

# From Inter-modal Transport Services to Integrated Common Objectives

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**Abstract:** The article starts from the paradigm of modernity and its connection to the technological basis with special regards to the technological determinations in the development of the transport modes. As a contrast to the approach, the next parts deal with the excess of the barriers at a paradigm level, introducing the connection of the problems with the different integrations. Integrations mean here both the common planning of the city with the conurbation area (territorial integration), the common handling of different transport modes (inter-modality, co-modality) and the transfer between technological platforms (interoperability). As a representation of the problems, the article presents and interprets the recent development of the plans for the public transport backbone network of Budapest and its environ. A further case for the integrated approach is the new integrated transport strategy for Hungary: where just the preparation phase begins in this year.

**Keywords:** *inter-modal, co-modal, integrated transport, modernity, post-modern, multi-level transport system*

## 1. Introduction

It is a commonplace now-a-days that there is a need for inter-modality / co-modality – that is the co-operation of the different transport modes – in the transport system. The target is not really debated at that general level – while it is much less evident, how, in which steps a common transport system can be formed. One option is the growing cooperation between the existing transport technologies, another gives more emphasis to searching new co-operation technologies to newly established transport objectives.

In the latter approach the problem is not a specific transport issue any more, but rather a wider social context that touches the fundament of the expectations towards the transport systems. The article supports this more general understanding of the integration issue.

The structure of the paper is the following. The first chapter explains the rise of the 'modernity' approach and also the changes in our thinking to exceed those barriers the approach would mean now-a-days. The next chapter presents the regular appearance of the new transport modes in the history that typically took the dominance from the previous ones earlier in leader position. In the future we expect a change in that respect towards the use of an integrated mix of the different transport modes. The final part of the paper shows the possibilities and the dangers in two planned case of the modal integration: one in the urban public transport system in the Budapest area and another in an integrated transport policy level.

## 2. The rise and fall of the idea of modernity

From 1928 on the CIAM (*Congres Internationaux d'Architecture Moderne*) was operating through three decades, with architecture congresses organised about three-annual. The group declared the adjective *Modern* also in its name, and the Athens Charter that was formulated in 1933 on the fourth congress of the CIAM summarises very well the essence of that school (*Kubinszky 1978*). The starting point of the thinking was the solution of the housing problem, especially the mass housing building achieving to the construction of the housing estate (=industrialised mass-production of uniformed flat-boxes). From here the next step was adjusting the city to the philosophy of the mass-production. The invention was the functional city, dividing the towns to big, functionally homogeneous quarters as dwelling zone, industrial zone, business district, recreation area – and naturally to intensive transport area that is able to connect the separated zones. Behind this idea the basic principles were the efficient mass-production, the economy of scale, the rationality, the standardisation / uniformisation and the planning.

Our first thought could be that in the transport services that background is very advantageous for the development of the public transport – based on the concentrated passenger flows between the quarters. Still, the dominant transport characteristic of the period is the rise of the road traffic, where the use of the small uniform boxes spreads over. The planners begin to create the possibilities of the industrialised and mass transport for these units. The main task is to make room for the cars in the city: it is necessary to remove everything that would hamper the motion of the cars, at least on the surface. Such barriers are the trams, even more the stops near the road crossings, the trees, the pedestrians etc. Sometimes it is necessary to occupy a part of the sidewalk, sometimes to push it under the houses (arcades). The general feeling was, that "there is not enough room, we need more for the cars".

Looking back from our days perhaps such summary of those activities seems a bit caricature-like, still it is important to flash on the post-industrial, post-modern turn that rose up just on the denial of the principles enumerated above.

It is not the circumstances, the society, the urban life, the environment that we should adjust to our planned systems but vice-versa: we should create systems that are able to respect the existing patterns, activities, the life. Instead of the keywords used like

*effective, uniform, homogeneous, optimal, calculated* the new ones are *co-operative, partner, integrated, adjusted, adaptive, networked* etc. The latter features can make possible the adaptation to the existing or changing conditions, even to those not calculable in advance.

It is that context where we can interpret the new urban policy documents like the Leipzig Charter (2007). Its main principle is the integrated approach, the mixed use instead of a spatially homogenised one. Multifunctional neighbourhood units instead of a macro-level functional divide of the urban space; small towns within the big cities, mixed zones, everyday target-points should be accessed by walking: city of small distances etc.

One of the lessons of the transport planning now is to give back a part of the public space to the different slow movements attaching to houses-sidewalks-local activities, that is to walking, staying non-motored moving. As Salingaros (2000) explained it, the coherent urban texture must have strong links in small scale while weak links in big scale. If we don't keep ourselves to that rule, we may tear out the roads from its urban context and force those living in the houses to turn back to the street and also to their environment by that.

### 3. Marked periods of the transport: the technological dominances

Until the middle of the 19<sup>th</sup> century the rivers and channels were the main axes of the inland transport. The alternative was the carts pulled by horses or other animals (beasts of burden).

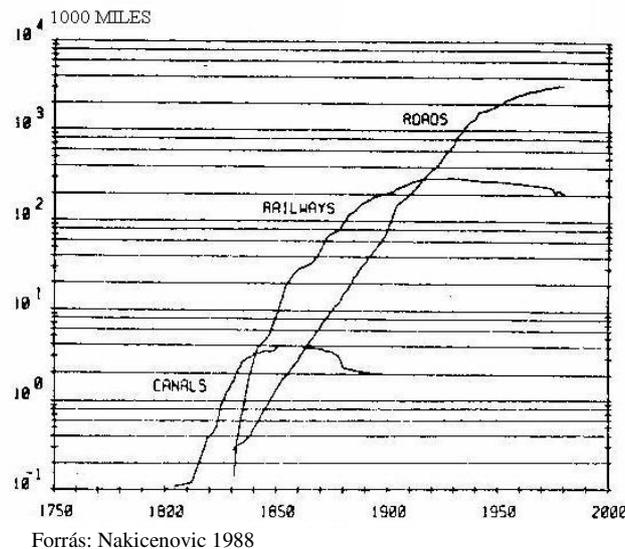
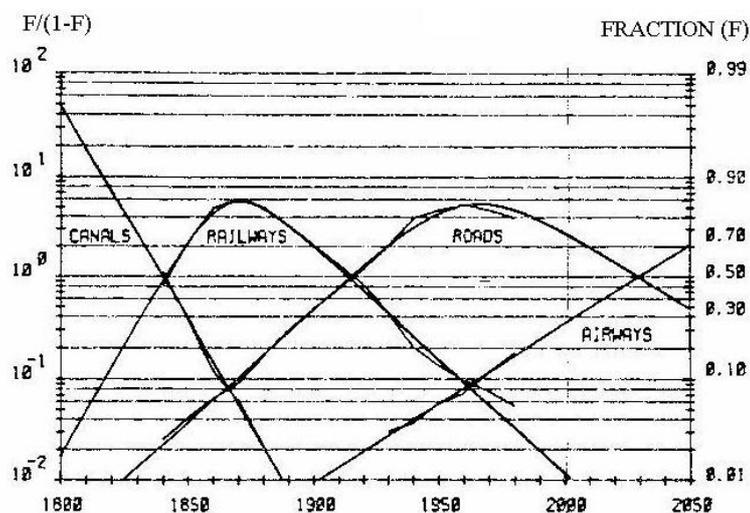


Figure 1. The length of different transport infrastructures in the United States between 1800 and 1980

Based on the statistics of the United States, *Figure 1.* presents how the rail or the paved road (and the automobile) appeared as a new technical invention, offering a possibility to take over the tasks from the previous actor, even to spread the transport provision to larger and larger areas.

The pre-industrial period can be characterised by the construction of the canals. The goods are transported on water, the ships are made of wood, driven by the wind (wind-wood-water period). The industrial revolution brings the dominance of the rail (coal-steel-rail), while the times of modernisation is accompanied by the glory of the car (oil-bitumen-motorway). What composition can come next?

In the history of the past two centuries of transport, there was always a dominant transport mode (changing from time to time) and an infrastructure based the given mode and determining the possibilities of the transport. In *Figure 2.* the different curves present the proportion of the built length of a single mode relative to all the other modes existing at the given moment. The period following the year 1985 shows the hypothetical expectations of the author of the figure.



Forrás: Nakicenovic 1988

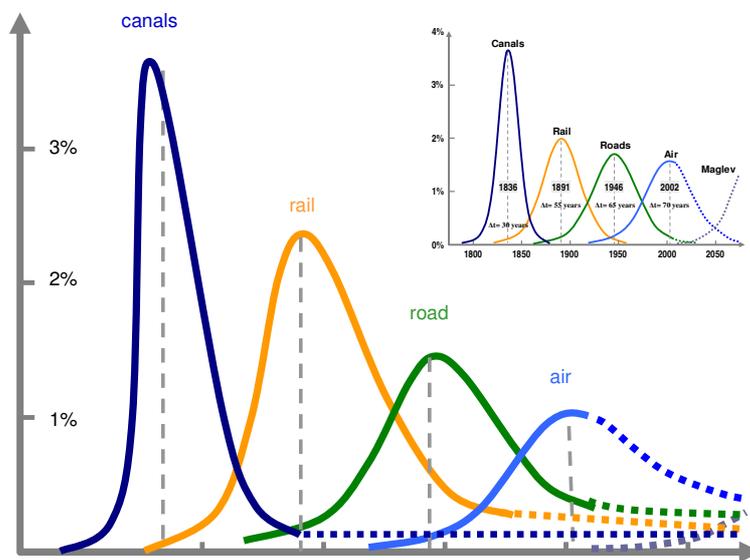
*Figure 2. Transport infrastructures in the United States between 1800 and 2050 – first substituting the previous one and gradually taking over the place from each other*

Whether we have to accept the presumption of Nakicenovic presented in *Figure 2.*, namely that we have to wait for a new dominant transport mode able to take over the service from the previous one? Really that would be the future, just looking on how the systems developed earlier extinct to give their place to a new and better solution?

Instead of the relative proportions of the different transport infrastructures, Ausubel et al (1998) present the trend of the growth rate of the same transport networks (see the right upper corner of *Figure 3*). This could be considered as the derivative of *Figure 1*

(if it weren't a schematic diagram) the tangent showing the measure of the rising in Figure 1 appears as y value in Figure 3. This latter figure also presents that those transport modes (new technologies) starting later are developing for a longer time and still their relative dominance to the other modes is decreasing. It is worthy to note that the figure is not only schematic but also ignores to present that the growth rate can also be negative (we could see in Figure 1 that the lengths of the canals and rails both begin to decrease at a given phase.)

Based on the figure of Ausubel et al, we made slight modifications on *Figure 3* (main diagrams). Instead of the growth rate, let us consider the diagrams rather to the proportion of the investments into the given network (by that we could give sense to its non-negative value range). We completed this approach to a hypothesis that the investment to the older ('outmoded') transport modes is not necessarily closes its cycle to zero, but the developments can be stabilised at a low, still not zero level. This means, that we could recognise a transport segment that can continue to be supplied best by the given mode and in that segment this mode keeps on developing.



Source: Rodrigue J-P. 1998-2010 (right upper corner) referring to Ausubel et al 1998

Figure 3. Supposed co-operation of the transport modes in the 21<sup>th</sup> century

We expect an evolution of the mixed use of the different transport modes by the 21<sup>th</sup> century, where all modes can serve a specific segment in the supply of the total transport needs, without any of them getting excessive dominance over the others. This approach fits very much into a post-modern paradigm, where it is a general rule that the elements of the accumulated heritage can be coupled with new innovative solutions; and where the new technologies also have to serve the possibility that the different segments could be associated to a well-operating whole. In our case it is the task of the transport

policy to promote and assure the co-operation of the different transport modes into an integrated and co-modal transport system.

#### **4. A practical case: local and commuter train system in Budapest and the conurbation area**

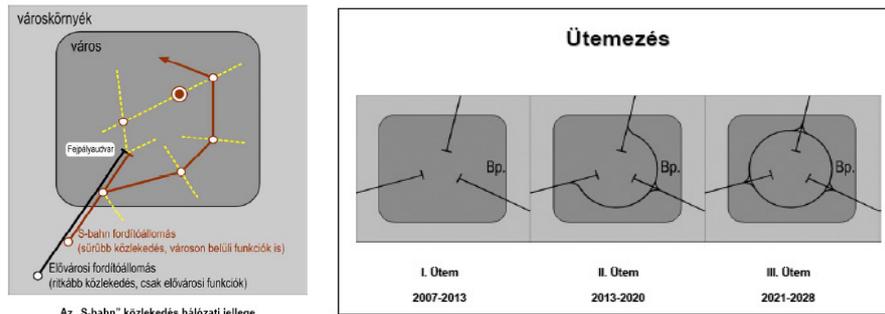
The spatial service of the different sites of the city and the conurbation area by public transport is an important and difficult challenge. As for the Budapest area, there was a significant development, rather a paradigm-change in the support of this task with networks in the recent years – at least at the planning level. We can well monitor this change by comparing the earlier (2001) and newer (2008) version of the Development Plan for the Transport System of Budapest (BKRFT): more exactly the plans BKRFT 2001, S-Bahn 2007 and BKRFT 2008.

Important historical background was the transformed public transport system of the 1970s, with the completion of the east-west and north-south underground lines supplying the inner third core of the Great-Budapest area. These lines were built with many and dense stations aiming at a direct service to the areas crossed, while the surface public transport system was converted (disintegrated, fragmented) at the same time to formulate short lines, direct feeding the underground stations and ceasing those lines parallel with the underground.

The BKRFT 2001 development plan was formulated during the nineties after extended consultations. As for its philosophy for the public transport, there was a sacred and central element of it: the Metro 4 – the relating plans were ready and basically followed the earlier planning pattern: a line crossing the very centre of the city, with end-points at the border of the inner core of the city and also with many short-distance stations.

The BKRFT 2001 plan formed big intermodal hubs at the end-points of the metro lines, holding up at the same place also the commuter trains, inclining by that to force all passengers to change. Such operation of the change points copied the principle of the freight distributing hubs (and also the operation of the already existing metro end-points) with technocratic rigidity. Just because of the earlier adverse experience, specific attention has been paid on the development of use of the the changing points, to promote the comfort of the transferring passengers. The ambition naturally approved, the fluent operation of the intersections is important. The problem was that this intention totally overshadowed the fact that a high proportion of the changes could have been avoided – they were created by the planners when they built their plans around the idea of the development of the big inter-modal hubs, endpoints of the arriving lines. For the passenger the comfort is not the possibility that s/he can chose among 22 directions at a huge omnipotent junction, but rather the journey that need no changes or less and simple changes.

Today it is already easy to describe the new principles, and it is not necessary to invent the base of the up-to-date move of the passengers in Budapest either. In 2007 practically the same planner group elaborated it for the commuter train system of the capital (S-Bahn 2007).



Forrás: S-Bahn 2007 [http://www.fomterv.hu/hun/sbahn/koncepcio\\_osszefoglalo.pdf](http://www.fomterv.hu/hun/sbahn/koncepcio_osszefoglalo.pdf)

Figure 4. Scheme of a rail network that is passing nearby the city centre offering many connections. (The final plan in the last phase connects head-stations with tunnel differing from the original scheme)

The essence is to work out a common transport system for the conurbation zone, for the outer districts of the capital and for the inner core of the capital, that is abandoning the earlier obligate and sharp separation of the 'out' and 'in' and also the accentuated technical separation of those braking line in the transport (Figure 4.). The commuter train is not something to turn back and keep far away from the city any more, but the backbone of the passenger transport to be continued in the city, part of a system that serves both conurbation and urban main traffic hubs.

With that S-Bahn plan the theoretic base of a two-level public transport for the capital and its conurbation was born. One level is the backbone network covering both the urban area and the conurbation with long overlapping lines, offering to all zones of the area an easy accessibility from each other with few changing. The other level is the traditional public transport with dense stops, offering a more fine covering within and between the single zones.

The new BKRFT 2008 prepared in the next year already contained the S-Bahn concept, but it remained a separated technological segment ('rail') within the plan, instead of adapting the new principles to the whole plan. There is no plan yet for the whole rapid-transit level of the public transport of the area, interconnecting the zones, where beside the rail also the elements of other modes – local train, metro, rapid-tram, rapid-bus – that could serve the same level would appear in a single system. Similarly, there is no general concept in the plan yet for the link of this level to the traditional level of the transport. While the territorial integration (urban and surrounding area) is already represented, the modal integration stuck in an outmoded old form.

In spite of all these shortcomings, it is important to note that the fundamentals of a new networking principle have been born in the recent years. Care should be taken to make the principles more conscious and known, promoting that no project could be prepared based on the old, contradicting views. Instead a new transport development plan for Budapest and the conurbation area should transform the multilevel transport network to the fundament of the future transport of the area.

## **5. Another future case: outlines of a new integrated Hungarian transport policy**

It is a relative new decision that the Hungarian government begins the preparation work of an integrated transport strategy (=covering all transport sub-sectors in one strategy). Naturally it is not the first attempt to develop such a strategy, actually at least three documents exist and valid to cover that area.

The oldest in the row among the still valid strategies is the Hungarian Transport Policy ([A] Magyar közlekedéspolitika 2003-2015. [2004]) approved by the parliament in 2004, and never was declared, that its 2015 horizon would be shortened. There were also no modifications approved by the parliament relating to this document. The policy covered all modes, but this statement could have been more authentic if the separated Motorway Act hadn't been approved by the parliament just three months before the transport policy.

Shortly later a new development plan (ÚMFT 2007) and sector-specific operative programs were prepared, covering all those projects that are supported from EU development funds. One of those was the transport operative program for the EU 2007-2013 planning period (KözOP 2007). This program was based on an integrated approach, as the main priority blocks are (1) the external accessibility of the country and its regions, (2) the accessibility within and between the regions, (3) the intermodal freight hubs and (4) the public transport hubs – cities and conurbation. However, the selection of the projects didn't follow too strictly this structure; the priorities were rather filled up from the old sub-sector projects.

The operative program had to be also approved by the EU Commission, and as a condition for that the Commission assessed the preparation of a single transport development strategy to show that the projects in the operative program all fit to a wider transport strategy of the country. These strategy documents were very quickly prepared first as single (all-transport) green, later white papers; (EKFS Zöld 2007) (EKFS Fehér 2007) and finally also a sector program was issued (EKFS Ágazati 2008). The integrated strategy was built up on four pillars: passenger transport, freight transport, transport infrastructure, and horizontal issues like safety or institutions. Somehow, the consequences of the strategy brought no new invention, but proved the choice of the earlier projects in the operative program as they were already accepted.

In 2011 a new general development strategy was approved by the Hungarian parliament (Új Széchenyi Terv 2011) with a transport chapter in it, declaring to overwrite the 2007 development strategy, (UMFT 2007) but not really its part, the transport operative program that is valid until 2013 (with time-to time modifications).

That is the moment, when the preparation of a new national integrated transport policy has been decided. As not more than verbal presentations were until now seen from this future document, the short comment below is a warning to possible dangers rather than criticism based on facts.

As we could see, the earlier integrated strategies followed different starting logics, all of them can prove to be a good structure. On the other hand a second and common feature was of all the earlier documents, that the strategy built up carefully wasn't consequently followed by subordinated second-third level goals that could have designate those tasks and programs that are suitable to achieve the general objectives. Instead it was always considered evidence that the projects decided beforehand in the different sub-sectors are just the best in the context of the new strategy too.

Now, the first signals show that those preparing the new strategy, announce a kind of 'bottom-up' principle, that really sounds very democratic, excluding, if the bricks at the bottom are not people or their organisations but sub-sector strategies. The decision that the integrated transport strategy should posteriorly balancing between separately elaborated sub-sector strategies seems to be the misunderstanding of the task of an integrated transport strategy. It is even worse that the different sub-sectors are very differently supplied by their own strategies, the preparation of the railways strategy has slowed down, perhaps stopped while the development plan for the motorways and main roads has just been finished and the transport authority intends to pin down it by a parliament order creating a *fait accompli* situation for the integrated strategy.

To avoid any misinterpretation of the preparation process of an integrated strategy, here *Figure 5* displays an empty frame just to demonstrate how the general objectives can gradually be enforced in the sub-sector strategies in an iterative process.

The small boxes can represent modes (inland waterways, rail, road, aviation, local transport) while the longer boxes show that during the process the integrated analysis of the achieved results and the integrated elaboration of the next activities is necessary several times.

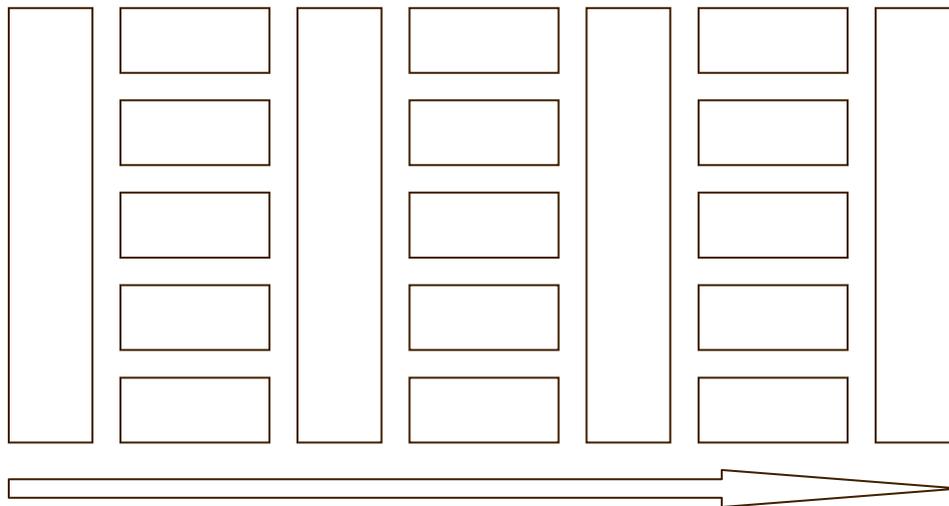


Figure 5. The suggested iterative set-up of the integrated transport strategy

The first block is integrated and can set general environmental, social, macro-economic objectives the transport sector has to serve. From that base also a commonly decided instruction can define the common structure of the analysis of the starting positions and the situation. The evaluation of the starting status is again a common block with the preparation of a problem-map and pointing at the causing mechanisms. By that way step-by-step the process can form the general transport goals to help to achieve the first level social objectives, then the programs to achieve this goals etc. What is important, the sub-sectors can't inject directly prefabricated projects into the last (right) boxes but they have to lead their targets through the whole process, and adjust the projects to the proven goals, not vice-versa.

## Conclusions

The article gives a general introduction to the integrations and co-operations trying to avoid a simplified view as if establishing co-operation between the different transport modes could be based on the willingness of existing (rigid) transport systems to understand each other. The presentation of the modern and the contradicting (post-modern) values and key-words first of all want to show that the biggest revolution occurred in our use of the space (urban space or land) together with our relation to the city and to the public space in our living area. The developments, also the transport developments have to serve, follow and promote this great change.

The co-operation between the transport modes is a small element in that whole frame, and the viewpoints towards that have to be filtered through the all-transport considerations: the integrated transport system transmits the social expectations. The integrated transport system unifies several different integrations: one part of them is external: as the integration between the transport and the other economic sectors, or between the transport and the dispersed users of the transport. A second block is the internal integration within the transport system as the spatial integration (local / trunk) and the modal integration.

The preparation of the transport strategies and the activity of the transport planning both have to be placed within that wider frame, to understand the more general social and economic macro-level objectives that the transport system has to serve.

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