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Chapter 6

Strategic Issues for the Future Funding and Operation of Urban Public Transport Systems

by
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This chapter provides a review of the operation and funding of urban public transport (UPT) systems and describes the challenges that the sector will have to meet in the future. How can diverse models of public transport systems contribute to urban dynamics? How will UPT be integrated into increasingly multimodal systems? This chapter details how UPT financing, pricing and organisation must be viewed from the more general perspective of urban policy.

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1. Introduction

Towns and cities account for a growing share of the global population, often over 80% in developed countries. They also produce the largest share of value added, in both industry and services. Urban quality and efficiency are accordingly key variables, as much for economic growth as for compliance with the requirements of sustainable development.

Yet the quality and efficiency of our towns and cities are directly related to transport, and more specifically passenger transport. In this field, urban public transport (UPT) poses specific problems and its role is currently undergoing change. Often viewed as a service for largely captive, low-income users, they once seemed confined exclusively to the public sector. But as the public sector everywhere is facing growing financial constraints, does this mean that urban public transport is under threat? Will the universal popularity of private cars one day sound the death knell of transport systems whose investment needs and operating subsidies are a drain on the public purse?

The answer to this question has changed over the past few decades. Following a period of relative decline, more large cities have decided to boost investment in UPT in light of projected needs to 2025/30, both in the industrialised world and in emerging countries such as Brazil, China and India. The new popularity of public transport, in particular projects involving segregated infrastructure, will not drive down public spending, quite the contrary. However, it does confirm the principle familiar to economists for a century now and known as "Wagner's Law", whereby the development of an industrial economy will be accompanied by increasing demand for public intervention. This is particularly relevant in urban areas where the smooth running of economic activities, as well as flourishing social and cultural activities, call for government policies that provide the community with the public goods it requires.

The law that A. Wagner formulated at the turn of the 20th century has been confirmed by the underlying rise in public spending as a share of GDP. But the very fact that it has proved to be true poses a problem in terms of logic. Public expenditure already exceeds 30% of GDP in the US and Japan, and 40% or even 50% (Sweden, France) in much of western Europe. So there is a need to rethink the forms that public policy can take in many sectors, including UPT. There should be no hesitation in conducting in-depth reviews of the situation in each of the sectors where government plays a strong role. These include education, health and research but also network industries such as water,

energy, telecommunications and transport. Such industries, particularly transport, often make intensive use of government funds, owing to their infrastructure requirements. Consequently, given the budgetary constraints on government departments, every avenue should be explored with a view to optimising UPT services, while at the same time ensuring that public spending does not get out of hand.

This chapter endeavours to provide input for an in-depth review of the operation and funding of UPT systems and is divided into four sections:

1. The first section looks at the UPT systems in terms of their current mode of operation, rationale and limits. What is the reason for the significant differences found across countries and continents? Are these differences entrenched?
2. The second section is a reminder that the widely differing approaches to UPT operations and management reflect the highly diverse range of urban management approaches. Can we identify any typical "urban models" and how can public transport systems contribute, within each model, to urban dynamics?
3. The third section looks at current and future changes in the organisation and funding of UPT. Over and above the new demands for efficient and transparent financing, how can UPT help to promote sustainable mobility, and with what resources?
4. The fourth and final section looks at the challenges that the UPT sector will have to meet in 2030. How will UPT be integrated into increasingly multimodal systems? What funding mechanisms will be put in place? How will the UPC sector open the door to technical and institutional innovation? How will mobility policies be evaluated, and by whom?

2. Urban public transport: varied country responses

Tourists who are fortunate enough to visit many cities in the industrialised world will have the initial impression that they are all fairly similar. Everywhere there will be buses and sometimes trams, underground or subway systems and railway trains. Fares and pricing will be different, and network maps and timetables will be more or less easy to find. Even if cities try to personalise their public transport networks, users will find that nothing looks more like a metro line than another metro line.

However, if we stop looking through a tourist's eyes and view the situation from the standpoint of the researcher instead,[1] we discover that these apparent similarities conceal some very marked differences in the way UPT systems are organised. Some cities have genuine decision-making powers, while others come under a regional authority or central government. In some cases, commercial revenue covers most of the operating costs, and even investment. In others,

government subsidies can cover as much as 80% of the costs. The UPT sector may be entirely government-run, or the private sector may predominate, with or without a detailed mandate. Insight is therefore required into this organisational diversity. To gain that insight, we shall first pose some key questions, before endeavouring to understand why the answers to those questions vary so widely across cities and across countries.

2.1. Key questions with regard to urban public transport

Although it may be a somewhat simplistic way of presenting the issues, there are four basic questions facing organisations providing UPT services:

- Who designs UPT?
- Who operates UPT?
- Who funds UPT?
- Who uses UPT?

Who designs UPT?

UPT provision seldom stems from private initiative. Bus, tram, underground and suburban train networks were set up by public bodies and not intended to be profit-making concerns. We are not dealing with a textbook example of market economics here.

UPT provision in some cities, particularly in the developing world, is entirely private. Individuals or firms, for instance, offer passenger minibus services, for which they charge fares set simply by supply and demand, on routes which are known solely to users and which can sometimes vary. However interesting those private initiatives may be,[2] they are not a benchmark for UPT systems in industrialised countries. And there is little chance that they will become one, for a simple reason linked to the nature of passenger transport services in urban areas. Even if UPT systems are used by individual passengers according to their needs, such services fall into the broader category of public goods. More specifically, the UPT sector has experienced several market failures, described in public economics over the past 50 years.

As a network industry, UPT – and in particular segregated public transport (SPT) – is characterised by increasing returns. It therefore features natural monopolies, or more specifically local monopolies requiring government policy upstream from service provision to determine routes, types of service, frequency and other details.

Such public policy is particularly necessary because of the social considerations involved. UPT is often the only reliable means of medium-distance transport for those on low incomes.

But economic considerations also enter the equation. Many in the low-income groups, who are more or less captive users of urban transport, are making a very worthwhile contribution to the economic vigour of their town or city. Consequently, just as road networks are developed and maintained under government supervision, UPT – whether segregated or not – is a government responsibility. It is a question of externalities.

The same applies to the environment. Well-organised UPT systems do less harm per passenger, or per passenger-kilometre, than private cars. This is one of the main reasons for recent expansion, namely potential, on segregated infrastructure, to ease road congestion problems.

The many different economic, social, environmental and other needs met by UPT make it essentially a political good. As one of the flagship components of the urban environment and of the city as a public good, UPT cannot leave elected representatives indifferent. For that reason it is increasingly included in policy plans that go beyond the confines of transport. When the policy planners decide to create or extend underground or tram lines, or map out bus routes, they are building our cities just as much as when they are building new roads, and just as much as any real-estate developer.

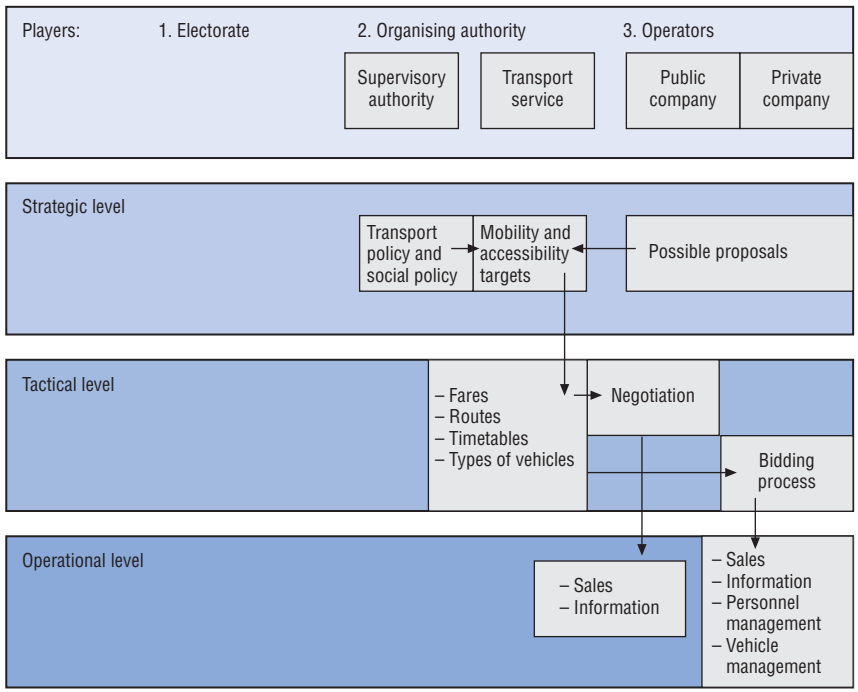
The answer to the question "who designs UPT?" is therefore fairly straightforward. UPT is very largely contingent, in the industrialised world, on government policy makers. But we should bear in mind the wide range of administrative departments involved in fleshing out the policy outline provided by politicians. It may therefore be worthwhile taking a closer look at the extent to which government policy making is decentralised. Do city councils really have the resources for their own UPT policy or are they hampered by national or regional constraints? How much weight, for instance, do city councillors carry *vis-à-vis* regional councillors? And when the city, as an administrative entity, is but one component of an entire urban community, are there political and administrative entities that are capable of acting on the right scale? To what extent, if at all, will regional rail services be co-ordinated with urban transport *per se*, for instance? This raises another question, of course, that of how systems are operated, but it also suggests that we bear in mind a lesson learned in public economics: while excessive government intervention may carry risks, too little or poorly targeted government intervention is a symmetrical risk that should not be underestimated.

With regard to large urban areas, the question is not just who designs UPT, but whether the entity in charge of service provision is working to the right scale or ensuring sufficient co-ordination with the neighbouring authorities, which amounts to the same thing.

Who operates UPT?

For a long time, UPT operations were closely tied in with design. Just as in railway networks there was originally no separation between design and operations, or between infrastructure provision and the operational side, in UPT systems, single operators were virtually the rule from the outset. However, the situation gradually evolved and a distinction was gradually made between owners and operators. This has led to diversification in the number of players involved, as shown in Figure 6.1 below, based on the EU's research programme named MARETOPE (Managing and Assessing Regulatory Evolution in local public Transport Operations in Europe).

Figure 6.1. **UPT systems: owner and operators**



Source: Based on MARETOPE analysis.

The columns in the figure show the distinction between ownership by the organising authorities and management by operators (private, public or a partnership between the two).

The rows, at each level, show the strategic, tactical and operational issues. The purpose of this distinction is to reveal some of the very practical issues, such as routes and fares. In other words, service provision *per se* can be broken

down into a host of separate components and the relevant responsibilities can be allocated in very different ways.

The distinction between the strategic, tactical and operational levels is interesting. A strategic situation is one in which there is some uncertainty as to the political and technical context. A purely tactical situation is one in which all of the parameters of the context are known. The difference between the two provides an insight into an initial form of responsibility sharing. The public sector, with its political and administrative components, retains responsibility for strategic decision-making. The operators merely make suggestions. While they are beginning to wield some negotiating powers on tactical issues, their real room for manoeuvre is confined to operations.

While the prime feature of this diagram is its logic, it is not set in stone. It allows the transfer of players to different levels of responsibility, and markedly alters the big picture by calling into question, for instance, direct service provision by the public sector (government department or agency) and replacing it with a concession or "public service delegation" (as in France). The UPT sector has long seen various forms of public-private partnership (PPP) aimed in particular at reducing operating costs in response to funding problems.

Who funds UPT?

By and large, UPT is expensive and the fares charged to users generally cover only a small share of the overall cost. Only a few cities in Asia with very heavy traffic receive enough operating revenue to cover not only their operating costs but also their investment costs. European cities, apart from some exceptions, are nowhere near breaking even. In most cases, commercial revenue covers no more than 50%, or even 30% of their current expenditure. The same applies to North America where public transport is heavily subsidised in that it targets what is very largely a captive market.

This means that other sources of financing have to be found. They are fairly varied and fall into the following categories:

- General taxes, by local or national authorities. In this case, the resources derived from government budgets are simply turned into subsidies.
- Special taxes, on those who benefit indirectly from UPT services.
  - One option is to tax businesses, whose employees are potential UPT beneficiaries. This is the case in urban France with the "*Versement Transport*", a payroll tax on firms with a workforce of 10 or more. This represents a substantial amount of funding, in some cases exceeding commercial revenue, and can have unwanted adverse effects on the labour market – not to mention the threshold effect which encourages very small firms to employ no more than nine people.

- In some cases, too, UPT may receive special funding, such as fines from illegal parking. Some cities (*e.g.* London, Singapore and Oslo) have introduced congestion charges for cars, some of which will go to improve public transport. In spite of initial hostility to the idea of charging urban road users, city councils are showing increasing interest in such schemes. The city of Stockholm has just launched a six-month experiment along these lines.
- Another form of special tax targets property owners. Whether it is regular (annual tax) or one-off (when new infrastructure is introduced), the idea is for the local authority to recuperate all or part of the capital gain linked to the presence of efficient UPT. Consequently such schemes mainly concern SPT, but are rather hard to organise.

- Along the same lines as capital gains, it is possible to envisage sophisticated forms of PPP, whereby the company operating SPT as a concession is also allocated a specific amount of land around the new line. It is then up to that company to utilise the capital gains on that land as a means of balancing its operating budget. This kind of scheme has been used in Asia and a few cities in the US. However, it cannot be readily brought into more widespread use.

So there are numerous different ways of funding UPT, and the fact that government subsidies and/or cross-subsidies are common shows that this is a sector marked by externalities. The idea is that the indirect beneficiaries of UPT should pay. But who are the direct beneficiaries of this kind of redistributive system?

Who uses UPT?

UPT users do not fall into a single category. To grasp just how diverse they are, we have to distinguish between cities (in terms of size, for instance), modes of transport, areas covered and even times of day.

To simplify matters, some UPT systems consist in a few bus routes, on which services are slow, infrequent and, in most cases, cheap. The passengers will generally be captive users who, for a variety of financial and other reasons, have no access to cars. They are on low incomes and are either elderly or young people who do not have access to a car. In such cases, there is almost a social stigma attached to using public transport ("I know what kind of person has to take a bus!").

At the other end of the customer scale are the users of rapid, segregated public transport systems in the larger city centres. In the heart of London, for instance, 85% of those who travel use public transport. They are probably not low-income passengers. The same applies to cities in Asia, and to most of the major world capitals. When UPT services provide comfortable services and acceptable overall journey times, the users become more high-profile. Of the 20 million US

residents who take suburban trains every day, some are private-car owners who appreciate the reliability of UPT. In the same category are the users of SPT services between city centres and major airports (London Heathrow Express, Arlanda-Stockholm, Brussels, Amsterdam-Schiphol). The overall trip speed of these links, much faster than taxis in the rush hour, is such a persuasive business argument that fares can more accurately reflect real costs.

Between these two extremes, with on the one hand subsidised less affluent, captive users and, on the other, affluent users who pay the costs they generate, a whole range of contrasting UPT situations are to be found. Some of the main differences depend on the part of the city concerned. In European city centres, UPT are increasingly used by non-captive passengers who prefer public transport to car use or even car ownership. In Paris, for instance, half of all households do not have a car at their disposal in the city – usually out of choice. This raises the question of whether fares should not be more in line with their ability to pay. Another similar question relates to the status and efficiency of transport operators. These are just two of many questions which prove that the organisational form of UPT is not set in stone.

2.2. Contrasts and change in national and local choices

The main characteristic of the UPT sector is its diversity. It is hard to compare a small town with a handful of bus routes and a teeming metropolis with several million inhabitants and dozens of kilometres of SPT. But the differences stem not just from the geographical and social background alone, but from national and local traditions. Some countries choose to maintain government-run UPT whereas others resort more to competition and private initiative. Below is a broad matrix illustrating some of the standard models that have served to organise UPT systems. It will enable us to see how organisation patterns can change.

An organisational matrix

Returning to the four key questions (who designs/operates/finances/uses UPT?) and some typical responses, we have identified four "models" or cases that will illustrate how wide a variety of situations there is. In reality, there is a continuum in UPT organisation patterns, stemming from the fact that such systems are a mix of economic, social and political factors.

The public sector model describes a situation found in many European and North American cities, where UPT is viewed more or less as a social service, and the rationale is largely redistributive. Consequently it is designed, managed and funded mainly by government.

Table 6.1. **UPT organisation: four "models"**

"Models"	Who designs UPT?	Who operates UPT?	Who finances UPT?	Who uses UPT?
Public sector (increasingly rare)	Government	Government or agency	Mainly taxpayers	Mainly captive users
Private initiative (urban minibus services in Brazil and Turkey)	Many small operators	Many small operators	Users	Middle and lower-middle classes
Public service delegation (continental Europe)	Organising authority and to some extent operators	Private or semi-private operators	Users, special taxes and general taxes	Various social groups
Allocation (*e.g.* United Kingdom, Sweden)	Organising authority	Several operators	Users and specific/general taxes	Various social groups

In clear contrast with the previous model, and in many cases set up in response to public failures, the private initiative "model" is the kind of private scheme found in some major cities in Latin America and Africa, but also Istanbul. These are based on private initiative and consist in minibus services.

Back in Europe again, there are two "models" that are fairly typical of the changes currently taking place. The first seeks to transfer the government's responsibility for operating UPT to others via public service delegation (*délégation de service public*) or concessions. An operator is chosen to manage the entire UPT network. This means competing "for the market" rather than "in the market" as in the previous example. Competition is found only at the bidding stage. Operators compete to submit the best bids.

Another way of introducing more competition while allowing government to retain much of its control over design is to increase the number of operators. In the "allocation" system, the UPT network is divided up and auctioned off to various operators in a tendering process. London, for instance, has allocated around 700 bus routes via some 500 auctions. In such cases, operators become no more than owner/operators. They have extremely little room for manoeuvre other than to cut costs, which is precisely the aim of this "model". It is also common practice in northern Europe (Sweden).

The interesting point highlighted by this matrix is that systems are not stable. As there are many sometimes contradictory selection criteria, policy makers may want to change the system to prevent it from becoming too "permanent" and favouring a specific player. The key issue should therefore be the impetus for change. Can it come from UPT policy makers alone or from private initiatives? Should these not be encouraged as a means of breaking the inertia inherent in certain models?

Uneven progress in the role of competition and private players

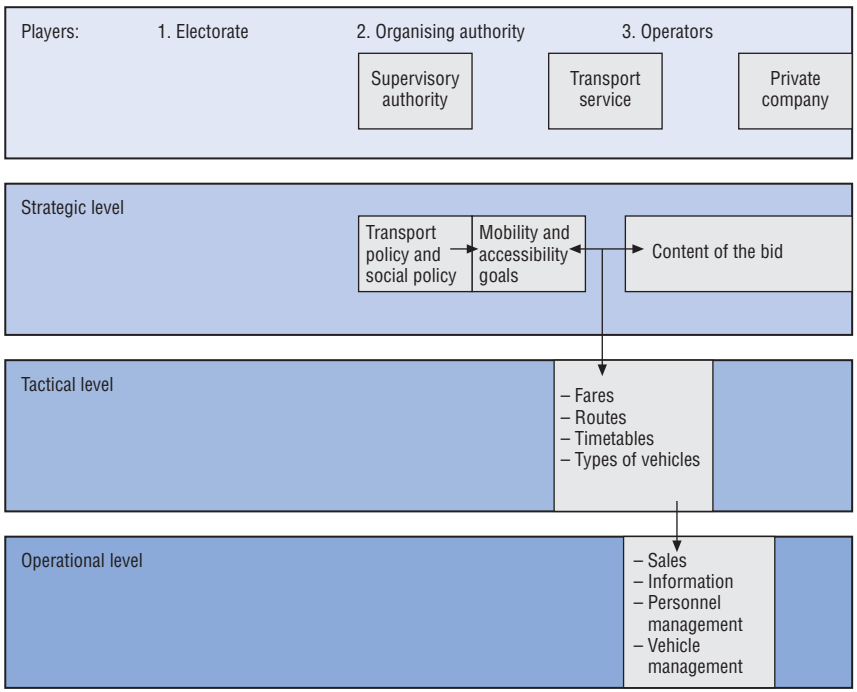
The wave of deregulation in the early 1980s also affected UPT. Private operators emerged to play a growing role in many countries and become part of vast multinational firms like Veolia, Kéolis and Transdev. But it should be borne in mind that public transport provision is still very closely tied to policy, and even politics. Elected representatives do not readily relinquish this kind of political leverage. This is one of the factors that restricts competition in such cases. Figure 6.1 shows what changes are possible in the roles allocated to each player.

A comparison of Figures 6.2 and 6.3 illustrates that there is scope for some very different options. There could be change, for instance, in the way the various responsibilities (routes, fares, transport policy) relate to one another.

In some forms of deregulation (Figure 6.2), government intervention is reduced to monitoring compliance with the rules on competition. Much of the tactical side and even some of the strategic aspects then fall to the carriers.

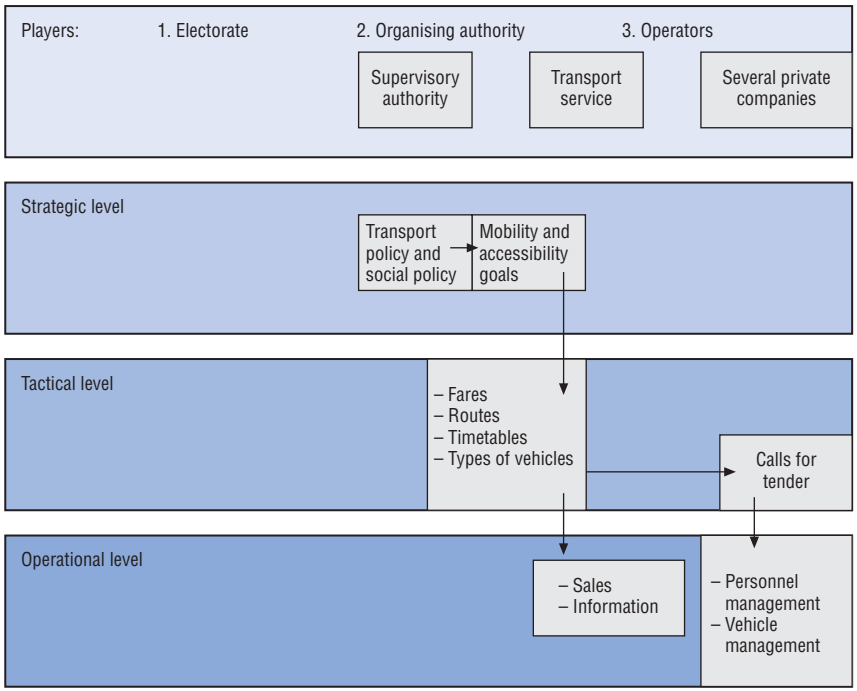
Conversely (Figure 6.3), other forms of deregulation may reduce the carrier's role to that of owner-operator.

Figure 6.2. **Transferring responsibility to the private sector**



Source: Based on MARETOPE analysis.

Figure 6.3. **Private initiative reduced to the operational function**



Source: Based on MARETOPE analysis.

So there is more than one form of private sector involvement, and the question is whether or not to give the operator a substantial role in designing the system. Clearly, there is more than one right answer to that question. It all depends on how much information and responsibility lies with the organising authority. In the case of London, for instance, it is clear that the authorities are familiar with bus management. As they are the ones making the decisions on routes, frequency and fares, it is normal for them to retain strategic and tactical decision-making powers.

But generalisation should be avoided, as the risk here is to lack critical judgement when designing the actual network. The advantage of Figure 6.2 over Figure 6.3 is that it reveals an approach that is not confined to policy alone. The operators are in a better position than the organising authorities to identify lines, routes or zones with a very low cost/utility ratio. It is the operators who know their customers and their travel patterns best. Leaving them scope to adjust provision is not necessarily a loss of power on the part of the organising authority. If the incentive arrangements have been properly devised, the efforts made by the operator should be a positive-sum game, i.*e*. improved cost-efficiency and a better situation for users and the public

Box 6.1. **Strategic questions for 2025-30**

- In the cities of the industrialised world, how much control do local authorities have over the design of UPT systems? Are they really holding the reins? If not, what should be done to ensure that they are?
- UPT systems are seldom funded by users alone. Other sources of finance therefore have to be found, one being the indirect beneficiaries. There is already some "good practice" in the form of contributions from employers or property owners. These will have to be developed. When users are genuinely in a position to pay, one option to be envisaged would be to increase their share.
- UPT remains a "policy goal" of prime importance at the local level. That does not mean that it should remain an entirely government-run concern. Recourse to private initiative and competition is possible, for instance by letting operators develop community-friendly innovation.

purse. In other words, innovation should be possible, just as it is in other sectors of the economy.

3. How does public transport contribute to urban dynamics?

Major cities are facing an ongoing challenge, namely accessibility. This is crucial, as three features now characterise metropolitan areas: urban sprawl, social segregation and road congestion. All three are accentuating distances, be they spatial, temporal or social. To prevent such developments from undermining the functional unity of urban areas, transport policies must clarify their goals, and this is where urban public transport can play a growing role. In years to come it is UPT that will be providing accessibility, the key to successful cities.

3.1. The role of transport in successful cities

Cities have occasionally been described as "organised proximity". This kind of rationale highlights the fact that urban activities are organised by combining location decisions and transport systems. The very existence of our towns and cities is based on the beneficial agglomeration effects that stem from density. We shall now look at some of the features that characterise urban density and the reasons why public transport is relevant in dense environments and, by the same token, less relevant in the kind of lower-density urban and peri-urban environments that are found in North America, for instance.

Key indicators in major cities

The information contained in the UITP (Union internationale des transports publics) database on "Millennium Cities" can be used to identify some of the salient features of cities around the world in terms of both similarities and differences. We have selected three main indicators, namely public transport use, overall trip speed and distance covered.

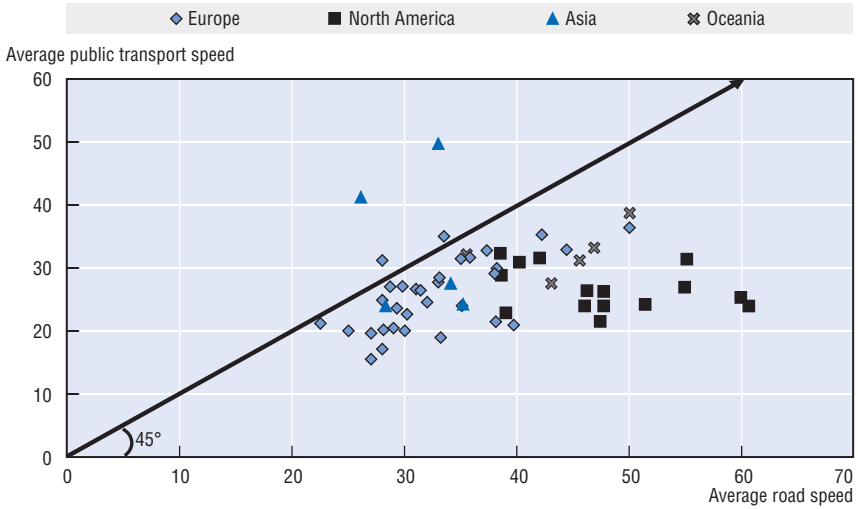
The modal share of UPT in daily urban mobility is the first sign that cities are not organised in the same way in the various geographical areas used in the UITP database. For instance, in the five typical Asian cities (Tokyo, Singapore, Hong Kong, China, Osaka and Sapporo), UPT accounts for over 50% of all passenger-kilometres in terms of motorised mobility. The ratio falls to 7.5% in five major cities in Oceania (Brisbane, Melbourne, Perth, Sydney and Wellington). Admittedly, the latter are smaller in size, which limits the relevance of public transport. But this should not mask the differences in public preferences, as in the comparison between Europe and North America.

In the UITP database, UPT accounts for only 5% of all motorised passenger-kilometres compared with 20% in the 32 European cities in the study. There is strong dispersal around the mean, and the salient features are not only national but local, as in the case of Geneva and Zurich, where UPT accounts for 10% and 25%, respectively, of motorised mobility. Across the Atlantic, UPT accounts for 12% to 13% of motorised mobility in Montreal and Toronto, compared with less than 1% in Phoenix and Houston. The latter are entirely given over to cars, which usually travel at faster average speeds than UPT. This is shown in Figure 6.4 below. With the y-axes giving average UPT speeds and the x-axes the average speed of private vehicles as indicated in the UITP database, it is easy to see that UPT speed exceeds average road speeds in only a few cities. This is the case in only two Asian cities and two European cities, those located above the first bisector.

However, we should point out that there is, here too, a substantial difference between European cities and those in North America, where the average speed of private cars may be fairly high, giving rise to a tendency to urban sprawl. This can be seen in Figure 6.5, which demonstrates the paradoxical effect of car speed. When average speeds are high, urban users tend to cover greater distances. As assumed over thirty years ago by Zahavi (1980), when the travel time budget (TTB) is constant, those who are mobile reinvest in travel the time that they save through speed. Hence the increase in distance covered, which is something of a paradox for the low-density cities of North America. It is as if the fact that North American car-drivers travel faster encourages them to cover longer distances, but also to spend more time travelling, as we shall see below.

Figure 6.4. **Overall trip speeds for UPT and private cars in 57 cities throughout the world**

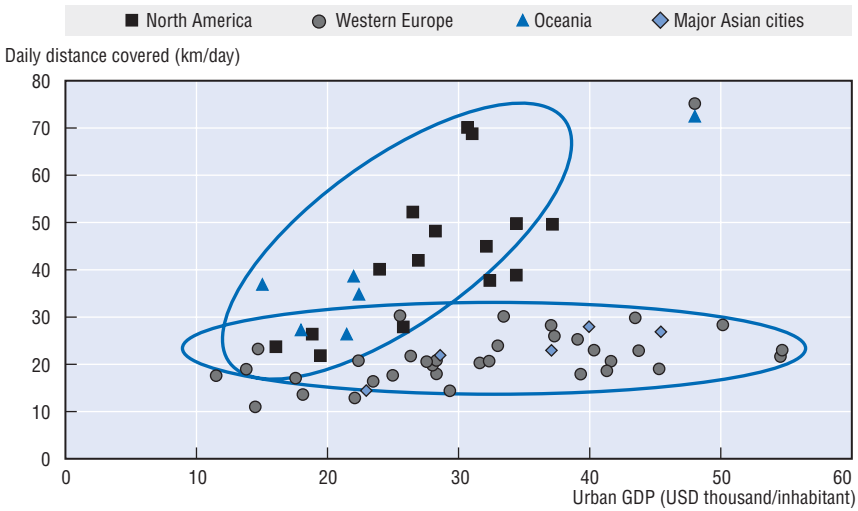
In kilometres per hour



Source: UITP database on "Millenium Cities".

Figure 6.5. **Average daily distance covered per person and urban GDP per person in western Europe, North America, Oceania and major Asian cities**

In kilometres per day and USD thousands



Source: UITP database on "Millenium Cities".

Two "urban models"?

The trend in US cities towards growth in distances and GDP is turning them into extensive entities, unlike Europe where the pattern is more intensive. Apparently, the distances covered bear no relation to urban affluence. Instead, it is linked to urban density, and more specifically job density in a specific area, but also housing density. The outcome of these highly contrasted organisational patterns can be seen in Figure 6.6. While job density varies quite widely across European cities, it almost always exceeds a threshold (15 jobs per hectare) that makes these jobs accessible without increasing the TTB. This is not true of the cities in North America or Oceania, where the lower the density, the greater the TTB.

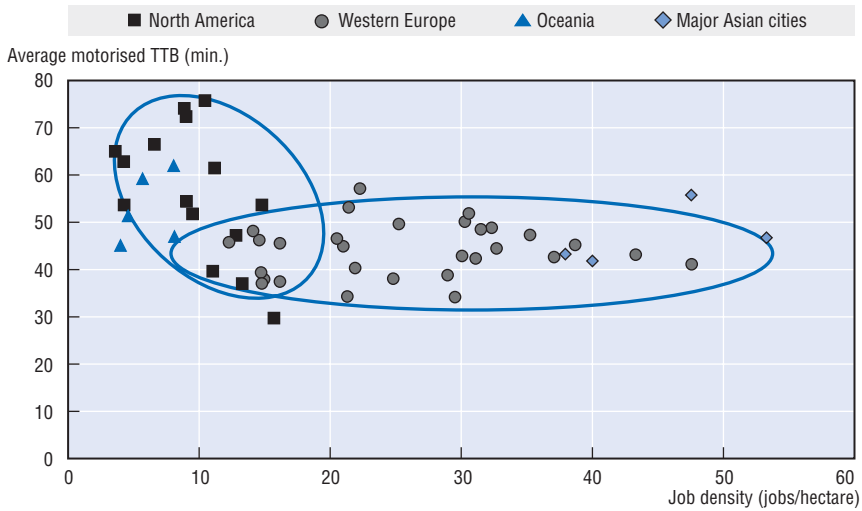
Urban models consequently fall into two broad categories:

- The "intensive" city model, denser and with greater UPT use, even if there are cars too. These are the cities in Asia and Europe.
- The "extensive" city model, where density is quite low, travel speed quite high and private car use predominant. These are the cities of North America and Oceania.

In these cities, then, space and time are expanding, and this is an issue that needs to be addressed. With time becoming an increasingly scarce and probably the scarcest resource, we should be addressing the relevance of these two urban models and the role that UPT can play.

Figure 6.6. **Motorised TTB per person and job density in western Europe, North America, Oceania and major Asian cities**

In minutes and per hectare



Source: UITP database on "Millenium Cities".

3.2. Public transport and accessibility

Whether cities are built according to the extensive or intensive model, they are increasingly having to cope with a lack of space, congestion (which suggests a lack of time) and the demands of sustainable development. For that reason, many are planning to develop UPT, in some cases as segregated PT. Going beyond the dictates of fashion and conventional wisdom on sustainable mobility, there is a need to show why UPT really does have a key role to play. We shall therefore reason on basis of the following assumption, namely that, if cities are to remain cities, if they are to continue producing agglomeration effects that benefit a majority of the population, then they should foster proximity among their residents. For a long time this issue was addressed in terms of space, but is now being approached in terms of time, via the notion of accessibility.

From proximity to accessibility: a new approach

If pedestrian cities have made accessibility rhyme with spatial proximity, motorised cities have done away with the location constraint. As far back as the 19th century in larger cities, the development of motorised transport enabled suburbs to develop at a distance from the city centre, thereby pushing back and spreading eroding the constraints imposed by a lack of space, expressed in economic terms as land rent. More recently, the widespread popularity of private cars and steady improvements in the road and motorway networks have allowed urban sprawl, or more precisely peri-urban development, *i.e.* urban fragmentation – to such an extent that most metropolitan areas no longer bear any relation to the official city limits or morphological city boundaries. It is increasingly common for people to live several kilometres, or tens of kilometres, away from their workplace, from the hypermarket where they do their shopping, or from the school that their children attend every day.

Addressing mobility merely as a transport issue, policies from the 1960s to the 1980s overlooked a hidden side effect of the drive to encourage faster travel, namely spatial and social distance. The advantage of extending the range of travel, largely thanks to cars, lies in the scope to segment (or segregate) urban functions. Today we know that there are limits to the rationales developed in the Athens Charter.[3] Dissociating housing and employment, housing and leisure or housing and stores not only puts a certain distance between urban functions, it may also put distance between social groups. Beyond the opportunities and constraints of daily mobility, cities are emerging in which the accessibility issue is becoming acute. How can we ensure that the residents of a metropolitan area, irrespective of social rank, continue to have access to all urban amenities? In other words, how do we prevent distances from growing, in terms of not only space but time (particularly because of road congestion)? This prompts another question: what is accessibility?

Box 6.2. **Accessibility: from transport costs to "density of opportunities"**

In 1959, W.G. Hansen developed a measurement of accessibility. He did this by first considering that travel patterns were proportional to the number of goods in the destination area and proportional to a decreasing function of generalised cost. He revealed the notion of choice indices by taking a transport link "ij" and varying urbanisation in "j" (*e.g.* increased job supply) and transport conditions between the two zones (increased cost of transport). He then applied the law of travel patterns to this link "ij" as follows: "For user satisfaction to remain constant (irrespective of change), any linear progression in the cost of travel should be associated with a progression multiplying the choices offered at the destination."

J.G. Koenig (1974) then formalised this second approach in an "economic theory of urban accessibility", taking up the microeconomic theory of consumption based on utility maximisation under constraints. The main purpose of the economic theory of urban accessibility is to evaluate access to jobs. To do this, Koenig assumes that consumers associate net utility (the difference between the advantages derived from a job, such as salary or job interest, and the costs relating to that job, such as the generalised cost of travel between home and work) to any job offered in the area. Koenig also assumes that the gross utility of a job is a random variable, of which the law of probabilities is a negative exponential function. The value of this theory lies in two key results. First, it establishes a link between the gravity model of traffic patterns and the microeconomic theory of consumption. Second, it allows a disaggregate analysis of utility according to various categories of consumer. However, while empirical studies have validated this theory based on microeconomic assumptions and the use of a negative exponential function for gross job utility, caution is advisable when moving from accessibility as a "service quality indicator" to its use in economic calculations aimed at assessing the economic value of a particular project.

In developing this economic theory of urban accessibility, Koenig considers a transport network as a vector of opportunities. Through the performance of a transport network, accessibility becomes a measurement of the supply of opportunities available to a household (or set of households), (Wachs and Koenig, 1979). Camagni, in 1996, takes up and develops the idea of accessibility as a source of new opportunities. For businesses, accessibility is viewed as scope to gather as much strategic information as possible before their competitors, while for individuals it is the scope to benefit from services confined to specific locations. In this approach, there is the positive nature of the accessibility concept, which is not confined to the costs inherent to any travel but also covers the advantages to be derived by the individual from using a transport network.

By establishing a link between opportunities and accessibility, these authors acknowledge the direct impact of accessibility on a person's activities. The more a destination area is accessible from the original area, the more people in that original area will increase their scope for potential activities and hence their satisfaction. This approach is in fact used in economic appraisals of urban transport projects,* which stipulate that the purpose of accessibility indicators is to measure the satisfaction that individuals derive from the transport system.

* For example, "Transports urbains et calcul économique", Working Paper No. 97-1, French Ministry of the Economy and Finance, Forecasting Directorate, Paris.

Following the work of Koenig (1974), economists and geographers were able to develop accessibility indicators, for a given point in space, by combining density and speed.

Density refers to the relative number of opportunities (including jobs and the number of inhabitants/shops/schools) in a particular area, accessible in what is considered to be an acceptable journey time, for instance one hour per day for a return journey.

Speed is a key component of the generalised travel cost, which associates monetary cost and the value of travel time. The greater the value of time, the greater the importance of speed in the generalised cost, particularly since improving speed automatically increases the accessible area and hence the number of opportunities available.

This rationale provides more insight into why government policy has been and still is drawn to the potential improvements in speed offered by new transport infrastructure. A motorway, or the widening of a trunk road, is a real step forward in terms of accessibility. The accessible area, and hence the scope for choice in terms of housing and potential jobs, grows substantially with the provision of rapid modes of transport. But this tendency to increase car speeds to enable users to "save time" runs up against two problems:

- First, it increases both spatial and social distances, while paradoxically increasing daily travel times. This steady creep tends to cause urban fragmentation, as in some North American cities where the growing number of "gated communities" is a negation of what cities should be.
- Second, it is an underlying factor that accentuates congestion, particularly for access to denser areas, density being the key feature of attractive cities.

It therefore comes as no surprise that, in dense urban areas, government policies have undergone a major shift. Without disregarding the lessons learned on accessibility, it is as if elected city representatives in Europe but also in Asia had ceased to bank on speed at any price and were instead opting for density and to reliability.

By developing relatively slow modes of transport such as tramways, new mobility policies have suggested that city-dwellers reconsider how they view accessibility. Rather than focusing on speed, and the distance it provides, residents are invited to make choices that reflect the advantages of density and to some extent proximity. There is accordingly a move towards denser urbanisation in the areas served by the new tram lines.

When warranted by the size of the city, in terms of both the distance to be covered and the number of daily commuters, the chosen option will be forms of SPT that move people faster than tramways. This will involve underground and regional express trains, a field requiring substantial investment in all of the world's major cities.

As if to show that reliability and speed were now the prerogative of public transport, many large cities have opted to curb or reduce average car speeds in urban areas by choosing not to reduce congestion. The initial grounds were road safety and the environment, but the main reason has been to break the spiral whereby increasing road capacity gradually induces traffic growth (see the Mogridge conjecture[4]).

Care should be taken not to be misled by the few cities that have introduced urban traffic charging (*e.g.* Singapore, London, Stockholm, Oslo, Bergen and Trondheim). In the charging zone, the aim is of course to keep traffic moving fluidly and thus at a guaranteed speed for those travelling by car. But this option is only available to a small section of the population. For the majority, it is public transport that will be ensuring access to urban opportunities. Controlling car flows by charging, as in London, or by road restrictions, as in Paris, are only two partially different forms of response to the same question, namely accessibility.

In the case of London, it should be borne in mind that the number of jobs in the "charging zone" far outstrips the number of residents (who pay only 10% of the daily EUR 12 charge). The purpose of charging is therefore to guarantee car access for a minority of working people with a high time value, the idea being that this will produce surplus revenue which goes to improving access by public transport.

In Paris, the ratio of residents to jobs is higher than one. This has dictated another rationale, whereby non-residents are dissuaded from driving into the city and invited to travel through Paris via public transport which, as explained above, is not financed solely by the city. Consequently, Paris has no objective reason to introduce charging.

The question of whether or not to introduce urban road charging is not the crux of the issue. The decisive question for the future of our cities is the quality of public transport and the accessibility it will provide.

Public transport and accessibility

The future of UPT lies in its ability to improve access to the denser urban areas with their wealth of jobs, shops, housing, entertainment and other urban amenities. Urban policies, particularly those promoting mobility, will therefore have to find a better fit between PT accessibility and the average speed of car trips.

Government policies should stop trying so hard to maintain car access over ever-vaster areas. On the contrary, they should try to foster – in conjunction with existing policies that promote public transport in the core cities of conurbations – improvements in public transport access for links between the centre and the outskirts. This would keep both jobs and residents in the core city, without creating a spatial, temporal and social divide with the outskirts, which by their

very nature exist only in relation to the centre. Thus cities, or metropolitan areas, will extend beyond what are increasingly theoretical administrative boundaries and retain their functional unity. That unity should also be addressed in terms of the travel time budget, a neglected but vital factor in sustainable mobility.

Time has long been a factor in transport economics. Price-time models were developed in the 1960s and are now quite robust. But the basic assumption behind those models is that improving speed is a way of saving time. The travel time budget (TTB) is therefore viewed as a variable which consumers seek to minimise. Without denying the fact that consumers seek to maximise utility, we should nevertheless remember that the travel time saved through increased speed is usually reinvested in longer distance or in further travel for a new activity. This is what economists call the "Zahavi conjecture".

Without asserting that Zahavi's assumption is universal and irrefutable, we can nevertheless use this simple idea as a basis for understanding key mobility trends, which can be summarised in two terms: relatively constant TTB, and the search for increasing returns to public transport.

If individuals reinvest the time they have saved in a new journey (the constant TTB hypothesis), any improvement in car speed will translate into longer overall travel distances and increased demand for roads.

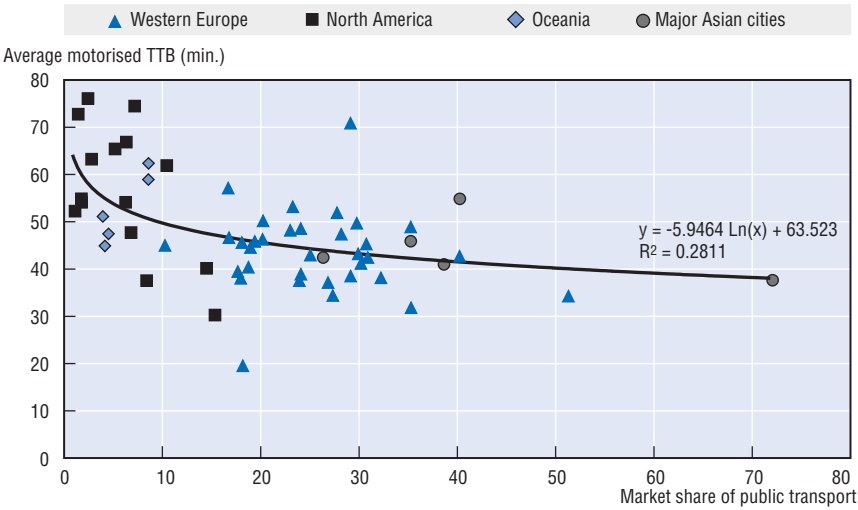
But as cars are not full, those roads are increasingly costly and cannot deal with the growing traffic flows. The decreasing returns to road infrastructure then become apparent in the form of congestion. City centres, in the rush hour, are functionally isolated. The time required to reach the centre by car is becoming longer and increasingly uncertain. Only SPT can offer the average speeds and reliability that will protect residents from growing uncertainty about travel times.

Consequently, rather than discussing the need for a modal shift to PT largely on environmental grounds, it would seem more relevant to explain that a modal shift would guarantee urban accessibility for the majority. The new phenomenon here is that roads, which dominated urban history in the 20th century, are no longer viewed as the travel mode of the future. For long-distance travel, they have been replaced on the high-speed list by air travel and high-speed trains; and for urban travel, congestion makes roads less attractive than SPT, provided it has been modernised and the network expanded.

So, by tying the idea of accessibility (travel time plus opportunity) in with the Zahavi conjecture, we can see why road use is now reaching certain limits in urban areas and why UPT should tackle the accessibility challenge. It is public transport that should increasingly be responding to the many challenges raised by the new scarcity constraints: scarce public funding, scarce environmental resources, lack of space, and – last but not least – loss of valuable time. Yet, as Figure 6.7 below suggests, is it not the cities with good public transport systems that are best at helping residents to control their travel time expenditure?

Figure 6.7. **Motorised TTB per person and market shares of public transport in western Europe, North America, Oceania and major Asian cities**

In minutes



Note: TTB = travel time budget.

Source: UITP database on "Millenium Cities".

Figure 6.7 gives some unexpected results. It is usually accepted that for the same journey from A to B, door-to-door car use will on average be faster than public transport. Although this is often confirmed by our mobility patterns, there are still two points to bear in mind:

- The first is systemic and has already been mentioned above in respect of the distinction between extensive and intensive urban models. The latter offers less incentive for mobility, precisely because urban density is greater. There is more travel on foot (not included above) but it is spontaneously regulated, more than car mobility.
- The second is forward-looking and refers to the fact that, for certain types of travel, particularly from the centre to the outskirts, the door-to-door speed of SPT exceeds that of car travel in the rush hour. So on airport routes, for instance, airport officials and city councillors alike are doing their utmost to develop rapid SPT links. The presence of such links in London, Stockholm or Amsterdam has become a key factor in making those cities and their airports attractive.

This last example symbolises the expectations placed in public transport systems, for today's demands on them in terms of efficient airport links are tomorrow's demands over the next few decades in terms of the many strategic

Box 6.3. **Strategic issues for 2025-30**

- The appeal of a city has always been linked to agglomeration effects. Bringing together people and activities creates a host of opportunities. But this "organised proximity" is now being threatened as much by urban sprawl as its corollary, road congestion around city centres. The new dynamics of UPT seeks to meet the challenges posed by congestion and rising TTB.
- Grasping the potential role of UPT in large conurbations means reasoning in terms of accessibility. In order to tackle road congestion, even if flows are controlled by charging, it is up to UPT to provide the fullest possible access to the city and its denser areas. This can even be done by proposing faster and more reliable overall trip times than private cars.

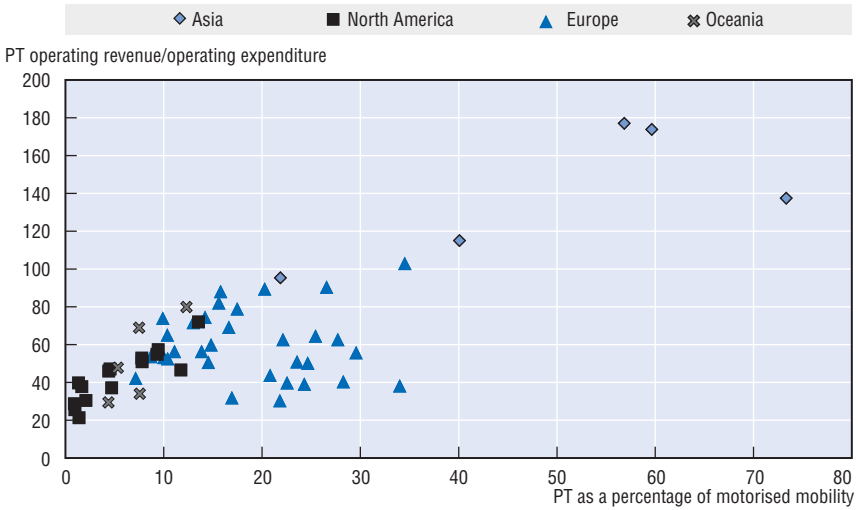
links within metropolitan areas. It is public transport that will be making our cities accessible and attractive in the 21st century. They will accordingly face a host of challenges, most of them relating to organisation and finance.

4. Organisation and financing of public transport: new requirements

Given the changes in how cities work, and more specifically the factors that foster urban sprawl and road congestion, the role of UPT is going to become increasingly critical for certain forms of mobility. As a result, the capital investment needs are enormous. But this is no reason why investment and operating costs should start to get out of hand. Cost control is therefore vital. But the question of pricing and user contribution must also be posed, as Figure 6.8 suggests. Along the vertical axis we find the R/E ratio, *i.e.* operating revenue divided by operating expenditure; and along the horizontal axis is the market share of UPT in the major metropolitan areas. The relationship between the two variables is obvious. The coverage rate, or R/E ratio, tends to increase as UPT accounts for a larger proportion of motorised mobility.

But deviations from the overall trend are just as important to study. Amongst the group of European cities in particular, we see many cases that depart significantly from the regression line. In other words, whereas UPT market shares are in these instances relatively high, the R/E ratios remain low, which can be explained by either excessively high operating costs or an excessively low level of fares, or by a combination of both. We must therefore address these two questions in turn. We shall begin by looking at ways to enhance the efficiency of UPT by exploring possible adjustments to business models, after which we shall turn to sources of financing, pricing and other factors. In both cases we shall be looking for changes that could make UPT financing more sustainable.

Figure 6.8. **UPT market share and R/E ratio**



Source: UITP database on "Millenium Cities".

4.1. *Looking for ways to improve UPT performance*

In discussing the performance of UPT, it must first be made clear that there are many sources of UPT efficiency or inefficiency. We shall of course be looking at the companies that operate UPT and how they could be prompted to cut their costs without impairing the quality of service. But the firms we are dealing with here are not ones that are driven spontaneously by a self-regulating market to seek productivity gains: by breaking down the cost structure of UPT, we shall see that the business models in question are still very heavily dependent on government policy making, which is not geared spontaneously to a quest for efficiency.

The cost and supplemental cost of urban public transport

It is a given that public transport is costly in terms of public funds. As shown by Figure 6.8, few cities succeed in generating sales revenue that covers, let alone exceeds, operating costs. And spending on infrastructure is in virtually all cases financed by government subsidies. These subsidies are sometimes deemed exorbitant,[5] but such a claim needs to be put in perspective by comparing the subsidies with parallel spending on roadway infrastructure, which provides motorists with substantial benefits while, exceptions apart, imposing no across-the-board infrastructure toll charges. Our intention here is not to point a finger at any given government subsidy, but to show why it would be fairly easy for spending earmarked for UPT to get out of hand, generating supplemental costs that would be as easy to spot as they are difficult to combat.

Let us begin with capital investment costs, which can be broken down into two main categories: infrastructure and rolling stock.

- Infrastructure costs are low if there is no reserved-track public transport. More specifically, these costs are included in aggregate roadway expenditure. Nevertheless, outlays for items such as bus shelters and bus stations have to be added in. But facilities such as these, which in some cases pay for themselves via advertising (as do bus shelters), do not entail substantial expenditure if there is no reserved-track public transport. Consequently, it is only large metropolitan areas (that do have this type of transport), which must engage in substantial capital investment for UPT. In this case, however, the question arises as to the risks of overinvesting.
- The cost of rolling stock can also trigger supplemental costs. Whether these assets (buses, trams, metros, trains, etc.) are wholly owned by the local authorities or are provided by a private entity, lessee or operator does not alter the fundamental question: how to avert the risk of overinvesting? When the decision to acquire lies entirely with government, there are strong pressures to channel spending towards the most costly models (using clean energy and providing low floors in buses and tramways, for access by people with reduced mobility in particular). Since they are supposed to set the example in the realm of sustainable mobility, governments are prompted to act as guinea pigs by disseminating new technologies or, very simply, protecting market outlets for local or national vehicle manufacturers.

But the most widespread of these traditional tendencies of bureaucracies to spawn supplemental costs and excessive quality lies only indirectly in rolling stock. The main cause is actually in the tendency to increase the number of lines and frequencies in areas, or at times, when UPT occupancy rates remain very low. Thus in many metropolitan areas there are public transport lines that it would be preferable, given their amount of use, to replace by transport on demand – and this brings us to operating costs.

UPT operating costs have two main components: labour and energy.

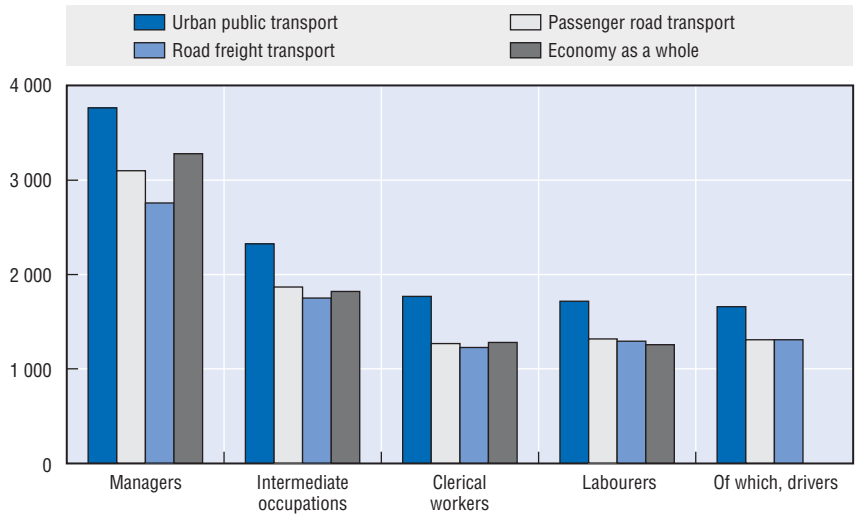
- With respect to energy, it would be possible for operating costs to trend downwards, although the savings might be used up, in full or in part, by a rise in capital investment costs if they stemmed from the purchase of new stock. Given the current increase in fuel prices, the cost of energy is on the rise, in absolute value and in relative terms, but it is still easier to control than the other major component of operating expenditure – wage costs.
- Total wage costs, including social security and pension contributions, account in many cases for over 60% of aggregate operating costs. They

therefore have a major impact on total cost, compounded by the fact that they are difficult to reduce, in terms of either staff numbers or unit costs.

- The number of employees depends first on the volume of jobs on offer, but it is also directly tied in with productivity, *i.e.* primarily the length of the work week, the number of holidays and the volume of compensatory leave. Since the rate of union membership is generally high, and since strikes (when authorised) have a major impact in the media, the occupations concerned frequently obtain substantial relative advantages.
- The same holds true for compensation. For the same reasons as above, employees in the UPT sector are in a position of strength to obtain higher average wages than for equivalent occupations, as compared with either the economy as a whole or other components of the transport sector. This is shown, in the case of France, by Figure 6.9.

Figure 6.9. **Average net monthly salaries of full-time employees in 2000**

In euros



Source: INSEE, derived from annual company reporting ("DADS" surveys). INSEE (2003), Table C.03-3 and DAEI/SES-INSEE (2003), p. 88, Table III 2.6.

We are thus in a delicate situation because whatever transpires in the realm of labour relations is a reflection of what prevails over all decisions affecting public transport. Just as elected officials are prepared to disregard expenditure in order to acquire the most modern equipment or make costly urban investments in new infrastructure, they have a tendency to forget about economic constraints when setting headcounts and unit salaries. Here, it is not

the market that dictates its law, but rather political and labour organisations, which tend frequently to agree on a consensus of underproductivity.

To guard against this tendency, a country like the United States, which has a flexible labour market, undertook back in the 1980s to limit the burden of payroll costs. Hiring women and part-time workers such as students effectively stemmed the rise in unit wage costs. At the same time, a variety of measures were taken to combat absenteeism and bolster employee commitment to the quality of services rendered. The United Kingdom followed this model in part, focusing more on working hours and organisational aspects than on unit salaries. But the UK was an exception amongst European countries, which held on to their more highly regulated job markets.

There are, however, a number of notable differences. Countries such as France and Italy have made no attempt to alter the UPT sector environment: labour unions remain powerful, their demands are great (lowering the retirement age to 55, or even 50; higher wages; shorter hours), and strike days abound. The same does not hold true in a country like Germany. While not engaging in US-style downsizing, German – but also Swedish – transport companies found themselves compelled by the opening-up of competition in the form of allotment to improve productivity without necessarily raising pay. The current discussions over a certain increase in working hours in Germany illustrate this new state of affairs resulting from incremental adjustments. Whether it takes the form of an Anglo-Saxon-style "big bang" or a gradual acclimatisation, will the opening-up to competition be capable of altering business models while sparing public finances certain costly increases in expenditure?

Opening up to competition: towards greater efficiency?

Competition is the keynote in the wave of deregulation that has swept through the industrialised world for the past quarter-century. A hidden motivation of the major comeback of this principle laid down by the founders of economics is a desire to rectify instances of bureaucratic and oligopolistic drift. As a result, competition has regained its place as the economic hallmark of network industries (water, energy, telecommunications, transport and so on). But in economic theory itself, competition takes a variety of different forms, and it does not eliminate government intervention, which in turn takes a variety of different forms, between which the choice is not readily apparent.

As is their custom, economists have proposed not one but multiple solutions to develop competition and improve the performance of firms operating in network industries.

The first idea is simply privatisation. Private management of a market activity generally outperforms public management, which is less sensitive to risks of losses and less apt to drive employees to show what they can do. But

this "solution" proves impossible in a context of network activities in which increasing returns to scale prevail. What should be done, for instance, in the case of a natural monopoly, or a quasi-natural monopoly, as is often the case with UPT?

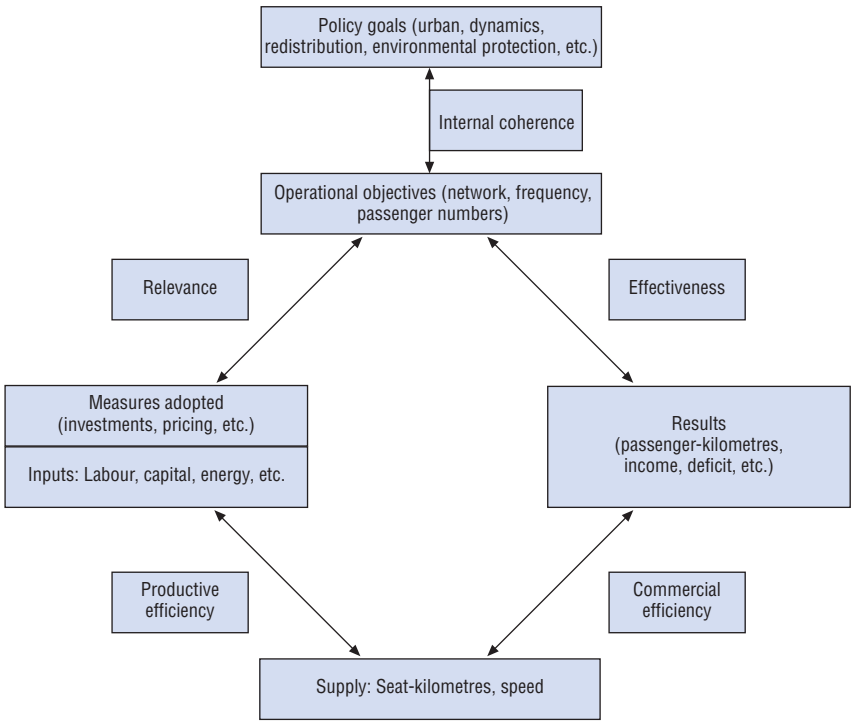
Here is where the theory of contestable (or disputable) markets, which emerged some twenty years ago, comes in. In the early 1980s, Baumol, Panzar and Willig substituted the idea of contestability for the idea of actual competition between a large number of competitors: the mere threat that a potential competitor might enter the market is enough to make the incumbent firm behave as if it were already in a competitive situation. Here the notion of barriers to entry becomes paramount, since any obstacle to a potential competitor's threat will cast doubt on the very principle of contestability. For this reason, the European Union has placed great emphasis on third-party access to networks, as we shall see later.

But contestability is not the only way to harness threats of competition so as to prompt players to improve their performance. Sometimes competition "by" the market has to be replaced by competition "for" the market (Demsetz, 1967). The community conducts a call for bids whereby operation of certain activities is contracted out to operators who are required to meet certain specifications at the lowest cost. It is this third type of competition that is practised most widely in the UPT sector.

It should be noted that in such a situation of Demsetz-style competition "for" the market, it is also possible to practise a complementary form of competition called "yardstick competition" (Shleifer, 1985). This consists in comparing the performance of various operators in comparable situations in order to uncover best practices.

With this in mind, we can seek out the various business models, taking care to distinguish between operators and the organising authorities. Given the eminently political nature of the supply of UPT, we cannot restrict our focus to operators alone. The hallmark of competition "for" the market is in fact the ongoing action of government, which cannot afford simply to privatise and then wash its hands of subsequent developments. On the contrary, public players, both upstream and down, retain an important role in laying down the rules for sector in question. We are not therefore in the classic agency theory situation that prevails when a principal delegates completion of a given task to an agent. While there is indeed delegation of a task, and that delegation can be evaluated, as we shall see, government action itself must in turn be evaluated because it plays a key role in determining the business model of UPT. As in Figure 6.10, we are going to explore ways in which competition can improve overall performance by working on one of the organisational components of UPT – efficiency.

Figure 6.10. **Coherence, relevance, efficiency and effectiveness of UPT**



There are three key concepts for assessing the performance of organising authorities: relevance, coherence and effectiveness.

- Relevance concerns the relationship between policy goals and operational objectives. Do these match policy goals with regard to the environment or redistribution, for example.
- The concept of coherence involves comparing the resources adopted, in the broad sense of the term, with operational objectives. Have sufficient resources been provided to achieve goals?
- Effectiveness involves comparing the results of the operational objective.

These concepts of relevance, coherence and effectiveness are not the same as the overall efficiency of operators which can be broken down into two main parts, productive efficiency, which compares inputs and supply, and commercial efficiency which compares supply and passenger use.

Competition is usually introduced into UPT systems in the lower section of the diagram, in a very gradual way. Using an operator other than the administrations themselves can give increasing responsibility to the operator depending on the type of contract between him and the organising authority.

Other "management" contracts, operators are sure that their costs will be covered by the communal authority. This is the same situation as for managers who are directly answerable to the administration. In these cases, there is zero competition.

A second type of contract, "fixed-sum" contracts, provides a greater incentive for operator efficiency. The amount paid by the organising authority to the operator is fixed in advance in line with the anticipated costs, and therefore supply. This means that if management is poor, losses will not be met out of the public purse as in the previous case. Operators here are responsible only for productive efficiency, and assume the industrial risk.

In a third type of contract, the operator takes on both the industrial and commercial risks. These may be called "fixed-compensation" or "at risk and peril" contracts inasmuch as the operator, subject to the specifications regarding the content of supply and pricing, enjoys greater freedom as to how to achieve the objectives laid down.

As shown in Table 6.2, taken from the MARETOPE European research programme, there are different degrees of openness to competition. In many European countries, with the exception of the United Kingdom, deregulation is still in its infancy.

Table 6.2. **UPT competition and deregulation in selected European countries**

	Deregulated and free market	Transition towards tendering	Mixed public/private regime without tenders
Countries	UK.	Scandinavian countries, Netherlands, France.	Germany, Italy, Portugal, Belgium, Luxembourg, Austria.
Similarities	Private initiative. Deregulated market. Tenders for loss-making lines	Public tendering introduced (S). Not yet applied everywhere (FRA, NLD).	Not (yet) privatisation of (some) public companies. Not (yet) transition towards tendering.
Differences		Some countries already "in the new" (S). Some others in the middle of transition. France, still a lot of direct concessions.	Some experiments with subtendering of operations (BEL). Some countries already have legislation to introduce compulsory tendering (AUT, ITA).

Source: MARETOPE, D2 Report.

The development of tendering is one way of getting operators to be more efficient. This was shown by a study conducted in France of 135 towns with a bus network (not public transport on dedicated infrastructure). The technical efficiency of operators (level of supply compared to inputs) is slightly greater when the organising authorities have called for tenders in which the operator assumes the industrial risk or both the industrial and commercial risks. But

the differences are not very large from one type of management to the other. Thus, the UPT sector shows similarities to the water sector for example. In both cases, it cannot be said that public production (under state control[6]) is always less efficient than private production since it all depends on the type of contracts and the incentives involved. Thus, still with regard to France, Marc Ivaldi showed that price contracts had a more favourable impact on UPT than cost plus ones.

Box 6.4. **Cost plus or price cap? What remuneration should the operator receive?**

With regard to remuneration of the operator, what types of incentive are the most effective? There are two possible methods here: *cost plus* or *price cap*. While, as we shall see below, the latter usually seems preferable, large areas of doubt remain as to its implementation. The cost plus method, which applies in the case of "fixed price" contracts, involves fixing prices in line with costs, at the same time guaranteeing for the operator a given and "reasonable" yield.

Although this approach seems at first sight sensible, there are many limits to it:

- The public authority must be in possession of a complex information system relating to operational costs, capital cost, assets required, etc.
- Not having any direct control over this information, unlike the operator, the authority is at an informational disadvantage. The operator might be tempted to inflate his costs and/or expenditures, passed on to passengers, without the authority being able to verify this or use dissuasive measures.
- If, in order to keep costs down, the regulator increases constraints too much, there will be a risk of underinvestment or under maintenance on the part of the operator.

The main drawback with the cost plus method is therefore that it offers no incentive to cut costs, thereby encouraging increased productive efficiency. To overcome these shortcomings, the price cap method* is the most commonly used form of incentive regulation. In the case of UPT, it sets in advance a ceiling on the amount of subsidy (fixed-compensation contract) in the knowledge that the fare levels are also fixed. In this way, prices are no longer subject to costs, any reduction in which is to the advantage of the operator. The operator therefore runs a risk with the price cap method (costs higher than prices), but also has the chance to make significant profits in the event of productivity gains. This has an impact on the public authority, the quality of whose work will be judged on its ability to maintain profits at a reasonable level.

* "Fixed cost" is often used instead of "price cap".

The form and content given to contracts following a call for tender are therefore very important. It can happen that the authorities are not demanding enough. What is more, as was confirmed in the French case, they are not faced with many competitors.[7] There is therefore a risk of cartels in the tendering process. As in the water sector, once again the tendering procedure is not a panacea. Far from discharging the public authority from its responsibilities, it results, as shown in Figure 6.4, in the operator being responsible only for efficiency. The requirements relating to coherence, relevance and effectiveness remain the responsibility of the public authorities. We should bear this in mind when looking at the way in which the European Union is pursuing a policy of opening UPT markets to competition.

The European draft regulation on public service obligations (PSO)

For some years, the European Commission has worked on introducing a certain degree of competition in the UPT sector. Considered as foreign to the concept of profit-making, UPT systems had been excluded from competition rules by European Regulations of 1969 and 1991 (1191/69 and 1893/91). But deregulation in the United Kingdom showed that other organisational formulae were possible while, at the same time, several studies showed that competition could be used to achieve efficiency gains. In addition, in 2003, in the Altmark judgment, the Court of Justice of the European Communities held that subsidies paid to an operator in charge of loss-making UPT lines should be assessed in comparison with an average, well managed and adequately equipped enterprise. This decision created a degree of legal uncertainty inasmuch as it became possible to contest the amount of certain subsidies before the courts. Such proceedings are naturally very tempting against operators who are given large subsidies and who are sometimes suspected of reaping profits on a protected market which means they can put in the lowest bid in response to certain calls for tender.

On 20 July 2005, the Commission therefore proposed a draft regulation concerning the public transport of passengers by road and rail. The purpose of this regulation is to harmonise and clarify the conditions for competition in the supply of public transport services in order to ensure greater transparency about the obligations of public service and the remuneration of services. The European Union has opted in favour of "regulated competition" which recognises the specificity of public subsidies in support of the supply of economic services of public interest. There is therefore a need to clarify the rights and obligations of each party in the knowledge that the social and territorial objectives specific to each competent authority are recognised. Encouragement is thus given to public service contracts which clearly identify SSOs and their costs.

In compliance with the principle of subsidiarity, the draft regulation gave territorial authorities the flexibility needed to meet the specificity or complexity of local public transport needs in line with their social cohesion and territorial objectives. Local authorities are thus given the right to choose the way in which their public transport services should be managed, in accordance with the legislation of most member states. Although authorities therefore are free to choose a management method, they must comply with the rule of geographical containment for internal operators (Article 5.2). This means that no enterprise, notably if under state control, can reply to a call for tenders if, in its area of origin, it benefits from a delegation of public service without any competitive process. The idea is to put an end to suspicions of "incompatible" aid while preserving recourse to an internal operator and margins of flexibility in the tendering process. Public service contracts can give rise to negotiations (Article 5.3) or be replaced by direct assignment in the event of an interruption of services (Article 5.5).

Thus, the draft regulation protects the room for manoeuvre of organising authorities which underlines their key role, and thus their responsibilities, which operate on two levels:

- *The level of operation*. If territorial authorities decide not to make a call for tender, they must keep a watchful eye on the questions of efficiency.
- *The level of the conception of the TCU offer*. Whether there is a call for tender or not, authorities are responsible for the coherence, relevance and effectiveness of TCUs.

It is therefore essential to undertake benchmarking studies not only about the efficiency of operation but also the relevance of the choices made earlier. Among these choices are the questions relating to financing and pricing.

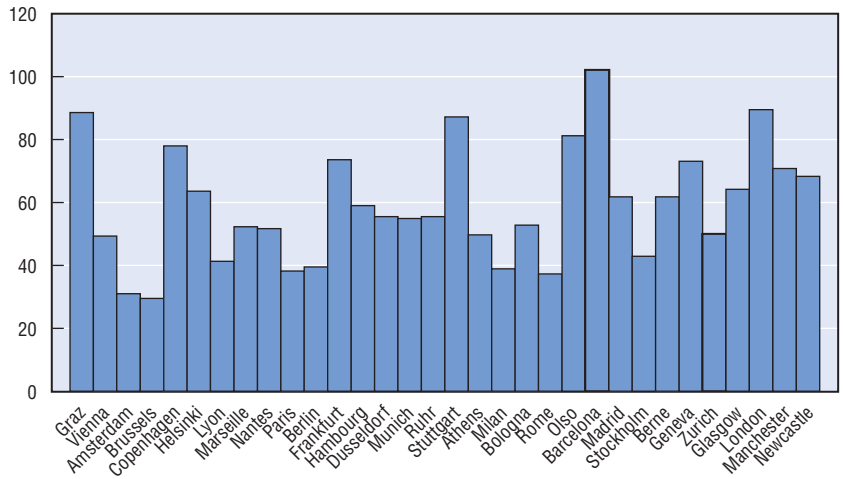
As was shown in Figure 6.8 there are wide differences across western cities with regard to financing and pricing. While there is an obvious distinction between North American cities, where the R/E ratio is low, and cities in Asia, where this ratio is high, sometimes even above 100, the situation in European cities is less clear. It is easy to say that in Asia, the large market share of UPT is the key to its sizeable commercial revenue and that, conversely, the marginal role of UPT in North America explains its poor commercial record. But why, in Europe, is there such a difference between Barcelona and London on the one hand (R/E ratio of 102% and 89%, respectively) and Paris (38%), Amsterdam (31%) and Brussels (29.5%), on the other?

The main conclusion to be drawn from this diversity is that cities are not condemned to suffer a situation in which commercial revenue is very low. But this requires taking some clear decisions on UPT pricing and financing and on fare levels for urban journeys in general.

Pricing and other forms of financing

It could be thought that the large subsidies given to many UPT systems means that it is impossible to increase the share of commercial revenue. But the examples of London and Barcelona show that this is not the case. If these cities have achieved a relatively high R/E ratio, it is because they have not hesitated to introduce higher fare levels. Comparing Figures 6.11 and 6.12, it can be seen that the average price of a PT journey, expressed as a proportion of GDP per capita of the city in question, is significantly higher in cities like London and Glasgow.

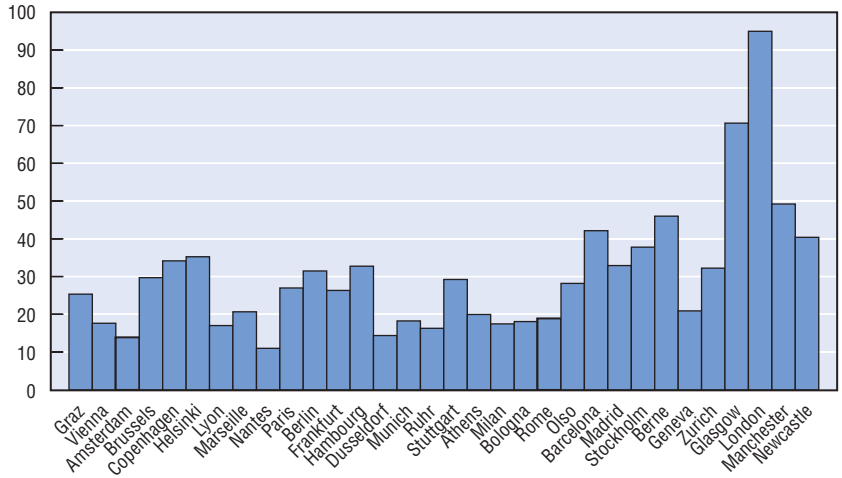
Figure 6.11. **R/E ratio in large European cities**



Source: UITP database on "Millenium Cities".

It could be tempting to point to national specificities. The cities in the United Kingdom (the four columns on the right) are visibly more demanding of their users than is the case in France, particularly in Lyon or Nantes. But national traditions cannot explain everything. UPT in Berne, for example, is twice as "expensive" for users as in Geneva. In Germany also, Berlin and Hamburg are twice as expensive as Dusseldorf and Munich. Organising authorities therefore need to think about the level of their operating revenue but not on the basis of the extreme case of the sell price for individual tickets. This latter is only one component of the fare structure. The problem is often to be found in the extremely low price of travel passes or special fares. Is it justified to offer such low prices to the whole population, including people on middle and high incomes? The organising authorities responsible for setting fares must reflect on these issues, especially when their customer base evolves and is increasingly composed of persons with money.

Figure 6.12. **Average fare for a UPT trip**
As a % of 1/10 000 of per capita GDP



Source: UITP database on "Millenium Cities".

The R/E objective is not to reach 100% (or even more if it is wanted to cover investments) nor should it be to approach zero (see box). The idea is simply that public authorities should think about what level they want while avoiding, as far as possible, any move towards "fiscal translation". There is a constant search for sources of financing other than direct users as a positive external effect of UPT. But while it may be legitimate to obtain financing from indirect beneficiaries (real estate owners, employers), the distorting effect of certain taxes must also be taken into account. Payments by employers are particularly relevant here. Questions have to be asked when, for example, the French transport payment (*Versement Transport*) levied on employers with more than ten employees led to a disincentive to job creation. To answer these questions, account has to be taken of all modes of urban mobility and thought given to the validity of the all too often implicit principle that mobility should be subsidised.

Towards an integrated approach to fare setting?

Rising oil prices have been a constant since the early 2000s. This translates, for motorists, into more costly mobility which represents a break with 1985-2000 trends. Following the oil counter-shock of the mid-1980s, the price of petrol, in constant terms, was tending to fall as was the price of cars once the quality effect was discounted. Adding to this trend towards cheaper automobile mobility was the steady increase in average speeds resulting in network improvements. In terms of generalised cost, meaning monetary cost plus the cost of the time spent travelling, automobile mobility does became increasingly competitive. The car therefore increased its market share in both urban and interurban transport.

Box 6.5. **Free UPT for all: a bad good idea!**

Given the R/E ratio and the desire of some politicians to encourage the use of public transport, the argument is often made that UPT should be free of charge. It is so already in many cities for unemployed persons or those without resources. So why not extend this to everyone, thereby saving on the costs involved in issuing and checking tickets? Although this seems an attractive idea, and has been tried out in cities as different as Odessa (Ukraine) and Atlanta (USA), it usually gives rise to perverse effects resulting in a worsening of the UPT situation in general.

The first obvious example of this is the reduction in UPT resources and therefore capacity to invest. But the main problem is the impact on users and staff. As could be feared, in light of the work done by Hirshmann (Exit, Voice and Loyalty), making UPT free of charge leads to staff becoming demotivated and to deviant behaviour on the part of many users. Contrary to expectations, motorists do not give up their cars and switch to public transport. What happens is an overuse of UPT by a marginal population which discourages other potential users.

As described earlier, this situation is gradually changing, both for long journeys (because of rapid forms of transport such as aeroplanes and high-speed trains) and for daily travel, which is what interests us here. In the case of car journeys in cities, both facets of the generalised cost are on the increase: the cost in terms of time, due to growing congestion on the roads at rush hour, and the monetary cost, given the rise in petrol prices and in ancillary costs such as parking and, in some cases, urban tolls.

In sum, UPT financing and pricing can no longer be addressed as issues relating to UPT alone. Policy choices in this field cannot be dissociated from the general objectives adopted by a metropolitan area in terms of accessibility, attractiveness and sociability. The multiplicity and ranking, often implicit, of objectives explains why sources of financing, as well as their combination, are varied. Contributions by UPT users and by motorists must not be neglected. Nor should there be any hesitation in taxing the indirect beneficiaries of the transport system, employers and real estate owners, while avoiding as far as possible distorting or penalising measures.

5. Public transport and sustainable urban mobility

As we reach the end of this prospective overview, issues relating to UPT financing, pricing and organisation must be viewed from the more general perspective of urban policy. As our discussion has progressed, it has become increasingly clear that UPT primarily fall under the category of public goods, in

Box 6.6. **What type of urban toll?**

When looking at the whole of an urban system and not simply at a particular main road, it becomes very difficult to combine the objectives of increased fluidity, infrastructure financing and financial (and modal) transfer. The pressure from the demand for travelling by car remains very strong and any local improvement in fluidity leads to an overall increase in traffic. Other than providing systematically for overcapacity on the network,[1] or imposing levies which are socially and politically insupportable,[2] there is no point in adopting a vague and general objective of fluidity. The lesson to be learned from recent urban policy is, on the contrary, the need for a differentiated approach to the network. While on some highways, for example a ring road, it is desirable to maintain a certain speed, this is not the case for city centres or roads leading thereto. In the first case, it may even be necessary to envisage new infrastructures. In the second, on the other hand, authorities today are rather seeking to reduce speeds for reasons of safety but also, and above all, as part of the requalification of urban areas. Even if the thinking may seem paradoxical, since the objective is to limit traffic, the approach is rather to reduce road space. Experience shows that this leads to a reduction in traffic which does not excessively cut speeds but which gives that to city centres their commercial, residential and cultural functions.

With this type of approach, there is little space for imposing congestion charges since traffic is well organised at a local level. This does not mean that there should be no thought given to pricing, however, rather that another basis should be used for charging. Although we have in effect given up the idea of fluidity in city centres, there is no question of creating generalised congestion. It must be possible to make journeys without wasting excessive time. In order to do so, it will be necessary to develop public transport. This requires money, and it is legitimate for car drivers to make a contribution beyond what they already pay in the form of fuel taxes. However, charging for the use of new sections of road makes little sense since this will not reduce heavy traffic precisely where this should be done, *i.e.* on the three sections of the network, in city centres.

The idea of an infrastructure toll must therefore be abandoned since it does not meet the need for a comprehensive approach to pricing, covering the agglomeration as a whole. The same is true for a network toll under which certain major city highways would be profit-making, supposedly guaranteeing for their users a high quality of service in terms of speed. Apart from its technical complexity, such an approach faces problems of acceptance relating to "first-class roads", and has no impact on traffic flow on sections which remain free of charge. If policy is objective-based, this is exactly where, at least in Europe, the priority of urban authorities lies, to give back to city centres, or maintain, their attractiveness which means, according to the Rhine city model, reducing automobile access without however banning it since such traffic is necessary to the daily life of the inhabitants, businesses and their customers.

Box 6.6. **What type of urban toll?** *(cont.)*

In such a scenario, it is clear that any traffic which can avoid the city centre must do so. Peripheral roads must not therefore be penalised. This excludes any idea of distance-based pricing and, on the contrary, argues in favour of a zone-based toll. Anyone entering a defined zone (city centre) in a motorised vehicle must pay a fixed charge. This is precisely the idea already adopted by Norwegian cities, London and Stockholm. Deciding to introduce a zone-based toll is one thing, deciding on the toll amount is another. In London, the desire to generate significant income while at the same time reducing congestion considerably in the city centre, led to the adoption of a very high charge. In Norwegian cities, the unitary charge is lower although it is gradually growing. The question of the amount charged is directly linked to the size of the zone concerned. Issues of acceptability together with the desire to generate income gives rise to two main variants, a rather expensive toll in a limited urban zone; or a somewhat lower toll but covering the agglomeration as a whole.

1. A frequent misconception may be mentioned here. Many car drivers, and unfortunately local authority officials, state that their objective would be to be able to drive every day under the same conditions as during school holidays when traffic is reduced by 10-15%. They forget that on such days, there is quite simply an oversupply of road networks since activity in the city is operating at a slower rate as it were. This idea is simply an avatar of the dream of "country living in the city".
2. In this respect, the toll system introduced in Singapore is rather an example of what not to do.

the same way that towns and cities have themselves become public goods. The many challenges relating to the issue of sustainable urban development would therefore suggest that we reconsider our initial four questions, but this time from the perspective of the year 2030. Who will be using public transport in a generation's time? Who will pay for public transport? Who will operate the services and who will design and plan both individual UPT systems and urban mobility in general? These questions are the same as those which served as the starting point for the first part of this discussion; what we shall now do is simply review them here in reverse order, moving this time from users to planning authorities.

5.1. *Who will be using public transport in 2030?*

The main change we need to take into account in our understanding of the changes we can expect to see over the next few years is the concept of multimodality. Growth in the use of public transport in many European cities is driven as much by complementarity as competition with other modes. This can clearly be seen in the case of travel by foot. All types of trip by public transport entail some travel by foot at both the origin and the destination. This complementarity also exists for other environmentally friendly modes such as bicycle, and can clearly be seen in countries such as the Netherlands and Belgium where the railway stations all have enormous bicycle parks. This use

Box 6.7. **Future strategic issues 2025-30**

UPT can no longer be considered as a minor issue in the large cities of industrialised countries. It is increasingly becoming a distinctive element in a city as is shown, in international classifications of cities, by the good rankings obtained by agglomerations such as Geneva, Zurich and Vancouver. Cities do not take the same form in Switzerland and in British Columbia but in both cases, significant efforts have been made to promote urban transport.

From this general "urban performance" viewpoint, deregulation must not be seen as a way for local authorities to rid themselves of a sensitive issue. On the contrary, by making a clear distinction between the tasks of conception and execution, the idea is to highlight the project owner role of local authorities which must assume their responsibilities.

One such responsibility is to ensure that costs are kept in hand. This means that care must be taken not to overinvest and to ensure that operating costs do not get out of hand. A certain transparency is required for this and international benchmarking must systematically be carried out in order to flush out abnormal situations.

Cutting operating costs is not in conflict with the trend towards higher mobility costs for all users of motorised transport. Contributions from UPT users must match their ability to pay, and the same is true for car drivers. Transport infrastructures must less and less be considered as an abundant and free natural resource. On the contrary, given their cost, there is no reason why the direct and indirect beneficiaries should not be directly involved in financing them.

of bicycles plus public transport is also growing in other cities such as Berlin and Lyon where bicycles are made available to season-ticket holders. Even though such systems, which the city of Paris is also developing further, remain relatively marginal, they show that accessibility to the town centre can be improved not by means of a single solution, but through a combination of different modes of transport.

The same logic applies to peripheral urban areas where bicycles, as well as cars, can be used to travel to the main public transport corridors. From the user's standpoint, there is no conflict between private car use and public transport. The person who needs to travel does not make an *a priori* decision whether or not to use a given mode of transport. The choice amounts simply to an optimisation under constraint whereby the user combines the most efficient mode of transport for each given segment of the trip. The main change is therefore that car use has become less relevant for certain links. However, this reality does raise a number of new issues. For example, the Brussels

conurbation is currently drawing up plans for a new railway network for the capital, comparable to the RER in Paris, which if implemented would offer commuters sharply improved travel times and reliability compared with the current supply of services. However, studies have shown (see the EU Scatter project) that unless other supporting measures are adopted, such an improvement could lead to a reduction in the population of Brussels. The reason for this is the improvement in travel times, since the time savings offered by public transport could be simply added on to other modes such as the car which in peripheral urban areas offers greater accessibility to areas where house prices are lower. Thinking in terms of transport infrastructure alone is not sufficient to ensure control over mobility. It is important, as in the "Vinex" project in the Netherlands, to consider the interface between transport and the localisation of activities (Sniellen and Hilbers, 2005).

It would therefore be best to avoid any over simplistic division into two opposing camps: "good citizens" who use public transport and "bad citizens" who use a private car. In reality, the situation is somewhat more complicated and in all probability is to some extent impossible to completely control. As the Swiss example shows, a highly activistic policy towards the development of public transport does not preclude a continuation of urban sprawl. And yet in countries that are particularly attached to the quality of UPT, private car use is gaining market share for the simple reason that more and more people live at a distance from their town centre and are clearly willing to increase their travel times in order to be able to live in a less densely populated area. Even though with population ageing we can observe the elderly moving back into the central areas of cities, it would be wrong to conclude that the peripheral areas will fall out of fashion. A more pertinent analysis would look at life cycles and the diversity of choice. Households with young children do not have the same needs or resources as households consisting of pensioners. Furthermore, choices and resources vary from one social group to another and also from one individual to another.

To meet this diversity of demand, public transport must therefore prepare itself to meet a demand based on multimodality that allows the inhabitants of major conurbations to optimise their mobility behaviour. To do this, however, the public transport sector will have to rethink its funding and open the door to technical and institutional innovation.

5.2. Who will finance public transport?

The introduction of urban tolls in cities like London, Oslo and Stockholm in the middle of a period of rising petrol prices must be seen as signalling a new approach which is gradually being adopted in large cities: the increasing generalised cost of mobility. For many reasons, mostly environmental and financial, local authorities no longer feel that mobility should necessarily be

subsidised. This is an important change which does not concern cars alone. The example of London is important here, a city which not only has a very expensive toll for motorists (EUR 12 a day) but also a relatively expensive UPT system. As is often the case, UK policy can seem a little surprising whereas in fact it is simply somewhat ahead in terms of practice and opinions.

We must realise that urban mobility is gradually entering into a new age. This is not a sudden revolution but rather a gentle curve, a slow transition between two approaches, between two eras. But the extent of this transition is not easy to grasp since, measured by the components of the generalised cost of transport, it includes elements that seem to be moving in opposite directions:

- Certain policies aim to reduce the monetary cost of mobility, notably by making use of competition and public-private partnerships (PPPs).
- But at the same time, there is a trend to increase user contributions. An increase in prices for end-users thus goes hand-in-hand with the reduction of certain costs.
- In terms of the time cost of mobility, some decisions seek to reduce user perceptions of the time spent travelling (introduction of TCSP, improvements in frequency and comfort).
- Others accept *volens nolens* an increase in time cost (the organisation, more or less, of traffic congestion as in Paris[8]).

These decisions, however, only appear to be contradictory. In fact, the message to citizens is relatively clear (see Box 6.8). First of all, it is impossible to continue to provide large subsidies for urban mobility, whether by car or UPT. Users are therefore going to have to pay more. But what is to be done with this extra money (revenue from fines, parking fees, tolls, etc.)? The experience of cities which have introduced tolls provides a clear answer to this question. While toll revenue may in some cases be earmarked to pay for new infrastructure (a bridge or a tunnel), it is increasingly clear that another purpose is to generate financing for other public expenditures, notably for UPT. We have replaced the toll/infrastructure approach by a toll/zone one, which means that urban mobility is considered as a whole by public authorities. It is no longer a question of finding financing specific to each mode of transport but of developing a global pricing system for urban mobility.

All this shows evidence of a strong desire to price all types of journeys: regulate demand and find financial resources for the whole system. The price message, for both car drivers and UPT users, is more than simply wishing to make users pay for the costs they incur. Not only maintenance costs would then be covered, but also external costs while authorising an equalisation adjustment between modes, in particular to the benefit of UPT, which is more

Box 6.8. **The generalised cost of transport and the messages being sent to users**

One way of illustrating the new messages being sent to users of private cars and UPT in urban areas is to look at the generalised cost of mobility, which may be defined as follows:

$$C_g = p + hT_g$$

where:
p is the monetary price of travel between points A and B
Tg is the generalised time between A and B
h is monetary parameter representing the average value of the time as perceived by travelers.

It is interesting to note that the generalised cost takes account of the monetary price, the whole time needed for the journey and also a parameter relating to the way in which this journey time is perceived. Factors to be taken into account here are saturated lines, service frequency in the case of public transport, number of changes required, etc. There is, therefore, a qualitative dimension to journey time. In order to measure it, depending on the mode being studied, the Tg parameter could be made more detailed so as better to reflect not only the time spent on the journey itself but also on access, before and after, as well as the performance and qualities inherent to the mode in question.

Taking rail transport as an example, the following could be taken into account:

- Travel time in the form of the average time needed to complete the journey between starting point and destination in zones A and B.
- An indicator of the average interval between trains calculated on the basis of the hours covered by the daily timetable.
- The number of times the traveller has to change trains (saturation of lines).
- The frequency of trains on the line.
- A constant representing terminal travel times.

All of this gives an aggregate total time, a physical value which will have to be made compatible with the journey price by selecting an average value of time for travellers.

- The economic analysis used to measure this theoretical value is based on the concept of the scarcity of time. Individuals choose from among different possible activities by comparing the benefits derived and the share of total time available they consume. Thus, the time spent on travelling is that much less to spend on other activities.
- From a practical standpoint, this measuring process involves using the concept of the Value of Time (VOT), or monetary value of time, which can be assessed by studying individual behaviour patterns (a behavioural value): the readiness to pay more in order to save time.

Box 6.8. **The generalised cost of transport and the messages being sent to users** *(cont.)*

In the case of urban mobility, given the huge cost of building new infrastructure (roads or TCSP), it is no longer possible to offer users savings in time in the strict sense of the term, except in special cases like access to airports. It is more important to focus on the parameter h by improving the quality of transport by cutting down on required changes and improving UPT frequency of service. But if these improvements are to be made, the monetary cost will have to be raised. In sum, we are moving towards an increase in the monetary component and, at best, a slight improvement in the time cost, mainly on the grounds of quality. The result is simple: a trend towards a higher generalised cost of mobility!

suitable than motor vehicles for travel in densely populated areas. But beyond its accounting dimension, prices constitute a multifaceted incentive whose essential purpose is to ensure the best possible system for the urban area.

But this general goal of ensuring that cities work better must rid itself of certain naïve assumptions. Better pricing for travel, for example in the form of an urban toll, cannot be a panacea guaranteeing that traffic will flow better, that infrastructures will be financed and that there will be an important shift from private cars to public transport. This is for the simple reason that it is generally difficult, and therefore imprudent, to try to make a single tool serve three such diverse objectives. Each urban area must therefore prioritise its various objectives and then investigate what type of pricing would be more suited to the goals sought.

From the standpoint of tariff integration, a search will also need to be made for other sources of funding that might be secured by taxing the capital gains realised by the owners of land and real estate in the vicinity of transport infrastructure designed to improve accessibility. Here again, the funding issue cannot be conceived simply in terms of the allocation of costs to users, but as a comprehensive financing system for urban amenities. In the same way that a supplier of electricity or water puts in place complex pricing systems (dual or tripartite pricing systems, progressive tariffs varying over time and distance, etc.), sometimes involving cross-subsidisation between consumers, the funding of urban mobility can also use a sophisticated mix of resources from a wide variety of sources: user charges, urban tolls, employer taxes, real estate taxes, etc. The need for such diversity will be all the greater in that we shall undoubtedly find ourselves facing a *de facto* challenge to the public transport monopoly.

5.3. *Who will operate public transport services?*

Our reply to the first two questions (who will use and who will finance public transport?) consisted of two keywords: multimodality and integration. In reply to the third question as to who the operators will be, we could add a third keyword "innovation", and to be more precise technical and institutional innovation.

Technical innovation will come first, following the diffusion of new information and communications technologies (NICT) into the public transport sector. The first applications of NTIC in UPT can already be seen in new forms of payment (magnetic subscriber cards) as well as real-time information systems. But what is also starting to take shape at the moment, notably in less densely populated areas, is the use of special software to optimise on-demand transport services. The problems besetting public transport in such areas have been widely documented: the wide diversity of origins and destinations of potential customers makes it difficult to provide a proper match between supply and demand. The outcome is either an insufficient supply of public transport or very low rates of patronage and exorbitantly high costs. However, it is possible to organise services differently. By asking users to state several hours beforehand what their points of departure and destinations are, operators can plan tailor-made routes and match the size of their vehicles to the number of potential passengers. On-demand public transport therefore looks set to grow in the future.

However, before such technical innovations can see the light of day, the door needs to be opened to organisational innovations. Accordingly, the first step is to challenge the fact that in far too many cases a single operator is responsible for all transport services in a conurbation. Even if this can sometimes be justified on economic grounds (increasing returns), it also acts as a brake on innovation. As a result, in many cases these bodies have problems matching supply to demand. Vehicles that are too large, running on routes that are too rigid are used in areas where they are not particularly suitable. Political and trade union pressures conspire to maintain a situation that is scarcely productive. The only way in which this state of affairs can be challenged is through the entry of new operators. We must therefore work towards securing a major institutional innovation, namely the integration of a diversified supply, provided by different operators, while maintaining a context of tariff transparency. Multimodality, integration and innovation must therefore be brought together into a coherent whole, and for that we need an overseeing authority which itself will have to adapt to the new set of rules that assessment ill bring.

5.4. *Who will design the supply of public transport services (and how)?*

As we have already noted earlier, the supply of public transport is classed as a public good; in fact, to be more precise, public transport is a political good or a good controlled by politicians. These two different ways of describing UPT by

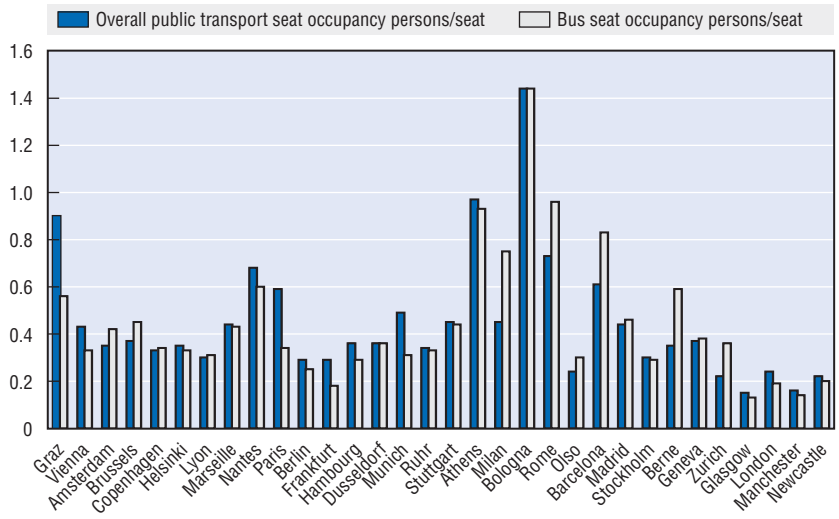
varying the emphasis are a timely reminder that we are confronted with a very particular type of situation. Public decision makers have made UPT an object that is primarily under their control and use it to lend substance to their policies. Public decision making is therefore not driven by economic considerations but by political interests or even the personal interests of politicians.

However, because these decisions entail increasingly large financial commitments that can have decisive impacts on the way cities function, they must be subjected to both *a priori* and *post factum* evaluation.

- *A priori* evaluation. The decision by the public authorities must be taken on the right scale and must ensure that the resources deployed are both coherent and relevant. The match between the level at which decisions are taken and the area concerned by the UPT supply is a crucial issue. In too many cases decisions are taken at suboptimal level, *i.e.* at too high a level when the local authority is subject to decisions taken at the level of central government; and by default when small authorities are unable to co-ordinate their actions despite constituting the same catchment area for daily mobility. The first evaluation to be conducted therefore raises this issue of the optimum level for decision-making.
- An *a priori* evaluation also needs to be made of the relevance of the resources deployed, failing which *post factum* evaluation is essential. Even though elected representatives are usually highly reluctant to undertake such action, the content of supply needs to be closely examined. Is the UPT supply properly matched to demand? Is the occupancy rate high enough? More generally, are the costs of UPT development borne by the local population justified in terms of the services provided? Figure 6.13 suggests that international benchmarking studies should be more widely conducted. In this example, we are clearly confronted with two types of extreme situation: firstly, Italian cities where very high occupancy rates indicate an inadequate level of supply; and secondly, cities in the UK where occupancy rates are very low and therefore indicate oversupply, particularly in view of the relatively high unit prices.

The most sensitive aspect of this issue is undoubtedly the coherence, relevance and transparency of public decisions. To use a well-known metaphor, the issue of UPT operator performance is merely the tip of the iceberg. The main problem lies hidden within the operating procedures for public administrations and the political bodies which govern them. However, what history and economic analysis, notably the school of public choice, have taught us is that there is no guarantee that either of them will be efficient. To ensure that decisions regarding UPTs are properly matched to the needs of the population

Figure 6.13. **Seat occupancy ratio**



Source: UITP database on "Millenium Cities".

and the goals that local authorities have set themselves, decision-makers should not be left to their own devices. There are two ways to ensure this:

- The first would be to make systematic use of an assistant for the infrastructure owner. Private actors specialised in such arrangements can guide public decision makers. The aim is not only to delegate the management of buses or public transport, but also to consider the consistency and relevance of the choices made.
- The second is to make regular and documented comparisons of choices. If it is now possible to determine the comparative performance of a hospital or school, it is only fair that citizens should be able to consult comparative studies of UPT systems. The provision of information still remains the safest fallback, particular if, as we have suggested, the aim is not only to manage the bus network by also to put in place an integrated and innovative policy towards multimodal mobility.

Box 6.9. **Strategic issues for the period 2025-30**

UPT currently enjoys public support in many cities, particularly in Asia and western Europe. It attracts an increasing number of users, primarily due to the rising costs of car fuels.

This trend requires us to plan ahead by closely linking the future development of UPT to its relative costs with regard to private transport. To be more precise, UPT must be developed on a new and different basis for which keywords are multimodality, integration and innovation. Innovation must be pursued in such diverse areas as tariff systems, information, the matching of supply to demand and reduced production costs. To achieve this requires help from the private sector which can bring innovations, particularly when operating monopolies are challenged.

The mission of the organising authorities must also be recast. Even if they retain the ownership of the infrastructure used for the supply of UPT, they can seek help with the organisation and running of services. Public administrations are also subject to requirements with regard to efficiency, which are part of an overall approach towards the evaluation of urban policies. With this aim in mind, benchmarking studies are required. To ensure that mobility policies do not simply follow the least line of resistance, they need to be informed by developments taking place elsewhere.

Notes

1. Stance adopted, for instance, for the MARETOPE research programme or the benchmarking study conducted by the transport authority in Barcelona (EMT), or by the International Union of Public Transport (UITP) when building its "Millennium Cities" database. This chapter draws on all three sources.
2. In many cities in Africa and Latin America, private provision is less costly to the community and performance is better than public provision. Some of these experiments can probably serve as examples in the industrialised world, for instance the development of various forms of car-sharing or car-pooling.
3. As pointed out by Wiel (2002), Le Corbusier thought that faster speed was the key to a new urban order.
4. Mogridge, an Englishman, explained in the 1970s why any road investment in urban areas tends to reduce average car speeds as infrastructure supply boosts demand beyond what the new capacity can cope with, while at the same time leading to a deterioration in the quality of public transport provision.
5. In France, public expenditure on UPT totals EUR 10 billion – an amount decried by the representative of the International Road Transport Union, Christian Gérondeau, in a book entitled *Les danseuses de la République* ("The Dancing Girls of the Republic"), L'Harmattan, Paris.

6. We may note, however, the striking case of underproductivity of the transport system in Marseille (RTM). A recent study by the Cour des Comptes (the official body which oversees public accounts in France) showed a particularly worrying increase in costs without any improvement in the service.
7. There are three large private groups which operate UPT systems today in France (Kéolis, Transdev and Veolia). Some years ago there were thirteen. In 2005, the Competition Council imposed a heavy fine on these three groups for having entered into cartels.
8. An apparently anodyne decision by Paris Town Hall after the 2001 elections was to reduce by a factor of five the cost to residents of parking in the street while gradually eliminating free parking places. The result is that residents are strongly discouraged from using their cars during the week. Their cars "colonise" parking spots and limit to a large extent the turnover of parking places and hence the chances of finding one, which is one way, amongst others, of reducing the average speed of journeys by private car.

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