover of the woodland canopy. They are considered to be beautiful, but an optional element of marked roads. Unfortunately, some paths of valleys have asphalt roads, resulting in easy access, and thus, clutter and a drastic increase in the tourist erosion – the site is being eroded by tourist's feet. [Nodzyński and Zygmąńska 2006]. The tourist erosion issue is a key problem in this part, which deals with the spatial distribution of the tourist trails. Slovaks have not been dealt with this problem yet, but Polish TPN have got the above problem. The reason for it - the excessive number of people visiting the Polish Tatras. Every year more than 2 million tourists visit TPN [<http://www.tpn.pl>]. Taking into

consideration the small area of the Park, it is obvious that it has a real impact not only on nature, but also on pleasant spending time of the wanderers. This phenomenon causes the problems of traffic management and safety. Many inexperienced tourists enter the heavily exposed places, not even knowing the dangers they could face.

The differences in the intensity of tourists in the Tatra valleys are determined by its management, ease of access, and above all, by knowledge about the place which is often mentioned in discussions and is listened to in the media. The popularity of tourism in this case is not affected by natural factors, but only by the anthropogenic ones. Therefore, for example, Biała Woda Valley has a different character of tourists relations, in comparison to the nearby Rybi Potok Valley. Although the one and the other one are very close in the early stages of routes, the tourists on the Polish side can wave the tourists on the Slovak side. We can only hope that Biała Woda Valley will remain in such state as long as possible, because of people seeking peace and mountain solitude [Fidelus 2014; own research 2013-2015].

4. TRANSPORT AND COMMUNICATION

4. 1. The network of motor vehicles in the Tatras foothills

Such kinds of transport as buses and cars play, undoubtedly, the key role in the tourism industry. In many cases the common tourists go to the Tatra Mountains by buses or cars [Kruczek 2011]. The roads surrounded by the Tatras are of great importance. Surrounding the range, the asphalt roads lead to both the Polish and Slovak side.

It is considered that a large area of valleys in Poland constitute Zakopane. For this reason, most of the hiking trails or ski infrastructure originate from the border line of southern streets of the city and a national park. An important tourist center is located in Kuznice, lying in the southern part of Zakopane, due to popular hiking trails and the lower station of the ropeway to Kasprowy Wierch. One can get to Kuznice by bus or horse-drawn carriage, as it is prohibited to go there by coaches and cars. An important communication route here is a chaussee, extending to the west, that is Zakopane - Kira - Siwa Polana. It supports the tourism industry at the foot of the Western Tatras - from the Mała Łaka Valley through the Koscieliska Valley up to Chochołowska Valley. There are two large parking lots at the Koscieliska Valley and Chochołowska Valley - appropriate to the intensity of the hikers in the valleys. The main road leads from the turn of the Chochołowska Valley to the northwest in the direction of the border crossing Chochołów - Sucha Góra. The most important tourist roads lead to Palenica Białczańska. Earlier known as Zazadnia Road, it was renamed as Oswald Balzer Road (built in 1902) in honor of the defender of "Polishness" of Morskie Oko. The road is important due to its connection with the roads leading to Morskie Oko, Roztoka Valley, Sucha Woda, Rusinowa Polana. The next road leads to Palenica through the Bukovina Tatrzańska. This road is used by the tourists staying in Poronin or Mały Cichy. The name of the road is connected with the most scenic driving route of Poland due to the unforgettable view of the extensive panorama of the Tatras from Głodówka [Nyka 2006; Around the Tatras. 2005/2006].

The Slovaks, possessing with almost 80% of the Tatras range, have surely even larger network of roads. The most important is the Road of Freedom (Cesta slobody) - starting immediately at the border crossing in Lysa Polana and ends in Štrbské Pleso (54 km). The Road of Freedom is a roadway with a width of 10-11 meters. The pinch points do not exceed

4.5%. The roads leads to foothills of Bielskie Tatras and High Tatras connecting the valleys outlets and different regions of the Tatra Mountains. Numerous lateral turnoffs connect it with a network of lower-type roads. It is the most important high road, connecting the initial sections of the trails. The western part of the Road of Freedom makes the Road of Youth. It has a beautiful landscape and convenient communication route surrounding the foothills of the Krywania and then going down to the foreland of the Western Tatras. From Pleso Lake to Liptovsky Mikulas the distance is 50 km. So, the difference in levels reaches up to 800 m. The important tourist roadways start from the Road of Youth and lead to the Žarska Valley, Waska Valley and Jalowiecka Valley. The possibility of multiple trips to the area of the northern slopes of Roháče Grani allows to use the roadways from Liptovský Mikuláš to Zuberec. It connects the southern part of the Western Tatras with the outlet of Zuberska Valley. One can see a magnificent view over the entire length of the road – in addition to the Tatra Mountains, the Chotczańskie Mountains, Skoruszyny Mountain Range, the Liptow artificial water reservoir, as well as the shaft of the Low Tatras are also visible [Nyka 2005; Around the Tatras ... 2005/06].

4. 2. The vehicles operating outside the national parks

The Tatras foothills are well connected with the city center by public transport (PKS bus service company), due to which the passengers are taken from the bus station to the city center. People commute, among others, to Kuźnice, Palenica Białczańska, Brzeziny through Cyrhla to Kir and Rostock. The route is aimed at satisfying all the major needs of hikers. The tourists can also travel by private minibuses. Its main stop is opposite the bus station. The passengers waiting for the bus at the bus stops can also get on the minibuses. One can also take a taxi. [Nyka 2006]. You can go to Slovakia from Zakopane. The buses run through Smokovec to Poprad. You can use the Slovak public transport running from Łysa Polana. It is much more difficult to get from the Polish Tatras to the Western Tatras in Slovakia, as the journey requires several changes, going on foot to cross the border, and thus, such way of travelling is tiring and time-consuming. That is why, almost no one uses such route. Local connections in Slovakia are carried out by buses. Unfortunately, many routes have a small number of bus lines. The situation is better in the southern foothills of the High Tatras. One can get from Lomnica Tatranska to the Szczyrbskie Jezioro by electric train which runs punctually and the fare is not expensive. The trains run from early morning until 10 p.m. For example, the first early morning train "elektrická" runs just at 4:00 a.m on the route Poprad - Smokovec - Szczybskie Jezioro. The standard gauge runs down the valleys between the Biała Spiska, Kieżmark, Poprad, Liptowski Mikulasz i Ružomberk from the south; from the west - between Dolny Kubin, Orawski Podzamcze and Twardoszyn. The southern line has a route to Tatras from Wielka Lomnica to Tatranská Lomnica. The last type of communication is a cogwheel railway from Tatrzańska Szczyrba to the Szczyrbskie Jezioro [Nyka 2005].

4. 3. Means of transport within the protected area

Means of transport within the TPN and TANAP play a triple role in tourism. The first one is obvious – it goes about ski lifts and cable cars allowing the skiers to schuss down the mountains slopes. The other two features relate to hiking. First of all, they provide an excellent base for long alpine routes for experienced, skilled tourists. They allow to save some time and efforts, to get to the places, where it would be difficult to get fit in hours from dawn

to dusk. The last feature concerns the tourists, who due to the cable cars, can reach high altitude without any effort, admiring the Alpine scenery. They just represent the biggest problem, as they are often not prepared, they do not have the proper clothing. Such category of people is characterized by their carelessness and bravado, they have no idea of the Tatras topography and sometimes cause the accidents. [own research 2013-2015].

4. 4. The mountain rollercoasters and lifts

In the Polish part of the mountain range run 3 roller coasters. The cable cars in Gubałówka have a very high carrying capacity - up to 2000 people per hour in one direction and the carriage takes approximately 121 people at one time. The Pobliski Butorowy Wierch is known for its own cable railway. It consists of 200 double chairs, carrying approx. 700 people / per hour in one direction. The most famous, and at the same time, the biggest cable railway is in Kasprowy Wierch. The length of the route is 4292 m, height difference is 936 m, speed limit - 5 meters per second. The carrying capacity in one direction constitutes 198 people per hour. Four available wagons take a maximum of 33 people. During the peak season all the cable cars are overcrowded. In winter the chair lifts are activated for skiers from Dol, Gásienicowa and Goryczkowa to Kasprowy Wierch; from Bystry to Nosal, Polana Szymoszkowa, Bialka Tatrzańska and Mały Cichy. The latter one sometimes works in summer. The cable cars are repaired in late spring and autumn. The tourist railroad with wagons covering the asphalt road from Chochołowska Valley of the Siwa Polana to Huciska is of great importance, inexpensive and popular with tourists. [Tarczyński 2004; Nyka 2006].

In the Slovak Tatras, Lomnica is the best adapted, in terms of cable cars. From Tatranska Lomnica runs a gondola lift to the station at the Łomnicki Staw. Only one carriage runs from the Łomnicki Staw to the Łomnicy summit (2634 m above the sea level!). It is the largest tourist attraction of the Tatra Mountains.

The attractive chairlift takes passengers from Łomnicki Staw to Łomnicka Przełęcz, from which you can cover a short distance of a short green-labeled section and get to Łomnicka Baszta, admiring the prospect of the highest peaks and the valley bottoms of Zimnej Wody as well as Pięć Stawów Spiskich. A very popular is the mountain railway from Stary Smokovec to Siodełko (Hrebienok), facilitating the tourists start of the eastern part of the High Tatras in the higher parts. Szczyrbskie Jezioro is connected with Przedni Solisk by a modern chairlift, which is an excellent and unusual shortcut of a long descending road of Dolina Furkotna from Bystry Przechod. There is only one chairlift in Przednia Salatyna (Slovak Western Tatras), it runs only in winter [Nyka 2005].

4. 5. Horse carriages and cabs

There is one more means of transport in the Polish Tatra National Park – a horse-drawn carriage. Carriages and cabs are associated inherently with the highland-style folklore; the highlanders, dressed in folk costumes, go for a ride in a cart. From Palenica Białczańska to Włosienica (it is 1.5 km before the Morskie Oko lakeshore) the carriages are on hand to ferry the tourists in the carts by a 9 km road of O. Balzer. Horse carriages can ride along the road from Kir to Kuznice through the Kościeliska Valley to Hala Pisana, and through the Chochołowska Valley to the Chochołowska Clearing. In winter the tourists can experience a horse-drawn sleigh ride along the road of the Bystra Valley to Kalatówka [Nyka 2006; own research 2013-2015].

5. SWOT ANALYSIS OF THE TOURISM PRODUCT: KASPROWY WIERCH CABLE CAR OF POLISH CABLEWAYS

As it was already mentioned, means of transport within the national parks can be considered in several aspects, because they can have different consequences. An example of the most popular Kasprowy Wierch cable car and SWOT analysis method should help in getting of positive and negative conclusions and enable the creation of a general framework for stimulating the development of this product, limit a negative impact and maintain satisfactory characteristics.

Table 1. SWOT analysis of the Kasprowy Wierch Cable Car

Advantages	Disadvantages
It is an element of modern mountain development	The excessive development of natural massifs of Kasprowy and Myślenickie Turnia
It gives the possibility for the experienced hikers to walk up to the distant steep mountain trais (eg. Orła, Świnica, Cicha Liptowska Valley, Gładka, Zawory, Ciemnosmreczyńska Valley).	High tourism intensity
It makes available for the disabled to admire the mountain scenery	Degradation and even devastation of area near the summit
It makes accessible to ski and snowboard (due to natural snow)	Provision of access to higher parts of the mountains to those who due to the lack of respect for nature should never be in the mountains
It gives an opportunity to provide the distinct weather forecasts for the Kasprowy Wierch	An increase in massif littering
- It gives an opportunity to get to granite cliffs for people who are not engaged in physical activities every day, and thus, they should change their habits regarding physical culture	A tourist noise heard already from distant ridge segments (in summer and winter)
It gives large capital gains	The loss of the natural character of the Tatra Mountains area
It acts as a regional tourist multiplier, for example, other people can make money too, because of cable car railway (taxi drivers in Kuznice, highlanders riding a horse-drawn vehicles to the lower station, nearby restaurants and shops, etc.)	A stumbling block for real tourists seeking quiet, peaceful hikes

It reduces the development differences between the Tatra Mountains and the Alps	Increase in the number of tourists who do not have any experience or even a minimum of equipment in such tourist areas as Świnica and Goryczkowa Czuba
It attracts a lot of tourists from Poland and abroad	Deep tourist erosion of the paths to Liliowy and Świnicka Przełęcz and Czerwone Wierchy
In case of an accident in Kasprowy Wierch, it facilitates the transportation of an injured to get to the city; sometimes it increases the chances for survival	Unnatural widening of tracks, treading of alpine grasslands patches
It is an attraction for many people, especially, for children	The deterioration of security because of provision of the exposed ridge places for tourists who are unconscious of threat
Favorable location of the upper station (scenically and educationally) at the border between the High Tatras and the Western Tatras	The increase in the TORP rescue, especially in Świnica region, which can be covered in 2 hours (the trail is, however, technically difficult, exposed, requires skills for rock climbing (with or without usage of artificial protection) The involvement of emergency services in trivial cases, which have occurred because of one's thoughtlessness and lack of preparation; while in another region one may urgently need help
The location of the upper cableway station at the tourist hub	Destruction of natural beauty of the Bystra Valley and Goryczkowa
Safety in case of travelling by cable car	Different changes in mountain fauna, wildlife disturbance, synanthropisation caused by an excess of tourists
The attractive website of Polish Cableways encourages people to use the tourism product which is provided for tourists	
Possibilities	Threats
Partial alleviation because of high intensity of those visiting the areas of Morskie Oko and Giewot - Good accessibility	Fierce competition relating to similar tourism products (for example, Łomnica massif in the Slovak Tatra mountains, which in this respect is even better adapted and has better image attracts a large number of foreign tourists)

	Putting pressure on the Polish Railways Rope by TPN in terms of increasing the rigor in provisions regarding the park protection
The growing importance of cognitive tourism and geotourism	Climate changes – increases the number of days with heavy precipitation in summer and decreases the number of days in the year regarding winter precipitation in the form of snow, thus, it results in the revenues decrease and an increase in product costs associated with artificial snowmaking
Permanent usage of the 3xE holiday model	The need to recruit more TPN security guards in case of the environmental degradation (they could keep the order and eliminate the negative effects of the tourists on nature)
Maintaining a large market potential and increase in the West tourists eager to explore the mountain ranges beyond the Alps	Putting pressure on the Polish Railways Rope by TPN in terms of assessment the undesirable effects regarding the park protection
Maintaining the huge popularity of the Tatras in relation to other Polish mountains	"Dead" seasons - spring and autumn
A very small number of offers in Poland which could be substituted by the railway to Kasprowy	Increase in the number of people with very low incomes due to the economic crisis
To accelerate the work of the railway with the growth of new technologies and increasing capacity	The impossibility of reaching a compromise between different interested parties (from the service sector and nature protection)
Continuous interest in tourism development by local authorities	Exceeding of the tourist-absorption (hosting) capacity, deterioration in the experience of tourists and the natural environment of mountains
Maintaining of favorable Schengen agreement allowing to freely cross the border	
Maintenance of the media image of Kasprowy Wierch	
Dissemination of the tourist image of the Tatras	
Good accessibility	

The above SWOT analysis shows that the Kasprowy cable railway has many advantages as well as disadvantages. Although the cable railway is prosperous today and brings big profits, you may notice a certain risk that all these achievements can turn into the long term dangers. In other words, the things that people are enjoyed nowadays can grieve them in the future. The huge tourist flows and continuous work of the cable cars in summer and winter are of great importance and satisfying, from the point of view of economic development. Exceeding of certain limit (difficult to determine) of the tourist-absorption (hosting) capacity may sometimes lead to the fact that riding a cable car to the peak of the mountain may cease to be attractive. If there is a decrease in the number of tourists staying in this place and getting the PKL services, one can notice a sharp fall in the tourism income. We must therefore be careful and to monitor if the situation does not become worse. The sustainable tourism in this case is not only desirable, but it is a prerequisite. We should be heartened by the fact that some segments of the Tatra Mountains, regarding the cable car riding, refers also to the disabled. However, it is not satisfactory that the mountains summits can be reached by people who pose the threat, are irresponsible and emotionally affected. It is therefore, necessary for few guards to climb the peak and put the tables with the fundamental principles of behavior in a national park. The tables with information would be of great importance here too – for example, informing about the difficult trails to Świnica. The above tables with the signs can have a deterrent effect and reduce the number of unnecessary rescue operations in the area. Therefore, a common sense approach is needed in this case with the desirable results. The natural environment (possibilities and threats) appears to be fairly stable and most of the above mentioned its components should not bring striking changes in the near future, but they are definitely connected with time and in the longer term may forecast the demand for Polish Cable railway services.

6. CONCLUSIONS

The results of the research and detailed analysis allow to draw the following conclusions:

- 1) Natural and anthropogenic factors determine fully all the specificities of tourism and recreation sector in the Tatra Mountains.
- 2) Natural factors are of the greatest importance in the development of tourism in the Tatras, both in space and time. They are responsible for specific forms of specialized tourism which can be implemented in high mountains. They determine the need for appropriate equipment, and even influence the physical aptitude and health of tourists.
- 3) Anthropogenic factors, determining the tourism industry in the Tatra Mountains, are entirely dependent on the environmental factors and they could not exist without them. They are only a derivative thereof, and must be closely matched to them.
- 4) Natural factors conditioning various forms of tourism in the Tatras have many advantages and disadvantages. They generate both the uniqueness of the landscape and the positive feelings of tourists, as well as a danger to health and life. The possibility of its artificial modification is very limited. However, prevention of the adverse effects is desirable and appropriate. The positive aspects should be taken into consideration.

- 5) Anthropogenic factors related to tourism in the Tatras have both positive and negative dimensions. They can be subject to any metamorphoses, however, taking into account the fact that nature conservation policy must limit the revenue generating investments.

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