The Effects of Globalisation on Logistics in Europe and in Hungary

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Transportation is essential for the functioning of the economy since mobility greatly supports growth and job creation. The transport sector in the EU employs about 10 million people and provides approximately 5% of the GDP. The efficiency of the transport systems is a prerequisite for competitiveness and significantly affects the quality of life of people.
Logistics plays a key role in terms of sustainable and competitive mobility in Europe and other objectives, such as a cleaner environment, security of energy supply, and widely available transport facilities. The use of safe and environmentally friendly vehicles is the main priority of all modes of transportation.
The key changes include alternative fuels, new materials, new propulsion systems as well as information technology and traffic management techniques. The organization of the transportation of raw materials and finished products within and outside the EU depends on the efficient operation of logistic networks. This is primarily an industrial activity and creating the right framework conditions is the responsibility of the relevant authorities.
In my study I analysed the situation of logistics in Europe and in Hungary. In order to exploit the benefits and to avoid the disadvantages of globalization the European Union implements structural changes which I describe and analyse.
Considering the EU and Hungary this paper covers the following areas:
- The effects of globalisation,
- The climate-, energy-, and environment protection policy of the EU and their connection to logistics,
- Tendencies in the changes of the transport sector,
- The possible changes in passenger and freight transport,
- The characteristics of the infrastructure and the requirements for its development,
- Future prospects of logistics.

On the basis of my examinations I will draw conclusions and offer suggestions regarding modifications in areas I consider most problematic.

Keywords: logistics, glabalisation, EU.

1. INTRODUCTION

Logistics is currently a determining factor of competitiveness. The main reason is the globalization of the production processes which has led to a situation in which different producers can produce similar products at similar cost. Only companies that provide quality logistics services to customers can gain competitive advantage.

There is no uniformly accepted definition of logistics, according to the relatively widespread definition (5M or 7M), logistics is a service that ensures that the products necessary for the smooth running of the business processes are available in the right place and at the right time in adequate quantity, quality and variety.

The following conclusions can be drawn from this definition:

- logistics deals with the flow of goods and information
- the phases of logistics operations are: planning, organizing, executing, monitoring,
- its aim is to meet customer needs at optimal cost.

In an activity-based (functional) interpretation logistics basically is a service package consisting of the combination of elements such as transportation, shipping, storage, warehousing, cargo handling, packaging, postage-courier, customs, distribution, commissioning, supply chain management and that of directly connected business services (such as IT, maintenance, and commerce), which is provided by logistics companies.

Therefore logistics is a complex activity that can significantly affect the environment. The social and environmental impact of logistics processes must be monitored and it is necessary to introduce more environmentally friendly solutions.

In terms of efficiency DUPCSÁK – MARSELEK (2013) considered it a central issue to reduce and optimize logistics cost.

Transport is essential for the functioning of the economy, mobility allows for growth and job creation. The transport sector in the EU employs about 10 million people and provides almost 5% of the GDP. The efficiency of the transport systems is a prerequisite for competitiveness and it significantly affects quality of life.

Logistics plays a key role in sustainable and competitive mobility in Europe and in other objectives such as a cleaner environment, energy security, and providing transportation services. The most important priority for all modes of transportation is the use of safe and environmentally friendly vehicles.

The key changes include the areas of alternative fuels, new materials, new propulsion systems, as well as information technology and traffic management techniques. The organization of the transport of raw materials and finished products within and outside the EU is subject to the efficient operation of logistic networks. This is mainly a sectoral activity and the creation of the proper framework is the responsibility of the authorities.

According to MARSELEK et al. (2008) the organisation of logistics (optimisation) is inevitable for the improvement of efficiency and profitability. TAKÁCS et al. (2012) present a relevant practical model in which the aim is to collect scattered biomass sources cost-efficiently according to logistics principles.

2. THE MAIN IDEAS OF THE WHITE PAPER

Amid global changes the 2011 White Paper serves as a guideline for the development of transport and logistics services, and their optimization both in the EU and Hungary. The main goal is to reduce dependence on imported oil and to limit CO2 emissions. The CO_2 emission level of the EU transport sector is to be reduced by 60% until 2050. The objectives of achieving this are the following in short:

The development and use of new and sustainable fuels and propulsion systems

- By 2030 to cut the number of vehicles running on conventional fuels by half in urban transport, by 2050 a total ban on them in large cities.
- By 2050 low CO_2 emission fuels must have a 40% share in air traffic.

The optimisation of the efficiency of multifunctional logistics chains, including the wider use of more energy efficient modes

- By 2030 30% of road transport that exceeds 300 km must use other modes such as rail or water transport, by 2050 this ratio must exceed 50%.
- By 2050 high speed railway must be constructed in Europe.
- Totally functional and within the EU intermodal TEN-T core network by 2030 high quality and capacity network by 2050 adequate information services.
- By 2050 all the core network airports must be connected to the railway – preferably high speed – network; all the core network seaports must be adequately connected to railway system in freight forwarding and where possible to the inland waterways system.

Improving the efficiency of transport infrastructure use by means of information systems and market-based incentives

- By 2020 the total modernization of the European air traffic management infrastructure and the completion of the European Common Aviation Area. Installing proper land and water transportation management systems. Installing the European Global Navigation Satellite System (Galileo).
- By 2020, the creation of the framework for an integrated multimodal transport information, ticketing and fare payment system.
- By 2020 halving the number of road accident victims.

– Use the 'polluter pays' principle, involving the private sector in the system.

The Medium-Term Strategy for Logistics (2013) refers to the infrastructure. It states that "In the field of transportation and logistics services both the maintenance of the incessantly modernised infrastructure and the development of services and background activities play a key role. An important prerequisite for this is the development and the operation under normal condition of integrated enterprise management, quality management, environmental and CRM (Customer Relationship Management) systems, which allow for efficient operation."

3. CHANGES IN TRENDS IN THE TRANSPORT SECTOR IN THE EU AND HUNGARY, THE SITUATION OF THE INFRASTRUCTURE

The European Union comprises 28 member-states on an area of 4,385 km², which stretches about 3,000-3,000 km in the north-west and south-east direction. The population of the EU is approximately 503.6 million people and the EU is the world's largest commercial centre.

The EU's objective remains to eliminate the barriers that impede the free flow of goods and people, but there are a number of regulations that vary from Member State to Member State (for example, permitted blood alcohol level, maximum speed allowed on motorways).

According to the EU transport policy mobility is essential for the improvement of competitiveness and the transport policy is the basic elements of achieving the Lisbon targets (EU, 2011).

The principle of the so-called co-modality (i.e. the optimized and combined use of different modes), which is a new element of transport policy, states that all modes of transport (e.g. road, rail) must be effective, competitive, environmentally friendly, and safe on their own.

The most important elements of the EU transport system are the Trans-European Transport Networks (TEN-T) adopted since the 90s, which, according to plans, by 2020 will include 95.7 thousand km of road, 106 thousand km of rail, and 13 thousand km inland waterways network as well as 404 sea ports and 411 airports (DÉRI - KŐHEGYI, 2009).

The logistics centres in Europe are mainly related to the sea ports, but in the future Eastern Europe may also play a more important role.

The role of road and rail transport is decisive in Hungary. The performance of the existing network continues to improve, but much remains to be done. Inter alia the optimal development of the road network crossing settlements may improve the traffic situation considerably (SOMFAI, 2008). Table 1 shows the change in length of the road network.

The in length of the road network in the first is shown in Table.

Table 1. The change in the length of the national road network between 2002 and 2011.

	Motorway	Highway	1 st order main road	2 nd order main road	Link road	Access road	Expressway parking place	Total road network
2002.	533	70	2,162	4,346	17,955	4,637	1	30,486
2003.	542	89	2,177	4,337	17,999	4,609	48	30,536
2004.	569	117	2,166	4,350	18,045	4,602	49	30,638
2005.	651	126	2,195	4,376	18,076	4,584	56	30,848
2006.	785	129	2,196	4,420	18,055	4,576	70	31,067
2007.	853	174	2,156	4,426	18,070	4,562	89	31,183
2008.	911	205	2,145	4,442	18,098	4,567	101	31,362
2009.	911	205	2,145	4,451	18,107	4,563	102	31,380
2010.	1,067	205	2,155	4,464	18,134	4,559	112	31,633
2011.	1,099	205	2,154	4,465	18,155	4,551	113	31,693

Source: Coordination Centre for Transport Development, 2012.

The railway network has good network density indicators, but quality indicators do not reach European standards (Table 2).

Table 2. Rail network distribution by train categories.

Line lenght	MÁV Zrt.	GySEV Zrt	All
Line category	line km	line km	line km
Railways, part of a Trans-European rail freight network	2,610	246,1	2,856,246
Railways, not part of a Trans-European rail freight network	1,649	153,7	1,802,461
Regional railways	1,363	17,5	1,380,78
Other railways	1,643	22,2	1,664,898
All	**7,264,885**	**439,5**	**7,704,385**

Source: Coordination Centre for Transport Development, 2012.

A mere 15.3% of the national railway network is double-track (EU 41.2%) and only 37.2% of the lines is electricity powered (EU 46.4%).

Compared to the permitted speed there is constant speed limit in effect on 3397 km of the network. Only one-quarter of the 1500 km of the national railway TEN-T network is suitable, its development would require HUF 1,300 billion. Other railway developments are of a similar magnitude. The TEN-T core network could achieve an adequate level of development by 2030 (National Transport Strategy I). The length of the national TEN-T road network line is 1,200 km, of which only 150 km is missing, whose completion would require HUF 370 billion. Figure 1 depicts EU transport development expenditure between 2014 and 2020 among the target areas.

The shipment and handling of intermodal goods is done in the intermodal logistics centres. In Hungary there are 15 such centres. The largest one is in Budapest whose competitors are the terminals in Austria (Vienna) and Slovakia (Bratislava, Kosice), but Arad in Romania is rapidly developing. The Záhony area is appreciating again, and from a logistical point of view it is a special zone in Hungary. Figure 2 illustrates Logistics Service Centres in Hungary.

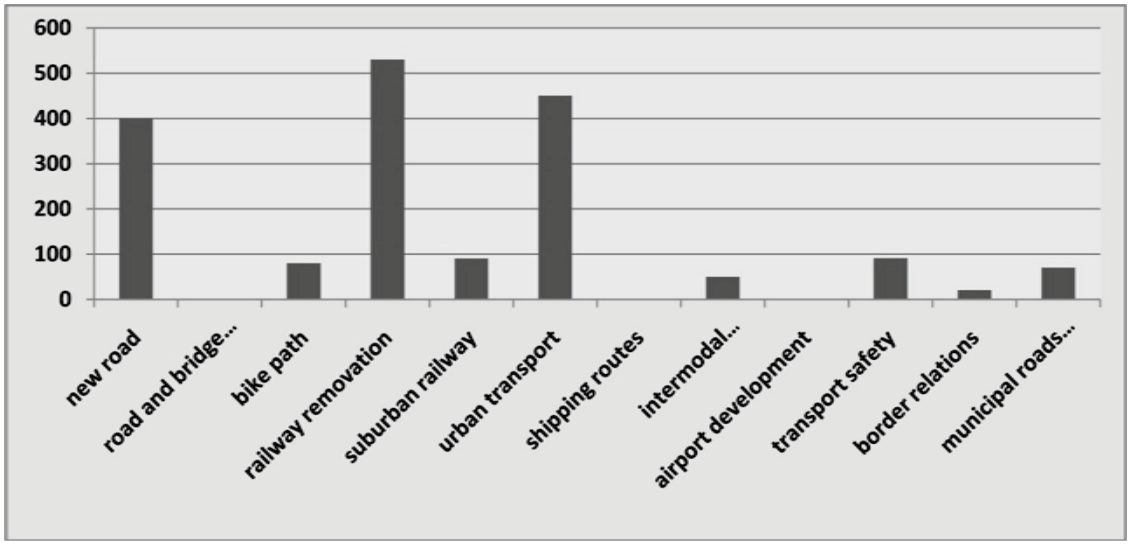

Fig. 1. Estimated values of EU transport development expenditure between 2014 and 2020 (billion HUF).
Source: Ministry of National Development, 2012.

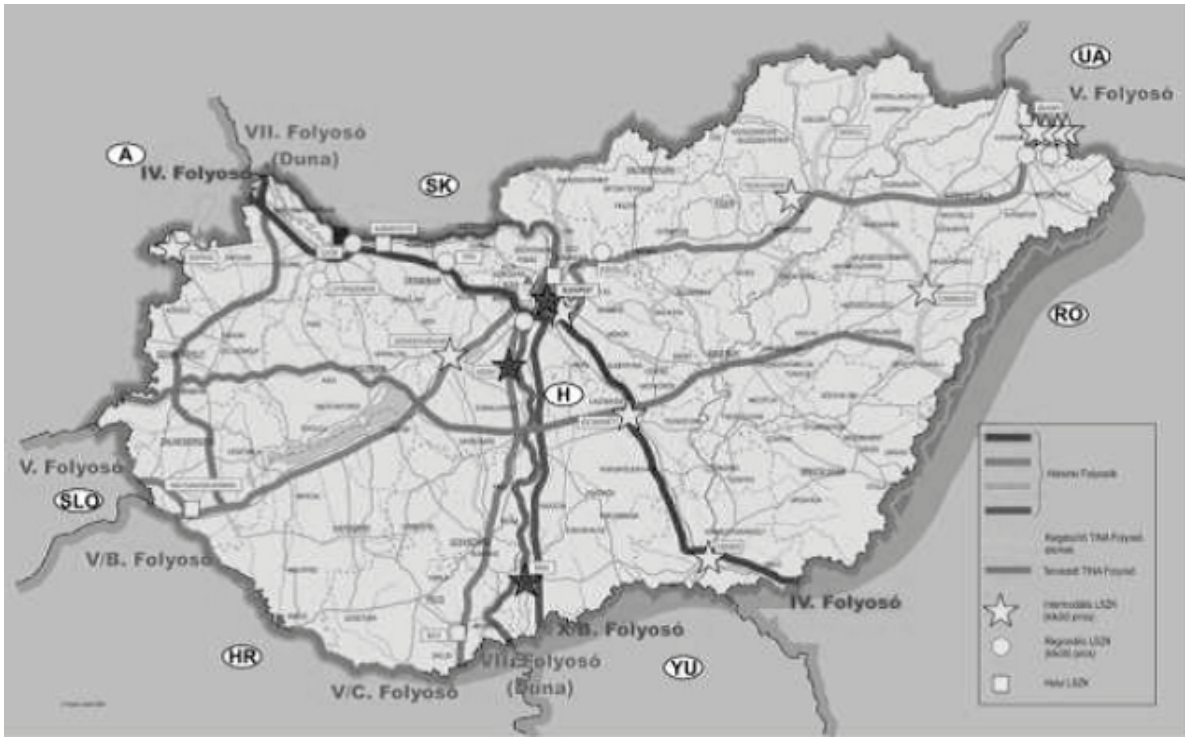

Fig. 2. Logistics Service Centres in Hungary.
Source: Association of Hungarian Logistics Service Providers, 2012.

4. EXPECTED CHANGES IN PASSENGER AND FREIGHT TRANSPORT

The European Commission predicts rapid growth in road freight traffic until 2030. Estimates in this regard are questionable according to some, as this change will only cause serious damage to the environment. The ratios are shown in Table 3.

- The spatial conditions,
- The social environment,
- The individual's own decision-making environment and opportunities.

The 2008 crisis hindered passenger transport to a lesser extent but freight forwarding was affected more seriously, but growth is slowly, less dynamically recovering. Both globalization and the regional integration processes of the EU induce passenger and freight transportation process (Fig. 3).

Table 3. Freight forwarding performances and proportions by transport modes in EU-27 until 2030.

EU 27, 1990-2030	1990	1995	2000	2005	2010	2015	2020	2025	2030
Road (Gtkm)	1,096.9	1,279.3	1,507.5	1,790	2,048.3	2,278.9	2,485.6	2,666.7	2,803
Railway (Gtkm)	524.8	385	3,961.1	396.9	427.2	469.5	504.6	535.2	558.9
Inland shipping (Gtkm)	257.2	264.7	271.3	280.1	294.2	312.9	331.3	344.3	355.3
Road (Gt km)	58.38%	66.32%	69.31%	72.65%	73.95%	74.44%	74.83%	75.20%	75.41%
Railway (Gtkm)	27.93%	19.96%	18.21%	15.99%	15.42%	15.34%	15.19%	15.09%	15.04%
Inland shipping (Gtkm)	13.69%	13.72%	12.47%	11.37%	10.62%	10.22%	9.97%	9.71%	9.56%

Source: European Commission.

The changes in passenger and freight transport performance are proportional to GDP growth in each country.

VAN ACKER et al. (2010) explain that there are three basic dimensions which determine changes in transport demand, which are as follows:

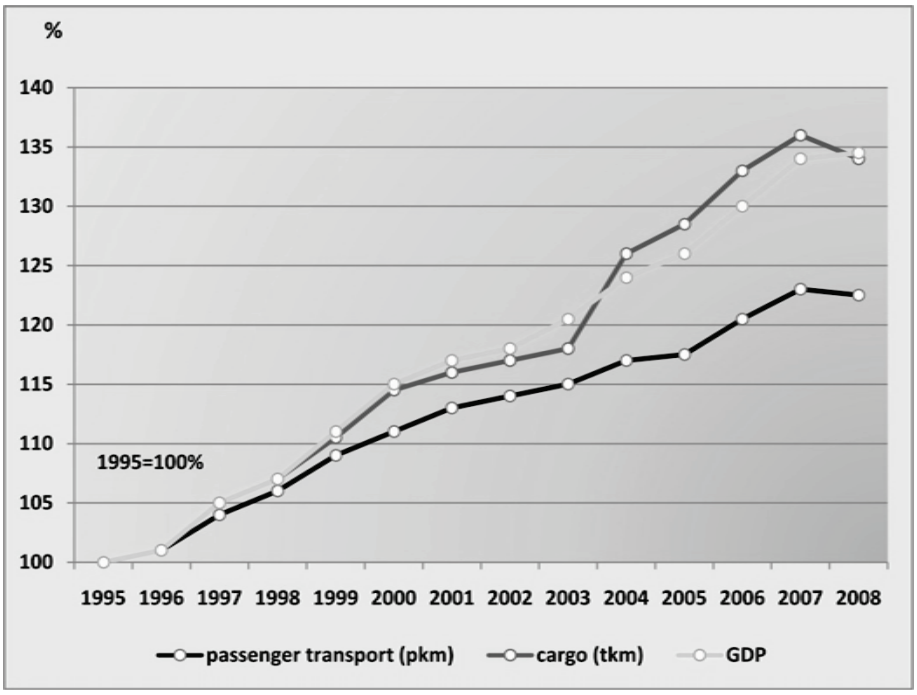

Fig. 3. Changes in passenger transport performances and in the GDP in EU-27; 1995-2008.
Source: Institute for Transport Sciences.

Passenger and freight transport performances in Hungary were in line with EU trends in recent years (Figure 4).

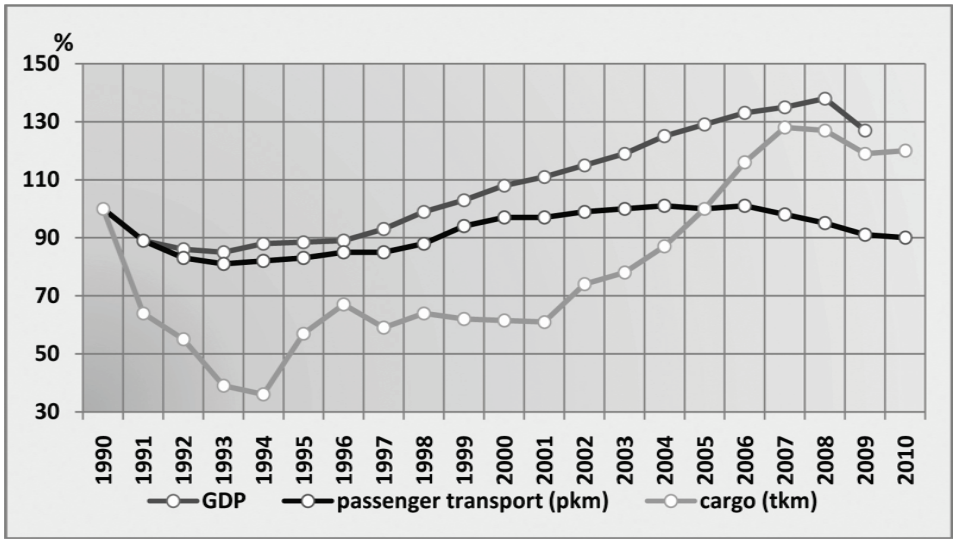

Fig. 4. Changes in passenger and freight transport performances and in the gross domestic product (GDP) in Hungary 1990-2010.
Source: Institute for Transport Sciences.

According to the New Széchenyi Plan in 2020 the obtainable sub-sector division of labour must be as follows: 67% road, 20% railway, 8% inland waterways, 5% for pipeline transportation, on condition that appropriate regulations are applied (Figure 5).

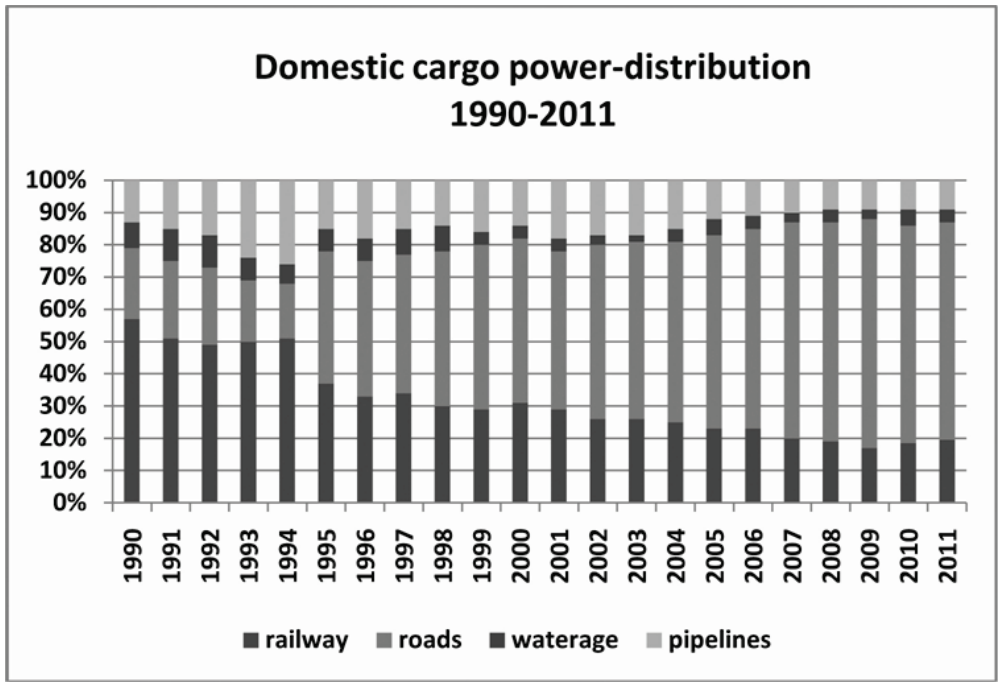

Fig. 5. Development of division of labour in freight transport in Hungary, 2001-2011 (based on ton-km).
Source: Hungarian Central Statistical Office, 2012.

It would be important to increase freight transport by rail from an environmental and safety point of view. Table 4 indicates the composition of goods transported by road and rail.

Table 4. Road transport performances by types of goods 2008-2011
(million cargo tonne kilometres).

Comodities	2008		2009		2010		2011	
	Road	Rail	Road	Rail	Road	Rail	Road	Rail
Agricultural-, forest products	3,554	297	3,541	472	3,869	516	3,590	648
Coal and lignite, oil and gas	162	17	77	640	117	665	191	487
Ores and other mining products	2,835	1014	2,419	917	1,989	1,367	1,851	1,408
Wooden products	2,130	486	2,225	419	2,305	464	2,294	286
Processed fossil minerals	703	554	690	447	543	604	441	510
Chemicals, phostics	3,715	620	3,695	632	3,564	571	4,044	554
Other not metallic minerals	3,254	752	2,721	155	2,289	99	1,973	87
Metal products	3,176	970	2,813	701	2,639	589	2,822	876
Machines and equipments	326	19	3,439	54	3,382	54	3,824	72
Transport equipments	1,251	293	718	128	720	135	777	111
Postal consignment	214	153	245	0	248	0	217	0
Freight containers	1,093	182	1,141	72	1,008	55	933	72

Source: Eurostat, 2012.

Freight transport performances declined significantly between 1992 and 2002, however currently they show higher values. As a result of globalization the average transport distance has increased significantly. The weight of the transported goods increased by 35% in 10 years, and the value of the ton-kilometre nearly doubled as it rose by 92% (Figure 6).

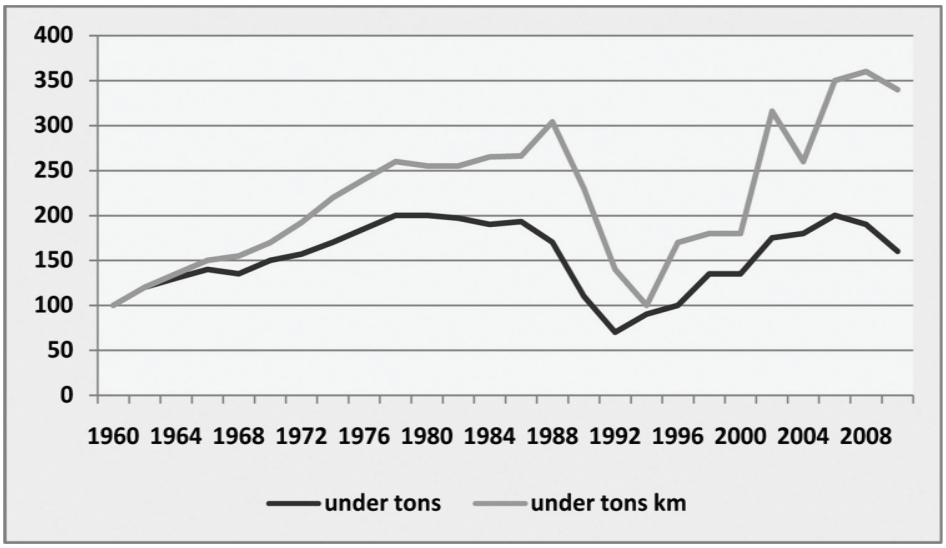

Fig. 6. The freight index of Hungary 1960-2010 (1960=100%).
Source: Hungarian Central Statistical Office, 2012.

Hungary's import- and export ratio compared to the GDP is over 60%, therefore we are a country of open economy.

Our share in world trade is estimated to be 0.6-0.7%, our most important trading partners are the EU member states, where more than three-quarters of our exports go, and from where nearly two-thirds of our imports arrive. Hungarian foreign trade is highly concentrated geographically, in product structures, and also at a corporate level.

Hungary has a dual structure, more than 80% of our export is conducted by large firms, the share of SMEs in export is marginal. Our largest partner is Germany (National Transport Strategy II, 2012).

5. THE DOMESTIC SITUATION OF LOGISTICS AND THE POSSIBILITIES

At the end of 2011 there were 17.5 thousand companies and 12.1 thousand private enterprises registered in Hungary in the transport and storage sector.

Based on data from the National Tax and Customs Office on companies with double-entry bookkeeping we can state that **in 2009 the total annual net revenue of the transport and storage sector was approximately EUR 2500 billion**, a quarter of which was related to road transport, one fifth each to transportation and related activities, while one eighth was storage, warehousing and cargo handling related (Figure 7).

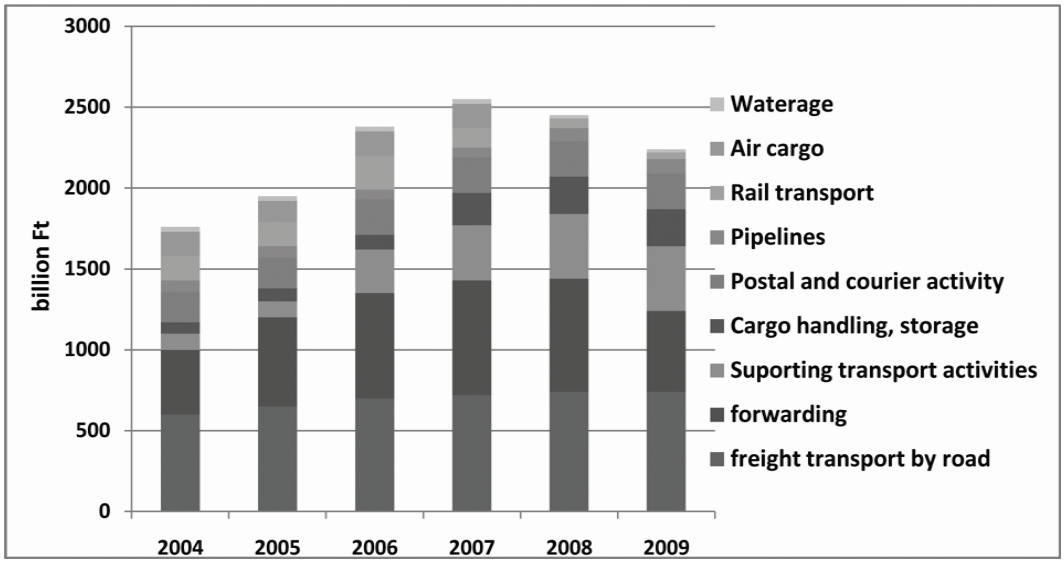

Fig. 7. The development of the revenue of Hungarian logistics service providers 2004-2009.
Source: National Tax and Customs Office.

The production cost level of domestic SMEs is quite high in international comparison. Demand for logistics services is generated by production and trading companies. According to a KPMG survey in 2009 large companies outsourced 81-84% of transportation, 69-69% of warehousing and freight forwarding, and 63% of customs clearance. However, the logistics outsourcing of small and medium-sized enterprises was of a much lower proportion.

One of the reliable indicators of the freight and logistics competitiveness position of countries is the World Bank's Logistics Performance Index (LPI), in which Hungary was ranked at the 40th place in 2012, which is an improvement compared to 2009, although Austria, Poland, and Slovenia are all ahead of us in this respect. The poor performance is mainly the result of the inadequate follow-up of consignments and the inaccurate timing of deliveries.

The national transport system is developing, but its backwardness is still considerable. The main problems are the following:

- energy wasting, polluting vehicles,
- road traffic causing great environmental pollution (transit routes through villages),
- energy dependence, the risk of fuel price increase,
- infrastructure is overwhelmingly centred in the capital city, Budapest,
- limited public resources, lack of automatism in financing,
- improving, but insufficient transport safety,
- uncoordinated transport sector,
- lack of long-term, stable regulations.

6. ENERGY CONSUMPTION

The energy consumption of the transport sector is continuously growing, the main consumer of energy is the road transportation sector (Figure 8).

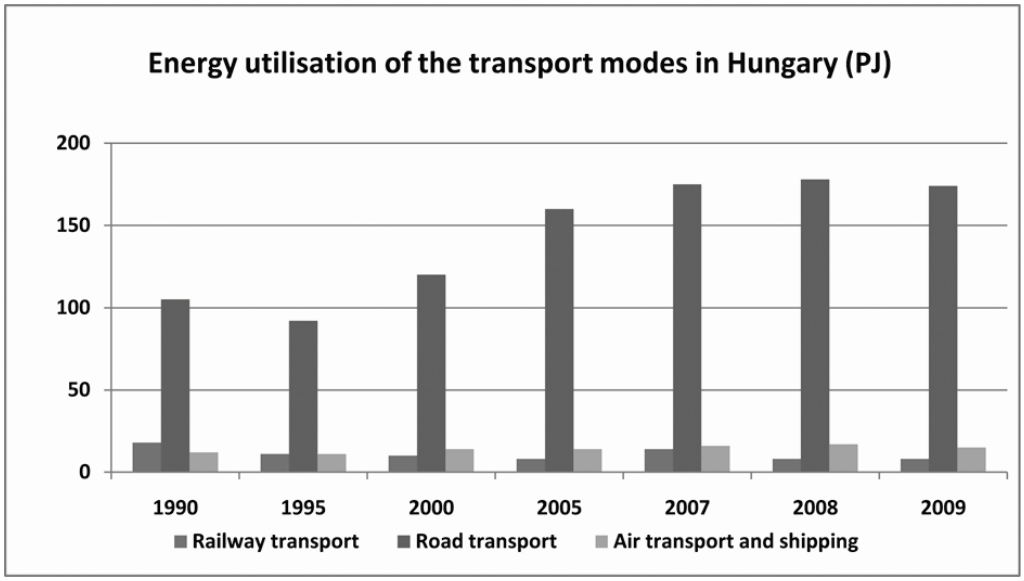

Fig. 8. Energy consumption of transportation in Hungary (PJ).
Source: Energy Centre.

Transport is a major polluter, and therefore the continuous monitoring of the transport-related sustainability indicators and the necessary interventions are crucial for our future (MAGDA R. et al., 2012).

The proportion of biofuels may increase in the energy consumption of transportation, but only slightly, as the agro fuels compete with the food industry for raw materials (Figure 9).

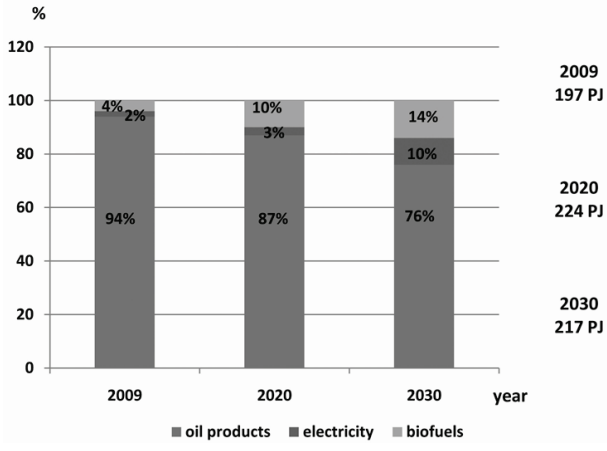

Fig. 8. The expected energy distribution of domestic transportation.
Source: National Energy Strategy 2030.

7. CONCLUSIONS AND RECOMMENDATIONS

Logistics or more precisely the transportation and forwarding sector is one of the largest employer sectors in the EU. With expanding globalization processes its importance continues to increase. The EU aims to achieve a Single European Transport Network, our country will achieve adequate levels through the developments by around 2030.

Infrastructural investments in Hungary are now largely realized from EU funds, only the own funds must be contributed.

The main European logistics centres are not based in Hungary but owing to our central position we have excellent possibilities in the development of logistics. Hungary strives to achieve the principles set out in the 2011 White Paper. In the long run it would be important to increase rail capacity in order to reduce pollution and improve road safety.

It is important to enhance IT-related developments of logistics, which is what we are striving for. As a result of globalization, the role of logistics services appreciated and we should take advantage of it.

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