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Viktorie KLÍMOVÁ

Vladimír ŽÍTEK

(Masarykova univerzita / Masaryk University, Czech Republic)

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ECONOMIC, SPATIAL AND ENVIRONMENTAL ASPECTS OF GROWING GEOTOURISM IN ISLAND ICELAND**Ekonomický, priestorový a environmentálny aspekt rastúceho geoturizmu na ostrove Island****LUCIA ŠOLCOVÁ****SIMONA DYSKOVÁ**

Katedra geografie a regionálneho rozvoja *Dept. of Geography and Regional Development*
Fakulta prírodných vied *Faculty of natural Sciences*
Univerzita Konštantína Filozofa v Nitre *Constantine the Philosopher University*
✉ *Tr. A. Hlinku 1, 94974 Nitra, Slovak Republic*
E-mail: lsolcova@ukf.sk, simona.dyskova@gmail.com

Annotation

The article focuses on Iceland and its growing tourism, which has grown in recent years, the larger dimensions. The paper discusses with the reasons and consequences of the growth of visitors to this island, the most visited places, the nationalities most visited this country and the number of visitors regard to the individual months during the years 2014 - 2017. Island begins with great development in the tourism sector more especially in the field of geotourism. This trend indicates an increased number of overnight stays. The number of tourists in accommodation facilities increased by 85%. Increase in the number of tourists and foreigners has also negative consequences to the primary landscape.

Key words

Iceland, geotourism, tourism and growth, tourism and environment

Anotácia

Článok je zameraný na ostrovny štát Island a jeho rastúci turizmus, ktorý za posledné roky nadobúda čím ďalej, tým väčšie rozmery. V článku sa zaoberáme príčinami a dôsledkami rastu návštevníkov na tento ostrov, najnavštevovanejšími miestami, národnosťami, ktoré najviac navštevujú Island a hodnotíme návštevnosť vzhľadom na jednotlivé mesiace v rokoch 2014-2017. Ostrov začína veľký rozvoj v oblasti cestovného ruchu presnejšie v oblasti geoturizmu. Na tento trend poukazuje zvýšený počet prenocovaní. Počet turistov v ubytovacích zariadeniach stúpol o 85 %. Nárast počtu turistov a cudzincov má aj negatívne následky na prírodnú krajinu.

Kľúčové slová

Island, geoturizmus, turizmus a nárast, turizmus a prostredie

JEL classification: Q56, R58, Z32

Introduction

Geotourism is a relatively new branch of the tourism industry, which emerged at the end of the 20th century. Its appearance was a coincidence of several factors, e.g. the demand from a highly competitive tourist market seeking new, attractive products, the changing preferences of tourists looking for something more exciting than a classic leisure vacation, the growing interest in the Earth sciences as a part of modern education, and growing interest in new attempts in protection and conservation of Earth resources defined generally as the Earth heritage conservation (Wilson et al., 1994 In Słomka, Mayer, 2011). The modern, broad understanding of geotourism must include also historical, cultural and social heritage of the geosite area as well as local and regional economic controls of tourism as a business regulated by sustainable development principles, tourist infrastructure and environment protection. Such a hollistic attempt is a new approach to geotourism, closely linked to the idea of

sustainable growth. In the following paper we intend to highlight the rapidly growing tourism in Iceland in recent years.

Iceland is synonymous with geological tourism. Situated on the Mid-Atlantic Ridge, the country has 22 active volcanoes, 250 geothermal areas, 780 hot springs, and the world's third largest icecap. It is one of the world's most active hot-spots with one-third of all the lava to surface on earth in the last 1000 years being of Icelandic origin. The country has two World Heritage Regions, four national parks and 80 nature reserves, and one geopark - Katla Global Geopark.

1. Methodology

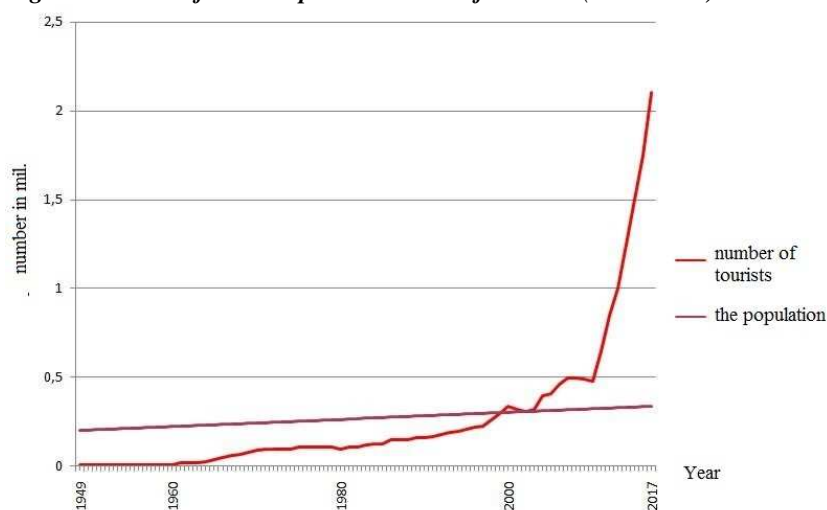
Geotourism was defined in the mid-1990s as the provision of interpretative and service facilities to enable tourists to acquire knowledge and understanding of the geology and the geomorphology of a site beyond the level of more aesthetic appreciation (Hose, 2011). Cultural tourism is essentially form of tourism that focuses on the culture, and cultural environments (including landscapes of the destination), the values and lifestyles, heritage, visual and performing arts, industries, traditions and leisure pursuits of the local population and host community. It can include attendance at cultural events, visit the museums and heritage places and mixing with a local people. It should not be regarded as a definable niche within the broad range of tourism activities, but encompasses all experiences absorbed by the visitor to the place that is beyond their own living environment (Kajzar, 2014).

The aim of the paper is to highlight the rapidly growing geotourism in Iceland in recent years, its causes and consequences. We follow the rapid increase in the number of tourists in Iceland. We analyze the frequency of tourists by countries from which they arrive for individual months in 2014-2016 based on statistics from the Icelandic State Statistical Office. It included a field research based on what we identified as the most visited sites and produced a variety of photo-documentary material.

2. Iceland geotourism

Although tourism has got the Iceland from the economic crisis that hit it in 2009 and is a major asset for the economy in the sense it has a positive impact on the local economy, the labor market and the construction industry, on the other hand it can have negative to devastating consequences. Local residents and landscapes are not ready for such a rapid growth of visitors. Everything is also related to the increase in prices for services and accommodation, which increased by 25% in the last 12 months (Þórsson, 2017). Iceland does not have sufficient accommodation capacities for such an increase in tourists and insufficient infrastructure on the island. The high number of tourists also has a great impact on the living environment of the island itself. The increasing number of tourists also brings many problems, which are also reflected in violations of the rules in national parks. For example, trips to the inland of the island, where access is only allowed with a guide, violate security orders on predatory rivers, waterfalls, geysers and glaciers, threatening both themselves and the environment. The government of Iceland plans to introduce measures and restrictions in the coming months to reduce the number of tourists. The country has no capacity for a lot of tourists and this rising trend (Fig. 1) is an environmental threat (Óladóttir, 2016).

Fig. 1: Number of tourists per inhabitant of Iceland (1949-2017)



Source: Statistics Iceland, Icelandic Tourist Board; edited by: Šolcová, Dysková, 2018

3. The results

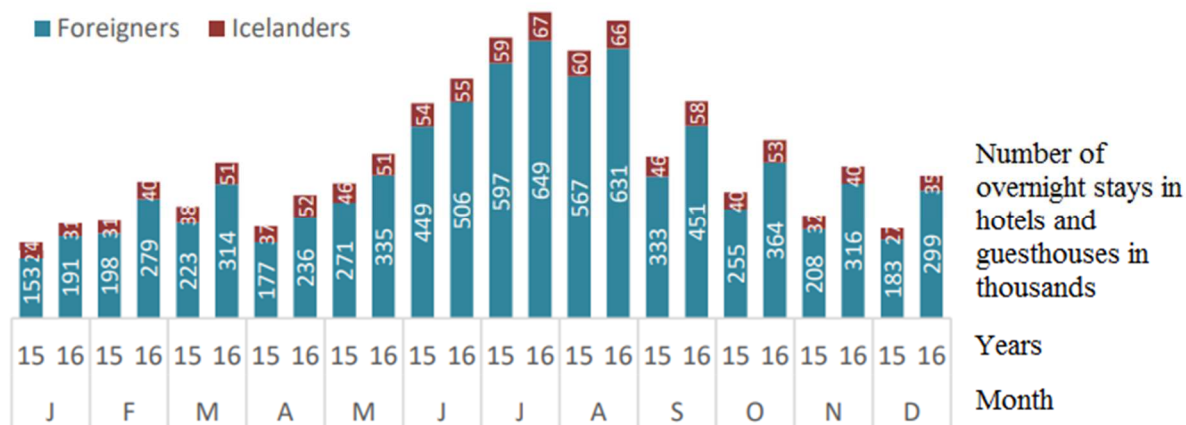
3.1 Causes of sudden growth of visitors to the island

Increased visitor growth has occurred since 2008. During this period, Iceland experienced a major financial crisis arising from excessive household indebtedness and credit expansion of local banks. This resulted in a decrease in Icelandic currency, making the landscape more attractive to foreigners. The tourism sector has grown, and many jobs have been created. It is not only because tourists are coming to Iceland. There has also been a rise in the number of people choosing to move to Iceland to live and work for an extended period of time (Gunnarsdóttir, 2017). The interest of foreigners in this country has started to increase significantly, especially since 2010, when the Eyjafjallajökull volcano erupted (the eruption occurred three times: 20.3., 31.3., 13.4.). It is a stratovolcano 1.666 meters high located only 125 km from the capital Reykjavik (Eyjafjallajökull, 2018). The volcano has now become a popular destination for geotourists. Thousands of people from all over the globe have made the journey to the tiny island of Iceland to see the magnificent volcano, providing not only a once-in-a-lifetime opportunity for the visitors but a booming economy for the locals. Before its eruption in March and April 2010, Eyjafjallajökull had very few visitors. Most visitors during this time were either scientist or outdoor enthusiast. Now thousands of people come from all over the world to see the volcano that stopped the world. On April 14th 2011, one year after the eruption, they opened up a visitor centre whose goal is to educate people not only about the eruption, but also about the geology and history of Eyjafjallajökull and other volcanos on Iceland (Dowling, 2013).

Tourism is one of the fastest-growing sectors of the Icelandic economy. It is very important to the Reykjanes area and one of the main sources of income for many families. Statistics for 2011 show around 113.000 overnight stays in the Reykjanes Geopark area. Overnight stays in the area increased by 25% from 2007-2011. Overnight stays in hotels for years 2015 and 2016 are in Fig. 2.

In addition to the interest, Iceland is also recorded the boom itself because of natural and cultural potential (film and music industry - Justin Bieber and Zara Larson).

Fig. 2: Overnight stays in hotels and guesthouses during the years 2015 and 2016 (in thousands)



Source: Óladóttir O., 2017; edited by: Šolcová, Dysková, 2018

3.2 Consequences of the sudden growth of visitors to the island

The fact that tourism in Iceland in recent years has increased sharply is significantly demonstrated by the fact that since 2012 the number of employees in tourism increased by 60%. The growth was recorded by travel agencies, airlines, rental cars, guides, the number of employees in the accommodation and catering sector, whose services have increased rapidly (Sigurðardóttir, 2016). Another consequence is the constantly new construction, mainly around the capital, which are constantly being built new hotels, guesthouses and other accommodation. Every year more than 850 new rooms are added to the hotels. Domestic residents also build their own space for rent. This type of accommodation is called AirBnB (a company providing accommodation around the world via Internet) and it is preferred by up to 44% of all tourists on the island. However, a majority of AirBnB apartments (over 1400) are not legally registered and do not pay city taxes. The Housing and State Fund estimates the number of such unregistered apartments that are leased over more than 90 days a year, and the state is taxed up to ISK 1 billion (€ 8.1 million). This type of accommodation is cheaper than hotels, but Iceland has the highest prices for

this accommodation across the Europe. The amount ranges are from € 100 to € 1,000 per night. This is linked to the problem of insufficient accommodation capacity for working people from abroad, as most of them are being rented to tourists. Accommodation prices have risen up to 5 times compared to previous years. Infrastructure is built not only in cities. New roads and large car parks are being built at famous tourist sites leading to geysers or waterfalls (Þórsson, 2017). Iceland has also introduced a hotel tax that climbed to \$ 430 million in 2016 ISK (€ 3.5 million), which Icelandic Tourism Minister Thordis Kolbrun Gylfadóttir wanted to reduce the visitation of the island by tourists (Óladóttir, 2016).

The general policy of Reykjanes Geopark is to have all sites open to the public, although it is the role of the advisory council on education and research to consider the protection of geosites, e.g. geosites with higher scientific value. Because of protection value, some sites have already a limited access according to Icelandic legislation, e.g. the island Eldey.

3.3 Number of tourists in individual months of the year

There are great opportunities in the tourism industry in the Reykjanes area due to the closeness of Keflavik International Airport, the largest airport in Iceland. The summer of 2012 go 15.000 of passengers go through the terminal daily during high season in June, July and August. A total of 2.112.017 of passengers passed through the terminal in 2011. The Blue Lagoon is the most popular tourist site in the proposed Geopark and one of the most popular sites in whole of Iceland with more than 400.000 of visitors per year. According to a survey carried out among tourists leaving Iceland from September 2009 to August 2010 (it is estimated that 322.000 of foreign tourists) travelled around Reykjanes. 94.000 guests visited the town of Grindavík and 30.000 of them the town of Sandgerði, according to the same survey. In the summer of 2011, the Krýsuvík area was visited by more than 100.000 tourists, the “toe” of Reykjanes and the Bridge between continents by 65.000 of tourists. The same number of visitors is estimated to have visited Gunnhver. And 110.000 - 120.000 of tourists visited at least one site in the Hundred Crater Park at the “toe” of Reykjanes in 2011. The two lighthouses at Garðskagi were visited by 21.000 guests during the same period.

Iceland, or the landscape of fire and ice, has been a great attraction for many tourists in recent years. The country with more than 330.000 people (2010) (Óladóttir, 2016) was visited by about half a million tourists. Since 2010 every year the number of tourist has increased. In 2016 Iceland was visited by approximately 1.8 million tourists, (39% increase over the previous year). The year 2017 recorded a record in the history of the country, when the number of tourists has grown six times the number of permanent residents. The latest data from the Icelandic Tourist Board (2017) reports 2.1 million tourists in the previous year. These numbers are growing tendency and in 2018 are expected to be 2.5 million of tourists, which makes seven foreigners per inhabitant.

The number of tourists with respect to individual months was recorded by arrivals at the airport to Keflavík. Chart 1 shows the number of tourists in individual months in 2016 compared to previous years 2014 and 2015. The number of tourists actually rises annually, especially in the summer months (Fig. 3).

Fig. 3: The number of tourists in individual months in 2016 compared to 2014 and 2015

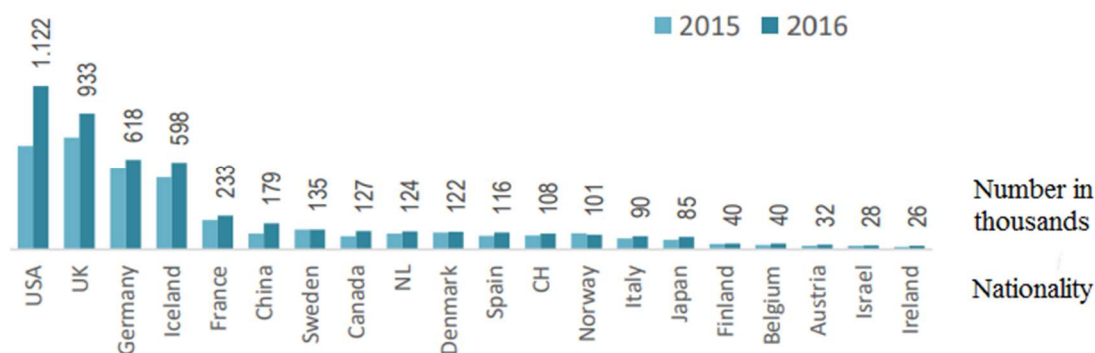


Source: Óladóttir O., 2017; edited by: Šolcová, Dysková, 2018

3.4 Visitors structure in Iceland

The number of tourists by country of origin in Iceland was also determined by passport control at Keflavik Airport (Fig. 4). Up to 98.7% of tourists used this international airport. The most numerous group of tourists in 2016 was from the United States of America (415.000). The second largest group to visit Iceland was the UK population (over than 316 thousand). The third group represents German visitors with 132. 000 of tourists (Óladóttir, 2016).

Fig. 4: Visitors structure by countries during years 2015 and 2016 (in thousands)



Source: Óladóttir O., 2017; edited by: Šolcová, Dysková, 2018

3.4 Most visited places in Iceland

Iceland's most visited places include the Golden Circle, which includes the Þingvellir National Park, the Strokkur Geyser and the Gullfoss Waterfall (Fig.5, 6, 7). The Þingvellir National Park is just 45 minutes by car (40 km) from the capital city. It is a UNESCO World Heritage Site. Reykjanes UNESCO Global Geopark is an area of 829 square kilometers, 0.85% of Iceland. There the Mid-Atlantic Ridge rises above sea level. Various forms of volcanic activity thousands of years of volcanic activity have helped give the site its unique appearance. In the Geopark it's easy to find geothermal activity and see the shaping of different landscapes, hundreds of different craters, caves and lava fields, a variety of bird life, astonishing cliffs, high geothermal activity, and black sand beaches.

The Reykjanes Peninsula is a young section of Iceland. It is a land-born, highly volcanic counterpart of the Mid-Atlantic Spreading Ridge where two tectonic plates part at an average rate of 2.0-2.5 cm/yr. The peninsula, with an area of 2,000 sq. km, contains late Quaternary volcanic palagonite tuff and pillow lava formations as mountains from the last glacial periods. Also basaltic lava flows and volcanic structures from interglacial periods, especially from the last of 11.500 years (the Holocene). Four volcanic systems and fissure swarms line the peninsula from SW to NE. They contain open fissures, normal faults, high-temperature geothermal fields and volcanic fissures. These are lined with monogenetic craters.

Many small and large lava shields are found in the area, some made of primitive mantle melt (picrite). Eruptions have occurred in the three westernmost systems during the past millennium, all in long episodes, in the 10/11th centuries, in 1151-1180 and 1210-1240 (Reykjanes Geopark, 2018).

Þingvellir is known for its geology because it is located directly between the North American and the Eurasian tectonic plate. There are frequent earthquakes in this area, so the distance between these boards increases each year by 2.5 cm. The valleys formed by these earthquakes are filled with fresh water from the Langjökull glacier. It passes underground across the porous lava wall towards Lake Þingvallavatn, which is the largest natural lake in Iceland (Gudmundsson, 2012).. Two Icelandic geoparks are listed as UNESCO Global Geoparks. The other one is Katla UNESCO Global Geopark. Katla Geopark is Iceland's first geopark and it opens up a natural wonderland to the visitor. A top priority of the park is to protect the natural environment, promote local sustainable development, introduce local culture and place a strong emphasis on nature tourism (Fig. 8, 9, 10).

Katla Geopark got its name from one of its most known volcanoes, Katla which is under the glacier Mýrdalsjökull. The geopark is 9542 sq. km or around 9,3 % of the total area of Iceland with a population around 2700. Katla Geopark is in every sense the land of ice and fire, with its towering glaciers and active volcanoes. These forces have been shaping the land for thousands of years and the nearest examples of that are the powerful eruptions in Eyjafjallajökull 2010 and Grímsvötn 2011. But there is also more of amazing landscapes in the area,

mountains, lakes, black sandy beaches, green pastures and meadows, powerful glacial rivers, beautiful waterfalls and vast lava fields (Katla Geopark, 2018).

Other geotourism attractions in Iceland include 'The Rift' in Eldborg, an exhibition of geology, geothermal heat and energy conservation is brought to life through multimedia displays. Also close by, there is the 'Blue Lagoon', one of Iceland's major tourist attractions with approximately 170.000 of visitors per annum. It is a geothermal spa supplied by hot water from the Svartsengi Geothermal Project, which supplies hot water to the Reykjanes Peninsula. The super-heated seawater is rich in blue-green algae, mineral salts and fine silica mud giving it a bright blue colour. The waters are surrounded by black lava with the steam rising from the geothermal plant adding to the surreal setting. Also on the Reykjanes peninsula there lies/tourists can admire the Bridge Between Two Continents, a remarkable geotourism attraction. It is situated on the lava-scarred peninsula where two of the Earth's tectonic plates split. The 'bridge' spans across these two continents and is situated in the Alfgja rift valley, a chasm marking the boundary of the Eurasian and North American continental tectonic plates (Dowling, 2013).

Fig. 5: National park Þingvellir

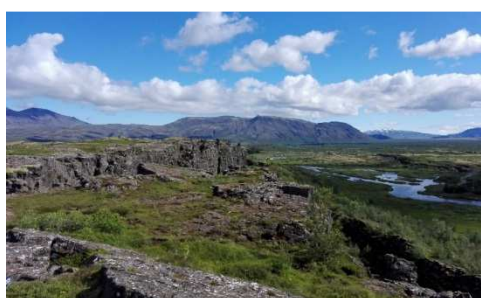


Fig. 6: Hot "pools" and springs in the Þingvellir National Park



Fig. 7: geysir Strokkur



Source: Šolcová, Dysková, 2017

The second stop on the Golden ring is the Geysir geothermal area in the Haukadalur valley. The whole area is known for active hot springs, swimming pools and pots up to 60 ° C. Surrounded soil and hills are colored with earth minerals. The most famous and largest is the Strokkur geyser, which erupts every 5-10 minutes up to a height of 20-40 meters. The activity of geysers is caused by the surface water leaking until it reaches the magma-heated rock. Such geothermal heated water exits back towards the surface of the explosion (Gunnarsdóttir, 2017).

Fig. 8: Gullfoss Waterfall



Fig. 9: Blue Lagoon



Fig. 10: Glacier bay Jökulsárlón



Source: Šolcová, Dysková, 2017

The third stop is Gullfoss' Golden Waterfall on the Hvíta River. It is 32 meters tall and runs into a 2.5 km long canyon. This canyon is eroded every year by 25 cm. It originated at the end of the ice period by flood waves.

Other famous tourist spots include the Blue Lagoon - a large geothermal spa area located in the volcanic area. The water is a geothermal sea (brine) heated in a volcanic bed enriched with SiO₂, salts and other active substances

acting on skin diseases, psoriasis or various eczemas. The geothermal springs in Iceland are used to generate electricity or to heat up potable water (Evans, 2014).

Iceland offers a huge number of beautiful and unique places, whether it's waterfalls, volcanoes, geysers, national parks, thermal springs, as well as glaciers that cover 11% of the country's territory. The largest glacier in Iceland, and the second largest in Europe is Vatnajökull. Its name is composed of two Icelandic nouns, namely water - water, and jökull - glacier. It occupies an area of 8100 sq. km, and covers approximately 8-10% of the island's area. Lagoons are formed around the glacier's edges where free floating masses of ice are located (Simmonds, 2015).

Conclusion

The analysis shows that the number of tourists is increasing rapidly every year. Most tourists come from English speaking countries who do not have a language barrier. Despite the difficult North German Icelandic language, 98% of the native speakers speak also English (Gudmundsson, 2012). Geotourism has emerged as a credible sustainable tourism industry, which offers new development and employment opportunities for local people. It can generate a range of economic benefits for local communities including income creation, job generation, diversification and infrastructure improvement. However, geotourism, like other forms of tourism, can generate both positive and negative impacts. By presenting income, employment and infrastructural benefits for local regions, geotourism is often presented as a mechanism having the potential to offset the local opportunity cost of protected natural areas and cultural sites.

The idea of coming to Iceland had (61,7%) of visitors, they mentioned interests in nature/country. 79,7% of the visitors stated that an interest in nature affected their decision to travel to Iceland. Icelandic culture and history was mentioned by 38,6%. These surveys also ask visitors what places they visited in Iceland. 46,6% of them visited the Reykjanes peninsula. More than 400.000 of guests visited the Blue Lagoon thermal spa alone. The Blue Lagoon is one of the most popular tourist attraction in Iceland. 21,3% of tourists visited Reykjanesbær municipality and 14,7% visited Reykjanes lighthouse/Gunnhver. According to another survey (2011), 68% of foreign tourists visited the Reykjanes peninsula. 13% of them visited Reykjanes lighthouse, 12% visited the Bridge between continents and 7% visited Garðskagi. Only 56% of the guests visited the Bridge between continents, also visited the Reykjanes lighthouse. This indicates opportunities in connecting better the most popular and places worth seeing in Reykjanes (Reykjanes Geopark, 2018).

Tourism is vital to the local economy in the Reykjanes area, especially tourism connected to nature and culture. Establishment of the Geopark is seen as the greatest opportunity in the area to improve tourism in a theme-based way. The Geopark will further on develop geotourism. The Geopark's aim is to create a high quality destination by building on the strengths of the region (geology, nature, cultural heritage, and local foods). The area and the inhabitants will benefit from the Geopark, especially by creating more specialized jobs requiring specialization and education.

The fact that Iceland is becoming more tourist country than it used to be, is also evident by the fact that rooms in hotels and hostels in the period 1998-2010 were 69% occupied by tourists, and the rest inhabited by domestic residents. In 2015, the number of tourists in hotels and guesthouses increased by 13% compared to 2010 (85%). Households therefore cover only the remaining 15% while the number of tourists in accommodation facilities is still growing, and nowadays it is necessary to book the room in hotel at least several months in advance (Sigurðardóttir, 2016). This increase in the number of tourist is not bearable for the city, but especially for a country that no longer needs attribute not touched. Many sites are visually marked by tourists. New roads and parking lots are being constructed along with new petrol stations, restaurants, toilets, and tourist shops. However, despite this, we can say that Iceland is unique and beautiful landscape that is worth seeing and experiencing. One of the benefits for future Slovak and Czech tourists is that there is a Slovak travel agency "D-Travel" on the island that provides travel, accommodation, program and also Slovak speaking guide.

Negative is in massiveness, often in a non-organized and unnecessary effort to promote and build a background for human entertainment even in places that do not meet the necessary requirements. This is the basic problem of tourism that decides environmentalism to the role of a strong opponent. On this basis, many studies have been written that strictly deny the further expansion of tourism and seek to limit its activities to the currently used in this way of destinations. This, of course, is not the only workable solution, simply because the guided tourism can be, for example, management of protected areas used in this way. The aim of any measures should therefore be to analyze the current situation and to identify such places and activities that would enable the current state of the

country and human activity to be maintained for the next generation, that support sustainable tourism (Ruda, 2009).

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