The State of Affairs of Transportation and Delivery in Hungary, Sustainability Studies, the Introduction of European Tendencies

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Transportation and delivery play a vital role in the economy, an efficient transportation system has a determining role in it. Its importance is far more significant than what the transportation sectors proportionally represent. The ratio of transportation and warehousing, which belongs to the national economy sector H according to Unified Sectoral Classification System of Economic Activities, in the total output of the Hungarian economy in gross added value of the national economy is 5.7%, its share in employment is 5.9%, and about 5% of active enterprises can be found in this sector (2010 data).
Keywords: Transportation, infrastructure, employment, efficiency

1. INTRODUCTION

An effective transport system has determinative roles in the development and dynamic functioning of an economy. Its importance is far greater than what each transportation sector represent in proportions. Globalisation has increased the significance of transportation, the sector is now the engine of the economy. The unified transport development of the EU is based on ideas laid in the "White Paper, European Transport Policy for 2010: Time to Decide" document published in 2001. These ideas give preference to the headway of rail transport, they aim to strengthen waterway transport by developing inland waterways and sea routes, and also they target to create a safer transport by eliminating congestions. Circumstances could be impressively improved by harmonizing and connecting transport systems of significant capacity. Hungary has to adapt to these ideas.

2. THE INTRODUCTION OF TRANSPORTATION OF GOODS AND PASSENGERS

Regarding transportation Hungary has a significant disadvantage compared to other EU member states. The quality of Hungarian public roads is beneath all criticism, thus this factor needs great improvements. The moderation of the capital-centred transport system is an equally important task; furthermore the poor condition of the facilities in the capital city is due to former negligence.

The EU expects sustainable and long-term transport policies from its member states and it aims to build a transport network that is capable of progress, free from internal obstacles and helps social development. Equally important is the harmonization of transport policies, i.e. the restoration of the ratio between the transport branches, a task that is also timely from environmental perspectives.

ABAYNÉ HAMAR et al. (2012) state that our energy utilization has to be transformed, sustainable energy utilization has to be realised. According to the energy utilization chapter of the National

Sustainable Development Strategy: 'it has to be aimed in the long-term that usage and import of fossil energy resources decrease to a minimum or perhaps come to an end'. Transport, being one of the major users, has a key role in this development.

Motorway toll fees contribute to the equalization of transport branches by forcing back automobile usage and applying the "polluter pays" principle.

Fee policy principus are connected with this. Transformation of tariff policy is needed in order to preserve the state of the public road system, to expand subsidizing sources, and to create a fairer burden bearing policy for the participants of transport. The foundations of this are laid in the debate so called Green Paper and in the fee policy White Paper, which is edited on the basis of professional business federation agreements of the Green Paper and contains the fundamental principles of tariff charging and the measuring plans for its realization (http://3k.gov.hu/pages/index.jsf?p=2&id72912).

Transport and storing (national economy branch H according to TEÁOR '08) bore an important part in the overall performance of the Hungarian economy in 2010. According to data from the Hungarian Central Statistical Office, the sector's 1,278 billion output contributing 5.7% to the annual gross added value of the national economy in 2010. Nearly 20% of the national wealth is made up of transport infrastructure and around 5% of active enterprises can be found in this sector. There are nearly 30,000 active enterprises in this sector with regular sales and employees.

There are about 150 thousand employees working in the sector – although this number is decreasing gradually (table 1).

Table 1Gross average incomes and the number of employees in the transport sector

Title	**Number of employees**				**Monthly gross average earning HUF/person**
	2000	**2008**	**2009**	**2010**	
Inland pipeline transport	107 526	96 186	90 290	91 829	174 586
Interurban railway passenger transport	26 094	8 869	8 826	--	--
Rail transport of goods	9 174	3 392	3 384	4 738	255 096
Other inland passenger transport	43 376	39 069	38 628	39 236	205 696
Urban, suburban, inland passenger transport	32 154	27 729	26 411	25 071	224 633
Taxi passenger transport	805	922	900	903	135 429
Other inland passenger transport	10 416	10 416	11 316	13 263	173 246
Road transport	**28 841**	**44 222**	**38 748**	**39 936**	**123 738**
Removals	36	30	70	68	128 016
Waterway transport	1 819	908	798	763	178 194
Air transport	3 311	2 064	2 029	1 770	433 472
Supplementary activities to warehousing and transport	46 839	54 842	55 326	54 517	247 317
Warehousing, storing	3 179	5 349	4 788	5 452	214 803
Supplementary activities to transport	43 660	49 494	50 538	49 064	250 805
Total	159 495	154 00	148 44	148 879	204 410
Of which:	156 722	0	3	142 614	204 410
full-time workers	2 773	148 57	142 31	6 265	--
part-time workers		5	9		
		5 425	6 124		

Source: Hungarian Statistical Yearbook of Hungarian Central Statistical Office, 2010

Gross average earnings at air transport are outstanding. Investments of this branch are significant, giving one-fifth of the total investments in the transport sector (table 2).

Table 2 Value of investments (at current prices)

Title	2005	2008	2009	2010
National economy total, billion HUF	3 394	3 497	3 095	3 282
Transport, billion HUF	554	593	649	647
Ratio of transport sector investments to aggregate investments %	16.3	17.0	21.0	19.7

Source: Hungarian Central Statistical Office, 2011

3. INFRASTRUCTURE, ECONOMIC OUTPUT

Data of transport infrastructure are illustrated in table 3.

Table 3 Transport Infrastructure (total length of lines – km)

Modes of transport	2005	2008	2009	2010
Public road	30 809	31 363	31 377	31 628
Railway	7 704	7 491	7 573	7 577
Inland waterways	1 440	1 440	1 440	1 440

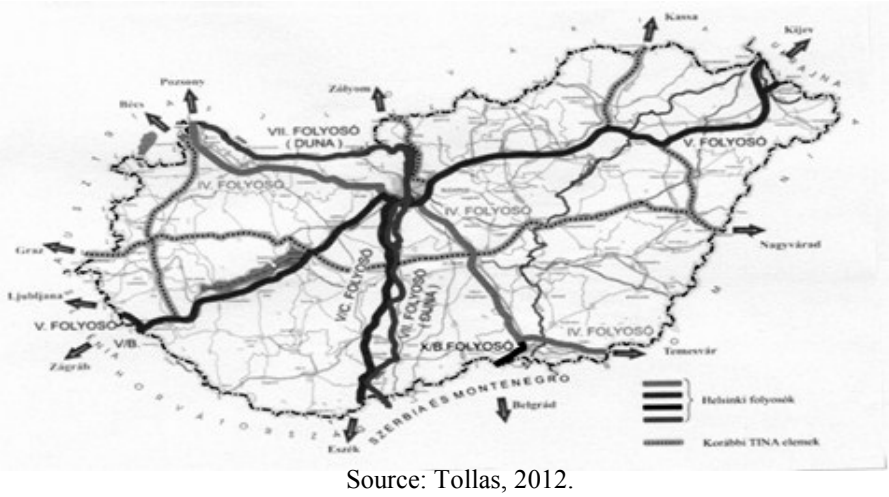
Source: Hungarian Central Statistical Office, 2011

The Hungarian public road system consists of national public roads connecting settlements (31 628 km) and public roads owned by local governments (167 939 km).

The length of motorways has increased at a rapid pace. Hungary built its clearways by exceeding its own possibilities. The section of the M6 motorway, connecting Dunaújváros and Szekszárd, was brought into use in 2010. With its 12 km motorway/1000 square kilometres, the public road infrastructure is still far behind the EU 27 average, which is 15km of motorway/1000 square kilometres.

From the perspective of transport, Hungary is situated in the central area, interconnecting roads go through the country (figure 1).

Figure 1 Trans-European Transport Network



Source: Tollas, 2012.

Red, green, black, blue line Helsinki's corridor, Earlier TINA elements

In Hungarian there are four transit corridors, three airports and seven ports:

Four transit corridors

IV. From the Austrian and Slovakian boarder towards Romania.
V. From the south-western border to north-eastern direction. The main branch crosses the border from Slovenia, branch V/B crosses the border from Croatia, while branch V/C crosses it from the direction of Bosnia-Hercegovina and heads towards Ukraine.
VII. Waterway of the Danube from Austria to Romania.
X. The X/B branch goes from Budapest to the borders of Serbia and Montenegro.

Three airports

Budapest Liszt Ferenc
Debrecen
Sármellék

Seven Ports

Győr-Gönyű
Komárom
Budapest-Csepel
Dunaújváros
Baja
Mohács
Szeged

The national road network is presented in table 4.

Table 4 The national road network (km)

Year	Clearways		Main roads			Side-roads	Total
	Motorways	Motor roads	First -rate main roads	Second-rate main roads	Junction branches of clearways		
2000	448	57	2 173	4 330	242	23 057	30 307
2001	446	57	2 173	4330	251	23 063	30 322
2002	533	48	2 164	4 346	276	23 093	30 460
2003	542	90	2 177	4 337	286	23 104	30 536
2004	569	117	2 165	4 346	303	23 138	30 638
2005	636	129	2 174	4 379	349	23 141	30 808
2006	785	129	2 196	4 409	421	23 119	31 058
2007	858	174	2 155	4 417	449	23 130	31 183
2008	911	205	2 146	4 442	512	23 147	31 363
2009	911	205	2 146	4 451	519	23 146	31 377
2010	1 067	205	2 155	4 461	580	23 161	31 628

Source: own edition, by Hungarian Central Statistical Office, 2011

Concerning the absolute length of railway lines and the length of railway lines per 100 km^2, Hungary is among the first third countries in Europe. The length of new standard gauge railways was 7525 km in 2010. Concerning the quality and standards of the tracks we are among the countries in the last third. The length of electrified lines in the EU was 52.2% in 2009, while 37.8% in Hungary.

The number of riverside ports in 2010 was 53, the determinant ones in water transport are the ports of Baja, Csepel and Győr-Gönyű. The air transport is dominated by three airports (table 5).

Table 5 Data on the main airports of Hungary (2010)

Name	Runway	Length of runways, meter	Ground
Budapest Liszt Ferenc International Airport	2	3 707 2 010	concrete/asphalt concrete/asphalt
Regional airports			
Debrecen Airport	4	2 500 2 500 2 500 1 000	concrete concrete concrete grass
Fly Balaton Airport (Sármellék)	2	2 500 1 000	concrete grass

Source: www.hungaryairport.hu

The length of the pipeline network in 2010 was 7.8 thousand km (a 1% increase compared to the previous year) of which the gas-pipeline length increased by 1% to 5.6 thousand km, while the length of oil (0.8 thousand km) and other hydrocarbon pipelines (1.4 thousand km) did not change.

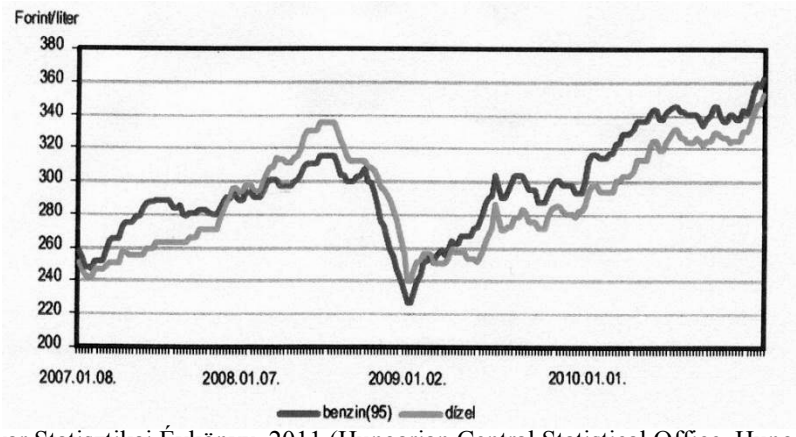
The public road motor vehicle fleet in 2010 consisted of 3 million 610 thousand vehicles, with and average age of 11.4 year. Less than 3 million motor vehicles participated in public road transport. 67% of the transport of goods was implemented on public roads – on the basis of freight ton kilometre – however, pipeline transport (11%) and water transport (5%) were also significant.

The rate of domestic transport output in freight ton kilometre is 34%. The role of international transport is dominant, in 2010 it had a 65% share. Rail transport performances are realised mostly by transit-transports in- and out of the country.

In local passenger transport buses have a dominant role (56% of the passengers), while trams (22% of passengers) and underground (15% of passengers) are also significant. The performance of interurban passenger transport counted in passenger kilometre increased to 25.2 billion in 2010, of which 11.9 billion was realised coach and 5.6 billion by air transport.

Profitability of transportation was weakened by lessening transport demands and the increase in the fuel prices. Excise duty in January was further increased. Fuel price trends influence the national economy as a whole. The fluctuation of domestic fuel prices is influenced mainly by the international market price of oil and the exchange rate of the local currency (HUF). The annual average USD/HUF medium rate was 172 in 2008, 202 in 2009 and 208 in 2010. The changes are demonstrated in figure 2.

Figure 2 The development of fuel prices



Source: KSH, Magyar Statisztikai Évkönyv, 2011 (Hungarian Central Statistical Office, Hungarian Statistical Yearbook) Blue line: petrol (95), Red line: gasoline

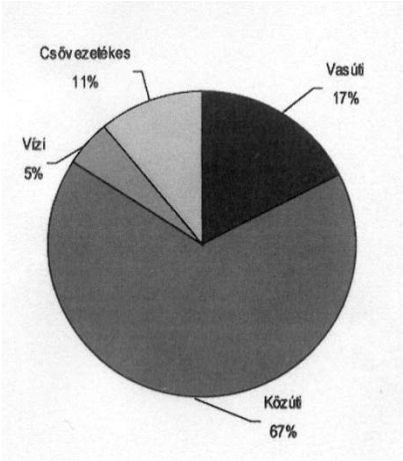
High maintenance costs, need for investments, accumulated debts and the state of facilities decrease the competitiveness of passenger transport. The economic performance of the Hungarian State Railways Ltd. (MÁV) and Budapest Transport Company Ltd. (BKV) influence the central budget. The balance sheet loss of BKV in 2009 was HUF 23.5 billion, its debts reached HUF 79.3 billion. The balance sheet loss of MÁV in 2009 was HUF33.9 billion, in 2010 it was HUF 43.1 billion (according to preliminary data) and its total debt was HUF289 billion. (BKV, MÁV year 2009 report).

Transport services are regularly characterized by annual activity, in 2010 along the 802 export level; there was a HUF 571 billion import level, too. In 2010, the number of enterprises that according to their statistical main activity belong to this national economy sector was more than 14 thousand and the net income achieved by them was more than HUF 3 208, meaning a HUF 120.5 billion positive business activity performance. Rail and air transport branches closed with a negative performance in 2010, the result of their economic activities was a HUF 20 billion loss.

4. TRANSPORT PERFORMANCES

Concerning the transport of goods, road transport is still dominant. However, performances of rail, inland waterways and pipeline transport are showing an increasing tendency. Data is demonstrated in figure 3.

Figure 3 Distribution of freight transportation performances on the basis of freight ton kilometer (2010)



Source:KSH, 2011. (Hungarian Central Statistical Office) Red: road-, blue: railway-, grey: pipeline-, orange: water-transportation

Table 6 displays the changes in the performances of the transportation of goods and passengers.

Table 6 Transport capacities

Year	Freight transport		Interurban		Local	
			Passenger transport			
	thousand tons	million freight ton kilometer	million person	million passenger kilometer	million person	million passenger kilometer
2001	207 043	26 241	756	25 546	2 464	9 726
2002	293 845	30 959	756	26 102	2 455	9 684
2003	291 227	32 614	744	26 418	2 447	9 645
2004	297 581	36 714	737	27 217	2 422	9 556
2005	314 032	42 026	720	26 736	2 489	9 206
2006	338 642	48 426	722	27 733	2 413	8 924
2007	331 518	53 912	682	26 887	2 332	8 607
2008	343 954	53 522	691	25 989	2 297	8 523
2009	303 078	50 154	651	24 881	2 179	8 048
2010	280 020	50 565	663	25 153	2 057	7 549

Source: Hungarian Central Statistical Office, Hungarian Statistical Yearbook, 2011.

The past period showed an impressive growth in freight transport but passenger transport stagnated. The transportation capacities are categorised and explained in table 7.

Table 7 Transportation capacity (2010)

Type of transportation	Rail	Road	Domestic waterway	Air	Pipeline	Total
	transportation					
Weight of goods carried, thousand tons						
Domestic	11 398	171 226	30	-	7 980	190 635
International	34 396	28 622	9 921	16	16 430	89 385
Of which:						
import	12 768	8 427	1 819	1	13 585	36 601
export	11 859	9 820	4 453	2	-	26 134
transit	9 769	10 275	3 649	13	2 844	26 650
Total	**45 794**	**199 848**	**9 951**	**16**	**24 410**	**280 020**
Freight-ton kilometre, million						
Domestic	1 341	11 285	4	-	1 037	13 667
International	7 468	22 435	2 389	20	4 585	36 897
Of which:						
import	2 604	6 428	288	1	3 309	12 630
export	2 124	7 282	718	3	-	10 128
transit	2 740	8 725	1 383	16	1 276	14 139
Total	**8 809**	**33 721**	**2 393**	**20**	**5 623**	**50 585**
Average length of transportation, km						
Domestic	117,6	65,9	127,4	-	130,0	71,7
International	217,1	783,8	240,8	1 239,5	279,1	412,8
Of which:						
import	203,9	762,8	158,2	1 401,5	243,6	345,1
export	179,1	741,6	161,3	1 459,0	-	387,5
transit	280,5	841,0	379,0	1 196,2	448,5	530,6
Total	**192,4**	**168,7**	**240,5**	**1 239,5**	**230,3**	**180,6**

Source: Hungarian Central Statistical Office, Hungarian Statistical Yearbook, 2011.

Passenger transport is dominated by coach transport showing slight fluctuation (Table 8).

Table 8 Passenger transport

Means of transport	Number of passengers, thousand		Passenger kilometre, million		Revenue from fares, million HUF	
	2009	2010	2009	2010	2009	2010
Interurban						
Total	**650 832**	**663 191**	**24 881**	**25 153**	**204 536**	**210 881**
Rail	142 811	140 519	8 073	7 692	38 463	41 666
Coach	502 589	517 519	11 321	11 860	81 605	87 598
Ship	859	641	18	14	826	668
Airplane	4 573	4 512	5 469	5 586	83 643	80 950
Local						
Total	**2 179 372**	**2 056 961**	**8 048**	**7 549**	**72 785**	**70 367**
Of which:						
Coach	1 228 648	1 152 023	4 759	4 484	40 073	39 184
tram, trolley-bus	562 362	544 261	1 395	1 351	18 308	17 982
metro, underground	314 929	301 556	1 399	1 339	11 397	11 178
suburban railway	73 433	59 121	494	376	3 007	2 023

Source: Hungarian Central Statistical Office, Hungarian Statistical Yearbook, 2011.

There is a growing proportion of road transport in the Hungarian transport system, a contradictory change started in 2010, but it is negligible. The ratio of water transport is far greater in the EU (Table 9).

Table 9 The division of the transport of goods according to modes of transport

(Percentage)

Year	Rail			Road			Inland waterway		
	EU-15[a)]	EU-27[a)]	Hungary	EU-15[a)]	EU-27[a)]	Hungary	EU-15[a)]	EU-27[a)]	Hungary
1995	15,5	--	35,6	76,6	--	58,3	7,6	8,0	6,1
2000	15,1	19,7	28,8[b)]	77,4	73,7	68,1[b)]	7,8	7,5	3,1[b)]
2001	14,5	18,8	28,1	78,1	74,8	67,3	7,7	7,4	4,6
2002	14,1	18,3	28,4	78,7	75,4	65,5	7,5	7,2	6,1
2003	14,3	18,5	27,9	78,9	75,7	66,6	7,6	6,8	5,5
2004	14,1	18,1	28,0	79,1	76,0	65,9	7,4	6,8	6,1
2005	14,1	17,7	25,0	79,2	76,4	69,2	7,2	6,8	5,8
2006	14,9	18,1	23,9	78,5	76,2	71,6	6,8	6,6	4,5
2007	15,2	18,0	20,9	78,0	76,2	74,5	6,8	6,8	4,6
2008	15,2	17,8	20,6	77,9	76,4	74,7	6,7	6,8	4,7
2009	--	--	17,1	--	--	78,8	--	--	4,1

a) Assumed value

b) Methodological fracture

Source: Eurostat, KSH, 2010.

The Danube-Tisza channel would help solve problems like water shortage and desertification. Its essence is that the river Danube and the river Tisza could be connected by a channel starting at or under Csepel Island and flowing into the Tisza at Csongrád.

There is a significant difference in the elevation above sea level therefore 11 locks would help the more balanced water supply, shipping, and it would also solve the transportation problems of the Southern Great Plain. In theory the EU is willing to support a domestic investment of such a great scale.

BOROS (2011) argues that the greatest advantage of the channel would be that the two most disadvantaged regions of the country could be opened up to the world market. On the one hand it would create jobs, and on the other it would facilitate the competitive transportation of goods. If we want to create jobs, it must be achieved locally, and irrigated vegetable growing would be an ideal solution. The work itself does not require either high qualifications or high wages.

Many countries in Europe have a well-developed inland waterway system, which is the cheapest way of transportation. Belgium, Germany, France, and the Netherlands all take advantage of this opportunity, it would be high time for us to follow suit (KEREK et al., 2011).

The Danube-Tisza channel would be beneficial for the water balance of the Tisza-valley and would improve the climate of the region. The man-made reservoirs (primarily for shipping) would make water abstraction possible. Furthermore, leakage from the river-bed could replace subsoil water. According to DEZSÉNYI (2011) the "improvement of the climate" in the Great Plain could be solved only by the implementation of flood- and permanent reservoirs and the related irrigation apparatus. However, we must be aware of the limitations that are presented by the Water Framework Directive (WFD), the specifications for land use in Natura 2000 areas, the demands of WWF on biotope usage regulations, the aspects of shipping, and the interests of landowners. Climate improvement involves rational land use and – where possible – ecological husbandry. Table 10 demonstrates the relevant data.

Table 10 Inland waterway transport in Europe

Country	2007	2008	2009	2010
	Thousand tons			
Belgium	134 647	130 350	108 243	--
Bulgaria	6 622	10 956	17 104	18 372
Germany	248 966	245 674	203 868	229 607
France	76 004	72 753	67 889	72 632
Luxemburg	9 999	10 984	8 172	10 467
Hungary	8 410	8 829	7 745	9 951
The Netherlands	352 615	344 797	271 495	--
Austria	12 107	11 209	9 322	11 052
Romania	29 425	30 295	24 743	32 088
Slovakia	8 013	8 371	7 823	10 103
Croatia	--	6 416	5 381	6 928

Source: Eurostat, 2011.

Passenger transport in the EU is dominated by cars. In Hungary the ratio of coach and rail transport is far greater (Table 11).

Table 11 The division of passenger transport according to means of transport

(Percentage)

Year	Cars			Bus			Rail		
	EU-15[a)]	EU-27[a)]	Hungary	EU-15[a)]	EU-27[a)]	Hungary	EU-15[a)]	EU-27[a)]	Hungary
1995	84,7	--	62,3	8,9	--	26,3	6,4	--	11,4
2000	84,7	83,1	62,1	8,8	9,8	24,8	6,6	7,1	13,0
2001	84,8	--	62,0	8,5	--	24,6	6,6	--	13,4
2002	85,1	83,7	61,5	8,4	9,5	24,5	6,5	6,8	14,0
2003	85,1	--	62,2	8,5	--	24,3	6,4	--	13,5
2004	84,8	--	62,9	8,5	--	23,6	6,6	--	13,5
2005	84,6	83,6	64,6	8,6	9,5	22,5	6,8	6,9	12,9
2006	84,6	83,8	66,0	8,4	9,3	21,9	6,9	6,9	12,1
2007	84,3	83,6	68,1	8,6	9,3	20,8	7,0	7,0	11,1
2008	83,8	83,3	68,1	8,8	9,4	21,4	7,5	7,3	10,5
2009	--	--	69,3	--	--	20,4	--	--	10,3

Source: Eurostat, 2010.

5. PASSENGER TRANSPORT BY AIR

Air passenger transport figure in the European Union came to 800 million passengers in 2008. 44% of it was traffic between member states, 35% involved countries outside the EU, and 21% was realised domestically. The annual passenger transport of Germany, Spain, France, and Italy each exceeded 100 million passengers. The passenger transport in Hungary was 8.4 million people with a slightly increasing tendency. The passenger transport of airlines belonging to Hungarian spheres of interest reached 4.5 million in 2010. The share of Budapest Liszt Ferenc Airport in the passenger transport of all the Hungarian airport was 99.5%.

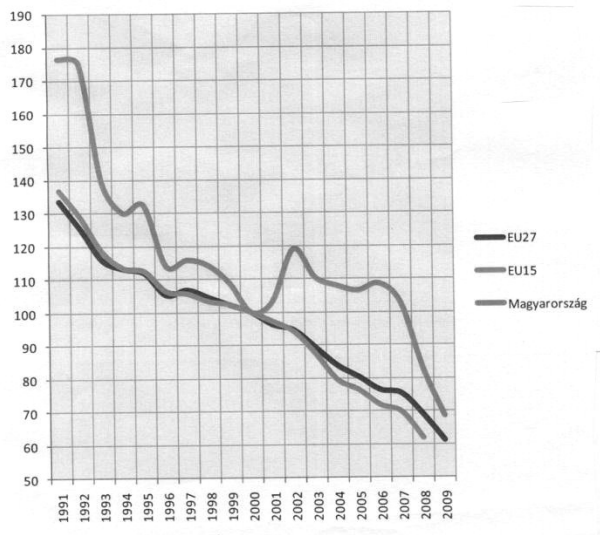
6. ACCIDENT TRENDS

Hungary – similarly to other EU member states – pays great attention to transport safety. The safest mode of passenger transport is air transport followed by water and rail transport. Road accidents are the most frequent ones but their number is decreasing. 740 people died in road accidents in 2010. The number of fatal accidents continuously decreased, which was preceded by a number of safety measures. Strict penalties for drunk motor-

ists contributed to the strengthening of the favourable trends. The indicator evaluating road accidents focuses on the number of people who die in accidents, including all people who participate in road transport e.g. drivers and passengers of bicycles and motorbikes etc. as well as pedestrians who die within 30 days after the accident.

Changes are presented in figure 4. Although Hungary is behind the scale of improvement experienced in the EU the numbers are encouraging.

Figure 4Road accident victims 1991 – 2009
(2000 = 100)



Source: Eurostat; Bíró, 2011.
Dark blue: EU27, Light blue: EU15, Red: Hungary

7. SUSTAINABLE TRANSPORT POLICY

The new European transport policy issued on 20 March, 2011 is aimed to answer new challenges. In 2009 the European Commission issued a number of announcements and formulated the criteria for a sustainable and user friendly system. On the basis of this the Commission formulated the following objectives for EU transport policy for the next decade (MÉSZÁROS, 2011):

- Safe, comfortable, and permeable transport system that facilitates mobility.
- Integrated, efficient network, single European transport area, and distance depending preferences for modes of transport (rail and waterways preferred over 300 km).
- Economically sustainable system (a decrease of greenhouse gases by 60% compared to 1990).
- Releasing settlements from fossil fuels.
- To stop transport being a fatal threat.
- High-tech solutions.
- Innovative mobility patterns.
- Equal competition conditions in intercontinental service sectors.
- Price policy based on "user pays" and "polluter pays" principles.
- A more efficient pricing system by the introduction of (mobility based, proportional to distances covered, differentiated tariff system) modern road-toll systems that contain external costs.
- Providing wider, complex financial sources.

In the long term it is expected that a road-toll system which is based on a uniform framework, on the infrastructure and external costs (air pollution, noise load, congestion), compulsory – mainly applying for lorries – may be introduced.

8. SUSTAINABILITY INDICATORS

One of the most important indicators is the energy consumption of transportation in relation to GDP. Energy consumption includes the commercial and private transportation modes (road, rail, inland waterways, and air) but it excludes ocean shipping and pipelines. The aim is to separate energy consumption from the GDP.

The separation between energy consumption and GDP is realised in absolute terms when the economic output is increasing but the environmental load is not. Relative separation is realised when the growth rate of both components is positive but energy consumption is growing at a slower rate than GDP. Table 12 shows the energy consumption of transportation in relation to GDP.

Table 12 The energy consumption of transportation in relation to GDP

(2000 = 100,0)

Year	Czech Republic	Poland	Hungary	Slovakia	EU-27
2000	100,0	100,0	100,0	100,0	100,0
2001	103,2	98,7	100,5	98,0	99,1
2002	105,7	95,3	101,4	113,9	98,7
2003	115,6	104,1	101,4	97,3	99,0
2004	117,1	109,5	100,1	91,6	98,9
2005	117,3	112,8	104,5	96,8	97,6
2006	112,4	118,0	112,1	91,0	96,7
2007	111,2	121,8	110,9	91,2	95,5

Source: Eurostat, 2010

In Hungary the energy consumption of rail transport has decreased, but the energy consumption of road-, air-, and waterway transportation has significantly increased. The separation of energy consumption from economic output has not been realised in Hungary, the Czech Republic, and Poland, on the other hand there is a slight relative separation in Slovakia and in the EU-27 average.

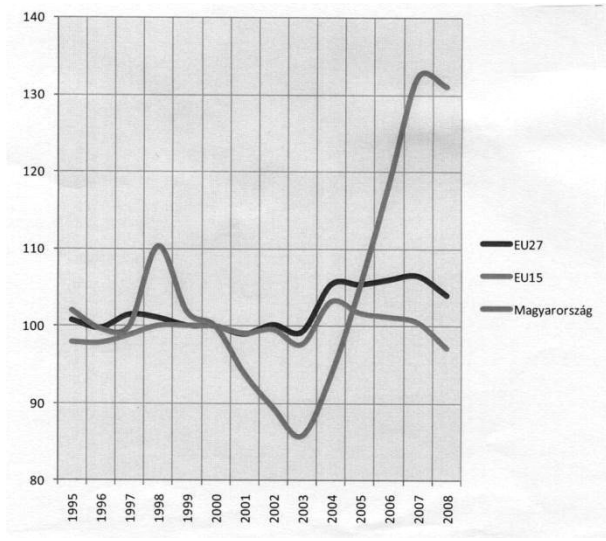
In Hungary the energy consumption of transportation (in proportion to GDP) grew by 41% between 1995 and 2007, this figure is preceded by the 63% growth of road transport, while the energy consumption of rail transport decreased by 40%.

The growth of energy consumption of transportation (in proportion to GDP) compared to that of the EU average and the Visegrad countries is the most dynamic in Hungary, which reflects sustainability.

Passenger transport output (in proportion to GDP) fell by almost 50% between 1995 and 2008. Passenger transport output is measured in passenger kilometre (the transport of one passenger to a distance of one kilometre) on an interurban and local scale by means of rail, coach, waterway, and air. In the EU there was a mere 10% decrease in the same period.

The output of the transport of goods (in proportion to GDP) has significantly decreased (figure 5). The output of the transport of goods is measured in freight ton kilometre (the transport of one ton of goods to a distance of one kilometre).

Figure 5 The output of transport of goods, 1995 – 2008 (in proportion to GDP 2000 = 100)



Source: Eurostat, Bíró, 2011.
Dark blue:EU27, Light blue:EU15, Red: Hungary

In transportation the following indicators are important in respect of sustainability: the emissions of ozone precursors, acidifying gases, and greenhouse gases. Ozone may be harmful for living organisms. It is made during the photochemical reaction of different atmospheric trace constituents (precursors). Ozone precursors may be the following: non-methane volatile organic compounds (NMVOC), carbon monoxide, nitrogen monoxide, and methane. The emissions of precursors have significantly been increased by transportation, warehousing, postal services, and telecommunication in the past 9 years. Other sectors do also contribute to this trend but in a smaller scale.

The emissions of acidifying gases have been increased to a vast extent in the sphere of transporta-

tion, warehousing, postal services, and telecommunication in the past 9 years. Sulphur dioxide (SO_2), nitrogen oxides (NOX) and ammonium (NH_4) belong here. The emissions of acidifying gases have decreased in other sectors thus the situation in this respect has improved significantly.

Greenhouse gases cause global problems, their reduction has been included in international agreements (e.g. Kyoto Protocol). Carbon dioxide, methane, dinitrogen oxide, and the partially fluorinated hydrocarbons and the sulphur hexafluoride belong here. The emissions of these gases have decreased in the Hungarian economy, but the transportation, warehousing, postal services, and telecommunication sectors almost doubled the emissions of these gases between 2000 and 2008.

The examined sector – compared to the favourable environment pollution values in Hungary – produced a drastic growth of emission between 200 and 2008. The total environment pollution of the national economy sectors has decreased but the transportation, warehousing, postal services, and telecommunication sectors significantly impaired the results, therefore revision and the assurance of reduction is indispensable.

Another important indicator is the annual amount of the total emission of solid materials originating from transportation. It has an important role in causing smog. The total emissions of solid materials have significantly decreased in Hungary but because of the growing road transport the ratio of emission originating from transportation is continuously growing.

The emission of solid materials in the EU decreased by an annual average of 3% between 2000 and 2006. The main polluting countries are France, Spain, Germany, Italy, the United Kingdom, and Poland table 13.

Table 13 The solid material emission of transportation

(thousand tons)

Countries	1990	1995	2000	2001	2002	2003	2004	2005	2006
EU-27	9 311	8 394	7 285	7 046	6 846	6 675	6 481	6 179	6 069
France	1 367	1 271	1 072	1 055	1 026	987	969	911	886
Germany	1 591	1 316	1 106	1 029	952	877	833	763	715
Spain	742	787	791	796	796	795	794	775	759
Italy	1 188	1 185	959	947	852	838	784	731	699
United Kingdom	1 517	1 296	998	920	849	825	795	760	757
Poland	525	452	384	361	393	388	370	356	402
Hungary	138	121	119	123	125	120	125	141	148

Source: Eurostat, 2010

Hungary is far behind the main polluting countries; nevertheless, emission rates are on the increase.

9. TRANSPORTATION ORGANIZATION AND EXTERNAL EXPENSES

At present, it is a clear aim to try to make different transportation types cooperate. This change was forced by the intensive flow of people into urban areas and looking from this perspective we are talking about aspects and social correlations that affect the basics of the expectations towards transportation. Spontaneous development cannot be trusted with the forming cooperation among the transportation sub-branches, we need conscious organizational work. Currently the greatest changes took place in our relation to the use of space and to cities, and this requires a new attitude. Transportation sub-branches have to be interpreted in a systematic approach. It is a change in the policy that a part of public space has to be returned to activities like walking, leisure, and slow traffic. (FLEISCHER, 2011).

The Leipzig Chart, the newest city-planning document, refers to it as well. Its basic principle is the integrated approach, diverse use instead of homogeneity. Multifunctional neighborhood units instead of macro scale functional division, small

towns in big cities, mixed zones, everyday targets reachable by pedestrians etc.

SALINGAROS (2000) points out that "the urban fabric must be strongly connected on the smallest scale, and loosely connected on the largest scale". Was this not respected we would rip road surface out from its organ and force home dwellers to turn their backs to the street thus grow cold towards it and through it towards nature as well.

In the new system, integration has to expand to the cooperation of transportation and other sectors, to the spatial cooperation of (local/interurban) systems that were spatially segregated so far and also to the formation of institutional structures in compliance with it.

Nowadays the analysis of external expenses and effects is of increasing importance, although regulation policy still treats infrastructure development as a prominent area. External effects and effect mechanisms revealed now are not yet appropriately detailed and elaborated. MÉSZÁROS (2008) claims that fitting of external expenses is justified by the principle "user pays".

Negative effects deriving from transportation concern society as a whole. However, benefits of displacement are enjoyed only by road users. By imposing such expenses directly on the users, moderation of general social burden-sharing can be possible.

Effect expense theory provides economical basis for the estimations of external effects. Theoretical approach defines the fair and effective validation of negative effects by charges; this provides a successful solution in the reduction of negative effects in transportation.

Regarding this, Hungary is still in the beginnings. As a first step a thorough revelation of demandable external expenses is required. As a second step, the range of expenses to be included in charges must be defined.

The following aspects provide bases to the description of the timely changes of external expenses: changing traffic parameters (dimension, composition, load), changing technological solutions (emission, accidents), changing income conditions.

Proper regulations can be of compelling effect towards reduction of environmental pollution and might show a direction to sustainability.

10. CONCLUSIONS AND PROPOSALS

Transportation of goods and people is a determining factor in the economic life of a country. In this respect Hungary is in a disadvantageous position. The poor condition of roads and vehicles as well as the increasing road transport impose a heavy burden on the country. Transportation suffered greatly because of the 2008 crisis and the continuously rising fuel prices are still problematic. Despite all this transportation services are profitable. The capacity of the transportation of goods has increased significantly but passenger transport is stagnant. In the long term more emphasis should be placed on rail and waterway transport. Due to the bankruptcy of MALEV air passenger transport is expected to decrease. The number of road accident victims has decreased, but the situation is still not satisfactory. Transportation is one of the most polluting activities, which must be changed.

As for the future, the aim is to harmonise the different modes of transport and to propagate a systematic approach. In the future the pricing policy should be based on "user pays" and "polluter pays" principles.

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