

The transport situation in the Great Plain

Introduction

Today transport plays a crucial role in our socio-economic life. In the two regions which comprise the Great Plain transport as a sector constitutes a significant share of overall GDP (5%). Transport affects the competitiveness of regions and therefore the quality of life. Good transport stimulates company activities, attracts direct investment, improves purchasing and distribution, and enables the realisation of extra income through international trade. Good transportation infrastructure supports the development of rural areas and promotes the convergence of regions.

As a result of travelling between settlements or commuting, public transport fosters the mobility of the workforce. The quality of public transport affects employment and schooling in different geographical areas, and access to services which are limited in a given area.

This study analyses the transport situation in the Northern Great Plain and Southern Great Plain regions. (The two regions are referred to hereafter as the Great Plain.) The paper presents the structure and quality of the road system, and the accessibility by road of Hungarian settlements. Furthermore, we highlight the features of rail, air and waterway transport.

Road transport

The role of road transport is salient both in passenger and freight traffic. In Hungary road transport accounts for two thirds of total freight transport and 46% of interurban passenger traffic, and it is the main form of local transport as well.

The structure and density of the road network

Hungary's road network has a radial structure with Budapest as its centre, and this structure affects the road system in the Great Plain as well. The major axis of the road transport in the Great Plain consists of express roads and main roads that start in Budapest. Main Road 5 runs in parallel with the M5 motorway in the North-South direction, while the M3 motorway and Main Road 4 both cater for increasing volumes of traffic in the West-East direction. These express roads, motorways and main roads pass all the county seats of the Great Plain except one, Békéscsaba, which is connected to the regional road traffic by Main Roads 44 and 47.

The western border of the Great Plain is the river Danube and the shortage of river bridges limits the transport connections of the region. In 2000 there were only two bridges, and since 2008 four bridges (three road bridges, and one rail and road bridge)

have provided road connections between Bács-Kiskun county and Transdanubia. The opening of Szent László Bridge in Szekszárd in 2003 and Pentele Bridge in Dunaújváros in 2007 (as part of the planned M8 and M9 motorways) was principally intended to improve the quality of Hungary's transversal connections.

The river Tisza – as well as several watercourses – is a natural impediment to road traffic in the Great Plain. In 2008 ten bridges crossed the river Tisza in the Northern Great Plain region and seven bridges in the Southern Great Plain region. These bridges over the river Tisza are close to interconnection points near the county seats and in consequence cater for significant volumes of traffic.

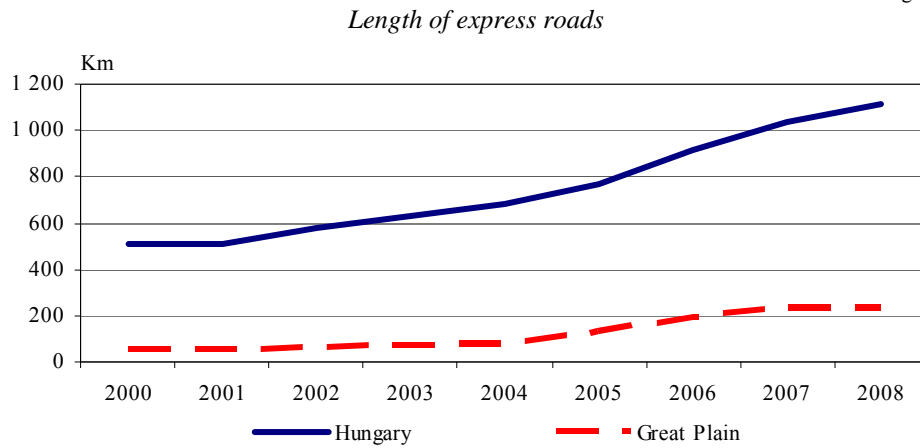
One third of the 31 000 km long national road network lies in the Great Plain. The two regions of this area are ranked in first and second place in terms of the length of road network. The density of the road network is 28 km/100 km², which is below the national average (34 km/100 km²). The relatively low level of this index is due to the specific structure of the settlements because there are relatively few extensive towns in the area.

Between 2000 and 2008 the national road network underwent significant modernisation: total infrastructure was extended by 4% and the length of express roads was quadrupled. Despite the development of the area, the share of motorways and express roads in the Great Plain (2%) is 1 to 2 percentage points below the national average. The share of trunk and secondary main roads is 23% of the total road network. The remaining 75% of the network consists of other national public roads such as through-roads, access roads, roads to stations and slip roads.

In 2008, 235 km of Hungary's 1 116 km long express road network lay in the two regions of the Great Plain. The M5 motorway heading south-eastward from Budapest links the Southern Great Plain to the capital, and this road has been one of the most important connections of Western Europe to the Balkans since it was extended to reach the border crossing point at Rösztke in 2006. In addition to Main Road 4, the Northern Great Plain is linked to Budapest by the M3 motorway. Between 2000 and 2008 a total of 617 km of express roads were opened to traffic in Hungary. 29% of these sections (179 km) are in the Great Plain, thus making Csongrád, Hajdú-Bihar and Szabolcs-Szatmár-Bereg counties accessible by motorway in addition to Bács-Kiskun county. The central position of Jász-Nagykún-Szolnok county and its proximity to the capital reduces the negative effect of the lack of motorways in this county. Among the counties of the Great Plain, Békés county's position can be considered the worst in terms of road transport.

The faster transit traffic of the settlements is restricted not only by the low proportion of express roads, but also by the shortage of ring roads around the primary cities. 17% of the main roads run within settlements, where the speed limit is usually lower and the traffic on these stretches generates more environmental pollution than in the interurban sections. The national public roads of the Great Plain are generally paved. The pavement of the surface of 91% of the network is asphalt, but in the Southern Great Plain the share of macadamized sections is significant (13%). The length of unmetalled roads was reduced by 22 km between 2000 and 2008, but 146 km remain unpaved. (Half of all unmetalled roads in Hungary lie in the Great Plain and a quarter of them can be found in Bács-Kiskun county.)

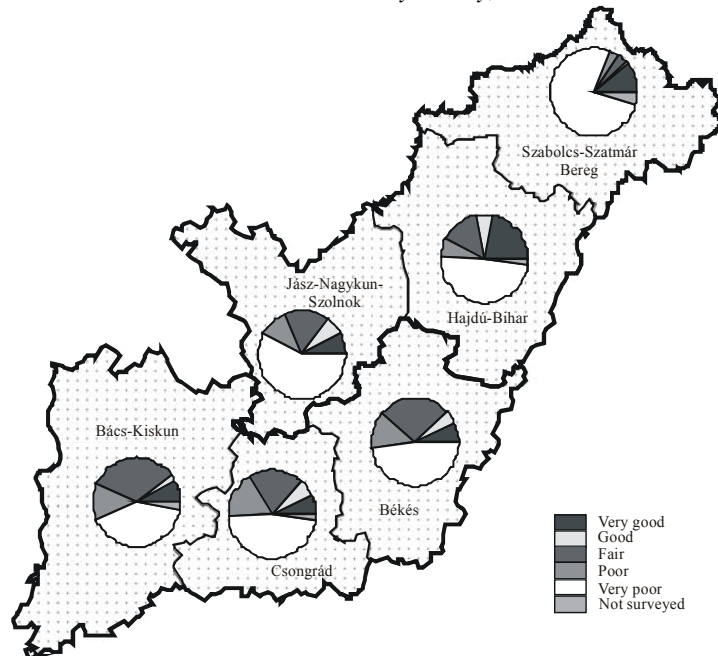
Figure 1



The condition of national public roads is surveyed by the Hungarian Roads Management Company, and data on the main surface defects are collected from the following points of view: the condition of the pavement, the evenness of the surface and the load-bearing capacity of the road.

Figure 2

The condition of the pavement of national public roads in the Great Plain by county, 2008



Source: Hungarian Roads Management Company.

As regards the condition of the pavement (including potholes and other depressions in the road surface) in 2008, 64% (almost 6 500 km) of the Great Plain's road network did not meet specified requirements. A further 19% (2 000 km) was considered fair on the five-grade scale, while the proportion of good or very good units was 15% (1 500 km). (The remaining 2% was not surveyed.) These proportions vary considerably in the different counties of the Great Plain. The percentage of top-quality roads was the highest in Hajdú-Bihar at 22%, while in Szabolcs-Szatmár-Bereg the rate of very poor sections (76%) is well above average.

Evenness reflects the rutting of the road surface caused by the wheels of vehicles. In this respect 47% of the roads, about 3 100 km, were classified as better than fair, 13% belonged to the middle category and 37% of the network was poor or very poor in 2008.

In terms of load-bearing capacity, half of the area's national public roads are at least good, 10% are fair and 35% are below the acceptable level. (The survey did not cover 6% of the network.)

Within the whole network the main roads are in a better state of preservation as regards each of the aspects mentioned than the secondary roads, and over recent years the condition of the Great Plain's national public roads has not changed significantly.

Accessibility index

Among other factors, the retention of population and the economic development of a certain region or settlement can be influenced by its accessibility by road. Better accessibility contributes to competitiveness and attracts direct investments, thereby creating jobs. This accessibility is mostly determined by the distance between the settlements and the central towns of an area, as well as by the proximity of express roads.

At micro-regional level, the average accessibility time between a settlement and its micro-regional centre is expressed by the indicator of accessibility on weekdays. (The accessibility indices are based on time and not distance.) Because of the low number of crossing points, the Danube is a sharp dividing line in both a social and economic sense. Moreover, Bács-Kiskun county, which is bordered by the river, has a special settlement structure with scattered farmsteads, thus the western part of the county can be regarded as an especially isolated area in terms of the indicator of accessibility on weekdays. On the other hand, the north-eastern frontier corner of Szabolcs-Szatmár-Bereg county is also difficult to reach in consequence of the lack of transport infrastructure and the unsuitable standards of the existing roads. Within these two areas of the Great Plain the accessibility circumstances are especially unfavourable in the Bácsalmás and the Fehérgyarmat micro-regions, where the index is the highest not only in the Great Plain but nationwide. At the same time, among the micro-regions with a county seat the Debrecen, Békéscsaba, Nyíregyháza and Szeged micro-regions are ranked in the first ten in Hungary. Furthermore, the average accessibility time in the Szolnok and Kecskemét micro-regions is also less than 10 minutes.

Figure 3

Indicator of accessibility on weekdays, 2007

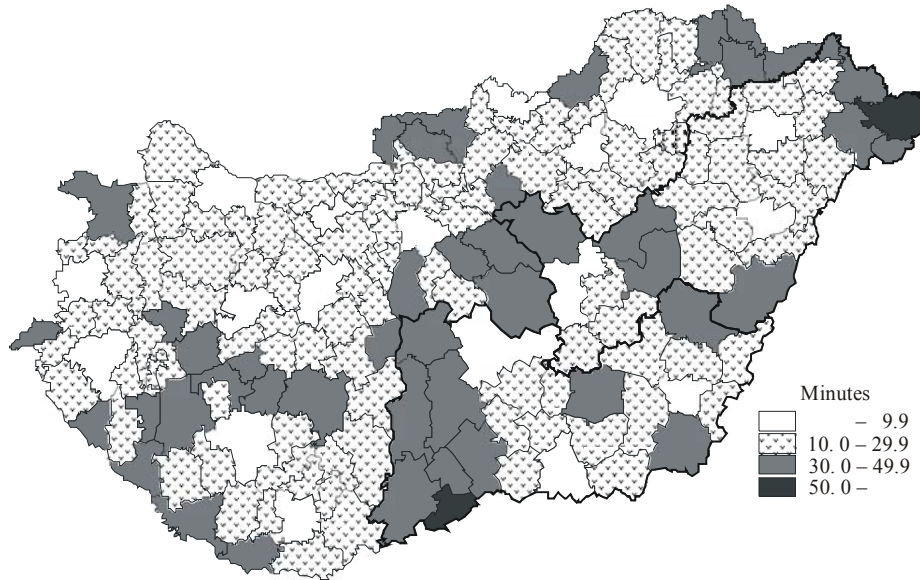
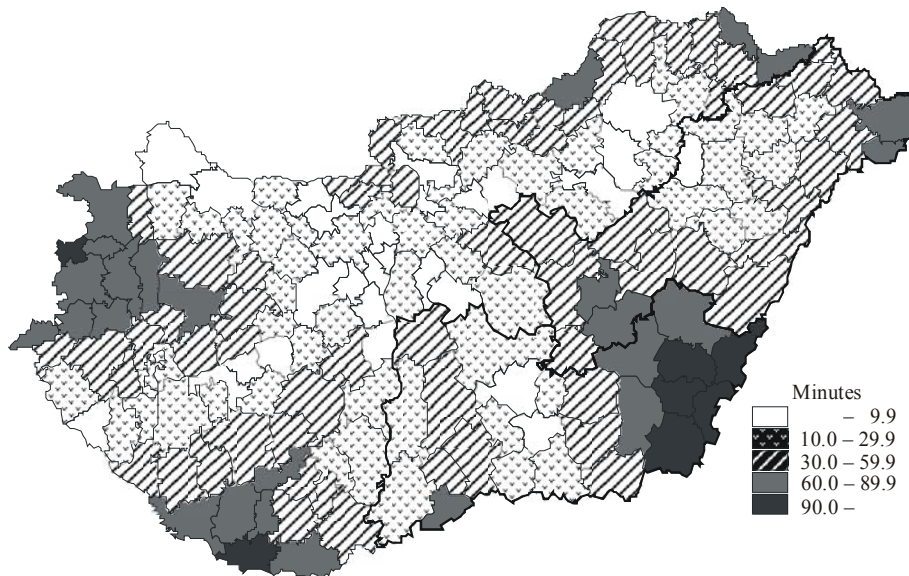


Figure 4

Indicator of accessibility to express road junction, 2007



Concerning the indicator of accessibility to express road junctions, the situation of the micro-regions lying along the motorways is the most favourable. From the settlements of

the micro-regions of Polgár, Kiskunfélegyháza and Kistelek it takes less than 10 minutes on average to reach the closest motorway. Furthermore, seven other micro-regions (Kecskemét, Debrecen, Szeged, Nyíregyháza, Hajdúböszörmény, Nagykálló and Hajdúszoboszló) are situated within 15 minutes of the high-speed road network.

On the other hand, it takes more than one and a half hours to get onto an express road from five micro-regions which have no motorways in Békés county.

Bus and coach transport

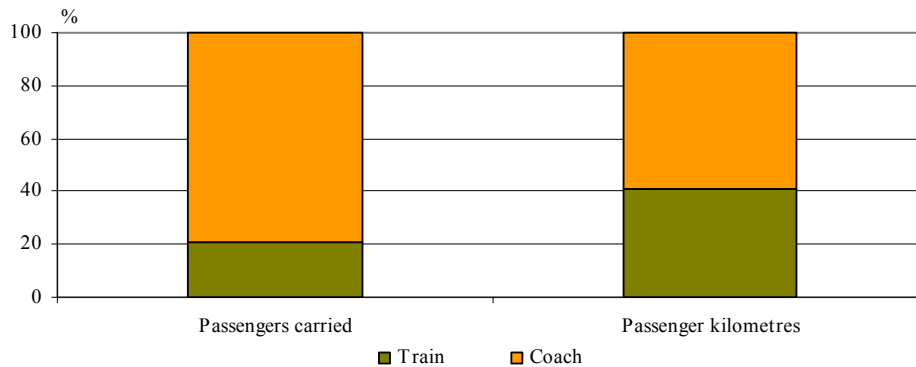
In Hungary the role of public transport in travel is more important than in the EU generally. The average of the 27 member states in 2007 shows that cars had a huge share (83%) in passenger transport, while the proportions of rail and scheduled road transport were much lower at 7% and 10% respectively. In Hungary the share of cars is 62%, and the importance of trains and coaches is higher than the community average (13% and 25%). We have analysed the features of bus and coach services on the basis of data provided by enterprises with 50 or more employees.

In Hungary most of the passengers who used scheduled interurban transport preferred coach travel to other forms of public transport. (In 2008 eight-tenths of passengers chose to go by coach.) In the breakdown of interurban passenger transport – expressed in passenger kilometres¹ – buses are relatively more important in short-distance travel, while over longer distances rail transport comes to the fore. The average distance travelled by bus was 22 km in 2008 compared to an average distance travelled by train of 57 km.

In 2008 the scheduled internal passenger transport of the Great Plain was operated by 7 Volán coach transport companies, and their long-distance coach lines reached every settlement in the area. A decade ago the service was incomplete as some villages in the Northern Great Plain – namely Fényeslitke, Komoró, Tiszagyulaháza and Újtikos – did not have a bus station.

Figure 5

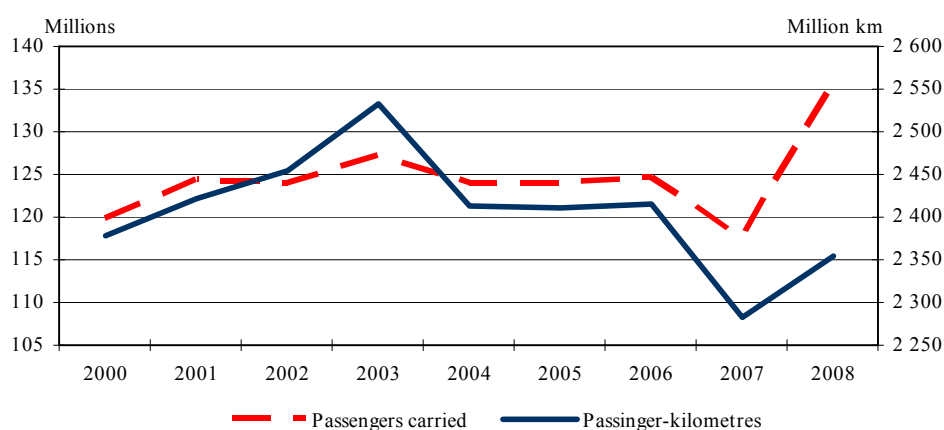
Breakdown of interurban passenger transport by main service providers in Hungary, 2008



¹ One passenger kilometre: the carriage of one passenger over a distance of one kilometre.

Among the main towns of the Great Plain counties, Kecskemét, which is closest to Budapest, has the most return coach services to the capital, 39 per day. Szeged is connected to the capital city by 8 return coach services each day, Szolnok and Békéscsaba by 2 each, and Nyíregyháza by only one. Scheduled coach services are becoming less and less important or are not available in towns served by train, which is faster and more comfortable. Such a town is, for instance, Nyíregyháza, mentioned above, or Debrecen, situated on the same train line with considerable international traffic. The latter does not have a through coach service connection to Budapest.

Figure 6

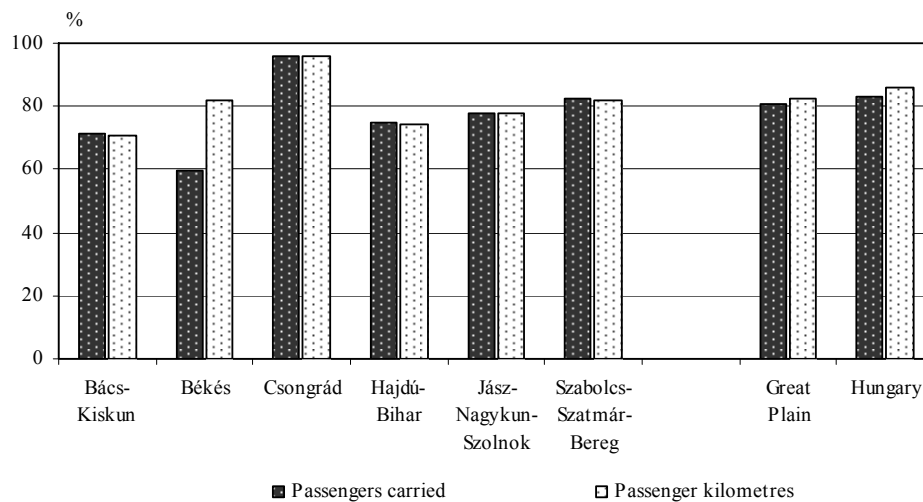
Trends of interurban coach transport in the Great Plain

In 2008, 135.6 million passengers were carried by long-distance coaches in the two regions of the Great Plain. This represents a considerable increase (13%) compared to 2000, which can be attributed to the performance of only two counties in the area. In Csongrád county and in Hajdú-Bihar county the number of passengers carried was 70% and 15% higher than eight years beforehand respectively. In parallel with the rising number of passengers, passenger kilometres also increased until 2003, but then fell almost continuously until 2007. In 2008 scheduled interurban passenger transport showed a slight year-on-year increase of 2% in passenger kilometres and a rise of 15% in the number of passengers, thus mostly passengers travelling shorter distances returned to coach services.

As regards international passenger traffic, trains are preferred to coaches because they are more comfortable and less tiring over long distances. For this reason international services by the coach lines of the Great Plain are very rare, even to neighbouring countries. The county seats of the Great Plain are connected by regular coach lines to only a few larger towns in Romania and Serbia. This means that only 1 or 2 coaches run on some days of the week. Szeged has the most “external connections”, followed by Kecskemét with far fewer external coach lines, whereas the other county seats (Szolnok, Debrecen, Nyíregyháza and Békéscsaba) are located along international railway lines. This explains why their external coach transport is insignificant, especially in view of the number of international railway services connecting these cities.

Figure 8

*Passengers and passenger kilometres of the local bus networks, 2008
(2000=100%)*



The decrease in the number of passengers was larger in every county (except for Csongrád) than in the whole country. In 2008 in the Great Plain 711 000 passengers travelled by local bus each day on average, Csongrád county having the highest average (230 000 passengers/day) and Békés county the lowest (34 000 passengers/day).

Between 2000 and 2008 the output of the local bus transport in the Great Plain measured in passenger kilometres fell by more than the national average, by nearly 18% to 978 million passenger kilometres. Similarly to the number of passengers, this decrease was higher in every county of the Great Plain (except Csongrád) than the national average.

In 2008 local bus services in the Great Plain covered a total distance of 1 140 km, more than the quarter of the whole country's network. This represents an increase in the area of almost one tenth compared to 2000. This growth did not occur in every county. In Hajdú-Bihar and Bács-Kiskun counties the length of the network was extended significantly (by four tenths and more than one quarter respectively), while in Szabolcs-Szatmár-Bereg and Jász-Nagykun-Szolnok counties the network was shortened considerably.

594 vehicles were used to provide local bus services in the Great Plain in 2008, up by just 2% compared to 2000. Local buses ran on 306 urban routes with a total length of 2 400 km. During the period examined, the number of the routes decreased slightly, but their length increased by almost 120 km. While some route modifications and discontinuations aimed to eliminate parallelism, in most cases they resulted in more restricted services. Szabolcs-Szatmár-Bereg and Jász-Nagykun-Szolnok counties, where both the number of urban routes and their length decreased significantly, were particularly affected.

Local fixed track transport

In Hungary, the inhabitants of more than 100 settlements can travel by local public bus, but tramlines run in only four cities and trolleybus transport operates in only three cities. Two of these cities are regional centres of the Great Plain, Debrecen and Szeged. In both cities the tram network was completed in the early 1960s. The closure of tramlines started in Debrecen in the first half of the 1970s and even earlier in Szeged, in the second half of the 1960s. The last closures were made in Debrecen in 1975 and in Szeged in 1977. The role of the closed tramlines was taken over by buses and later some were replaced by trolleybuses. The reconstruction of tram transport started two decades later, essentially after the millennium. Today there is only one 8.8 km long line in Debrecen. In Szeged, where there were fewer cuts, there are four lines with a total length of 24.5 km.

Neither the tram network nor the rolling stock was developed for a long time. The reconstruction of the tram network only started a few years ago, when rails were updated, the old tramcars were changed and the Szeged network was enlarged, the length of lines increasing by 7 km and the length of urban routes² expanding by 16% compared to 2000.

Table 1

Lines and urban routes of fixed track transport, 2008

Length and routes	Debrecen		Szeged	
	tram	trolleybus	tram	trolleybus
Length of lines (constructed length), kilometre	5.6	12.2	16.3	26.7
Length of rails, kilometre	10.5	–	24.8	–
Number of urban routes	1	3	4	4
Length of urban route, kilometre	8.8	27.5	24.5	22.5

Trolleybuses have been running in Szeged since 1979 and in Debrecen since 1985. Since then, many modifications have been made to local trolleybus transport as well. In 2008 there were 3 trolleybus routes connecting different parts of the cities in Debrecen and 4 routes in Szeged with respective lengths of 27.5 and 22.5 km. Trolleybus transport was expanded in both cities compared to 2000. The level of development was greater in Debrecen in terms of urban routes (about 70%) and in Szeged in terms of lines (over 100%). In Debrecen the renewal of the trolleybus stock saw the introduction of 2-axled, partly or totally low-floor Ganz Transelektro vehicles. In Szeged articulated Ikarus vehicles and Soviet trolleybuses in service since the first half of the 1990s are gradually being replaced by used Czechoslovakian Skoda trolleybuses. Today most of the trolleybuses are of that type, but a few of the older vehicles can still be seen on the streets of the city.

² The length of urban routes differs from the length of lines if a section of line is used by more than one route. Such sections are multiplied by the number of routes using it.

Table 2

Stock of trams and trolleybuses, 2008

Stock of vehicles	Debrecen		Szeged	
	vehicles			
	number	capacity, person	number	capacity, person
Tram total	21	3 259	43	5 467
Of which: railcar	2	203	16	1 732
articulated car	19	3 056	25	3 535
trailer	–	–	2	200
Trolleybus total	33	2 827	42	4 477
Of which: articulated	4	452	22	2 892

Experience and passenger counts both confirm that demand for local public transport services have decreased in recent years. This is particularly true of tram transport. In 2008 nearly 19 million passengers travelled by tram in Debrecen and 14 million in Szeged, 25% and 11% less than at the beginning of the decade respectively.

Table 3

Output of local tram and trolleybus transport, 2008

Number	Debrecen		Szeged	
	absolute value, thousand	2000=100.0	absolute value, thousand	2000=100.0
	<i>Tram</i>			
Number of passengers	18 903	74.7	13 948	89.1
Passenger kilometre	43 480	74.8	33 399	100.1
	<i>Trolleybus</i>			
Number of passengers	13 125	89.7	17 552	114.7
Passenger kilometre	39 111	89.7	42 712	119.6

There was not such a pronounced decline in trolleybus transport and indeed in Szeged there was quite an appreciable rise due to network development, with the output calculated in passenger kilometres showing a marked increase. Nonetheless, the changes in tram and trolleybus transport did not cause any substantial realignment in the use of public transport types (including buses) between 2000 and 2008. The respective rates of use of tram, trolleybus and bus services among the average number of passengers per day calculated over 9 years were 17%, 11% and 72% in Debrecen (376 000 passengers per day), and 12%, 16% and 72% in Szeged (324 000 passengers per day).

Trams are used for short journeys, which explains the smaller share of trams in terms of passenger kilometres, i.e. 12% in Debrecen and 8% in Szeged.

Until recently, local public transport in both cities was organised by two companies, a municipally owned transport company overseeing tram and trolleybus transport (DKV in Debrecen and SZKT in Szeged), and Hajdú Volán in Debrecen and Tisza Volán in Szeged providing bus transport. This remains the situation in Szeged, but in Debrecen the DKV took over all types of local public transport in July 2009.

The local transport companies of both cities have decided to make major developments in tram transport. After the renovation of the existing line in Debrecen, a totally new second line is going to be constructed, and in Szeged line 2 will be extended by a new section.

Railway transport

In 2008, 18% of goods and 32% of interurban passengers in Hungary were transported by train. This means that the role of railway transport was around the EU-27 average for freight and above average for passenger transport.

Hungary's main railway lines, like its public road network, connect the capital city with county seats. Four main lines provide the frame of the railway network of the Great Plain. These are the Budapest–Szolnok–Debrecen–Nyíregyháza–Záhony, the Budapest–Szolnok–Békéscsaba–Lökösháza, the Budapest–Kunszentmiklós–Kelebia and the Cegléd–Kecskemét–Szeged international lines.

In 2008 the length of operating railway lines in the Great Plain was 2 900 km, and the density rate of the network (80 km/1 000 km²) marginally exceeded the national average (78 km/1 000 km²). In this region the density of the network was the highest in Szabolcs-Szatmár-Bereg county (96 km/1 000 km²) and the lowest in Bács-Kiskun county (70 km/1 000 km²).

The rate of electric railway lines (27%) is lower than the national average (36%). 57% of the electrified sections are concentrated in areas neighbouring on Central Hungary, in Jász-Nagykun-Szolnok and Bács-Kiskun counties. These areas have longer stretches of main line tracks.

Table 4

Length of operating railway lines, 2008

(kilometre)

County, region	Length of lines	Of which		
		electrified	simple	double or multiple
			track	
Bács-Kiskun	591	204	564	27
Békés	437	79	399	38
Csongrád	310	48	310	–
<i>Southern Great Plain</i>	<i>1 338</i>	<i>331</i>	<i>1 273</i>	<i>65</i>
Hajdú-Bihar	460	76	384	76
Jász-Nagykun-Szolnok	502	243	307	196
Szabolcs-Szatmár-Bereg	568	134	486	83
<i>Northern Great Plain</i>	<i>1 530</i>	<i>453</i>	<i>1 176</i>	<i>354</i>
<i>Great Plain</i>	<i>2 868</i>	<i>784</i>	<i>2 449</i>	<i>419</i>
<i>Country total</i>	<i>7 269</i>	<i>2 628</i>	<i>5 935</i>	<i>1 334</i>

The rate of double or multiple track railway lines was 15% in the Great Plain and 18% in the whole country in 2008. In this case a significant difference can be observed between the two regions of the Great Plain. The Northern Great Plain is ranked the highest among rural regions of Hungary in terms of both track length (354 km) and the

proportion of double and multiple tracks (23%), while the Southern Great Plain is only in sixth place in the ranking in both regards (65 km and 5%).

The state of main railway lines is more favourable than that of branch lines for electrified and multiple tracks as well. On some branch lines there are permanent speed limits due to worn rails.

Air transport

Air transport in the Great Plain is served by several smaller airports with different classifications. The most important of them is the Debrecen Airport, which has operated as an international commercial airport and permanent border crossing since 2003. At present there are no continuous scheduled flights, and most passengers are tourists of international charters. In 2008 the number of passengers was 43 000, a slight fall year-on-year, but an increase of 29% compared to 2005. While the number of passengers rose between 2005 and 2008, the number of flights decreased significantly, by 46% to be precise, which suggests growth in flights with larger passenger capacity.

Water transport

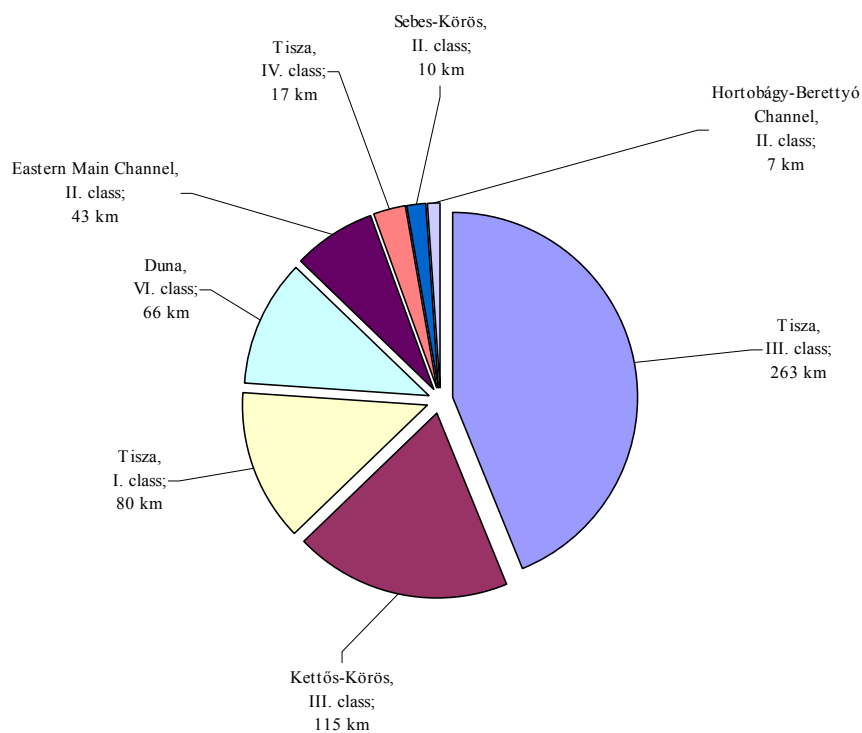
The geographic conditions of the Great Plain are highly favourable for waterways because the area is flat, but different sections of the rivers vary in size. The total length of the Great Plain's rivers navigable by large vessels is 601 km, of which the river Tisza accounts for 360 km. The unnavigable stretches are frequently used for tourism and water sports.

The classification of navigable waterways is based on the internationally accepted standard of the UN Economic Commission for Europe. Classes I to III are for regional waterways, and classes IV to VI indicate international inland waterways. Of the Great Plain's rivers, almost the full length of the Danube crossing the region (with the exception of one bottleneck) complies with the watercourse parameters established in the recommendation of the Danube Commission, and is a class VI (international) waterway.

A 419 km stretch of the 584 km section of the river Tisza in Hungary flows through the Great Plain. The navigability of the river is limited by freezing weather in winter and low water in summer, thus the shipping period of the Tisza fluctuates between 265 and 295 days. The river Tisza is navigable from Vásárosnamény, and the other sections are suitable only for water tourism. The section of the Tisza with the best classification (class IV³) is the wider part at the southern border. The other sections of the river are mainly class III due to narrow and shallow parts and one section, between Vásárosnamény and Dombrád, is in class I.

³ Class IV: two-way traffic for 1 350 ton vessels.

Figure 9

Breakdown of navigable rivers of the Great Plain

Source: Veres, 2001

Of the influents of the Tisza, the Körös has class II and III sections and a part of the Eastern Main Channel is class II.

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