

9 Transport in the Carpathians

9.1 The evolution of the transport network

The development of the vehicle-based transport network of the research/evaluation area started with the building of railroad lines. The major features of railroad network are as follows:

Compared to West-Europe the first railways emerged here with a delay of some decades and until the 1880s their growth rate was much slower than in other parts of the civilized Europe.

The rate and the territorial structure of main railway lines composing the backbone structure:

- At the onset (until the Austro-Hungarian Compromise, but in several cases until the 1860s) were determined by the power interests of the Austrian Monarchy.
- Then they were shaped by the interests of the Austro–Hungarian Monarchy in several cases by the manifestation of the national, political and economic interests of the Hungarian Holy Crown Monarchy including certain regional and large corporate (mostly heavy industrial) interests as well.
- With the establishment of the Romanian Kingdom this interest structure was further diversified by another member;
- The Serbian Kingdom and following the Croatian Compromise Croatia and Slovenia were also doing their best for influencing the railway network building process by their own interests.

Hills and highlands, heavily increasing railroad building costs were excluded from railway routes for long periods and they were crossed by railway with a significant delay. These delayed developments are explained not only by heavy relative costs, and the lack of skills and technical instruments in building big railway structures (tunnels, viaducts, deep railway cuttings) but also by the sharp political conflicts between the Carpathian countries (they were especially hindering the planning of Transcarpathian pass railways). Apart from the short dead-locked railway lines of local importance, the first long-distance railway lines connecting regions and province seats were mostly departing from Vienna.

In the Carpathian Basin,

- Following river Danube the line was passing through Nové Zámky continuing to Budapest. Here the line was split into three sections (following its route to Debrecen, Békéscsaba–Oradea and Szeged–Timișoara).
- Passing through Sopron to Nagykanizsa.

Outside the Carpathian Basin the line was following the arch of the Carpathians from outside on Moravia and Polish territories through Galicia, Krakow until Cernovic in Bukovina then through Moldova until Constanța. These ‘Charles Railways’ had two missions:

- Holding the rebelling Hungarians in check at bay by a semi-circle of a high capacity railway line which would serve as a delivery route for the Austrian Army in case of a new Hungarian ‘rebellion’.
- Decreasing the role of Hungarian agriculture in the agricultural supply of Austrian and Czech provinces with cereals/food by importing them cheaply from Transcarpathian areas. (The south-eastern branch of these railways was favouring Romania. Its strategic role remained the same during the 20th century. When the Soviet Union annexed Bessarabia in 1940 and the Soviet–Hungarian border was established on the backbone of the Carpathians – the German–Soviet Treaty preserved it as a normal gauge line between Germany and Romania its allied state – for maintaining direct transport connections for military, food supply and oil delivery purposes.)

Of the major railway routes departing from Hungary entering or passing through the Carpathian Mountains zone the following lines had primary importance from the aspects of economy and inter-regional cohesion:

- Budapest–Miskolc–Košice railway line.
- Košice–Vrútky–Odevberg (Prussia–Silesia) railway line.
- Hatvan–Salgótarján–Banská Bystrica railways.

The building of these three railway lines was motivated by the heavy economic interests of Upper-Hungarian (Gömör, Salgó-Rimamurány, Szepes counties) metallurgy and processing industry as it facilitated their cooperation in production with Silesia and opened new market areas.

The Vah Valley railways departing from Bratislava passing through the Tatras was another important railway line in Upper Hungary. Its north-western sideline to Silesia opened a new connection. The railway line departing from Košice passing through the straits of Prešov and Bardejov through Dukla Mountain Pass going to Galicia established a connection with the provinces of Austria in Poland.

For accessing Transylvania two alternative routes were taken into consideration from the onset:

- The railway line starting from Arad following the Valley of River Maros was demanded by the wealthy and highly civilized Saxon citizens of South-Transylvania.
- Other stakeholders preferred the Oradea–Crown Pass–Cluj–Napoca direction.

Although the Cluj-Napoca railways were the first opened some years later they could join the Maros Valley railways.

Romania was in bad need of an international railway connection with Western Europe passing through Hungary. Its route included an entry point to Hungary in Orsova at the Lower-Danube district just to keep the railway line starting from Bucharest on the territory of Romania as long as possible. However the Hungarian Government (from the same reason – i.e. to keep them on Hungarian territories and charging as high transit fees as possible) insisted on joining the two railway sections at Predeal Pass nearby to Braşov. Romania could not do anything but to obey the Hungarian demands and a new connection point was to be built at Vercivora, a nearby place at Orsova, subsequently only to this connection.

On the main international railway line departing from Budapest and crossing the Carpathians Transcarpathian sections (through Verecke and Użok Mountain Passes towards Zemberg) were completed the last.

Of the countries situated outside the Carpathian area, Serbia was the first to be connected by railway along the Subotica-Belgrade railway line in 1886. (This had special importance in foreign trade as it was later extended to Saloniki and its eastern section connected Niš with Istanbul.)

By the end of the 19th century a radial system of international railway mainlines had been shaped around Budapest passing through the Carpathians and connecting the neighbouring provinces of the Austro-Hungarian Monarchy (Moravia, Czech-Silesia, Galicia, Bukovina), Germany (through Prussian-Silesia) and Romania (Moldova, Wallachia), Old-Serbia and with Rijeka through Croatia-Slovenia. The number of Transcarpathian transit railway lines was increased by some sidelines at the turn of the 19th and 20th centuries (through Turnu Roşu Mountain Pass in the Southern, Eastern and Northern Carpathians).

The extensive radial railway network of the Carpathians was opposed by a very few number of transversal lines within the inner side of the Carpathians. The most important of them in long-term perspective proved to be Hungarian North-Eastern Railways connecting Upper Hungary through Transcarpathia with North-eastern Transylvania/Maramureş since the 1870s. Beyond the Carpathians several lines are following the line of Carpathians within a distance of 50–70 kilometres (in Moldova and Wallachia) beyond those having already been mentioned.

Since the 1880s, the second half of the railway age, by the initiation of local railway companies 2–3 times longer railway sidelines have been built than the total length of main railway lines.

Local railway companies had two missions.

- Improving the general transport accessibility of peripheral area, providing inter-settlement service facilities for the population and
- Easing cargo transportation for forest companies, mines and industrial plants, making it cheaper and facilitating local economic development in

general (by transporting wood, salt, mined ores, coal, building materials and cereals etc. in railway carriages as bulk cargo). By purchasing stocks big landowners, mine and factory proprietors contributed to the majority of the costs of railway building almost everywhere but the building of some railway lines was fully funded by them (later on they were purchased by the Hungarian Railways).

The major features of the railway network of the Carpathian area before the First World War were as follows:

- Adapting to the lower population density and the less number of cities and in general to lower mobility and less cargo delivery the network has been created by far lower density than on the lowlands and hills of the Carpathian Basin. This low density is also true in the case of railway network in the hills of the Carpathians in Hungary.
- In provinces beyond the Carpathians, the density of railway network is by far lower than in the internal part of the Carpathians. This can mostly be explained by the lower financial power of local railway building companies who due to their organisation structure/legal background could create a smaller network (in Moldova, Wallachia, but even in Bukovina and Galicia) than their counterparts in Upper Hungary, Transcarpathia and Transylvania.

The new borders of Hungary (having been delimited by the Trianon Peace Treaty) and the new political division of space had the following impacts on railway network (which still has higher importance than road network):

- In the Eastern and Southern Carpathian regions the Transcarpathian railway lines turned from international into national ones (bearing interregional importance) which generated much higher demands for passenger and goods transportation between Transylvania and Regat in Romania. However on the increased territory of the Romanian state for maintaining economic/cultural cohesion only the modernisation of the existing railway lines (electrification, building double track lines) has taken place without building any new railway lines or new motorways between 1918 and 1944. Railway capacities increased between 1944 and 1989 and a motorway was built with enormous costs for passing Wallachia. The domestic air service was launched between the capital city (Bucureşti) and the major cities of Transylvania (Timișoara, Oradea, Sibiu, Cluj-Napoca, Târgu Mureș, Satu Mare, Baia Mare, Oradea etc.).

In Czechoslovakia, being formed as a new country in 1918, the east-west direction became the major route of domestic transport services between the two country parts. Therefore, the Prague–Puchov–Bratislava–Košice–Užgorod railway line was reconstructed and extended by some new short sections and the

roads of Váh and Hornád Valley were developed to the best quality. In the 1920s domestic air mail and passenger services were introduced on the route of Prague–Puchor–Bratislava–Košice–Užgorod as experimental services which have become regular with scheduled air services by the late 1930s. In the Slovakian part of Czechoslovakia railway services faced such a problem that the southern valleys of the country's eastern part with their economic centres (Rimavská Sobota, Lučenec, Rožňava) were oriented by traffic towards the core areas of the Carpathian Basin until 1918 but the central parts of the new Czechoslovakian state and Prague, the capital city, were hardly accessible by rail only by taking quite big roundabouts with poor technical facilities (allowing low speed traffic only). Although the idea of building a railway axis at the southern part of the country (Bratislava–Levice–Zvolen/Veľký Krtíš–Lučenec–Rimavská Sobota–Rožňava–Košice) was raised already in the 1920s its completion has still not been finished as only some of its sections have been built as parts of the main line.

The new western border of Romania set up after 1918 has cut the traditional interregional diagonal route of Historic Hungary at several places such as the Oradea–Rijeka railways (built as a route for bypassing Budapest in the exporting of the agricultural products of the Hungarian Great Plain to overseas markets) and the Oradea–Arad main line. For this reason additional new sections had to be built and the whole line had to be renovated for launching fast train services on the Oradea–Timișoara railway line. As a result of the common railway development programme of the Small-Entente states surrounding Hungary from the east and the south the Prague–Košice–Užgorod–Oradea–Timișoara–Belgrade railway line with its potentials of running fast train and big capacity cargo train services provided direct connections between the Small-Entente member states bypassing Hungary.

The period of state socialism after 1945 generated the following changes in the transport system of the Carpathian countries:

- In the international transportation of goods the orientation to the Soviet Union became dominant as a consequence of an extensive heavy industry development several million tons of raw materials (ores, alloying materials and artificial fertilizers), energy resources and fuels were imported and industrial products and food were exported to the Soviet Union. The most important consequence of this enormous eastward railway of traffic goods was the building of broad gauge railway lines starting from the borders of the Soviet Union and ending at quite a big distance.
- In the southern part of Poland it ended at Sławków, Silesia (about 350 kilometres from the border)
- In Slovakia it ended at the integrated metallurgy plants near Košice

Apart from broad gauge railway tracks several cargo transshipment zones with railway stations and parallel railway lines were built in the south-eastern part of Poland, in the eastern part of Slovakia and in the north-eastern part of Hungary within a 20–30 kilometre zone of the Soviet border. In the deeply underdeveloped agricultural zones they were core areas of regional development providing more qualified job offers, better wages, social infrastructure and official residence, secondary schools, better public services than the average level of their neighbourhood. These establishments (in settlements of Medyka, Ágcsurgó, Záhony, Ungbery etc.) have preserved their employment centre character functioning as modern centres for goods transshipment but they were unfit for building local processing industry plants based on the raw materials and fuel delivered here in massive amount.

Although the increasing foreign trade among the Carpathian countries mobilized enormous amounts of goods, but very few steps were taken for the development of crossborder infrastructure. This is true whether we look at the railway transition areas of mountain rims, the technical development and the traffic capacity of border stations between Slovakia and the Carpathian section of Poland, or between Slovakia and Hungary or between Romania and Hungary. Some progress has been made in the electrification and building double tracks on some main line sections, but due to the negligence of sideline maintenance and the increasing density of cars, railway services have lost a lot from their attractive force. However, only a few railway lines with extremely low traffic have been terminated in South-Poland and North-Hungary but in the mountain regions of Slovakia and Romania this socially highly sensitive plan was not approved by the political government.

The development of the road system was different from the railway. Of the two levels of work

- the covering of main roads with asphalt was completed but international goods transportation traffic was moderate, and trucks were used as accessories for short-distance delivery but international passenger transport during the summer “top” seasons in some relations (e.g. between Slovakia and Lake Balaton or the transit traffic between Czechoslovakia and the Adriatic Sea) was very high even in the late 1960s. During the 1980s an increasing number of city bypass roads were built on main roads.
- Since the 1960/70s some motorways were built at certain places. Their majority was part of the TEN system initiated by Hungary and Poland connecting North-Europe with the Adriatic Sea and Asia Minor. In the Carpathian region only some sections (Vah Valley entry zone (until Piešťany) the Prešov–Košice section in Slovakia and in Poland some

short sections connecting big cities with the internal part of their agglomeration zone) have been completed until the change of regime.

- The governments of every Carpathian country were trying to stop the demographic deficit of their peripheral highland zones by building asphalt covered by-roads (link roads – to be usable by cars in all seasons – to connect the blind settlements of secondary road network). However, these steps could only slow down this process, but they were unable to halt the outmigration of the local population to cities and industrial zones. Small highland villages and settlement groups, stock breeding farms became victims of the economic restructuring. By now the number of highland herdsmen and woodcutters has dropped to a small fraction of the relative value of the 1980s. Workers were transported for motorized wood cutting from remote villages and small towns by buses of state companies or cooperatives daily or in certain periods.

9.2 The current situation of transport

The Carpathian region's transport has been affected by the changes of transport following the change of regime in the following ways and intensity:

- Of the main railway lines and roads too much funding has been allocated to the development of international corridors (Helsinki/PEN/TEN and partly TINA).
- The Bratislava–Žilina–Košice section of the 5/a corridor is under construction. A motorway has been built from Bratislava to Žilina in the Valley of River Vah and the section between Low-Tatra and High-Tatra (with a tunnel in Branisko) will also be completed soon. A significant progress has been made on the railway line of the same direction (some of its parts are suitable for maintaining a speed of 140–160 km/h and the line is electrified with double tracks) and the intercity train service between the two biggest cities of Slovakia has intensive passenger traffic.
- The 4th corridor between Berlin and Istanbul is serving Germany's interests (the railway connects Germany with one of its biggest market and labour force source). Two parts of this corridor cross the Carpathian region. On the Bratislava–Komárno–Budapest railway section the quasi high-speed train service can be introduced in 2007 and some sections of the Bratislava–Nitra–Zvolen dual carriageway have already been completed.
- The other planned part of the corridor is crossing South-Transylvania (along the Maros Valley) through the South-Carpathians reaching the Black Sea at Constanța. The motorway is crossing the Carpathians at Turnu Roșu while

the corridor railway line at Predeal Pass. The Romanian section of the 4th corridor is under construction and its railway line is undergoing a partial modernisation.

- The M3 motorway in Northern Hungary a part of the 5th corridor, has practically been completed until Debrecen/Nyíregyháza area and its continuation towards Carpathian-Ukraine is being planned. Although there have been declarations on building it further until Kiev it is doubtful whether this project can be completed.
- A short part of the 10b (Budapest–Belgrade–Saloniki) corridor will touch Serbia, a country involved in our research. (It is merged into the 4th corridor at Belgrade.)
- The 9th corridor connects Helsinki with the Greek port of Alexandropolis through Chişinău/Jassi (its section in Moldova is approaching the Carpathians).
- The Danube waterway is the 7th corridor but its navigation with ships above the capacity of EU economical threshold value (1350–1500 tons) called “European” ships is quite problematic on the Bratislava–Vác–Budapest section due to the low water level in the end-summer and autumn seasons. Although maintaining the continuity of navigation on the Slovakian-Austrian, Slovakian–Hungarian, Hungarian and Romanian/Bulgarian river sections is a priority task of the EU Quick Start Programme no major steps have been made so far for the achievement of this target.
- The other section of the 7th corridor in the riverbed between the South Carpathians and the Serbian Mountains is fairly well navigable thanks to dams of the two huge common Romanian and Serbian hydropower plants (Djerdiap I and II) rising the water level significantly. However the costs of shipping are increased by lockage fees.

The primary mission of corridors is providing quick transport facilities between capital cities/big economic centres (e.g. on Prague–Bratislava–Budapest–Trieste route) therefore they are serving as means for internal cohesion within the European Union as a complex system of transportation facilities providing quick access in several sub-sectors.

There are big differences in the completion stage of these corridors mostly depending on the level of their funding. Spectacular improvements were made in those projects that had received heavy sums funded from national resources and loans for implementation. (Until 2004 the EU funded the preparatory plans, feasibility studies, environmental impact assessments, and the guarantee interests of loans disbursed by the banks of the European Community. However, EU member countries may soon receive significant EU grants (e.g. from Cohesion Fund).

The territorial impacts of although with long delays compared to plans but after all being realised corridors are rather ambivalent:

While these corridors are significantly contributing to the increase of the free flow of goods and labour (and indirectly they are accelerating information and capital flow) at the same time they have a linear strong attractive force on their hinterlands generating effects of exhaustion and degradation on the other hand. Along these corridors several new plants of innovative industries and services were built with logistic and distribution centres attracting the potential labour force of the skilled young generation of their hinterland. The agricultural production segments in their neighbourhood produce high quality, transport intensive and valuable products (greenhouse flower and fresh vegetable farming, biotechnology based knowledge, intensive production methods etc.) with ageing population, critically high rate of unskilled labour force in the peripheral areas of corridors. The outmigration of qualified population will accelerate demographic erosion both in quantitative and qualitative aspects.

The air traffic centres of the Carpathian region, the big airports of capital cities are located at the edge or outside the region (Vienna-Schwechat with an annual passenger traffic of 17 million, Prague with 11 million, Budapest with 8 million, Bucharest with 3 million, Belgrade with 1.8 million, Bratislava with 1.5 million. Of regional airports the passenger traffic of Krakow is more than 2 million and of Katowice is exceeding the figure of 1 million. The annual air passenger traffic of Timișoara belongs into the category of 0.5–1.0 million, while of Košice and Cluj (and Constanța) into the 0.3–0.4 million. The annual air passenger traffic of the remaining airports (Tirgu Mures, Oradea, Satu Mare, Sibiu, Bacău, Jassi, Suceava, Debrecen, Użgorod, Cernovitz, Posten, Sliac, Poprad-Tatry, Rzesov) is below 0.2 million (the majority has some ten thousands only annually). A growing number of regional airports are running international air services beyond the domestic ones (mostly in the summer tourist seasons by charter flights carrying tourists into the holiday resorts of the Mediterranean region).

9.3 The major problems of transport in the Carpathian region, weaknesses and alternatives for their solution

9.3.1 Side-roads in peripheries

Accessing highland settlements (villages, forest farms, mining sites and recreational villages) has one and only real alternative today (and possibly in the future): It is the network of public (and partially private) roads with technical parameters customised to current traffic situations and providing easy access to

magisterial roads. Although local stone for road building can easily and cheaply be accessed from a short distance this has no relevance on the costs of road building as the building costs of road structures necessary for bridging the irregularities of the ground are increasing the total costs of road building to several times compared to the normal costs. Due to the expansion of motorized road transportation the number of traditional local instruments of wood transportation (long lumber slides, cable ropeways and narrow-gauge wood transportation railways) has strongly diminished. However, the quality of roads, especially in the mountains of Romania and Poland is very poor and the asphalt cover of roads has strongly been damaged.

The assessment of the real demand for mountain side-roads (including future demands as well) should carefully consider the local environment with special regard to meeting the requirements of environmental sustainability.

Under similar physical surface and population density conditions:

- A denser and better quality road network is needed in areas exposed to big tourist traffic but the impacts of its higher environmental load should also be foreseen (including the building of a bicycle road network which is considered as an acceptable infrastructure for ecotourism. Strict limitations should be applied regarding cross-motorcycling and quad cycling heavily damaging forest plants and soil (accelerating the erosion process as well). These crazy fashion activities generating big noise, disturbing and scaring away wild animals and tourists searching for peace and quietness are unfriendly for nature and should be permitted only at certain places.
- Motorcycles should be banned from tourist paths and walkways, traffic should be limited on one-lane roads truck in time for some hours' period only (just to ensure the provision of local shops with the essential goods for tourists and the locals).
- Car traffic and road usage should be minimized in the territory valuable for the ecosystem and in still existing ('untouched') wild forests.
- The still operating mini railways in forests should be preserved because its passengers enjoying the beauties of nature are the less harmful for the environment. In places where tourists have great affinity for exploring the nature in such a way and relatively small groundwork is needed for the building of a narrow-gauge railway line the establishment of further forest mini-train services seems advisable. For exploring those parts of national parks that are open to the public, battery powered electrical mini- and middle-size buses (operated by light sulphur/sodium batteries) are the most suitable means of transport.

9.3.2 Regional traffic

The transport policy objectives in building connections between provincial cities and in urban agglomerations should be the preservation of the present role of railway services or at least halting its radically dropping tendency. (The use of small – even one carriage – trains with scheduled e.g. hourly, two hourly services is recommended in simplified mode reducing the costs far below the original level.) Bus services in areas with low passenger traffic should be reorganised by introducing flexible, demand-oriented bus service with call-centre based mini-buses or bigger share of taxis following the example of the system implemented in the (Italian) Apennines. In short-distance cargo delivery the use of railway can be profitable in exceptional cases only (e.g. the delivery of bulked mining products into power plants) in other cases cargo transportation by trucks and lorries has more reality. At certain places rafts and small ships may be used as alternative means of timber transportation. (For example national transport concepts are mentioning Upper-Tisza, Hernád and also the lower sections of Vah and Hron rivers as such potential places).

9.3.3 Interregional traffic

In domestic passenger transport between regional centres the use of fast, modern and comfortable IC train services should get a priority. Cargo can be delivered by fast light trains. For a faster access of cities dual carriageways or motorways should be built and air taxi services should be launched.

9.3.4 International (cross-border) traffic

The international traffic in the majority of countries in the Carpathian region is oriented from mountain top areas towards ‘mountain slope’ zones or the inside of the Carpathian Basin (Budapest) or further towards West-Europe.

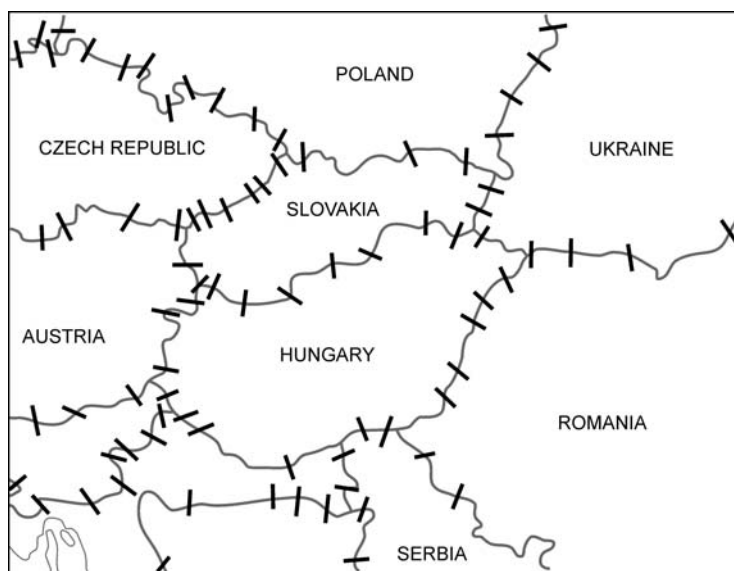
- A major traffic route is oriented from Transylvania but to certain extent from the Regat towards Hungary and Austria/Italy.
- One-third of Slovakia’s international traffic is oriented towards Hungary/Adriatic region.
- Two-third of the traffic of Carpathians-Ukraine is oriented towards Hungary/Austria.
- Almost 75% of North-Serbia’s international traffic is oriented towards Hungary/Western-Europe;
- or targeted at the Czech Republic/Germany (almost 66% of Slovakia’s international traffic is oriented at the same direction).

- A smaller part of the Carpathian region's international traffic is oriented towards north and north-east.
- To Moldova/Dobrogea, Moldavia and to Ukraine (and partially to East-Poland and the Baltic states through Ukraine).
- Between Slovakia and Poland bidirectional traffic is smaller, however transit traffic has a larger role (this latter is between the Vah Valley and Silesia (through the Jablonka Pass) or in the eastern part of the Carpathian region the most typical route of north-, north-eastern traffic flow is (Oradea–Debrecen)–Košice–Krosno/Nowy Sacz.
- Compared to the previous west-originated multi-component traffic flow system the bidirectional or multi-directional traffic within the Carpathians is very low:
 - Between Slovakia and Carpathians-Ukraine and even more,
 - Between Carpathians-Ukraine and Romania.

Figure 6–7 show that the number of railway border crossings and the number of road border stations between the above-mentioned countries is very low but even between Slovakia and Poland is far below than between Slovakia and Hungary and between Romania and Hungary.

Figure 6

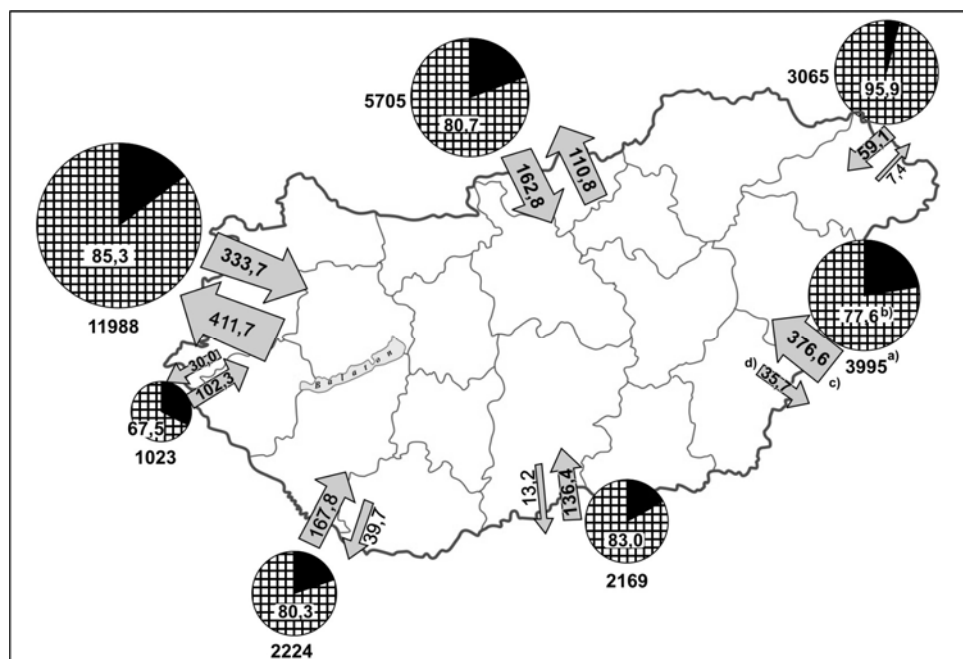
Railway lines passing the country borders of the Carpathian region (2004)



Source: Author's composition.

Figure 7

Cross-border car traffic through Hungary (2004)



Legend: Find at the Hungarian–Romanian border: a) in thousand; b) percentage of passengers’ cars; c) no. of entering foreign lorries, in thousand; d) exiting Hungarian lorries, in thousand.

Source: Author’s composition.

Considering the intensity and the structural features of international traffic and the cities of the Carpathian region:

- Should be connected with a greater number of directions and with higher intensity into the system of international rail services (Eurocity, Euronight, IC and express trains).
- Air connection should be established with a wider circle of cities.
- A carefully planned complex system of high-speed roads should be planned consisting of dual carriageways and motorways oriented towards directions not disturbing seriously any country’s national interests.

In our time international motorway building plans are prepared on the basis of random ideas representing a certain business group’s partial interests in the media (such as the Odessa–Chişinău–Iaşi–Satu Mare–Oradea–East Great Plain motorway) and these plans do not fit neither the Helsinki corridor concept nor the long-term national transportation concepts.