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ROAD ACCESSIBILITY TO TOURIST DESTINATIONS OF THE POLISH-SLOVAK BORDERLAND: 2010-2030 PREDICTION AND PLANNING

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Abstract

An essential requirement for the development, not only of tourism but also of most sectors of economy, is the development of transport infrastructure and adequate accessibility of areas. Accessibility is an important element for tourism development. The Polish-Slovak borderland is currently suffering from inadequate routes to the region and cross-border connections because of the mountains. The borderland is characterised by the poor accessibility and bad condition of the roads. Unfortunately, tourism development analyses and studies carried out over recent decades in Poland and Slovakia have not addressed the problems. The aims of the article was to analyse the Polish-Slovak borderland road accessibility and the key transport solutions required for successful road development. The article presents the results of the analysis on road accessibility to the tourist destinations on the Polish-Slovak borderland. Opportunities for enhancing tourist potential through improved road accessibility of the borderland and new road investments are noted. The accessibility of the area was calculated separately for general tourism, and medium-term tourism (long weekends, 2-4 days) in two years: 2010 and 2030.

Key words

road accessibility • road transport • time-based accessibility • tourist development • regional development • demand • isochrones • potential model • Carpathians • Polish-Slovak borderland

Introduction

Spatial interactions result from a range of aspects and reveal the specificities of the interdependence between phenomena and the way phenomena function. As regards tourism, interactions usually occur between the emission areas and reception areas. The interactions are based on transit (transportation). Human mobility refers to the size and frequency of tourist flows and the impact on spatial interactions. Accessibility is an important element for tourism development. Upgrading the transport infrastructure improves the attractiveness of tourist destinations and helps new tourist destinations to be discovered. Increased tourism, including tourist flows, is forcing decision makers to improve transport systems. On the other hand, poor accessibility causes tourists to escape to regions with better accessibility, development, and organisation, and better quality services. Poor accessibility can be the reason for the decline of a tourist region (Sorupia 2005).

There are favourable preconditions for the development of various kinds of tourism on the Polish-Slovak borderland and for stimulating regional development in general. This border, however, is currently suffering from inadequate routes to the region and cross-border connections because of the mountains. The borderland has the least favourable natural conditions for transport and transit through all border sections of both Poland and Slovakia (Podhorský 1996; Zygadlewicz 1997; Komornicki 1999; Więckowski 2004). This is why issues for the cross-border areas concerned should be addressed.

Unfortunately, tourism development analyses and studies carried out over recent decades in Poland and Slovakia have not addressed the problems. The results merely touch on the poor accessibility and bad condition of the roads. The studies on the accessibility of tourist areas are far and few between, fragmentary, and only cover small areas. We tried to fill the gap with detailed

research which was produced in two monographs (Więckowski et al. 2012a,b). This article is an elaboration based on the two, above-mentioned studies. In this article, the most detailed analysis was on accessibility by road. Cars make up the basic means of tourist transport to the Polish-Slovak borderland.

Methods

The first aim of this article was to analyse the Polish-Slovak borderland road accessibility. The second aim was to analyse the key transport solutions required for successful road development. The article presents the results of the analysis on road accessibility to the tourist destinations on the Polish-Slovak borderland. Opportunities for enhancing tourist potential through improved road accessibility of the borderland and new road investments, are noted. The accessibility analysis prepared in the course of the research may serve as the basis for investment- and organisation-related recommendations that should improve the functional connections between the areas.

After presenting some crucial connections between transport accessibility and the main characteristics of the studied area, the authors present the results of road accessibility to the Polish-Slovak borderland. The latter has been divided into several sections, which deal with different points of view as far as scale is concerned, and general external accessibility, and accessibility to tourist destinations and centres, as well as different methods used: isochrones, potential accessibility, demand analysis.

The greatest range of methods could be applied to the accessibility by road (for all detailed needs see Więckowski et al. 2012a). In this article, the research results are for road transport accessibility, because cars are the principal means of transport used by tourists coming to the Polish-Slovak borderland area. The accessibility of the area was calculated separately for general tourism, and medium-term tourism (long weekends, 2-4 days). For

general tourism, time required for access 'to' and 'from' a given destination was used. For the medium-term tourism (the main type of tourism on Polish-Slovak borderland), the potential accessibility analysis and demand analysis were prepared.

External accessibility was primarily researched by using a model of potential accessibility. This model incorporated a number of assumptions (see explanations in Więckowski 2012a) about how the attractiveness of a destination depends on the tourist's perception of the time required for travel. The second method used isochrones to note the accessibility situation in 2010 (all existing roads in 2010) and 2030. The analysis of potential accessibility was carried out in two time spans corresponding to the current condition and to the hypothetical full development of the road system (2030)¹. Only the current population without changes resulting from a natural population rise and (or) migration were taken into account.

The results of the comparison of the situations produced over this time should be interpreted as the maximum improvement attainable in accessibility (due to changes of new road construction). The measurements of internal accessibility concerned the analyses of travel times to selected cities/towns in the Polish-Slovak borderland area. The method using isochrones was similar to the method applied for external accessibility. Next, cumulative accessibility was analysed from the demand perspective (sources of tourist traffic).

¹ For 2030, the implementation of more ambitious infrastructure versions was assumed both in Poland (the planned layout of expressways and motorways corresponding to the Regulation of 2004 amended to include the investment projects added by the new National Spatial Development Concept 2030) and in Slovakia (the development of the motorway and expressway network included in the document entitled "New Plan for Motorway and Expressway Construction" of 2000 with further updates and amendments), as well as in the Czech Republic (according to the resolution of the Government of the Czech Republic no. 741/1999 on transport network development).

The main method chosen for the transport accessibility analysis is the method based on potential accessibility. All inhabitants on the European continent were considered potential tourists, irrespective of the income and mobility of the population. The whole area of Europe, along with the Polish-Slovak borderland, was divided into transport regions in compliance with a traffic engineering methodology developed by technical scientists. There were 133 regions marked out, including 49 in the borderland area; out of this number 25 were in Poland and 24 in Slovakia. Each of these 133 transport regions was given a mass, equivalent to the population living in a given region. This mass was assumed to be the number of potential tourists. Nodal towns in each region were identified. For each nodal town, the travel time from all nodal cities/towns in the Polish-Slovak borderland (49) was calculated in accordance with the traffic speed model.

The function, which describes this phenomenon, is referred to as the distance-decay function. It is an explanatory function used in tourism e.g. by McKarcher & Lew (2003).

For a medium-term tourist who comes to the Polish-Slovak borderland and intends to spend 2-4 days there, the curve of the distance-decay function is no longer a declining curve but resembles a Gaussian curve (Fig. 1). Only for medium and long-term tourist trips is the purpose for travel such that the attractiveness of the destinations is not a decreasing function in respect to increasing travel time. In other words, only a very limited number of travellers who go away for 2-4 days, would be willing to spend a weekend in a locality which is 'only' within a 15-30 minute drive. It was assumed that weekend trips with a destination 45-90 minutes away by car had the highest probability of being chosen. For places whose location requires a drive of more than 90 minutes, the probability of being chosen as a weekend destination decreases. When a ride takes three hours, the probability amounts to 30%, and in the case of 5 hours it is basically close to nil. Very few people decide to travel for 5 hours

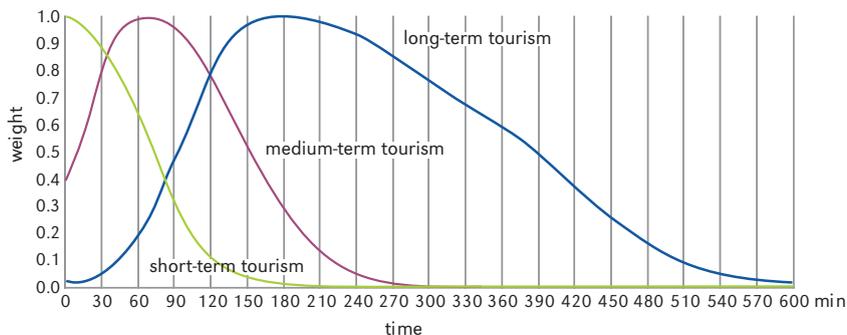


Figure 1. Shape of the distance-decay function depending on the travel time

in a passenger car in order to spend a weekend in the mountains or at the seaside. However, polls have shown that Poles are willing to travel even longer by car to spend a weekend in a place attractive to tourists. The curve has been modulated on using data obtained from the survey (Więckowski et al. 2012a). As shown by research in Western countries, people are willing to spend two to three hours travelling. Beyond this time limit, motivation to travel for leisure purposes drops dramatically. In Poland, due to the bad condition and slow construction of fast traffic roads (motorways and expressways), the acceptable travel time is longer, namely approximately four hours.

The travel time between any pair of transport regions was calculated by applying the method of identifying the shortest travel routes according to Dijkstra's algorithm (Dijkstra 1959). The potential accessibility of a transport region situated in the borderland was calculated using the following index:

$$A_i = M_i f(t_{ii}) + \sum_j M_j f(t_{ij}) + \sum_k M_k f(t_{ik})$$

where:

A_i – accessibility of an i transport region,

M_i – own mass (population size) of an i transport region,

M_j – mass (population size) of a j transport region belonging to the Polish-Slovak borderland,

M_k – mass (population size) of a k transport region located outside the Polish-Slovak borderland,

t_{ii} – time of an internal journey within an i transport region,

t_{ij} – travel time between the transport regions i and j ,

t_{ik} – travel time between the transport regions i and k .

This formula describes the general potential accessibility of 49 communication regions located within the Polish-Slovak borderland. The accessibility index has three parts: own potential, i.e. $M_i f(t_{ii})$, internal potential, i.e. $\sum_j M_j f(t_{ij})$ and external potential, i.e. $\sum_k M_k f(t_{ik})$.

While calculating the external potential, the masses (population sizes) of 84 communication regions situated outside the borderland area were used.

Transport accessibility and tourism

An essential requirement for the development of tourism and most sectors of the economy is the development of a transport infrastructure, and adequate accessibility to the surrounding areas. A transport infrastructure contributes to economic success based on tourism. For a majority of tourists, a good accessibility to a tourist destination is when the area can be reached and explored, quickly, cheaply and comfortably (e.g. by car or using public transport). Prideaux (2000) argues that a destination should be easy to get to and easy to travel around the area. On the other hand, certain recent studies (Celata 2007; Toth & David 2010) indicate that there is no absolute connection between the improvement of geographical accessibility

(when taking into consideration only distance and transportation) and the increase in income from tourism. These studies also indicate that there is a significant difference between the theoretical models of tourism and the actual tourist waves. A number of other studies (Komornicki et al. 2010; Michniak 2010, 2011; Rosik 2012) clearly indicate that nowadays networking and overall regional development must be based on detailed accessibility analyses. Optimisation of the transport system can then be achieved even if there is no direct impact on tourism. In Poland, there are more than a dozen publications that contain summaries and categorisations of indices. These are primarily the works of Taylor (1999), Guzik (2003), and Komornicki et al. (2010), and a paper focusing on the role of new highway investments affecting accessibility in Poland (Stępnik & Rosik 2013). In geographical research in Slovakia, the issue of accessibility was addressed by Kusendová (1996), Tolmáči (1998, 2002), Michniak (2002, 2003, 2006, 2009, 2010a, b, c), Križan (2005, 2007), and Križan and Gurňák (2008). The effects of accessibility to tourism development, though, have been poorly studied. Few studies have been done on this topic and few studies on borderland areas. Road/train and the number of cross-border connections (by bus and trains) was studied by Więckowski (2004), and Michniak (2009, 2010a). The importance of accessibility to tourist regions (the Tatras, Orava and Poloniny) was covered by Michniak (2009, 2010a,c). The only large study on the transport accessibility and tourism of the Polish-Slovak borderland was prepared by a group of authors, and was mentioned in the introduction of this article. They researched accessibility on both sides of the border, and the cross-border relationships between the many types of transport. One of the most interesting papers dealt with accessibility of health resorts only on the Polish side of the border (Guzik & Kołoś 2003). Other interesting studies had to do with accessibility and the tourism function development of Romanian small towns (Bănică & Camară, 2011), and tourism

accessibility in Italy (Celata 2007). Liszewski (1989) applied isochrones to determine potential transport connections to the town of Augustów, Poland. This approach is very useful for determining tourist demand. Knowing the potential number of people within the various isochrones makes planning the size and structure of a tourist base, a more accurate exercise.

The term 'accessibility' may be defined as the ease of reaching a place (region etc.). Accessibility of tourism destination concerns the various possible ways of reaching the tourist destination. A place of recreation qualifies as a tourist destination. Accessibility plays a significant role in the choice of the destination of a planned journey. Accessibility is one of the most important factors in the development of tourist regions. The directions and volumes of these flows are determined by a range of factors, notably: attractiveness for visitors, accessibility by various means of transport, and price. The latter being the factor regulating the exchange rate (Więckowski 2010).

Study area

The research results presented in this article cover the Polish-Slovak borderland corresponding to the area receiving support for the Cross-border Cooperation Programme in the Republic of Poland - Slovak Republic, 2007-2013. The study area encompasses 38,000 km² and has 4.8 million inhabitants. The Polish part constitutes 58.6% of the total area and Polish population account for 68.8% of the residents. The whole Polish-Slovak borderland is located in the territory of the Carpathians. The Polish-Slovak border divides natural homogenous and socio-economic territories which were administered and used for tourism in different ways throughout the last few centuries. The process of connecting these two areas has lasted for almost 20 years thanks to a new transport infrastructure, common initiatives, events, promotion, etc. (Więckowski 2002; Michniak 2011; Lewkowicz 2013).

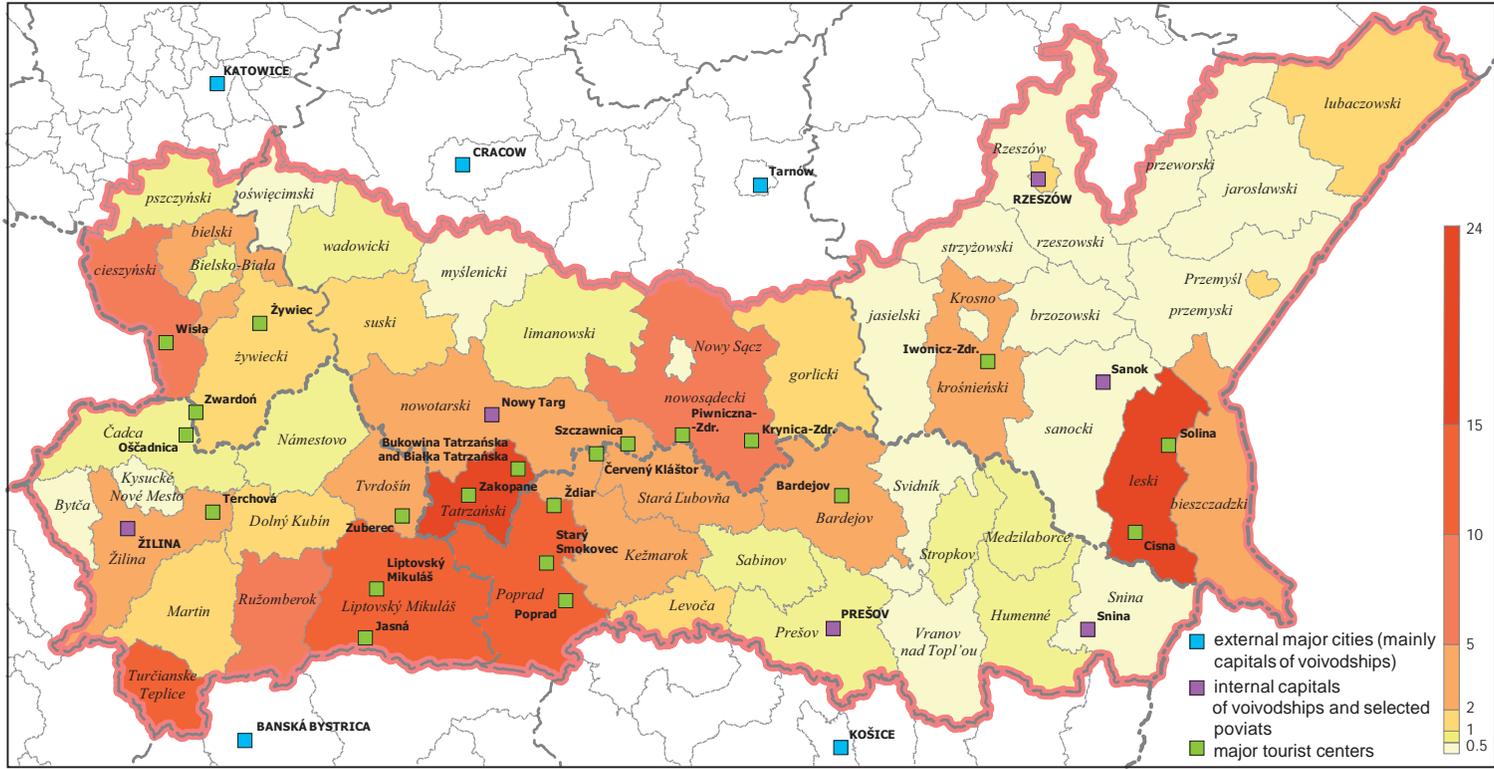


Figure 2. Tourism in the Polish-Slovak borderland by Schneider Index (annual number of overnight stays divided by number of population) by poviats (counties) Based on data of the Statistical Office of the Slovak Republic and the Central Statistical Office of Poland

The significant barrier effect decrease of the state border is a very important factor in the development of tourism (Komornicki 1999, 2002; Ptaszycka-Jackowska & Baranowska-Janota 2003; Ptaszycka-Jackowska 2007; Więckowski 1999, 2004, 2010). Currently tourism plays one of the most important roles in the economy in the Polish-Slovak borderland. The main development of borderland tourism is due to the potential benefits of the natural environment (Warszyńska 1971, 1985; Groch & Kurek 1995; Michniak 2010b; Zawilińska 2010, 2013). The varied topography, the climatic conditions (the number of days with snow cover), forest cover, surface water and groundwater – including mineral and thermal waters which contribute to the development of spa and health tourism in some centres, are all part of the high aesthetic value of the country. The national and landscape parks, along with other areas protected by law, help preserve the natural environment (Więckowski 2004, 2013; Zawilińska 2013). The borderland is also rich in terms of cultural heritage (cultural-historical monuments, museums, folk traditions, art and skills). A large number of these types of events is organized for visitors to the borderland.

Recreational and active tourism dominates on the Polish-Slovak borderland (relaxation and hiking). In particular, mountain hiking and climbing, cyclotourism, and water sports abound. Sailing on the lakes and canoeing in the mountain rivers is popular. In recent years, hipotourism has been developing as well. Cultural tourism includes sightseeing, pilgrimages, and the discovery of cultural heritage. Cultural tourism is popular in rural areas and in areas with valued nature rural tourism; mainly agritourism. Congress tourism and business trips (e.g. the Economic Forum in Krynica-Zdrój, Poland) play a secondary role in the Polish-Slovak borderland. An important kind of tourism, also undervalued, is tourism connected with the attendance of various events. Shopping and transit tourism are also important in the vicinity of the state border.

The number of tourists on the borderland reaches 3.2 million a year. According to some estimates, this number is even higher and may reach 5 million. The number of tourists on the Polish part of the borderland exceeds 2 million per year, more than 85% of them citizens of Poland. The Slovak part of the borderland was visited by almost 1.27 million visitors in 2010. Domestic visitors made up almost two thirds of the visitors (65.9%).

On the Polish as well as on the Slovak side, the tourist flow is concentrated mainly in the Tatra region. Other frequently-visited regions are Pieniny (including rafting), the Nízke Tatry, the Malá Fatra, the Veľká Fatra and the western part of the Beskides – mainly on the Polish side (the Beskid Śląski and the Beskid Żywiecki) (Fig. 2).

Poor accessibility is one of the most important reasons for the different spatial distributions of tourist traffic. Problems with accessibility are caused by the long distance to tourist centres as well as an insufficient transport infrastructure. Such an infrastructure does not make it easy to cross the Polish-Slovak border (this concerns mainly its eastern part). Analysis concerning the improvement of tourism on the Polish-Slovak borderland has shown that the improvement of accessibility, and providing convenient transportation modes, are the most important factors to be taken into consideration.

External road accessibility

The present-day situation of the border areas threatens the development of the areas. The Polish-Slovak borderland is situated on the periphery of the European Union. According to many studies and authors, this borderland is perceived as a peripheral one with a low accessibility level (Vickermann 1995; Spiekermann et al. 2002, 2011; Tóth & Kincses 2011; Więckowski et al. 2012a). The values of the potential accessibility index investigated with the ESPON spatial arrangement at the NUTS3 level are low for the units situated on both sides of the border. Therefore, the differences in the accessibility levels of the

Polish and in the Slovak parts of the area are minimal. According to European research, the western part of the area is more accessible. This accessibility decreases towards the east, both in Poland and in Slovakia. Thus, the concentric distribution of potential accessibility is maintained in respect to the economic nucleus of the European Union. The better accessibility of the western part of the area was also determined by investment projects carried out outside the area of the Polish-Slovak borderland. Evidence for this finding is provided by the changes in the level of the all-European index determined in the years 2002-2006 (Spiekermann & Schürmann 2007). Research done for the Fifth Cohesion Report of the European Union shows that the potential for improving accessibility, as a result of transport investment projects in the entire study area, lies in one of the zones with the highest rated potential in the European Union (the so-called low base effect) (European Commission 2010: 56).

The position of the Polish-Slovak borderland within the European transport system is not advantageous as a result of historical conditions and because of the mountains. Thus, the transport accessibility may seem to be a key factor for the development of many economic functions. Tourism is the function which attracts the highest interest. The position of the analysed territory within the national transportation systems of Poland and Slovakia is a bit better. In recent years, there has been an improvement of the borderland's position in the transport system. This improvement was due to those investments in the transport infrastructure implemented outside the analysed territory of the borderland (e.g. A4, S7, S69, S19, D1). This particularly concerns Poland, where there was a relatively low number of big projects implemented in the borderland. One example of the investments is the S69 expressway going through Zwardoń and Skalité. Concurrently, the construction of the West-East motorway routes (namely the A4 motorway on the Polish side and the D1 motorway on the Slovak side) is sig-

nificantly improving European accessibility to the borderland.

External isochrone accessibility

It was assumed in the study that time accessibility (the isochrone map) of the Polish-Slovak borderland is identical with the accessibility of the state border itself. In the event of an even distribution of the road network across a given area, the isochrones should take the shape of ellipses arranged along the east-west axis. Deviations from such an arrangement testify to the existing irregularities in the infrastructure quality. A high concentration of isochrones on the eastern side of the analysed area is caused by the spatial barrier presented by the border with the Ukraine. Moreover, in the close vicinity of the Polish-Slovak borderland, the arrangement of the isochrones is partly disrupted by orographic factors.

Directions of better accessibility to the borderland may be regarded as 'access channels'. They are primarily visible to the west of the study territory. The most distinct, by far, are four channels - those through Bratislava, Prague, Wrocław, and Łódź. The general differences in the travel time to the state border from the north and from the south are insignificant. Taking into account the previously mentioned orographic layout, this means, however, that there exists a relatively better infrastructure on the Slovak side. Particularly visible is the lack of external access channels towards Warsaw and Budapest, which beside Vienna are the largest metropolises located 500 km from the study area (Fig. 3.).

Access to the study area by means of the road network is 'channel-based'. There are access channels from the south-west, west, and north-west. The lack of such channels from the north (Warsaw) and from the south (Budapest) is clearly visible. It was pointed out that the accessibility of the study region from Warsaw (Fig. 4) is relatively poor. The travel time from the capital of Poland to the Slovak part of the borderland will still exceed

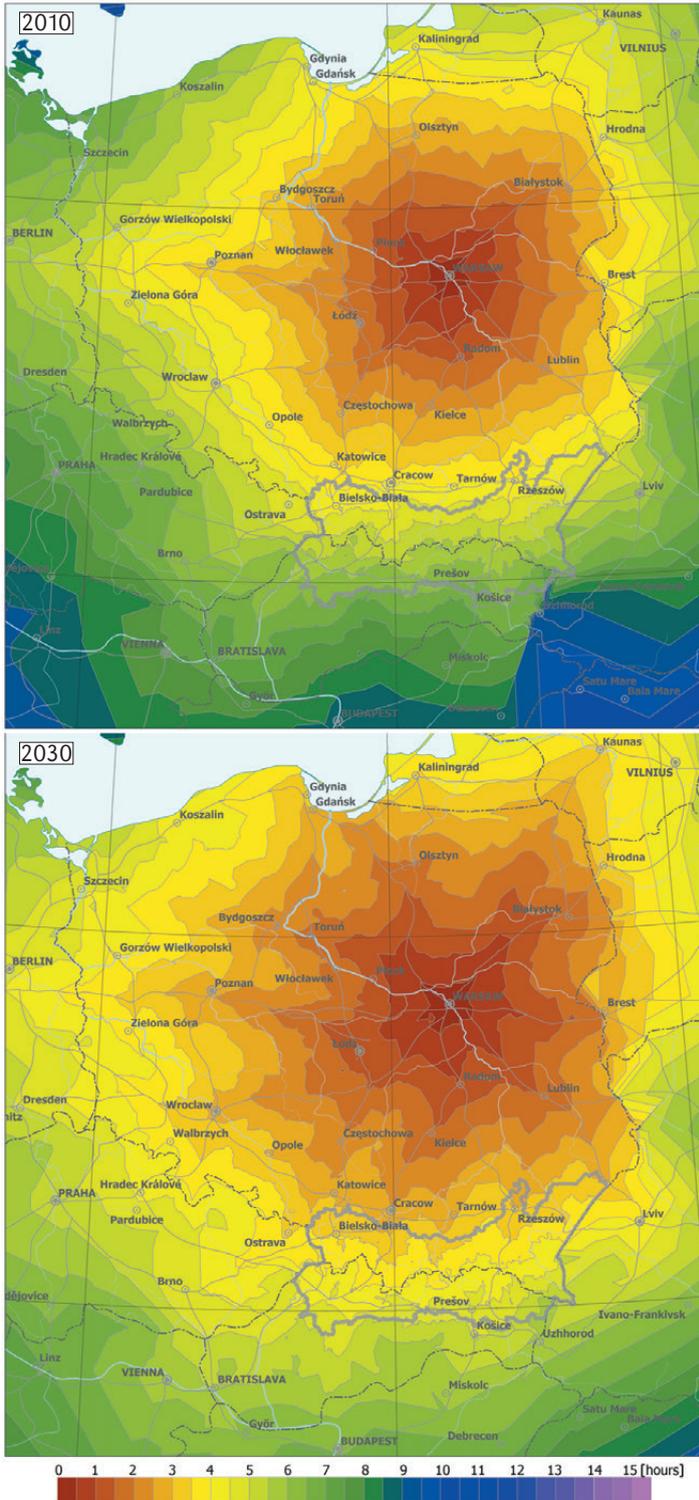


Figure 4. Isochrones from Warsaw, 2010 and 2030

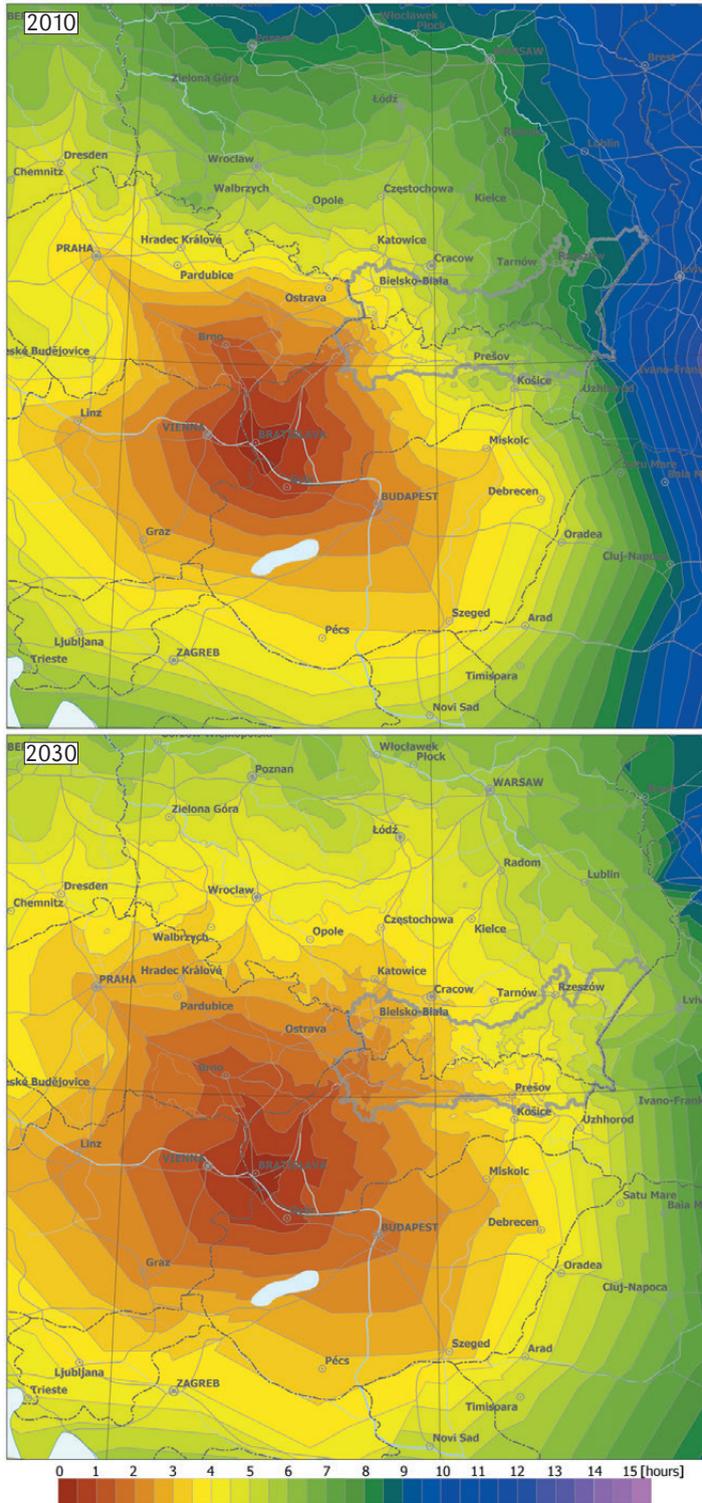


Figure 5. Isochrones from Bratislava, 2010 and 2030

External potential accessibility in 2010 and 2030

The distribution of short-term potential accessibility remains determined by location to large urban centres. The centres refer mainly the Upper Silesian conurbation, Cracow, and to a lesser extent, also Bratislava. In practice, the transport conditions in the entire eastern part of the study area are unsuitable for the development of short-term tourism.

The differences in the potential accessibility of the study area described above are also visible in the case of medium-term tourism, though obviously in a milder form (Fig. 6). Nevertheless, Zakopane has a better potential tourist base than Poprad or Wysoké Tatry. On the other hand, the south-western part of the area has a noticeably improved potential owing to the influence of the population potential of Bratislava and Vienna. The value of the index decreases at a steady rate towards the east on both sides of the border. The transport distance to these areas also remains a significant barrier, even for longer trips. The changes in medium-term tourism are less spectacular (Fig. 6c) and still have slightly more of an effect in the Slovak part of the study area. There is, however, a decided increase in the index value noted in the eastern Polish part of the borderland, especially in the Bieszczady Mountains and in the region of Przemyśl and Lubaczów.

Accessibility of tourist destinations and its changes as a result of road investments

Owing to the use of a multi-criteria analysis it is possible to show the complexity of the phenomenon and to draw conclusions from various points of view, e.g. in respect of tourist destinations, tourists as well as the expected human pressure, especially in areas of natural value. Conclusions may also be formulated concerning the transport (accessibility) determinants related to the development of various kinds of tourism and to competi-

tiveness – both between destinations and between countries.

To research the accessibility of particular localities, 27 towns as well as tourist destinations located in the borderland area were selected. In addition, 5 large cities in the vicinity of the area (Katowice, Cracow, Tarnów, Banská Bystrica, Košice²) were also taken into account. In total, the analysis involved 32 localities – 17 in Poland and 15 in Slovakia.

Table 1 presents the total influence of road investment projects on the accessibility improvement in the poviats and regions with the most important tourist centres of the Polish-Slovak borderland.

The completion of the investment projects which are currently being carried out on the Polish side of the border will bring the largest benefits to the centres situated in the eastern part of the study area (e.g. Iwonicz-Zdrój, Cisna, and Solina). On the Slovak side, on the other hand, the beneficiaries will include the sub-Tatra centres (Liptovský Mikuláš, Jasná, Starý Smokovec). The largest differences in the level of potential accessibility between the distribution of motorways and expressways proposed in this study (the 'extended' variant of 2030) and the one provided for in government ordinances, occurs in the poviat centres of Nowy Sącz (Krynica-Zdrój and Piwniczna-Zdrój) in Poland and in the town of Bardejov in Slovakia. These towns would benefit relatively little from the officially planned investments. For each of them, the possible construction of the Tarnów-Nowy Sącz-Prešov expressway would result in a considerable improvement in spatial accessibility. The effect of opening the Polish-Ukrainian border would be seen primarily in the eastern part of the Polish-Slovak borderland, namely in such centres as Iwonicz-Zdrój, Cisna, and Snina, and to a lesser degree, also in the central part (Bardejov, Krynica-Zdrój).

² Additional cities/towns were selected because they are important destinations (for example, for administrative reasons) to the Polish-Slovak borderland. These additional cities/towns are also considered to be places generating tourist traffic.

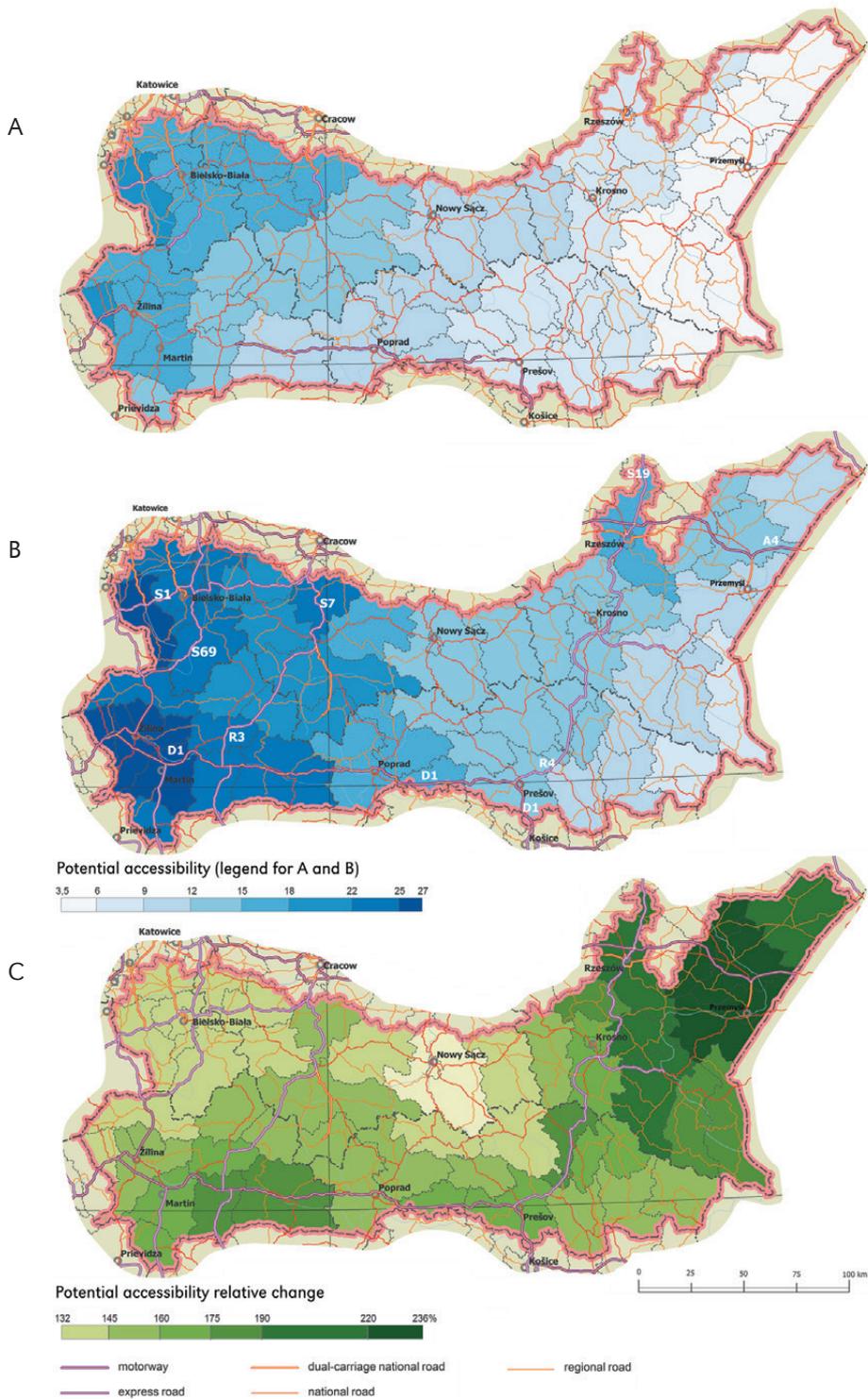


Figure 6. Potential road accessibility for medium-term tourism in 2010 (A) and in 2030 (B) and the potential road accessibility changes for medium-term tourism from 2010 to 2030 (C)

Table 1. Changes of potential accessibility for medium-term tourism on the Polish-Slovak borderland for the period 2010-2030 (%)

Country	Powiat (county)	Tourist localities	Changes in the level of potential accessibility for medium-term tourism compared to 2010		
			government variant (2030)	extended* variant (2030)	extended* variant (2030) taking into account the opening of the Ukrainian border
Poland	cieszyński	Wisła	36.6	38.1	38.3
	krośnieński	Iwonicz-Zdrój	65.5	66.5	80.2
	leski	Cisna Solina	92.2	104.5	144.9
	nowosądecki	Krynica-Zdrój, Piwniczna-Zdrój	28.5	71.2	75.1
	nowotarski	Szczawnica	50.6	52.2	52.9
	tatrzański	Bukowina Tatrzańska and Białka Tatrzańska, Zakopane	55.1	56.9	57.4
	żywiecki	Zwardoń	45.2	47.0	47.3
Slovakia	Bardejov	Bardejov	47.0	63.0	66.5
	Čadca	Oščadnica	39.1	40.9	41.0
	Kežmarok	Červený Kláštor	62.7	69.0	69.7
	Liptovský Mikuláš	Jasná Liptovský Mikuláš	93.8	94.4	94.6
	Poprad	Ždiar Starý Smokovec	63.6	67.1	67.5
	Snina	Snina	53.6	56.7	61.4
	Tvrdošín	Zuberec	57.3	57.3	57.7
	Žilina	Terchová	47.6	49.4	49.4

*extended 2030 variant: all two-lane expressways and the possible construction of the Tarnów-Nowy Sącz-Prešov expressway.

It should be stated that for the majority of the centres examined, the most important large road investments are: the Slovak D1 motorway (full length) and the traffic route of the S7 and R3 expressways – together with the Rabka-Zakopane branch (Tab. 2). Other routes are less significant. Among the shorter sections, the potential S50 expressway from Cracow to Bielsko-Biała will play an important role. The analysis also confirmed the effectiveness of the possible Kielce-Tarnów-Prešov route for the health resorts in the region of Nowy Sącz and for the town of Bardejov. The existing centres (both Polish and Slovak) will benefit less from the Polish A4 motorway

and the S19 and R4 expressways, with the exception of the localities in the Bieszczady Mountains (Tab. 2).

Generally speaking, for the western part of the borderland, the road investments to be implemented on the Polish side are more important, and this is also true for the Slovak side. In the Tatra region, these proportions are more equally balanced. Towards the east, there is a change in favour of the possible completion of the road investments in Slovakia; in particular, the D1 motorway. Moreover, the policy of tourist centres does not always include the increasing number of visitors.

Table 2. Transport investment priorities for selected tourist centres to improve of their spatial accessibility

Country	Powiat (county)	Tourist localities	Transport investments priorities	
			1st rank	2nd rank
Poland	cieszyński	Wisła	S50	A1
	krośnieński	Iwonicz-Zdrój	S19/R4	D1
	leski	Cisna Solina	S19/R4	D1 i A4
	nowosądecki	Krynica-Zdrój Piwniczna-Zdrój	Kielce-Prešov	D1
	nowotarski	Szczawnica	D1	S7/R3/R1 with a branch to Zakopane
	tatrzański	Białka Tatrzańska and Bukowina Tatrzańska Zakopane	D1	S7/R3/R1 with a branch to Zakopane
żywiecki	Zwardoń	S69/D3	S50	
Slovakia	Bardejov	Bardejov	D1	S19/R3/R1
	Čadca	Oščadnica	S69/D3	S50
	Kežmarok	Červený Kláštor	D1	S7/R3/R1 with a branch to Zakopane
	Liptovský Mikuláš	Jasná Liptovský Mikuláš	D1	S7/R3/R1 with a branch to Zakopane
	Poprad	Ždiar Starý Smokovec	D1	S7/R3/R1 with a branch to Zakopane
	Snina	Snina	D1	S19/R4
	Tvrdošín	Zuberec	S7/R3/R1	D1
Žilina	Terchová	S69/D3	D1	

The most accessible tourist centers according to the demand analysis

The demand analysis was carried out on the basis of the population size available within 2-3 hour isochrones for the alternative road network development of 2010 and 2030. Twenty-seven selected tourist destinations were analysed (extended analyse see also Śleszyński et al. 2014). The size of the market for short-term and medium-term tourism was determined for the 2 and 3-hour isochrones. In 2010, the largest population groups, within time distances of both up to 2 and up to 3 hours from the examined destinations were found in the localities situated in the western part of the borderland (Wisła, Żywiec, Żilina). After the completion of all roads, the largest

population potential will be that of Żilina, then Wisła and Terchová (within the 2-hour isochrone), and Żywiec and Liptovský Mikuláš (within the 3-hour isochrone) (Fig. 7).

The benefits enjoyed by the localities in 2030 will be considerable. For the 2-hour isochrones, the changes in the absolute values range from 0.4 million (Cisna) to 6.6 million (Żilina), while the percentage changes range from 23% (Cisna) to 180% (Liptovský Mikuláš). For the 3-hour isochrones, the analogous changes range from 1.6 million (Cisna) to 14.1 million (Liptovský Mikuláš), and from nearly 30% (Cisna) to 142% (Jasná) (Fig. 8).

Expanding the road infrastructure can cause changes that will benefit the development of the western part of the borderland and of the Tatra region. The destinations in Slovakia will benefit the most. The expanded motorway will benefit the most. The expanded motorway in Slovakia (Bratislava will be included within

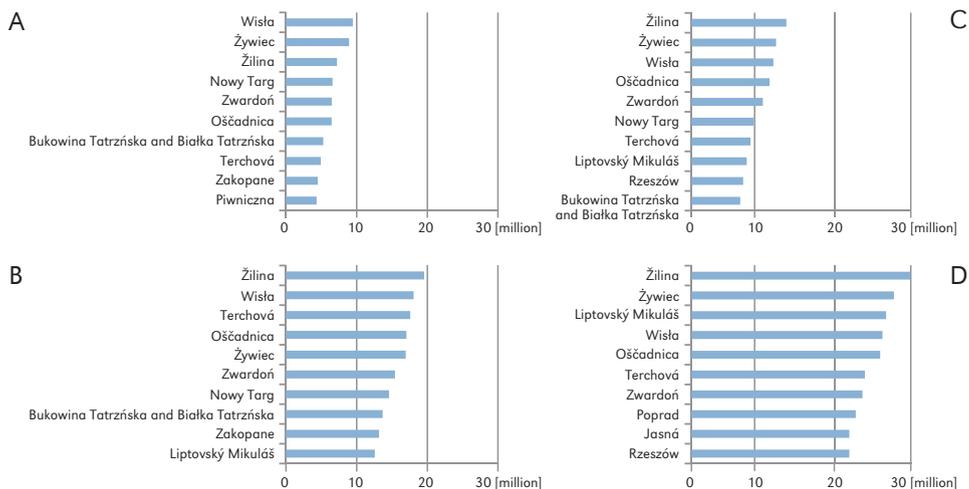


Figure 7. Destinations with the highest population potential within the 2-hour isochrone (A – 2010; B – 2030) and the 3-hour isochrone (C – 2010; D – 2030)

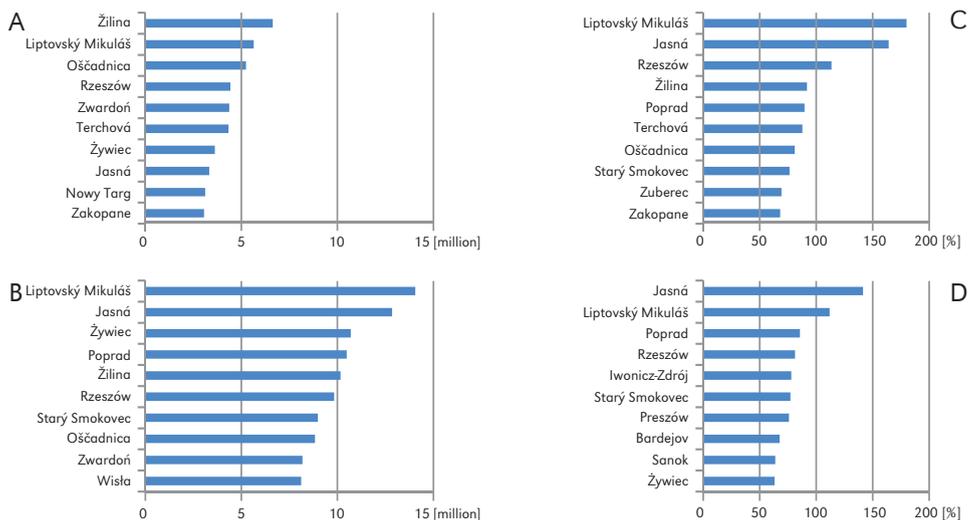


Figure 8. Destinations with the largest changes in population potential between 2010 and 2030 (absolute value: A – 2-hour isochrone, C – 3-hour isochrone) and the percentage increase (B – 2-hour isochrone, D – 3-hour isochrone)

the 3-hour isochrone) and the expressways to Poland will significantly increase the number of Poles within reach of the 3-hour isochrone. The greatest beneficiaries on the Slovak side will be Žilina and Ošadnica, Liptovský Mikuláš, Jasná, and Poprad. On the Polish side, Żywiec, Zwardoń, Rzeszów and Iwonicz-Zdrój may benefit the most from these changes. The

smallest increase in the population size within the 2-hour and 3-hour isochrones will be noted in the destinations located in the east of the borderland (Cisna and Snina). This may, on the one hand, influence the continued peripheralisation of the area, but on the other hand it may result in less tourist pressure in these attractive areas.

At present the pressure on areas of natural value is considerable and is bound to increase after construction of the planned roads. The most attractive and heavily promoted places are mainly the Tatra National Park and the Pieniny National Park. The already intense tourist traffic in the vicinity of these parks may become even more intense. Some projects will bring about a significant increase in the population potential.

Particularly important may be the dramatic increase in the number of potential tourists within the 4-hour isochrone. These would primarily be those people who can often come for short-term and medium-term stays (Fig. 9).

families with children, the majority of the working population prefers a higher number of shorter stays lasting a weekend or a long weekend. There is a global trend towards a decline in the average length of a tourist stay. This decline has also been documented in the Polish-Slovak borderland. Weekend tourism, regardless of the season, is more likely to be developed in the western part of the borderland, in terms of potential availability.

Transport accessibility, diversification, and competitiveness are important factors influencing the development of tourism. A proper investment policy may constitute an effective tool for various territorial policies. From the

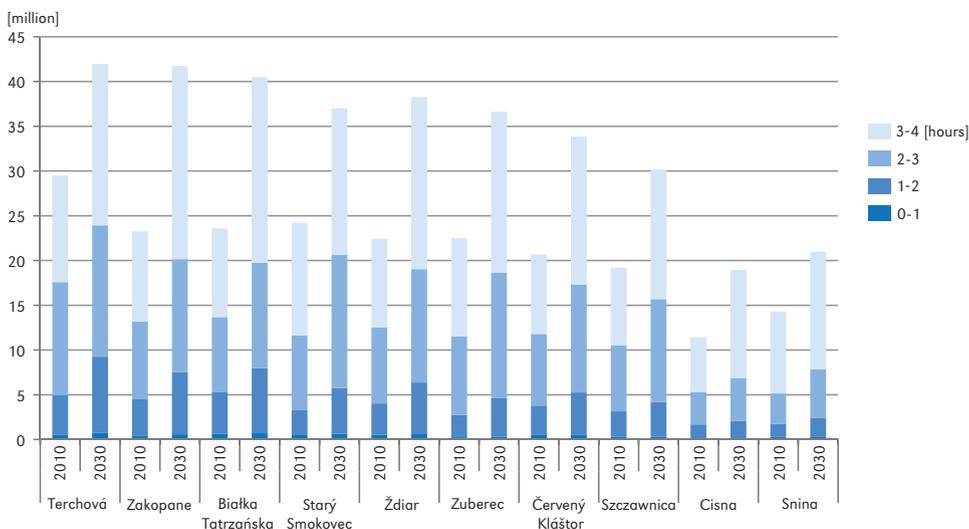


Figure 9. Population number within the 1-4-hour access isochrones of the tourist destinations neighbouring the Malá Fatra National Park (Terchová) the Tatra National Park (Zakopane, Biłka Tatrzańska, Zuberec, Starý Smokovec, Ždiar), the Pieniny National Park (Szczawnica and Červený Kláštor), the Bieszczady National Park (Cisna), and the Poloniny National Park (Snina), in 2010 and 2030

Conclusions

The gradual change in lifestyle of contemporary society towards greater flexibility and speed impacts the change in tourist preferences and behaviour. Tourists want to more efficiently use of their free time on recreation and entertainment. Despite the fact that the one-week vacation model (either winter or summer ones) still persists, especially for

point of view of accessibility within the European context, the Polish-Slovak borderland is located in the peripheries of the continent. This borderland is relatively far from the capitals of both countries. The research presented in this study shows that road accessibility (travel time) to the borderland from the most significant cities generating tourist traffic is varied but in most cases quite poor. Currently, many locations, which are

a source of tourist demand (e.g. large cities, such as Warsaw, Bratislava, Gdańsk, Poznań) have easier and better transport connections to many places elsewhere in Europe (by plane) than to the Polish-Slovak borderland. From these cities, the distance to the Polish-Slovak borderland is very long; from at least 5 hours to even 7-8 hours. This may result in a massive escape of both foreign and domestic tourists to destinations located abroad. The stagnation or decline in tourist flows may lead to an economic recession of the vast borderland areas. Internal factors alone, are not enough for these areas to prosper.

The actual impact of particular transport projects on the improvement of accessibility may vary considerably depending on their geographical scale and on the types of tourism. The change in the time accessibility of the border itself, as well as of the accessibility from particular metropolises, which generate tourist traffic, is significant from the point of view of competitiveness. In this respect several conclusions should be drawn. Within the context of Europe the area examined is more accessible from the south-west, west and north-west. On the other hand, a scarcity of modern infrastructure is evident in the northerly corridor (central and northern Poland, including Warsaw) and the southerly corridor (Budapest). It should be emphasised here that accessibility from central and northern Poland is particularly significant, since it is only from these areas that the access time to other highland regions (the Alps) is clearly longer than the access time to the Carpathians. This accounts for the competitive advantage that is held by the ski resorts in the Polish-Slovak borderland. Secondly, the analyses show that the development of infrastructure and the resulting increase in accessibility will be quicker on the Slovak side of the borderland. In particular, the western and central part of the borderland is not treated as marginally as is the case with the Polish areas of the Carpathians. Therefore a rather pessimistic conclusion may be formulated at this point. Despite the investment process, the Polish-Slovak border

will, within several years, become an infrastructural barrier to a relatively higher extent than it is at present. Due to development of the highways in Poland and Slovakia external accessibility to the borderland will appear but inside (especially in cross-border meaning) the region it will stay at the same level as today.

The transport infrastructure, predominantly running along a north-south axis, also does not show any quantum change at the border. Development of weekend tourism in the Slovak part of the borderland will depend largely in the coming years on completion of the motorway network, particularly D1 motorway as well as other north-south connections such as D3 motorway, S69 expressway and R1/R3/S7 and R4/S19 expressways. In the Slovak part of the central borderland the development of infrastructure consists primarily of expanding the base for Polish tourists on weekend or other short-term visits. In the eastern part of the area examined, on both the Polish and Slovak side, the development of 'large-scale' infrastructure is a condition and necessary precedent for the further development of all kinds of tourism. Crucial in this case is the completion of the A4 and D1 motorway sections leading to the Ukrainian border as well as ensuring that construction of the Rzeszów-Košice-Miskolc expressway (S19 and R4) be completed.

For internal accessibility, i.e. for mobility within a given area, the construction of new roads with high traffic standards is important, which should result in an increase in the average travel speed (by-roads, improvement of technical and operational parameters). Although this is not readily translated into a significant improvement of travel time, it has a decisive impact on driving safety and convenience.

Road construction or upgrades may stimulate the inflow of tourists but also generate some threats. There will be excessive congestion and concentration of traffic, especially during long weekends and holidays. There will also be excessive pressure on the natural environment.

Regional planning should focus on the dispersion of investments, especially of commercial tourist facilities. Such investments should have strong attraction power, e.g. aquaparks, ski resorts. This would allow such facilities to intensify their management and focus on tourism, improvement of the product range, and decentralisation of the intensity of tourist traffic (see explanation concerning the concentration of the tourist flow and their consequences Kistowski & Śleszyński 2009; Więckowski et al. 2012a). When planning the road network, it is essential to respond to various kinds of internal demand connected not only with tourism but also with commuting to work and educational travel. This will create particular advantages for sub-regional centres such as Rzeszów, Nowy Sącz or Poprad, which contain the largest job markets.

It is equally important to stress that accessibility must not be seen as a panacea for the improvement of tourism development. Tourist potential alone, without sufficient tourist and transport infrastructure, will not ensure socio-economic growth. It merely creates a potential opportunity for such development. Therefore, it is essential to assess the accessibility of the regions and tourist centres in the Polish-Slovak borderland both by country and in cross-border terms. As a rule, growing or improving accessibility enhances attractiveness, increasing tourism flows in many tourist regions. Poor or declining accessibility may lead to the marginalisation of towns and

whole regions, hindering or completely blocking economic growth. Such a result would mainly concern public transport, and would hardly permit the tourist areas on both sides of the Polish-Slovak border to be explored. Meanwhile, public transportation is crucial to ensuring sustainable development within naturally valuable areas.

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