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**Working Paper**

## Competition or cooperation in public transport

OECD/ITF Joint Transport Research Centre Discussion Paper, No. 2009-19

**Provided in Cooperation with:**

International Transport Forum (ITF), OECD

*Suggested Citation:* Aba, Botond (2009) : Competition or cooperation in public transport, OECD/ITF Joint Transport Research Centre Discussion Paper, No. 2009-19, Organisation for Economic Co-operation and Development (OECD), Joint Transport Research Centre (JTRC), Paris, <https://doi.org/10.1787/5kmmr3ccp8hj-en>

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JOINT TRANSPORT RESEARCH CENTRE

*Discussion Paper No. 2009-19*  
*December 2009*

# *Competition or Cooperation in Public Transport*

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## **1. INTRODUCTION**

Transport, especially public transport has been at the centre of professional attention from time to time.

Although the effect of transport innovation shortly appears and it works high effectively in public transport (as you think of the innovation of bus transport and its dynamic progression) the attention is not due to these results, but due to problems of public transport and to strains in its social contradictions. (Sometimes the transport innovation starts already in public transport sector system, for example innovation of subway and high speed train.)

Economic crisis especially highlights social contradictions, when the market is decreasing and enterprises are struggling to survive or to hold monopoly status.

New enterprises could go on the market or the existing ones could stay in competition only if they are able to influence and convince passengers to choose them “by getting on”.

The third that benefits is often the individual transport, and behind the automobile industry with extended power and influence.

My hypothesis is that public transport sector is economically very different to classical categories of market sector, while personal utility and real value do not determine the whole market (included supplies and demands) but the phenomena of pseudo market does it.

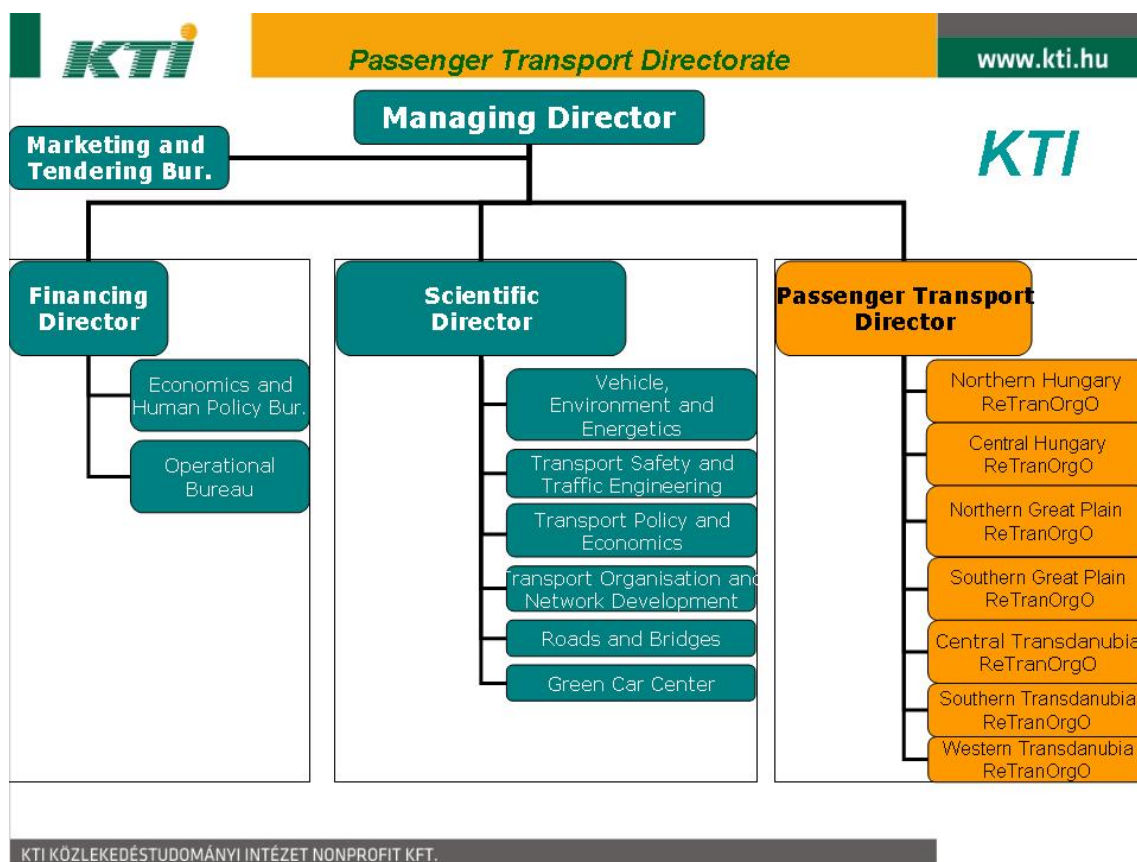
The sustainability of public transport does not depend on the individual in the sense of passenger, but on the community and on the options of common weal of it.

## **2. PRESENTATION OF INSTITUTION OF TRANSPORT SCIENCES (KTI)**

Institution of Transport Sciences, which had the 70-year-old anniversary last year, has been focusing on the market of public transport in the last 8 years, because strain of the market has been realized. The classical orientation of the institute, which was automobile transport and road research, has been widened with railway transport, transport policy and economics research.

In 2007 Passenger Transport Directorate has come into existence. It leads 7 regional offices all over the country. They evaluate interurban public transport performances, processes and control the fulfilment of public service contracts.

Picture 1: Organisation of KTI



The traditional divisions of KTI are to research and to measure. In examination of passenger transport sector our young researchers reveal new aspects. In the following topics will be briefly introduced:

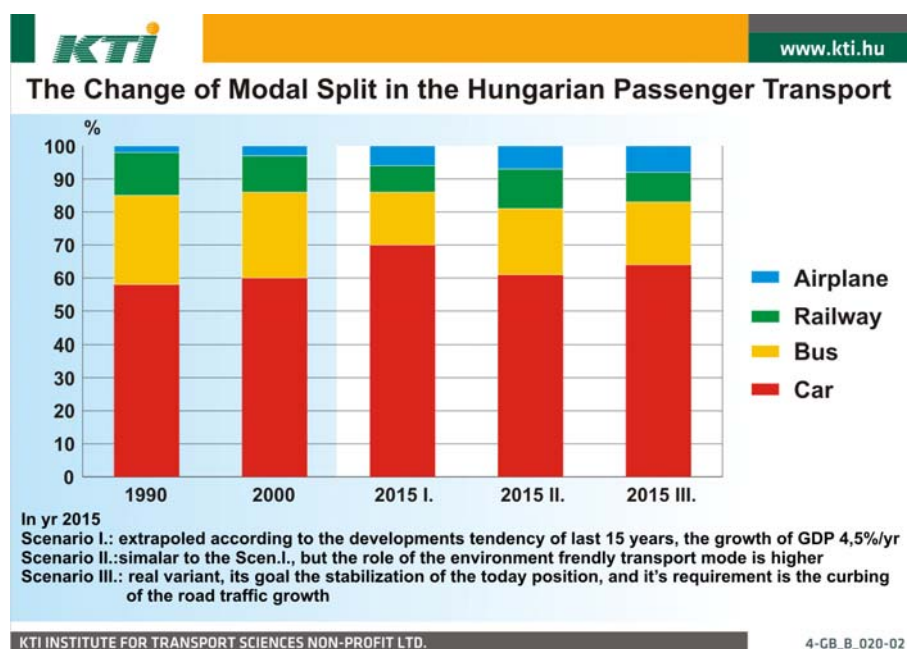
1. Gábor Albert and Árpád Tóth worked out the said concurrency-index, which determines the competition between different transport modes and quantifies potential of alternative routes.
2. Balázs Ács quantifies the economical background and experiences of long distance bus transport.
3. Dr. Maria Heinczinger and her team studied "The impacts of flat rate and discounts introduced in PT on taking rail and on division of modality."
4. In Hungary not only KTI experts analyse and research these questions. One of them is László Kormányos (MÁV), who made scientific models presenting service improvement and technical development by using of integrated periodic timetable in his Ph.D degree.

Overview of the passenger transport sector in Hungary

Experiences of new EU countries are partly common, but partly substantially diverse. Since 1990 the following basic statements could have been defined in terms of passenger transport sector in Hungary:

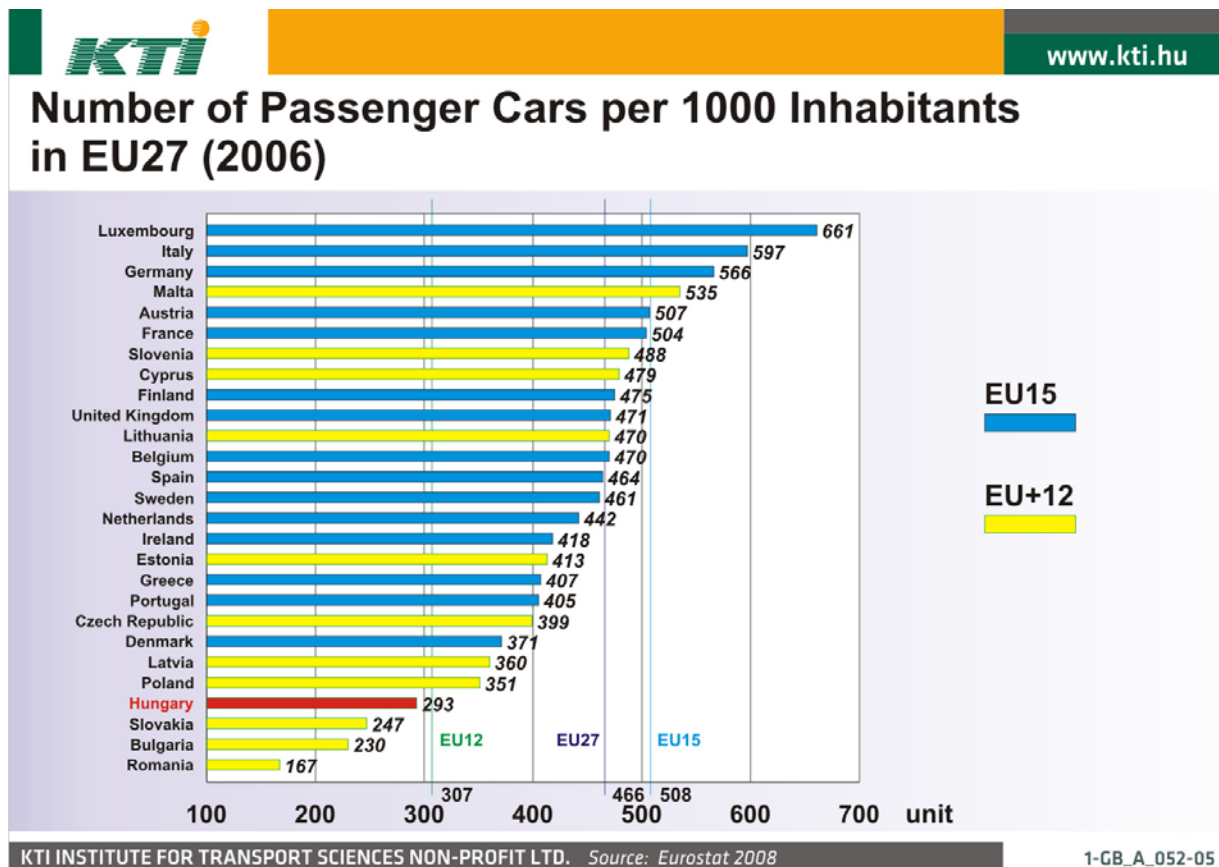
- ⇒ Hungary, similar to other Eastern-European countries, **had a very high modal split as a starting point**: having few cars, public transport dominated.

Picture 2: **Modal split forecast**



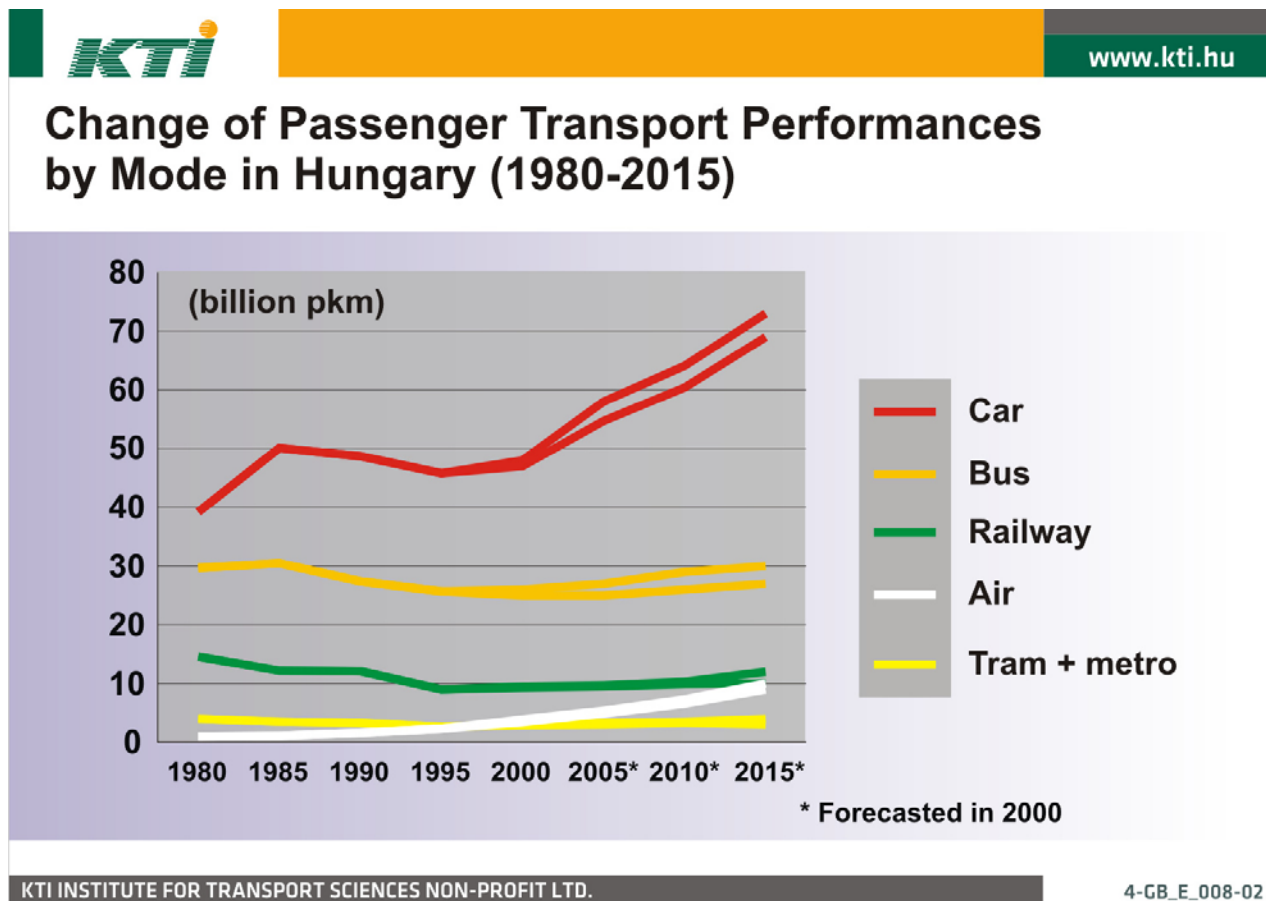
⇒ **Number of automobiles used to be very low.** Furthermore among EU 27 it is still very low.

Picture 3: **Number of automobiles per 1000 inhabitants in EU27**



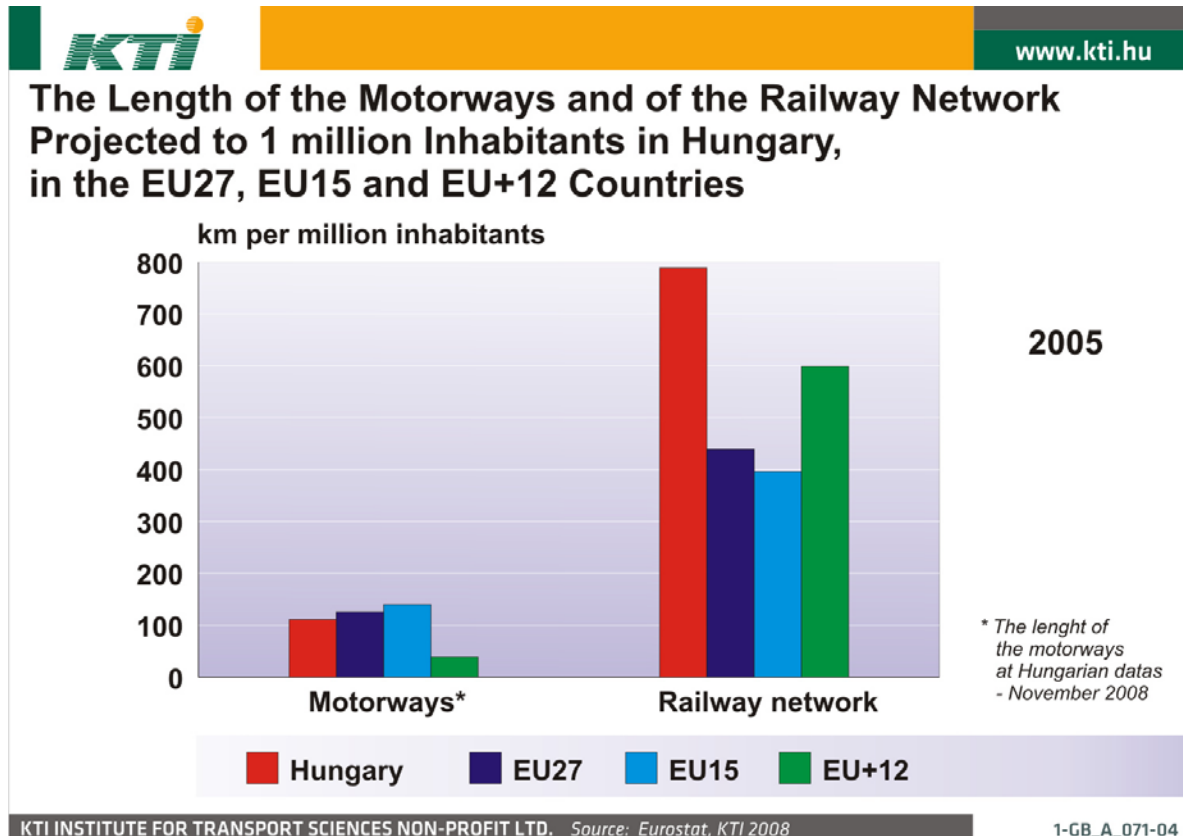
⇒ **No real market existed** uniformly in CEEC countries. Hungarian Planning Institute did distribution of public services between the two state-owned group of enterprises (Hungarian Railways called MÁV and National Coach Companies called Volán).

Picture 4: **Passenger Transport Performance Forecast**



⇒ **Railway sector had a significant infrastructure potential**, meanwhile Hungary was lack of motorways, therefore intercity bus transport had much less infrastructure potential.

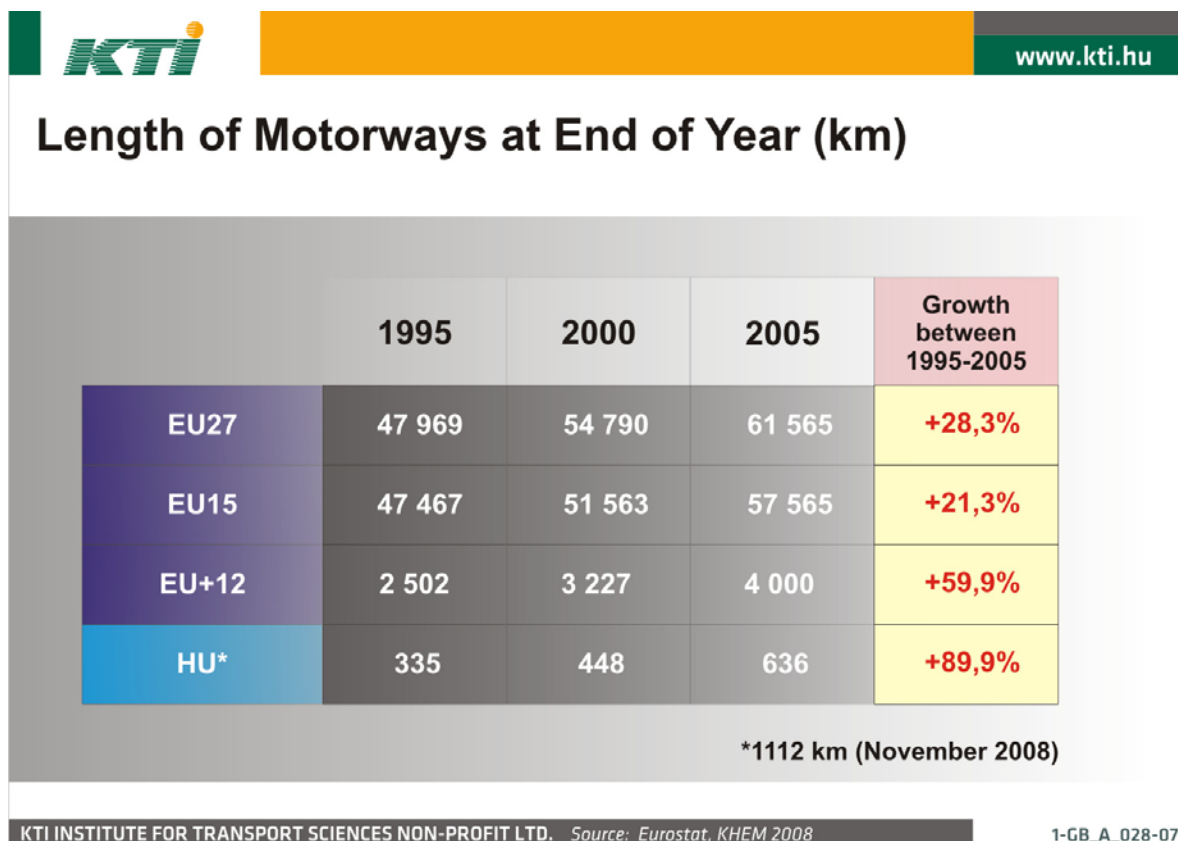
Picture 5: **Infrastructure potential**





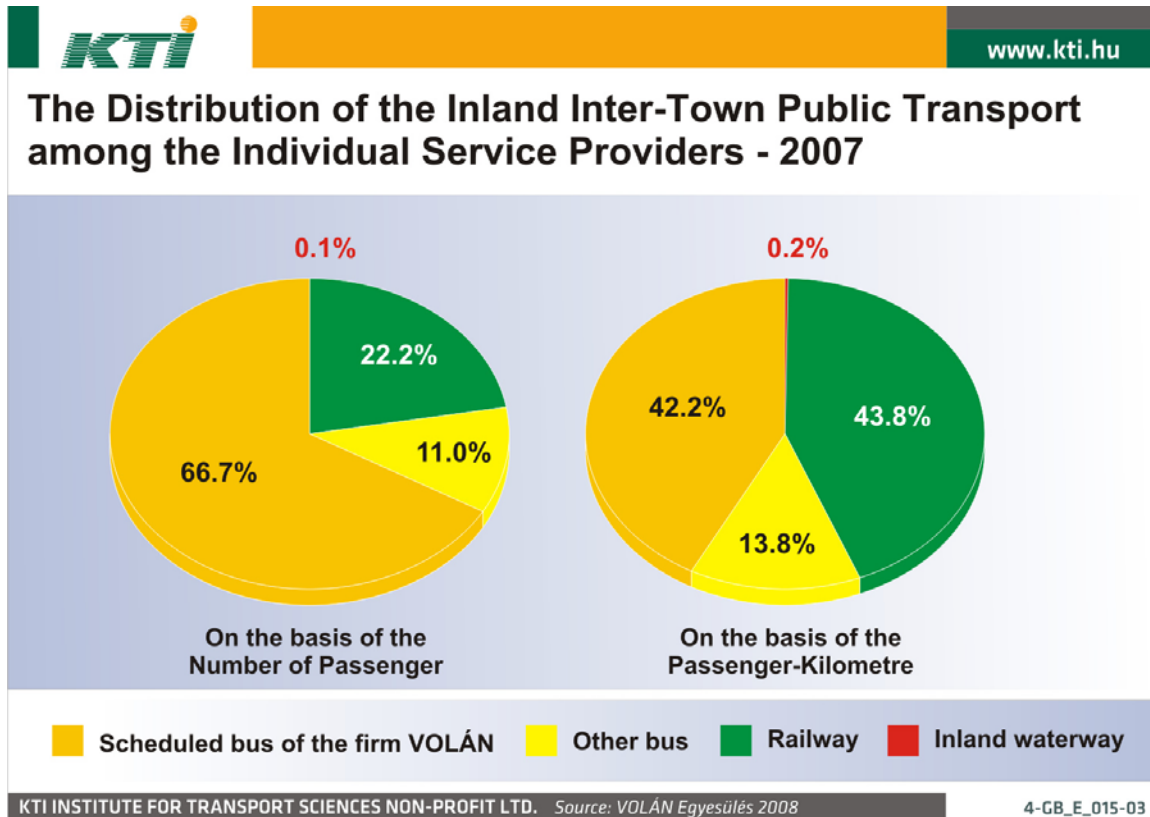
- ⇒ **The radically growing length of motorway network** caused changes in distribution: **great demand appeared to launch intercity bus services which reach high speed on motorways.** Furthermore even the private sector was interested in it.

Picture 6: **Development of Motorways**



- ⇒ However, **the market has not been open**. Most of the long-distance public transport operators are still state-owned participants.

Picture 7: **Distribution of Domestic Interurban Public Transport**



- ⇒ When Hungary joined the European Union, transport sector was lack of domestic regulations, furthermore most of state-owned enterprises had and still have long-term public service contracts.
- ⇒ It is hard to define when market could open, it may happen in 2012.
- ⇒ Lack of particular international benchmarking makes situation warm for the responsible authority, and real data could hardly be determined for the sake of market interests.

These lead us to question whether in Hungarian passenger transport sector...

### Question 1: Is there any competition?

The answer is quite surprising, but it is definite: **yes, there is.**

The 4<sup>th</sup> picture clearly shows that number of automobiles has greatly increased since 1990, generating the fact that it gained market share from public transport sector.

The modal split has failed since 1980 when it was 50-50 percent share. According to the past 15 years tendency the market share of public transport will reduce to 30 percent in 2015, except a drastic intervention will be done in market processes.

(It is important to highlight that dropping from 50 percent to 30 percent is not more dramatic than the change in city transport, where modal split fell from 82 percent to 60-55 percent between 1988 and 2008. It is useful to take into consideration the analogies of city transport, while it shows more clearly the characters of enterprise economy, market and social distortion than interurban traffic indicators.)

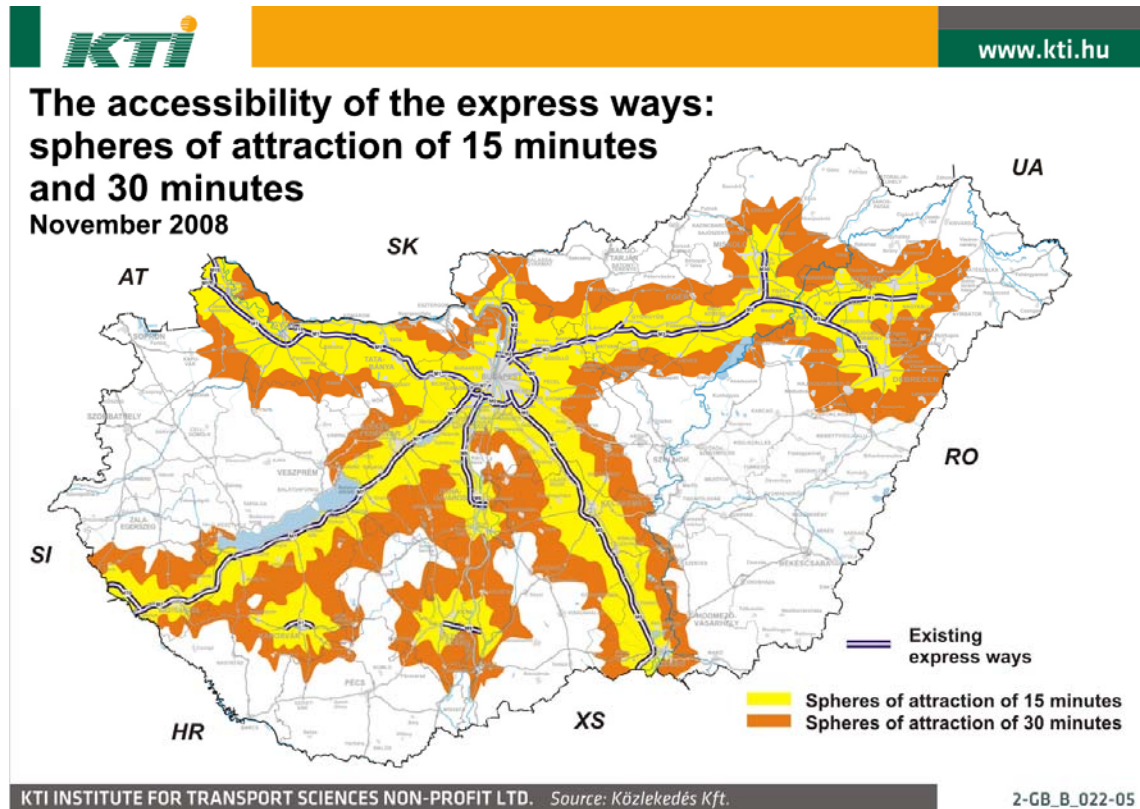
Before asking to whom this competition is worth, it is rewarding to determine what kind of competition it is? How social traditions could be changed in this relation.

### Question 2: What kind of competition are we talking about?

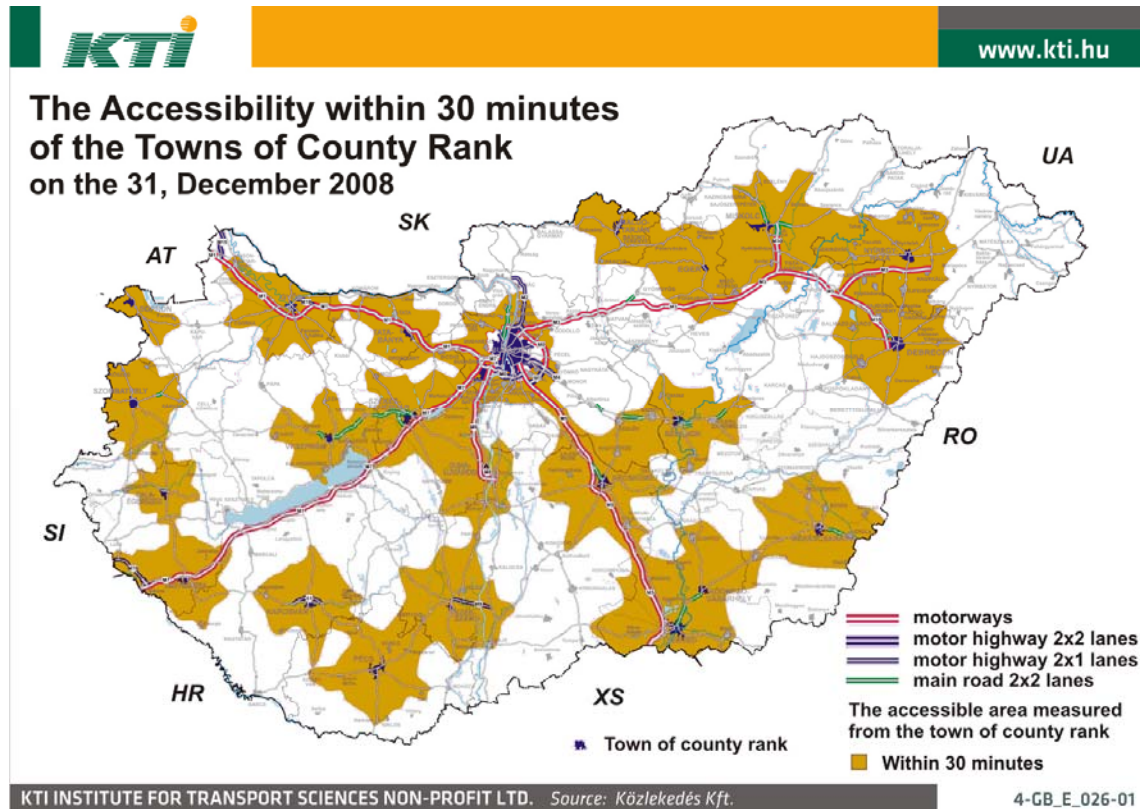
It is not a new statement but we often forget that in passenger transport sector there are **dual purchaser relations. The passenger as an end-user of the service** directly values market effects: the quality of the service and its price. Depending on social perception in each country (for example in Nederland, Italy or in Hungary) consumers differently act in terms of:

- Journey time (see picture 8, 9);
- Access and egress walking time (which is almost zero in case of individual transport);
- Accessibility or frequency of the service;
- Waiting and transfer times;
- Own service quality respectively accessories (for example internet use);
- Charge of the journey.

Picture 8: Accessibility of motorways



Picture 9: Accessibility of chief town in counties



**Insecurity effects of statements above sharply influence market** as a KTI-survey of passenger complaint has been resulted. It seems that contemporary passengers are more sensitive to indirect values such as comfort, secure and stress effects than to primer interests such as travel time and charge. (However, measurement of these is not based on scientific punctuality, but tendencies clearly shows them.)

**In reality these quality questions belong to competency of responsible authority** as soon as the smallest intervention has been done in market processes. (From regulation for enterprises to possibly entering a market to regulation of compensation for losses and its payment are considered as interventions irrespectively of the fact that state, regional council or an optional self monitoring market imposes them.)

In Hungary **a strong competition developed between individual and public transportation**. The economical crisis is notable for both sectors but the effects are different. While in PT sector public financing restrictions force state to radically diminish and to save expenses (as state is the responsible authority); inhabitants, individual transport users do not economically and cognitively feel the power of economical crisis. Moreover, people in Hungary are envious of countries where introduction of scrapped car subvention scheme prompted individual transportation.

By the way, has any of you heard about introduction of scrappage scheme for tram or for bus in order to strengthen demand in any country?

Picture 10: **Pacific Electric Railway cars piled atop one another at junkyard on Terminal Island, California, 1956.**



In 2008 Hungarian national household spent about 1 billion € amount on operational financing of public transport sector as in the EU regulations were written. In 2009 this amount was blocked and in 2010 in the EU cooperated with international financial institutions against global crisis is planned to reduce the normal level by 10-15 percent. (In other word this amount of savings has to be reached in three years.)

**Decreasing public financing generates strong competition among transport sectors.** This competition is realised not just as an **active lobbying**, in my point of view it is a pseudo market phenomenon and notably makes distortion in market relations and even **in redistribution of transport performances**. While operators try to cut back services, which generate loss (for example train services were closed). In Hungary bus operators were applied to eliminate 3500 services in 2008 and 2009 up to this day. Economical recession seems to reveal total confrontation between lobbying groups.

At the same time among bus operators competition has barely appeared. Previously aim was to gain new passengers from train sector providing a better service structure, but for today bus operators acquire passengers from each other or they give up territories where profit has decreased. This is true not only for small private enterprises but also for big state-owned enterprises with a long term territorial contract.

Evolving competition involves advantages and disadvantages.

Advantages	Disadvantages
It more likely refers to real demand in rush hours and frequented lines	Off peak times stay without any service or get overbidding
According to route demand a quicker access time is assured.	There are blank territories and no side trips route (for example farmstead).
Chain efficiency improves – operator surrenders passenger where service is not significant effective.	Last-mile problems – which is responsible for a door to door service?
To choose the right volume efficiency and to build an integrated service system in a company or in a group of companies.	Efficiency decadence in high overhead cost monopolies.
Imperative effect of volume efficiency is increasing. (Earlier there were train services even where no passengers are.)	Instead of having 3-4 bus services, train service would be indicated.

Conclusions:

- ⇒ National transport culture influences market decisions of passenger and rationalization of transport operator choice.
- ⇒ Passengers very quickly accept reliable service conditions.
- ⇒ Economical interests of transport operators are often in contradiction of passenger interests.
- ⇒ Public financing and its disproportionally distribution make a distortion in transport operator's efficiency.

**All in all, the question is only in inquiry of efficiency how should we prioritize:**

- ⇒ **Effort of state/ region/ council who are focused on social welfare,**
- ⇒ **Intention of transport operators who are focused on profit,**
- ⇒ **Demand of passengers who vindicate their individual interests.**

**Question 3: “To be or not to be?” To compete or to cooperate?**

To decide this question it is satisfactory to analyse this two market methods: competition and cooperation in consideration of above priority context.

It is widely believed that in case of competition **the winner is the consumer, namely the passenger**. In other word competition favours individual passenger interests.

This statement is evident in real market environment. However, this advantage does not obviously manifest in pseudo market phenomena of public transport. (The proof of this statement has been a great lack of our profession). Two factors could be determined for reasons for restriction:

- ⇒ Transport operators do not directly affect passenger's value (there are always exceptions), but they **compete for the market**. After having signed agreement of public service contract, transport operators conform to obligate only depending on how strongly the PSO is controlled. It is evident that **in private sector (supposing best of intentions) endeavour for profitability appears. Target of profitability and improvement of modal shift are contradictory.**

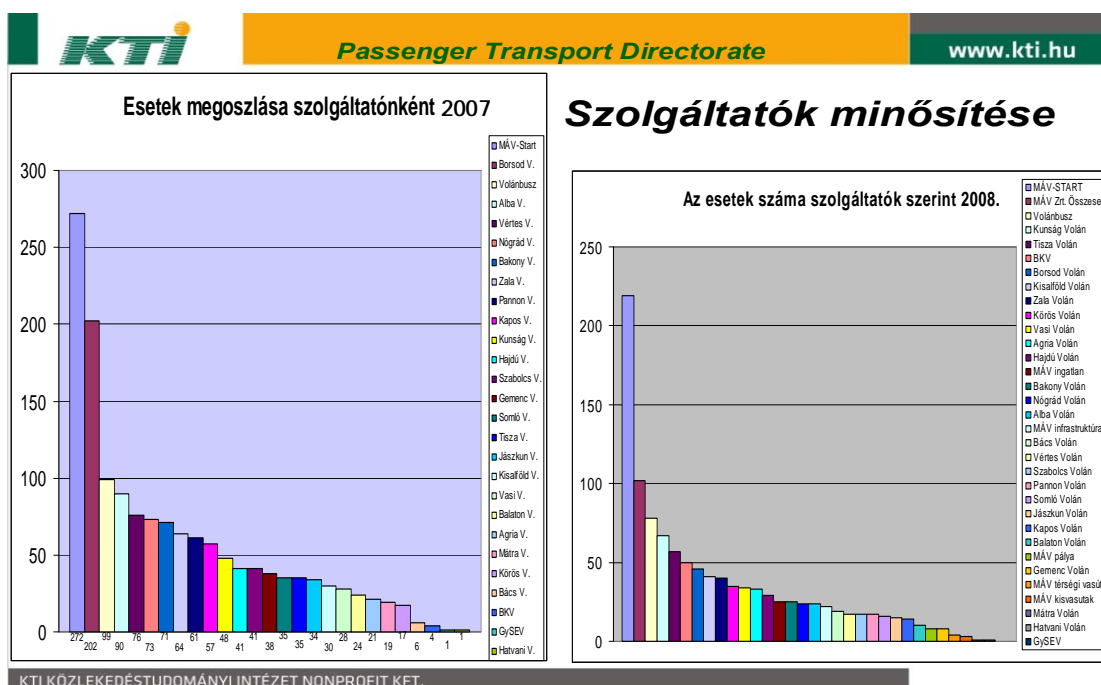
- ⇒ **Passengers do not evaluate public cost spent on transportation**, especially if resources are blocked by crisis contrary to cost spent on his/her own individual transportation, where only fuel expenses count. (Deformation of this kind of evaluation and economical rationalisation belong to more important and more harmful pseudo market phenomena.)

In case of responsible authority or municipality only one aim counts: what relation is between public transport responsibility, social solidarity and market economics?

According to this, three factors could influence its success:

- ⇒ Constituent, namely passenger's satisfaction, does not evaluate only at public elections. To monitor changes of **passenger complaint** in terms of quantity and quality is a great method to evaluate efficiency of responsible authority.

Picture 11: Last two years evaluation of transport operators

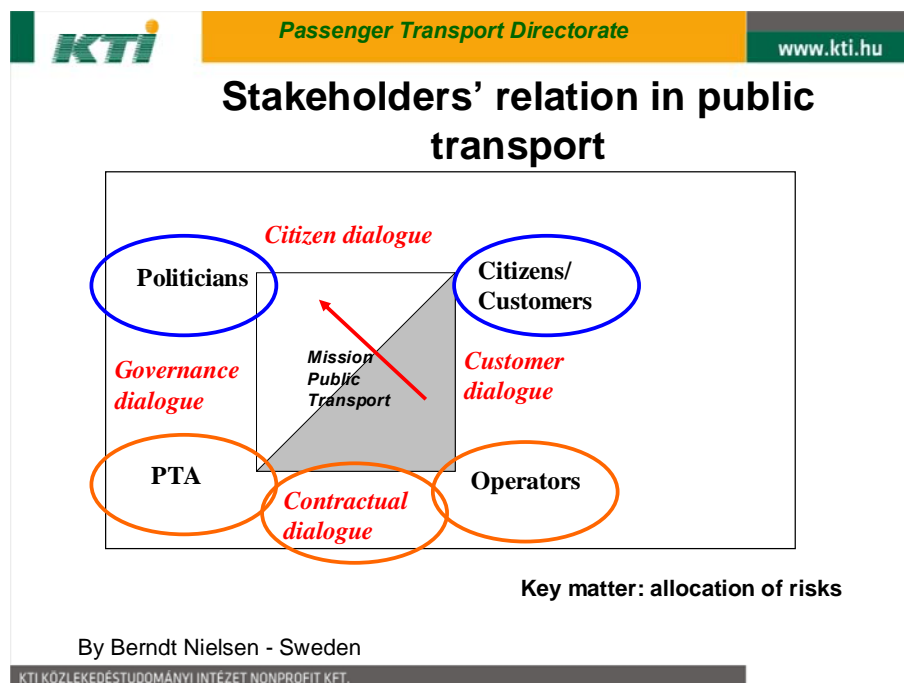


- ⇒ Responsible authority interests are evident: to **decrease public expenses** and to amend “public efficiency”.
- ⇒ Among interest relations emerge a **demand for market domination**, in other word for the fact that procedures would be calculable, comprehensible and feasible. To assure this is the strictest obligation of responsible authority. Unfortunately regulation decencies often generate that state keeps these unpredictable market relations.

**Transport operators' interests seem simple and direct: to make a great profit and to secure capital return.** Hungarian pseudo market has a special feature that every state-owned transport operator is interested in profit minimizing. At the same time state-owned institutions have exclusive right for risk allocation.

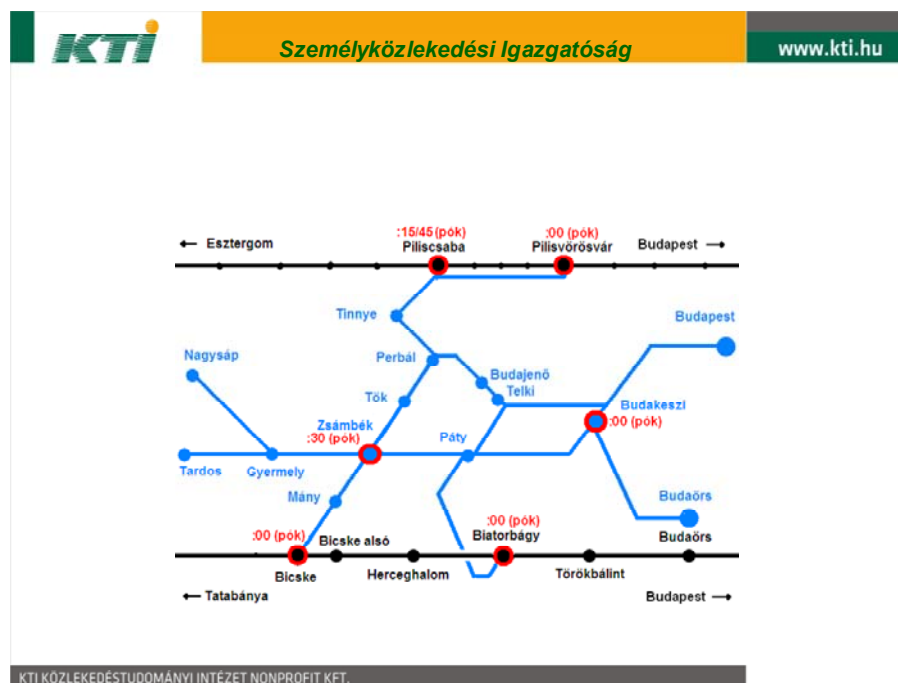


Picture 12: Stakeholders relation by Berndt Nielsen



**In cooperation it is much easier to find common interest.** It is evident that it is impossible to supply every passenger transport's demand with only one mode. All participants: responsible authority, transport operators and passengers are interested in **choosing an optimal way for changing a mode**. All of them equally benefits from cooperation. If participant interests are substantially diverse then cooperation will easily and shortly be broken.

Picture 13: **Intermodal system with periodic timetable (ITF) in Western-Buda area**



KTI has been found different ways how to choose optimal way for changing a mode. One of them is integrated periodic timetable. Two train operators (MÁV National Train Company, and ROE Train Company), two bus operators and one of the subcontractors tightly cooperate with each other on network below.

**Competition and cooperation are not opposite categories, but joint elements for rational economy. As a consequence it is inappropriate to oppose cooperation and competition instead of doing this,**

- ⇒ **Real market competition has to be created** (and not to maintain an artificially pseudo market function).
- ⇒ **Cooperation has to be required in an optimal level of the system** (, where average time for use is on a minimum level and the smallest public cost financially means “the greatest profit”. \*)
- ⇒ **Optimal market control tools have to be used in order to create common interests of all participants**, including the creation of legal regulation, but also the mechanism of intervention, which are countable, maintainable and in term of risks supposed equal right and safety for everyone.

\*I agree that this is very arguable. ☺

To answer the question, what optimal solution is, provokes serious professional debates. **The aim is to achieve that transport operators would be interested in maintainability instead of profit maximum.** The facts that have to be in contract conditions:

- ⇒ in case of extra profit responsible authority is entitled to levy concession;
- ⇒ in case of accepted losses the rate of public financing, its calculation and disbursement must be controlled;

- ⇒ in terms of winning services in package conditions of cross financing must be clear;
- ⇒ the possibility to use efficient protection against influence of market acquiring and manipulation of market relations;
- ⇒ participants voluntarily and compulsorily restrict monopoly acquiring.

It is also important that all the tariffs must be formed in order to the fact that rate of individual and public finance is accepted by the society.

At the end of last millenary when modal split was 60 % in a representative survey researchers in city transport sector were curious of opinion of population how high the rate of individual and public finance should be in transportation costs.

The result predictably was 60/40 percent. At first sight it is easy to think that sixty percent, who travels by public transport, prefers public finance, meanwhile automobile society supports „pay as you go”.

When researchers are absorbed in evaluation of answers, it turned out that answers belong to car users as well as to public transport users in the same 60/40 percent rate.

This means that solidarity in society is supposedly significant and public transport finance is widely well tolerated. Only international benchmarking would evince that in Hungary high demand for public finance is whether historical heritage or real permanent social demand.

**Question 4: How could be possible to regulate competition and to enforce cooperation in a market conform way?**

**Requirement 1:** analysing situation of public service. It is possible to deduce the conclusion for intervention's need from given supply data.

One of the possible measurements is a concurrency-index made by KTI. This index measures **how possibly current public service could replace with another sector which also has current service**. Its advantage is that above verbal evaluation gives also objective numerical evaluation by virtue of this a rank of different services could be created.

As a result of it, parallel supply could optimally be distributed or reduced. The index indicates an interrelation of two public transport operators supplied between the same two given points from passenger's view (and not from the transport operator's view).

It does not complexly rank, it only gives how possibly is able to replace one of the operators with another.

Concurrency-index refers to a number: the value is zero if you can not reach point B from point A (namely if there is substitute operator in neither end) or the alternative mode is unacceptable. The value is 100 if operators have the same examined characters, so the two transport operators are equal. The value could be over 100 if the alternative operator is better than the one being replaced. The software examines the cases when:

- it happens by only just bus or only just train
- in case when train is without transfer, or in case when bus has maximum one transfer

- in case of transfer when waiting time (contingently total access time + waiting time) could be defined with one parameter, or when longer waiting time is not unacceptable at all.

**Requirement 2: exact definition of target position.**

One of the methods and measurements is a model worked out by László Kormányos, which is able to evaluate the mobility supply. The model prefers supply market, namely it is a **measurement oriented in passengers**.

In order to this analysis system of relations, network aspect and integrated transport chain in consideration of the following parameter systems are defined:

- **average access time** [hour],
- **average access frequency** [access /hour],
- **complex timetable-structure index** (ITF index) [%]
  - frequency index( $P$ ),
  - symmetry index( $S$ )
  - transfer index( $C$ )

“**Vectorial method** defines the value vector of mobility supply, which by averaging and weighting could be quantified in terms of relations and complex network, it could be produced out of parameters of basic mobilization supply.

$$\underline{v} = \begin{bmatrix} v_t \\ v_f \\ v_I \end{bmatrix} = \begin{bmatrix} \frac{\sum_{i=1}^n t_{n_i} \cdot n_i}{\sum_{i=1}^n n_i} \\ \frac{n}{t} \\ \frac{N_p}{N_{\ddot{o}}} \cdot \frac{N_s}{N_{\ddot{o}a}} \cdot \frac{N_k + N_{cm}}{N_{\ddot{o}}} \end{bmatrix}$$

The model is able to evaluate mobility supply of optional public transport's relation (one or more relations, even in terms of whole train network or more public transport mode's network). According to mobility demands **alternative accessibility is in the centre of evaluation model**. In terms of network aspect the preciousness of analysed mobility supply is defined by qualitative analysis of transfers and

access time (symmetry and so on). **Comparative versions' evaluation of mobility supply (timetable) for evaluation parameters and preciousness changes could be determined"** <sup>1</sup>

**Requirement 3: beyond using soft and neutral market tools of state regulation, competition capability and cooperation willing among the transport operators could be amended.**

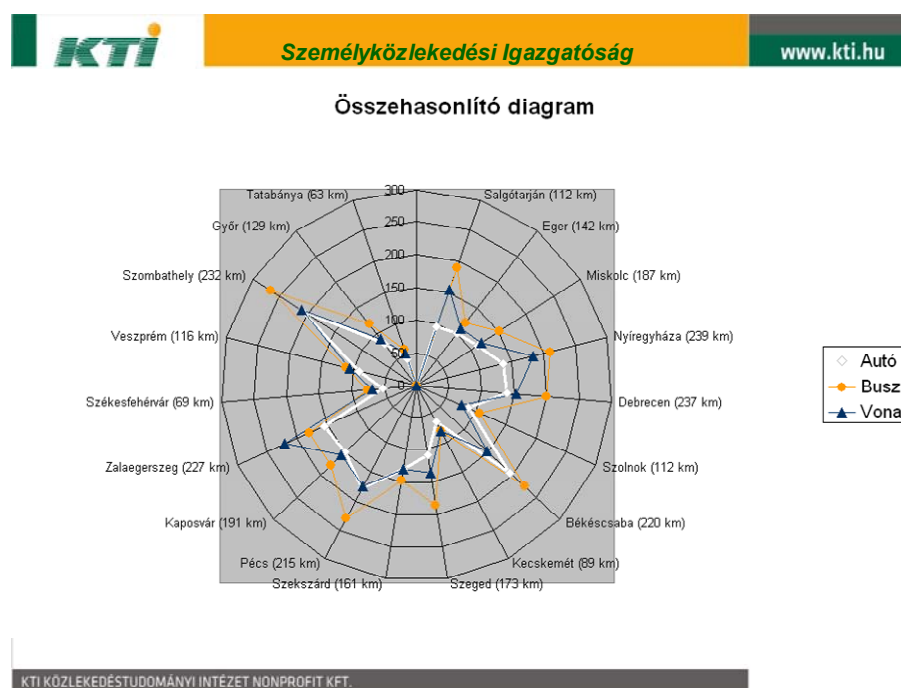
Analysis and taking advantage of market competition capability in terms of infrastructure use is highly important in market entry. Cost efficiency in Hungary is determined by infrastructure fee as shown below.

Usage (route) cost of infrastructure per 1000 seat kilometre

Mode	Cost
Bus transport	~ 3 €
Train transport	~ 13 €

Intensive use of infrastructure results an indirect market manipulator factor, utilization of travel time. Disadvantages have to be mentioned such as reduction of mass, deterioration of volume efficiency.

Picture 14: **Access time among competitive sectors (Private car, bus and train)**



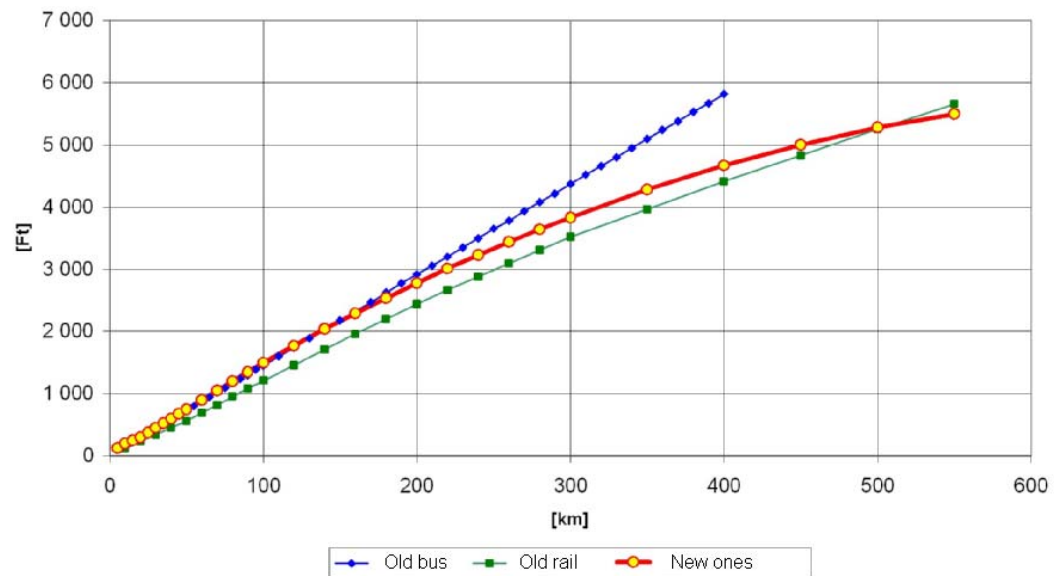
Last market control mode, that we mention, is **tariff and its effect on competition capacity**. It must be clear that one of the most remarkable modes maintaining balance between supply-demand and between different transport modes is the tariff policy.

<sup>1</sup> László Kormányos: The operator system of integrated periodic timetable, 2009. Budapest, BMGE c. Ph.D dissertation

Picture 15: Comparison of full price tickets (Bus, rail, common)



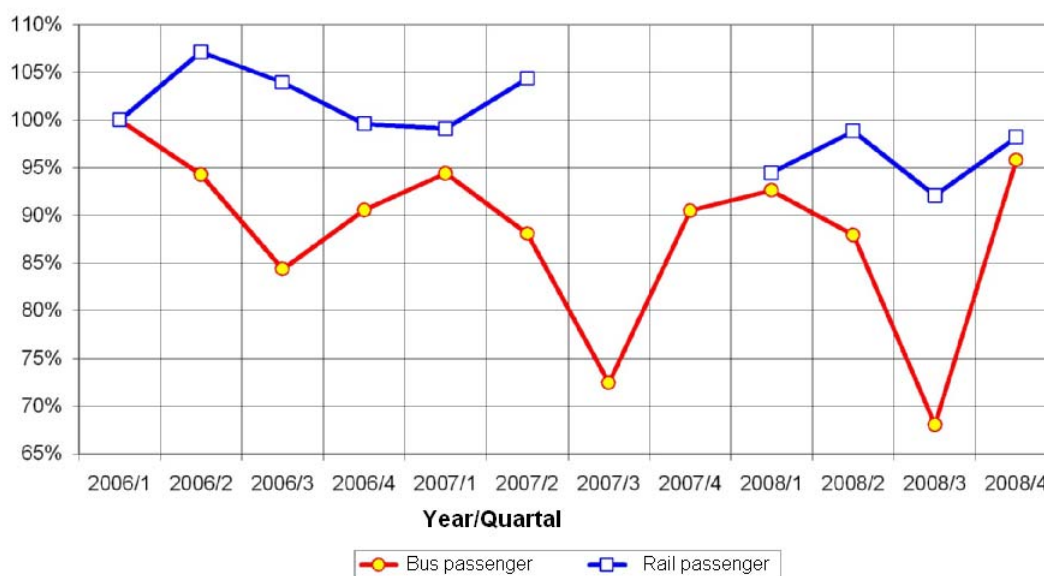
### Comparison of full price tickets



Picture 16: Number of Passengers before and after tariff reforms




Number of Passengers related to 2006 (%)



The transport operators usually are unwilling to use too complicated tariff systems. But pictures 15 and 16 show, that the unification of tariff system only would not effect on demand and competitiveness. The dramatic deterioration in bus transport depends more on the simplification of discount system. The more than 43 different types of discounts were simplified detriment of bus passengers. However relative increase of rail tariffs was higher. But the average travel distance explains the real effect whereas average distance is 19 km in case of busses and 56 km on train.

Before ending this report the table summarizing rail and bus services in Hungary shows the remarkable differences between rail and bus sector. Till state contribution of railway sector is high as shown below no real competition is to forecast.

Picture 17: Summary of the Hungarian bus and train services

<div>  <div> <b>Passenger Transport Directorate</b> </div> <div> <a href="http://www.kti.hu">www.kti.hu</a> </div> </div>		
Rail and bus services in Hungary		
Characteristics	Rail	Bus
Transport performances	Passenger: <b>150</b> million Passenger-km: <b>9</b> billion	Passenger: <b>480</b> million Passenger-km: <b>9</b> billion
Proportion in regional public transport	Passenger: <b>22 %</b> Passenger-km: <b>5 %</b>	Passenger: <b>77 %</b> Passenger-km: <b>50 %</b>
Travel distance (average)	Cca. <b>60</b> km	Cca. <b>18</b> km
State contribution (for 1 passenger on 1 km)	Cca. <b>15-25</b> HUF	Cca. <b>1</b> HUF
State subsidy since 2000	<b>1111</b> Md HUF	<b>44</b> Md HUF
Public service contract	1-1 year	By 2012
Service level changes	1+3 times per year	3-8 times per year

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At the end just for fun...



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### Why public transport?




### And how?




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*Múlt?*

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**Really is this the past?**