INFRASTRUCTURE NETWORKS AND THE COMPETITIVENESS OF THE HUNGARIAN ECONOMY

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SUMMARY

This paper[1] aims to examine how technical infrastructure networks may contribute to improving the competitiveness of the Hungarian economy. Consequently, our main question will be to establish how certain networks or sectors can promote competitiveness of the *entire economy* rather than how they could be more competitive in their own field.

In the macroeconomic or regional sense *competitiveness* is interpreted as the entirety of safeguards and preconditions that provide a long term basis for success in a competitive market environment. The review of the economic, social, institutional and facility preconditions of competitiveness has highlighted that practically every component must be backed by a good system of relations: both strong, balanced *internal relations* promoting co-operation and *external relations* to assure outward linkages.

Despite the above correlation, it would be a fallacy to assume that infrastructure networks as linking elements in general are factors per se improving competitiveness. In accordance with the level of development of the economy, the key forms of activity and the realistically attainable objectives, *different linkages and service*

[1] This paper was produced as part of the research project entitled 'Economic competitiveness: recent trends and options for state intervention' Leaders of the research were: Orsolya Lelkes and Ágota Scharle, Strategic Analysis Division, Ministry of Finance. The paper reflects the views of the author and does not represent the policies of the Hungarian Ministry of Finance.

needs become key for the development of the economy *in different stages*. Today the speed and success of the switchover from the former resource-driven course to an innovation-driven path are key factors in Europe's alignment to the economic vanguard of the world and Hungary's alignment with developed countries alike. Experience shows that in this transition those sectors may hope to be successful which are able to radically transform their activities exploiting the potentials offered by the most recent info-communication technologies. This holds true for every level of production, service provision and the institutional system as well as the network infrastructure sectors.

Undoubtedly, the most thorough and most direct transformation is happening in the infocommunication sector itself; in other words, this sector is reforming itself and acting as a driving force of the transformation of the entire economy at the same time. Consequently, *today the infocommunication infrastructure has a completely different relationship with the competitiveness of the economy than other networks do, and these relations cannot be discussed in the same context*.

The infocommunication sector is a booming and leading industry, therefore it is (especially) true that the competitiveness problems of the sector also have a direct impact on the competitiveness of the entire economy. Especially in communications, the issues relating to *service providers and their customers* should be regarded as such internal sectoral tasks: licensing, market surveillance, network access, network compatibility (interconnections), data handling, data security and consumer protection should be mentioned in this context. These tasks effectively encompass the entire communications policy and as a whole, as a state-of-the art communications environment, they can have a significant influence on the competitiveness of the economy.

On another level of the linkages of infocommunications networks, not only customers but also *the entire society is affected*. In this context we should mention issues such as avoiding the digital gap, preventing exclusion from services, assuring universal service provision as well as the general approach to data protection. Finally, we have identified a separate, third level for the presence of infocommunications in the activities of other sectors and the *formulation of the strategies of industries permeated by infocommunication technologies*. The two latter levels together can also be regarded as the *social and institutional aspect of information society*, and no doubt the progress here has a fundamental effect on economic competitiveness.

The presence of infocommunication in the various sectors also indicates how far transformation has gone in those sectors/subsectors. Furthermore, the contribution to GDP and its growth rate also provides guidance to the investigation of differences between the sectors.

Having looked at those factors, we can safely state about certain subsectors (e.g. development of inland navigation, the retention of the airline at any costs, the promotion of coal mining, high-speed motorway system development in a radial structure and the system of logistical centres relying on that ill-considered structure) that *assistance to them cannot be justified by competitiveness considerations* either based on the economic or the complex economic, social and environmental conditions of competitiveness.

There are also technical-economic considerations where the problems of the communications sector are analogous with the difficulties faced by other sectors. *Convergence – the competition for the provision of similar services, providers formerly separated along technical parameters* – is comparable, despite the numerous differences, with the situation on the market of public transport, where passengers do not want to vote for technical solutions, i.e., the railway, buses, microbuses, trams or metro; instead, they would prefer to rely on service providers acting in alliance to service a town or micro-region in an integrated system. The barriers hindering integration are also similar: the protection of the existing monopolies – even if this is sometimes complemented by the shortcomings of subsidy systems, which also work towards the protection of existing positions.

Another finding of our study reveals that it is only in the field of the electric power system where the EU required as a precondition of accession that the Visegrád countries first prove the operability of their systems in regional co-operation. This was the case despite the fact that it would be expedient in a number of other instances, for example on the level of airlines, railways or even post offices, to look into this option of *regional strategic alliances* to improve competitiveness.

Finally, in some sectors we looked at the long term correlation between domestic provision and GDP growth. The systemic change brought about major fluctuations in energy consumption and GDP growth, but the *significant improvement of energy intensity* has indicated a real change, and the favourable turnabout of the trend promising for the improvement of competitiveness as well, only since 1996.

INTRODUCTION

The purpose of this study is to commence the fact-finding research in the field of *network infrastructure* that would be conducive to the reconsideration of the role of the government and later to the adoption of specific measures.

THE INTERPRETATION OF COMPETITIVENESS

The term 'competitiveness' is much used; still, it has no uniform definition in the economic literature. It is often used as a tautology ('the well-functioning, advanced economy is competitive').

Even though originally competitiveness is mostly a micro-economic term, recently it has frequently been used in the extended sense of "regional competitiveness" or the "(economic) competitiveness of the country".

The global market position of a company or group in terms of market sales, or the changes therein, is generally considered to be the *indicator* of competitiveness in the original sense. Competitiveness itself is more than that, effectively comprising all the factors which provide *safeguards for improving the share in market sales or, in case of a good starting position, at least maintaining that market share*.

According to Ádám Török (2003), it is expedient to differentiate between the *supply* side factors of improving competitiveness, that is, the ones relating to the quantity, quality and costs of the goods offered; and the *demand* side aspects, which (with the exception of a market leader position with price setting powers) should be regarded as external factors, but which warrant attention. Even though infrastructure is generally classified among *supply* side conditions, it should be noted that the improvement of certain infrastructure elements may improve the market access of domestic producers as well as foreign producers, thereby potentially resulting in changes in market conditions detrimental for domestic producers.

In another approach, partially overlapping with the aforesaid, Porter (1990) lists *factor inputs*, the level of *corporate technology*, the existence of *linked and service activities* and *demand*-side conditions as factors of competitiveness. In a rough-and-ready approach, the availability of infrastructure is generally classified among *factor inputs*. In contrast with this one-sided classification, we should highlight that the availability of infrastructure also has a key role in the emergence of *linked activities, regional clusters and corporate networks*, and, as we noted earlier, infrastructure can also affect the *demand-side conditions*.

Imre Lengyel (2000) lists five (or rather seven) criteria of regional competitiveness. These are: the existence of R&D (Research and Development), the ability to attract FDI (Foreign Direct Investment), the local network of SME's (Small and Medium Size Enterprises), the availability of infrastructure (INF) and Human Resources (HR), the appropriate level of institutions (INS) and social capital (SC). Though at first glance infrastructure appears to be only one of the seven factors, we should also consider *what infrastructure conditions promote* (or what deficiencies hinder) *the development of the other six factors*. Cf. *Table 1*.

Table 1. Infrastructure conditions of factors of competitiveness

	Infrastructure required
R&D	good supply systems: energy, utilities, internal transport, telecom + see HR
FDI	good external links to attract FDI, internal linkages to promote internal absorption capacity to become competitive
SME	to adequately support clusters: strong internal linkages
INF	external accessibility and good internal exposure, coverage
HR	(education and training), for its retention: good utilities, (+environment, public security)
INS	links with national and international institutions, strong internal links
SC	hinges on linkages, therefore good internal links (transport and telecom) + see also HR

Finally, yet another approach should be mentioned. In accordance with the definition provided, competitiveness is necessarily an *ex ante* indicator, that is, it relates to future performance; still, we often encounter ex post indicators either as indicators used for practical reasons of availability or (incorrectly) as measures of competitiveness; these include components of the regional (national) GDP such as *productivity, employment rate* or *market share*. It should be noted that these indicators in themselves may be misleading even when used as the indicator of future competitiveness. The improvement of productivity at the cost of employment *concentrates* income, while the improvement of employment at the cost of productivity *spreads it out*. Both situations may lay the ground for either improving or worsening competitiveness in the region, but the indicator itself reveals nothing about that. Similarly, market share can be increased in a market segment which the market leaders are leaving for a good reason. In such cases the temporary advantage can be exploited, but investments in the production of the outdated product/service may easily prove to promote uncompetitiveness rather than competitiveness.

Laying the foundations of competitiveness, which requires consideration and long term planning, may be supplemented effectively by infrastructure projects,

which also define conditions for a long period of time. However, this does not mean that the establishment of *any* infrastructure would necessarily improve competitiveness, or that we should not attempt to define some sort of measure to indicate how much emphasis should be placed on *improving infrastructure* and on *promoting other factors* of competitiveness.

This paper urges the commencement of studies to establish such measures, and does not purport to give ready-made answers. The possible framework of a thorough analysis is laid out in Table 3 in the Annex. Below we shall overview some preconditions of improving competitiveness in the context of network infrastructure (transport, telecommunication as well as energy and water networks).

CERTAIN ECONOMIC POLICY ASPECTS OF INFRASTRUCTURE NETWORKS

There are a number of fallacies, or at least unproven clichés, used in connection with infrastructure both in itself and as related to competitiveness.[2]

(1) "The elements of infrastructure are public goods"

Pure public goods are goods from the consumption of which no one can be excluded, and the consumption of which by individuals does not reduce the stock available to others. This definition does not apply to most of the costly infrastructures offered today, or to the services offered where, just to the contrary, the *consumer pays* principle should be the starting point and the modes of assisting those excluded from consumption should be discussed as *exceptions*. (Heating, lighting, water supply, canalisation, waste management, telecommunication, public transport, private transport). In any event, references to public goods or club goods should be treated with caution, and in this respect there is no general principle applicable to every type of infrastructure facility.

(2) "The provision of infrastructure is a state responsibility"

There are basic services the provision for which is indeed a public service obligation (of the central or local government): a basic level of water supply for public health considerations, a basic level of accessibility for fire protection and public

2 There are very few numerical analyses or thorough studies of linkages about the effect of infrastructure and of the various infrastructure subsectors on the competitiveness of the macro-region, the country and the various regions – while such linkages are claimed to exist in a number of sectoral policies. To make up for that deficiency, it would be necessary to commence such studies and to analyse findings in a comparable system.

safety considerations, etc. On the other hand, there are high-quality, high-standard and costly services the provision of which to everyone at public cost cannot be regarded as a consensual decision of society (in Hungary today): e.g. hot water or mobile telephony. Furthermore, there is a relatively broad range between the two, the assessment of which changes over time. In the 19th century the establishment of most infrastructure facilities, e.g., railways, public lighting, gas supply, public transport, started with private funding; subsequently, the state or city soon had to purchase must of them from the original owners to avoid their failure. In the 1990's, however, a privatisation drive emerged all over the world (and not only in the ex-state-socialist counties), resulting in the partial or total private ownership of a number of state-owned and state-run sectors. In Hungary that process is not over yet, while the construction of Hungarian expressways, for instance, moves along a completely different course.

It can be stated with certainty that the discussion of infrastructure *in general* as a state responsibility is not at all convincing. Instead, the various sectors, or even their different levels (e.g. minor roads vs. expressways, or railway sidelines vs. intercity links) should be analysed on their merits separately.

(3) "One Forint invested in establishing infrastructure (or sometimes: expressways) generates three Forints of income in the region concerned"

It is beyond doubt, and supported by numerical comparisons in international surveys (World Bank 1994), that *more infrastructure is built in economically more advanced countries*.[3] [4] This correlation, however, does not mean that wealthier countries are wealthier because they have spent more on infrastructure; of course, the oppose conclusion is also not valid, that is, that infrastructure development is a mere whim, and wealthy countries have invested in it only because they could afford to, that is, they would be just as wealthy in its absence.

However, the interpretation of that correlation is highly politicised all over the world, and when large public construction projects need to be justified, the authors who claim the project in question to be a key issue and the driving force of the national economy are regularly quoted. In the early nineties Aschauer (1991) played that role in economic literature; the high-sounding reasoning of his articles advocating state infrastructure developments in the US was much quoted everywhere by the management in the construction industries.

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3 For instance, while in 1994 infrastructure assets per capita were estimated to be USD 150 on average in countries with USD 1000 GDP per capita, the same figure was in excess of USD 1500 in countries with income of USD 10,000 per capita.

4 World Bank (1994) op. cit. p. 3. Fig 1.

In contrast, the reasoning which attributes macro-economic processes to the close concert of a number of factors is increasingly gaining ground, claiming that no component should be unilaterally emphasised or unduly neglected. Should a situation arise where all factors of development are present and only underdeveloped infrastructure hinders progress, the implementation of the missing element would indeed be a highly efficient investment ("missing link" effect). This is generally not the case, however, and looking at the various development indicators or the largely overlapping competitiveness conditions we mostly find that a medium level of regional infrastructure is generally accompanied by a *similar level* of corporate culture, institution network, co-operation capability, qualification potential, market skills etc. Naturally, even in this case it is important to consider what action or intervention would influence the *most factors* in a positive direction; however, the outcome of that thorough consideration is generally not the conclusion that the one-sided, excessive development of one factor on another would solve all the problems.

Based on the data series of twenty years of seven countries in the Far East, Wang (2002) examined the mutual effects of infrastructure projects and private investments in the regions concerned. The question was not whether infrastructure projects have any impact, but whether they really constituted the driving force of development. Wang found that the impacts work both ways; indeed, private investment projects had a greater effect on regional infrastructure development than the other way around.

Of course, these findings could be applied directly to the Hungarian environment only if we knew, and considered identical, the initial conditions of infrastructure, production and service provision and their relationship to each other and to their international peers in the two regions. However, we can safely hazard some general conclusions.

Infrastructure developments fit into a network (energy network, transport network etc.) not only within their own sector but also in the macro-economic (competitiveness) context of the region. Therefore, when examining contribution to competitiveness it is not enough to prove that a given infrastructure project has positive externalities beyond the internal sectoral impact, but within the regional macroeconomic network the results must be compared with alternative development scenarios where similar amounts of public funds would be invested in other sectors or other factors of regional competitiveness promotion.

(4) "It is true for infrastructure development in general that ..."

Within networks and linkages affecting the various factors of regional macroeconomics it would be wholly unjustified to consider infrastructure as the *single factor*.

Even in comparisons encompassing the entire global economy, such as the "poor country – rich country" differentiation quoted based on the World Bank publication, we must ask what components the few or many infrastructure facilities have in the various countries. The findings reveal that in the developing countries of the third world a significant part – almost half – of the few existing infrastructure facilities related to *water* (water supply, irrigation), whereas in developed countries half of the stock related to *energy supply*, another quarter to *public road* infrastructure. As these stocks consist of the aggregate of the networks established in the past decades, we cannot be far off the mark concluding that these two dominant categories correspond to infrastructure demanded by *agriculture* on the one hand and *industrial production* on the other hand. Accordingly, in a decade or two we can expect *telecommunication/information technology* related infrastructure to represent an increasing weight within the total network assets of the developed countries *of the time*. In other words, the size and rate of not only infrastructure in general but that of *network subsectors necessary for the development of competitive production (service provision) cultures in particular* is expected to predominate within the conditions of future competitiveness. It is important whether in the 21st century we intend to maintain our competitiveness by developing navigable waterways or by establishing glass fibre cable networks. This issue is totally analogous with the one mentioned earlier, whether, in order to promote the increase of global market shares, we should spend large sums on an industry past the apex of its life cycle.

(5) "Infrastructure investments are the driving forces of the economy"

Above we have discussed the content and function of infrastructure projects and, through that, the expected macro-economic effects of the *completed facilities*. A frequently used argument tries to justify the positive effects of the project concerned on the economy not with the content of the infrastructure but with the large (public) investment *at the time of the construction* of the facility and its role in employment.

Naturally that impact does exist; no one brings that to question. The problem is that that effect is generally not compared with alternative investment scenarios of a similar sum in the region concerned (evidently, here we focus on the short term impacts on employment rather than *competitiveness*). In contrast, the region and regional leaders mostly face the choice of '*either this or nothing'*, and are forced to support the "free" investment project even if they themselves could propose more important projects which would have at least as much short term benefits as well. As a result, *a doubtful and, for competitiveness considerations, potentially mistaken project may gain strong "grassroot" support, and sober consideration of the justification of the facility becomes increasingly impossible*.

COMPETITIVENESS ASPECTS OF VARIOUS INFRASTRUCTURE NETWORKS

In this chapter we shall review the present situation and development ratios of the various network sectors and subsectors from the aspect of their ability to contribute to the competitiveness of the entire country and economy. The contribution of the sectors to GDP and the related time series are summarised in Tables 2 and 4 in the Annex. However, this approach must be refined: there are periods when an infrastructure sector becomes the leading industry of the entire economy, in which case it is naturally crucial *how much the sector itself is capable of growing and living up to those expectations*. Examples include railway construction in the second half of the 19th century, which was the organising force for a number of important economic activities of the period from coal mining to wagon manufacturing, the timber industry to steel production. In the 20th century *motorisation* was such a sector, driving and linking the most important sectors of developed economies from petroleum processing to motor vehicle production, rubber, steel and cement industry to tourism. Now we expect that in the 21st century *infocommunication* will become a key factor to organise the economic sectors with growth potential, therefore that sector is not just one of the network sectors influencing economic competitiveness.

The question whether the framework for the growth of the future leading sector is in place can in itself be decisive for the future competitiveness of the economy. However, this is the exception: the other sectors will be examined as important networks to be thoroughly considered from the aspect of the competitiveness of the economy. That consideration, however, does not mean that every issue that is important in the subsector concerned is also a key issue for the competitiveness of the national economy.

Transport

In general, we attach great importance to the *linkage components of competitiveness* (clusters, local production level links, social capital, co-operation).[5] Naturally, transport has a major role in assuring the physical possibility of such linkages. It should be highlighted, however, that the *promotion of micro-linkages* depends to a large extent on the adequate level and structure of local, municipal, micro-regional and inter-microregional transport connections, and does not justify concentration on the pan-European corridors *to the extent* that development plans and financial priorities focus on them under the slogan of EU accession today. It is our fundamental statement that *the implementation of the large axes in itself does not render the economy developed, and the benefits expected from those investments can exert a positive effect on the economic competitiveness of the regions concerned only if the*

5 The actual figures relating to transport are shown in Table 4 and Figures 1-3 of the Annex.

regions possess the other requirements necessary for absorption capacity, for instance the local network linkage systems mentioned earlier.

Naturally the various subsectors of transport have different roles in maintaining local and national connections. It is an important consideration for economic competitiveness that *the various subsectors of transport in aggregate cover all tasks at high standards*.

Recommendation: it would be expedient to review the priorities of Hungarian transport policy to establish whether they satisfy the above requirement, which has a fundamental effect on regional competitiveness. Beyond sectoral policy in the narrow sense, transport policy priorities are present, and are to be reviewed, in the documents of regional development, spatial planning, the National Development Plan and the National Environmental Programme as well.

Railways

a/ Advantages of dedicated tracks

The advantages of fixed transport lines with dedicated tracks can be exploited where large, bunchable traffic flows are present in a relatively narrow lane. The following are typical examples, where the railways must be able to exploit its better starting position (also/again) in the future:

"intercity" passenger traffic between cities[6]

suburban passenger traffic

in case of the passenger traffic of large cities, primarily Budapest, participation in servicing the main local public transport lines

transit, export and import freight shipments

as part of that, freight transport to relieve certain road axes in the form of intermodal transportation

b/ The value of railway-owned land

As another advantage, the railways traditionally own very large areas of land, specifically located along transport corridors. These lands, which

6 A special segment of this is the high-speed railway (TGV) which can substitute for short, 400-800 km flights. The real and solvent demand for this is typically forecasted when the air traffic demand for that distance assumes "suburban" characteristics, and flights should be started every 30-60 minutes to the same destination, and neither the air space nor the airports allow for such frequency. In Hungary, however, there is no such pressure at this time, and in this situation the high-speed railway would be more a prestige project than an efficient investment.

generally wrestle with brown-field type problems (i.e. characteristic of deserted industrial sites) within cities, potentially have very good logistical positions, which would be appreciated by today's investors, but it is not the position but the site well serviced with transport facilities that should be offered.

c/ On the other hand, the railway faces clear, well-defined challenges:

- it must provide high-quality passenger transport services to *meet the demands of the middle class* (reliability in punctuality and public security, clean, operationally safe, on schedule, taking into account connections, etc.)
- the rigid and cumbersome system must be converted into a *flexible service provider* looking out for passenger needs. This is possible only if it can combine the scheduled railway service with flexible, connection-rich auxiliary services.
- *freight taken on with responsibility* (safety, time of delivery, careful freight handling) and single door-to-door administration are indispensable requirements in freight transport as well.
- the accounting transparency required by the EU must be achieved *in view of these key objectives* (that is, it is not just the present rigid operation that must be made transparent).

In summary, the challenge is the following: the railways must be converted from an asset-centred operator into a passenger-friendly logistical service provider.

d/ The railway company described above contributes to the competitiveness of the region covered because

- it provides high quality and reliable connections,
- relieves public areas of the pollution caused by motor vehicles,
- provides stable conditions for passengers, with less stress than at present, which improves the quality of spare time and working conditions alike.

*e/ What is **not** an objective:*

- to *increase speed at any cost* beyond the modernisation of traditional railways (140-160 km/h) (instead, the reduction of the waiting/transfer time resulting from poor organisation would be efficient),
- to reduce the labour force at any cost
- to *insist on maintaining* railway services *on lines* where there is permanently insufficient demand, and the run-down railway track is an *obstacle* to the introduction of a better service.

to *treat the railways as a uniform, independent system*, a single layer, as if sidelines with little traffic and trunk lines with heavy traffic loads had the same functions.

Recommendation: The railway strategy promoting a competitive economy should not be devised along the efficiency considerations, and within the framework, of MÁV as an independent corporation; instead, solutions for segments that can be efficiently serviced by the railways must be identified within the single transport system, and adjusted to the other elements of the system.

Public roads

Road transport is the only subsector in transportation that can assure access to *every* settlement, and, within that, direct service to every house, business and other destination. *Neither the railways nor navigation or aviation is able to do that*. Consequently, the quality of micro-connections must be assured within the transport by the public road subsector, and that function must be performed first of all, even if in operational terms it would be more profitable to use the same amount of asphalt in a single large project than to toil at maintaining the roads providing small settlements.

a./ Public roads form a multi-layer network system

The above objective of providing high-quality connection between neighbouring settlements and promoting a wealth of connections must be achieved primarily on the level of *national minor roads*. The minor road network to be established must be conducive to connections between neighbours irrespective of the county, regional and country borders. This can assure that settlements along borders do not become outlying areas of a micro-region and do not lose their connections.

The importance of designing maintenance, modernisation and development in a single system must be highlighted in the context of local networks. The ultimate objective is the efficient operation of the *entire network*, and conspicuous development projects are not necessarily the main tools to promote that goal. For the Hungarian road network to be "EU-compatible," the quality of the 30 thousand kilometres of the national network must be in line with the traffic; this is also a precondition for the competitiveness of the regions. This cannot be substituted by the construction of easy-to-communicate, high-profile new roads at the cost of maintenance: new project make sense only in the context of the network. Otherwise we are effectively channelling traffic from disadvantaged regions to the major roads, which will be followed by investor decisions aligned to the modern roads – then studies will be prepared to emphasise the major effect of expressway construction on regional development.

b/ Main road networks

By emphasising the above considerations we do not intend to question the need of a *main road network* connecting the regions of the country (the qualitative problems of the existing radial intercity system could be alleviated by the construction of by-pass roads along settlements and multi-level intersections at busy railway crossings). Relatively smaller weight should be accorded to the improvement of the public road main network *structure* – not that the radial structure is not detrimental but because *the next layer, the network of high-speed roads connecting regions is under construction today,* and the structural problems of the main road network can be redressed primarily by designing the currently built network in a *grid structure*. Instead, there is much talk about the wrong structure of the main network, while the high speed network is being constructed and planned in the exact same structure.

c/ High speed networks (interregional corridors)

The current plans for the development of the *high speed network* propose to lead, in addition to the existing M1, M3, M5 and M3 expressways, additional high speed roads (M2, M4, M6, S10) into the capital. The radial main road network is detrimental to competitiveness because on the one hand it wants to connect every direction in the vicinity of the capital (which slows down the change of connection and places unnecessary burdens on the agglomeration), and on the other hand, it siphons traffic from other parts of the country, depriving them of potential hubs which could have developed into local centres in another location. Furthermore, the radial system, though at first glance providing regions with direct connection to the capital city, in reality *forces interregional connections to be replaced by connections through the capital*, increasing rather than reducing dependence on the capital and its region. Instead of reinforcing local poles, the "capital city – rural area" connections are conserved, and *the disadvantages that used to exist primarily in the Budapest agglomeration are spread to the whole country as the radial system of connections expands*. The radial system creates more and more compulsion for development in the centre, roads bear the heaviest traffic load here, and this will continue to be the case as long as we want to redress existing problems with new roads leading to the centre.

Inland navigation

Navigation suffered the first major setback in the second half of the 19th century, when the railway gradually outplaced steam navigation, which used to dominate *over land*. As a change even greater than the direct reallocation of traffic, destinations (industrial sites) which used to locate near rivers started to find railway hubs just as attractive. Still, inland navigation continued to be a major factor within transportation, especially in countries by the *sea*, where the wide *river mouths* connected to the shore, and where *canals* had been built between the rivers running parallel with the seashore. Even at the end of the 20th century close to 20% of freight was transported

by boats in Germany and Belgium, and close to 40% in the Netherlands. Thus this transport sector has been closely intertwined with a large part of the national economy, remaining a large employer as well, thus these countries could not afford *not* to curb the adverse tendencies in this area.

In other countries, inland navigation lost considerable ground, despite the fact that environmental and transport efficiency reasons had always pointed to the advantages of navigation. However, environmental efficiency assessment generally compares means of traction based on the amount of energy required for transporting *one ton* of freight, where the existing facilities transport goods on existing tracks or existing river. In Hungary, however, the *goods* that bear the transport conditions of navigation have become rather limited, furthermore, there is a problem with the *fleet* (which should satisfy the Rhine requirements), with the *navigable Danube bed* (compatible with the Rhine requirements), and the *harbours* are obsolete or missing. Even under such conditions navigation is advantageous for some 4-5% of the goods; it is rather questionable, however, whether it would be worthwhile expending considerable resources on increasing that ratio (and thereby creating a navigation sector which would thereafter be in need of subsidisation).

Accordingly, we can conclude that navigation is not a sector of transport infrastructure that could significantly contribute to the competitiveness of the national economy.

This is of course not saying that navigation that is viable on a market basis should not be maintained, that sectors of passenger navigation important for tourism should not be developed and that ferry lines and riverine public transport that can potentially be incorporated into the Budapest transport system should not be expanded. The advance of navigation technology may open greater ground for navigation adapted to the existing river facilities. The issue of harbours is also open, which is complemented by additional considerations relating to logistical centres.

It should be emphasised that the above thoughts summarise the *issues of inland navigation from the aspect of the competitiveness of the Hungarian economy*, irrespective of the existing or pressurised international commitments to reduce the losses of enterprises that want to sail through the country or sell boats to us, and to make them “competitive”.

Recommendation: inland freight navigation, which represents 4-5% of freight traffic and one third of that rate in terms of revenues, is not justified to be treated as a priority for the competitiveness of the country.

Aviation

Even though it is not one of the large subsectors of transport in terms of its market share, aviation has produced a continuous and dynamic growth (if we consider the period of the terrorist threat as a *temporary* setback). Unlike navigation, aviation can acquire a market share in excess of the growing passenger kilometre rates on the market of *quality passenger transport*. It is a different issue that on liberalised markets the airlines fight a life-and-death struggle with each other, most of them losing out in the battle; that is, the increasing aggregate market share has not improved the competitiveness of most companies on the liberalised market.

Below we shall separately discuss the competitiveness issues relating to the *airport* and to the *airline*.

a/ The role of Ferihegy and the airports

The competitiveness related issues of the large international airport of Budapest can be discussed on at least three levels.

The first consideration, which can be regarded as being a micro-economic issue, is the *direct payback* of the operation of the airport, that is, who pockets the resulting profits. Evidently it would be advantageous for the Hungarian economy to retain not only tax receipts but also profits within the economy, but it is more important to assure that the service itself develops to satisfy the requirements of the age with appropriate capital backing.

The issue of who decides about development projects also relates to the agreements concluded with the owners. This also has a bearing on the two other levels of competitiveness considerations.

On the second level the issue is the embedding of the airport into the Hungarian environment: its connections to the capital city and to the other parts of the country; and the role of the airport within the logistical network, whether it constitutes part of the Hungarian logistical system or develops independently. Apparently, most of the real decisions are in the hands of Hungarian transport policy makers and the designers of the Budapest transport systems as these are issues of the transport network and logistical mezzo- and macro-economics.

The third issue is the role Ferihegy gains within the network of medium sized and large airports. In this respect the interests of the private owner-operator and of the Hungarian economy generally coincide (unless the same investor owns the potential competing airports as well), namely, both actors would like the largest possible role for Ferihegy. A problem may arise only if, influenced by wishful thinking, the Hungarian government allocates *excessive* investments to this third level, neglecting the second level, that of maintaining a balanced development assuring its embedding into the Hungarian economy and into the region. The real interest of the region is not

to expand the airport beyond measure but to assure that the *effects of the airport can be optimally absorbed into the economy*.

The following further impacts on competitiveness should be mentioned:

the region becomes more attractive for business connections and for relocation,

it becomes a more attractive destination for tourism,

improved access for conferences and events.

When discussing issues of *regional airports*, political prestige considerations are often intermingled with economic and economic policy reasoning.

The evolution of a decentralised regional structure in the country would certainly be promoted by the various regions possessing their own airports as long as there is *real demand* for them. Real demand can be measured one way only: if the potential users of the airport are willing to pay for the costs of establishment and operation. We have seen that this criterion is not satisfied even in case of expressways: there is demand for the *use of facilities that had been constructed from other people's money. In a strict macro-economic sense such facilities are not competitive*.

The next question is how to quantify the *additional external benefits not materialising on the macro-economic level*: regional economic upswing, additional economic and welfare effects of the expansion of connections. At present proponents of the construction of such facilities generally use estimates for those benefits (adding more and more "consumer surplus" categories to the benefit side of the cost-benefit analyses until benefits exceed costs). Problem is that the same potential benefits are taken into consideration for expressway construction, railway line reconstruction, logistical centres and airports alike, which is definitely unjustified.

Macro-economic effects must be assessed on the level of the network rather than of the facility, and at the time when the various investments within and without transport are still competing with each other. The question is this: assistance to which investment would create an attractive environment for other investments and induce more confidence in private investors (so that they promote the attainment of the goals of the region concerned). Even though calculations are being prepared on the establishment of regional airports, we do not wish to take a stand on this issue for lack of adequate information.

b/ The role of the Hungarian flag

We take no major risks by stating that the maintenance of Malév, the leading Hungarian airline, is not competitive. On a European market where Swissair and Sabena were unable to operate profitably, the competitiveness of Malév in the market sense is not a question. *The issue should be restricted to the question of the value of*

aviation under the Hungarian flag as an advertising medium for competitiveness purposes.

If we ask this question today, we should concentrate on the post-accession situation. We have the feeling that where Hungarian diplomats and businessmen are present at the discussion of every European issue worth speaking of, where Hungarian bidders may participate in any tender, the image of the country will depend more on our achievements and participation at those forums. Furthermore, the image of the country will depend on the experiences of people visiting Hungary, or taking jobs here, as a result of the interest generated. In that environment we attach no outstanding importance to the presence of a Malév barely gets by, at the various airports. (Naturally the case would be different if, as a result of some revolutionary breakthrough/innovation, Malév were to become a universally admired model; however, in this even *its competitiveness would make it a good advertising medium*, rather than its advertising function making it competitive.)

The above considerations, that is, that the national promotional value of Malév does not justify excessive assistance, do not mean that we have nothing to do in the field of aviation. The same reasoning is applicable to each accession country with its own airline, but it would not necessarily be valid for the entirety of those airlines. It would be/would have been of great import for the internal connections of the region and the strengthening of co-operation if Central Eastern European countries had attempted to devise a mutually beneficial common system relying on their own internal requirements. The most important counter-argument has always been the claim that the poor airlines are unable to supply each other with the most important asset: capital. We are of the view, however, that well-designed services to the internal market would have made this common network much more valuable for potential investors as well than the proceeds from these airlines separately "wedded" to western suitors indicate. Furthermore, they would have entered that relationship with a common network designed along internal considerations, which would have improved their bargaining position in respect of maintaining the connections/flights beneficial to them.[7]

Recommendation: In respect of competitiveness, the quality of the international airport and its integration into the country have decisive importance in aviation. The next most important element is to assure bargaining power to achieve flight positions satisfying the Hungarian needs. In this, we consider the appropriate selection of strategic alliances and co-operation with countries in similar positions more significant than the maintenance of the otherwise subordinated Hungarian fleet at any cost.

7 Uniquely among infrastructure (and probably also other) sectors, it was only in the electricity system that the four Visegrád countries first established a common system, which then joined the Western systems. Cf. the chapter on Energy for details.

Intermodal transport and logistics

Intermodal transportation, which is preferred in the EU as well, is profitable only in case of shipments in excess of approx. 5-600 kilometres due to the need for the change of mode and loading. For Hungary this means that it is viable practically only in case of *export, import and transit carriage*. However, even in these cases we must examine whether the intermodal traffic will *increase or decrease the traffic load* on the Hungarian section. The trucks transferred to the railway at the Sopron terminal reduce the load on Austrian roads, but first they cross Hungary to get to Sopron. Six hundred trucks a day would not be added to the traffic on the main road between Győr and Sopron if the vehicles could be transferred to the railway for instance in the Gönyü area beside the M1 motorway. The operators of the Sopron terminal have a clear counter-incentive to the establishment of an intermodal railway station at Gönyü, which would be advantageous for the country.

The above case is an example that *environmentally friendly projects may be constructed in the wrong place and the wrong structure*, so that the impacts on the region of the site are detrimental: for instance, in case of Sopron and Road 85, the interests of the environment, safety, tourism and quality of life are certainly compromised.

Logistics is the science of organising the change of location, which hinges on good *organisation*, systemic *thinking*, that is, *software type skills*. Naturally, the software must be supplemented with an operating infrastructure, that is, the construction of *hardware*-type facilities. Today's transport policy, however, increasingly limits itself to logistical centres rather than *logistics*, that is, on *hardware development* rather than the combination of software and hardware.

Logistical centres are hubs established along the major international freight flows which perform the mode change of goods, their storage, and a certain degree of processing and selection. Obviously their significance lies in the fact that some of the goods flow going through the region undergoes some kind of manipulation, thus added value is produced with local labour. Also importantly, regions expect logistical centres to contribute to supplying their vicinity by performing certain distribution functions. Without questioning the importance of these functions, we should notice the *intensity of competition currently ongoing in Hungary for the establishment of logistical centres*. The Transport Policy adopted in 1996 identified 11 such centres, whereas today there is talk about 11 regions and 13 future centres. In contrast, taking into consideration the minimum carriage distance of 5-600 kilometres for intermodal transport, it can be hardly justified to established more than two or three major logistical distribution bases within Hungary with government assistance; we do not question, however, that a number of additional distributing and processing local logistical centres can also be established and that every larger manufacturing or commercial facility, border station etc. also performs logistical functions.

The slogans heard in connection with the establishment of logistical centres and in the competition for their sites are certainly exaggerated in view of the fact that if they are established in too close proximity, they will take business from each other. On the other hand it should also be noted that logistical centres have a dual effect in terms of competitiveness. Positive impacts include the aforementioned expectations respecting local jobs and the distribution of goods. We must be aware, however, that *by establishing local warehouses in logistical centres, remote producers are able to respond to local demand more flexibly and more rapidly than local producers*; as a result, logistical centres improve the competitiveness of distant producers rather than of those living in the vicinity of the facility; those distant producers having gained closer access to the local market *without* the local producer gaining access to their markets at the same time. *In this context* logistical centres have an asymmetrical effect, and irrespective of the location of production they favour those who have more capital and can stock large inventories in many locations. They have the right to do that; the only question is whether this activity should be promoted from Hungarian funds as well.

Consequently, investments by foreign investors into the establishment of logistical centres in Hungary are not necessarily worthy of assistance. We must consider in very case whose competitiveness the proposed facility would improve, and the use of public funds for the project can be decided in light of that conclusion.

The other key problem of the logistical distribution systems being established in Hungary is that they rely on the single-centred, mistaken logistical system marked today by the main roads, which is aggravated by the proposed expressway routes due to the mistakes enumerated earlier. Naturally, the capital city will certainly remain a logistical hub in the country, but this does not justify the parallel establishment of competing logistical centres in Nagytétény, Csepel, Soroksár and Ferihegy, concentrating in the capital such capacities some of which could exert beneficial regional development effects more in the centres of the western and eastern parts of the country, i.e., in the Székesfehérvár and Szolnok areas, also providing the foundations for the direct rail and high speed motorway connection of those two hubs bypassing Budapest.

Today, driven by considerations very different from the declared expatiations, the development of *logistical centres* is motivated by the following main forces, with widely varying significance for the competitiveness of Hungary:

the interests of construction firms (“to use a lot of concrete”),

competition between local governments (prestige; this is how districts, counties or harbours, border stations try to obtain public funds),

foreign exporters (to obtain a base close to the market),

producers-investors (less bargaining with the municipality, everything can be established near the expressway and an enclave can be created there).

Recommendation: The current logistical concept, and in particular the role and function of logistical centres, must inevitably be reviewed with an eye to its effect on national and regional competitiveness; furthermore, special attention must be paid to assure that the implementation of such centres does not reinforce the outdated single-centred spatial structure and transport network.

Bus and urban public transport

It is true for both of these subsectors that they are related to the issue of competitiveness primarily through the so-called "soft factors" of site selection and the improvement of the quality of life. Metaphorically speaking, this means the contribution of transport to the creation of a liveable city and liveable micro-region.

In both sectors, competitive public transport is not at all identical with transport firms getting by on their market revenues. On the contrary, the question is what *conditions* must be attached to subsidies by *local governments* to assure that the operational interest of the firm are in line with the interest of the inhabitants of the town (region).

One of the key issues of urban public transport is to *give preference to collective transportation* by creating the appropriate regulatory, legal, traffic and infrastructure conditions. In the absence of these, not only will individual transport engulf everything (roads, sidewalks, public spaces, pedestrian areas) but it will also slow down public transport by creating congestion. The enforcement of the benefits of collective means of transport is a vital condition of creating a liveable town.

In Budapest and its vicinity the establishment of a transport alliance has been on the agenda for fifteen years, while the capital city and the government, which promotes the plan, provides price subsidies and other means of support in such a system as to give transport companies a disincentive to its establishment. At present the dispute revolves, inter alia, around the mode of distribution of the compensation for the future "losses" suffered in the alliance, relative to the existing supports contradicting the decided objectives.

Obviously, public transport services to a liveable micro-region cannot be created as long as these better service should be provided at the cost of the Volán companies (coach operators). At present 99.5% of settlements are connected into the public transport system, while even providing a once-a-day service to settlements with less that 500 inhabitants, which constitute one third of all settlements, generates a loss with the use of the uniform 50-seat scheduled buses, let alone the fact that the "disappearance" of the fare revenues make the statistical situation look even worse than

reality. At the current standards of mobile telephony and communications, the desirable objective should not be rigid, inadaptable scheduled services but flexible, callable, intelligent services with small buses; this arrangement would also reinforce connections among the settlements within the micro-region. As long as the system of subsidies does not promote such an arrangement but ensure the reimbursement of costs charged in the present rigid system, the situation is not going to change.

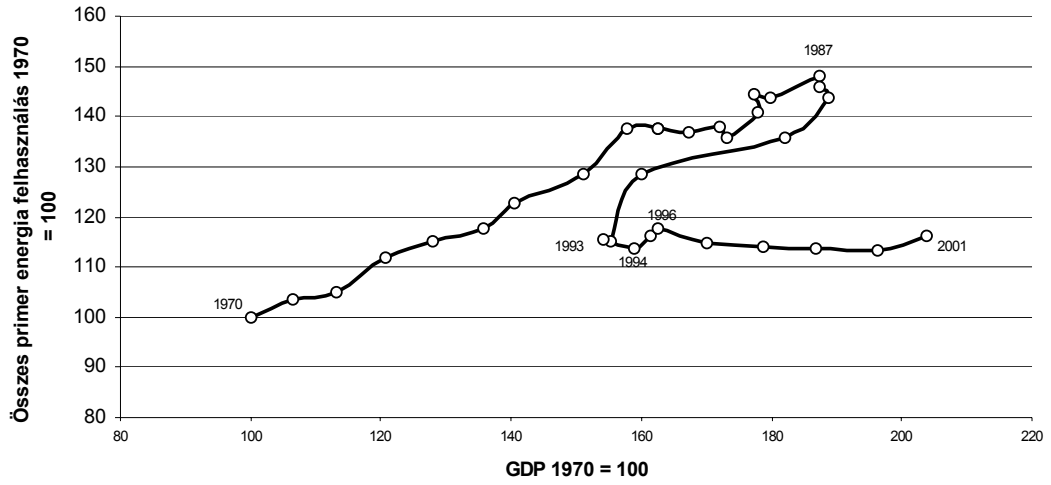
Recommendation: the fundamental task is to assure that public transport subsidies and interventions do not promote the survival of uncompetitive corporate systems but contribute to the operability of systems to be designed to enhance regional competitiveness. The arrangements to be designed must be based primarily on the requirements of the representatives of potential consumers (local governments, regional planning entities, production and service provision co-operations, NGOs of residents and passengers etc.), which may be considerably different from the present interests of the transport companies.

Energy management

In respect of energy systems, we take as our starting point the ex post indicator of competitiveness, that of GDP production and energy consumption trends.

Until the late eighties total energy consumption and electricity consumption were both closely linked to GDP. Within that, the growth rate of electricity consumption was higher, that of total energy consumption lower, than GDP growth.

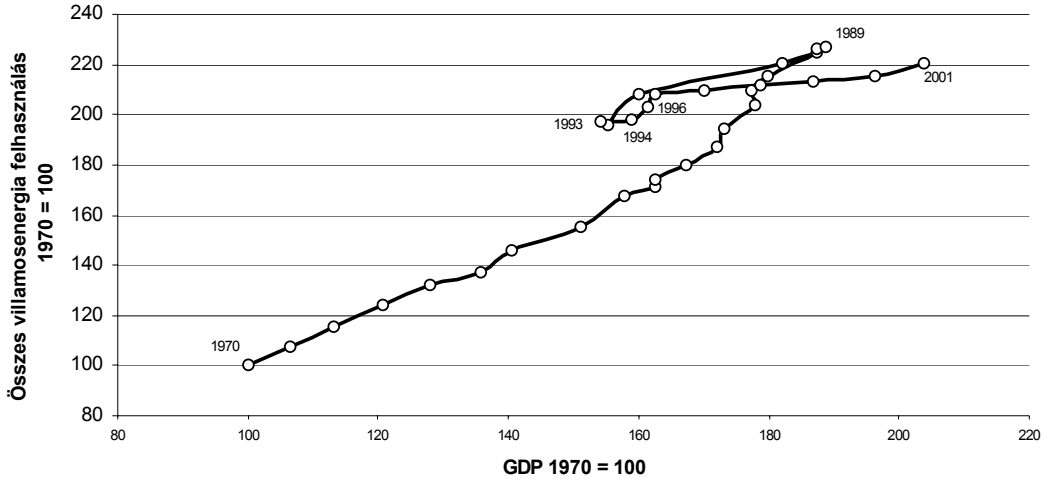
Figure 1 Total primary energy consumption in Hungary as a function of GDP, 1970-2001



Source: A Magyar Villamos Művek Közleményei (Communications of the Hungarian Electricity Works), 39 (3), October 2002

The relationship is shown in *Figure 1* depicting total energy consumption as a function of GDP. Energy consumption increased in line with GDP growth steadily until 1979, and for another eight years the same trend continued with fluctuations. This close link was effectively maintained during the decline between the late nineties and 1992; indeed, the slow recovery between 1994 and 1996 also showed signs of the resumption of the earlier course. Major structural changes occurred afterwards: since 1996 GDP growth has accelerated while total energy consumption has remained essentially level.

Figure 2 Total electricity consumption in Hungary as a function of GDP, 1970-2001



Source: A Magyar Villamos Művek Közleményei (Communications of the Hungarian Electricity Works), 39 (3), October 2002

The same break-points characterise the electricity consumption depicted separately in *Figure 2*, with the difference that the increase of electricity consumption in the entire thirty-year period was greater than that of total energy; accordingly, the decline was also more moderate, and it has been characterised by slowed-down growth rather than stagnation since 1996: however, the growth rate is markedly lower than it used to be.

The figures lend themselves to the conclusion that we effectively managed to break the previous connection of total energy consumption and electricity consumption and GDP and to assume a new energy demand path only in 1996.

This has an important indirect (indicator-type) connection to competitiveness. International comparative studies had indicated since the mid-eighties that state-socialist countries consumed almost two–two-and-a-half times more energy for the unite per capita GDP than market economies did. Naturally, the degree of the difference was significantly influenced by the foreign exchange rate used to convert GDP into USD, but there was universal agreement that some significant difference *did exist* between the energy demand of the two groups of countries.[8]

8 The question remains to what extent that difference is attributable to wasteful (excessive, loss-inducing) use of energy or to the undervalued nature of the goods produced. The latter question is also highly relevant for the link between energy management and competitiveness as it raises the

Within infrastructure sectors, it was in the *electricity system* that the *four Visegrád countries first established a common system* (CENTREL), and following its testing, that system was connected to the western system. By way of historic background: in the early nineties Western European countries were horrified by the prospect that Central European countries would depend on the western electricity system the way they used to do on the Soviet system. Energy generation is a polluting industry, and for environmental considerations they wanted to avoid the production of electricity in Western Europe to be used in Easter Europe. Therefore under these exceptional circumstances they were *not looking for export markets*; on the contrary, they wanted to make sure that the Visegrád countries provide for their own needs. Among other things, they promoted this by setting the criteria of the interconnection of electricity systems and compliance with the quality criteria applicable in the West (frequency stability, emergency capacity, accounting discipline etc.). We could say that in this case the objective was to assure that the electricity system of the Visegrád countries be competitive with the western system.

Further links with the competitiveness of the economy[9]

The energy sector can contribute to the competitiveness of the economy in the following areas:

stable energy supply – in terms of quantity, quality and reliability

availability of the necessary reserves (oil and gas stockpile, primary and secondary reserves)

closure of environmentally hazardous, polluting, outdated power plants.

issue of how much competitiveness can be improved by improving energy production or by changing the industrial production structure.

9 At this point we raise, but are unable to answer at this moment, another important question. In connection with the privatisation of energy production and distribution bases it is sometimes voiced that they are strategic industries. Their breakdown can halt the entire economy.

In the context of privatisation we should consider whether, if the monopolies can be eliminated at the same time (which did not happen in the case of telecommunications), the strategic position of the sector would be retained, that is, to what extent the potential threat from the aspect of economic policy arises from the monopoly or from the characteristics of the network sector concerned. In electricity generation sophisticated reserving rules assure that enough reserves are available even in case of the stoppage of the largest capacity. In transport, however, there is no such conscious capacity management; on the contrary, increasing volumes of traffic are bundled and there are no reserve capacities available in case of a breakdown.

Recommendation: Starting from the example of electricity networks, the consideration of the role of crossborder co-operation and strategic alliances in reinforcing competitiveness should be raised in a number of other sectors as well. Global competitiveness is a macro-regional (Central Europe, Easter Europe etc.) issue in a number of respects, and in that context our interest is the improvement of our neighbours to a higher level rather than gaining the upper hand of them.

Infocommunication

The early era of telecommunications was characterised by the establishment of the line systems considered as *natural monopolies*. This was essentially replaced in the nineties by the establishment of a *competitive environment* and the privatisation of state monopolies on the organisation side, and the introduction of uniform *digital* bases for the various modes of telecommunication, the so-called *convergence* on the technology side.[10] Finally, the penetration of infocommunication not only into communications but into *every sector*, and the emergence of information society, is regarded as the next stage.

As the ability of a sector to exploit the possibilities offered by digital culture practically becomes a criterion of the development of those sectors, infocommunication technology (ICT) has become the engine of economic growth even at the current level. This has been true in the sense that it is a formal driving force of the economy (productivity growth has been the highest in the ICT sectors), and also in the sense that traditional sectors are modernised using state-of-the-art technology, if they are penetrated by infocommunication.

This assessment is true even if the global setback at the turn of the millennium highlighted the fact that the constant stable growth induced excessive financial expectations from the ICT/dotcom sector and over-extended investments under the pressure of the capital rushing to the sector.

10 „From the angle of telecommunications, first we talked about convergence with information technology and automation; this was followed by broadcasting and network information services, and by now the production and processing of information content has also been added to the converging processes. This ever expanding range of converging areas has been given various names, no established terms exist as yet. One of the probably most commonly used terms is infocommunication, which comprises the production, processing and transmission of information, as well as the production of the necessary equipment, in respect of any type of information. Accordingly, the infocommunication sector encompasses telecommunications, broadcasting and postal service providers, producers of computer software, programme, advertising and publications, other information providers as well as manufacturers of telecommunication, broadcasting and computer equipment. As a result of synergies, the growth rate of the infocommunication sector now significantly exceeds GDP growth as a global average, in Europe and even in Hungary." Cf. dr. István Bartolits (1998)

The EU is also lagging behind the leading global trends, and since the second half of the nineties it has made considerable efforts to accelerate the alignment, i.e., the spread of infocommunication. The most recent document in the area, "e-Europe 2005: An information society for all" (21-22 June 2002), the action plan presented in Seville builds on the objectives of the former "e-Europe 2002", focusing on an environment conducive to private investments and job creation, the improvement of productivity, the reform of public services and universal access.

On the infrastructure, i.e., supply side, the focus is on the broad – and affordable – access to the broad band network and the achievement of information security, while on the demand side it is on the creation of modern public services: e-government, e-learning, e-health and e-business (including e-commerce).

These plans set the competitive course for the *accession countries* as well. In the nineties Central Eastern European countries had to develop their line telecommunications networks, which had been totally de-emphasised mainly for political reasons, from a level even lower than their own economic level of development. At the same time, we could commence mobile telecommunication development effectively contemporaneously with other countries, and we have been able to keep abreast with the new technology as appropriate with our economic development both in terms of coverage and ownership structure.[11] Just as the EU started by identifying its relative lag, the Hungarian Information Society Strategy (HISS 2002) concluded in December 2002 also had to take account of a number of negative factors. Even though there was impressive growth in the nineties, the momentum faltered, a number of initiatives were discontinued, and too many things had to be restarted in every government term. The monopoly position of the former leading telecommunications carrier was preserved, the costs of network access are outstandingly high; the high service charges hindering the penetration of the internet and internet use in Hungary are not a mere hazard but a fact. It is little consolation that the regulation of the telecommunications market is not satisfactory elsewhere either, and the EU had to set the objective of re-regulation in general for itself.

In designing its objectives, the HISS relies on the statement of the National Development Plan (NDP 2002): *the realignment from the former resource-driven course to an innovation-led orbit is a fundamental challenge for the entire economy*. In the course of this, in line with the aforementioned objectives of e-Europe 2005, it is not sufficient to develop the supply side of infocommunication; instead, we must

11 In 2000, over half of the total telecommunications calls and approximately one quarter of the total call time was initiated from mobile telephones in Hungary. For more details see Tables 2 and 4 and Figures 4, 5 and 6 in the Annex.

also assure that the new technology can quickly and effectively penetrate the various sectors and a broad range of society.[12]

Economic and social competitiveness is explicitly mentioned in the emphatic layer in the HISS, which aims to avoid the *digital gap*, to achieve universal *access* and thereby reduce regional differences[13]. The sectoral objectives (e-administration, e-local government, e-health, e-justice, e-culture, e-economy, e-transport) go way beyond the sectoral considerations of infocommunication, which is also indicated by the fact that the various sectoral infocommunication strategies must be prepared by the sectors concerned (by October 2003), and the HISS only provides directions and a common framework. Thus the preparation of a strategy itself forms part of raising awareness of the information culture, thereby promoting the goal that not only the improvement of existing arrangements using new technologies become sectoral objectives but gradually new, innovative solutions facilitated by the new technology are also devised.

Some of the network infrastructure sectors (water management and energy management) are not listed among the strategic sectors in the HISS. Referring back to our statement that those sectors are capable of reforming themselves (and becoming competitive) which can incorporate the new achievements of infocommunication technology, this can be explained by the fact that these are highly important strategic sectors but are strongly linked to the *former resource driven development path*. To a certain extent this is also true for the transport sectors, which are incorporated among the target sectors of the strategy under the heading of e-transport. It would be worth examining in which narrow and targeted areas the info-communication approach sees development-reform potentials from among the many transport subsectors.[14]

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12 For the listing of objectives and their relationship to competitiveness, see Table 1 in the Annex

13 „ In the field of infocommunication, in order to improve the competitiveness of the country, the number of community access points must be increased in the entire territory of the country by eliminating regional differences, and the creation of a real service providing state, also for disadvantaged social groups, must be promoted through the use of the achievements of information society." (HISS 2002)

14 „eTransport: Our objective is to achieve sustainable mobility, higher service standards and economical and environmentally friendly transport systems. The intelligent transport systems of the future are integrated systems which provide to road operators and road users information which is accessible everywhere all the time relating to transport, using user-friendly tools and information equipment. In the field of travel information services, we attach outstanding importance to a comprehensive service containing dynamic and static data, traffic information and map information, which is able to transmit the required information to drivers, if network access is assured, via various media (e.g. radio, telephone, fax, SMS, internet). In the area of urban/community transport the improvement of intermodality and giving priority to public transport are important objectives. The application of smartcards in transport is another strategically important area, primarily in designing a uniform ticket system for public transport." (HISS 5.2.7)

Recommendation: The relationship of infocommunication and competitiveness must involve different considerations than in the other sectors. Today the speed and success of the switch from the former resource-driven path to the innovation-driven course plays a key role in the alignment of Europe to the economic vanguard of the world and the alignment of Hungary to developed countries. In this process, the penetration of information technology and its incorporation into the development of the others sectors are of primary importance. Consequently, the competitiveness of the infocommunication sector itself must be accorded special attention when discussing the competitiveness of the entire economy.

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ANNEX

Table 1. The connections of the objectives of the Hungarian Information Society Strategy and economic competitiveness

Code	Objective	Contribution to economic competitiveness
C1	Better job opportunities, working conditions	**
C2	Assuring access to more knowledge and information, facilitating information acquisition	***
C3	Useful and pleasant spare time activities	*
C4	Facilitation of human relations, improving their quality	***
C5	Protection of privacy	*
C6	Easier access to information, access to information of public relevance	**
C7	Freedom of expression	*
C8	Social and economic security (operation of, and access to, health and education systems)	**
C9	Equal opportunities (to disadvantaged groups and regions)	**
C10	Preservation of culture and language	*
C11	Efficient, service providing public administration	****
C12	Open, transparent public sector (glass pockets)	****
C13	Creation of a strong civil society	**
C14	Healthy lifestyle	**
C15	Healthy environment	***
E1	Network with adequate band width and access	**
E2	Access to equipment (individual and community-access computers, ICT equipment)	**
E3	Availability of applications (basic applications, basic information	**
E4	Availability of basic services (in networks and applications alike)	**
E5	Creation of an infrastructure assuring credibility, reliability, integrity, confidentiality	***
E6	Commitment of politicians and decision makers to the creation of information society	***
E7	Improvement of the social acceptance of IT (as a tool and the objectives of the HISS)	**
E8	Efficient, competitive economy	****
E9	Enhancing user skills and knowledge (HR development)	***
E10	Social and scientific innovation, research and development	***

Source: Based on the table in the HISS (2002), with the author's assessment of the various objectives.

Obviously the values we have allocated to the closeness of the connections can be disputed. It should be noted, however, that we found no objective that would not enhance competitiveness based on the approach adopted by this paper to economic competitiveness.

Table 2. The contribution of the various network infrastructure sectors to the GDP of all the sectors

Year	Sectors total	Energy	Water man.	Transport	Post	Telecom	*Navigation*	*Aviation*
				at current prices, HUF billion				
1997	7556	239.8	45.2	439.9	48.6	222.0	*2.6*	*10.2*
1998	8874	287.7	54.3	512.4	59.7	274.5	*4.2*	*13.1*
1999	9973	329.7	59.3	573.6	67.6	336.6	*3.5*	*14.1*
2000	11506	345.3	69.7	630.1	73.6	358.4	*3.4*	*11.9*
				as a percentage of total GDP				
1997	100.00	3.17	0.60	5.82	0.64	2.94	*0.03*	*0.13*
1998	100.00	3.24	0.61	5.77	0.67	3.09	*0.05*	*0.15*
1999	100.00	3.31	0.59	5.75	0.68	3.38	*0.04*	*0.14*
2000	100.00	3.00	0.61	5.48	0.64	3.11	*0.03*	*0.10*

Source: CSO data, available at the homepage of Water Management
http://www.vizugy.hu/vizgazd9801/01/14.htm

Table 3 A possible framework for a comprehensive review – subsectors and indicators

0		*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*
		Nat. perf.	Budget expend.	GDP prod.	Investments	R&D	(FDI)	(SME)	Employment	Qualification	Social capital?	Sectoral policy	Sectoral law	NDP about sector	NSP on sector	EU accession	IMF studies
1	railways																
2	public road																
3	water																
4	air																
5	urban and public transport																
6	logistics																
7	pipeline																
8	water reserve management																
9	flood and surface water control, river bed c.																
10	water supply																
11	sewage and canalisation																
12	(waste?)																
13	electricity																
14	natural gas																
15	crude oil																
16	coal																
17	renewable energy																
18	district heating																
19	telecommunication																
20	broadcasting																
21	postal services																

Notes

In respect of the vertical column of the above table we should note that the comprehensive review of network infrastructure subsectors would have required the analysis of at least twenty subsectors.

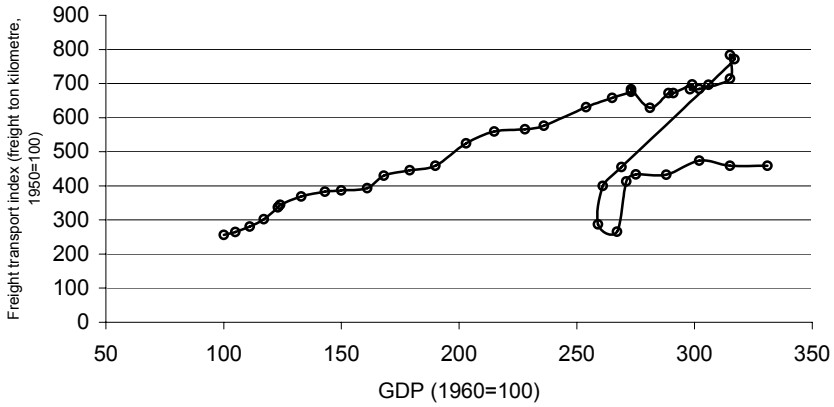
The horizontal headings show the indicators and correlations that we consider indispensable for the analysis of the competitiveness of the economy. Columns 1-4 contain the comprehensive economic indicators which show the importance and trends of the subsector (natural performance indicators, budget expenditure, contribution to GDP, level of investments). Such table components are symbolic, representing time series rather than individual numbers; for instance, the intersection of Line 1 and Column 3 stands for the time series showing the contribution of railways to GDP. This is followed, in columns 5-10, by the effects of the various infrastructure subsectors on other components of competitiveness; this expresses our conviction that some of the effects of infrastructure is not exerted directly on competitiveness but indirectly on other factors of competitiveness. Here the various boxes should also be envisaged as containing papers or analyses rather than a single figure: for instance, at the intersection of Line 1 and Column 6 we would have a study on the impact of railways on the ability (of the country) to attract FDI. From among the criteria of competitiveness, columns 5-10 include R&D, FDI attraction, the development of SME's, and the impacts on employment, qualifications and social capital. We have omitted references to the institution system; instead, in Columns 11-16 we listed some important documents (sectoral policies, sectoral laws, as well as policy documents of regional development, environment protection and EU accession) the linkages to which must be examined. This is essentially a control analysis: the review of whether the recommendations of the policy document concerning the railway sector, for instance, are in line with the tasks identified in the context of the effects of railways on competitiveness.

Table 4. Time series of various infrastructure performances as compared to GDP

Year	GDP	Freight transport index based on ton-kilometre	Long-distance passenger transport index by passenger km	Local passenger transport index, by passenger number	Number of passenger cars	Telephone traffic initiated, million calls	Number of telephone main lines, '000	Television subscriptions, '000
	1960=100	1950=100	1950=100	1950=100				
1950		100	100	100	13054	230.7	110	-
1951								
1959								
1960	100	256	241	191	31268	538.2	243.4	104
1961	105	265	248	199	39872	558.3	255	206
1962	111	281	266	205	53118	572.3	265.7	325
1963	117	302	274	207	71297	596.1	276.9	471
1964	123	337	292	215	86247	606.4	291.4	675
1965	124	344	296	220	99395	553.3	303.8	831
1966	133	369	305	223	116677	569.8	319.2	996
1967	143	383	308	237	143601	596.9	336.9	1169
1968	150	387	307	244	162477	618.1	360	1397
1969	161	393	315	250	190741	645.1	382.6	1596
1970	168	430	325	257	238563	638.8	399.1	1769
1971	179	446	326	263	283661	696.4	424.1	1943
1972	190	459	338	270	332565	765.2	451.2	2085
1973	203	525	346	275	399776	719.9	470.6	2199
1974	215	559	366	279	480924	762.4	493.6	2295
1975	228	566	367	283	568259	765.4	508	2390
1976	236	576	372	288	640502	714.3	516.6	2477
1977	254	631	383	295	720133	802	523	2557
1978	265	658	392	300	820145	1033.8	533.3	2633
1979	273	676	399	307	933851	871.6	560.6	2702
1980	273	683	403	312	1013412	915.5	617.2	2866
1981	281	629	412	321	1105446	952	636.6	2806
1982	289	672	405	325	1181682	989.8	655.3	2838
1983	291	672	365	331	1258495	1021.8	676.4	2864
1984	299	697	371	339	1344101	1048.5	705.4	2995
1985	298	683	369	348	1435937	1042	738.8	2911
1986	302	684	370	349	1538877	1105.5	770.2	2930
1987	315	714	372	353	1660258	1184.8	812.7	2958
1988	315	784	374	352	1789562	1237.9	858.2	2940
1989	317	771	378	337	1732385	1242.1	915.9	2944
1990	306	696	362	311	1944533	1300.8	995.8	2930
1991	269	455	328	288	2015455	1456.1	1129.1	2852
1992	261	400	311	266	2058334	1638.1	1292.1	2863
1993	259	287	300	261	2091623	1838.9	1497.6	2819
1994	267	266	311	261	2176922	2349.9	1785.4	2737
1995	271	413	327	256	2245395	2713.8	2157.2	2665
1996	275	434	339	250	2264165	2967	2651.2	2535
1997	288	433	351	237	2297115	3788.7	3095.3	2589
1998	302	474	361	241	2218010	4143.9	3385.1	2692
1999	315	459	389	241	2255526	4250.3	3609.1	2682
2000	331	459	406	145	2364706	4190.5	3479.3	2649

Source: CSO-ECOSTAT http://www.ecostat.hu/idosorok/eves10.html

Figure 1. Freight transport index as a function of GDP 1960-2000

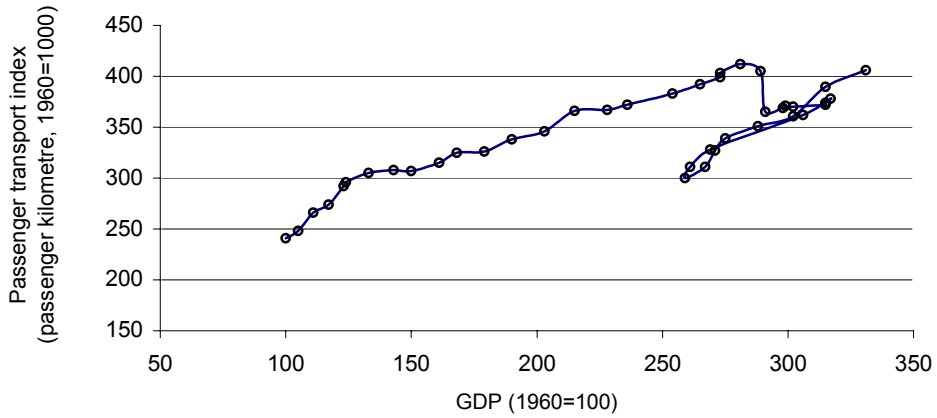


Source: CSO-ECOSTAT http://www.ecostat.hu/idosorok/eves10.html

In case of freight shipments, the basic scheme is similar to that of energy consumption. Between 1960 and 1979 both GDP and freight transportation showed an essentially unbroken growth, and the correlation remained in the eighties with a minor break (lower growth rate). Between the late eighties and 1993 both GDP and shipments dropped, the former by more than a decade, the latter by two decades. In 1994-95 the resumption of the former path commenced, but from 1996 on it became obvious that the growth does not resume its previous trend but assumes a new path, where the same GDP value corresponds to a significantly lower aggregate transport volume. We cannot state with similar certainty whether the steepness of the curve has undergone a similar change, that is, whether any additional GDP growth will be accompanied by transport increments corresponding to the former rates or less.

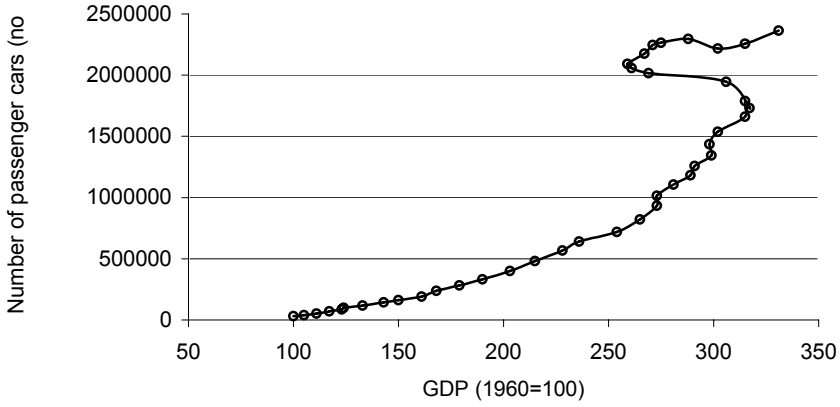
There are various vested interests related to this issue. The transport sector expects the volume of transport to increase in excess of GDP growth, while the entire economy has an interest in producing goods with smaller volumes (more modern products containing less material and energy). The conflict is not genuine, because in reality this is also in the interest of the transport sector as the transportation of such state-of-the-art products allows for the realisation of greater revenues despite their smaller weight – for those who are prepared for the transportation of such goods. The real question is this: is the sector prepared for the kind of transportation to be expected, or does it hope for the reappearance of the goods volumes once seen.

Figure 2. Long-distance passenger transport index as a function of GDP 1960-2000



Source: CSO-ECOSTAT http://www.ecostat.hu/idosorok/eves10.html

Figure 3. Number of passenger cars as a function of GDP 1960-2000



Source: CSO-ECOSTAT http://www.ecostat.hu/idosorok/eves10.html

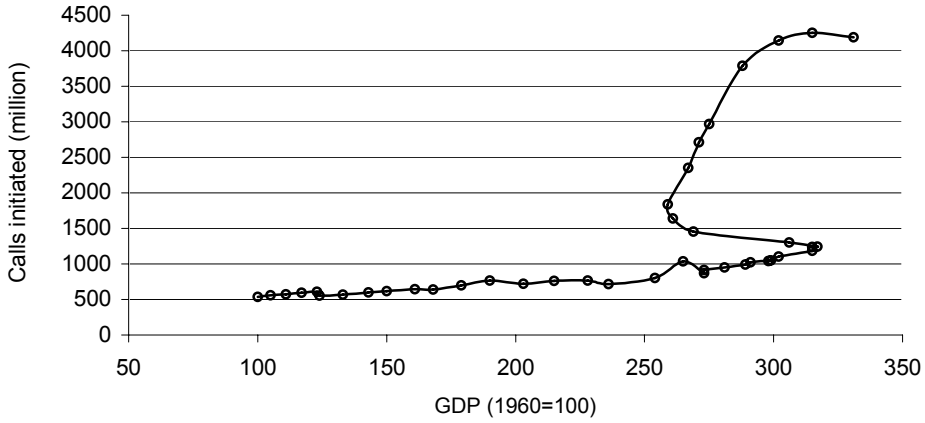
In long-distance passenger transport a relatively significant decline occurred earlier than in freight transport, in 1983-94, that is, when GDP growth was still unbroken. Since then the path has not changed: transport performance increased with GDP growth and decreased with GDP decline, following essentially the same course. Apparently in the area the systemic change did not result in a structural shock. Before engaging in further analyses it would be essential to clarify the content and collection methodology of the statistics of "long-distance passenger transport" in order to avoid

"analysing" figures which produce a smooth course simply because that trend was the basis of the estimate.

The correlation of GDP and the number of passenger cars showed a different trend than transport: the growth of the fleet continued even during the decline of GDP, and it came to a halt in the past 5-6 years, when GDP started to rise. This is obviously because there was a very strong demand buffer, "queuing" until the end of the eighties, that is, fewer people could buy cars than the demand would have justified. In the years after the systemic change this demand was manifested in effective purchases.

A similar "queuing" was ended in the case of telephones, where the curves of traffic and coverage are very similar. After 1988 demand continued to increase despite the GDP decline – at essentially the prior rate until 1992-1993, and the technical requirements of accelerated growth were created at around the same time, incidentally coinciding with the period of renewed GDP growth.

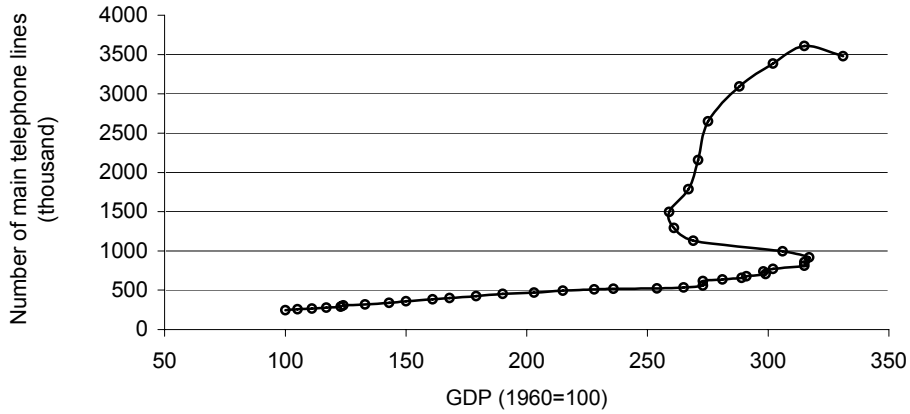
Figure 4. Number of telephones calls initiated as a function of GDP 1960-2000



Source: CSO-ECOSTAT http://www.ecostat.hu/idosorok/eves10.html

The rate of growth of the number of main lines and of the number of calls has been decelerating since 1996-97, actually declining in 2000. The complex phenomenon should be investigated from several aspects: price levels in line telephony, the effects of substituting systems, etc. Here we encounter the issue of the competitiveness of line telephony in Hungary, which is not covered by our original subject; we strive to discuss the relationship of the telecommunications infrastructure with economic competitiveness.

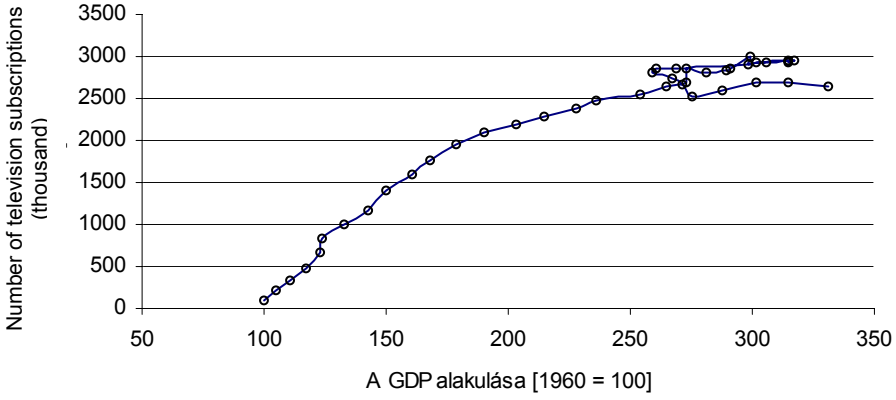
Figure 5 Number of main telephone lines as a function of GDP 1960-2000



Source: CSO-ECOSTAT http://www.ecostat.hu/idosorok/eves10.html

Finally, we present the changes in the number of television subscriptions, a service where no deferred demand existed. Accordingly, it had limited relationship with GDP until 1995; we can hazard the statement that even the single major drop in subscriptions was attributable as much to changes in the subscription discipline and political views as to economic factors.

Figure 6. Number of television subscriptions as a function of GDP 1960-2000



Source: CSO-ECOSTAT *http://www.ecostat.hu/idosorok/eves10.html*

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