

**THE URBAN MOBILITY SYSTEM AND ITS PUBLIC TRANSPORT LAYER
AS CORE ELEMENTS OF
COMPETITIVE, SUSTAINABLE AND PLEASANT CITIES**

Paper produced for EMTA – Association of European Metropolitan Transport Authorities
José Viegas, Instituto Superior Técnico, Lisboa (PT)
September 2009

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EXECUTIVE SUMMARY

Recognising the growing weight of urbanization and the importance that is increasingly attached to quality of life, economic competitiveness and sustainability of our cities, this paper has a double objective: to highlight the role of urban mobility systems (UMS), and of Public Transport in particular, in support of those goals, and to present in a structured way some of the conditions necessary for that role to be played with high levels of efficiency and political accountability.

Formal assessment of the economic value of the UMS or even of its public transport component in a large city is meaningless, as they are essential parts of that city and its character. There is however plenty of justification to appraise sub-components of those systems, and new projects in particular. And this formal appraisal is increasingly done, mostly with Social Cost Benefit Analysis (SCBA), sometimes with an extension to Multi-criteria Analysis, in order to cover aspects that are more difficult to monetise.

But recent scientific developments in the “New Economic Geography” show that there are significant elements of benefit introduced by transport systems, which go beyond those accounted for in SCBA, namely the ones associated with aggregation economies, and their impact on innovation and its dissemination, as well as on variety of accessible skills and higher specialization thus stimulated. There is clear support for that in an analysis made of productivity in French cities, where it was found that productivity grew with the size (population) of the agglomeration and the average speed of the home-to-work journey, and diminished with its sprawl. At the same time, the more empirical studies and reports on quality of life and competitiveness of cities unanimously mention the role of good internal and external mobility as key factors, in parallel with strategic decision-making capacity and innovation.

Next we look at important evidence on the systematic flaws present in the appraisal of many transport projects, in the estimation both of construction costs and of future demand. Recognising that some estimation errors are inevitable, the recommendation is that these appraisal studies always include a reference framework or benchmark of similar projects, which provides a perspective of the alignment of the values of the new project with those references. But this inevitability, associated with the multiple objectives of any transport project, also leads also to a reassessment of the formal appraisal exercise, awarding it more a screening role that will only let good projects pass, and moving to a more holistic and political exercise of discussion and concertation of the projects with the relevant stakeholders in society.

Two contemporary issues are then considered: what does change and what should be done in the realm of urban mobility in a period of Economic Crisis, and what adjustments of Urban Mobility policies should the fight against Clime Change induce? In the first item, the main point is that preservation of the right to mobility is essential and must be supported by public authorities, especially in a period of crisis, as this mobility might be even more necessary in the search for a new job. But also the crisis may be turned into an opportunity for

improvement of public transport services, as these quickly create local jobs in a large array of skill levels. In the second item, it becomes clear that significant changes in our mobility patterns have to be brought about, but also that the current offer of public transport is far from satisfactory to many car drivers, which raises the need for a strong innovation push, both in service enhancement on the existing modes and in the development of intermediate modes that fill the gap between the private car and the current public transport offers.

This first part of the paper leads to the conclusion that taking a structured view of the choices governing action for the evolution of the UMS – a pro-active position – is more important than the formal assessment of its economic value – a defensive position. That structured view basically corresponds to answering three key questions: The Configuration Question, The Financing Question, and the Institutional Question. The second part of the paper takes these questions in sequence.

The Configuration Question has been the object of “Transport Plans” over the last four decades or so, but major insufficiencies can be found in their results, as they frequently fail to treat the various modes jointly (as both competitors and complementary), and especially because there has been little room for innovation (in the Plans but especially in real life). Alternation of travel between the modes as well as the development of innovative services based on information technologies have to be stimulated, but the key concept is that there has to be a unified vision and strategy for an UMS of high quality, covering all its services, population segments and geographic areas, and capable of periodic adaptation to the emerging mobility requisites of society, as well as to the constraints arising from economic, environmental or political factors. In this, the questions of equity and sustainability are of high relevance.

On the Financing Question, it is stated that the choices in the financial dimension have to be aligned with the strategic goals of the UMS, and that prices should play their double role of cost recovery and of driver of consumers’ choices. It is recognised that little justification besides inertia exists for the current low level of participation of public transport users in the coverage of its costs (although this is quite varied across EMTA cities), and that pressure from other social expenditures will likely reduce the availability of public budget funds for public transport. This will force an evolution of the subsidy concept: instead of subsidising all passengers, subsidise only those who need, with the money for this subsidy coming from the (revised) budgets of the social support institutions, not from transport authorities, operators, or the other passengers. This is not only fairer, but also more efficient. In general, the UMS should be able to fully cover its operational costs, and this is made possible because, besides the contributions from travellers (direct beneficiaries), there is a reasonably wide spectrum of indirect beneficiaries who should be brought to contribute. Some examples are presented.

On the Institutional Question, the main argument is that the quality concept must be developed for the UMS as a whole, which corresponds well to the notion of “clarity of purpose” in the strategic guidance of the system. And to combine the clarity of purpose with the capacity of periodic adaptation, in a legitimate, coherent and transparent way three things are essential: a legitimate political organ preferably representing the whole mobility conurbation to take the decisions at the strategic level; a single agency responsible for all the tactical (planning) decisions, in charge of all transport modes in that area, carrying out planning and oversight with technical competence and firmness in action, while ensuring transparency and fairness in treating the legitimate interests of multiple public agencies and private parties, possibly allowing some fragmentation of responsibilities closer to the operational level; and regular monitoring of the performance of the system, with publication of the results.

The paper concludes with a section on conclusions, which is a synthesis of the main recommendation of the three sections dealing with the key questions, and the bibliographic references.

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PART A – INTRODUCTION

1. OBJECTIVES OF THIS PAPER

Everybody today recognizes the strategic importance of big cities for the well being of mankind in general, and of the European Union in particular: not only it is there that the majority of the population live (above 74% in the case of the EU live in cities of more than 5000 inhabitants according to [Eurostat, 2008]), but a very significant proportion of innovation and economic added value is created in the larger cities [Florida, 2005; OECD, 2006]

It is therefore of paramount importance that these cities are resilient and efficient production systems, which means they have to be competitive in a world where some of the most relevant production factors (financial and human capital) are increasingly mobile. For this, they must offer good governance overall, with attractive conditions for business, and quality of life to their inhabitants [ODPM, 2004; Eurostat, 2008].

So, quality of life in cities is no longer a generic goal for local politicians, related to the short-term well-being and satisfaction of their constituency; it has become an instrumental goal for local and national (as well as European) politicians, as an essential component of a comprehensive approach to mid- and long-term economic development and sustainability at all those territorial scales.

In all studies of urban competitiveness and quality of life in cities [ODPM, 2004; Mercer, 2009], quality of urban mobility is given a prominent role. We can see two types of reasons for this: first, mobility is a daily component in the lives of everybody, with implications on how we organize the rest of our activities; second it is one dimension of urban life for which symptoms of low efficiency (traffic congestion, public transport with excessively high or excessively low occupation) are very visible, and thus easily transposed to the reputation of each city as a pleasant or unpleasant place to live.

We should note the current levels of complexity of our social and economic systems require an efficient contribution from all segments in society to achieve a good level of urban competitiveness [OECD, 2006]. With the current speed of change in knowledge requirements and organizational patterns, special attention must be given to the risks of social exclusion and to the

policies that allow mitigation of this risk [Preston, 2009]. Failures in this dimension not only reduce the possible levels of creation of wealth, but also generate additional expenditure in remedial actions, increase the potential for social unrest and, last but not least, may impact on human dignity.

It is generally recognized that mobility constitutes an essential component of social inclusion [Le Breton, 2005], which implies that the quality of the urban mobility system must also encompass all segments of society, with recourse to a varied set of offers that allow each social group to find the solutions that best fit their requirements and financial capacity.

Since the performance of the various transport modes is not independent, it is a matter for policy makers to make the allocation of some critical resources (urban space, time priorities, and financial means) across the various modes so that the distribution of users across that spectrum provides good levels of satisfaction in all segments.

Over the last decade or so, the issue of climate change has been gaining prominence, having led to the adoption of legislation on reduction of emissions of greenhouse gases (GHG), both at European Union level and at national level by several member states [European Commission, 2009a; OPSI, 2008; ONERC, 2007; German Federal Government, 2007]. Given the weight of the transport sector as an emitter, and of concentration of activities in urban areas, it is inevitable that this new dimension is added to the analysis of options for urban mobility systems.

In spite of the strong technological progress in vehicles and fuels, recent scientific work [MEEDDM, 2006, Stern Review, 2006; Schaefer et al, 2009] clearly indicate that this will not be enough to achieve the reduced levels of emissions defined for the EU and its more developed countries in the target dates of 2020 and 2050, unless significant changes occur in current patterns of organization of activities and mobility, or EU societies accept significant and lasting reductions of their pace of economic growth.

Unless we consider that this political compromise is not to be taken seriously or that societies will easily accept to forgo economic growth (with dangerous implications on solidarity and cohesion as clearly demonstrated in [Friedman, 2005]), action will be needed on the reorganization of activities and on the mobility patterns that connect those activities. Such changes will be driven by the need to reduce GHG emissions on the mobility front while preserving the overall efficiency on the aggregate of (activity + mobility), which will require an enhanced strategic guidance for the development of a range of solutions for the urban mobility complex.

Public Transport should be a decisive component of the answer to this challenge, given the high potential it offers to reduce the energy consumption and GHG emissions per unit of mobility provided. In the process of change, Public Transport has to reduce its own emissions and become a more acceptable option to a large spectrum of citizens who currently are quasi-captive users of their private cars. This can only be achieved through systematic introduction of innovative services and of the deployment of Information and Communication Technologies (ICT) more targeted to the mobility requirements of citizens.

This paper has two key objectives: the first is to highlight the role of the Urban Mobility System in general, and of Public Transport in particular, for the competitiveness, quality of life and sustainability of European large cities [Metropolitan Areas], and for their evolution in a path of significant reduction of GHG emissions; the second is to present in a structured way some of the conditions necessary for that role to be played with high levels of efficiency and political accountability.

2. THE ECONOMIC BENEFITS OF TRANSPORT

2.1. THE GENERAL PICTURE

Although nobody questions not only the economic significance but even the absolute need of transport systems in large urban agglomerations, as well as the social interest in their quality, it is not obvious how ambitious we should be on the quality level, nor how much and in which components public spending is justified to reach that quality level.

The method of widest application and recognition to assess the balance between social benefits and costs of any given project is Social Cost-Benefit Analysis (SCBA), first applied by Jules Dupuit in 1848 and systematically used since more than 30 years ago. The initial framework has remained rather stable, although numerous scientific papers and reports from governmental and intergovernmental agencies have been published in a widely distributed and sustained effort to ensure consistent application of the method and, through it, comparability of results and a commonly accepted body of knowledge for the interpretation of those results [DfT, 2006; European Commission, 2008].

The transport sector has been one of those with greater application of SCBA, across all modes and distance ranges. In particular, many projects for interurban road and rail links, as well as projects of Urban Public Transport – mostly light-rail and subways – but also more recently Bus Rapid Transit projects and whole networks and Transport Plans have been appraised with this method.

However, this is always about measuring the balance between benefits and costs of some designated intervention(s), not about measuring the benefits of the *existing* system. For that, an interesting concept that was first formulated in [Fogel, 1964] is that of *Social Savings*, which he applied to assess the economic value of the railways to the U.S., by estimating the aggravated costs of the U.S. economy if the railways were not present.

Although some economists have criticized this concept for being too static and ignoring the indirect and induced effects of the railway, any attempt to apply it to any large city with respect to its transport system in general, or even to only one of its major components (private transport or public transport) would certainly be face tremendous difficulties given the virtual impossibility of the other modes to cope with the current mobility demands, and the need to foresee the

many adaptations that individual persons, families and companies would need to develop in order to reasonably cope with that radical change in their operating environment. Abolishing the transport system or any of its major components is not an option on the table, and that would be a very controversial exercise of no value.

Three major weaknesses are recognised in SCBA: it ignores which social groups stand to gain or lose with the project (thereby skipping all distributional aspects), it considers gains and losses symmetrically (when psychology has firmly established that for the same amount the valuation of a loss is stronger than that of the corresponding gain), and it forces monetisation of all indicators of the impact of the project, even the intangibles. It also is not able to address strategic concerns [Beuthe, 2002].

In spite of these weaknesses, but recognising its value for a systematic appraisal and comparability of results, the use of SCBA is now mandatory at EU level for Major Projects (above 50 MEuro in the case of Transport) in the framework of the Structural Funds and of the Cohesion Fund [European Council 2006], as well as at national level in several member countries.

Frequently, because of these problems, Multi-Criteria Analysis (MCA) is also used, sometimes as a kind of outer layer, which encompasses several dimensions one of which is the SCBA [Bristow and Nellthorp, 2000].

The most significant items in terms of the benefits accounted for in SCBA applications to urban mobility projects typically are time savings (and through it productivity gains), and in the case of public transport projects, reductions of environmental impacts (emissions, noise and accidents), release of public space from car traffic (circulation or parking) to use by pedestrians, gardens or other.

Other aspects in favour of Public Transport used in the Multi-criteria exercises are equity / social inclusion considerations, amenity of urban landscape, and increased safety in public areas, promotion of more sustainable land-use policies, and physical fitness and human health associated with a more regular practice of walking [UITP, 2009].

Another type of value, often forgotten, is the *Option Value* of public transport, which is associated to the value people confer to the availability of a service they do not intend to use as their first choice. This is a well known attribute, but only recently there has been an attempt to measure it [Geurs et al, 2006], through stated choice methods applied to regional rail links in the Netherlands. The values found are reported to be significant.

Transport projects, like in all network industries, polarize the geographical space, and thus have inevitable impacts on the distribution of welfare and opportunities for interaction. Moreover, the nature of mobility as a human right that provides access to other important human rights (health, education, work, etc.) gives a special dimension to the impact of the price of mobility on the capacity to exercise those rights by all members of society. These two issues are at the core of the questions of equity and social inclusion in the transportation sector, which have been treated not very frequently but with quite some attention ([Masser et. al., 1993], [Khisty, 1996],

[Rietveld, 2003]). In a recent paper [Thomopoulos, N., et al., 2009] propose a new MCA method to explicitly incorporate a range of equity issues in the evaluation of transport infrastructure.

The UK Green Book [The Green Book, 2007] clearly states that “all new policies, programmes and projects [...] should be subject to comprehensive but proportionate assessment”, and explicitly endorses the use of Multi-Criteria Analysis, as well as of Cost-Effectiveness Analysis (in which “the costs of alternative ways of producing the same or similar outputs” are compared). Even though there is a long tradition of using SCBA in France [Quinet, 2000], the French Government recently recognised that it is somewhat lagging in the adoption of standard procedures for the appraisal of Major Projects and suggested the adoption of a procedure based on the British “Green Book” [Besson, 2008].

Specifically for transport, the UK’s New “Approach to Appraisal” (NATA) framework, started in 1998 and updated in 2009 [DfT, 2009], builds on the experience of the SCBA and the Strategic Environmental Assessment methods, and introduces a framework approach, allowing the decision makers a certain latitude of choice among appraisal methods, while preserving the respect for some predefined principles. Other countries, like the Netherlands, Germany and Japan, have also introduced a framework approach [Thomopoulos, N., et al., 2009].

Even with these increasingly complex assessment procedures, some important components of the benefits of transport seem to be not fully accounted for. In a relatively recent past, two new dimensions of the discussion around the valuation of the Economic Benefits of Transport have emerged:

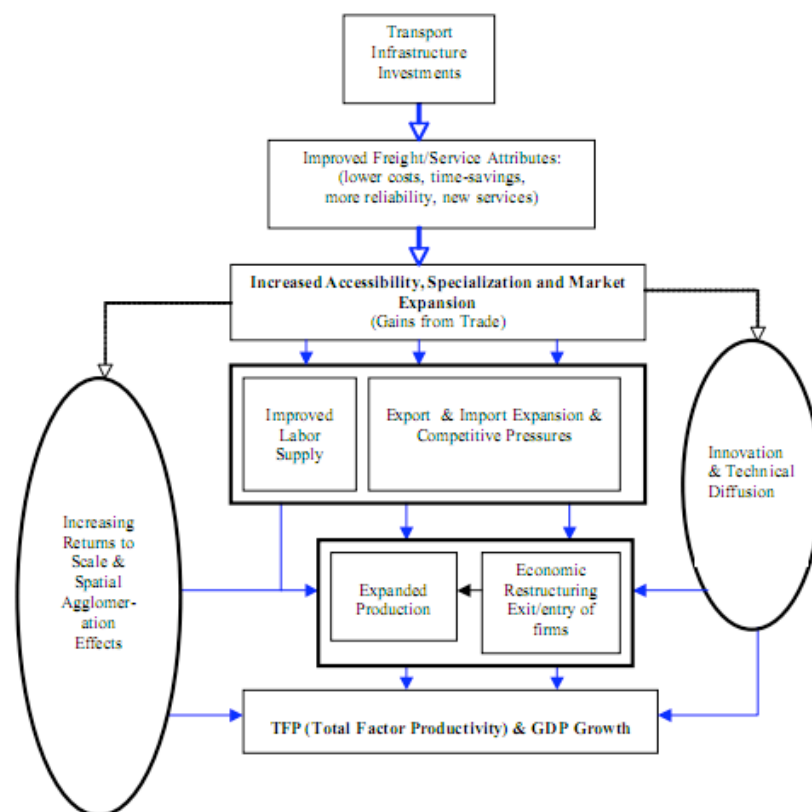
- On one hand, recent research developed in the “New Economic Geography” area has identified other types of impacts of transport projects that normally are not accounted for in the SCBA;
- On the other hand, the issue of Urban Competitiveness (and the role of the mobility component towards that goal) has gained prominence in the political arena, with some reflections on scientific works seeking to analyse it.

The following paragraphs pick up the main points relevant to our topic in these two dimensions.

In the “New Economic Geography” area, important research and discussion has been going on to identify and possibly measure the “wider benefits of transport infrastructure investment”. Figure 1 shows “one view of the mechanisms and processes underlying” those wider benefits [Lakshmanan, 2007]. Although largely based on examples of interurban transport, the main results are applicable without significant changes for large urban agglomerations, and in particular for the high capacity public transport modes.

For example, gains in productivity no longer derive only from shorter travel times, but also from the capacity to interact efficiently with a wider set of suppliers and clients, thus promoting specialization and trade under increased competitive pressure.

Figure 1 – Transport Infrastructure and Economy-wide benefits



Source: Lakshmanan, 2007

Another important dimension of the productivity gain is the capacity to recruit from a wider labour basin (for employers) and to find jobs in a wider employer market (for workers). Both play in the same direction, of a better fit between job requirements and workers' skills.

Yet another dimension of the agglomeration economies is the easier spread of innovation and technical diffusion, made possible simply by the strong increase of the number and diversity of contacts, formal and informal, made by anyone involved in a technical job as well as by any company. The new concept here is "Economies of Variety" [Quigley, 1998].

In another recent paper [Vickerman, 2007] argues that three different methodologies have been applied to assess the impact of transport infrastructure on economic activity, with different results among them stemming from the differences in the approaches themselves: the macro studies of the overall impact of transport on the economy; the new studies oriented to the measurement of the agglomeration effects; and the micro studies around particular projects, trying to understand what has changed in the decision of individuals, families and firms in response to those projects. And while recommending great care on the transfer of results from one region to another, the author clearly states the role that each of these three methodologies should play in the public decision process:

Each has its role to play according to the policy priority and the initial situation, such that where the lack of transport infrastructure is a constraint on economic growth the best understanding will still arise from traditional macro studies. Where questions of regional competitiveness are paramount, market based studies of agglomeration will be central to any appraisal. Where it is about improving efficiency and maximising social benefit then more detailed micro studies will be essential. There remains much still to do. (excerpt from [Vickerman, 2007])

The other new dimension of interest for the identification and assessment of the benefits of transport (and of public transport in particular) is that of Urban Competitiveness.

With the process of globalization, many more companies were able (or forced) to compete with other companies from distant countries, and to study foreign markets and production environments. A significant part of the critical factors in those production environments are related to the composition and organisation of the respective urban agglomerations. So, even if the direct competition is between companies, the competition between cities as supporting environments is also very real. Direct engagement of the mayors is very visible in promotion of their cities: at stake is not only prestige, but the jobs and wealth creation that are associated with attracting leading companies (and not losing the ones that were previously there).

The UK government issued a Literature review on Transport and City Competitiveness where it states that

“The economic and technological revolutions have placed new requirements on cities and their competitiveness. Location attractiveness now arguably depends not so much on geography, but on the knowledge and skills levels of the population and access to high quality transport and communications infrastructure. Although many transactions can be carried out remotely, face-to-face contact appears to be becoming increasingly important, hence the continuing need for travel.” [Dft, 2004]

In spite of all the interest on this topic, there is little agreement on exactly how to define it. For the purpose of this paper, we adopt one proposed in [Storper, 1995]:

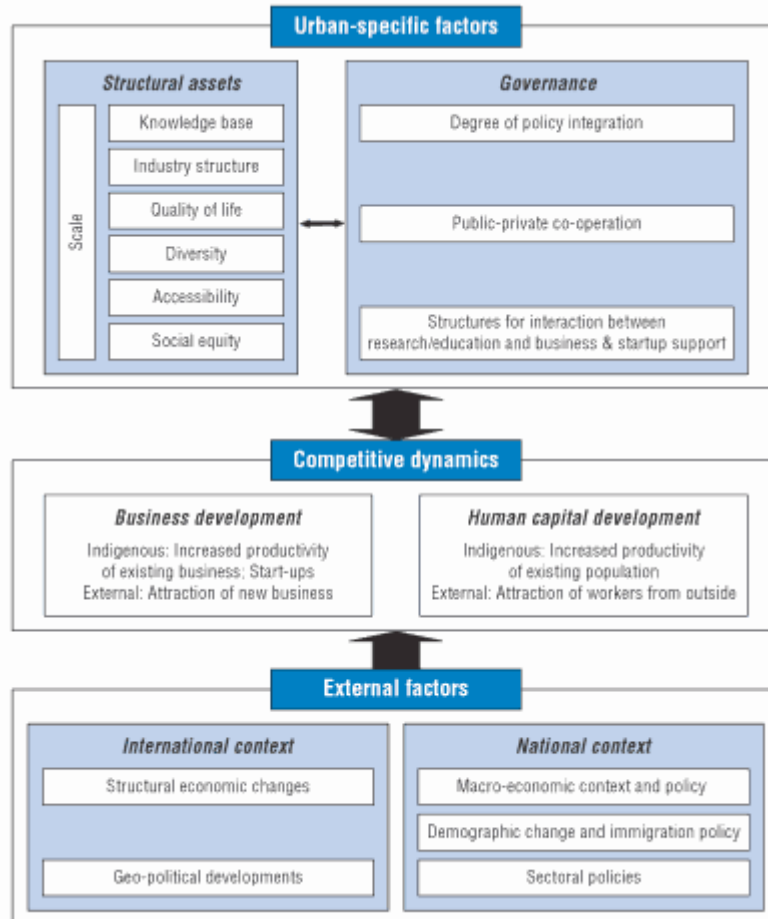
“Competitiveness reflects the capability of an economy to attract and maintain firms with stable or rising shares in activity, while maintaining stable or increasing standards of living for those who participate in it”.

The discussion on competitiveness is frequently accompanied by two other topics: social cohesion (a somewhat wider concern that that traditionally expressed in the equity concept), and governance (getting the right mix of priorities between competitiveness and cohesion, and the adequate participation of the many stakeholders in society).

A rather clear structure for the determinants of Urban Competitiveness was presented in [Van Winden, 2006]. There, the author distinguishes between the urban-specific factors and the

external factors, and states that the outcome of urban competitiveness has two closely linked dimensions: the development of business productivity, and the development of human capital.

Figure 2 – Determinants of Urban Competitiveness



Source: Van Winden, 2006

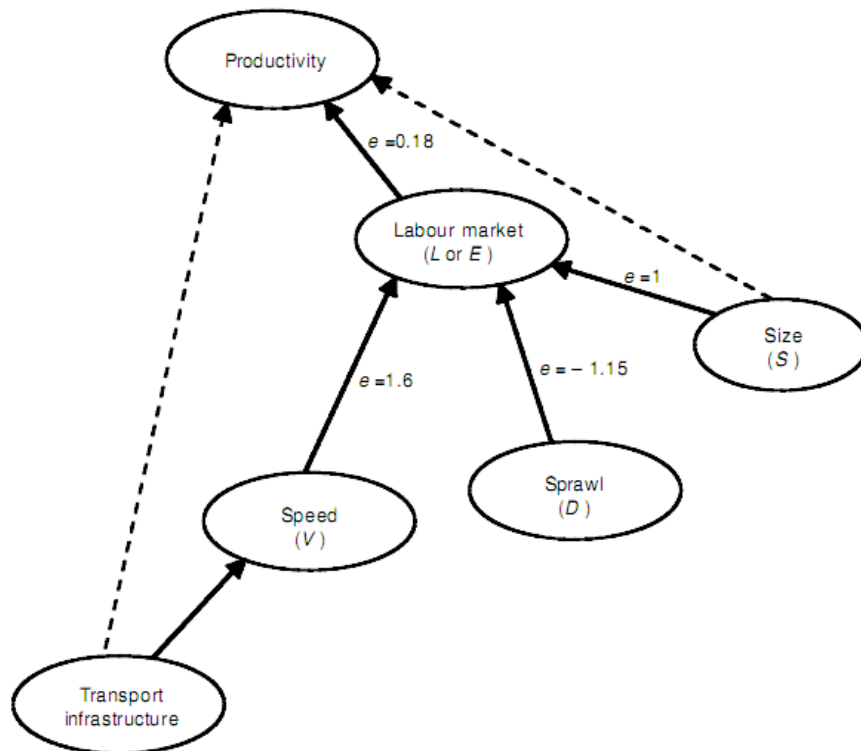
As pointed out in [Dft, 2004], there seems to be a literature gap in the assessment of the transport role in competitiveness, in that only the accessibility (including congestion) and land-use impact around public transport stations are mentioned, ignoring impacts as important as those on land-use at a wider scale and on quality of life in general, and on the quality of the urban environment in particular.

The continued push towards agglomeration in large cities and the need to respond with a high quality transport system is visible in the New Economic Geography literature as well as in the very high investments being prepared for instance in London (the Crossrail project) [Crossrail, 2009a] and in Paris (the not yet so developed projects for the Grand Paris) [Grand Paris, 2009].

Important econometric work has been done in the relation between agglomeration (density) and productivity: in [Ciccone and Hall, 1996] the authors analysed the differences in labour productivity across the U.S. states and found that doubling employment density increases

average labour productivity by around 6%, and that more than half of the variance of this productivity could be explained by those differences in economic density. And in [Prud'homme and Lee, 1999] the authors find that for a sample of 23 French cities, labour productivity is a function of the “effective size” of the labour market of those cities, this effective size being determined by the city size (population), by the average potential job-home distance (sprawl), and the average speed of the journeys to work. They also compute the elasticities of productivity to these factors. The overall model is conveniently shown in the Figure 3.

Figure 3 – The Efficiency of cities



Source: Prud'Homme and Lee, 1999

These results are very important because they show that it is important to simultaneously contain sprawl and increase travelling speed, which is only possible if Public Transport of high quality is a significant part of the mobility supply. Allocating a large part of the mobility supply to individual transport implies – due to its much lower efficiency in the use of space – to increase the urban sprawl and thus to reduce productivity (as well as increase energy consumption and GHG emissions). And of course, it reduces the part of society that can take part in that process of productivity gains.

In a report to the Office of the (UK) Deputy Prime Minister on “Competitive European Cities: Where do the Core Cities Stand?” [ODPM, 2004] the situation of the English “core cities” (Birmingham, Bristol, Leeds, Liverpool, Manchester, Newcastle, Nottingham and Sheffield) is analyzed, as well as why they (with the exception of Bristol) lag significantly below the national average GDP, in comparison with other comparable European cities. Recognising the very high diversity among cities, in their traditional activity portfolios as well as in their response to the

emerging challenges, the study has assessed the relative significance of a number of factors of competitiveness, based on an extensive literature review and a series of structured interviews with economic development officials in over 30 European cities. A substantial agreement between researchers and policy makers about what matters for city competitiveness has emerged. A set of 5 factors was identified as critical by a large majority of respondents:

- innovation in firms and organisations;
- skilled workforce;
- connectivity internal and external;
- economic diversity;
- strategic decision-making capacity.

The transport dimension is here clearly represented in the “connectivity internal and external” factor. As we will see later, two more of these factors are essential to fully deploy the potential contribution of urban mobility to urban competitiveness: strategic decision-making capacity and innovation in firms and organisations.

2.2. EX-POST EVALUATION AND LESSONS FROM THAT EXERCISE

In spite of the existence of an ample consensus on the indispensability of good transport systems, internal to the cities and in their connection to their surrounding areas and to other cities, and of the long experience of ex-ante appraisal of projects, there is still no clear-cut method to answer the question of the most adequate level of ambition for the quality level of the urban mobility system. Even the question of the components of that system where investment should have priority is not always easy to answer, given the complexity of the system and the many indirect impacts of those investments, which are different from one mode to the other.

In this context, it is important to try to learn from previous experiences, by looking at ex-post evaluations. Compared to the number of projects appraised ex-ante, there is little practice (and reporting) of rigorous application of ex-post evaluations, including not only the resulting costs and benefits, but also the intervening changes in the specification of the project during its design and construction phases, as well as in surrounding conditions.

Two relatively recent papers [Flyvbjerg et al, 2002, 2005], report on the first studies of this type based on large samples from developed and developing countries, and show the existence of significant demand forecasting errors, as well as of serious cost underestimation in transport-related public works projects, with no visible reduction of these problems over the last decades.

In both cases, no significant improvement in the quality of the estimates is visible over a period of 30 years, the error margins are much higher in rail projects than on road projects, and a solid

basis is found in favour of the hypotheses of intentionally biased estimates, made by promoters and by planners, so that their favoured projects can get approved.

Two major recommendations emerge from these works:

- adoption of a benchmarking or “reference class” approach, developed to compensate the cognitive bias in human forecast, as described by Nobel-prize winning Daniel Kahneman in his work about economic forecasting [Kahneman, 1994];
- institutional reforms that favour transparency of procedures, independent peer review of results, and accountability of planners and promoters

It is also well known that many projects face escalating costs because of changes of specifications after the moment of political approval, when the need to convince the political bodies is a forgone thing. Moreover, in a very recent paper [Polydoropoulou and Rouboutsos, 2009] highlight the potential for serious disruption of quality in projects as they are subject to high-level decisions during the construction phase.

So, in spite of all the efforts from multiple institutions, we still find that too often the project being evaluated is not exactly the project that gets implemented, and the demand and cost estimates are flawed, leading to the question of whether the appraisal exercise is only a ritual that must be performed, allowing the selection of the favourite projects of the respective promoters but with no real guarantee of selection of the project that would have been in the best public interest (that is, if we were able to agree on how that would be defined).

Nobody questions the need of the appraisal exercise and of clear and stable rules for that. But, if we want to take this ex-post information seriously, it is wiser to consider that the appraisal exercises have the major benefit of screening the bad projects, leaving a relatively small pool of good projects in the short list for a decision possibly based on political preferences of a strong leader or on delicate balances of power and preference across a range of stakeholders.

It is the need to consider the existence of multiple stakeholders with the formal or informal power to oppose any particular project (particularly in urban areas), that makes the appraisal exercise easily become one of “concertation” or multi-polar acceptance (within the limited set of good projects) rather than one of optimal choice [Viegas and Macário, 2003; Labouz et al., 2008] as originally intended in the formal definition of SCBA.

This is certainly more complex but also very likely preferable from a social point of view. Virtually nobody would defend today a technocratic procedure for selection of the public projects to be implemented, in urban mobility or otherwise. Leadership and compromise of multiple interests are vital for the sustained development of our cities, and our main quest must be for transparency and accountability, not only for maximum efficiency.

2.3. THE ECONOMIC VALUE OF PUBLIC TRANSPORT IN A PERIOD OF ECONOMIC CRISIS

In a period of Economic Crisis like the one we are currently crossing, Urban Public Transport provides value to society and to the economy in multiple ways:

- First of all, by providing mobility to many who have lost their jobs and seen their revenues severely reduced, and can no longer afford the costs of their own mobility by private car. If the current system of overall subsidization through the operators is replaced by a system of direct subsidization of citizens in need (as the unemployed certainly are) the cost of this mobility for these persons can be zero for a certain period where it is most needed, i.e. when they need to move to find a job;
- Second as a quick job activator, both for the maintenance or upgrade of infrastructure and for more intensive operation. In both cases, the density of employment is high and the positive effects can be felt quite quickly. Moreover, not only can these works and services be deployed in a relatively short period, but also they involve a rather large spectrum of professional skills, thus spreading the positive effects upon a wide array of purchasing power levels in society.

So, in the fight against the economic crisis, it is appropriate that cities mobilize some of their resources in this direction as these are public expenses that have a direct benefit on preservation of mobility while at the same time they allow the creation of local jobs and the associated contribution towards stability of consumption patterns of the local population.

2.4. THE CHALLENGE OF CLIMATE CHANGE FOR THE URBAN MOBILITY SYSTEM

As it was said in the introductory section, the best science available today allows us to say that the level of reduction of GHG to reach the targets set by the EU and by several national Governments cannot be reached by technological progress on vehicles and fuels, unless we accept significant reductions of GDP levels.

The alternative is to adopt new mobility patterns so that we can get higher productivity of mobility (more Euros per pax.km or per ton.km) and / or lower emissions per unit of mobility.

In the first case, the best hopes are associated with a revision of land-use patterns, reducing the overall need for motorized mobility and promoting the use of more efficient modes, and / or a partial replacement of real mobility by virtual mobility; in the second case (and for a given technological pattern) gains can be associated with growth of the market share of modes with higher energy efficiency, meaning higher use of rail as well as of road modes with higher load factors.

None of these changes will come about easily, as they all impose changes on lifestyles and deep ingrained preferences. To be effective in this respect in a democratic society implies that the reasons for change must be well explained to the people, and also that the alternative choices that are being promoted can be seen as a relatively small personal penalty in exchange for a larger social benefit. In a single expression, the new choices must be presented as a “double second-best”, i.e. almost as good for the citizen as if he could choose selfishly, and at the same time almost as good for society if the choice was purely determined by social objectives.

And we have to admit that to many people in our large cities, the current offer of Public Transport is far from being this second-best: for many origin-destination pairs, two or more transfers are needed, or one of the lines to be used has a low frequency of service, or some part of the trip has to be done with high levels of density on board, etc.

If we want Public Transport to be able to play this role of alternate mobility vector for many people who previously travelled exclusively with their private cars, a very ambitious marketing effort is needed, starting by the recognition that there are different types and levels of mobility requirements in society and that it is impossible to serve well so many clients with a single type of services: market segmentation is a clear need as it will improve market volumes and penetration of specific items, in urban mobility like in any other mature market.

Availability of modern fleets in the Public Transport system is very important for the reduction of emissions, but vehicle occupancy is of paramount importance: as shown in [Chester and Horvath, 2009], this can have a greater impact on global lifecycle emissions than technological advances. And public transport is particularly sensitive to this aspect when it runs large vehicles with very low occupancy for a significant number of hours of operation. Of course, providing those services is very important for quality of life and equity, but smarter ways of using smaller vehicles to provide those services or other of a more responsive nature have to be developed.

These evolutions will involve a very significant quality boost on the traditional services, mainly through systematic deployment of consumer-oriented IT based services, as well as the introduction of innovative services, possibly with intermediate modes, filling the size gap between private cars (or taxis) and standard buses. This is one of the main reasons why promotion of innovation in urban mobility services is so important.

2.5. SYNTHESIS ON THE ECONOMIC VALUE OF URBAN MOBILITY AND URBAN TRANSPORT

A very rich body of research has been built over the last decades in relation to the appraisal of the social benefits of transport projects, including their indirect impacts. Good transport systems in urban agglomerations are recognised as essential, not only for their direct users but also for several groups of indirect beneficiaries who reap benefits from the existence of those transport

systems, and for the community as a whole, as they contribute to the economic density that favours innovation and productivity growth, and with it the competitiveness of the city.

So, more than listing and explaining the different headings under which the economic value of transport can be accounted for (a defensive position), it is essential to realize that what is at stake is not the value of a good urban mobility system (UMS), or of its public transport component, but rather a small set of other (related) questions – a pro-active position. When a city finds good answers to all three questions, that potential contribution of the UMS to the quality of life and competitiveness of the city is unleashed.

- a. What changes would be desirable to the UMS to improve the overall quality of life, competitiveness, social cohesion and sustainability of the city, considering the emerging societal changes and acting proactively to mould land-use pattern changes in a favourable way? (*The Configuration Question*)
- b. What is the most fair and efficient way to split the costs of the UMS and its Public Transport component across the various segments of society, and particularly what fraction should be supported by public funds? (*The Financing Question*)
- c. What is the institutional design that seems to be most effective to provide good answers to the two previous questions? (*The Institutional Question*)

Clearly these are questions that require political decisions, as the answers inevitably contain some value judgement about relative levels of importance. But in all cases, it can be argued that it is important to favour the emergence of well-informed strategic guidance to address these issues, as well as of the institutional framework to allow the translation of that strategic guidance into efficient and effective tactical and operational decisions.

A useful framework in this process is proposed in [DfT, 2007], where a four-step process was recommended for implementation of the recommendations of the Eddington study on the role of transport in sustaining the UK's productivity and competitiveness [The Eddington Study, 2006] under consideration of the findings of the Stern Review on the economics of climate change [The Stern Review, 2006]:

- clarifying the goals of transport policy;
- specifying the challenges to be addressed on each of the three types of network (city and regional, national and international) and on a cross-network basis;
- generating a range of cross-modal options to address the challenges, looking at the role of regulation and price as well as infrastructure;
- appraising the options on the basis of their delivery against the transport goals and their value for money.

With a minor exercise of scoping of the second bullet for the urban case, these recommendations spell out the key steps of the process needed to address the configuration question, and to start touching on the financing question.

A recent paper [Walker, 2008] speaking about “purpose driven public transport” is a good example of the need to clarify the goals of transport policy, and suggesting a procedure to develop adequate information to citizens and elected officials about the “pure” (partially conflicting) goals, the service patterns that would satisfy each of those goals and the possible ways to reach compromise solutions through consultation.

The following sections of this paper deal with the three questions as formulated above, and are largely based in [Viegas, 2008] and [Viegas, 2009] which is basically a summary presentation of the main recommendations of the former.

Here, as in those other documents, reflections and recommendations have to be made in terms that are mostly applicable to all large cities, and so not specific to any of them. The necessary adjustments of applicability and scale are left to the reader in each city.

3. THE CONFIGURATION QUESTION: EVOLVING SOCIETY AND ITS REQUIREMENTS, EVOLVING MOBILITY SOLUTIONS

Answering the configuration question is the typical mission of “Transport Plans” (under this or similar names), which have been produced for most midsize and large cities for at least some 40 years. There, the current situation and socio-demographic trends are considered, and a package of interventions is put forward that should be able to solve current and emerging bottlenecks and possibly improve the general quality of mobility.

It is well known that in a large part of those 40 years these “Transport Plans” were made under a rationale of “predict and provide” [Owens, 1995] assuming that recent individual preferences and their trends had to be respected without constraints, and so inevitably leading to a continued investment in road infrastructure and consequently to Urban Mobility Systems of diminishing sustainability. It was essentially during the 90’s that the environmental conscience arose and the development of a new style of Transport Plans has emerged, recognizing the existence of constraints on urban core space as well as on emissions and other environmental impacts, and trying to identify configurations for the UMS (and paths to get there) that would be able to provide the desired levels of quality of mobility without violating those constraints. This has resulted in a revival of Public Transport and, even more, of soft modes (walking and cycling) as essential elements of the mobility spectrum. As examples of this evolution of “Transport Plans” we can mention the French PDUs (Plans de Déplacements Urbains), and the British LTPs (Local Transport Plans).

Unfortunately, the production of these Plans (and the subsequent deployment on the real world) is still suffering from low levels of innovation in what concerns Public Transport, continuing to consider only the traditional forms of scheduled production at relatively large levels of production. This is very likely reducing the potential market share of Public Transport, and with it the overall efficiency and sustainability of the UMS.

As recognized in [European Commission, 2009b] that innovation is highly needed because the mobility requests of society have been changing. In urban mobility two directions of change are most visible:

- a) an increasing proportion of trips is of a voluntary nature (i.e., not work or school related), with a growing dispersion of origins and destinations
- b) an increasing proportion of people is having different mobility requirements across the days of the week, as they engage in voluntary activities on a non daily basis

The mix of these two changes has led to situations in which quite often one person is faced with the need to travel to a destination that implies a couple of transfers (in Public Transport) from where she lives or works, or is served by a low frequency service except at the peak hours, or still some other combination of attributes that makes that trip much better served by private car than by public transport. As soon as this type of situations occurs with some regularity (say, once or twice a week), and that person has the level of revenue enough to own and regularly drive a car, she will probably start using it for those trips, and then for all the trips in the week, because she no longer finds an efficient public transport tariff (transport title) that takes into account that she is a very regular but not daily user.

To address these challenges, two major responses are needed:

- Public Transport tariffs (transport titles) should easily accommodate the notion of *Modal Alternation*, i.e. the fact that there can still be good regular clients of public transport that use it 3 or 4 days a week (not necessarily 5) and thus should be entitled to preferential prices;
- New types of services should be allowed for introduction in the market, exploring the possibilities of market segmentation, in some cases responding to lower volumes of demand for a given Origin-Destination pair, in those and in other cases possibly with varying levels of comfort on board or other service features, making strong use of ICT (Information and Communication Technologies) oriented towards the client and not so almost exclusively (as it currently happens) to the control of operations, complemented only with the simplest types of information to the travelling public .

Many examples of similar innovations in real world application for the private car users can be given, and many can also be brought up for Public Transport in these directions, but they have been stymied by the nature of the existing contracts between authorities and operators, in which services to be made are fully defined and operators just have to run those services efficiently.

Adaptation to the evolving mobility requirements of society can only be produced by less regulated environments, and it should be possible to have configurations for the Public Transport subset of the UMS in which one part is very stable and defined from the top (i.e. the Authority) and another part is generated at the bottom (transport operators and other service providers) with dynamic specifications and basically looking for its clients, developing services on which those clients recognize value and are willing to pay for, progressively taking market share from

the private car and from the classical public transport services. This would correspond to a classical example of “creative destruction” in the Schumpeterian sense [Schumpeter, 1957]

Clearly, there is an important role to be played by the application of Intelligent Transport Systems (ITS) solutions oriented to improve the experience of the traveller in Public Transport, not only by providing the most relevant information to allow a seamless journey (e.g. early warning about service disruptions on regularly used lines and recommendations for alternatives), but also to offer additional services like seat reservations, alerts for synchronization of arrivals of passenger and vehicle at the boarding point, etc. But virtually all Public Transport operators have started their introduction of ITS by applications oriented to production control (in many cases for more than a decade), and passenger-oriented applications have been missing, with the only significant exception of panels at boarding points (or websites accessible via smartphones) about the waiting time till the next service of each line or information about the next stop in buses, as referred by the EMTA members.

Development of these ideas is not the main focus of this paper, but the author believes there is a clear need to have some evolution in this direction if we want to have a high quality UMS in large cities, as the recognition of their great complexity points to the need for dynamic adaptability of their configuration in order to satisfy the evolving mobility requirements of the inhabitants and visitors, and enhance the competitiveness and quality of life of those cities.

Still, to be able to address effectively and successfully the Configuration Question, it is essential to recognize that such dynamic adaptability of the configuration without strategic guidance is a dangerous practice, which can lead to significant losses of efficiency. And for a strategic guidance to emerge, clarity of purpose is essential.

In line with these arguments, the policy process has to start with a clear definition of the Strategic (Quality) Goals for the Urban Mobility system, preferably adopting a relatively small set of KPIs (Key Performance Indicators) and their target values at the future reference date [Transplus, 2003; Prospects, 2003]. To be reasonably comprehensive and stable, as strategic goals should be, these goals should include some components in each of the three main axes of transport policy (Efficiency, Equity, Sustainability).

The Equity dimension should be addressed considering not only differences of quality of service across the geographical space (and time of day), but also across modes. This is where the concept of Public Service intervenes, as availability and affordability are important elements of social inclusion and of citizenship [Wickham, 2006].

The Sustainability dimension in these Strategic Quality Goals should include not only the usual (direct) environmental impacts, but also the mix of land-use patterns that will subsequently affect the mobility requirements of the city. This is also recognized in the recent Communication of the European Commission on a sustainable future for transport [European Commission, 2009b] .

The goals should be periodically revised, for instance every 8 or 10 years, in alignment with the evolution of lifestyles as well as in response to the trajectory of the city itself and its Urban Mobility System in the recent past.

Once these goals are approved, preferably following discussion with leading stakeholders, a “Transport Plan” should be prepared and subsequently submitted as a whole (as well as its periodic revisions) to a rigorous appraisal exercise of the Cost-Benefit (or Cost-benefit plus Multi criteria) type in which the expected gains in social welfare are weighted against the costs.

To avoid the kind of gross estimation errors mentioned above, both for the construction and operating cost and for the demand estimations of any new project, a benchmark of the corresponding values in past projects of a similar nature should always be included alongside the estimates produced by the studies made specifically for the new project. And, whenever there is significant misalignment, an independent peer-review exercise should be launched to put those differences in perspective.

An important test of the justification of the main components of the “Transport Plan” is the assessment of their real value, i.e. identification of their contribution to each of the strategic quality goals, through their marginal contribution for improvement of the relevant KPIs. This exercise should also be done in combinations of those elements as they may well be not independent and thus have synergetic or counterproductive effects. Only those components (projects) that get a good mark in this analysis (in relation to their costs) should be accepted for implementation [Viegas, 1998].

In parallel with this front of traditional planning, it is advisable to evolve towards a regulatory framework that stimulates modal alternation and innovation in public transport services, filling the gap between individual transport (private cars and taxis) and scheduled standard busses.

Modal alternation should be promoted by the Authorities, through the evolution of monthly cards to “multiple days” cards which still confer advantageous prices to intensive users, but not necessarily on a daily basis. In a second stage, the same payment instrument should be adopted for all types of mobility, for instance through the issue of a “Mobility Card” or equivalent electronic device, that would be used in public transport, in parking houses or parking meters, (and on urban road tolls when applicable) etc., and which could be associated with some marketing promotions (discounts or upgrades) in connections to desirable usage patterns.

On the other hand, innovative services should be initiated by transport operators as well as by other service providers (e.g. telecoms) and accompanied by authorities, so that some of them may eventually become mainstream, in the above mentioned process of “creative destruction”.

Regular monitoring the evolution of the implementation of the “Transport Plan” is essential not only to allow navigational corrections, but also in support of the periodic revision of the Strategic Quality Goals. For such monitoring to be effective, results of the achieved KPIs versus the targets should be published and discussed with the main stakeholders on a regular basis.

4. THE FINANCING QUESTION: HOW TO FUND THE URBAN MOBILITY SYSTEM, AND IN PARTICULAR WITH WHAT CONTRIBUTION LEVEL AND APPLICATIONS OF PUBLIC FUNDS

Provision and consumption of mobility in large urban areas represent a significant budget item, for public institutions, companies and families. Important choices are made in every city about the overall cost level at which the mobility system operates and is expanded or renewed, and about the split of these costs across society, public and private parties of various natures. To a significant extent the quality and adaptability of the UMS to the evolving requirements posed by society depend on the soundness and stability provided by those decisions in the financial dimension.

And it is because of their importance that these financing choices must be aligned with the above mentioned strategic goals of the UMS. Furthermore, only by mastering the financial balance of the UMS throughout the lifecycle of its major components can a consistent mobility policy be implemented.

In this, the double role of prices (tariffs) must be clear in the minds of the public decision makers:

- on one hand they pay for the mobilization of resources, allowing the replenishment of the supply side;
- and on the other they are a potent driver of consumers' choices, allowing the managers of the UMS to influence the level of demand across the various components of the system. Of course, it must also be remembered that there are price thresholds above which some persons will not be able to access those services.

There is in most European countries a tradition, going back to after the end of World War II, of public sector supply with rather low prices in Urban Public Transport. At that time this was very understandable as reconstruction was the main economic goal, many people had lost a large part of their assets, car ownership was very low, and granting mobility to everybody was essential to get the urban economies moving. Subsidization was not necessary in many cases as patronage was very high and salaries and fringe benefits in the Public Transport industry rather low.

But, as car ownership started growing (and conditions for workers in the industry getting better), the financial balance of those operators deteriorated, with growing need for significant subsidization of the operational costs. In the 80's both France and the UK introduced significant changes in the regulatory framework to mitigate this need, through managed competition (France, London) or through deregulation (rest of the UK save Northern Ireland), the French approach having been replicated in several other countries since then. That growing need for subsidization has been slowed down, but not abolished or reduced.

Today we face a very different situation and the reasons and scales for subsidization of public transport must be found elsewhere. In general, there is no need to subsidize many of the clients of Public Transport, although it is essential that no one is deprived of mobility because of inability to pay. This corresponds to an application of the principles of vertical equity (subsidize those who need it) instead of adopting a general tariff subsidy through the operators. That general subsidy is not only unfair (loading the taxpayer without a real need for that on the part of many of the beneficiaries), it also promotes inefficiency of the operators.

To ensure greater fairness and efficiency (and also fiscal responsibility), it is important that the subsidy to those in need is supported by the budgets of the various existing social protection agencies (for the unemployed or with low income, for those with some mental or physical impairment, etc) and become part of their support of dignified living conditions of their beneficiaries. Clearly, transport authorities or operators have little knowledge about the real situation of those in need and so generally grant subsidies to social groups that largely exceed those in need. With the current sophistication of the information systems of those agencies, they can do a smarter job with very low transaction costs.

Those persons should use the normal transport titles for their travel, paid in full by their social protection agency, while in the backstage they may have paid to that agency only a part of that price or even nothing at all, depending on their (means based) statute in that agency. This will of course require a revision of the budgets and funding bases of those social protection agencies, but the overall burden on the public budget will be smaller than with the current system and it will be for those agencies to decide on what kinds of benefits the application of those budgets is more important, instead of counting on the generosity of public transport authorities or of its regular passengers.

This is the area of what is normally called concessionary fares and the evidence collected from several EMTA members (Barcelona, Brussels, Ile de France, London, Stockholm, Vilnius, Warsaw) clearly shows that, although there are a few common privileged segments (elderly people and students namely), various other segments are benefitting in each city, as an apparent result of an ad-hoc procedure occasionally repeated in each city. There is also no clear rule or even principles about compensation of these discounts, with possibly the exception of Stockholm and Warsaw where the city council covers all costs above the fare-box revenue and operators are contracted on a gross cost basis. But the progressive deterioration of the cost coverage ratio in Warsaw seems to indicate this is not a sustainable situation.

In several cases, when there is no compensation, it is in fact the tariff of the regular passengers (not the general taxpayer) that is subsidizing the concessionary fares.

Clearly, this is a field in which there would be great value from a concerted reflection of the EMTA members, leading to propositions to their political leaders with at least some form of commonality of principles.

The important point is that the Urban Mobility System should be able to move towards full coverage of its operational costs, i.e. the costs of provision and maintenance (and possibly also regular technological updates), plus those associated with its external impacts. This is a key

element to achieve control of the trajectory of the UMS if we recognize the growing competition for public funds from other sectors with less ability to provide a similar level of cost coverage, namely pensions and health care in an ageing society, plus education of increasing sophistication levels in a knowledge society. Failing to recognize this now will lead to drastic measures in a relatively near future.

Besides the contributions of the travellers in Public Transport (farebox revenue) and in private cars (specific taxes and possibly part of the fuel duty), there are other commercial revenues that should be brought at least partly into the financial balance of the UMS: publicity in public transport vehicles and stations and in outdoors along the urban roads, land rentals from gas stations, and so on. In most cities, several of these items are not included in the transport accounts, although the revenues charged are clearly connected to “exposure” i.e. to how many people pass in front of them each day.

A stronger contribution from Public Transport passengers is seen as essential by leading experts in at least France and Germany [Coppey and Toulouse, 2009; Kossak, 2009] to contain the growth of public budget subsidies. Moving towards full cost coverage of the UMS is even more ambitious but does not necessarily imply bigger tariff increases for the clients, as there are other sources to cover the gap between revenues and costs: not only the progressive withdrawal of subsidies to operators (and the promotion of innovation and market segmentation as mentioned above) would increase their efficiency and so reduce the deficit levels, but also there are multiple indirect beneficiaries of Public Transport who are not specifically contributing to cover its costs (only as general taxpayers, but with no linkage to the benefits received) – not only businesses, but especially car drivers and land owners / tenants.

So, a central element in the answer to the Financing Question is how to include contributions from these indirect beneficiaries, including the differential for space consumption and emissions from private cars, and the additional value of land and businesses created by proximity to transport infrastructure and services.

The case of employers (and employees) as indirect beneficiaries is one which has been recognized early on and translated into application in France in the seventies through the *Versement Transport*, a surcharge on the payroll of all entities with at least 9 employees. In spite of its very low transaction costs, it is now recognised that it introduced some distortions and above all was an important factor against employment, and as such is not likely to be generalised [Bonnafeux and Claisse, 1986; Darbéra, 1990]. It must be recognised that the availability of the *Versement Transport* has allowed great expansion of public transport networks in French cities, and until recently a rather good financial stability of its operations, but it is now clear that it is no longer able to keep the same level of relative weight in the public transport budgets, possibly because investment was too easy [Bouf and Henscher, 2007; Coppey and Toulouse, 2009] and now the operations and maintenance bills are showing up.

Private car drivers are among the main beneficiaries of the existence of a good public transport system, as this generates a very strong positive externality on them, reducing the congestion levels in comparison to what would prevail if public transport was of poor quality or non-existent.

It is also recognized that private cars generate significant negative externalities in urban areas, for which they are generally not charged.

There are several ways in application today in different parts of the world, to charge for the use by private cars of all or some parts of the urban road space: the older one is on-street parking fees (and the corresponding fines in case of violation), but more recently London [Evans, 2007] and Stockholm [Stockholm Expert Group, 2007] have introduced road charging schemes, in which an additional fee is collected for granting access to a specific geographical area of the city. In both cases, the charging scheme has substantially reached the announced goals. And in Shanghai, access to the urban freeways is restricted to cars with a number plate of that municipality, which has to be bought in monthly auctions for a price higher than that of a small car [Shanghai China, 2007].

Although always subject to heated public discussion, the examples of London and Stockholm show that introduction of congestion charging is not only possible in Europe but also finally accepted and effective. Very likely, more cities will be following these in the coming years. It is possibly a question of time and scale.

Whether the charges are applied based on arguments of external benefits received, of external costs generated, or of value of the service received (road or parking space, in both cases less saturated thanks to the existence of a public transport alternative), is possibly more the consequence of local political circumstances than of economic argument, but it makes a lot of sense to bring all the charges applied to private cars into the financial balance of Urban Mobility Systems.

It must be always present that the charges on private cars serve a double purpose: not only to provide a layer of funding to the UMS in general (alongside the contributions from other indirect beneficiaries and from the travellers in public transport) but also to influence travellers' choices, as they reflect value for drivers who accept to pay.

An important consideration to bear in mind is that the charges on access by private car to different urban areas (no matter whether through parking or through circulation) should be different according to the quality of service provided by public transport to those areas, private car charges being lower in the areas less well served by public transport. When the quality of provision of public transport is lower, a higher market share for small scale transport (in private cars and in other forms of demand-responsive public transport) can be socially more efficient and still fully inclusive. This is critical to ensure fair endowment of accessibility to all urban areas (territorial equity). As recognized in [European Commission, 2009b] "the transport system would particularly benefit from better price signals".

These charges have to be monitored and adjusted (with different tariffs in different urban areas and at different hours of the day) so that the levels of congestion can be kept under the thresholds defined as tolerable and a good level of accessibility ensured for all urban areas.

The ongoing evolutions in the fields of wireless mobile communications, sensor miniaturisation and ICT in general provide ample opportunities for charging systems which will be able to

differentiate according to value for the user and scarceness of the resources consumed, while at the same time the transaction costs will be shrinking.

The third group of indirect beneficiaries is that of land owners and their tenants, who frequently enjoy higher values of their location due to the accessibility provided by transport infrastructure (roads or public transport). It is common knowledge that this impact exists, and many studies have been looking at it, but the variety of modes (road, commuter rail, light rail), types of property (residential, business), size and wealth of the cities analysed, and methodologies used in the studies has been such that it is impossible to present a solid general conclusion. Not only the range of percent values of those impacts has been found very different but there are even some (a few) cases where proximity to transport infrastructure has been found to have a negative impact on land prices, most likely because of the associated externalities, mostly noise.

Although land-value capture has been used mostly (almost exclusively) for investment funding, the fact is that the presence and operation of the transport services provides benefits while they are in service, and not only at inauguration. So, it would be appropriate for this kind of contribution to be mobilised also as a layer for coverage of the operating costs, and not only for the investment costs, exactly as it happens with the *Versement Transport*. But as this mechanism has been used mostly for investment funding, we discuss it below, in that section.

Besides the users of the transport system and the indirect beneficiaries of various kinds as described above, there may also be a rationale for a contribution from the general budget of local authorities (subsidies) to fully cover the operating costs.

The equity argument (making public transport accessible to everyone), is very relevant, but this objective can be better reached through direct subsidization of the less affluent citizens (from budgets outside the transport sector as mentioned above) than by overall subsidization through the operators.

In the name of optimum efficiency of Public Transport, there is also the argument of the “Mohring effect” [Mohring, 1972] by which a higher level of supply in Public Transport allows reduction of the headways and thus of the waiting times and costs for the travellers (a positive externality), without getting any contribution from them. This would justify subsidization by the general budget to the level of those external benefits (assuming the subsidies are used for increasing the frequencies of service).

But in general, the most usual argument for giving subsidies to Public Transport is that private car drivers do not pay for the external costs they generate. We have seen above that it is preferable to address this through charging the private car (for those generated external costs and for the external benefits they collect from the existence of Public Transport) than by subsidizing Public Transport. Of course this must be done gradually, but the direction of change (and preferably the intended path) should be clear.

Infrastructure investments justify a different treatment as part of the general urban fabric, and so can largely be financed through public budgets, with or without recourse to financial

engineering techniques to facilitate the adjustment between what is normally a concentrated request for funds (the construction period) and a long-term period of fruition.

Mobilization of nationally (regionally) managed resources for infrastructure investment makes sense, especially for the more capital-intensive modes, but this should be made under clear, previously defined, rules for the availability and relative level of participation by those national or regional authorities, so that the different cities can compete for those funds in fair terms.

Given the difficulties with public budgets, land-value capture and private financing mechanisms are attracting strong interest in connection with investments in Urban Transport infrastructure (road tunnels as well as rail).

The most common ways of land-based mechanisms for funding of investment on public transport infrastructure are presented in [GVA Grimley, 2004]. These include Land Value Taxation (in which the value of the land is revised in connection with a new infrastructure and taxed accordingly), Tax Incremental Financing (in which the expected growth in property tax revenues is securitised to provide for investment funds), Business Improvement Districts (in which a special levy is charged on all properties in a designated area), and Business Rate levies (in which a markup on business rates is applied).

The application of land-value capture has been much more widespread in the US than in Europe, but the shortage of other sources may well imply that its application in Europe will soon have to grow.

In [Martinez and Viegas, 2009] a study in the Lisbon Metropolitan area is presented, where different hedonic regression models were tested to explain the variations in prices of residential units (houses and apartments) sold in 2007. This allowed identification of the contribution of multiple attributes of those units, including proximity to subway stations, suburban rail station, expressway nodes, etc. Calibration was rather good and the results show, for instance, that proximity to one subway line in the city of Lisbon increases the value of the residential unit by between 6.5% and 8.7%, and to an intersection of two subway lines by between 9.2% and 12.5% (depending on which lines).

The Portuguese tax on real estate (approved by Parliament in 2003) is based on a presumed market value of each residential unit obtained through a mathematical model that also includes a coefficient to assess the multiplier effect of accessibility on the otherwise prevailing market value of that property. But, although the revenues of this tax are fully allocated to local authorities, no hypothecation of the accessibility mark-up is foreseen or allowed.

In the case of London, and specifically for the Crossrail project, a new tax is introduced, a Business Rate Supplement of 2p applicable to business properties with a rateable value above £50,000 [Crossrail, 2009b]. This will apply to about 15% of London's properties but captures 77% of the potential income. Based on the expected revenue from this tax, the Greater London Authority will borrow £3.5 billion (for a total estimated capital cost of £15.9) and this rate will be charged for a period that is estimated between 25 and 30 years, until the debt is repaid. Still related to contributions from the real-estate side, an additional £300 million is expected from

“Developer Contributions” which are monetary contributions made (following case by case negotiations) by developers in the framework of their planning applications.

Private funding of investments in the UMS (both for Public Transport and for Road infrastructure) has been growing, mostly through the Public-Private Partnerships (PPP) model. Even if they have the advantage of allowing the realization or anticipation of specific UPT projects, they have a very fundamental difference with respect to public funding: all private funds must be paid back, with interest adequate to the risk levels, and this means that the UPT projects in question must not only cover its operational costs but release enough additional cash flows to pay back those private funds.

They require clear ring-fencing of responsibilities and allocation of costs, revenues and risks to ensure participation of private capital, which is not easy in systems with tariff integration. And, because they involve an element of risk and reward for private investors, the cost of capital is always higher than in public financing schemes.

In balance, PPP’s in UMS may seem justified only when the scarceness of public funds for investment is high enough to consider the (social and political) costs of waiting for their availability more significant than the (financial and transactional) costs that have to be paid to attract the private investors.

It is also very important to understand that launching and managing a PPP requires considerable levels of negotiation and management skills on the side of the Administration, not all of which are amenable to delegation to competent and diligent consultants.

The most important recommendation with respect to investment funding is that the decision to make the investment should only be made after careful demonstration of the expected economic feasibility of that component once in operation, i.e. its capacity to become a part of the general transport system without deteriorating the general principle that it should be able to reach a level of coverage of its operating costs (including maintenance) in line with the valid framework in that city.

Too often this notion of subjecting the investment decision to a sound operational budget (even under the current subsidization levels) has been forgotten, with the consequence that many flagship projects at the time of their inauguration have become a big headache for the yearly budgets of operating costs of urban public transport systems.

5. THE INSTITUTIONAL QUESTION: WHAT IS THE INSTITUTIONAL DESIGN THAT SEEMS TO BE MOST EFFECTIVE TO PROVIDE GOOD ANSWERS TO THE TWO PREVIOUS QUESTIONS?

If it is recognized that the UMS has an important role to play in the Quality of Urban Life and in the Competitiveness of the city, it is implicit that the UMS itself must be of good quality. Both for reasons of equity and of efficiency, the quality objective must be present throughout the system, although inevitably the level of quality will not be the same across space and modes in a given conurbation. Delicate balances must be sought in this respect as the various modes compete for resources (money and space being the most visible), but they also complement each other, and no mode is in a condition to be an effective monopoly provider of mobility in any large European city.

Market shares are not the key performance indicators, but just intermediate indicators, as the goals (and so the targets) must be related to quality of life, economic efficiency, sustainability, and social inclusion.

Even if we take the elegant and simple formulation of [Prud'homme and Lee, 1999], where the productivity of the city is shown to depend on its size (sprawl) and average travel commuting trip, we see that too much dependency on public transport will imply rather low average speeds (too many people need transfers and too many lines have frequent stops) but if we rely too much on private cars, we will have heavy congestion, very wide sprawl of some portion of both. And when we have congestion and / or sprawl, clients of public transport suffer disproportionately. So, all modes have to be part of the mobility package (including soft modes for shorter displacements), and it really has to be a package. Good public transport is indispensable for healthy growth of urban areas.

This means that an encompassing quality concept must be developed and the process of transforming the current system into something closer to that concept must be launched. What level of quality and what level of speed in the transition are aimed at will depend on the level of ambition for this sector and on the resources that can be made available for that, but in all cases it is important to make the best use of those resources towards those goals, i.e. to be effective and efficient.

This quality concept corresponds to what was referred above as “clarity of purpose”, which is an essential but often forgotten item in the transport policy realm, as noted in the section dedicated to the Configuration Question. Given the complexity of the system and its need for permanent adaptation of mobility solutions, in response to the permanent evolution of life styles, a strong and wise Strategic Command of this system is required, so that the adaptations are well incorporated into a baseline trajectory towards the established quality targets.

This Strategic Command and clarity of purpose are to be provided by a political organ, singular or collective depending on the prevailing local and regional power solutions in each country, preferably representing the whole mobility conurbation.

At the Tactical (or planning) level, a single agency must be in charge of all transport modes in the mobility conurbation, carrying out planning and oversight with technical competence and firmness in action, while ensuring transparency and fairness in treating the legitimate interests of multiple public agencies and private parties.

This need for solid and effective institutional design is recognized in Government, in business, even in non-profit undertakings, but somehow not yet adopted in the vast majority of European large cities for their Urban Mobility Systems [Maretope, 2003] [Viegas, 2008].

In fact, although the typical institutional design changes from one country to the next, in most cases we have one entity in charge of road traffic, another in charge of public transport, and yet another in charge of traffic and parking violations. Sometimes this gets even more complicated as there will be more than one entity for the road traffic (depending on the hierarchical level of the roads considered, which translates into an administrative statute), and more than one entity for the public transport system (for similar reasons).

The size and complexity of the system will certainly imply some fragmentation of responsibilities closer to the operational level, with some units or departments inside this agency (or at lower level administrative levels) in charge of detailed plans for the different modes, and possibly different companies in charge of ensuring smooth operations, either by subcontracting or by direct management. This also happens in Governments and Business, and does not by itself endanger the unicity of the tactical command. And clear allocation of responsibilities is essential, separating the Strategic (policy and goals), Tactical (planning and oversight) and Operational decision levels.

The idea that you can be successful with separate strategic or tactical guidances as long as you have good institutional cooperation among the respective units is a bit of an illusion: there are numerous cases in which this cooperation is indeed fruitful for some years, but only as long as a tactical alignment is possible of the (different) strategic objectives of those separate entities. And with the depth of the measures that will be necessary in the financial dimension in the coming years, it would be an illusion to believe that a stable tactical alignment would be possible across all transport modes in the large European cities.

The public perception of this unicity of strategic command, as is the case in London for instance with Transport for London under the direct leadership of the Mayor, is something of great importance for the capacity to discuss and negotiate with the different stakeholders and for the public acceptability of the measures that have to be taken [Viegas and Macário, 2003].

It is also very important to have a close link at the strategic level between mobility and land-use as their cross-influences are so strong. In some cases the leadership may even have to be the same, although inevitably the tactical level will have to be managed by separate agencies, as the

type of challenges, the time dimension of the impacts, and the style of the interlocutors are very different in the two areas.

The need for a systematic monitoring of the system has already been highlighted in the section dedicated to the Configuration Question. On the institutional front, it is important to stress the need for a strong commitment (at all decision levels) to monitor performance of the Urban Mobility System in its multiple components, preferably by independent entities, and to make the results of that monitoring public. Only through such a transparent and independent process can we achieve the necessary levels of public acceptance for some restrictive measures that every now and then have to be adopted.

6. CONCLUSIONS

From all that has been said above, a few things stand out as cornerstones of whatever ambitious policy towards high quality of life and competitiveness in a large European city and the action path for its effective implementation:

- The Urban Mobility System is a critical contributor to quality of life and competitiveness of European cities, and must offer high levels of quality in all its modes;
- Effective mobilization of the energy and skills of all members of society requires that good mobility solutions are available to all population segments and urban areas
 - Public Transport of high quality is an essential mobility provider not only for people who do not own a car, but also especially in those areas where high density demand can only be efficiently served with its strong presence
 - In a period of economic crisis, Public Transport is essential not only to continue to provide mobility to those in economic distress but also as it enables quick creation of jobs across a significant range of skill and remuneration levels
 - As daily mobility requisites vary, so should it be easy to vary the solutions adopted: the concept of Modal Alternation is a powerful leverage for higher (private and public) efficiency but still faces many barriers, especially in the Public Transport tariff domain
 - A powerful instrument in this direction (in practical as well as in symbolic terms) could be an Urban Mobility Card covering all types of mobility in the mobility conurbation
 - Given the big gaps between private cars and traditional public transport, a significant role can be played by Intermediate modes and demand responsive services, if they can be recognized as “double second-best” offers
- The complexity of these systems and the permanent evolution of lifestyles and mobility requisites can only be adequately addressed under a governance framework which provides Clarity of Purpose and Strategic Guidance, while encouraging stakeholder participation and innovation in the services brought to the market
 - A single agency should be in charge of the tactical (planning) decision level for all issues in the mobility conurbation, with strong links to land use decisions

- Some planning activity could be delegated to units at a lower administrative level, under control from that agency
 - Innovation in mobility services is very important for better adaptation to evolving requisites, and is preferably brought up by private companies, transport operators or not. It is the role of public agencies in general and of this planning agency to favour the emergence of such innovations and their integration with the previously existing supply forms
 - Information and Communication Technologies are especially important in this direction, and their use should be steered at least as much in customer-oriented applications as it has been in production-control applications in the past
 - Monitoring the performance of the system, publishing the corresponding results and discussing them with stakeholders are key elements for building the social capital needed to preserve the strategic guidance
 - The pressure of Climate Change and the corresponding need to reduce emissions from urban mobility systems reinforce the value of these positions and the role of a Public Transport and component of high quality and of innovation in the services it provides
- A sound Financing framework must be defined and accepted for the Urban Mobility System, promoting its evolution to the desired configuration
 - Recognizing that the financing issue must be addressed globally for the Urban Mobility System, and not separately by mode
 - The above mentioned Urban Mobility Card would be a powerful symbolic element in support of this position
 - In general, the Urban Mobility System must be able to reach full coverage of its operating costs (including maintenance)
 - Prices of mobility services must be aligned both with (internal and external) costs generated and with (direct and indirect) value for the beneficiaries
 - Contributions of indirect beneficiaries must be included in the equation
 - Subsidies must be awarded to only those people who need them, through the budgets social protection agencies who know their situations better
 - And not through the general tariffs, wasting public resources on people who do not need them

- Investment costs may require contributions from the public budget, given their foundation role in the urban fabric
 - Since there are frequent gross mistakes of construction cost and of demand estimation in new projects, benchmarking practices must be systematic adopted in their appraisal, followed by independent peer-review of the corresponding studies in case of discrepancy
 - Any new investment project must only be approved after it can show that it can be properly integrated in the general system without disturbing the future balance of operating cost coverage

Some cities are closer to these positions than others, but the majority is still rather far from them, in several dimensions. Some points are more critical than others for achieving the desired high quality of life and urban competitiveness.

For instance, clarity of purpose, strategic guidance and unicity of tactical command are decisive for points for effectiveness (and should be pursued as soon as possible), while the recommendations on financing may be adopted more quickly or more slowly, depending on the existing pressure.

Part C of this paper and these recommendations must be understood as an attempt to provide a coherent and structured framework within which the Urban Mobility Policy can be developed to support and promote a better city and conurbation, still leaving plenty of space for the political decision makers that must, as always, set the fundamental societal choices: no specific priorities or quality indicators were defined, no parameters were given, that is precisely where the legitimate political choices must be made. Here it was about principles for a robust, efficient and accountable path of the mobility system towards a more competitive, sustainable and pleasant city.

□

PART D – REFERENCES

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