

SOCIAL, ECONOMIC AND CULTURAL ASPECTS OF TRANSPORTATION ACCESSIBILITY IN MOUNTANIOUS AREAS, ON THE EXAMPLE OF TATRA COUNTY, POLAND

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Abstract

Social, economic and cultural aspects of transportation accessibility in mountainous areas, on the example of Tatra County, Poland

In this article, spatial variations both in local and regional transportation accessibility are looked at through the lenses of the social, economic and cultural environments of Tatra County. A number of methods are applied in the analysis of daily links, prices and travel time to the county capital. A comparison between local, private carriers and the National Bus Company (PKS) is made to illustrate the ongoing economic processes and their effects in this mountainous region. Also, a relationship between the Podhale, Spisz and Orawa social regions and transportation accessibility is presented as an example of certain cultural determinants of the latter. As such, this study contributes to the understanding of mobility problems in mountainous touristic areas.

Key words

accessibility, mountainous areas, Tatras, transportation services

1. Introduction

There are many factors that affect the accessibility of mountainous areas. In addition to the major role played by the natural environment (land relief in particular), there are social, economic and cultural factors that exert such large influences upon transportation accessibility that they must be taken into account.

A number of previous studies have concerned themselves with the accessibility of particular site types in Poland, such as cities (Sobczyk 1985, Ratajczak 1992, Wendt 2000), rural areas (Taylor 1999), and whole regions, such as Polish provinces (Lijewski 1962, Kozanecka 1995, Kozłowski 2003). Less attention has been paid to the accessibility of mountainous areas, albeit some relevant research has been conducted in the Beskid Śląski (Dziadek 2001, Jeż-Pawlak 2002).

Transportation accessibility in Tatra County affects two groups of people: the local inhabitants and tourists. This first group is densely but unevenly distributed across the county (140 persons/km² in 2008, as compared to 124 persons/km² for all Poland), ranging from 323 persons/km² in the town of Zakopane to 25 persons/km² in Witów, a village mostly located within Tatra National Park. Zakopane is the largest town in the area, with a total population of 26,929 inhabitants. A majority of those present in Tatra County, (especially during the summer and winter months), consists of tourists, the annual number of which reached 2.5 million in 2007. Both inhabitants and tourists create a demand for transportation services, and, in turn, a social aspect of transportation accessibility, as the ease of access for the two groups is a factor in determining standards of living and recreation. Bus routes supplied by the National Bus Company (PKS) and local and regional entrepreneurs answer this demand. The private entrepreneurs mostly use minivans to provide transportation services within Tatra County, with charter buses serving routes that extend throughout Małopolskie Province.

According to B. Górz (2003), the large supply of private transportation in the Tatra Mountain region during the early 1990s, which greatly exceeded the demand, was due to the high unemployment rate in Poland at that time. This surplus gradually overwhelmed Tatra County. As a result, there has been continual competition between the National Bus Company and private entrepreneurs in the area, especially since the late 1990s, when the former began to gradually be privatized. Another reason for this surplus is the poor extent to which the local government can exert control over transportation providers. Under the current laws there are not many ways to deny an applicant a license to render transportation services (Szczerbaciuk 2008).

Finally, cultural aspects of accessibility are connected with the historic region of Podhale. This is the ancient home of the Górale ethnic group, whose traditions, habits and other cultural features affect their transportation decisions. In the same vein, people living in the adjoining regions, the Spisz and Orawa, do not have a strong historical relationship with Zakopane and may not have any desire to travel there.

Many aspects contribute to the disparities in transportation accessibility in this relatively small county. The main goal of this paper is to present how the above-mentioned aspects affect the accessibility of particular villages on the local level, as

well as the accessibility of the town of Zakopane and its surroundings on the regional level.

2. Setting and dataset

Tatra County is located in southern Poland: in fact, it is the southernmost county of Małopolskie Province, and encompasses an area of 472 km², making it the 15th largest of the province's nineteen counties (Central Statistical Office 2008). The county consists of four rural - Biały Dunajec, Bukowina Tatrzańska, Poronin, Kościelisko - and one urban municipality - the town of Zakopane. Each municipality is divided into several villages, all of which are twenty-three in total (Fig 1.). The largest villages are those whose boundaries extend to the Tatra Mountain ridges (e.g. Witów 65 km², Kościelisko 54 km²), while the smallest are located in the north of the county, resting in the mountains' foothills (Gliczarów Górny 3.9 km², Bustryk 4.2 km²).

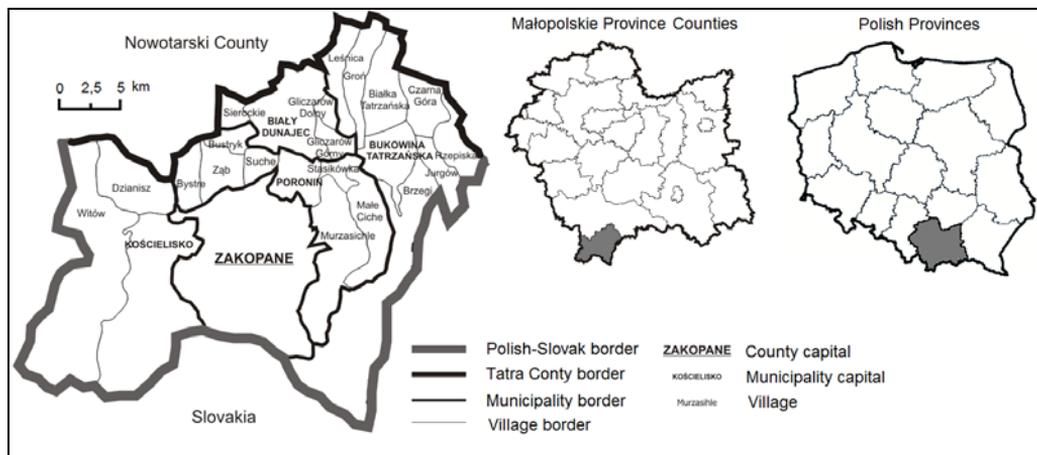


Fig. 1: Location of Tatra County and its administrative divisions in 2008.

Source: author's work based on administrative and touristic maps.

Different forms of infrastructure, particularly roads, are required before transportation can exist in any region. Tatra County contains all road types currently defined by Polish code (article 103 of the Introductory Code of Public Administration Reforms), including: state, regional, county and village roads (Fig. 2). The two most important of these are State Roads no. 7 and 47, together commonly called "Zakopianka" which stretches between Cracow and Zakopane. "Zakopianka" is notorious for heavy traffic, especially during the summer season, which negatively affects travel times.

The only other state road in Tatra County runs through the eastern side and leads to the border crossing in Jurgów. There are significantly more regional roads in the county, which are distributed longitudinally and connect municipality capitals. Road density is a crucial aspect of spatial accessibility, as it determines which means of transportation to particular villages and touristic sites can be utilized, and how often. This density varies from 0.5 km/km² or less (Witów, Brzegi) to 1.6-1.7 km/km² (Zakopane, Gliczarów Górny), with an average of 0.9 km/km² for the whole county.

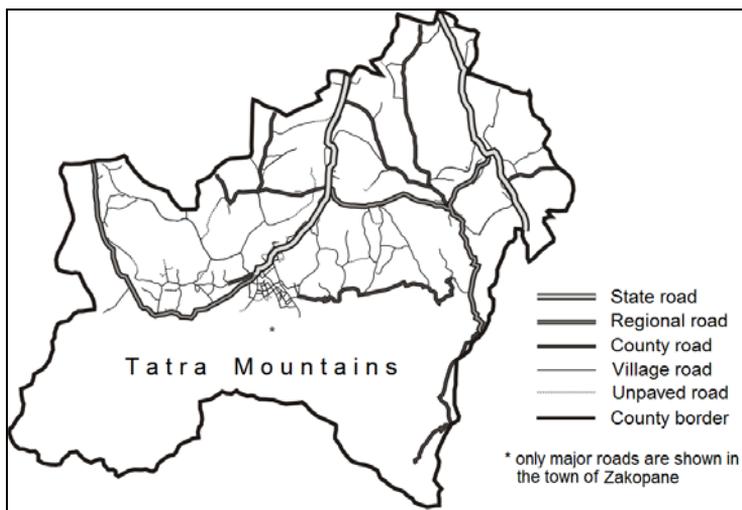


Fig. 2: Road network in Tatra County in 2008.

Source: author's work based on administrative and touristic maps.

Accessibility is sometimes confused with similar notions, namely availability and affordability. In response to this confusion, a number of scientific works have striven to effectively distinguish the terms from each other (Joseph Philips 1984, Guagliardo 2004, Bagheri et al. 2005). For example, Unal et.al (2007) regard both accessibility and availability as spatial in nature, but define availability as the adequacy of the supply inside a region while accessibility is the lack of travel impedances to providers outside the region.

Warakomska (1992) classifies the accessibility of a transportation network as the distance (physical, time, economic, virtual etc.) from a base point to the nearest road that travels to the destination point. In this paper, transportation accessibility is defined to extend beyond just space (e.g. distance, natural barriers) and incorporate social needs and expectations (e.g. low travel time, number of links, frequency of departures, relative expense) and economic issues (e.g. ticket prices, travel costs per km, opportunity costs).

The data used was, in part, extracted from bus timetables collected annually by the Transportation Department of Tatra County in Zakopane. Additional data was retrieved from the websites of the main transportation companies that serve Zakopane. Finally, the National Timetable (www.autobusowyrozkladjazdy.pl) and Regional Bus Station of Cracow (RDA) websites provided data concerning regional bus networks.

3. The Social and Economic Impacts of Accessibility in Tatra County

As they live in one of the most aesthetically attractive places in Poland, the local inhabitants of Tatra County are forced to coexist with the countless tourists who visit the region throughout the year. This situation gives rise to constant conflict, as too many people want to use the both spatially and qualitatively limited resources of the mountains. At the same time, though, locals always look forward to the arrival

of the tourists, as they are an indispensable source of income, using and paying for the many services available in the area. The transportation sector in Tatra County enables tourists to access their desired locations, local people to reach essential services (such as trade, administration, education, health, etc.), and local entrepreneurs to attain a satisfactory income.

3.1. Impact on the Social Environment

A prerequisite to good accessibility is the high availability of transportation links existing in a locality. As soon as convenient transportation services are supplied to an area, those living in that area are provided with the opportunity to travel to other destinations. In Tatra County, equity within the transportation services, especially among the smallest villages, is one of the goals of the local and regional authorities (Tatra County Development Vision 2007-2013, Małopolskie Province Development Plan). A lack of bus services in an area forces those who wish to go to and/or from that area to walk, ride a bike, or buy a car, all actions which deplete their time budgets and monetary supplies.

In addition, any significant distance to the closest transportation services and subsequent lack of choice in provider and link times doubly disadvantages the local inhabitants of poorly served areas (Haynes et al. 2003). In the case of transportation accessibility, the easiest way to measure the lack of choice presented above is to relate it to the frequency of bus departures during the day. This issue is depicted in Figure 3 for both public and private transportation.

Most of Tatra County's villages have excellent access to Zakopane, though there are some without any connections to this county capital at all (Rzepiska, Groń, Leśnica). It is clearly visible that there is a scarcity of public bus transportation, which, due to economic problems and competition, has been in steep decline during last few years.

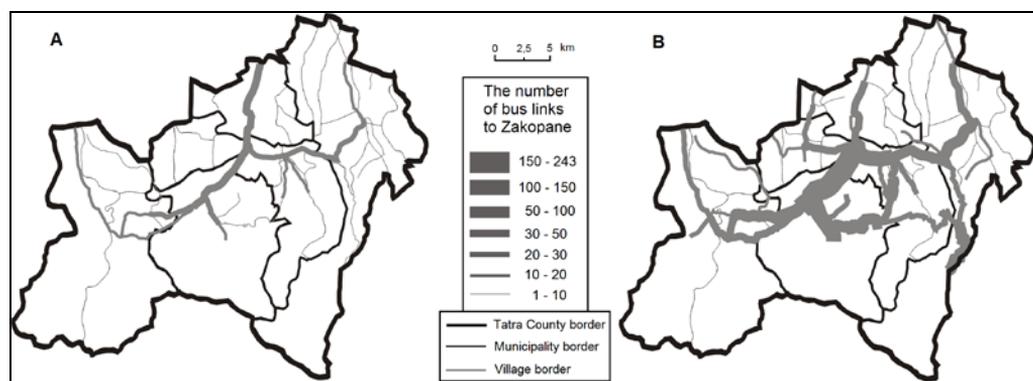


Fig. 3: The number of daily links to Zakopane provided by public (A) and private (B) transportation services in Tatra County in 2008.

Source: author's work based on timetables.

Nowadays, private transportation dominates in Tatra County, with significant advantages over the National Bus Company (PKS) in the number of bus links provided, especially in the south, the most touristically attractive part of the county.

The most diversified choice in transportation services is available to those living in the villages located along “Zakopianka” (Poronin, Biały Dunajec), as well as those adjoining Bukowina Tatrzańska village (Małe Ciche, Białka Tatrzańska). Similarly, those villages famous for their touristic sites, (Brzegi, Kościelisko), have a clear advantage in transportation choices. These situations contrast with areas located in the northern part of the county, where people do not really suffer from immobility (Groń and Leśnica have connections with Nowy Targ, the capital of the adjacent county), but rather from a shortage of bus links (and, subsequently, a lack of choice). As a result, any decrease in the current growth of the local touristic business throughout Tatra County may adversely affect those areas. However, these underserved villages may benefit from tourists who own their own cars, allowing them to stay farther from the mountains, and for a conceivably longer time.

One of the key social determinants of accessibility is the time that people must devote to get to particular places. Tarski (1976) admits that the significance of travel time decreases inversely proportionally to distance and varies according to travel reason – it is much more important in the case of those commuting to work, less important in the case of shopping or school travels, and least important in touristic or business trips. Nonetheless, in the case of tourists, a high travel time may be discouraging and cause people to choose a different place to visit, a decision which mostly concerns one-day excursions. Also, Guzik (2003) notes that any unnecessary travel time is lost time that might potentially be dedicated to other, more valuable activities. As far as travel time to Zakopane is concerned, large spatial disparities can be seen on both the regional and local level. Figure 4 presents the time accessibility of Zakopane, a popular destination point for tourists (regional level) and inhabitants of Tatra County (local level).

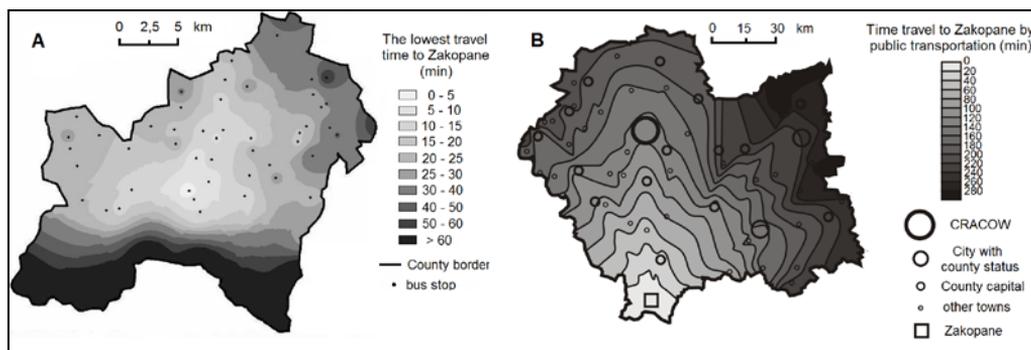


Fig. 4: Time accessibility to the bus station in Zakopane across Tatra County (A) and Małopolskie Province (B) in 2008.

Source: author's work based on the timetables of 47 bus stops in Tatra County (A) and bus station timetables of 58 cities in Małopolskie Province (B).

On the local and regional level, there are huge correlations between the proximity of “Zakopianka” and a low travel time to Zakopane (as compared to congruent straight-line distances of locations farther from the roadway). Within Tatra County, villages located on the northeast edges, namely Czarna Góra, Rzepiska and Jurgów, claim the worst time accessibility to the Zakopane bus station. It takes more than 50 minutes for buses to get to those localities (in good traffic), while the time accessibility of the adjacent village of Brzegi is under 30 minutes. Shorter travel

times are more common in the western parts of the county. This exemplifies the privileged situation of the most attractive touristic sites, where time accessibility is much better.

On the regional level, State Roads No. 7 and 47 ("Zakopianka") extend across the areas with the lowest time travel to Zakopane. It takes only 2 hours to get to Zakopane from Cracow, while from plenty of closer counties the travel times increase. A large longitudinal gap in time accessibility can be seen between the eastern and southwestern parts of Małopolskie Province. Almost all eastern counties lie within 3-3.5 hours or more ride from Zakopane, which is disadvantageous for short-term tourists who would rather choose a different, closer, more accessible place to visit in the Polish Carpathians.

3.2. Impact of the Economic Environment

The economic aspects of accessibility within Tatra County mainly concern transportation service providers, who are divided into public and private sectors. As mentioned above, competition between private entrepreneurs and the National Bus Company (PKS) has forced the latter to give up most of the market and reduce their total number of bus links. Local bus owners have several advantages that have allowed them to out-manuever PKS, such as small scales of activity (usually only one route), and high organizational flexibility, a result of using small minivans, allowing for easy adjustments to the changing situation of the local market. At first, the newly introduced private transportation owners found it hard to coexist with each other, a situation which induced an economic fusion process. As a result, the largest private transportation company in Zakopane now is the Private Transportation Association (ZTP), which serves the most popular touristic sites.

Beyond that initial attraction, the Association offers unified ticket prices and well-organized timetables. Even with the creation of the Private Transportation Association, there are inevitably still flaws within the whole bus system. The main problem, and one which often triggers conflict with the local government, is the tendency of private providers to disregard their timetables and routes, causing chaos within the transportation system of Zakopane. Moreover, a lack of suitable government control exacerbates this problem. In order to counteract this and other shortcomings, several ideas were proposed at the time that Zakopane was being considered as a possible host for the Winter Olympics, such as the introduction of a trolley bus (Albright 1996) or tramline (Antoszyk, Dobiecki 1996) in Zakopane, but to no effect.

At present, there are plans for a tramline in Zakopane, which would adversely affect the private bus sector in the town. As it stands, though, private providers of transportation in Tatra County dominate the market, something that allows them to charge higher rates than PKS. These rates are established annually, with prices set higher during peak tourist seasons and lower during the off-seasons. Figure 5 presents the ticket prices in Tatra County for chosen bus stops of both public and private transportation companies.

Due to the broader area served by private transportation entrepreneurs and lower average travel time, passengers on private buses are charged more for riding when compared with those who use the National Bus Company.

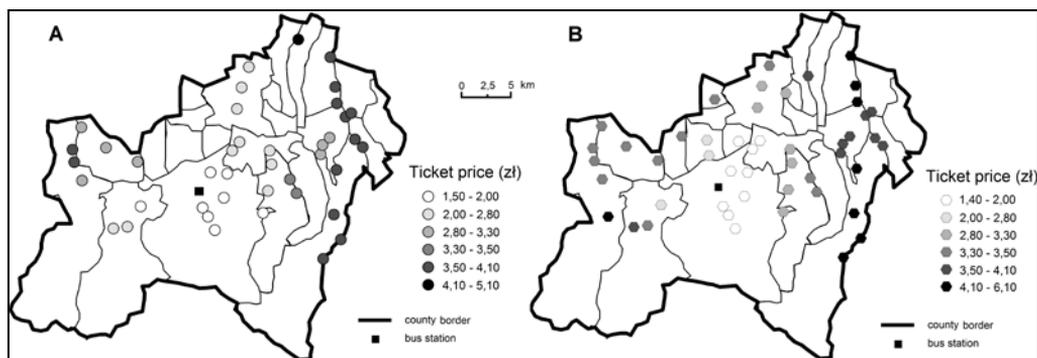


Fig. 5: Ticket prices to Zakopane bus station from bus stops across Tatra County for public (A) and private (B) transportation in 2008.
 Source: author's work based on price lists.

The greatest differences are especially prominent on the routes to/from Zakopane to/from the most popular touristic spots in the county. These are located in the southeast and southwest corners of Tatra County, and the price gap between private and public providers can reach up to 2 zł. Generally, bus ticket charges rise gradually in conjunction with the distance from Zakopane, but eastern route prices increase dramatically due to the rough terrain of the area, which makes travel costs higher and, in turn, ticket prices.

Accordingly, those travelling with private entrepreneurs pay more to get to Białka Tatrzańska (a famous ski resort), the southern part of Brzegi (by a popular route to Morskie Oko lake) and the villages of Kościelisko and Witów (where two of the most popular valleys are located). The economic accessibility of Zakopane is high in the villages along the Zakopianka, as well as those located on the Gubałowskie Foothill to the north of Zakopane, contrasting with the much lower economic accessibility of the western and eastern parts of the county.

The economic situation of the National Bus Company mentioned above, as affected by the introduction of competition, greatly influences the transportation accessibility of Tatra County. Throughout the entire Małopolskie Province, PKS has many more links to Zakopane than any other carrier. The only route where private transportation dominates is to/from Cracow-Zakopane, the route which plays the most important role as far as regional accessibility is concerned. This issue is presented below (Fig. 6A), as well as the economic accessibility along the Cracow-Zakopane road and rail route (Fig. 6B).

The high number of PKS bus links from Cracow to Zakopane is a result of two main factors. Obviously, the first one is connected directly with Cracow - as Małopolskie Province capital, there is an intense demand for transportation services from the many city dwellers who want to go to the mountains for rest and relaxation. The relatively close proximity of Zakopane draws people to it in hoards, especially during the weekend. The second reason is an accumulation of buses headed toward Zakopane in Cracow, as almost every PKS route goes through it on their way. Therefore, the best accessibility to Tatra County is found in areas within the vicinity of "Zakopianka", especially when most other courses from the west and east enter this road between Rabka and Nowy Targ. Only a few daily links to Zakopane are available in the eastern part of the province, with a total of only ten from Nowy Sącz

and Tarnów, the second and third largest cities in Małopolskie Province. This situation is a result of the economic decline PKS has been going through in the recent years, although it is still the dominant carrier on the regional level. Additionally, intense competition on the main Cracow-Zakopane route between PKS and private companies has stripped away much of PKS' demand.

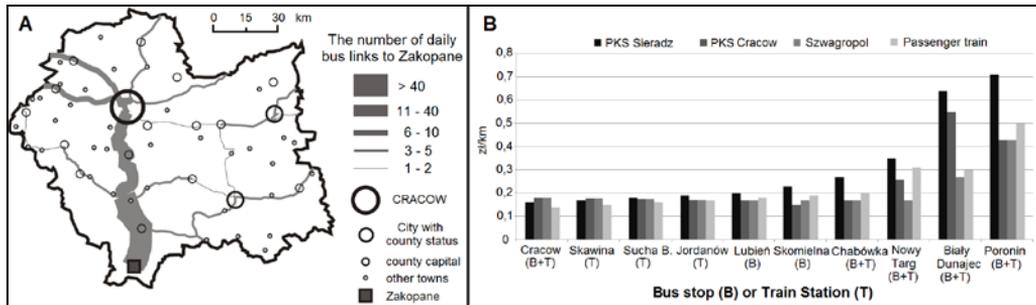


Fig. 6: The number of daily links to and from Zakopane provided by the National Bus Company (PKS) in Małopolskie Province (A), and the average price per kilometer on Cracow-Zakopane routes charged by long-distance PKS, regional PKS, private companies and trains in 2008.

Source: author's work based on www.autobusowyrozkladjazdy.pl, bus and railway price lists.

As far as ticket prices are concerned, there are some disparities between carriers serving the Cracow-Zakopane route. Long-distance PKS, regional PKS, private companies and trains were chosen as part of the ticket-price analysis. The lowest price, (per kilometer), from Cracow is paid by train passengers, but the journey takes a longer time than by bus, as the railway distance is 1/3 longer than the road course. A significant increase in the average price per kilometer takes place at Nowy Targ, most notably in the case of long-distance PKS buses. The lowest increasing trend belongs to private companies, as they have the greatest possibility of collecting more passengers along the way (more bus stops for private companies leads to lower prices). Consequently, economic accessibility is much better from Cracow for train and long-distance buses, with private companies and regional PKS charging more per kilometer from Cracow, while long-distance buses and trains attempt to acquire additional income through passengers who live closer to Zakopane.

4. Cultural Determinants of Transportation Accessibility

Tatra County is not a uniform region as far as local culture is concerned. Although mountains surround the county, which effectively separates the area from others, three different cultural regions exist within contemporary Tatra County. The majority of the county is located within Podhale, with some adjoining villages (on the western and eastern sides) belonging to completely different cultural regions, namely the Orawa and Spisz (both originally part of the Austrian Empire before 1918). Tatra County is inhabited by the Górale, a close-knit ethnic community who strive to maintain their traditions and habits. Widespread commercialization of their image for the amusement of tourists is a serious problem for their survival as an ethnic group. Interesting relationships between the Górale, as well as other indigenous peoples, and their land in Tatra County can be seen upon examination of the bus links in their areas. Namely, a set of motivations inherited within different cultural regions result in either transportation demands existing in particular villages

or a lack of one in places where people do not feel a connection with Zakopane. A comparison of bus links, provided by PKS and local entrepreneurs, and cultural regions in Tatra County is shown in Figure 7.

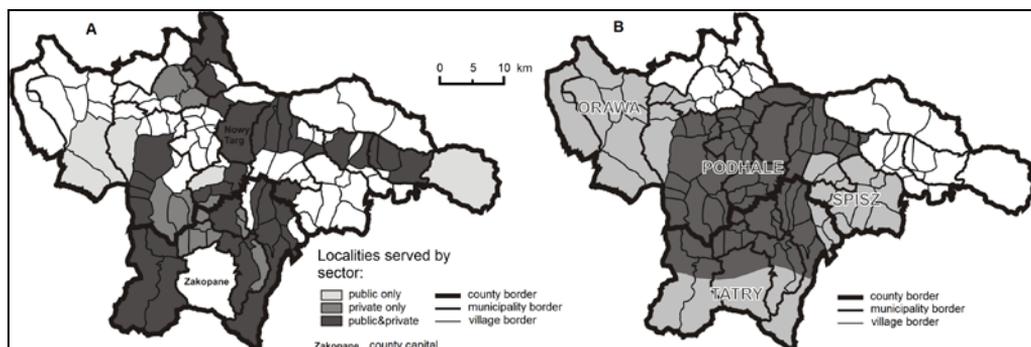


Fig. 7: The villages with a direct link to Zakopane provided by public and/or private transportation in 2008 (A) and cultural regions (B) of Tatra and Nowy Targ Counties.

Source: author's work based on bus timetables (A) and Tylkowa (2000).

Though most of the villages adjoining Tatra County on the west side are served by at least one carrier, only one village in the east side of the county has bus links to Zakopane. More than half of the villages that comprise Podhale have direct bus connections to Zakopane.

The only exceptions are those which lie closer and have very good accessibility to Nowy Targ, the capital of the adjacent county. It is interesting to note the range of private transportation activity, as none serve the Spisz and Orawa regions, but do stop in some villages in the county's north. Practically no bus links exist from Spisz and Orawa villages to Zakopane, except some PKS buses in route to Chyżne, the busiest border crossing in the region. The Podhale region is well-served by both public and private transportation, while the Spisz and Orawa regions mainly have links to Nowy Targ. It is important to mention that a few villages located to the west of Tatra County were part of Tatra County before 1990, something which is one of a few historical factors determining bus links in the region. Consequently, both cultural values and history have greatly contributed in the shaping of Tatra County's contemporary transportation system and crystallization of transportation accessibility on the local level.

5. Conclusions

It has been shown that the transportation services and accessibility of Tatra County both affect and are affected by social, economic and cultural issues. Because there are many spatial actors, (local inhabitants, tourists, and entrepreneurs), dependent upon good transportation accessibility in this area, the main tasks of authorities are to: provide as equitable as possible accessibility to human services, stimulate local business growth and attract tourists to the county. Of course, every action must be congruent with environmental protection laws and sustainable development. None of these goals can be achieved without considering the social, economic and cultural elements of accessibility.

First, a crucial matter is the equitable provision of transportation services. A large spatial polarization can be seen in Tatra County in the many villages where the number of links to Zakopane greatly exceeds the local needs, whereas others have no such connection. On the regional level, the population living along "Zakopianka" has much better accessibility to Zakopane than those living in the distant, eastern part of Małopolskie Province. These disparities clearly show the need to lighten the number of routes on "Zakopianka" and distribute those buses to underserved areas, which would spread routes more evenly across the county.

Second, people living in many areas served by local or regional transportation do not have much choice as to the number of daily bus links to Zakopane. With the scarcity of these connections, especially in the eastern part of Małopolskie Province, tourists may not be interested in visiting Zakopane for short-term excursions.

Third is the social issue of travel time. As in the first two points, the largest spatial disparities exist between the eastern and western parts of both the county and province. Additionally, on the local level, travel time is much lower, and consequently better, for touristic places that are served mainly by private transportation.

Fourth, economic issues of accessibility depend on the transportation market division. In the last 20 years, a large private transportation sector has developed and crystallized in Tatra County, forcing the National Bus Company to recede from the market. As a result, private transportation has been able to set higher ticket prices, something clearly seen at the most popular destinations. Regionally, private transportation only dominates along the "Zakopianka." The rest of the province is served by the declining PKS, who provides very few connections to Zakopane, even from the second and third biggest cities in Małopolskie Province.

Finally, the cultural aspect of accessibility concerns the different ethnic groups living in the Tatra County. While most of it lies within Podhale, there are substantially fewer bus links to Zakopane from other cultural regions – namely the Spisz and Orawa. To some extent, then, the accessibility disparities between cultural regions in Tatra County can be explained by the fact that Zakopane is in part located within Podhale, and so is closer socially to the inhabitants of this region than those from the farther Spisz and Orawa. This testifies to the importance of cultural issues in pinpointing the needs of people by carriers and the local government.

All of the above-mentioned issues should be taken into consideration by local governments considering transportation planning across mountainous areas. As every touristic area is not free of conflict, including in the field of transportation, the local bus system should be managed by governmental authorities. As it is, this study has tried to bring attention to a few of the many processes that shape the transportation accessibility of mountainous areas, and by doing so present some guidelines for transportation planners.

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SOCIAL, ECONOMIC AND CULTURAL ASPECTS OF TRANSPORTATION ACCESSIBILITY IN MOUNTANIOUS AREAS ON THE EXAMPLE OF TATRA COUNTY, POLAND

Summary

Article presents some very actual problems of transportation accessibility in mountainous areas. Using Tatra County as an example, a detailed analysis is conducted to show social and economic impacts of transportation accessibility on both local (Tatra County) and regional levels (Małopolskie Province). Within the sets data measured, large spatial disparities in daily links (Fig. 3), travel time (Fig. 4), and ticket prices (Fig. 5) were discovered. The most popular touristic sites were found to be privileged with the highest local transportation accessibility in the region. Also, a great amount of local, private carriers, as compared to the National Bus Company, has allowed for higher prices in exchange for shorter travel times and greater daily frequency of departures, both more convenient for locals and tourists. Moreover, cultural determinants of transportation accessibility were considered and showed more bus links to Tatra County from the villages located in the Podhale cultural region than the rather incidental links to the Spisz and Orawa regions (Fig. 7). The array of different factors that shape accessibility in the Tatra region is important for the local government to bear in mind while establishing and managing transportation policies that meet the needs of and avoid conflicts between county inhabitants, local carriers and the millions of tourists visiting the region every year.