8th WCTR

LEGAL AND REGULATORY OPTIONS TO PROMOTE SYSTEM INTEGRATION IN URBAN PUBLIC TRANSPORT

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Abstract

Nowadays most cities are faced with increasing traffic congestion and decreasing public transport market share. This situation calls for a new strategic approach to urban public transport, where multi-modal transport should assume a more important role in the competition with private car. Intermodality is not and objective in itself but an instrument to achieve system integration. To increase its market share public transport should offer a level of fluidity equivalent to the one offered by private car, and for this network integration is one of the key factors. The paper demonstrates that the main requirements for successful system integration are:

- Regulatory harmonization, assuring a transparent allocation of responsibilities and mission between modes and agents;
- Integrated management, assuring the achievement of the mobility policy goals through a product mix including public and private transport modes;
- Network articulation, offering effective economies of scale and scope to the users.

INTRODUCTION

Urban living conditions have undergone profound changes in the last decades, with an increasing residential dispersion, longer home-work distances and a more complex travel pattern. In conjunction with this, an increasing availability of private motorised transport is a common trend in most European cities.

On the basis of these changes are the evolution of the structure of the urban areas, with commercial and business activities concentrated in the centre and the residential areas spread across suburban areas, as well as the increase of the economic power of its inhabitants. The first group of factors had a direct impact on urban mobility demand patterns, the second on the availability of transport alternatives to a significant part of the population.

Urban authorities have to deal with two distinct types of demand:

- >From public and private investors, who normally have a specific requirement, either directly related with transport infrastructures, or not transport related but with a significant impact in mobility patterns (e.g. building houses, offices, commercial malls, etc);
- >From the inhabitants, who expect to see their levels of accessibility improved, which is directly related to how easy it is to reach those poles of attraction.

With the growth of the cities and the development of more complex consumption patterns, mobility becomes an essential mean to realise other economic and social functions, in particular an indispensable mean for social integration.

This combination of factors clearly contributed to the change of urban transport environment. In one hand, both the general public and the politicians, have acquired a different perception on the importance of urban mobility, that is now seen as one of the citizens' basic needs and as such a political priority. On the other hand, both authorities and operators have understood that single mode systems could not efficiently provide the quantity and quality of supply capable to compete with the attractiveness of the individual private motorised modes.

The European Commission' "Citizens' Network" Green Book (European Commission, 1996) reflects this aim by clearly advocating that user requirements should be at the centre of decisions about transport provisions. This means that the transport supply should give an appropriate answer to users needs, i.e. the citizens right to good accessibility levels independent of their capacity to use private cars (non-exclusion principles).

Nowadays most cities are faced with increasing traffic congestion and decreasing public transport market share. This situation calls for a new strategic approach to urban public transport, where intermodal transport should play a stronger role.

This strategic approach requires both an holistic view over the transport system and a clear notion of the mission and responsibilities each mode and agent are to assume within the overall system, so that synergetic effects can be achieved.

MAIN ORGANISATIONAL SYSTEMS IN EUROPE. POTENCIAL FOR INTEGRATION.

The regulatory and organisational framework under which transport is conceived, planned and finally produced is a complex structure where operators from different modes and authorities from different

jurisdictional level coexist both in time and space. This complex framework gives room for the definition of a variety of regulatory regimes in Europe that can be classified with recourse to several criteria. We consider the following two as the most relevant (ISOTOPE, 1997):

- Type of competitive pressure;
- Entrepreneurship in the creation and specification of Urban Public Transport (UPT).

Following these criteria we can distinguish the following regimes in Europe:

- Deregulated, where operators can establish themselves in direct on-street competition. The only significant example for this regime is Great Britain' bus service outside London.
- Limited competition, where the authorities specify the service and open tenders for its provision by the bidding operators. Examples of this regime can be found in several European countries (mostly Nordic countries and France) and also in different modes, with the exception of railways where competition is actually being enforced through the application of an European Directive.
- Regulated, where a monopolistic company, normally publicly owned, is in charge of the service operation and sometimes also of the design of the network. This regime is found in most European countries and in all modes. Direct competitive pressure is absent in this regime, and indirect pressure can only be achieved through longitudinal comparison of the performance of each company through the years (internal benchmarking), or comparison against the performance of other operators (external benchmarking). The assurance of the effectiveness of this indirect competitive pressure is frequently sought through a contract between the authority and the operator, enforcing regular monitoring of the performance of the latter.

In what concerns entrepreneurship in the creation of transport services, the main division is between the regimes based on operators initiative and the ones based on authority initiative (Van de Velde, 1997).

In market initiative regimes the entrepreneur is the operator. This category entails the free competition regime (or deregulated) and the licensing regime, in which the operator requests a license which entitles him to operate a specific service under protection against competition in that route during the term of the license. The former is again exemplified by the bus services outside London, and the second (very common in Europe) can be found in countries like Germany, Netherlands, Portugal, etc.

It is worth noting that a significant number of licensing regimes evolved towards a "de facto" monopoly of either private or public companies. This evolution has an historical twofold justification. In some cases the mechanism of (automatic) license renewal, together with the absence of competitive pressure in the system, led to "de facto" unlimited exclusive rights. In other cases the public ownership of the companies itself - either from the start of their establishment, or through the take over of private money loosing companies by public undertakings, with the purpose of assuring the continuity of services considered of social interest (i.e. public service) - also led to the establishment of public monopolies.

In Authority initiative regimes the entrepreneur is the authority who decides to organise urban transport and then:

- either tenders the execution of the operation (Limited competition regime);
- or delegates that service to a specific company of its choice (Regulated regime) The delegation of service is normally done to a public company but cases exist where this was done in favour of a private company (e.g. Greece);
- or gives a long term concession for its operation (Regulated regime);
- or produces the service by its own (Regulated regime).

Each transport mode has its own particularities and this has been reflected through the years by the adoption of different regulatory schemes between modes within the same urban area. Very often that

discontinuity of regulatory background imposes some competitive disadvantages between modes and barriers to the development of partnerships. When talking of system integration this balance of competencies and power (Anthony, 1988) between modes becomes crucial - who pays what, and who controls what has to be clearly defined, in particular when infrastructures are used in shared regimes between more than one operator.

Deregulated regimes are an example in which the operator takes all risks. Despite improving economic efficiency and offering higher supply-demand adjustment flexibility, this regime has significant drawbacks in what concerns system stability and integration, as well as possibly overall quality provided.

Agreements between authorities and operators, known as quality partnerships, have been developed (e.g. Great Britain) to overcome this problem. However their capacity to enforce any characteristic of the system, or even a minimum requirement, is not yet clarified as these agreements are based in the trade-off of interests from both parties at play. A more successful alternative is the case where only price is deregulated while service specifications and minimum quality standards are defined by the authorities (Carr, 1997).

At the other extreme we have the regulated regimes, the advantage of which is in fact the assurance of stability and integration of the network. However if no incentives/penalties schemes are applied, associated with risk sharing, its quality tends to degrade and its inefficiency tends to increase. These cases in which integration is less successful are often due to the lack of interest from the authorities in promoting public transport and the consequent lack of motivation from the operators to promote innovative solutions.

Limited competition regimes are an "intermediate stage", between the two previously described regimes, as they have the advantage of maintaining competitive pressure in the system while assuring other values like stability, network integration and effective risk sharing between the agents according to a contractual arrangement.

Irrespective of the regime, the enforcement of system integration requires a co-ordinated planning for all urban operating modes (Ciuffini, 1995) and this is hardly possible if regimes of authorities initiative coexist with market initiatives within the same urban area. In the former the authority defines the transport service, and thus has the opportunity to design the network (or outsource this function), considering not only the social obligations but also the interests of specific target groups, and to plan for economies of scale in the use of the transport system making it more convenient to the user needs. In the second the operator designs the network according to its own business interests, unless it has an incentive to do it otherwise.

The superior definition of transparent rules for the allocation of responsibilities and sharing of risks between the different agents of the system is an indispensable tool for the management of an integrated system (Banister *et al*, 1995). Operators from different modes and authorities from different jurisdictional levels have to coexist in time, space and, last but not the least in the market itself.

The legal and regulatory framework is the umbrella under which transport is designed, planned and produced. Its impact on the potential for integration of the urban public transport is threefold (ISOTOPE, 1997):

- at the **strategic level**: where mobility policy is defined reflecting the needs of the citizens. At this level minimum accessibility, quality standards, target market share, etc., should be defined;
- at the **tactical level**: where the translation of the political goals to the product specification should be done, thus assuring the effectiveness of the system;

- at the **operational level**: where transport is produced and consumed, and the efficiency and quality of its provision can be effectively monitored.

The survey undertaken in ISOTOPE research project, showed that in most European cities (or urban areas) the borders between these levels of planning and control are either fuzzy or overlapping. The result is some malfunctioning with causes often difficult to identify, which clearly jeopardises the quality level the system could provide (Viegas *et al*, 1997).

In most countries the strategic level is normally left to the authorities that are expected to decide on what is to be achieved by the system. The operator who is supposed to perform the services as planned undertakes the operational level. The tactical level where network design and planning should be developed, is where most organisational variants can be found. Tactical decisions are in some cases performed by the authority, in other cases be the operator and, given the technical essence of the work, we can still consider as an admissible hypothesis having a third party providing it.

The tactical level is especially important in what concerns system integration. The design of the transport system and the articulation of the different modal sub-networks to create an integrated urban network are among the main functions to be developed at this level. Its non existence will result in an urban public transport system characterised by bilateral agreements formalised between operators, seeking the maximisation of economies of scope in benefit of those agents, and without achieving the level of connectivity that provides effective economies of scale and scope for the users.

FROM INTERMODALITY TO SYSTEM INTEGRATION

Improving public transport market share requires that the citizens perceive this option as an effective alternative to the private car, namely in what concerns:

- Flexibility (always there when is needed, allows its user to enjoy a door to door service, low level of information required for its use);
- Low perceived out of pocket cost;
- Comfort.

To compete with these attributes, in which private car industry is prone to continuously bring innovation and improvements, public transport should be seen as an equally easy to use mode offering a good relation between quality and price.

The ease of use perceived by users can be translated through the simplification of an originally complex product that requires previous knowledge of timetables, routes, connections, etc. So to achieve this goal urban public transport needs to offer:

- Good information on the available options (Morrison, 1996), entailing:
    - General support covering all modes and operators allowing the perception of the whole urban network;
    - Tailored information (network "as seen from my place") that is only as complex as needed by the user;
    - >From one operator easily perceive the connections available to and from the rest of the network.
- Stability of perception of service (long validity periods for timetables);
- Network integration:
    - Easy change of route;
    - Easy use of different operators in the same trip;
    - Availability of interchanges;
    - Timetable co-ordination so that transfer times can be minimised;

- Tariff integration for frequent and infrequent users.

These measures of attractiveness have to be accompanied by co-ordinated pull and push measures (Viegas, 1995). The first ones to be promoted by the operators through competitive price strategies and an increased level of service quality offered. The second ones are the responsibility of the authorities addressing the integration of road traffic with public transport in general, and within its different modes in particular, assuring good levels of fluidity for the system.

Intermodality is not an objective in itself but an instrument to achieve system integration. To increase its market share public transport should offer a level of fluidity equivalent to the one offered by private car and network integration is one of the key factors to achieve it (World Bank, 1996).

The main aim of system integration is to offer a more attractive and easier to use urban transport system, leading to an increase of its market share and consequently reduced congestion. Moreover, integration can also serve cost efficiency purposes (for the overall system) by avoiding duplication of services where customers do not have any benefit out of it.

There are three main dimensions of integration in the urban public transport system:

- **Physical**: In space, time and technology reflected in the network design, existence of good interchange stations, timetable co-ordination. In brief, intermodality "strictu sensus";
- **Logical**: Involving global system information (all modes and all operators), focused information (from one specific mode and/or point of the system to the whole network), reliability of connections provided by real time information.
- **Contractual**: Entailing the allocation of responsibilities between authorities and operators and between operators of different modes for the quality of the service provided (including system integration initiatives), and including tariff integration and revenue sharing.

It is consensual that system integration has numerous advantages and results in a positive overall benefit. However, there are implications running from the main dimensions of integration described that should also be highlighted. The following tables provide a synthetic analysis of those implications for each of the dimensions considered.

Table 1 Physical Integration

Main elements	*Advantages*	*Disadvantages*
Network design	➢ High intermodal standard of service levels. ➢ Economies of scale and scope. ➢ Network co-ordination.	➢ Direct routes customers might be penalised by a route design favouring connections to other routes.
Interchange Stations	➢ same as previous, and ➢ waiting and transfer conditions for customers clearly improved.	➢ Might raise difficulties in cost and risk sharing related with interchanges investments and running expenditure.
Timetable co-ordination	➢ Increases confidence (and ease to use) in Public Transport supply.	➢ Difficult to implement in periods of heavy traffic.

Table 2 Logical Integration

Main elements	*Advantages*	*Disadvantages*
External information covering various modes and operators	➢ Ease of use. ➢ Increases confidence in PT. ➢ Favours market share growth.	➢ Difficulties in allocating the costs among operators. ➢ Difficulties in keeping the information updated.
One operator' information covering connections to other modes and other operators	➢ Facilitates planning and execution of multi-operator trips.	➢ Higher costs for each operator. ➢ Difficult to assure permanent update of information of others operators' supply.

Table 3 Tariff integration

Main elements	*Advantages*	*Disadvantages*
Tickets for Infrequent travellers	➢ Incentive to first experience in Public Transport. ➢ Lowers barriers to infrequent users.	➢ Increases overhead costs related with revenue sharing. ➢ Distribution coefficients are more expensive to estimate due to the higher variance of the population.
Tickets for frequent travellers	➢ Increases customer fidelity.	➢ Same as above with less expensive estimation of distribution coefficients.
Revenue sharing	➢ Allows better intermodality, with stable network design and relationships between operators.	➢ Increases overhead costs related with revenue sharing. ➢ Agreement covering all cases may be difficult to reach.

In what concerns contractual integration the main elements to consider are:

- Scope of authorities competencies;
- Responsibilities of the different agents regarding initiatives concerning system integration.

The existence of an authority that co-ordinates all mobility aspects, land-use and urban environment for that same territorial area allows the consideration of inter-relations among these types of decisions and the development of coherent policies. This naturally implies a heavy administrative structure for this entity, the alternative being the adoption of a systemic approach to urban mobility where the dynamics of the interaction between the different agents involved should be continuously monitored.

The division of responsibilities between agents differs according to the underlying regulatory framework. Depending on the organisational option the initiative of promoting system integration will lye with one of the following entities: Transport authorities; Other authorities; Operators; Users representatives. The main impacts of this choice in the overall objectives of the system are synthesised in table 4.

Table 4 Responsibilities in integration Initiatives

Main agents	*Advantages*	*Disadvantages*
Transport authorities	➢ Political and social objectives are better achieved.	➢ Economic efficiency of the operators might be left as a second priority.
Other authorities	➢ Better integration with other urban policies. ➢ Allows for an integrated approach with other merit goods.	➢ Economic efficiency of the transport system might be considered as a second priority. ➢ Integration benefits must be careful assessed to motivate operators. ➢ Risk of lack of knowledge of real transport costs may lead to cross subsidisation with other activities.
Operators	➢ Higher level of cost efficiency tend to be achieved ➢ Represents the understanding that integration brings positive results	➢ May represent attempts to gain information about other operators markets or to create collusion of incumbents against new entrants.
Users representatives	➢ Social objectives and user needs will be highly considered in both network design and productive organisation	➢ Risk of lack of knowledge of real transport costs, ignoring that integration should be matched by additional customers

Quality of the service is a wide concept, as it relates with all elements of the system, and also a subjective one in the sense that its assessment depends on individual perceptions. This characteristic together with the fact that transport is a "non-stockable" service, i.e. the moment of production and consumption are one and the same, demands a new systemic approach where integration plays a key role not only between public modes but also with private modes, namely in what concerns traffic

management. The dimension and intensity of integration to be implemented in the system should be decided against its main strategic goals and considering the impact that each element of integration as in the overall efficiency and effectiveness of the mobility system.

CONCLUSIONS

We have shown that the main requirements for successful system integration are:

- Regulatory harmonisation between modes, assuring a transparent allocation of responsibilities and mission between modes and between agents (authorities and operators);
- Integrated management (on the authority side) assuring that the mobility policy goals are achieved through a well designed product mix including all modes public and private;
- Articulation of networks offering effective economies of scale and scope for the users.

The underlying regulatory regime is one of the factors that impacts on the potential for integration of a transport system. As more competition is introduced in the system a good level of integration is more difficult to maintain especially when operators are given the freedom to redesign the network. This inconvenience is particularly obvious in the Deregulated regime.

The regulated regime, although providing the best framework conditions to promote integration, does not always achieve this goal as operators lack incentives and competitive pressure to improve the service and a number of authorities give only a secondary priority to Urban Public Transport.

The limited competition regime in turn enables the authority (or a third party to whom the function has been delegated or contracted) to control the level of integration of the system while maintaining competitive pressure and leaving some room (depending on the contractual framework) for operators initiative towards the improvement of the system.

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