Pilot project study on innovative ways of sustainably financing public transport

Final Report

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Executive summary

The ‘Pilot project study on innovative ways of sustainably financing public transport’ was commissioned by the DG MOVE under the contract MOVEC/1/2016-539. The study has been carried out by the research organisation CENIT in conjunction with the consultancy company Prognos and external experts, which are partners of a consortium led by COWI.

Study rationale

Urban public transport (UPT) plays an essential role in dealing with diseconomies of urban agglomerations, such as traffic congestion, air pollution and noise, and in attaining the objectives of low-carbon, resource-efficient and liveable urban areas. However, transport authorities are confronted with difficulties to ensure the financial sustainability of UPT systems.

Fares and other direct revenues from UPT typically do not cover the cost of providing the service, since they must be low enough both to ensure affordable accessibility and to be competitive with private vehicles. This means, in practice, that UPT-specific infrastructure and part of the operation and maintenance (O&M) costs must be covered by public subsidies from different government levels. Less commonly, UPT costs are partially covered by contributions of indirect beneficiaries. Finding an appropriate funding mix for UPT is very often a cumbersome exercise.

Continuous urban growth, evolving demand patterns, higher environmental standards and the emergence of breakthrough technologies and services in urban mobility call for significant improvement and expansion of UPT networks. The resulting increase in investment and O&M will most likely generate additional financial gaps to Public Transport Authorities (PTAs) that are already severely compelled by debt and deficit constraints.

Aim and scope

As a response to this challenge, this pilot study provides an active research on innovative ways to sustainably financing UPT within an evidence-based and context-specific approach. The aim is to develop recommendations, proposals and guidelines on innovative financial mechanisms for the UPT system at European Union level. The study is not proposing concrete actions because, due to the subsidiarity principle, the European Commission is limited to providing advice and, in some cases, financial support to PTAs through programmes with specific objectives.

Methodology

To this end, the team has gathered detailed information on the situation of many urban areas and their public transport systems around the world that could be relevant for the study. It has also carried out a direct consultation to UPT stakeholders and experts about the most relevant trends in the UPT sector, with particular emphasis on their impacts on financing and business models. From this practical work, covering a wide spectrum of European urban areas, it has been possible to establish a set of “UPT clusters” with relevant differences in terms of suitability for the implementation of financial innovations. Six case studies have been selected to illustrate particular innovative approaches in UPT financing for these clusters and to assess their performance and replicability. This allows for context-based recommendations, proposals and guidelines on how to enhance the financial sustainability of UPT systems.

Trends and challenges

The main findings of this study regarding trends and challenges in UPT financing can be summarised as:
• **Urban growth and ageing population**: Increased mobility needs and a higher proportion of reduced fares may imply an added pressure for UPT budgets.

• **Evolving demand patterns**: Travel behaviour is rapidly evolving and so are expectations from transport services. A clear example is that young adults in urban areas show a less interest in car ownership. This demands more flexibility to UPT systems in both planning and operating phases and, quite often, additional investments in infrastructure and vehicles.

• **Digitalisation**: The increasing digitalisation in the UPT sector allows for an integration of real-time data streams with potential for a better responsiveness of UPT services to user needs. In addition, e-ticketing facilitates fare integration and enables more sophisticated and user-based pricing schemes. This transformation requires significant investments but may lead to reduced operating costs and to increased fare revenue.

• **Emerging urban mobility services**: The emerging on-demand and shared mobility services, in particular through their integration within a Mobility-as-a-Service framework, represents both a challenge and an opportunity for the financial sustainability of UPT services. Whilst these services might increase the capillarity of UPT services and decrease the need for car ownership, they could represent a severe loss of ridership for UPT without the adoption of adequate supply and pricing schemes for urban mobility. This trend will most likely require adaptations in the business model of UPT towards a further collaboration between public and private transport services.

• **Environmental standards**: Attaining the objectives of increased availability of public space, lower air pollution and noise in urban areas and progress towards a low-carbon mobility requires a modal shift from private vehicles to UPT. On the other hand, UPT systems are progressively advancing towards cleaner bus fleets and rolling stock. This replacement implies a significant financial effort for UPT systems.

• **Sustainable finance**: This is an emerging concept that encompasses financing for sustainable growth with robust financial performance. It represents an opportunity to steer private capital flows towards investments in UPT. Green city bonds, for example, are increasingly used to finance UPT investments. Cities may issue municipal bonds to the rapidly growing but still incipient green bond market to finance projects credited as environmentally beneficial.

**Taxonomy of innovative approaches**

The identified innovative approaches to sustainably financing UPT are classified into strategic, tactical and operational decision levels, and can be summarised as follows:

• **Strategic**: This level deals with regulations, governance and long-term plans, and basically involves upper government levels. Innovative approaches include a review of current deficit/debt accounting for long-term investments in UPT infrastructure under a sustainable finance vision, the creation of specific investment platforms, and a further integration between transport planning (i.e. sustainable urban mobility plans, SUMPs), investment programmes and financial strategies counting on the required funding streams.

• **Tactical**: This level deals with the revenue structure of the UPT system and its business model, and basically involves transport authorities in charge of planning and managing UPT systems. Innovative approaches include the introduction of new revenue sources from indirect beneficiaries (e.g. land value capture) and from traffic externalities (e.g. congestion pricing or parking charges) that would financially support new investments or increased operating costs. At this level we also include the adoption of new business models regarding integrated mobility solutions with on-demand/shared services and a further exploitation of UPT assets through retailing and advertisement.
Operational: This level deals with the improvement of current financing mechanisms and involves most of UPT stakeholders in a cross-cutting manner. Innovative approaches include tailored financing solutions for non-infrastructure investments, an enhanced allocation of UPT subsidies and an updated fare revenue management.

Recommendations and proposals

The main recommendations and proposals to enhance the financial sustainability of UPT are provided for the sector in general and thereafter some concrete ones are determined for the various clusters in which it has been divided for analysis. They are summarised here:

- **A strategy at EU level should be adopted to promote private investment in UPT** through green finance markets and other investors. This may include a classification of sustainable UPT investments, an adaptation of accounting standards for debt/deficit, and the creation of an investment platform for UPT.

- **Metropolitan cities would benefit from the creation of mobility agencies** with powers on the management of all the financial flows of UPT (and other mobility areas), and on planning and regulating mobility services. This would ease the implementation of comprehensive financial strategies in UPT and would enable an integrated regulation in a context of disruptive mobility services.

- **Pricing schemes for urban traffic may constitute an appropriate new revenue source for UPT** while favouring a modal shift to UPT. Congestion charges are the first-best choice to manage travel demand but their high implementation and operating costs make them only suitable for large and dense urban areas. Workplace parking levies are more effective in terms of net revenues for UPT financing and may be a suited alternative for medium-sized cities.

- **The adoption of land value capture mechanisms for the financing of UPT** investments is especially recommended for new urban developments.

- **Emerging on-demand/shared mobility services may represent a cost-efficient alternative** to scheduled bus services in areas with low density of demand, notably for small and medium cities. As these services might still require public funding in these contexts, an integrated management with traditional UPT is recommended.

- **A stable consensus on a clear fare review mechanism** is essential for the financial sustainability of the UPT operating deficit. In turn, opportunities of digitalisation regarding user-based UPT services and pricing schemes should be explored to increase ridership and fare revenues.

- **An enhanced allocation of UPT subsidies** from upper-level governments should pursue stable and predictable financial commitments to transport authorities and operators while promoting cost-efficient UPT services.
1. Introduction

1.1. Motivation

Transport policy targets

Cities have to manage economies and diseconomies of agglomeration. Whilst urbanisation continues apace, indicating the overall positive effects of agglomeration, the difficulties of increasing the capacity of transport in consolidated areas have resulted in severe congestion in most urban areas, which is perhaps the most striking agglomeration diseconomy. There are obvious limits to the capacity of the street network to accommodate private vehicles, even under optimised future conditions, such as the expected through automated cars. As urban growth and citizens’ well-being is only possible under adequate mobility conditions, the only efficient option appears to be the development of urban public transport (UPT) networks providing services comparable to automobile in terms of generalised costs. This should be done by infrastructure improvements and adapting services to the changing demand for mobility and the use of emerging technologies. Besides ensuring that congestion doesn’t hinder growth, UPT improvements contribute to a low-carbon, climate-resilient and resource-efficient economy, which is a major goal for the EU. The modal shift to more environmentally friendly transport modes should help attaining the two targets set by the European Commission for transport CO₂ emissions in its White Paper on Transport 2011: a 20% reduction from 2008 levels by 2030 and a 60% reduction from 1990 levels by 2050.

Improving the resource efficiency of the urban transport system as a whole requires a more efficient use of existing capacity and the allocation of the available financial resources of the public sector to urban mobility projects with the highest social, environmental and economic benefits.

Financing needs

The fundamental problem to finance sustainable urban mobility is that UPT does not generate sufficient revenues to pay for its capital costs or even to pay for its operating and maintenance costs. Thus, transport authorities need additional resources to keep their UPT systems running and, in particular, to expand them. As improvement and expansion of UPT becomes necessary to respond to increasing urban population, ageing population and changing demand patterns, and there is resistance to fare increases, the pressure on UPT budgets is mounting. For example, the increase of urban population, which is forecasted to be around 5% by 2050 (DGMOVE, 2012), will most likely ask for more funding for UPT because the resources required to finance UPT grow more than proportionally with city size. This supply expansion will have to be aligned with some vehicle improvements to cope with the growing number of people with reduced mobility (PRM). On the other hand, both the social function of UPT and the need to entice the modal shift towards cleaner transport modes prevent substantial changes in tariffs.

The “Study on the financing needs in the area of sustainable urban mobility” estimates that there will be a significant increase in funding gap requirements in UPT for the period 2010-2040. According to the study’s estimates, the total yearly operating expenditure for this period will increase by 84% on average. Even though the operating expenditure will grow faster in EU-12 cities (at 2.8% per annum) than in EU-15 cities (at 1.5% per

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1 Generalised costs include all the factors that drive demand: travel time, tariffs, operating costs for vehicles, safety, reliability, comfort, etc.
2 The report disseminated by DGMOVE in 2012 “Study on the financing needs in the area of sustainable urban mobility” considered six case studies of European cities and available data on transport spending. Based on this, the authors obtained a forecast for the UPT funding gap in Europe for the period 2010-2040.
3 EU-12 are Member States which joint EU after 2004 whereas EU-15 are those who joint EU before 2004
annum), the latter will still require a higher amount of funding per inhabitant. On the other hand, the expected capital expenditure requirements of UPT in EU cities are estimated to increase, on average, by 105% during this period. It can thus be expected that, in most EU cities, the overall financing gap of UPT will increase, although it must be stressed that the actual financing needs will highly depend on the city context in terms of size, economic development or existing assets, among others.

**Study rationale**

The former considerations point out that, in the years to come, public transport authorities will have to deal with increased financing needs in a context of breakthrough changes in urban mobility. They will have to be covered in a context of severe constraints affecting national and local public budgets that arose as a result of the sovereign debt crisis but can be expected to persist for a long time. This is a challenging situation requiring the active research on innovative ways to sustainably financing UPT within an evidence-based and context-specific approach that has been undertaken in this study.

### 1.2. Aim and scope of the assignment

This pilot study aims at gathering detailed information about the different financing instruments currently available for UPT and about relevant trends in the sector to develop feasible innovative approaches for sustainably financing UPT at EU level. The final goal of this study is to provide context-specific recommendations and guidelines on how to apply these innovative approaches.

### 1.3. Structure of the report

The present report is structured as follows:

- **Chapter 2** describes the overall methodological approach, the main tasks of the study and the adopted data collection tools.

- **Chapter 3** presents a general understanding of UPT financing, regulation and governance, and a brief description of the state of play in Europe.

- **Chapter 4** provides a taxonomy and an analysis of existing financial instruments for UPT.

- **Chapter 5** includes an overview of relevant trends in urban mobility and UPT financing.

- **Chapter 6** presents the identified innovative approaches to sustainably financing UPT at strategic, tactical and operational level.

- **Chapter 7** describes the resulting clusters of implementation contexts.

- **Chapter 8** provides a detailed description of recommendations, proposals and guidelines on how to enhance UPT financing sustainability in general and for each of the established clusters.

### 1.4. Acronyms and terminology

**CBA: Cost-Benefit Analysis.** CBA is an estimation of all the costs and benefits involved in project investment (i.e. infrastructures). This analysis allows estimating the feasibility of the investment and provides a basis to make a comparison between different alternatives.

**DBFO: Design, Build, Finance and Operate.** Type of PPP agreement which includes the phases of project design, construction, financing and the operation of the relevant infrastructure.
**GPI: Government Promoting the Investment.** Public Administration, normally a national, regional or metropolitan authority, which has the powers to promote the execution of an investment related to an urban public transport service.

**ICT: Information and communication technologies.** It is the application of computers to manage data and information with an integration of the telecommunications. The report focuses on its application to urban public transport.

**IFI: International Financial Institutions.** Non-profit institutions owned by a set of countries sharing some common interests, that provide financial support and professional advice for economic and social development activities in specific areas (often less developed countries or regions) and sectors, and promote international economic cooperation and stability.

**LVC: Land Value Capture.** Funding mechanism capturing a proportion of the increase in the value of the landlords’/householders’ properties during a pre-defined time span.

**MaaS: Mobility-as-a-service.** Integration of various forms of transport services into a single mobility service accessible on demand.

**NPV: Net Present Value.** It is the difference between the present value of cash inflows and the present value of cash outflows using a pre-defined discount rate. It is used to analyse the profitability of an investment.

**O&M: Operation and maintenance.** This includes the running the urban public transport services, including ordinary maintenance operations for vehicles and rolling stock, and the soft maintenance of rail infrastructure and superstructure and of some facilities used by bus services.

**PPP: Public-Private Partnership.** Cooperative arrangement between the public and the private sectors, typically of a long-term nature. PPP contracts are used to finance infrastructure projects and may include different phases of management an infrastructure (design, construction, maintenance, etc.).

**PTA: Public transport authority.** Public authority with powers on planning, managing and/or financing urban public transport. This includes all possible governance structures, from a specific department of a local authority to an independent public transport agency.

**PTO: Public transport operator.** Public or private company in charge of supplying the urban public transport service at an operational level. It may refer to any mode of transport and it is independent of the management model.

**SPV: Special Purpose Vehicle.** It is a structure specially created for the execution of a project and taking only project risk, in order to reduce the exposure of the larger parent organizations that are usually behind the operation but do not wish to provide corporate guarantees. In this report, SPVs are only considered within the PPP framework. SPV may represent a part of the PPP arrangements, as a measure for private companies to limit their exposure to liabilities and transferring some risks.

**TFS: Tailored financial solution.** It refers to a blended financial solution, which is designed specifically for supporting a concrete investment.

**UPT: Urban public transport.** Collective transport modes in urban areas, directly or indirectly managed by public authorities, including bus, tramway, metro and suburban rail networks. Other public services related to mobility, such as taxis, shared vehicles (cars, motorbikes, bicycle and similar) are not included.
2. Methodological approach and data collection tools

2.1. Overall approach

The final outcome of the study is the generation of recommendations and policy guidelines based on feasible innovations in UPT financing and adapted to particular implementation contexts in urban areas. To achieve this result, the methodological approach is structured into four main tasks: A background on the state of play and trends in UPT financing, a research on innovative approaches for sustainably financing UPT, a cluster analysis on implementation contexts and, finally, the development of final recommendations, proposals and guidelines (Figure 2-1).

In Task 1, through desk research and general interviews with experts, extensive data is collected on existing financial instruments, current trends in urban mobility, and financial challenges for UPT. Based on this, innovative approaches for sustainably financing UPT are identified in Task 2 and further assessed through specific interviews, questionnaires and case studies. In parallel, the implementation contexts of these innovations are analysed and classified into clusters in Task 3. By matching the innovative approaches with the resulting clusters, context-specific recommendations, proposals and policy guidelines can be derived (Task 4).

2.2. Task 1: State of play and trends in UPT financing

Aim and outcomes

This task aims at gathering all relevant data to elaborate a comprehensive background on the current state of play in UPT financing and on related trends and challenges. This research leads to a general understanding of UPT financing and governance (Chapter 3), to a taxonomy and an in-depth analysis of current financing instruments (Chapter 4) and, finally, to an extensive description of current trends with an impact on UPT financing and their related challenges (Chapter 5).
Data collection

Data collection is based on desk research and general interviews with experts. Regarding the desk research, there is an extensive literature on the issue covering a wide range of topics related to UPT financing, management and regulation, and from both academic and applied approaches. References used are detailed in Appendix D.

Interviews and questionnaires were used to gather first-hand information from experts and stakeholders of the UPT sector. Specifically, interviews and written questionnaires asked for current trends of urban mobility and their link to UPT financing. In addition, experts and stakeholders were asked to provide their own ideas and proposals for the enhancement of the UPT financing model. The list of consulted experts and stakeholders and the main outcomes obtained are described in Appendix A.

2.3. Task 2: Innovative approaches

Aim and outcomes

This task aims at identifying and assessing innovative approaches with potential to enhance the financial sustainability of UPT. Based on the information collected in the previous task (Task 1), innovations are identified and classified in strategic, tactical and operational levels, according to their scope and time horizon. From this preliminary classification of innovative approaches, interviews and case studies are designed ad hoc to assess each specific approach. The purpose of the assessment is to extract the improvement that the innovation may entail in terms of financial sustainability and urban mobility performance and to analyse the transferability of such innovative approaches. The outcome of this task is described in Chapter 6 of this report.

Interviews and questionnaires

Once innovative approaches are identified, a second round of interviews and questionnaires are designed ad hoc for experts within each of the related topics. Experts are specifically asked for their view on the performance and transferability of each of the innovative approaches. A list of experts with a positive response is shown in Table 2-1. Further details on their responses are included in Appendix A.
### Table 2-1. List of experts who provided feedback in the second round of interviews

<table>
<thead>
<tr>
<th>Innovative approach</th>
<th>Contact person</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific regulations for sustainable UPT investments</td>
<td>Vicenç Pedret</td>
<td>Retired European Commission Official</td>
</tr>
<tr>
<td>Development of comprehensive financing strategies</td>
<td>Arturo Ardila - Sánchez</td>
<td>Lead transport economist at World Bank</td>
</tr>
<tr>
<td>New sources of incomes from UPT beneficiaries and private vehicle negative externalities</td>
<td>Wylde Declan</td>
<td>Financial Director of the Railway Procurement Agency in Dublin</td>
</tr>
<tr>
<td></td>
<td>Todd Litman</td>
<td>Director of the Victoria Transport Policy Institute</td>
</tr>
<tr>
<td>Developing new business models for UPT</td>
<td>Manel Villalante</td>
<td>Director of Barcelona Regional</td>
</tr>
<tr>
<td></td>
<td>Niko-Matti Ronikonmäki</td>
<td>Transport economist at Helsinki Regional Transport Authority (HSL)</td>
</tr>
<tr>
<td>Improved financing solutions for non-infrastructure investments</td>
<td>Kevin Cheung</td>
<td>Public Transport Specialist at European Investment Bank (EIB)</td>
</tr>
<tr>
<td>Improvements in the financing of the operating deficit</td>
<td>Carmen Sanz</td>
<td>Director of the Commercial Area at Madrid Transport Authority</td>
</tr>
<tr>
<td></td>
<td>Halina Rakowska</td>
<td>Coordinator of European affairs at public transport authority in Warsaw (ZTM)</td>
</tr>
</tbody>
</table>

### Case studies

A series of case studies have been selected to illustrate the innovative approaches and assess their performance in practice. One or two case studies are included from each innovative approach and according to the following selection criteria:

1. Potential to enhance the financial sustainability
2. Data availability
3. Representativeness of different city sizes
4. Representativeness of different geographical locations
5. Representativeness of different governance structures

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4 Except from the "Specific regulations for sustainable UPT investments" innovative approach, which is a proposal not applied in practice
<table>
<thead>
<tr>
<th>Innovation approach</th>
<th>Case study</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific regulations for sustainable UPT investments</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Development of comprehensive financing strategies</td>
<td>The Big Move – Toronto, Canada</td>
<td>Comprehensive strategy for sustainably financing the construction of key major projects</td>
</tr>
<tr>
<td>New sources of incomes from UPT beneficiaries and private vehicle negative externalities</td>
<td>Workplace parking levy – Nottingham, UK</td>
<td>Successful implementation of a workplace parking levy to reduce car use and support the financing of a tramway extension</td>
</tr>
<tr>
<td>Developing new business models for UPT</td>
<td>Yélo system – La Rochelle, France</td>
<td>Business model encompassing mass transport and emerging mobility services within an integrated management, ticketing and branding system</td>
</tr>
<tr>
<td></td>
<td>Leasing and advertising activities – Singapore</td>
<td>Business model based on a high share of the public transport operators’ revenue from rental and advertising services</td>
</tr>
<tr>
<td>Improved financing solutions for non-infrastructure investments</td>
<td>Local bonds – Krefeld, Germany</td>
<td>Purchase of tramways financed through bonds issued to public transport users</td>
</tr>
<tr>
<td>Improvements in the financing of the operating deficit</td>
<td>Redistribution formula for subsidies – Catalonia, Spain</td>
<td>New formula for the allocation of funds seeking a balance between efficiency and equity</td>
</tr>
</tbody>
</table>

Data from case studies has been gathered through desk research, when relevant documents were available, and through specific interviews in all cases. Case studies have been assessed by following the general criteria described in Table 2-3. A complete description of case studies and their assessment outcomes is included in Appendix B.
Table 2-3. Assessment criteria for case studies

<table>
<thead>
<tr>
<th>Assessment outcomes</th>
<th>Criteria</th>
<th>Indicators/Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Financial sustainability</td>
<td>To what extent does the solution generate more revenues for public transport?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>To what extent does the solution contribute to diversify revenue sources?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>To what extent does the solution contribute to improve the predictability of revenues?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>To what extent does the solution reduce the financial costs of public transport investments and/or operations?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>To what extent does the solution ensure financial stability in the long-term?</td>
</tr>
<tr>
<td></td>
<td>Urban mobility performance</td>
<td>To what extent does the solution contribute to increase the ridership of public transport?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>To what extent does the solution contribute to reduce traffic externalities?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>To what extent does the solution contribute to improve transport accessibility?</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>Other</td>
</tr>
<tr>
<td></td>
<td>Replicability</td>
<td>Which are the main enabling factors to adopt the solution?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>In which implementation contexts the solution is not feasible at all?</td>
</tr>
<tr>
<td></td>
<td>Suitability</td>
<td>Which are the main success factors of the solution?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>In which implementation contexts the solution might be convenient?</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>Other</td>
</tr>
</tbody>
</table>

2.4. Task 3: Clusters of implementation contexts

Aim and outcomes
This task aims at analysing the implementation context of innovative approaches to sustainably financing UPT and at establishing a set of clusters with relevant differences in terms of implementation suitability. The analysis covers a wide spectrum of European urban areas and their public transport systems. The final proposal for clusters of implementation contexts is described in Chapter 7 of this report. The cluster analysis database is included in Appendix C.

Clustering methodology
The clustering methodology follows three phases (Figure 2-2). First, an initial set of variables is defined to represent the diversity of European cities in terms of financing their UPT system. Second, data on these variables is collected for a representative sample of European cities. Third, by analysing the collected data, independent variables are extracted and clusters are established through a qualitative analysis.
Research

The research was based on a sample of 96 European cities representing a wide range of population sizes, starting from 100,000 inhabitants, and uniformly distributed around the continent (see Figure 2-3).

2.5. Task 4: Recommendations, proposals and guidelines

Aim and outcomes

This task aims at establishing sound recommendations, proposals and guidelines on how to enhance the financial sustainability of UPT by applying the identified innovative approaches. A detailed description of resulting recommendations, proposals and guidelines is provided in Chapter 8.

Work process

First, the general principles behind the application of innovations are described in the form of all-fit recommendations and proposals. Second, these general recommendations are further extended to build specific recommendations for different clusters. Based on the transferability analysis of innovative approaches, specific recommendations are matched to clusters through a compatibility analysis. Finally, context-specific innovation guidelines are developed as a conclusion of prior results.
3. An overview of the financing system for UPT

**Mobility and UPT**

Mobility and adequate infrastructure have become more widely regarded as civil rights, central to inclusion and critical to individuals’ capacity to participate and prosper in the modern-day economy (NLC, 2017). Mobility is strongly correlated to socio-economic activity, but its level in a specific region depends on the existence of infrastructure and transport services adapted to the needs of people and enterprises operating there. Efficient transport services, which are essential for the competitiveness of the region, require adequate infrastructure to sustain them. It is particularly through the provision of viable infrastructure and the regulation of services that policy-makers may ensure adequate mobility conditions aimed at favouring prosperity and welfare. These conditions are clearly different between interurban and urban/metropolitan areas, as the latter are much more constrained by land use, the density of travel demand and the presence of important externalities. Public intervention to ensure adequate mobility levels whilst avoiding externalities from congestion and air pollution is thus particularly necessary in urban areas. This intervention is focused on controlling private vehicles use and providing the collective transport services (and facilitating alternative means, such bicycle use or pedestrian areas) that ensure a proper alternative to cars.

The transport system is presently being confronted to great uncertainties linked to technological developments that will severely affect future mobility: autonomous automobiles, electric powertrains for all sorts of vehicles, big data effects on drivers’ behaviour, etc. The unavoidable changes new technologies will determine on urban mobility will have a strong impact on UPT and on its financing. This impact is obviously unknown, but its potential to disrupt current models for the provision of mobility services, but also for revenue generation, must always be present in this study about innovative mechanisms to finance UPT.

3.1. A comprehensive vision of UPT financing

**Categories of UPT expenditure**

Urban public transport expenditure can essentially be divided between the funds required to carry out major urban mobility projects and those to be mobilised for the operation and maintenance (O&M) of the transport system. To cover UPT expenditure there are essentially three sources of funds: direct revenues from the operation, earmarked taxes or fees and contributions from public administrations as grants.

Most direct UPT revenues arise from the fares paid by its users. Under present patterns, UPT fares are low compared to the cost of providing the service. The reasons for limiting the contribution of users are to favour the diversion from cars to UPT to reduce non-internalised externalities of urban traffic and to comply with its social role as provider of accessibility to citizens. The consequence is that UPT revenues from fares and other commercial activities typically do not even cover operating expenditure. This means that UPT-specific infrastructure and, quite often, even the purchase of rolling stock and part of the O&M must be covered by public budgets. This affects the accounts of those public administrations responsible for UPT services, which must ensure the availability of the necessary subsidies.

The practical structuring of UPT financing depends very much on the governance models that frame the provision of these subsidies. The variety of the relations between local, regional and national administrations complicates any classification, so it is relevant for the study to set up some basic criteria to analyse the UPT financial conundrum. A simple way to tackle the problem is through the identification of the various types of UPT expenditure and how they are financed. Three major categories are to be considered:
A. **Investments.** Investment programmes contributing to substantially enlarge or ameliorate UPT networks with the aim of improving accessibility and favouring sustainable urban mobility. These projects are typically related to infrastructure and superstructure expenditure, to rolling stock or vehicles purchase and to technology applications for the provision of better services (fleet management, user information, etc.). The principle “who benefits pays” (direct beneficiaries, but also indirect ones and the society in general through the provision of options for non-users) could be applied to finance new infrastructure projects, but it is extremely difficult to establish how such benefits are distributed for UPT investments.

The Government promoting the investment (GPI) in major UPT actions is normally a national, regional or metropolitan authority that, quite often, delegates the implementation of the project to a fully owned public entity or company. In some cases a public-private partnership (PPP) scheme is used and a private (or partly public) Special Purpose Vehicle (SPV) takes the responsibility to design, build, own, and maintain the new infrastructure. A UPT promoter traditionally tries to fund the project, as much as possible, through loans from International Financing Institutions (IFIs) and/or private banks in order to distribute the project’s financial burden over several annual budgets in a way that may be affordable by the GPI that is ultimately responsible for covering the full costs, because they are not recoverable through user fees. This fact is the argument that is often used by GPIs to try and obtain grants from upper-government bodies, including the EU, to reduce their direct investment.

B. **Improvements (adaptations and maintenance).** Investments mostly related to heavy maintenance of existing UPT infrastructure (metro, tramway), renewals of rail rolling stock or the bus fleet, and other minor investments focused on the quality of UPT system operation (e.g., shelters for bus stops, information panels, ticketing system, etc.) and to improve environmental conditions (air pollution, noise...).

C. **Services.** Operations and maintenance expenditure is needed to deliver quality UPT services. This includes the running costs of the services, including ordinary maintenance operations for vehicles, and the soft maintenance of rail infrastructure and superstructure and of some facilities used by bus services. They depend, obviously, on the extension and complexity of the UPT network. In major urban areas, in particular when they count on rail services, operators may require significant amounts of O&M funds that very often are much bigger than the revenues from the users. The various administrations and agencies involved in the provision of UPT services are thus expected to find an adequate distribution of the deficit among them.

**Sources of finance**

Finding the most appropriate funding instruments to sustainably finance public transport is complex and, as already mentioned, depends heavily on the governance structure. Figure 3-1 shows in a simplified way how the basic components of the financial equation are balanced to avoid deficits that would make the system unsustainable. The expenditure in capital (Capex) needed to fund investments (i.e. infrastructure construction) and operation and maintenance expenditure (Opex) is not covered by revenues and requires additional public contributions (some of them possibly from specific funds) to cover the deficit. Within this equilibrium it is also necessary to make sure that the various types of UPT expenditure are financed in ways that ensure the long-term stability of the accounts of the different agents, particularly the public authorities involved in UPT, as they are the main contributors to the funding in terms of investment and, often, operations, through the payment of subsidies or in the direct running of transport services by municipal authorities (CODATU, 2009).
Funds from society
The final source of the public funds needed to finance the UPT system are the taxpayers. The public budgets of the different administrations (local, regional, national) supporting UPT are fed, more or less directly, from general taxation on revenues, property, consumption, etc. including specific taxes on the transport sector (on fuel, vehicle ownership, vehicle purchase, etc.). Some specific taxes may be earmarked for UPT, usually through dedicated funds. In this case some particular groups of citizens (e.g. car users) may be affected.

Funds from beneficiaries
Beside taxpayers, beneficiaries\(^5\) (users and non-users) of the UPT system contribute to its financing. The revenue generated by users, as direct beneficiaries purchasing travel tickets according to regulated public transport tariffs, typically cover a proportion of operating costs within a range of 40-60% in most metropolitan areas of the EU.\(^6\) Indirect beneficiaries of improved accessibility and mobility conditions may contribute to finance UPT through multiple mechanisms. For example, the increase in property values due to better transport can be captured through property taxes and, exceptionally, through betterment levies, development charges and other land value capture mechanisms. In France, employers contribute to UPT financing through payroll taxes due to a legal obligation established in the “Versement Transport” law. Users of individual motorised vehicles may be subject to levies or tolls to alleviate congestion and internalise external costs (pollution, congestion, noise, etc.); these payments are quite often earmarked for UPT financing. Moreover, parking charges and revenues from advertising and commercial activities in transport facilities can also be devoted to reduce UPT deficit.

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\(^5\) “Beneficiaries” refers to those people, companies and business activities or entities that will benefit from the presence of a public transport system and the accessibility that it provides (optionality) without necessarily being direct users.

Table 3-1. Sources of funds and financing instruments for transport initiatives

<table>
<thead>
<tr>
<th>Funding and financing instruments</th>
<th>Source of Funds</th>
<th>Who bears the financial burden?</th>
<th>Financial Scope</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grants</td>
<td>Upper-level government</td>
<td>Society</td>
<td>Investments/Improvements</td>
</tr>
<tr>
<td>Public Budget</td>
<td>Taxpayer</td>
<td>Society</td>
<td>Investments/Improvements/Services</td>
</tr>
<tr>
<td>Earmarked Taxes</td>
<td>Taxpayer</td>
<td>Society/Beneficiaries</td>
<td>Investments/Improvements/Services</td>
</tr>
<tr>
<td>Loans</td>
<td>Banks, IFIs</td>
<td>Society</td>
<td>Investments/Improvements</td>
</tr>
<tr>
<td>Bonds</td>
<td>Banks, Institutional Investors, Capital Markets</td>
<td>Society</td>
<td>Investments/Improvements/Services</td>
</tr>
<tr>
<td>Green Financing Solutions</td>
<td>Institutional Investors, Capital Markets</td>
<td>Beneficiaries/Society</td>
<td>Investments/Improvements/Services</td>
</tr>
<tr>
<td>PPPs (DBFO⁷ commitments)</td>
<td>Third parties/Institutional Investors</td>
<td>Society/Beneficiaries</td>
<td>Investments</td>
</tr>
<tr>
<td>PPPs (others)</td>
<td>Third parties (private actor)</td>
<td>Society/Beneficiaries</td>
<td>Improvements/Services</td>
</tr>
<tr>
<td>Land value capture mechanisms</td>
<td>Real state owners/Developers</td>
<td>Beneficiaries</td>
<td>Investments/Improvements</td>
</tr>
<tr>
<td>Ticket sales</td>
<td>Users</td>
<td>Beneficiaries</td>
<td>Transport Services</td>
</tr>
<tr>
<td>Versement Transport (France)</td>
<td>Employers</td>
<td>Beneficiaries</td>
<td>Investments/Improvements/Transport Services</td>
</tr>
<tr>
<td>Congestion/Parking charges</td>
<td>Private car users</td>
<td>Beneficiaries</td>
<td>Investments/Improvements/Transport Services</td>
</tr>
<tr>
<td>Commercial Fees</td>
<td>Business activities (advertisement, shops, etc.)</td>
<td>Beneficiaries</td>
<td>Transport Services</td>
</tr>
</tbody>
</table>

Pricing strategies

Adequate accessibility is considered a service that should be ensured by the public sector at acceptable costs for all citizens. The only technical possibility available to provide adequate levels of accessibility to the urban population is through collective transport. The massive use of private vehicles is not compatible with the structure of European cities. Even in urban areas designed for the automobile, like many USA cities, congestion prevents the provision of the desirable levels of accessibility. However, even in dense urban areas with reasonable UPT services, the generalised costs of transport for many trips within the city are (or are perceived to be) lower for many travellers, particularly for those with higher values of time, especially if there is no specific payment for the use of the car (through tolls or similar) and the externalities this generates. Under a

⁷ A DBFO commitment implies for the private partner to design, build, finance, operate and maintain the infrastructure and, once finished the concession period, transfer it to the GPI.
market situation that is not taking into account the “user pays” principle, the standard practice has been to reduce the generalised cost of public transport through better service and, more generally, through low tariffs, aimed principally at attracting those who are more aware of the real costs (e.g. commuters) or are more price-sensitive. Such low tariffs, as already mentioned, are not able to cover the overall costs of public transport, which include the full costs of infrastructure construction, operation and maintenance, and, as a consequence, transport services are typically lossmaking for public authorities.

The issue is to design a pricing strategy that is able to match two somehow contradictory objectives: attracting users to the system, particularly those prone to use private transport modes, and reducing as much as possible the deficit generated by subsidised tariffs. On the other hand, the variety of fares that is observed in most UPT systems does not obey to market reasons but to social policy objectives (special fares for children, elderly people, unemployed, etc.). UPT pricing strategies are thus politically sensitive. They are also bound by certain constraints, such as the difficulties of sudden changes in the tariff scheme as they may create strong opposition from certain social groups or have an undesirable impact on inflation rates.

Under this framework, it is obvious that UPT fare regulation, stemming from these economic and social considerations, cannot be derived from the market and responds to the particular situation of the urban area and to the social and political interests of its decision-makers. In any case, the pricing of the services is a key factor in the UPT financial structure, as it has a direct repercussion in the operating deficit. The observation of this deficit around the world indicates a trend towards relatively lower tariffs and higher deficits when countries become wealthier, probably as part of the concomitant social actions to prevent marginalisation.

Under this context, but always constrained by the regulatory set up, transport authorities usually introduce “political” nuances in UPT pricing, looking for a positive impact on their stated objectives. The implementation of integrated fares, for instance, allowing the use of several services and even transport modes independently if they are managed or not by different operators- with a single ticket, can enhance urban mobility as it favours free transfers between transport modes/vehicles during a period of time (seamless journey), but it may have a substantial negative impact on total revenues if it does not increase demand. The territorial structure is particularly relevant for integrated fares as fares are often linked to the capacity to move inside a specific area. The zonal distribution has not only a social component, as certain areas are wealthier than others, but also a political dimension if the zones have different local authorities involved. Certain season tickets tend to increase demand during peak hours when the provision of additional capacity may be very expensive. Special tariffs for some social groups (disadvantaged minorities, youngsters, elderly people, students, etc.) may also affect the financial equation, particularly if the beneficiaries use the system in high-demand periods.

As mentioned before, in the urban context, UPT pricing must be analysed in the context of the generalised cost of mobility. Besides attractive UPT tariffs, if public authorities desire to limit the use of private vehicle they should consider the application of congestion and/or environmental charges in specific areas or during certain periods of the day. Such charges may attain different levels of sophistication (parking charges, area licenses, electronic road pricing with tolls that are linked to road use, time of day vehicle emissions, etc.) and could be assigned to reduce UPT deficit.

An overview of the financing options for UPT

The options to sustainably financing UPT are multiple so the financial package for each project or system should be carefully designed to optimise it. Local authorities require counting on both strong financial capabilities and regulatory skills in order to select the best suited financing tools. They should also be able to understand the relationships among the different actors involved in UPT financing, which are complex and involve different government levels and regulation frameworks.
It must be stressed that, in the UPT sector, the agents enduring the financial burden of any public investment, at the end of the day, are users and taxpayers no matter the financing instrument employed to develop the project. In general, at least in EU countries, direct taxes collected from the whole transport sector usually cover extensively the public investment and the public contribution to the operation and maintenance of the infrastructure. However, the subsidies to collective transport, mostly to interurban rail and buses, and to UPT, are not linked to direct taxes to transport. The subsidies-taxes relation varies not only among countries but even among urban areas in the same country, as their fiscal approaches can be quite different.

An adequate balance should be found between the participation of stakeholders benefitting from the UPT services and the taxpayer (local, regional, national and even European) on the financing of the UPT system. In this context, it is important to detect the indirect beneficiaries of both the new investments and the UPT system, in general, as they can play a prominent role through their financial contributions to the system through ad-hoc financing mechanisms or taxation, based on the principle “who benefits pays”.

3.2. Organisation of transport competences and governance mechanisms

Public organisations formally in charge of spatial development, including land-use planning and the design and promotion/implementation of its related infrastructure, are typically distributed among the national, regional and local levels. The responsibility for the provision of public services, in particular when the subsidiarity principle is applied, falls mostly on the level of government where these services are directly supplied. Local authorities are, in general, in charge of urban mobility and thus responsible for both traffic management and public transport services, although regional authorities often play a coordinating role. UPT services are thus typically regulated at the local, metropolitan or regional level and provided through transport operators that are either publicly owned or participated or fully private. In any case, for the reasons already explained, UPT operators count on public subsidies and, as a consequence, the system requires an adapted governance model that ensures its good performance and a proper use of public money.

Given the variety of situations in which UPT takes place, from the physical and demographic characteristics of the urban area to the political, economic and administrative structure of the country, the governance framework for urban public transport provision obviously encompasses a range of organisation options. The mixture of national, regional and local governance scales is different in each country. This derives, to some extent, from geographical features or population size (Hrelja, Monios, Rye, Isaksson, & Scholten, 2017) and entails that transport authorities are organised quite differently depending on institutional structures, actors’ constellations and/or policy instruments (Treib, Bähr, & Falkner, 2007). The stated objective behind the adopted organisation for the UPT system is to benefit the majority of the community it serves (Oni, 1999), but it can be observed that, quite frequently, the institutional background is what prevents the adoption of efficient structures for urban mobility provision.

The transport authorities’ role

The variety of frameworks has not prevented, however, the appearance of some common institutional patterns for UTP, as a consequence of cumulated experience. The extent of the involvement of a transport authority in strategic activities varies according to local circumstances, but is largely influenced by the scale of the geographic area being served (EPTA, 2014). In metropolitan areas, for instance, the local agencies involved in UPT provision tend to be fully integrated under a common transport authority that usually incorporates representatives of upper-level government institutions. These Metropolitan Transport Authorities (MTAs) gather broad
competences (UPT policy, planning, regulation, management, etc.) that, in some cases, are expanded to include a role on other mobility options (traffic management, parking, bicycle hire, etc.). MTAs, in general, take only institutional responsibilities and delegate some functions, through concessions and contracts, to public or private companies supplying infrastructures and/or services.

In smaller urban areas, UPT represents less of a challenge for the public sector, as they take a smaller share of total mobility, which is essentially provided through private means. Nonetheless, decisions on UPT are quite often poorly split (or even undefined) between the regional and the local levels entailing both deficient services and financial conflicts. Cooperation, in particular through knowledge-sharing and scale economies (from technical services to joint purchases), under the regional umbrella seems to become a main trend in this UPT sub-sector. In this sense, it is worth realising that, in general, transport legislation does not regulate the coordination between different levels of government involved in UPT and its related fields (transport financing, land-use planning, environmental policies, etc.).

From these examples, it could be asserted that, given the variety of roles and interests of the agents in the UPT system, it seems pertinent to establish, at the relevant level and empowerment, a transversal authority that plays a strategic role in the formulation, integration and coordination of strategic policies, plans and programmes. Where they exist, such public transport authorities (PTAs) make the link between political decision-makers and public transport operators and have demonstrated their capacity to improve the effectiveness in the provision of transport services by developing better organisation structures, to avoid fragmenting decision-making capacity between various administrative levels, with different aims, roles and mandates (Hedegaard-Sørensen & Longva, 2011) and to provide well integrated, accessible and affordable mobility options (UITP, 2009).

**Regulations for UPT expenditure**

Transport authorities are usually bound by specific regulations on UPT financing issues. More or less formal agreements exist between local, regional and national governments regarding the financial responsibility of each, both in investment funding and in deficit coverage. To deliver efficient and reliable UPT services transport authorities deal traditionally, with external firms for infrastructure provision and UPT services delivery. These firms may belong to public shareholders, to private actors or to mixed public-private ventures. Whilst infrastructure builders are typically private actors providing services through tendering/awarding processes, very often public actors deliver UPT services in the market at local level through public transport operators (100% public services companies or public holdings), especially because this kind of services are typically loss making. One of the main concerns for public authorities subsidising monopolistic public holdings is their impact on deficit/debt ratios in national and regional public accounts.

Some transport authorities and/or public authorities with transport responsibilities prefer to go beyond the traditional award of construction or operation contracts and commit UPT services involving investment and O&M to private companies through Public-Private Partnerships (PPPs). This allows the public authority to act as a regulator and thus concentrate on service planning and performance monitoring instead of being tied up in the day-to-day supervision of works and delivery of services. Public authorities tie the payment of economic compensations to the operators with specific service commitments. Typical arrangements foresee penalties when operators are not complying with the agreed service quality and additional income if they are able to achieve certain targets, usually related to the amount of users served. PPP contracts for UPT, contrary to other public concessions such as toll motorways, cannot be based on user payments, as they will probably not even cover O&M, and have to establish compensations based on availability or other supply considerations. This undoubtedly requires particularly complex contracts and mechanisms to deal with disagreements, which often appear in the very complex urban mobility environment, as many decisions can severely affect the forecasts made when the PPP contract was signed.
In any case, the possibility of signing agreements with private agents depends on the existing overarching institutional context behind the UPT authority, and also on the regulatory context and other governance constraints, such as bidding procedures. As a consequence, the financing instruments available to support the UPT system can vary widely between metropolises, even between those in the same country with apparently similar features.

3.3. Public accounting constraints

Deficit and debt consequences of financing UPT

A key aspect for the GPI to select among the financing solutions for UPT expenditure is to establish how it will affect debt constraints and its financial impact on public accounts.

Local funding options for investment repayment and UPT service’s operation are multiple, but the limits on public deficit and debt⁸ imposed to the national governments of the Eurozone constitute a severe constrain on investment. The rules stipulated in the European System of Accounts (ESA) to establish whether an investment must be accounted or not as debt for the GPI are key in this sense. Moreover, the new regulatory framework Basel III has introduced a package of measures aimed at strengthening the international banking system. This new regulatory framework has an impact on the banks’ strategies in financing, among other things, infrastructure projects, as they have to resort to shorter-term debt structures (SEOPAN, 2017). Thus, the use of traditional GPI financing structures is constrained, so financing mechanisms involving the private sector are increasingly perceived as a solution to develop public infrastructure.

Given the ability of UPT projects to generate reasonably predictable and sustainable cash flows and the quality of the own assets (infrastructure), this type of projects are particularly interesting for equity funds looking for vehicles to invest their money, directly or indirectly, through project finance schemes, project bonds, etc. (Beeferman, 2008; EIB, 2013). The challenge for public actors involved in PPPs is, however, risk allocation. To determine who will have the economic ownership of the asset in PPPs, which essentially depends on which part, public or private, bears most of the project risks, is a critical aspect of project financing and for the debt/deficit calculations in public accounting. In this sense, it must be stressed that institutional investors can play a role in public transport financing only if the risks to be born entail a sufficient financial return for shareholders. The GPI, on the other hand, is willing to transfer most of the project risks, but obviously only when the compensation to the private partner for the transfer is financially reasonable.

The reality is that certain risks can only be absorbed by the public sector because it is the only partner that can spread the risk among many projects (and many taxpayers). The private partners can essentially absorb risks that are well identified and can be mitigated or, at least, controlled. Otherwise, available experience shows that they will only accept risks when they are somehow reduced by GPI commitments. Actually, the potential losses of poor projects are limited by the PPP contract itself or, eventually, by future renegotiations (Ruiz Ojeda, 2006; Gauza & Llobet, 2017). The question of interest is, therefore, whether the Value for Money (VfM), which should be understood as the additional efficiency for the whole society, brought about by the private participation, is high enough to compensate the transaction costs (in terms of resources) generated by the innovative financing schemes involving the private sector.

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⁸ According to Annex 2 of ESA, public investment for infrastructure creation must be considered as an expenditure incurred during the construction period, independently of: (1) whether the payments to builders are made or not during that period; (2) the repayment schedule in the financing agreements for the project between the GPI and third parties; and (3) the amortisation period for the infrastructure. In clear opposition to the logic of ESA rules, PPPs allow distributing the impact of infrastructure production in public accounting during longer timespans.
3.4. UPT financing in EU cities

Compact urban structures, typical of European cities, are more favourable for cost-efficient and attractive UPT services. European urban areas count, in general, on an extensive offer of UPT services providing both high capacity of transport in the main urban corridors and capillarity extensions of the networks to satisfy the accessibility needs of their citizens.

UPT services in the EU are managed under a wide range of governance and financial arrangements between different public administrations, which mostly depend on the territorial organisation, the public financing structure and specific regulations.

In the Netherlands, for example, whereas UPT is managed at metropolitan or province level, public funds basically come from state aid from the central government. A similar scheme can be found in Italy, where the State transfers a proportion of fuel tax revenues to regions to finance and manage UPT. Alternatively, in Spain, Madrid and Barcelona finance their UPT networks through an administrative consortium with its own legal personality. A small proportion of funding is provided by the State through contract-programmes and infrastructure subsidies. The majority of funds to cover UPT investments and O&M deficits are provided by regional (autonomous communities) and local authorities. Finally, in Copenhagen and Stockholm, for example, the participation of the central government in the financing of the urban transport systems is completely marginal or non-existent. Local administrations are responsible for their exploitation deficits and their investment needs, except for those related to state railway companies.

The United Kingdom (UK) presents a singularity in that bus services are completely deregulated since the 1980’s. This allowed for the introduction of competition on local bus services. Two kinds of bus service can be provided: commercial and subsidised. Any bus operator can freely enter to the market and run a commercial service without any subsidy and no restrictions on fares. Only services deemed as non-commercial can be subsidised. These are routes which the PTA considers as socially necessary, but are not commercially viable without a subsidy. The fares, routes and times of these subsidised services are set by the PTA. However, PTAs are normally required to seek competitive tenders for these services.

A second singularity in the UK is that funds from the State Department of Transport to local authorities for improvements in UPT services are increasingly provided through a bidding process, while the amount of fixed grants has decreased in the last years.

The French case is also singular. Revenues from the payroll tax (Versement Transport) are directed to local or metropolitan transport authorities to finance capital and operating costs of UPT. Because of this earmarked tax, which constitutes a large proportion of funds for UPT, the financing and managing of UPT in France is particular in many ways and, for example, the cost coverage of operating costs with fare revenues is significantly lower than in other countries.

Financing operating costs

For cities belonging to the Association of European Metropolitan Transport Authorities (EMTA), the yearly cost of operating public transport per inhabitant is around 350-400 €/year/inhabitant. However, large differences can be observed according to the city size. Whereas in London it is 998 €/year/inhabitant, in Cadiz bay it represents 14 €/year/inhabitant (EMTA, 2015). For this reason, large metropolitan areas demand a much higher operating subsidy allocation. In 2008, for example, Madrid and Barcelona received 83% of the total operating subsidy provided by the Spanish central government, while Paris and its metropolitan area received 54% of the total French government subsidy (Ruiz-Montañez, 2017).

Compared to other areas in the world, the financing of public transport in Europe is characterised by a higher proportion of public funding supporting UPT operations, which implies a smaller coverage of operating costs with fare revenues. These revenues are, nevertheless, a substantial contributor to the coverage of operating costs. According to a survey for EMTA cities in 2012, user revenues cover, on average, some 48% of...
operating costs (EMTA, 2012), but significant differences may be found among European cities. Figure 3-2 shows the main funding sources for UPT operating costs in a selection of EU cities. In Paris and Lyon, a proportion of 40-48% of operating costs are covered by the Versement Transport fund and, thus, fares coverage can be significantly lower than the average. In other cases, like Prague, Turin or Budapest, coverage from fares is also below the average but the remaining operating deficit is financed by public subsidies. Among the metropolitan cities selected, the maximum coverage level is achieved in London and Stuttgart (68% and 57%, respectively). It must be noted that some additional revenues for the operators may come from non-UPT commercial activities.

Figure 3-2. Main funding sources for UPT operating costs in a selection of EU cities (EMTA, 2012)

The contributions of the different levels of the administration to the coverage of the operating deficit varies depending on the UPT mode and the context. In general, the central government provides a higher contribution for local train services, while the other UPT modes are mostly supported by regional and local governments, although their participation is very heterogeneous.

Financing UPT investments

The financing of UPT investments may be addressed by using different funding and financing instruments coming from various sources:

- Public budget and earmarked taxes, from taxpayers.
- Private investment from PPPs (DBFO), green financing solutions and debt, coming from institutional and private investors.
- Debt and PPPs (other types, different from DBFO) money coming from private investors.
- Property taxes, betterment levies and land value capture mechanisms coming from indirect beneficiaries.

9 UITP Transport Economics Commission published a report that brings to light how, depending on the coverage rate method used, there can be significant differences in the estimated rates. Thus, the comparison of results should be taken with caution.
Examples of earmarked taxes that may provide financial support for investments are the Versement transport tax in France and the Mineralölsteuer (a proportion of the fuel tax) in Germany.

In the case of UPT, even when private funding is involved, the ultimate funds to pay for investments are basically contributions from public authorities. The commitment to do so can be used for credit guarantees when needed to arrange the financial structuring. Thus, it is relevant to consider the contribution of the different government levels in financing UPT investments. The amount and the characteristics of the investment logically affect how it is perceived and, as a consequence, the possibilities of luring the participation of the relevant administration in its financing. Investments in infrastructure and rolling stock, for instance, are typically counting on different sources.

The financing of investments in rail and metro infrastructure is basically split between central and regional administrations. However, in the majority of cases the central government plays a fundamental part in their financing. In more decentralised States such as Germany or Spain, the contribution of regional authorities may be higher. In any case, the contribution from local authorities is generally very low.

Investments in metro and railway rolling stocks are financed, in the majority of cases, by PTOs using some financial instruments or with their own resources. Investments in other rolling stock and vehicles, fundamentally buses and trams, may be fully financed by a local contribution or, alternatively, through a shared contribution between the three government levels (State, regional and local).
4. Analysis of existing financial instruments for UPT

Transport authorities responsible for UPT count on a variety of instruments to finance investment and operation and maintenance of the system. The main challenge for them is to get access to these instruments and to combine them wisely and fairly. In order to do so it is first necessary to understand the characteristics and potential of the available financing instruments and their relative advantages and disadvantages. For this purpose, Figure 4-1 below shows a classification of those instruments typically available for GPIs and transport authorities.

Figure 4-1. Financial instruments for UPT

4.1. Borrowing options

Concept

This group involves the constellation of borrowing possibilities for public authorities, but also for private stakeholders investing in the system. It is not of relevance for this study to describe the characteristics of loan facilities. It is worth mentioning, though, the potential interest of using soft loans from public lending institutions (EIB and other IFIs, national banks, etc.) that cover a financial market gap and offer particularly good conditions in terms of duration, interest rates, grace periods, etc. It is worth insisting here that taxpayers will end up paying for the totality of the investment, and therefore the debt. As already explained, in the majority of urban areas of the EU there are practically no investments in UPT for which the generated additional revenues for the system are sufficient to cover the additional O&M cost stemming from the investment. Recovering even a small part of the investment is therefore very improbable under the current situation and thus the whole amount of money spent will have to come, under different forms, from the taxpayers who benefit from UPT. Debt is a reasonable option to spread the burden of investment on taxpayers over the years of operation. It would seem, however, less appropriate to use loans to pass the deficit generated during one period to future taxpayers. Private investors in UPT infrastructure will usually have access to similar lending facilities as those enjoyed by the public sector, because investors will only participate in a PPP if they have sufficient guarantees of repayment. As UPT infrastructure does not, in principle, generate direct revenues, these guarantees will end up coming from the

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10 This is, unfortunately, a rather common situation because it is politically appealing to postpone unpopular measures (such as fare increases or new taxes) and pass the resulting deficit increase, and the additional debt, to future administrations. The snowball effect produced by this behaviour leads to an unsustainable situation that, at a certain point, has to be solved by a massive financial restructuring that is often disastrous for the many stakeholders affected, including UPT users.
commitment of payment, in various forms, given by the GPI. This means that private investors in UPT infrastructure essentially act as financial intermediaries to obtain the money for construction. They will require some compensation for this task and, given that this intermediation represents a further step in the guarantees scheme, there are often additional fees and higher interest rates than in direct loans to the GPI. A variant of this is a procurement process in which payments of the works to the construction company are delayed. This method, used by certain countries to reduce the public budget deficit of the year in order to comply with macroeconomic criteria, is not accepted by Eurostat in this sense and seldom used nowadays. It is also, by definition, more expensive than standard loans, as the guarantees to the banks have to be provided by a company that is probably unfamiliar with complex financial arrangements and is already perceived by the banks as accountable for some construction risks.

Debt financing is also systematically used for the purchase of mobile assets, such as wagons, trams or buses. In this case, there are additional options because the possibility of the recovery of the assets for alternative usage allows the operators to guarantee a loan covering even the totality of the investment. Leasing and renting mechanisms to buy rolling stock and buses are an example of the possible alternatives to corporate loans, for which the public or private company operator will respond to the bank with its global financial position. These asset-based mechanisms are, of course, more expensive than traditional loans, but they usually show fiscal advantages that makes them attractive to corporations. These advantages should be considered in the global financial set up of any UPT investment, as they most probably affect different administrations, according to how taxes are split among them.

Considerations

The main advantages of debt financing come from the spreading over time of the repayment of the funds required for construction and, compared to other mechanisms, from more flexibility to adapt to the actual project requirements, including the extension of the loans if some cost overruns occur. The adaptation to the long-term characteristics of the infrastructure projects, including the acceptance of a grace period that could affect, in some cases, not even the amortisation of the principal but also the interests, could be essential to ensure the financial sustainability of the project. Some practices could be, however, rather unfair for future generations. For example, some borrowing agreements (i.e. bullet loans), mostly provided by IFIs, although infrequently, allow borrowers the repayment of the entire principal at the end of the loan term.

New specialised lenders

Alternatively to traditional sources of credit, i.e. private banks and IFIs, some Investment Funds have emerged in the last decades as a way of channelling funds directly from capital markets to specific areas of societal interest. In the public sector, for example, it is possible to find multiple financial agencies across the EU that have decided to set up their own funds with the aim of financing investment programmes or projects related to green or social goals in urban areas (sustainable investment strategies). This can be an option when the effects of these investments are measurable and the GPI can monetise them, i.e. net benefits can be expressed in terms of money.

4.2. Public-private partnerships (PPPs)

Concept

PPPs are the most common formula to incorporate private investors into UPT. As there are practically no market niches where the private sector could develop profitable operations without public support and as, even in these cases (for instance, some touristic services), they are regulated, any arrangement with private investors will involve commitments from both sides, including financial transfers from the public sector, and define, therefore, a partnership. A main objective of a PPP will always be to
reduce the public sector short-term funding needs and to **distribute/smoothen in the long term the impact of UPT payments** on public accounts, notably for investment. This can be done through **innovative risks allocation schemes** with a twofold objective. First, through contracts, such as DBFO\(^{11}\) agreements, which allow distributing in the long term the fiscal impact of transport expenditure on public accounts. Second, avoiding eventual cost overruns for the public sector from biased construction cost estimates, higher maintenance and operation costs than foreseen, etc. In UPT it is more difficult than in other transport projects to introduce demand risks on the contract, because the private partner has very limited leeway on tariffs. However, a PPP with the right incentives can contribute to increase the demand for the specific project and even for the whole system. If this results in a revenue increase for the UPT system, the PPP arrangement could somehow compensate, through this increase, the additional transaction costs generated by a privately managed operation.

**Considerations**

It is worthwhile underlining that PPP is not a tool of funding or financing but it should be considered as a way to enhance efficiency in the relationship between public and private actors because both parts share a common interest in the development of a project. Actually, as already explained, the GPI ends up paying the estimated investment costs with higher interest rates than those that could be obtained by the GPI directly from banks. However, the private agent could be expected to build the project on time and below the estimated cost, something that is not so common when the promoter is public. On the other hand, the PPP arrangement should represent an effective transfer of the majority of risks to the private partner in the PPP. Otherwise the European accounting rules (ESA) may entail an unwelcome impact on the GPI’s deficit/debt ratios if Treasury authorities find that there was not an effective transfer of the majority of risks to the private partner in the PPP. In this case, the higher amount to be paid would be included as debt (discounted future payments) in public accounts.

### 4.3. Land value capture mechanisms

**Concept**

This group includes funding mechanisms based on **capturing a proportion of the increase in the value of properties during a pre-defined time span**. Land value capture mechanisms (LVC) typically aim at sustainably financing investments and network improvements, which can be achieved through extraordinary property taxes, betterment levies or development charges that capture a reasonable or fair amount of the increase in value that the project brings to owners or to developers. Another option is land asset management where public authorities acquire land before the UPT project is announced and sell it after the project is implemented.\(^{12}\)

A wide range of funding and financing solutions falling within LVC are increasingly used to sustainably finance new urban developments. Their application is particularly adapted to the creation of public transport facilities giving service to UPT network extensions. In the case of new (greenfield) urban developments, the use of LVC allows collecting a share of the accrued benefits to landowners and use them to finance the project along its life cycle\(^{13}\).

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\(^{11}\) In this case, the private partner would be asked to make the final design (as in the urban setting, the pre-design will be decided in the relevant urban plan), build the infrastructure and buy the vehicles, find the money to finance the venture and operate the service. A proper compensation, in principle adapted to the risks adopted, will be needed to lure investors to enter the partnership.

\(^{12}\) For a more detailed description of the different land value capture mechanisms, see, for example, Ardila-Gomez and Ortegon-Sanchez (2016)

\(^{13}\) Legislation will not allow a scheme to capture economic resources higher than the cost of the project. A typical life cycle for development levy schemes is 30 years.
Considerations

The point is to distinguish between financing instruments for strategic urban development purposes and funding instruments that aim at contributing to sustainably finance UPT projects. Very often, it is difficult to determine the trigger of these complex financing operations. As changes in land use depend on the relevant public authority’s will, landlords are traditionally willing to accept additional burdens on their properties when such charges are necessary to materialise the expected swift benefits from an operation that enables them to build in new zones. In this case, public initiatives to develop the city through UPT-centred accessibility improvements based on new infrastructure investments and using LVC may be more easily accepted than other land use changes. In general, however, using LVC to extend the UPT network towards consolidated zones will be quite difficult to apply, as real estate owners will be reluctant to contribute to finance something that is not directly transferred to their income, at least in the short term.

Despite these difficulties, LVC may also be a feasible option for UPT funding, although, as already mentioned, there would logically be some opposition, in particular if this is not a usual practice. Property owners would be asked to accept an exceptional tax or a betterment levy on their properties during a period of time to finance the transport investment. As public acceptability of these charges is, indeed, a key factor for its implementation, it is essential that beneficiaries understand that the funds from betterment levies/taxes are dedicated to funding UPT. Decision makers may consider labelling them as earmarked funds. There are many cases across the EU where this funding system has been applied linked to the construction of both new transport facilities and improvements in transport infrastructure (metro, tramway) providing better accessibility conditions to existing urban areas.

Difficulties

As it can be easily understood, the main disadvantage of LVC is the need for local authorities dealing with land use and UPT decision makers to achieve an agreement on the subject and to get a sufficient degree of public acceptability to apply new taxes or levies on private property. The population can show a social rejection to “supplementary contribution development schemes”, as these schemes may be seen as a factor that increases the cost of residential housing. Other legal difficulties may arise depending on the global institutional context and where the competences to enforce new taxes/levies (and to capture the new revenues) rely within the different levels of government. Indeed, this is a complex matter that may require referendums and the development and approval of new laws in some countries, as the use of some funding tools based on LVC mechanisms requires attaching financial burdens to the planning permission (new urban developments) or to the existing levy on the increase in the property value (consolidated urban areas). Whatever the case, it must be taken into account that residential taxes/levies may vary considerably over the cycles affecting real estate and therefore their potential contribution to finance UPT, when LVC funds are earmarked.

4.4. Green taxation

Concept

This group of instruments refers to funding solutions related to green taxation (pollution charges, congestion charges, etc.) earmarked for public transport financing and the requirements needed to make them work. Green taxes have generally a twofold objective: 1) providing incentives for a reduction of environmental or other externalities (congestion, pollution, noise, etc.) caused by road use in urban areas, and 2) generating an added funding source that supports the financing of UPT. The rationale behind this cross-financing is the need to apply Pigovian taxes for a more efficient urban mobility and their capacity to generate additional resources to improve UPT services. To enhance the acceptability of green taxation, the funds collected should
be devoted to improve UPT. On the other hand, to be able to incorporate these funds into the UPT financial equation it is essential that they are quite fixed and sustained over time.

**Considerations**

Depending on the scope and the design of the green taxation scheme, either demand objectives (reduction of externalities) or supply objectives (robust funding for UPT) will be prioritised. For example, congestion charges are an appropriate mean of dealing with congestion and other car externalities in urban areas but their application implies high implementation and operational costs. Other policies, such as parking levies (see the Nottingham workplace parking levy scheme, for example), are cheaper to implement and operate. The additional charges to automobile use may provide sufficient funding for investing in ambitious UPT projects, but this will obviously depend on the structure and amount of the charges and on the impact they may have on car usage. The more inelastic the demand of travel by car is, the more stable the revenues available for UPT will be. Assume, for example, a congestion charge for peak hours in a city where working hours are very flexible. Car users will avoid driving during peak hours and revenues will diminish. In a longer term perspective, the potential impact on green taxes of electrification, autonomous shared vehicles and other developments, such as cooperative driving, pushed by technological development, must be taken into account. Hence, both the quantity and the stability of funds generated by green taxation depend on the design of the scheme and on which policy goals are prioritised but also on their capacity to adapt to change.

**Difficulties**

The overarching institutional context and practical implementation issues are key for these “green taxation solutions”. As in the case of any other tax, law constrictions, governance rules, local/transport authority’s powers and political acceptance are key for their success. Public acceptability has been the major barrier for the implementation of such policies in many urban areas. Thus, besides the legislative framework, the introduction of green taxation requires a strong and stable political set up capable of achieving social consensus.

**4.5. Revenue management**

**Concept**

This group of instruments comprises mechanisms that generate revenues to finance the operation of UPT services. Fare revenues are obviously an essential part of the UPT financial system and, thus, the optimisation of fare management deserves the attention of public transport decision-makers. Technological improvements in ticketing systems enable the adoption of more sophisticated tariff structures. Through the better demand knowledge from the information collected by electronic payment means, these structures can respond to particular user needs and, at the same time, increase fare revenues. This may include the use of dynamic or distance-based pricing or even the introduction of premium services for specific user needs, applying higher fares. In many cases, the review of the UPT tariff system entails political controversy. It is therefore an issue that often appears in local elections debates, so carrying out substantial changes in UPT tariff arrangements highly depends on political cycles. A consensus among the key political parties on a systematic fare review mechanism, for instance relating it to inflation rates, would increase the financial sustainability of UPT services. It must be stressed, however, that there is a complex balance between the need for an attractive fare system (such as integrated tariffs), the interest of ensuring maximum use of the system (through lower prices for recurrent use), the social action (attention to handicapped, minorities, etc.) and the maximisation of revenues.
**Trends**

The emergence of new mobility services and the integration of real-time information from multiple modes in unitary and easily accessible platforms will certainly shape the scope of public transport services and the way these services are priced. The introduction of the Mobility as a Service (MaaS) concept reinforces the need to rethink UPT fare management and to set user-based pricing solutions. Public transport authorities could offer complementary services as park and ride facilities, car-sharing or on-demand services within an integrated fare and ticketing system. This should strengthen the financial capabilities of transport authorities whilst optimising the supply of public transport.

**Other revenues**

Besides the important issue of fare revenue management, public transport authorities may seek funding sources from indirect beneficiaries of UPT services. Differently from green taxes, where taxation aims to correct for externalities, other taxes or charges may be introduced with the only purpose of funding UPT services and, thus, lowering their operational deficit. A clear example of this is the Versement Transport in France. In this case, companies, as indirect beneficiaries of UPT services, are obliged to contribute to its funding through a payroll tax. Other similar mechanisms may be envisaged but they all require a broad social and political consensus and, in many cases, specific and cumbersome modifications of existing laws.

**4.6. Commercial value**

**Concept**

Strategies to obtain **extraordinary funds from beneficiaries of transport facilities** (rail/metro stations, modal shifting terminals, etc.). Typical beneficiaries are companies interested in renting/leasing commercial spaces within transport facilities that aim at advertising and/or selling their products to transport users following obligatory tours or standing within these facilities in the process to make use of UPT services. The main challenge for public authorities to obtain revenues from private companies is to find out the right price for renting/leasing and, further, to design stable commitments to share their potential rise in benefits, for example through a fee on sales. The airport model is probably not the best suited for UPT as there is not or should not be much idle time in the waiting facilities. The idea, already developed in cities like Hong Kong, is to create a seamless UPT space where the public is walking along places offering services, as in a commercial street, and the public transport component is part of the global mobility experience.

There have been many failed experiences in the commercial use of UPT-related spaces. The innovative proposals are based in the creation of attractive spaces integrated in the mobility experience. They require more investment and specific design to create a safe and “modern” environment able to take advantage of the great number of travellers passing by. In this endeavour, the participation of the private sector since the planning of the action is essential.

**Considerations**

A question of interest is if these commercial opportunities have the capacity to raise stable and predictable funds for the UPT system, as well as whether they have a meaningful impact on its financial sustainability. The flows from these commercial activities depend very much on the relationships between the UPT managers and private companies. Quite often, UPT managers, centred in their transport operations, underestimate the potential of stations and other UPT facilities to attract customers for companies providing commercial services. With poor expectations, public managers assume that commercial services will have a small financial impact and will consume a
lot of management efforts, so they may lack in motivation to commercialise public spaces and will show little interest in developing bold actions to attract customers. Whilst there are locations within the UPT network that can be considered “golden places” in terms of consumption and thus very convenient for private enterprises to sell their products, e.g. intermodal stations in the city centre, most transport facilities in suburbs have little sense for commercial purposes. Without flexible cooperation between the UPT operator and commercial companies leasing the facilities, poor outcomes in terms of revenues for all of them can be expected. There could be, therefore, a case for better management of these “commercial” areas, including the possibility of outsourcing it to a specialised manager of these venues, which could provide a fixed yearly income for the UPT system.

Advertising has been a traditional source of income for UPT companies. In specific stations or stops and in vehicles (outside and inside them) fixed adverts have been used practically since the first UPT services. New technologies allowing more flexible and focused messaging are increasingly being used. There is therefore a potential to be tapped for new applications linked to telecommunications and other technologies. On the other hand, it is possible to increase the revenues generated by advertising. Experienced teams with adequate skills (commercial, marketing, legal, etc.) could define new global long-term commitments with private companies interested in managing the commercial potential of the UPT network. In short, integrated strategies enhancing the commercial value of the overall UPT network could lead to positive results in terms of operational deficit financing as a result of the increase in predictable and stable revenues from indirect beneficiaries.

4.7. Conclusions

**Blending of financial options**

In the classification above, society (the taxpayer) ends up footing the bill of most UPT infrastructure investment. UPT users can endure a part of the financial burden from the investment although, in most cases, covering the generated operation and maintenance burden would be considered a success.

The essential point is how to combine wisely and fairly the different funding and financing instruments available for PTAs and GPIs. The classification above and the analysis of advantages and disadvantages (see Table 4- below) provide some clarification and guidance for application. In some cases, decision makers may improve revenue strategies, or they may enforce the use of new funding sources as a way to feed the public budget with the purpose of financing UPT amelioration, such as betterment levies (LVC). In other cases, they may opt to obtain funds through debt emission or long-term loans. They even may be interested in financing alternatives through PPPs when the GPI faces fiscal constraints. The possibility of increasing UPT revenues through the cooperation with private partners, who could take advantage of public transport facilities for their businesses, must be considered even though their overall contribution to deficit reduction might not be very substantial. It could be said that, for major investment programmes and major urban mobility projects, as well as for UPT O&M, it is unusual to rely on a single source of funds. At the end of the day, **decision makers tend to use financing packages combining both funding and financing sources**, which involves taxpayers, users and indirect UPT beneficiaries.
### Table 4-1. Summary of financial instruments for UPT

<table>
<thead>
<tr>
<th>Financing instrument</th>
<th>Description</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Borrowing options</strong></td>
<td>Group of borrowing solutions supported by the public budget (taxpayers)</td>
<td>• GPI can agree with credit entities appropriate repayment conditions.</td>
<td>• Repayment conditions flexibility usually depends on the type of project and the negotiation power of the lender.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Tailored Investment Funds can obtain funding from capital markets directly.</td>
<td>• Tailored Investment Funds from Institutional Investors are only possible when effects of the investments needed are measurable and GPI can monetise them.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Institutional Investors expect lower interest rates for long maturity periods if the project is aligned with “green goals”.</td>
<td></td>
</tr>
<tr>
<td><strong>Public-private partnerships (PPPs)</strong></td>
<td>Type of solutions where a private party bears significant risk and management responsibility in an investment or a service provision</td>
<td>• Distribution in long term of the fiscal impact and associated risks.</td>
<td>• Uncertainty related to eventual financial overruns, based on estimations (i.e. inflated revenues, lower maintenance and operation costs, etc.), although innovative risk allocation schemes make it more improbable.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Appropriated when the GPI has some financial constraints.</td>
<td>• Investment has higher interest rates.</td>
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<td></td>
<td></td>
<td></td>
<td>• Difficulty, in some cases, to transfer the majority of risks efficiently.</td>
</tr>
<tr>
<td><strong>Land value capture</strong></td>
<td>Type of funding mechanism based on capturing part of the increase in the value achieved by the landlords’/householders’ properties due to the UPT</td>
<td>• Suited alternative in urban areas under development.</td>
<td>• The necessity of public acceptance.</td>
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<td></td>
<td></td>
<td>• Possibility of capturing funds from indirect beneficiaries.</td>
<td>• Society’s opposition may depend on the UPT network extension.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Arisen of legal difficulties, depending on institutional context, competences, etc.</td>
</tr>
<tr>
<td><strong>Green taxation</strong></td>
<td>Group of funding solutions related to earmarked taxes or charges aimed at reducing transport externalities</td>
<td>• Represents an incentive for a reduction of environmental and other externalities impacts.</td>
<td>• Need to ensure that funds received from green taxes are stable and sufficient to meet the financial needs during the life of the project.</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>• Public acceptability of these measures and, in addition, the necessity of strong and stable political and social consensus.</td>
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<tr>
<td><strong>Revenue management</strong></td>
<td>Group that includes mechanisms to generate revenues and finance operation costs of UPT services, including fare revenues and other funding sources</td>
<td>• New technologies for payment systems bring opportunities to introduce updated fare structures</td>
<td>• Fares are politically and socially sensitive, and hard to modify</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Earmarked taxes or charges with the exclusive purpose of financing the operation costs of UPT services can provide stable and predictable funding</td>
<td>• Earmarked taxes or charges with the exclusive purpose of financing the operation costs of UPT require cumbersome consensus and legal modifications.</td>
</tr>
<tr>
<td><strong>Commercial value</strong></td>
<td>Actions to obtain extraordinary funds from beneficiaries of transport facilities (for example, leasing activities or advertisement)</td>
<td>• Possibility of generating benefits from UPT assets.</td>
<td>• Generally, it represents a small contribution to the overall funding</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Huge value of the space situated in places of interest or important, such as in the city centre or in intermodal stations.</td>
<td>• Difficulty to find out the right price for renting or leasing and external expertise may be required.</td>
</tr>
</tbody>
</table>
5. Financing challenges for UPT

Motivation

Technological development, which has direct effects on the characteristics of vehicles, but also indirect effects on mobility (for instance through teleworking or e-commerce); demographic trends, such as population ageing in developed countries; security issues; and increased consciousness of the environmental and health effects of motor vehicles, are some of the leading factors drawing transport and mobility perspectives. In urban areas, the observed and foreseen changes in mobility patterns are forcing transport authorities to design plans and investment programmes for UPT services in order to ensure that the expected mobility needs of tomorrow’s citizens will be adequately satisfied. There are, however, some additional objectives pursued by UPT investment, such as moving towards a low-carbon economy and reducing the air and noise pollution footprint, which are shared by all transport authorities across the EU. Obtaining the funds needed to meet the investment amounts that must be mobilised for the realisation of the programmes, represents a major financing challenge for public decision-makers. To establish the proper framework for this challenge, it is worthwhile to analyse with some detail the implications of the former trends in the financing requirements of UPT.

5.1. Urban mobility trends

Demographic Change

Demographic change has an impact on UPT. On the one hand, travel behaviour has been observed to vary with age; UPT use, in particular, is related to the purchasing power capacity of the age group. This explains why transport tickets for the elderly are heavily subsidised, which contributes to a relatively high mobility of this cohort. For example, people older than 65 years buy almost 30% of UPT tickets in the metropolitan area of Madrid. This reduces the average fare, but the overall financial effect on UPT accounts, particularly if the elderly cause only marginal costs, is not obvious. In any case, ageing population is a relevant phenomenon for the UPT financial conundrum. On the other hand, there are important behavioural changes that are linked to age and social trends that affect mobility. They are quite apparent in the present generations of young people. Some experts have pointed out that present youngsters have different aspirations than in the past, showing, in particular, higher interest in personal experiences than in material goods such as cars. This, together with certain social phenomena (youth unemployment, continuous migration to cities, etc.) is reducing car ownership among young adults in developed economies.

Social behaviour patterns affect mobility habits (type and number of displacements, reasons to travel, moment of the day, etc.) and, as a consequence, UPT services requirements. It is therefore convenient to follow the development of demand, particularly in cities where there are multiple transport options (cycling, public transport, car-sharing, etc.) and car use is restricted (scarce and/or expensive parking, congestion charges, pedestrian and traffic calming areas, etc.) in order to produce investment programmes that are adapted to the expectations of the population. The foreseeable demographic and behavioural changes in urban areas will have effects on the financing

14 If they are only allowed reduced tariffs in off-peak period, the overall additional cost of these users may be quite small. On the other hand, elderly people increase average boarding/egress time with effects on operation. In Japan, a country concerned by the phenomenon, some cities plan to extend the tramway system to reduce buses in order to facilitate accessibility to the UPT system.

15 This population sector increasingly encompasses a wider part of it. With the purpose of fostering loyalty among younger customers, some transport authorities have expanded until 26 years old the limit to consider a person as “young” in the UPT sector.
equation of UPT. They may come, on the one side, from reduced revenues from fares, as more users obtain discounts, higher expenditure due to specialised material and more complex operations, or, on the other side, from additional revenues due to more users but they may require additional investments. The absolute impact is not obvious, but will probably go in the sense of UPT requiring increasing amounts of funds for investment and O&M deficit compensation.

**Multimodality**

Multimodality can play a key role to improve UPT efficiency and diminish its need for capital expenditure. Adequate physical facilities/infrastructures (e.g. park & ride, bus-train interchanges and facilities for cyclists and pedestrians) and operational conditions, increasingly enabled by technology, to make a multimodal/multi-leg journey seamless (integrated tariff systems, on-line information of options, etc.) are essential for a successful multimodal approach to UPT. Whilst this may reduce investment needs in hardware, it is clear that the need for expenditure in adaptations and in information technology will increase.

Some recent developments such as car-sharing and ride-sharing may be positive for a multimodal approach to UPT, as they could be integrated in the system for trip legs where demand is scarce. On the other hand, without a rather sophisticated tariff system that penalises the use of cars where UPT is available, these new systems, in particular with the utilisation of autonomous vehicles, could represent a severe loss of patronage for UPT.

Multimodality, including private cars through ad-hoc formulae of integration, could be extremely positive for global urban mobility efficiency and for attracting passengers to the UPT system, ideally diverted from extensive car use. It must be taken into account, however, that the success of multimodality will depend on the possibility of offering services at low generalised costs\(^\text{16}\) compared to the pure automobile option. This means that integrated tariffs, which are essential to reduce the generalised cost of multimodal trips, will reduce the revenues from trips having several (paying) stages. The new revenues from trips diverted from cars or generated by the integrated tariffs will most probably be insufficient to cover the reduction in revenues from existing users and the additional operating costs of the new users. Setting the fares for the integrated system is a delicate task, as it must balance the objective of removing cars, allowing adequate mobility through multimodality and avoiding deficit increase. Some adapted financing mechanisms are often necessary to ensure the financial sustainability of the UPT system. Charges to cars making urban trips in the global financial arrangement is one of the less controverted.

**Smart public transport systems**

Tariff integration has been facilitated by technological innovation. Electronic data collection and payment systems have allowed substantial changes both in ticketing and in demand management. Mobility in densely populated urban areas is increasingly complex, particularly in advanced societies, characterised by the diversification of behaviours and multimodality, so information technology tools become essential for transport planning, scheduling, e-ticketing, cost optimisation, etc. and to provide information to the public. A bold example is when the Googlemaps or Citymapper tools suggest a journey that has different segments combining walking, metro and bus, and digitalisation and data processing allow transport operators to distinguish between time slots. This favours the adaptation of fares to demand contexts (dynamic pricing), such as in London, where UPT tariffs are higher in peak demand periods.

On the other hand, smart cards are being replaced by e-ticketing, such as contactless bank cards and mobile phones that can also be used as mobile ticket machines. As a

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\(^\text{16}\) Generalised travel costs include all the costs perceived by the traveller. Some of them are clear in money terms, other such as the value of time spent in the various phases of a trip (walking, waiting, in vehicle), or safety, comfort, reliability are difficult to monetise. These costs are determinant of the traveller modal choice and, as a consequence, the basis of the demand models used for forecasting modal split.
result, it is increasingly easy to provide integrated services through a multimodal fare system (with free transfers) without having to go through large investments in new technology platforms.

Technology is also helping the supply side. Leading UPT operators are exploring new opportunities created by digital technology to increase their efficiency and enhance passenger experience. Investments in software for fleet management, predictive and preventive maintenance as well as on public information and on-board services can help decrease operating costs and make UPT more convenient and attractive for passengers while providing new revenue streams. Many UPT vehicles in EU cities are already equipped with on-board communication for vehicle tracking, revenue management, customer information, etc. Early moves are now made to integrate UPT into other services such as connected infrastructure (e.g. traffic lights, traffic monitoring and parking). This could be used to grant priority to trams or buses, particularly if they are running late, and on-time information to travellers with information about delays and alternate routes. But digitalisation boosts burgeoning apps enabling smarter UPT that in turn drives transport authorities, operators and vehicle manufactures to new innovations. Indeed, the smart public transport market is expected to grow at around 14% annually until 2020. A **digitalised system for UPT** is at the core of the future society (Öberg, Ribe, Glaumann, Gjelstrup, & Berntsson, 2017), but the speed to unlock such potential will depend on the funding streams available for financing smart UPT systems.

**On-demand mobility services**

On-demand mobility services refer to the use of vehicles that can be accessed on demand. The trip can either be shared with other travellers or not. Travellers typically reserve a vehicle or a ride via a smartphone application or “app” shortly before the trip is made (Greenblatt & Shaheen, 2015). These services are part of a strategy of solutions to substitute trips made in other modes (own car or taxi), but also public transport, and they are increasingly present not only in populated areas but, increasingly, in zones of weak demand. In these areas, **partnering between public transport authorities and private carpooling companies** could offer an incentive for local authorities and employers interested in splitting fare costs. Since this should be a relatively affordable option, the main challenge for UPT financing is to present these partnerships as reliable and convenient to encourage users to consume this type of services. Nevertheless, there is always a risk for on-demand mobility modes to take passengers away from public transport systems, which would reduce the revenues of the UPT system and increase the costs per passenger.

**New mobility paradigm**

Unlike collective public transportation, private vehicles have been traditionally associated with pollution and congestion in urban areas. However, the automobile industry is responding to this perception by developing technologies that diminish these negative impacts. The increase in energy efficiency and the proliferation of electric vehicles could significantly reduce pollution in the future. On the other hand, autonomous shared mobility services may favour congestion reduction in the more densely populated areas, increasing speeds and, therefore, reducing generalised costs for car use. New mobility paradigms question the traditional scheme in which UPT is the single feasible alternative to fight against externalities of transport in urban areas. They may make automobile trips in urban areas more attractive, unless they are charged for the use of streets and urban highways. The objective of convivial urban areas implies a reduced occupation of the urban public space by cars and for this it seems necessary to contemplate a unified urban mobility system. This system would be expected to provide **seamless transport services**, where the different modes of transport interact in a flexible way, according to their service potential and with payment based on the “user pays” and “polluter pays” principles. In this context, UPT should look for synergies to increase patronage, avoid increasing the operational deficit and ensure the financial sustainability of the investments needed to meet mobility demand.
5.2. Environmental sustainability challenges

Encouraging sustainability of UPT

Sustainability is a concept that may be applied to multiple sectors for different goals. It has been used as part of the concept of **sustainable development**, which refers to meeting the needs of the present generation without compromising the ability of future ones to meet theirs (Brundtland Commission, UN). Something sustainable can be understood as a profitable action for present individuals that would not entail negative future economic, social or environmental impacts or, if such impacts are produced, they would be irrelevant or could be easily neutralised.

In the transport sector, sustainability is mostly linked to the limitation of **negative environmental impacts** (air and noise pollution, effects on the natural environment, etc.) and the promotion of energy-efficiency and low-carbon transportation solutions that would reduce greenhouse gases (GHG) emission. In urban areas, investment in sustainable transport options is especially important as such solutions entail evident positive effects on air quality, noise levels and other aspects affecting human health.

In terms of sustainability, a priority for transport authorities is to accelerate the shift from conventional to more sustainable transport options. The development of wider and more efficient collective public transport networks has the potential of generating huge benefits for society (Sayeg, Allen, Eckermann, Huizenga, & Swann, 2015), as the transport sector is responsible for around 25% of energy related GHG emissions globally. Considering the urgency of such change, it is necessary to move towards the internalisation of the external costs of all modes of transport, which should favour diverting users of automobiles towards cleaner vehicles and promote both a more balanced urban development and investment in UPT projects. But such actions require a drastic change in the financial equation of urban mobility allowing a substantial increase in the funds allocated to UPT financing.

5.3. Financial trends in UPT

Public managers find difficulties to meet additional revenues to finance the implementation of cleaner UPT services as well as to develop infrastructure for environment-friendly transport modes in urban areas (e.g., tramway). New investments are mostly funded by loans. If there is a substantial down payment, either from public money or from the private investor in a PPP (in this case, probably corresponding to its equity contribution), this funding component will always be guaranteed before the project gets under way. So, the main problems regarding financial sustainability will appear in relation to the postponed payments for the amortisation and interest charges of the loans and to the possible additional deficit generated by the operating and maintenance expenditure. The characteristics of the credit component and the efficient performance of the project, alongside the stream of revenues from fares, are thus critical aspects in the financial model to be used to ensure that the project will be financially robust over its life cycle.

Given the inherent difficulties of UPT to generate revenues allowing the recovery of the investments in the system, the contribution of public budgets under different possible formulae is, in reality (through direct budget payments and indirect ones, such as loan amortisations), the single source of finance for UPT projects. As public budgets in most EU countries are quite tied, GPIs are trying to extend as much as possible the payments related to the funding of the investment through IFIs loans providing long tenures, grace periods and low interest rates and, in some cases, by resorting to private finance. As financial markets (private banks and/or institutional investors) show a growing demand for sustainable investment options, when the GPI is able to offer reasonable refunding guarantees, PPPs may be a good option to delay budget payments. Whilst this postponement should never be the main objective of a PPP solution -as PPPs should be justified by efficiency gains -, it could help complying with macroeconomic constraints,
in particular when the GPI is confronted with the debt and deficit limits imposed by the Stability and Growth Pact (SGP) in the EU.

**Green Finance**

The development of “green finance” is a worldwide trend that appears useful to channel funding to sustainable transport projects. Tailored financing instruments and specialised investment vehicles have emerged in the last decades with the aim of financing projects with green or social goals. The label of “green” is useful to capture capital for business cases that proactively seek environmental and social benefit across the economy. The most popular tailored investment funds are those selling “green bonds”. This can be an option when the investment effects are measurable and, most important, “monetisable”, i.e. the net benefits for society can be expressed in terms of money. For the public sector, the main advantage of this way of financing public investment is that, while traditional credit entities put more attention on risk perception and due diligence, institutional investors tend to provide money to “green” projects expecting lower interest rates for long maturity periods without asking, a priori, for specific details of the projects to develop.

UPT projects with capacity of producing net benefits in terms of energy savings and GHG emissions reduction are therefore obvious candidates for the green label. This is actually an “easy” option for investors to allocate capital, as the positive environmental impacts from these projects are measurable and, most importantly, “monetisable”\(^\text{17}\). Both lenders and investors in green finance can track how their capital flows to assets contributing to a more sustainable future.

As a result, local authorities and private actors have found in green finance an opportunity to obtain funds for investments in sustainable solutions, such as non-motorised modes, electric mobility and UPT. The challenge is to channel private capital with social concerns towards green finance instruments (Sayeg, Allen, Eckermann, Huizenga, & Swann, 2015) offering it comparatively low yields during long time-spans and, in some cases, asking it to absorb risks that could be quite high or imprecise, when dealing with innovative projects.

**Sustainable finance**

Beyond “green finance”, “sustainable finance” is emerging as a comprehensive vision in which lenders and borrowers should contribute to a **more sustainable development without compromising the ability of future generations to finance their own needs**. It encompasses investments strategies focused on minimising the negative impact of investing, such as “Sustainable Investing (SI) and Sustainable Responsible Investments (SRI)” and, in addition, seeks to introduce environmental, social and governance standards with risk management to lending practices. In this sense, sustainable finance appears useful to channel funding to develop a fairer and more sustainable future.

In the transport sector, this comprehensive vision implies a proactive search of business cases with a robust financial performance that, besides, entails measurable and verifiable positive impacts over the long-term. Putting a monetary value on the socio-economic costs and benefits and, in particular, on those resulting from externalities, would be particularly useful to incorporate quantitative information within valuation models, business strategies and decision-making. However, quantifying and furthermore monetising the positive impact of transport projects is complex\(^\text{18}\). As a consequence, the funds that aim at promoting sustainable development through financial mechanisms are confronted with certain difficulties, similar to those mentioned

\(^\text{17}\) The economic value of the reductions in air pollution and CO2 emissions has been determined in €/ton by specialised institutions and are already commonly used for this.

\(^\text{18}\) For example, the EU trading system (ETS) price of carbon is currently about €5/t. The European Investment Bank, by comparison, uses a much higher carbon price after applying a shadow cost (€32/t, rising €1 each year to €45/t in 2030).
for “green bonds”, to justify their bids in front of their investors, who are ready to accept low returns in relation to the adopted risks but require fund managers to prove the effectiveness of their investments.

Sustainable finance looks beyond “green” impacts and aims at supporting a more balanced development. Social welfare depends on the ability of governments to promote an economy characterised not only by a better protection of natural resources and higher employment levels but also by better and fair redistribution among social groups, territories and generations. In this sense, social (e.g. poverty, gender objectives) and territorial issues are usually considered the most relevant. However, as the “sustainable” concept implies, an increasing concern is to show that financing schemes are fair for generations to come. The challenge is to identify and understand the differential impact that an investment has on the generations being affected by the project during its life cycle. The conflicts between intra-generational and inter-generational effects are often set up under the perspective of the sustainable use of natural resources. However, for major infrastructure projects in general and, in particular, for investments in transport infrastructure this analysis must address some aspects that are parallel to the long-term effects of climate change that are now politically assumed. These aspects include the identification of the redistributive effects caused by the variability, across the different generations affected by the project, of the gap between what each annual generation has to actually pay for the project (in financial terms) and the socio-economic net benefits it will obtain. The elaboration of sustainability indicators for dedicated investment funds is still in its initial phases, but will have to incorporate the intergenerational impacts.

**Opportunities and challenges**

In sum, there are significant investment opportunities in UPT to contribute to a more balanced development in terms of mobility and land use, etc. The problems of funding investments in a system that is unable to cover even its operational and maintenance costs from direct revenues from fares, require solutions that, at the end of the day, will have to come from public budgets or from publicly-driven funds. There are, however, opportunities arising from some private actors that are increasingly concerned by the sustainability of our present society and are ready to support investments, such as those in UPT, that are clearly aligned with their goals. They are open to explore innovative funding modalities that will align private and public interests.

**5.4. SWOT analysis**

As a summary of previous sections, a SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis is provided for the UPT business. In particular, the analysis distinguishes the revenue and the expenditure dimension of the UPT business. This is, the SWOT analysis is focused on two objectives or strategies:

- Maximise revenue and/or introduce new revenue sources
- Minimise expenditure

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19 See Penyalver, D. et al. (2016) for a definition and measures of intergenerational redistribution effects.
Table 5-1. SWOT analysis of UPT revenue

<table>
<thead>
<tr>
<th>Internal factors</th>
<th>Strengths (+)</th>
<th>Weaknesses (-)</th>
</tr>
</thead>
<tbody>
<tr>
<td>UPT demand is rather inelastic with respect to fare changes, especially in the short-run.20</td>
<td>UPT generally counts on strong social and political support</td>
<td>A high proportion of funding relies on public budgets of different government levels, which may have diverging interests</td>
</tr>
<tr>
<td>There is a wide range of feasible alternative revenue sources involving indirect beneficiaries or transport externalities that have been successfully implemented in practice in multiple urban contexts</td>
<td>UPT counts on a large set of assets with high potential to generate revenue from added value activities</td>
<td>Fares are socially sensitive and highly dependent on political cycles</td>
</tr>
<tr>
<td>New revenue sources (e.g. land value capture, green taxation) require wide political consensus and may need legal modifications</td>
<td></td>
<td>The implementation of new revenue sources (e.g. land value capture, green taxation) encounters difficulties in gaining social acceptability</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>External factors</th>
<th>Opportunities (+)</th>
<th>Threats (-)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digitalisation and continuously evolving ICT technologies bring opportunities to introduce more sophisticated fare structures with potential for increasing fare revenue and users’ loyalty</td>
<td>New shared and on-demand mobility services may shift users from UPT to less efficient individual mobility options without the adoption of adequate supply and pricing schemes for urban mobility</td>
<td></td>
</tr>
<tr>
<td>The observed trend of reducing car ownership may entail increased ridership for UPT or, at least, opportunities for new business models</td>
<td>Transport tickets for the elderly are heavily subsidised. With an ageing population in Europe, the unit revenue from fares will decrease, which may imply an added pressure for UPT budgets.</td>
<td></td>
</tr>
<tr>
<td>The accomplishment of future environmental targets should ease further investment in UPT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The uptake of the green bonds market and other green finance options represents an opportunity to steer private capital flows to UPT investments under a sustainable finance view</td>
<td></td>
<td></td>
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</tbody>
</table>
Table 5-2. SWOT analysis of UPT expenditure

<table>
<thead>
<tr>
<th>Internal factors</th>
<th>Weaknesses (-)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strengths (+)</td>
<td></td>
</tr>
<tr>
<td>UPT systems present economies of density. This means that the average operating cost of an UPT network decreases with ridership. Because of this, mass transport is generally the most cost-efficient option in dense urban areas</td>
<td>Developing UPT infrastructures usually implies cost overruns and delays</td>
</tr>
<tr>
<td></td>
<td>When demand increases, there is a need for heavy infrastructure deployment (e.g. metro or suburban rail, for example) and, thus, the expenditure per inhabitant increases with city population</td>
</tr>
<tr>
<td></td>
<td>The cost of production factors (chiefly labour and energy) costs are growing</td>
</tr>
<tr>
<td>Weaknesses (-)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>External factors</th>
<th>Threats (-)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opportunities (+)</td>
<td></td>
</tr>
<tr>
<td>ICT technologies allow for real-time data streams between users and UPT operators. This information can be used by operators to better match operations (routes, frequency, etc.) with user needs and lower operating costs</td>
<td>Technological obsolescence because of upcoming breakthrough technologies may imply large investments in fleet replacement and/or in other supporting technologies</td>
</tr>
<tr>
<td>New shared and on-demand mobility services may substitute scheduled bus routes in low-demand areas and provide similar or higher accessibility at a lower operating cost</td>
<td>Changes in travel behaviour and expectations from transport services demands flexibility to UPT systems. This update may imply a considerable financial efforts</td>
</tr>
<tr>
<td></td>
<td>More strict environmental standards imply more expensive vehicle purchases and may increase maintenance costs</td>
</tr>
</tbody>
</table>

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20 Price elasticity of demand for urban public transport is around -0.4 in the short-run and around -0.7 in the long-run. See, for example, Litman, T. (2017). Understanding transport demands and elasticities. Victoria Transport Policy Institute
6. Innovative approaches to sustainably financing UPT

**Taxonomy of innovative approaches**

Decision-makers in UPT are confronted with severe difficulties to obtain funds to cover their operating deficits and to fund new investments that, in general, will add to these deficits when in exploitation. Traditional financing sources are often insufficient to ensure the sustainability of the financial equation. **Innovative formulae are required to improve the efficiency of the current models and guarantee a sustainable financing.** “Purposeful, systematic innovation begins with the analysis of the opportunities” (Druker, 1985). In this sense, the aforementioned trends in urban mobility and financial practice bring several opportunities for UPT to introduce innovations in their financial models.

Several innovative approaches to enhance the financial sustainability of UPT can be developed involving different decision-making scopes and time horizons. **Strategic innovations** concern general regulations, long-term plans for public transport investment and general decision-making processes. **Tactical innovations** are related to the incorporation of new funding sources. Finally, **operational innovations** deal with the enhancement of current instruments to finance the operational deficit and non-infrastructure investments.

Within each of these innovation levels, we can find different **innovative approaches** that decision-makers involved in UPT may consider for implementation. In turn, innovative approaches will involve decision makers or stakeholders belonging to different **levels of governance (national/regional/local)**. The EU, which is the upper level of government has limited powers in UPT due to the subsidiarity principle and is essentially providing advice and, in some cases, financial support through programmes with specific objectives (convergence, environment, energy, innovation, etc.). The decisions to implement innovative methods of UPT financing will essentially fall into the **transport authorities and stakeholders** directly responsible for urban mobility policy and the operation of the UPT system. The power given by the administrative set up to each level of government will frame the possibilities of establishing innovation strategies in financing. Table 6- below summarises innovative financing approaches for UPT structured according to the taxonomy described above.
Table 6-1. Summary of innovative approaches for UPT financing

<table>
<thead>
<tr>
<th>Innovation level</th>
<th>Innovative approach</th>
<th>Innovative measures</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Strategic</strong></td>
<td>Specific regulations for sustainable UPT investments</td>
<td>• Classification of sustainable investments in UPT</td>
</tr>
<tr>
<td></td>
<td>• Adaptation of ESA accounting standards</td>
<td>• Adaptation of ESA accounting standards</td>
</tr>
<tr>
<td></td>
<td>• UPT Investment Platform</td>
<td>• UPT Investment Platform</td>
</tr>
<tr>
<td></td>
<td>Development of comprehensive financing strategies</td>
<td>• Integration of transport plans (SUMP), investment programmes and financing strategies</td>
</tr>
<tr>
<td></td>
<td>• Classification of sustainable investments in UPT</td>
<td>• Creation of an integrated municipal/metropolitan mobility agency</td>
</tr>
<tr>
<td></td>
<td>• Adaptation of ESA accounting standards</td>
<td>• Transparency of UPT financing issues and decisions</td>
</tr>
<tr>
<td><strong>Tactical</strong></td>
<td>New sources of incomes from UPT beneficiaries and private vehicle externalities</td>
<td>• Land value capture mechanisms (land sales, betterment taxes, joint ventures, etc.)</td>
</tr>
<tr>
<td></td>
<td>• Earmarked taxation on traffic externalities (congestion charges, pollution charges,</td>
<td>• Earmarked taxation on traffic externalities (congestion charges, pollution charges,</td>
</tr>
<tr>
<td></td>
<td>workplace parking levies, etc.) to fund UPT investment and operation</td>
<td>workplace parking levies, etc.) to fund UPT investment and operation</td>
</tr>
<tr>
<td></td>
<td>Developing new business models for UPT</td>
<td>• Incomes from integrated mobility solutions with other transport services (park and</td>
</tr>
<tr>
<td></td>
<td>• Incomes from integrated mobility solutions with other transport services (park and</td>
<td>ride, ridesharing, car sharing, public bikes, etc.)</td>
</tr>
<tr>
<td></td>
<td>• Development of new business models for UPT</td>
<td>• Development of business making use of public transport facilities (retail, advertising, etc.)</td>
</tr>
<tr>
<td><strong>Operational</strong></td>
<td>Improvements in the financing of the operating deficit</td>
<td>• Development of more efficient, fairer and more stable allocation of operating funds</td>
</tr>
<tr>
<td></td>
<td>• Stable pricing framework in the long-term</td>
<td>• Implementation of ITC and smart ticketing technologies</td>
</tr>
<tr>
<td></td>
<td>Improved financing solutions for non-infrastructure investments</td>
<td>• Design of contractual conditions to reduce costs and enhance quality</td>
</tr>
<tr>
<td></td>
<td>• Standardisation of UPT technologies</td>
<td>• Tailored financing solutions</td>
</tr>
<tr>
<td></td>
<td>• City green bonds</td>
<td>• Tailored financing solutions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Tailored financing solutions</td>
</tr>
</tbody>
</table>
6.1. Strategic innovation (I): Specific regulations for sustainable UPT investments

Macroeconomic dimension of transport financing

The basic problem of UPT financing is that, to make it sufficiently attractive to urban travellers and divert from more polluting transport modes, it must provide services with fares that are too low to recover the whole expenditure in investment and O&M. This unavoidably represents a charge for public budgets. In most countries, public budgets are increasingly tied by expenditure in social sectors that have little possibilities of generating revenues. This means that macroeconomic stability must be found through sectors, such as transport, which, from the public perspective, can globally be financially viable. Some parts of the transport system, such as UPT, require public contributions, but some other sub-systems, in particular those linked to individual vehicles, may be net contributors to the public purse.

Looking at the whole transport system, it should be noted that UPT is aligned with other social services and it is therefore coherent with standard practice in the EU that its deficit be covered by external contributions (i.e. taxpayers). As general taxation is already quite stretched in most countries, it can be envisaged that these contributions will increasingly be requested to those parts of the global transport sector that can sustain them, in particular if they are generating negative externalities. The theoretical concept is that the transport sector will balance their public accounts and do it through the application of the “polluter pays” principle. In a severely distorted market such as the urban mobility one, the implementation of this concept is complex, but it seems that it is becoming mainstream, at least in EU cities.

Besides this vision of UPT as part of a global transport system that should be neutral (or eventually positive) for public budgets, there is an important point to be made in relation to the macroeconomic constraints: There is the possibility to adapt these constraints to reduce their negative impacts on society’s long-term well-being. As development depends on viable projects, considering debt incurred for them in the debt/deficit ratios obviously refrains carrying them out. Recently, a report of a group of experts\(^{21}\) on sustainable finance has pointed out that there exists the perception that certain accounting standards are making investment more difficult for sectors with a longer-term focus, such as the transport sector.

Macroeconomic constraints for UPT investments

In the EU, the Stability and Growth Pact (SGP), created with the aim to keep public debt sustainable, is based on the accounting rules established in the European System of Accounts (ESA)\(^{22}\). These rules are key instruments for the calculations in the Excessive Deficit Procedure (EDP) included in the SGP to ensure compliance with budgetary discipline. According to ESA, government financed infrastructure creation must be considered as an expenditure generated during the construction period. This has a direct impact on debt and deficit ratios\(^{23}\) and affects the corresponding calculations of Eurostat that are taken into account in the EDP.

\(^{21}\) A High-Level Group on Sustainable Finance of the EC delivered in July 2017 the interim report “Financing a Sustainable European Economy”

\(^{22}\) The European System of Accounts (ESA 2010) offers specific guidance on the accounting methods to be applied by the public sector. In addition, ESA rules establish concrete rules for the public accounts that specifically concern PPPs.

\(^{23}\) The SGP establishes that the ratio of government deficit to gross domestic product should not exceed the reference value of 3% as well as the ratio of government debt to gross domestic product should not exceed the reference value of 60%.
Accounting standards have an impact on how long-term projects are financed, including both investment funding and the payments derived from the repayment of the loans and the eventual deficits (or profits). As ESA accounting rules do not take into account to what extent infrastructure creation can be useful for the economy, the rules to maintain budgetary discipline make the application of these regulations to long-term investments an administrative procedure with a sound arithmetic foundation but little economic sense. The ESA rules entail a barrier for long-term finance, as the most common financing arrangements affect negatively public debt and deficit ratios. As a result, governments promoting investments (GPIs) meet difficulties to carry out their investment programmes in the transport sector. The EDP gives priority to its stabilising role of national budgets over a possible consideration of the social and even the economic role of public money. This bias has a negative impact on the promotion of projects that need significant amounts of upfront capital to be built, such as transport infrastructure, independently of their contribution to a more sustainable and fair development. It is, obviously, even more negative for projects that have no possibilities of recovering the investment as most UPT ones.

**Innovation rationale**

To confront this problem, the aforementioned experts have suggested the convenience of bringing about some changes into private but also public accounting standards while developing a **classification of sustainable investments**. The objective would be to encourage private funding streams towards investments targeting emissions reduction and energy efficiency. Both initiatives should lead to a list of investment opportunities across the EU contributing to develop a more sustainable future in both environmental and social terms. Most UPT projects showing adequate socioeconomic returns should fit into this list.

How to integrate into accounting standards the debt supporting long-term viable investments, in particular those planned under a comprehensive vision of sustainability is still a challenge. A decision by the relevant EU institutions on this would be particularly helpful for the development of UPT infrastructure.

**Criteria for sustainable investments**

A major obstacle to establish what kind of investments would be eligible to an adaptation or even a waiver on public deficit/debt ratios, if ESA rules were modified accordingly, is the lack of reliable metrics to evaluate whether a project will effectively deliver long-term economic, social and environmental benefits higher than its costs. Moreover, as the vision of sustainable finance implies a fair split of benefits and financial burdens over time for the individuals affected, intergenerational redistribution should also be considered in the ESA rules. The basic reason behind the macroeconomic constraints is to avoid passing the burden of present consumption to future generations. Those projects being fair to future citizens would not endanger this objective.

This study is not the right place to discuss the issues on the calculation of indicators. The main criteria that could be used for the classification of sustainable UPT investments with potential for an adaptation of ESA rules seem, however, rather clear:

- **Efficiency**: The project must show positive NPV through a proper appraisal including a cost-benefit analysis (CBA) and a justification that the positive effects not quantified in the CBA are sufficient to satisfy any negative impact on efficiency. Account should be taken that long-term quantification of impacts is highly hazardous.

- **Financial sustainability**: The project must show a solid financial sustainability, meaning that the resources needed to build and operate the project are ensured and no major stakeholder may become bankrupt due to the project.
• **Intergenerational fairness**: The results of an intergenerational impacts model\(^\text{24}\) should indicate a sound positive bias towards future generations, which depends on possible user payments (through user fees, tolls, etc.) and on the funding scheme adopted.

• **Overall macroeconomic sustainability**: on the basis of the previous project related criteria, the overall effects of the project package as a whole in the very long-term should reasonably ensure a positive addition to the country’s net wealth position taking debt sustainability into account.

Whilst the first three points could be checked by the European Investment Bank (EIB), probably as part of its project appraisal to provide long-term financing\(^\text{25}\), the closing point could be assessed, if needed, by the European Central Bank (ECB).

**Projects fulfilling these four criteria could be labelled as “long-term growth enhancing investments”** as they can be deemed to be productive, sustainable and fair and not generate important macroeconomic imbalances. Under conditions of dynamic efficiency, it appears evident that a number of sufficient “long-term growth enhancing investments” in a country could contribute to generate primary surplus and help it to converge to an equilibrium position regarding public debt. Thus, it would be justified modifying ESA accounting rules to review the deficit/debt calculations of the marginal addition to national debt of loans needed to fund “long-term growth enhancing investments”. UPT projects fulfilling the criteria would thus have a special status regarding the deficit/debt constraints. A practical mechanism to facilitate the application of this proposal, in particular for relatively small projects, would be the use of a UPT Investment Platform, as described below.

**Innovation proposal**

Essentially what is desirable is to find a practical administrative mechanism through which investments in UPT showing the above characteristics would have their debt component (or, at least, its EIB loans) with a special status in relation to the macroeconomic constraints on debt/deficit imposed by the “Maastricht criteria”. Member States directly, if they fund the project, or indirectly through the reduced debt of their lower level authorities, would thus be able to take more debt than at present to finance UPT investments if they comply with strict appraisal criteria and monitoring conditions.

**Effect on PPPs**

This proposal, if accepted, would have effects on the structure of PPPs for UPT, in particular for those based on availability payments over the project cycle to reimburse the private investor for the up-front investment costs. As user payments will not generate sufficient revenues to cover more than a part of the O&M expenses, the full investment component paid by the private partner will have to be included in the availability payments. The private investor will typically obtain loans to finance his investment with conditions that are, in general, worse than those that could be obtained by the public administration making the availability payments, which is finally the ultimate guarantor of the loans. These additional financing costs were usually justified by the credit restrictions imposed to public promoters. Having recourse to (more expensive) private capital appeared as the only option to carry out the project. This means that the proposed innovation would reduce investment costs and, at the end of the day, allow additional investment.

The potential effect on efficiency in the construction of a UPT infrastructure of using a PPP mechanism should not be lost, because the only real modification is that the private partner is not acting as a financial intermediary. This function is actually not appreciated

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\(^\text{24}\) The “Intergenerational Redistributive Effects Model“ or IREM (Penyalver & Turró, 2017; Penyalver et al., 2017) has proven to be useful to establish if the investment is fair and sustainable from an intergenerational point of view, independently of the traditional outcomes obtained from discounting (Penyalver & Turró, 2016).

\(^\text{25}\) Actually, simply taking out of the ESA rules the EIB loan component of the funding would already give a clear support to UPT investments.
by most builders and operators, who are those introducing efficiency in the project, so this innovation would not entail particular opposition from the key players in PPP projects. A more adapted PPP structure that concentrates public payments on the O&M component, taking into account that O&M costs depend on the quality of the construction, would ensure overall efficiency and reduce the cost for the taxpayers that end up paying for the investment component.

There is, therefore, a clear potential for participation of private agents in the financing of UPT projects, even if eventual changes in ESA rules were introduced. They would particularly affect, though, the biggest projects. Projects of relatively small size have specific funding projects. In relation to private financing, besides the relatively heavier weight of transaction costs related to the bidding and other administrative procedure, they have a problem in accessing major sources of funding. They cannot benefit directly, for instance, from the Connecting Europe Facility (CEF)\(^\text{26}\), the direct loans from the EIB or from the European Fund for Strategic Investment (EFSI). To support small projects, EFSI has developed a mechanism that allows the blending of money from all these related sources under the name of Investment Platforms (IPs) that could be used by small UPT projects. IPs are a mechanism of cooperation with investment funds (public, institutional or commercial) with the objective to finance projects with the well-defined EFSI objectives. Whilst the most common formula, in line with the traditional activity of the European Investment Fund, was the participation through equity and loans, in funds investing in SMEs, the concept has been extended to other sectors. Actually, some of EFSI Investment Platforms are devoted to infrastructure financing under various formulae.

**UPT Investment Platform**

The creation of a **UPT Investment Platform could represent a major change in the present formulation of the funding of certain UPT projects.** Such IP could receive equity from EFSI and participate in funding medium-sized projects that, due to their size, would not be compliant, as individual projects, with the investment amounts required to obtain CEF grants or direct EIB loans. On the other hand, through the EFSI, the IP would be eligible to receive a credit line from the EIB. The IP would convey the loan conditions of the Bank to the different projects to be financed. The EIB would essentially treat the IP as an intermediary bank. If the IP demonstrates the capacity to control project quality and follows strict awarding and monitoring procedures, the EIB would delegate to the IP all the responsibilities for project selection and follow up. As the conditions requested to have a special status regarding the deficit/debt calculations would be enforced by the IP and monitored by the EIB, this would be a mechanism to easily incorporate small and medium size projects in the ESA rules adaptation.

The UPT IP would finance small infrastructure investment and also “package” projects (including the purchase of common rolling stock or non-polluting buses) in order to present them to the CEF or the EIB as investment programmes that would comply with the size conditions to apply for the grants and loans. With equity and other financial instruments provided by the different stakeholders, including EFSI, the IP could be an effective vehicle to convey private money to UPT investments. The feasibility of developing it would require, however, a more detailed analysis that goes beyond the objectives of this study.

\(^{26}\) CEF has as a grant line devoted to “Actions implementing transport infrastructure in nodes of the core network, including urban nodes”.


6.2. Strategic innovation (II): Development of comprehensive financing strategies

Financial conundrum of UPT

Under the complex financial situation of UPT, decision-makers are confronted with the opposite pressures of guaranteeing high service quality and of doing so without endangering public finances. Reducing expenditure might create a snowball effect, with poorer service expelling users, with lower demand levels leading to less revenues and forcing further service reductions, and so on. On the other hand, it is difficult to pass the cost of improved service to the users, as higher tariffs may also affect demand. Decision-makers are therefore bound to find strategies that reduce the amount of public money devoted to subsidize UPT whilst providing the right supply of collective transport services. Whilst there are obviously no magic solutions to solve the problem, which has a great number of variables, there are some innovative ways of financing urban public transport that could contribute to improve the present situation, at least for certain situations.

As already mentioned, it is reasonable to address UPT financial issues taking into account that UPT investments and O&M deficit financing require adopting different perspectives, although clearly related because UPT investments are generally not directly recoverable and they often generate additional operational deficit. This means that the improvements brought about by new infrastructure and vehicles must come along with a commitment by the relevant public administrations to provide the necessary financing (additional subsidies or new revenue sources) during the project cycle. Such commitments, which are linked to the “deficit perspective”, are easier to obtain than short-term commitments for the investment. The reason is that these commitments must be included in the investment budget of the administration providing the grants and, being more substantial and apparent, they are politically sensitive, particularly in periods of public deficit. This rather illogical situation could be changed through an updating of the public funding models of MS, but an easier solution that has been often used to transfer up-front public contributions to long-term ones without having them appearing as grants (or loans), has been the recourse to PPPs. Through this mechanism the private capital used for funding is returned with postponed payments that appear as expenditure (not capital investment) in public budgets.

Private investors, in particular institutional investors, are increasingly interested in UPT because, due to the stability and predictability in revenues from major transport projects in urban areas, as there are clear commitments from the GPI, and the clear benefits UPT entails in social and environmental terms, investing in the sector fits very well into their framework of Social Corporate Responsibility. The participation of private investors in major infrastructure financing has indeed increased over the years following the development of PPPs that are now quite well established in many countries. Infrastructure Funds, which are usually fed by institutional investors, currently raise about US$ 20bn per annum worldwide, some 90% of it devoted to equity financing. Around 10% of this amount is devoted to finance the debt generated by infrastructure investment in Europe (EIB, 2013).

Investment barriers

The availability of transport investment opportunities suited to the features and requirements of sustainable finance is a key factor for green finance market growth. However, some transport infrastructure investments, in particular UPT, show characteristics that are different from other asset classes and could represent barriers to entry to potential investors. The main barriers to invest are related to the difficulties raised by the procurement process and to the need for specific expertise in the UPT sector that is lacking for most potential investors.
**Investment plan and financial strategy**

In this context, decision makers may contribute to meet sustainable financing for UPT through clear and reliable investment and communication strategies. This implies to **set out an affordable plan to finance the investment programme** as well as to provide the required certainty-level for the potential investors. Indeed, it should be useful to clearly identify goals, objectives and challenges and demonstrate that the proposed PPP actions are critical components of the resulting UPT plan and its investment programme. It should also be clear that this programme will be carried out as foreseen and that there is a proper strategy to finance the UPT system in a sustainable way. This means that there should be a well-defined investment programme setting out a reliable procedure to finance it. In this sense, **there should be a strong link between Sustainable Urban Mobility Plans (SUMPs), the resulting investment programmes and the financial strategy that supports them.**

This procedure should first establish the financial framework in which the investment programme will take place. The contribution of the various money flows into the UPT system (revenues from tariffs and from earmarked taxes, other sources of UPT income, subsidies from the different administrations, etc.) must be sufficiently clear to guarantee, at least in the short term, stable and predictable income sources ensuring the financial sustainability of the UPT system. Next, the financial road map should consider the long-term consequences of the investments in terms of operation and maintenance costs and the implications of the technological developments that can be envisaged, but also of the effects on UPT of the socioeconomic evolution of the urban area. Innovative ways of funding the rehabilitation and expansion of the UPT system should be included in this vision of the financial process for the execution of the investment programme. In this sense, **the BigMOVE plan implemented in the metropolitan area of Toronto constitutes a best practice** of an ambitious investment plan linked to a sound financial strategy.27

**Optimal combination of funding sources**

The complexity of urban mobility and the resulting variety of users, operators and citizens, who are both taxpayers and the subject of important externalities (positive and negative), are reflected in many money flows that irrigate the UPT system. Consequently, to guarantee that there are sufficient, stable and predictable funds over time to support it, a robust blending of instruments, ideally following the principles of “beneficiary pays” and “polluter pays”, seems most suitable. **A robust combination should diversify risk.** This means that revenue streams should be varied in terms of sources (or contributors), timing and risk factors. On the other hand, they should be combined in adequate proportions to reduce overall risk and take into account the existing situations of the various stakeholders in terms of debt and potential to increase their exposure.

**Intergenerational fairness**

Regarding the financing formula, **public managers should also pursue intergenerational fairness.** This means that the adopted formula should achieve a balanced distribution between benefits and financial burden among successive generations. It represents an undeniable new challenge for decision makers and for institutional investors interested in sustainable finance, which is increasingly becoming a guiding principle in developed countries.28

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27 For further details see the Appendix B: Case studies

28 See (Penyalver & Turró, 2017; Penyalver et al., 2017) for a procedure to establish intergenerational fairness indicators.
**Mobility Agency**

A potentially reasonable solution to develop comprehensive financing strategies, in particular for decentralised countries, could be the creation of municipal/metropolitan mobility agencies. These integrated public agencies would encompass all (or most of) the financial flows going to the local administrations from the various existing and potential mechanisms designed to ensure the achievement of the objectives of the system, including efficiency, social equity, environmental quality, ensure minimum connectivity levels to the whole population and financial sustainability and fairness (notably from the intergenerational point of view). On the one hand, it would collect UPT user fees and distribute non-UPT user mobility revenues arising from mobility-related charges (vehicle ownership, parking, tolls, Versement Transport, part of fuel taxes, etc.) to ensure the financial sustainability of the whole system, including certain investments that would require to be specifically analysed and funded. In this sense, the Agency could collect land-value capture charges and other potential sources of money for the project and arrange an adequate financial package. The Agency will most probably require also funding from regional/national authorities, which should seek a fiscal and financial balance between them. The creation of a Mobility Agency would entail an integration of current governance and financial structures regarding UPT and it may also encompass other mobility services such as bike sharing, car sharing, ridesharing, etc. Transport for London (TfL) is a benchmark example of a PTA with wider powers beyond their traditional role.

**Application**

Developing financing strategies as described above is only applicable in large cities where an infrastructure-intense UPT network is required and, thus, where the financing of the UPT system involves significant up-front capital costs. This innovative approach requires, in the first place, a strong consensus on a long-term plan for UPT and on derived investment programs with well-established financing needs. Secondly, the financing strategy set out to afford the investment program requires a citywide political and social consensus on the allocation of the UPT financial burden. Once clear funding sources are creditable and stable enough, the financial strategy can be open to the involvement of private stakeholders and institutional investors. Finally, as mentioned above, the concentration of powers into an integrated Mobility Agency eases the development of comprehensive financing strategies.

**6.3. Tactical innovation (I): New sources of income from UPT beneficiaries and private vehicle externalities**

**Funding needs and blending of funding sources**

An appropriate funding scheme should generate sufficient, predictable and stable revenues for the public transport authorities to access to convenient financing conditions, both in terms of financial costs and flexibility of repayments. The combination of funding sources should be such that these conditions are ensured during a sufficient period. UPT network extensions or significant improvements involve both large investments and increased operational costs. Hence, they can only be financially sustainable if the funding scheme counts on higher revenues. The capacity of public administrations to increase their funding contribution is limited and, for this reason, public transport authorities seek innovative funding sources when they undertake (or plan) an amelioration of the UPT supply.

**Innovative funding sources**

Traditionally, in most urban areas, revenue streams to pay for UPT total costs ultimately rely on UPT users (direct beneficiaries) and taxpayers (society as a whole). In this context, funding sources involving indirect beneficiaries of the UPT system...
emerge as an innovative approach for many cities to both increase their revenue streams and distribute the burden of public transport financing in a fairer way in coherence with the “who benefits-pays” principle.

**Land value capture**

There are multiple instruments to increase the contribution of indirect beneficiaries to UPT financing. The implementation of land value capture (LVC) mechanisms, which can adopt multiple forms in practice, may contribute significantly to the funding of a particular infrastructure investment. They have been more commonly used in new urban developments or in areas with low supply of UPT because the increase in property values can be derived more easily and this improves acceptability. When LVC is a one-off contribution by real estate owners to a particular infrastructure investment, it does not represent a stable revenue stream with flexibility to support various financial requirements. The more traditional approach of LVC, that comes through an increase of the taxable value of the properties that have seen their market price increased due to the project, generates additional income to the administration collecting the relevant taxes, but, unless they are earmarked for UPT (a quite uncommon outcome), such indirect impact is difficult to incorporate in the UPT financial sustainability equation.

**Green taxation**

Should the GPI or the transport authority be willing to increase the overall amount of money for UPT through a higher contribution of all the indirect beneficiaries, the suited instrument would be an earmarked tax or charge that could be maintained over time. Again, many options are available. Green taxation may be an option in cases where the objective is not only to generate funds for UPT but also to reduce the use of private vehicles. Using vehicle charges for the use of urban roads/streets encourages the modal shift to UPT and, through the concomitant reduced congestion, an improvement of the travel time of those remaining car users that are ready to pay the charges. This, in principle, should entail some efficiency increase in the mobility system. The use of the vehicle charges to directly finance UPT is not necessarily the best option, but it is often critical for the acceptability of the measure.

This cross financing between private vehicles and UPT will only be acceptable by the public if it builds on a coherent urban mobility policy. Where such measures have been already applied, there is a delicate balance between demand management and the supply of alternatives in terms of UPT services. In Stockholm, for example, the UPT network was significantly extended prior to the implementation of congestion charges to increase the acceptability of the measure. In addition, as aforementioned, revenues from green taxation may decrease over time if demand is elastic enough. GPI and transport authorities should consider this fact when evaluating the funding potential of vehicle charges.

**Other funding sources**

If tax revenues do not depend on travel behaviour, the predictability of the funding source increases. This is the case of a payroll tax earmarked to UPT, as the Versement Transport in France, where employers contribute in a significant proportion to the funding of UPT. However, the implementation of new taxes without any objective other than generating new funds, even if they are earmarked, is always a very difficult exercise for politicians. An alternative to introducing new taxes would be to earmark an already established tax revenue (or part of it) to the financing of UPT. For example, a proportion of fuel taxes could feed a UPT fund.

**Application**

Above all, funding sources from indirect beneficiaries may be an opportunity for many transport authorities to update their funding schemes by means of increasing revenues and distributing the burden of UPT financing more fairly. This innovative approach will
be particularly suited for urban areas willing to expand their UPT supply. The use of innovative funding sources based on indirect beneficiaries may unblock or accelerate investments in UPT that are necessary to move towards a more efficient urban mobility. As already mentioned, the selection of funding sources should seek an appropriate blend such that total revenues are stable, predictable and sufficient.

The choice among the options available should consider the implementation context of each case. Green taxation schemes are only applicable where traffic externalities (congestion, pollution, etc.) are an important issue; this is, in large and/or dense urban agglomerations. Land value capture is mostly suited to developing cities or to large investments in the UPT network. Instead, other earmarked taxes could be applicable on a wider range of contexts. However, the options described require a wide political and social consensus and cumbersome legal modifications. Thus, not only the urban context but also the political and legislative background will shape the final approach regarding the use of these innovative funding sources.

6.4. Tactical innovation (II): Developing new business models for UPT

Emerging urban mobility services

Technology and evolving patterns of travel behaviour are disrupting urban mobility. Real-time streams of data make it easier and more efficient to provide citizens with transport services according to their particular needs. On top of this, some of the traditional attitudes and perceptions towards transport (importance of car ownership, for example) are changing and this boosts the emergence of new mobility services making use of new technologies.

On-demand services (Uber, Lyft, for example) are already a widespread transport alternative in many cities. Some of these services include a combination of the demand-responsive service with the shared used of the vehicles. In this sense, the concept of shared mobility encompasses a wide range of emerging services, both sharing trips (carpooling, ridesharing) and vehicles (car sharing, bike sharing, etc.). Furthermore, the level of automation of cars is increasing and evolving towards fully autonomous vehicles, which may have significant impacts on mobility patterns and, in turn, on urban structure.

Beyond this, the way users may choose, access and pay for transport services is also expected to change in the near future. Integrated mobility or Mobility-as-a-Service (MaaS) relies on a digital platform that integrates end-to-end trip planning, booking, electronic ticketing, and payment services across all modes of transportation, public or private. As defined by the European Mobility-as-a-Service Alliance, the key concept behind MaaS is to “put the users, both travellers and goods, at the core of transport services, offering them tailor-made mobility solutions in real time based on their individual needs”.

Challenges for UPT

Authorities and operators of UPT should respond to the challenges that represent the upcoming mobility services by developing new business models. Public transport should still be considered the backbone of sustainable mobility in urban areas but there is a need to find synergies with the emerging services. Traditional, scheduled public transport delivers highly efficient trips in dense areas when providing both high capacity and high frequency of service. Then, demand responsive services could act as feeders to improve access to high capacity links or offer door-to-door services within low-density areas. Under a Mobility-as-a-Service perspective, the resulting door-to-door trip is seen as a single service, no matter the transport mode or who provides the service.
**Business models based on integrated mobility**

To coordinate interactions between services and to deliver an overall efficient mobility, **public transport authorities should collaborate or even partner up with other sustainable mobility providers.** Furthermore, for UPT to maintain a predominant market position, it is key to work on fare and ticketing integration, both within public transport services and concerning complementary services. For this, public transport authorities should also collaborate or partner up with mobility aggregators providing single payment options.

In this sense, some transport agencies are evolving from pure public transport providers to mobility providers. The San Francisco Municipal Transportation Agency, for example, is transforming itself into a mobility manager, with responsibilities that go beyond a public utility model of public transport provision and including regulation of bike sharing, car sharing, ridesourcing, shuttles, parking and curb access. In any case, the development of new business models related to a further integration of public transport services with emerging mobility services is both an opportunity and a necessity for UPT to keep playing an essential role in urban mobility and to ensure its financial sustainability.

In the presence of low density of demand for transport, such as in suburban areas or in small and medium cities, on-demand and/or shared mobility services are likely to substitute traditional UPT services when and where operating costs may be reduced. However, new services may be still unprofitable and public funding is needed. Where this is the case, transport authorities should integrate the provision of these emerging mobility services in their business model to deliver an overall efficient supply for mobility. In this context, the **Yélo system in La Rochelle constitutes a best practice**29. Alternatively, in large metropolitan areas where emerging on-demand and/or shared services may be profitable, private participation may be desirable to introduce further innovation and competition to this new urban mobility paradigm. Public transport authorities in this case should collaborate with mobility providers and aggregators and act as regulators to ensure even competition, open accessibility, an overall efficient supply of mobility and an adequate pricing reflecting all social costs.

**Business models based on improved commercial activities**

When seeking additional revenues to reduce the operational deficits of UPT, public transport authorities commonly take advantage of UPT infrastructure to develop business related to advertisement and shopping. These revenues come from commercial or leasing fees that infrastructure owners charge to commercial activities in their facilities. In a mid-term period, these revenues represent a rather stable funding source that can be important to ensure the financial sustainability of UPT operations in spite of representing a small proportion compared to other sources.

Within a tactic decision level, public transport authorities or infrastructure owners should optimise their offer of leasing activities and develop imaginative business models to make the most of their assets. Many Asian cities (Singapore and Tokyo, for example) rely heavily on the development of leasing activities within their UPT facilities to finance the operational deficit. While acknowledging the differences with European cities regarding cultural background and population density, some practices could be incorporated as the creation of joint ventures to develop business around UPT facilities.

**Application**

The optimal role of PTAs will basically depend on whether emerging mobility services will be profitable or not. In any case, PTAs should actively seek **synergies with new mobility services** and adapt their business model accordingly. The development of these new business models for UPT requires not only an active innovation-based management but also a certain degree of flexibility by PTAs, users and related

29 For further details see the Appendix B: Case studies
stakeholders. The implementation of the Yélo system in La Rochelle constitutes a best practice of an updated business model for PTAs in small and medium cities. On the other hand, the further development of business models based on commercial activities requires a high turnover of passengers in UPT stations and a cultural propensity to consume in such facilities.

6.5. Operational Innovation (I): Improvements in the financing of the operating deficit

Financing the operational deficit

To finance the yearly financial gap between the real cost of operating UPT services and the revenue obtained through users’ fares, transport authorities count, in general, on subsidies from public budgets. The difficulties of increasing these budgets are pushing the implementation of earmarked funds as those already mentioned, as well as the increase of UPT fares. The implementation of earmarked taxes presents, however, technical difficulties, notably for small municipalities, which require the financial support of upper-level institutions. Changes in the fare policy may be also cumbersome because of the reluctance of users to increase fares and the difficulties in overcoming political cycles to set a long-term pricing framework.

Subsidy optimization challenge

Thus, there is a challenge to optimize the financing of the O&M deficit. This can be achieved by (1) redistributing more efficiently the total amount of available subsidy, (2) providing incentives in the contract to reduce the operating cost and/or improving the performance of UPT services, and (3) enhancing the fare policy.

Allocation of operating subsidies

The distribution of operating subsidies may be determined at two different levels. First, the funding contribution of each government level. The split of contributions is highly dependent on the territorial and public financing structure of government. Second, how the available subsidy of each government level is distributed among the different transport authorities. The latter falls within the scope of this study because it only depends on UPT policy. In addition, current allocation mechanisms are often non-efficient and the result of historical decisions that have lost their original meaning, so there is a high potential for improvement and for the application of innovative ideas at this level.

In Spain, for example, every year a pre-defined amount of funds for UPT operations is distributed among municipalities that have the obligation to provide UPT services (those with more than 50.000 inhabitants) according to a formula where the determining factor is the O&M deficit per ticket sold. However, the large metropolitan areas of Madrid and Barcelona have a special status in terms of budget allocation30, with a subsidy per inhabitant much higher than the rest of municipalities. The rationale behind these numbers is that, as Ruiz-Montaño (2017) concluded, the amount of resources to allocate to cities for financing UPT operations grows more than proportionally with the city size.31

Observable trends indicate that population will grow relatively more in the bigger cities. UPT financing needs will thus increase, particularly for metropolitan areas.

30 Madrid and Barcelona transport authorities have a contract-programme with the central government that specifies the allocation of operating subsidies for their UPT services.

31 When the number of boroughs (transport nodes) increases, the number of required links grows more than proportionally. Authorities have to provide more transport services, so there is a need to allocate more funds per inhabitant.
New redistribution mechanisms

As above mentioned, current distribution formulas to allocate operating subsidies usually focus on the amount of operation and maintenance deficit regardless of the efficiency of the service. Thus, the innovation in this case is to define a new approach based on wider criteria that would seek a more efficient, fairer and more stable allocation of funds.

To promote efficiency of UPT operations, distribution formulas should reward UPT services that reduce their O&M costs per unit of output\(^{32}\) and increase their environmental benefits. These aspects should be measured through objective and clear indicators. In addition, because the assessment of efficiency is highly context-dependent, a preliminary clustering of transport authorities or UPT services is required to compare indicators from different contexts. This clustering may account for variables such as the coverage area, UPT trips per inhabitant or population.

Besides efficiency, distribution formulas should include equity criteria to ensure the acceptability of the allocation and to provide equal opportunities for a certain level of service in UPT. This may account for the economic effort of public authorities in the delivery of UPT services in terms of their fiscal and budgetary conditions.

As a result, the distribution formula should incentivize operators to be more efficient while providing the appropriate service for each case. Decision makers should seek a balance between efficiency and equity by correctly weighting the above-mentioned criteria.

It is also worthwhile noting that a stable allocation of funds per transport authority increases the predictability of available revenues to pay for UPT operations and, hence, reduces the financial risk of the O&M deficit. For this reason, decision makers should establish a stable legal framework providing clear rules by which transport authorities and operators would know and predict their fund allocations as well as where to focus their efforts.

Improving the quality or the performance of the UPT service

In order to improve the UPT service by reducing costs and enhancing quality, some contractual conditions may be agreed between public transport agencies or administrations and private or public operators.

There are, basically, three main measures to improve the quality/cost relation:

a) **operational risk transference**, so the operator takes responsibility for the adaptation of the service to the eventual fluctuations of demand or changing conditions of the mobility system. It is logical that the party with the right expertise adopts the most adequate measure;

b) **performance-based scheme (bonus or malus)**, that should be in combination with the responsibility given to the operator, to ensure quality through appropriate incentives;

c) **fixed quality requirements**, is the more rigid administrative approach, implying strong public monitoring to ensure compliance.

Each alternative has their pros and cons. A full operational risk transference (i) would guarantee a more regular and stable subsidy contribution, avoiding unexpected fluctuations (increase of costs or decrease of revenues) and enhancing the efficiency of the service. The main drawback is that the administration may lose control of the UPT service and some issues related to significant information asymmetries may arise.

On the other hand, performance-based schemes (ii) or strict quality requirements (iii) assure higher quality of service, in general, but they imply higher costs for the

\(^{32}\) Outputs can be measured both in terms of demand (passengers) or supply (quantity of transport offer, vehicles per kilometer, for example)
services, which in general grow more than the revenues derived from the induced demand that those improvements generate.

As a result, a trade-off has to be considered between risk allocation and an assurance of the service quality. The optimal point, which highly depends on the city of application, should maximize the quality of service per unit of cost, including externalities like pollution, congestion, accidents, etc. In addition, as explained, the importance of a more regular and stable subsidy contribution and the possibilities offered by the different governance models have to be underlined.

**Fare policy**

In parallel, the financing of the operating deficit can be improved by focusing on enhancing the fare policy. In this sense, two main lines of work are worth mentioning: **establishing a pricing framework in the long-term and taking advantage of ICT and smart ticketing technologies.**

The predictability of available funds to pay for UPT operations would be significantly improved by reaching a stable consensus on a long-term pricing framework (i.e. 10-15 years horizon). This should include **fare review mechanisms based on clear indicators.** The main challenges of such a measure are gaining acceptability from population and reaching a consensus between the multiple public administrations and stakeholders involved, regardless of political cycles. For this, decision-makers should work on improving transparency, communication and participation on fare policy. The fare policy in Germany represents a best practice due to its regular fare increases at a rate slightly above inflation and a joint decision-making on fare strategy at regional scale.  

On the other hand, ICT bring several opportunities to introduce smart ticketing systems and set more sophisticated pricing schemes. **User-based fares** may attract users to UPT, increase the loyalty of current users and increase fares to users with higher willingness to pay for premium services (i.e. peak hour, internet connection, more comfort, etc.). All this would tend to increase fare box revenues. Furthermore, data from smart ticketing systems can be used to better match demand with supply of UPT services and reduce operating costs.

### 6.6. Operational Innovation (II): Improved financing solutions for non-infrastructure investments

**Non-infrastructure investments**

Besides the financing of major infrastructure projects, UPT systems require recurrent updates to deliver an adequate performance in terms of quality of service and environmental impact, in coherence with available technology. **Vehicle renewal and updated ticketing and information systems** constitute the main non-infrastructure investment needs.

With the aim of cutting down pollutant emissions and CO₂ levels, the alternative fuels and cleaner transport technology sector is gradually moving towards larger-scale deployment across the EU. In particular, UPT systems are progressively advancing towards **cleaner bus fleets and rolling stock** composed of vehicles complying with low-emission standards (e.g. Euro VI for diesel buses) or electric, hybrid and alternatively fuelled (i.e. bio fuels, natural gas, hydrogen) vehicles. This replacement implies a significant financial effort for PTA and PTO as it may be seen as an **extraordinary upfront cost.**

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33 For further details on this issue see the UITP Position Paper: Towards better fare regulation and adjustment, December 2012
On the other hand, ICT bring several opportunities to enhance the quality of service of UPT systems. In particular, the technology for contactless and seamless ticketing has been available for many years now but it is constantly evolving. User information systems benefit from real-time data streams and the development of integrated platforms. These updates may lead to large investment amounts, such as the renewal of the whole ticketing and payment system in a metropolitan-wide UPT network. Besides, it should be noted that the implementation of new technologies of ticketing and user information will generate data of high value for planning and operation purposes. Thus, the ownership and sharing agreements of these data should be carefully taken into account when designing the financial arrangements of such investments, particularly when the private sector is involved.

Non-infrastructure investments may be of a less predictable nature than infrastructure or operation expenditure and may imply some technological risks. Hence, these investments require financing solutions tailored to their particular requirements in order to ensure their long-term financial sustainability, which is particularly an issue in the context of budgetary constraints.

**Tailored financing solutions**

Tailored financing solutions (TFS) are essentially a combination of equity, loans, guarantees, and other risk-sharing mechanisms that may include a proportion of funding from grants. The use of TFS to address specific market needs is increasing, as they are considered a cost-efficient way of using public funding. Moreover, the financing instruments supported by public money are expected to have a leverage effect, i.e. to attract additional private or public funding.

**Tailored financing solutions in the EU**

In the EU, the EIB and the EIF are the most active public actors providing TFS. They are both exempt from applying EU procurement rules, which enables a higher speed of set-up and flexibility in the management of a TFS. When TFS mechanisms are set up at lower institutional levels (national, regional...), the public procurement requirements for selection of financial intermediaries makes the process lengthy and complicated, which may decrease the efficiency of implementation.

The increasing use of TFS is supported in the multiannual (2014-2020 period) EU budget, the ESI funds policy framework and the EFSI (2014-2020 period). For example, the EIB in cooperation with the European Commission under Horizon 2020 has developed a joint mechanism for TFS that aims to facilitate and accelerate access to financial support for innovative businesses and other innovative entities in Europe. The “InnovFin” (EU Finance for Innovators) offers a range of tailored financial products including direct loans and guarantees for intermediaries that lend to companies developing smart and sustainable mobility projects. This programme offers TFS having an indirect application to the UPT sector, notably supporting companies or projects engaged in innovation for resource-efficient and climate and environmentally-friendly technologies that could be applied to UPT infrastructure and vehicles. Another example is the European Cleaner Transport Facility (CTF), which is a major EIB financing programme providing a wide spectrum of debt financing solutions to support investments targeting emission reduction and energy efficiency in the European transport industry (automotive, railroad, aircraft and shipping industries as well as related infrastructure). The EFSI, already mentioned, could also be used for a range of UPT investments using TFS, including through a UPT Investment Platform to support smaller projects.

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34 For example, although the technology for electric buses is rather consolidated, there are some concerns on whether operators will be able to deliver the same level of service as diesel buses
**Benefits from standardisation**

The setting of technology standards at EU level for both cleaner vehicles and ticketing and information systems would decrease technological risks, enable larger purchase scales and increase the guarantee of debt repayment because of a larger market for these technologies. All these effects would favour more convenient financing conditions and ease the issuing of enhanced TFS. Thus, the financing sustainability of UPT would clearly benefit from a process of progressive standardisation of these technologies, which should be led by European institutions.

**City bonds**

Another financial solution is for cities (or transport authorities or other stakeholders) to issue municipal bonds to finance specific major investments or UPT investment programmes, whenever the legal framework enables them to do so. Cities may have access to the rapidly growing but still incipient green bonds market, where financial conditions are more favourable for “green projects”, i.e. projects with clear environmental benefits, especially when it comes to the climate challenge. Alternatively, cities may issue bonds focusing on their citizens (or on public transport users) through financial intermediaries. These community financing solutions do not necessarily imply more favourable financing conditions, as transaction costs are very high, but may eventually increase the visibility of UPT projects and even the loyalty of UPT users. The case study of Krefeld is a good example of a community financing solution.35

**Application**

The need for expertise, skills and administrative capacity, both in the area of financial and banking knowledge and in specific market needs, is an important challenge related to TFS development. Very often technical assistance is needed for the definition of TFS. For national/regional/local administrations, the promotion of a financing solution requires a deep analysis of different technical, legal and financial aspects. Whilst they have to tailor financial solutions for key beneficiaries, they need to understand what type of expenditure will be financed in order to address specific issues (e.g., technological performance of new batteries for cleaner buses), existing and future standards, and the potential demand. Moreover, they have to identify potential barriers and leverage tools to set up innovative financial tools providing advantageous long-term financing.

Thus, a further cooperation among the stakeholders involved (the CE, IFIs, PTA, PTO) would ease the application of TFS to satisfy key financing needs of public transport agencies and UPT operators.

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35 For further details see the Appendix B: Case studies
7. Implementation context clusters

The implementation context clearly determines the suitability of innovative ways of financing UPT. Thus, a classification or clustering of implementation contexts is necessary to identify the most adequate financial innovations for each basic type of situation that may be found in the EU. The background of the cluster analysis that has been carried out is the information gathered from the literature and a web search, but also from the interviews carried out for the study. This chapter presents the main findings of this exercise.

Results of the analysis

Two basic characteristics appear as the most relevant to classify UPT systems in relation to their financing models and their capacity to absorb innovations to improve them: transport modes used, which is heavily dependent on city size, and governance structure.

Regarding the principal modes of UPT, four main levels were established for the clustering exercise, with the adopted quantitative factor (city size) being used due to the observed correlation with transport modes available. The limits should therefore be used with flexibility. The first level considers cities with less than 150K inhabitants, which provide UPT services only with urban buses in most of the cases studied.

The second level consists of cities having between 150K and 350K inhabitants, where in some cases the tram appears as a mode of transport besides urban bus. The presence of trams highly depends on the level of UPT network development, which is related to the city size, but also on wealth, urban structure, UPT model in the country, etc. Medium-size cities with a consolidated UPT network tend to have trams.

The third level contains cities between 350K and 1 million inhabitants. As observed with the second level, the main transport modes depend on the level of UPT network development. Cities with a more consolidated network offer a metro service, besides urban bus and tram, while cities with a developing network are limited to offer UPT services with urban buses and trams, as well as trolleybuses in some cases.

Finally, the fourth level contains cities with more than 1 million inhabitants. This type of cities, with high demand for UPT, usually count on all standard UPT modes: urban bus, tram, metro and suburban train.

Regarding the governance structure, it has been observed that in cities under 350K inhabitants, local authorities are in charge of managing UPT systems, while cities with more population often have an integrated public transport authority. The main rationale is that when cities attain a certain size, the UPT system becomes more complex and requires an integrated planning, management and fare system.

Clusters proposed

From the analysis of the different variables affecting UPT services in EU cities, six clusters, based on the above characteristics, are proposed (see Table 7-).

- Cluster #1. It includes all cities under 150K inhabitants, regardless of their level of UPT network development. They provide UPT by bus and have a local governance structure. A total number of 11 cities studied can be included in this group, among them Mataró (Spain), Aix-en-Provence (France), Regensburg (Germany), Opole (Poland) and Borisov (Belarus).

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36 In the former socialist countries, for instance, trams were more common than in the EU-15. Actually, old tram systems were dismantled in many EU countries in parallel to car traffic growth. Only in the past 30 years have modern trams been considered real UPT investment options in Western countries.
• **Cluster #2.** It includes cities with a population between 150K and 350K inhabitants providing UPT by urban bus and tram modes. Their governance structure is local, and their UPT network is well developed. A total of 19 cities among those studied fit into this group, including Ghent (Belgium), Catania (Italy), Nantes (France), Bonn (Germany) and Tampere (Finland).

• **Cluster #3.** It includes cities with a population between 150K and 350K inhabitants providing UPT by urban bus. As for Cluster #2, their governance structure is local, but their UPT network is “in development”. A total number of 14 cities studied can be included in this group. Białystok (Poland), Ljubljana (Slovenia), Kaunas (Lithuania), Novi Sad (Serbia) and Varna (Bulgaria) are some of the most representative.

• **Cluster #4.** It includes cities with a population between 350K and 1 million inhabitants providing UPT by urban bus, tram and metro. The governance structure in this case is based on a public transport authority, and the UPT network can be classified as consolidated. This group contains a total number of 17 cities including Lisbon (Portugal), Oslo (Norway), Amsterdam (Netherlands), Dublin (Ireland) and Edinburg (United Kingdom).

• **Cluster #5.** It includes cities with a population between 350K and 1 million inhabitants providing UPT by urban bus and tram, as well as trolleybus in some cases. As in Cluster #4, the governance structure is based on a public transport authority, but the UPT network development is considered “in development”. A total number of 15 cities studied, such as Zagreb (Croatia), Riga (Latvia), Mykolaiv (Ukraine), Tallinn (Estonia) and Brno (Czech Republic) can be included in this group.

• **Cluster #6.** It includes cities with a population bigger than 1 million inhabitants providing UPT services by urban bus, tram, metro and suburban train and having a governance structure led by a public transport authority. These cities, independently of the maturity of their UPT system, have important financial problems. Even for those that already have extensive rail systems, there are important investments to be made to improve or to extend them. Both funding and deficit financing problems are not too dissimilar among these major urban areas and, having complex governance systems, innovative financial solutions should be of interest to all of them. Among the 21 cities in this group, the cases of London (United Kingdom), Madrid (Spain), Milan (Italy), Kiev (Ukraine), Prague (Czech Republic) or Warsaw (Poland) are, for instance, quite different, but share many characteristics regarding their financial problems.

These clusters have been used to analyse the potential of implementation of the different innovations in financing UPT that have been collected from the research and the interviews, or developed as part of the study. It is through this classification that recommendations on innovative UPT funding and deficit financing solutions are proposed.
## Table 7-1. Set of clusters proposed

<table>
<thead>
<tr>
<th># Cluster</th>
<th>Population</th>
<th>Principal modes of UPT</th>
<th>Governance structure</th>
<th>Level of UPT network development</th>
<th>Examples of cities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>&lt;150K</td>
<td>(1) Urban bus</td>
<td>Local</td>
<td>Consolidated / Developing</td>
<td>Mataró (Spain), Aix-en-Provence (France), Regensburg (Germany), Opole (Poland), Borisov (Belarus)</td>
</tr>
<tr>
<td>2</td>
<td>150K - 350K</td>
<td>(2) Urban bus and Tram</td>
<td>Local</td>
<td>Consolidated</td>
<td>Ghent (Belgium), Catania (Italy), Nantes (France), Bonn (Germany), Tampere (Finland)</td>
</tr>
<tr>
<td>3</td>
<td>150K - 350K</td>
<td>(1) Urban bus</td>
<td>Local</td>
<td>Developing</td>
<td>Białystok (Poland), Ljubljana (Slovenia), Kaunas (Lithuania), Novi Sad (Serbia), Varna (Bulgaria)</td>
</tr>
<tr>
<td>4</td>
<td>350K - 1M</td>
<td>(3) Urban bus, Tram and Metro</td>
<td>Public Transport Authority</td>
<td>Consolidated</td>
<td>Lisbon (Portugal), Oslo (Norway), Amsterdam (Netherlands), Dublin (Ireland), Edinburg (United Kingdom)</td>
</tr>
<tr>
<td>5</td>
<td>350K - 1M</td>
<td>(2) Urban bus/Trolleybus and Tram</td>
<td>Public Transport Authority</td>
<td>Developing</td>
<td>Zagreb (Croatia), Riga (Latvia), Mykolaiv (Ukraine), Tallinn (Estonia), Brno (Czech Republic)</td>
</tr>
<tr>
<td>6</td>
<td>&gt;1M</td>
<td>(4) Urban bus, Tram, Metro and Suburban train</td>
<td>Public Transport Authority</td>
<td>Consolidated / Developing</td>
<td>London (United Kingdom), Madrid (Spain), Milan (Italy), Kiev (Ukraine), Prague (Czech Republic), Warsaw (Poland)</td>
</tr>
</tbody>
</table>
8. Recommendations, proposals and innovation guidelines

This chapter provides recommendations, proposals and innovation guidelines on how to apply innovative approaches to the financing of UPT that are the result of the detailed analysis of the experiences collected through the survey and of the research carried out specifically for this project. The first point (8.1) describes general recommendations stemming from basic principles applying to public sector financing. In the second (8.2), these recommendations are further developed leading to concrete proposals that take into account the implementation contexts clusters. Finally, in (8.3), cluster-specific innovation guidelines are described as a briefing of previous findings.

8.1. General recommendations and proposals

**Adequately combine financing sources under a long-term perspective.** As UPT income from users is usually insufficient to cover even the exploitation costs, an optimal mix of different financial instruments can ensure sufficient, predictable and stable revenue (sustainable) to pay for UPT investment and for O&M expenditure. When revenue streams are varied in terms of sources (or contributors) and there is a long-term commitment to UPT support, the risk of shortcomings in the coverage of the deficit is reduced and transport authorities have better access to debt financing, which is needed for investments and to cover eventual mismatches between income and expenditure. Conventions among public authorities providing the needed subsidies, and clear commitments on tariffs and on the level of provision of services (and the relevant investments required by this level), should establish the framework through which the financial sustainability of the UPT system will be guaranteed.

**Expand UPT revenues through contributions from indirect beneficiaries.** Public transport users and society in general are obvious beneficiaries of the UPT system and contribute to finance it through fares and general taxes, respectively. However, some benefits can be assigned to particular groups other than direct users. Businesses gain from increased accessibility and cheaper labour supply. Developers and real-state owners gain from increased property prices due to better accessibility. A “beneficiary-pays” approach could be more systematically applied in order to improve the revenue stream, diversify revenue sources and establish a fairer distribution of UPT financing. In this sense, land value capture mechanisms, green taxation or similar formulas may be effective to raise additional funds and to achieve an enhanced balance between contributions and benefits of the UPT system.

**Ensure available funding at local/metropolitan level.** Under a decentralised public financing structure, increasing funding from within the community (i.e. revenues at local or metropolitan level) provides higher autonomy to transport authorities to implement integrated and sustainable urban mobility plans and adequate the UPT supply according to the particular needs of each urban area. The creation (or empowering) of a mobility agency in charge of most of the financial flows related to UPT may deliver optimised financial packages and a further integration between planning and financial decision. Alternatively, under a centralised context and particularly when local or metropolitan authorities have very limited fiscal powers, national (or regional) governments should commit to a long-term funding framework (convention) for UPT with local or metropolitan public transport authorities. With such a framework, transport authorities can increase the time horizon of their planning and investment programming and enhance the conditions of their financial deals.

**Take an intergenerational approach in the decision-making of UPT investment and financial plans.** Sustainable finance of UPT should contribute to meet the needs of the present without compromising the ability of future generations to meet their own needs. This requires pursuing a more accurate intergenerational fairness in terms of payments and net benefits allocation over time for the individuals concerned by such
investment plans. Besides, it is necessary to look closely at the overall effects of the project’s expenditure. Spreading out the financial burden from major projects of UPT infrastructure over the years very often involves important yearly payments from the public sector to lenders or private agents. The design of these payments may affect future public budgets quite differently and endanger the sustainability of the overall UPT system. It may also be unfair to certain future taxpayers, who will have not even participated in the decision on the investment. Thus, taking an intergenerational approach also implies assessing the effects of long-term commitments for funding and financing on future individuals’ welfare.

**Develop new business models to reduce operating deficits by taking advantage of ICT.** Information and communication technologies (ICT) enable the generation of real-time streams of data both from users to the UPT system and vice versa. This makes a case for developing user-based UPT services and more adapted pricing schemes, which can lead to cost savings in service operation and increased fare revenues. The integration of UPT services through a single intermodal system undoubtedly increases the attractiveness of public transport but, without a tariff design that is adapted to the integrated model, the potential increase in revenues from users could end up being null or even negative. This means that the financial consequences of ICT-driven changes in the tariff structure must be carefully analysed.

**Be aware of the potential financial impacts of new mobility services and autonomous vehicles on UPT.** Emerging mobility services based on shared and/or on-demand services boosted by ICT, which will certainly expand with the proliferation of autonomous vehicles, represent both risks and opportunities for UPT services. In response, transport authorities and UPT operators should envisage new business models to find synergies with these emerging urban mobility services. Maintaining the system unaltered could represent its financial failure in the medium term.

**Consider tailored financing solutions for non-infrastructure investments.** Updates to the UPT system such as vehicles replacement for low-carbon alternatives or the implementation of smart ticketing and users’ information systems usually imply extraordinary upfront costs and technological risks. They could benefit from ad hoc financing solutions to reduce costs and risks and to ensure their long-term financial sustainability. Specialised programmes at EU level have shown the potential savings from the standardisation of UPT technologies and from blended financial solutions. Enhanced cooperation among stakeholders and UPT authorities across the EU is needed to take full advantage of these programmes. In this sense it would be particularly useful to promote the cooperation among public transport authorities and operators with the aim of optimising the purchase scale of certain physical assets (buses, rolling stock, etc.) and services (information and management programmes, etc.), getting adapted financial packages (including through mutualisation) and sharing relevant information and best practices.

**Explore innovative ways of allocating UPT subsidies through smart governance rules.** The allocation of subsidies to pay for the UPT operational deficit should pursue a more efficient, fairer and sustainable distribution. This allocation should be based on indicators of cost-efficiency, quality of service and environmental performance, giving the right incentives to PTOs, and take into account the fiscal and budgetary capacity of the different administrations involved.

Improve contractual arrangements with PTOs to promote a reduction of operating costs and an improvement of UPT service performance. Contractual settings between PTAs and PTOs can incorporate an operational risk transfer, a performance-based scheme (bonus or malus) and/or fixed quality requirements. Public transport administrations and operators have to consider these alternatives and pursue an optimisation of the risk allocation and the quality of service, according to the context and specific characteristics of each case.
8.2. Specific recommendations and proposals

**Strategic level**

**SR1 – Develop an EU-wide financing strategy for sustainable investments in UPT infrastructure.** This EU-wide financing strategy for UPT infrastructure projects should be based on the vision of sustainable finance, i.e., providing financial support to UPT development without compromising the ability of future generations to finance their own needs. Thus, for projects showing an outstanding performance in terms of environmental goals (CO₂ reduction objectives, for example), socioeconomic efficiency, financial sustainability and intergenerational fairness, enhanced accounting standards for public debt/deficit may be envisaged to better match long-term investment needs with present financial options. A practical mechanism to facilitate the application of such regulatory changes, in particular for relatively small projects, would be the use of a UPT Investment Platform.

**SR2 – Link investment plans with financial programmes.** The financial sustainability of the overall UPT system soundly improves when decision-makers establish clear financing programmes encompassing robust financial commitments in the short run, robust solutions for the generation of sufficient revenues and the implementation of legal frameworks supporting concerted actions in the long run. Investment plans resulting from Sustainable Urban Mobility Plans (SUMPs) often also represent an increase in the UPT operating deficit. Thus, through clearly linking specific investment plans with their long-term financial implications and the commitment of supporting administrations, more favourable conditions may be achieved with lenders, who perceive the resulting risk reduction.

**SR3 – Engage private participation and financial institutions into financial strategies.** Private sector participation in UPT, beyond the provision of services, is still relatively rare. As the sector, at least in the EU, is unable to provide the returns required by a pure market-driven venture, this participation is only possible through PPPs. For these partnerships, often involving important investments, to be successful, the GPI partner must count on stable and predictable sources of funds to amortise the investment made and to compensate for the risks involved in funding, operating and managing the project. This entails the need for a legal framework that ensures long-term stability but is adapted to the changing conditions that will undoubtedly affect a UPT project. Whilst legislation is typically a country-wide concern, the possibility of establishing an ad-hoc framework for UPT, even at the metropolitan level, should not be disregarded. Such a framework should be the result of a consensus between the public authorities and the representatives of the private actors in the sector (investors, operators, bankers, etc.) in which the multilateral financial institutions could potentially play an arbitration role. Unless there is a PPP model adapted to the particular circumstances of UPT it would be quite difficult to increase private sector financing in the sector. In the strongly regulated environment of UPT, PPPs should focus on availability of services with well-defined quality standards and rather simple incentives for performance. Efficiency should be pursued by the private partner through efficient construction, O&M and good management.

**SR4 – Build credibility.** Besides the existence of a proper framework for PPPs, potential private partners, and institutional investors in particular, need to ascertain the determination of decision-makers, ideally supported by strong political majorities, to jointly implement large UPT investment projects. Transport authorities need, on the other hand, to show reliability in the use of existing resources before seeking to convince private investors to share long-term financial risks.

**SR5 – Create a mobility agency.** Establishing comprehensive financial strategies for the development of UPT investment plans can be significantly optimised under the management of an integrated mobility agency in charge of UPT financial flows and with a relevant role in planning and implementing UPT investments. Such an agency would imply a further integration of current governance structures and would have powers to collect the revenues from dedicated sources, including user fees, subsidies, green taxation or land value capture, for example. In a more advanced phase the agency could also be responsible for traffic and parking management and for the collection of some of the charges applied to vehicles using the urban road network (from taxis and other automobile service
providers to possible urban tolls, parking charges, permits and other fees, etc.). Such a mobility agency would require sufficient financial independence to come to arrangements with third parties (public institutions, IFIs and private actors) involved in the provision of financial coverage.

**SR6 – Elaborate a diagnosis on the distribution of the UPT financial burden.** The diagnosis should take into account how the UPT system is financed through user payments and subsidies from different administrations and link them with the various groups benefitting from public transport (users, non-users, enterprises, etc.) and with its area-wide effects (local, metropolitan, regional, national, EU). The main result would be the net economic impacts on each group. It should be noted that tax effects of all financial flows should also be included as they may have a significant impact on the resulting distribution of the financial burden. This diagnosis will be useful as a rationale for the creation of new revenue sources from indirect beneficiaries or for an enhanced allocation of contributions among the public administrations involved.

**Tactical level**

**TR1 – Link urban developments to public transport and adopt land value capture mechanisms.** The planning of new urban developments should carefully consider the provision of the required public transport services. This brings the opportunity to introduce land value capture mechanisms for the financing of new UPT services. In growth areas, developer’s contribution schemes could be considered to finance the up-front costs of new UPT services. Another alternative is to use land asset management schemes, where public authorities acquire land before the UPT project is announced and sell it after the project is implemented. When the UPT project is not necessarily linked to a new urban development or when the scope of the financial base needs to be larger, the introduction of betterment levies is an alternative to support the financing of UPT projects on a larger scale. The main drawback of this measure is the difficulty of estimating the added value to properties of major UPT projects. In any of the abovementioned cases, the value captured should not exceed the benefits of the UPT project to ensure acceptability and keep the economic rationale behind these projects. Furthermore, land value capture mechanisms should not be seen as a stable and recurrent funding option but as a financial support to particular UPT investments, especially in urban growth areas.

**TR2 – Consider charges for congestion and/or air pollution.** In urban areas with high density of transport demand, a congestion and/or pollution charge to private cars may be an appropriate demand management tool. A shift from private car to public transport increases fare revenues for public transport while the marginal cost of new users to high capacity services is very low. This contributes to decrease the operational deficit of UPT. In turn, charges can be earmarked for UPT financing. Although operating costs of such levies could be quite high in relation to revenues, their application throughout a large city can represent a significant amount of money. The public acceptability of car-charging policies is usually low, so complementary measures should accompany them and, in particular, a parallel or an a priori improvement of the public transport supply.

**TR3 – Consider workplace-parking levies.** A workplace-parking levy is a second-best instrument to deal with congestion but it may be an adequate policy to reduce car use in urban areas where commuting to work constitutes a significant part of urban trips. In comparison to congestion charges, workplace-parking levies imply much lower operational costs and, thus, it is a more efficient financial instrument if earmarked for public transport. The drawback is that the scope of the measure is smaller and the impacts in travel behaviour will be more modest. The implementation of a workplace parking levy scheme in Nottingham constitutes a benchmark case in Europe.

**TR4 – Link the introduction of earmarked charges to identifiable transport projects.** There is clear evidence that the acceptability level of new charges or taxes significantly increases when revenues are earmarked for a short list of clearly identifiable UPT projects. This requires not only transparency and adequate public communication but also a prior investment programme enjoying a wide political consensus.

**TR5 – Use earmarked taxation as a leverage for private funding.** When taxes are earmarked for particular UPT projects, there is a stable public funding source to partially
cover investment needs. This creates the adequate environment for private funding through PPP arrangements. In this way, earmarked taxation has a considerable multiplier effect in capturing extra funding from private agents.

**TR6 – Consider enlarging the scope of transport authorities to integrate emerging mobility services.** Emerging mobility services should be considered as an opportunity to cut down the operating costs of providing adequate accessibility coverage to urban areas. However, in low demand areas, notably in small and medium cities, emerging mobility services may be unprofitable and require public funding. This makes a case for enlarging the scope of transport authorities through the introduction of (some) emerging mobility services in the integrated planning, management and pricing framework of UPT. In small or medium cities with low density of demand for transport, emerging on-demand and/or shared mobility services may partially substitute mass public transport services where and when efficiency gains can be achieved, so a completely different approach to manage UPT might be necessary.

**TR7 – Collaborate with new mobility providers and aggregators to find synergies.** Shared taxi services are emerging in large cities across Europe and – in some cases – they are cannibalising urban public transport. The convenience of door-to-door service and the relatively low cost compared to regular taxis can shift demand away from public buses and trains. UPT providers should actively seek to collaborate with these new mobility services to jointly develop multimodal services that combine metro rides with individualised pick-up and drop-off services. In cities with concentrated transport demand allowing the continuity of use, these emerging mobility services may be profitable for individual drivers (e.g. Uber type) and lean private companies. Thus, the role of public transport authorities should be to account for total societal costs, find synergies and ensure fair competition between different mobility providers and/or aggregators.

**TR8 – Increase the political powers of transport authorities to regulate transport services and set pricing schemes under emerging mobility concepts.** In the presence of private on-demand and/or shared mobility services and under a Mobility as a Service (MaaS) framework where the PTA acts as a collaborator with mobility providers and aggregators, there is a strong need to increase the policy role of the PTA, as private MaaS operators will not have incentives to take all the societal costs into account in their optimization. In this context, the PTA should concentrate powers regarding the planning, regulation, pricing and management of mobility services in order to take advantage of synergies and deliver an efficient UPT supply.

**TR9 – Diversify the business portfolio of UPT operators.** UPT operators generally rely both on fare revenue and public funds to covers their costs. Decision-makers, on the other hand, are always pressed to reduce both fares and subsidies to UPT whilst maintaining or even improving services. Increasing revenues from complimentary business activities can alleviate this pressure by making UPT operators more financially independent. These business activities can include renting out space at UPT stations to stores and restaurants, offering advertising space at UPT stations, on trains and buses or on the UPT system’s webpages or selling some aggregate information on mobility. These are common activities, but could be improved to generate more revenues through better design and management, in particular when public transport becomes a seamless type of experience with leisure and commercial activities, as is being proposed in many cities.

**Operational level**

**OR1 – Increase the financial skills of UPT professionals.** Public transport authorities and operators should count on professionals with high competence in the field of finance management, capable of designing appropriate financial formulae for UPT investments and services. This available knowledge would also facilitate access to a wider range of financial markets and solutions.

**OR2 – Consider tailored financial solutions for non-infrastructure investments.** An extensive study of available specific financial programmes at EU or Member State level should be undertaken, in particular when planning non-infrastructure investments (vehicles, ICT solutions, etc.). Technical and financial solutions can be adapted to better fit with these programmes aimed at standardisation, PPP support, etc. PTAs and PTOs may
obtain convenient financial conditions through blended financial solutions adapted to the nature of the project in terms of technological risks and project scale aiming at the combination of several financial mechanisms, including grants and loans, with mechanisms facilitating private participation.

**OR3 – Promote the standardisation of UPT technologies.** The setting of technology standards at EU level for both cleaner vehicles and ticketing and information systems would decrease technological risks, enable larger purchase scales and increase the guarantee of debt repayment because of a larger market for these technologies. All these effects would facilitate financing through EU-wide programmes such as the EIB’s Cleaner Transport Facility.

**OR4 – Take into account the value of data when designing financial arrangements for investments in ticketing and information systems.** The implementation of smart technologies of ticketing and user information may generate data of high value for planning and operation purposes. Transport planners, private mobility services and other businesses are willing to pay for these data. Thus, the generated data should be appraised beforehand and ownership and sharing agreements should be clearly stated in the financial arrangements.

**OR5 – Consider the use of green bonds for the financing of UPT.** Green bonds respond to the demand for alternative financial products by many savers. In exchange for the guarantee that their money is invested only in environmentally sustainable businesses, savers are generally willing to accept below market interest rates. UPT investors can benefit from this demand for green bonds by issuing their own green bonds or by obtaining financing from specialised funds emitting such bonds.

**OR6 – Explore community financing options.** For smaller investments, the idea of green bonds can be combined with the idea of community financing to create “green citizen bonds” that – when marketed locally – can turn ‘UPT users’ into ‘UPT owners’ and raise identification with the local UPT system.

**OR7 – Define new distribution formulas to finance the operational deficit.** Public administrations with UPT responsibilities providing subsidies to mobility agencies, PTAs or PTOs should consider objective indicators to properly value decisive factors like cost-efficiency, environmental impact and equity in order to finance the operational deficit or the financial gaps arising from new investments. Relevant factors ought to be valued through objective indicators and properly weighted through a multicriteria analysis that ensures a reasonable equilibrium among all the variables, but is sensitive to the particularities of UPT services in each urban area.

**OR8 – Explore a new contractual arrangement with operators based on a partial transfer of operational risk and a performance-based scheme.** Operational risk is split in two parts: production and demand risks. Given their tariff-setting and planning capacity, public administrations are expected to bear most of the demand risk, whilst operators have to bear production risk. It is, however, convenient to design an incentive scheme to promote an increase of ridership, besides a performance-based scheme promoting a reduction of operation costs and a good quality of service.

**OR9 - Explore a new contractual arrangement with operators based on a full transfer of operational risk.** This may include a set of measures empowering operators in the strategic and tactic levels of decision. This is, defining routes, stops and frequencies or even ticket fares. In exchange, the operational risk can be fully transferred to operators and the subsidy borne by public administrations becomes a fixed quantity. Public administrations should set the required contractual requirements to ensure an adequate quality of service and environmental performance. It may be a suitable solution in small and medium cities with unimodal public transport networks.

**OR10 – Transfer technological risk to operators or manufacturers.** Technological risk in the sector is increasing because of, for example, the introduction of electric or hybrid buses, autonomous vehicles, etc. There is an uncertainty associated with their performance as well as their life cycle. Thus, it is recommended that operators bear that risk by enforcing specific contractual restrictions, such as fixed quality requirements. As an alternative, the risk may be transferred to bus manufacturers (highly recommended when the PTO is a public company).
**OR11 – Set stable pricing frameworks.** In many cases, the review of UPT fares encompasses political controversy and depends highly on political cycles. An inconsistent fare policy will entail added financial risks for PTAs and PTOs. A consensus on a systematic fare review mechanism based on clear criteria would set limits to the operational deficit and increase the financial sustainability of the UPT system.

**OR12 – Consider the introduction of user-based fees.** The application of ICT to ticketing systems should enable the adoption of more sophisticated fare structures. This may include the use of dynamic or distance-based pricing or even the introduction of premium services for specific user needs with higher fares. Fares could respond better to particular user needs and, through this adaptation, generate more “captive users” and increase fare revenues; sporadic users could be charged more than recurrent ones; fares could be modulated to reduce peak demand and the need for fleets that are poorly used during the rest of the day, etc. User-based pricing schemes will be more be more aligned with the MaaS concept that integrates other services, such as car-sharing, parking (for park and ride), etc.

**OR13 – Optimise UPT operation with new data streams.** New data streams collected through smart cards, sensors on vehicles or social media, for example, may provide an accurate picture of the travel behaviour of UPT users. These processed data may be used not only to optimise planning but also the operation of UPT services in terms of routes, frequencies, capacities, peak periods, etc. Thus, a data-driven management of UPT operations has a large potential to cut down operating costs, increase ridership through more adapted tariffs and, in turn, enhance UPT financial sustainability.

**OR14 – Create municipal and PTA organisations to take advantage of financial synergies.** Small or medium municipalities often find difficulties to afford an adequate UPT system. An organisation of institutions responsible for providing UPT services may be an adequate mechanism to find common solutions to their financial challenges. For example, presenting a joint front to obtain grants from upper level administrations, including the EU, to reduce costs through shared purchases, to obtain legal and financial support from specialists that could not be afforded individually, to share experiences and knowledge on contracts, notably on PPPs, etc.
### Figure 8-1. Suitability of strategic recommendations

<table>
<thead>
<tr>
<th>ID</th>
<th>Definition</th>
<th>Cluster 1</th>
<th>Cluster 2</th>
<th>Cluster 3</th>
<th>Cluster 4</th>
<th>Cluster 5</th>
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<td>SR1</td>
<td>Develop an EU-wide financing strategy for sustainable investments in UPT</td>
<td>X</td>
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<tr>
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<td>infrastructures</td>
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<tr>
<td>SR2</td>
<td>Link investment strategies with financial programmes</td>
<td></td>
<td>X</td>
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<tr>
<td>SR3</td>
<td>Engage private participation and financial institutions into financial</td>
<td></td>
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<tr>
<td></td>
<td>strategies</td>
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<tr>
<td>SR4</td>
<td>Build credibility</td>
<td></td>
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<tr>
<td>SR5</td>
<td>Create a mobility agency</td>
<td></td>
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<tr>
<td>SR6</td>
<td>Elaborate a diagnosis on the distribution of the UPT financial burden</td>
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### Figure 8-2. Suitability of tactical recommendations

<table>
<thead>
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<th>Definition</th>
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<th>Cluster 2</th>
<th>Cluster 3</th>
<th>Cluster 4</th>
<th>Cluster 5</th>
<th>Cluster 6</th>
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</thead>
<tbody>
<tr>
<td>TR1</td>
<td>Link urban developments to public transport and land value capture</td>
<td></td>
<td>X</td>
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<tr>
<td></td>
<td>mechanisms</td>
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<tr>
<td>TR2</td>
<td>Consider charges for congestion and/or air pollution</td>
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</tr>
<tr>
<td>TR3</td>
<td>Consider workplace parking levies</td>
<td></td>
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<tr>
<td>TR4</td>
<td>Link the introduction of earmarked charges to identifiable transport</td>
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<tr>
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<tr>
<td>TR5</td>
<td>Use earmarked taxation as a leverage for private funding</td>
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<tr>
<td>TR6</td>
<td>Consider enlarging the scope of transport authorities to integrate</td>
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<tr>
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<tr>
<td>TR7</td>
<td>Collaborate with new mobility providers and aggregators to find</td>
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<tr>
<td>TR8</td>
<td>Increase the political powers of transport authorities</td>
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<tr>
<td>TR9</td>
<td>Diversify the business portfolio of UPT operators</td>
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Figure 8-3. Suitability of operational recommendations

<table>
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<th>Definition</th>
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<td>OR1</td>
<td>Increase the financial skills of UPT professionals</td>
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<tr>
<td>OR2</td>
<td>Consider tailored financial solutions for non-infrastructure investments</td>
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<td>OR3</td>
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<td>OR4</td>
<td>Take into account the value of data</td>
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<td>✓</td>
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<td>OR5</td>
<td>Consider the use of green bonds</td>
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<td>OR6</td>
<td>Explore community financing options</td>
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<td>OR7</td>
<td>Define new distribution formulas to finance the operational deficit</td>
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<td>Explore a new contractual arrangement with full risk transfer</td>
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<td>OR10</td>
<td>Transfer technological risk to operators or manufacturers</td>
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<td>✓</td>
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<tr>
<td>OR11</td>
<td>Set stable pricing frameworks</td>
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<td>OR12</td>
<td>Consider the introduction of user-based fees</td>
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<tr>
<td>OR13</td>
<td>Optimize UPT operation with new data streams</td>
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<td>✓</td>
<td>✓</td>
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<td>OR14</td>
<td>Create an organization of municipalities intended to find synergies</td>
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Figure 8-4. Legend for recommendations suitability

<table>
<thead>
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<tr>
<td>✓</td>
<td>Suited recommendation</td>
</tr>
<tr>
<td>≃</td>
<td>Suited recommendation with some conditions</td>
</tr>
<tr>
<td>✗</td>
<td>Unsuit ed recommendation</td>
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</table>
8.3. Context-specific innovation guidelines

8.3.1. Cluster 1: Cities with less than 150,000 inhabitants and existing UPT services

*Suited recommendations:* TR6, TR7, OR1, OR3, OR4, OR6, OR7, OR10, OR12, OR13, OR14

**Context**

This group is composed of small or medium urban agglomerations with a unimodal UPT system mainly based on urban or interurban buses and, hence, with no need of investments in UPT infrastructure. For this, these cities should focus their innovation approach on the tactical and operational level.

**Tactical level**

On a tactical level, this group of cities should study the feasibility and benefits of introducing emerging on-demand and/or shared mobility services in their UPT business model. These emerging services could substitute (or complement) scheduled bus services where cost-efficiency gains could be obtained. Because these emerging services may still require public funding, an integrated management encompassing collective and on-demand/shared services seems the reasonable way forward. Such an integrated management should aim at providing adequate accessibility in a cost-efficient way in order to ensure the financial sustainability of the UPT system.

**Operational level**

On an operational level, this type of cities would benefit from establishing a UPT organisation with other municipalities of similar characteristics. They could benefit from certain economies of scale in vehicle purchase, operational software, technical and financial counselling, etc. In the case of neighbouring municipalities it could be even possible to share staff and vehicles. Such organisation could explore common financing options for the purchase of new vehicles. The managers responsible for UPT of these urban areas should put special emphasis on the contractual arrangements with PTOs. By transferring fully or part of the operational risk to PTOs, the municipal contribution to UPT would be more stable and, thus, more financially sustainable in the long-term.

8.3.2. Cluster 2: Cities with population between 150,000 and 350,000 inhabitants and a consolidated UPT network

*Suited recommendations:* SR6, TR6, TR7, OR1, OR2, OR3, OR4, OR6, OR7, OR10, OR12, OR13

**Context**

This group is composed of medium cities with consolidated UPT networks, which often include tramway as well as bus. Because their investment needs in infrastructure are likely to be small, as no major developments are needed, the innovation approach should rather turn to tactical and operational levels.

**Tactical level**

On a tactical level, this group may benefit from the introduction of emerging on-demand/shared mobility services, especially in areas with low density of demand. As for the previous case, such new services should be directly or indirectly managed by transport authorities. Furthermore, given that the UPT network is consolidated and in cases where
traffic externalities are an issue, the implementation of green taxation on parking, such as a workplace parking levy, could be an option to increase UPT revenues.

Operational level

On an operational level, pricing schemes and UPT operations should be optimised through a further application of ICT and data-driven management. For this, tailored financial solutions are required and, thus, good financial skills. Furthermore, a partial risk transfer to PTO in their contracts would reduce the uncertainty of public contributions to UPT services.

8.3.3. Cluster 3: Cities with population between 150.000 and 350.000 inhabitants and a developing UPT network

Suited recommendations: SR2, SR3, SR4, SR6, TR1, TR6, TR7, OR1, OR2, OR3, OR4, OR6, OR7, OR8, OR10, OR12, OR13, OR14

Context

This group is composed of medium cities with unimodal UPT networks based on buses. They are likely to plan an expansion of their UPT network. For this, the strategic level of innovation for infrastructure financing is also relevant.

Strategic level

On a strategic level, this group of cities should establish clear and creditable investment plans linked to sound financial programmes. In this sense, the option to engage private stakeholders should be considered and PTAs should elaborate a diagnosis on their revenue sources.

Tactical level

On a tactical level, this group of cities should explore the use of land value capture mechanisms to finance new infrastructure investments. In case of new urban developments, the focus should be placed on developer contribution schemes as a financial support for infrastructure upfront costs. In addition, this type of cities could incorporate emerging mobility services in their transport plans and current operations, especially as a complement of the core UPT network.

Operational level

On an operational level, the expansion of UPT services could be optimised by finding synergies with neighbouring municipalities. Innovative financial instruments such as community financing options or other tailored financing solutions should be considered for the financing of new vehicles or rolling stock.

8.3.4. Cluster 4: Cities with population between 350.000 and 1.000.000 inhabitants and a consolidated UPT network

Suited recommendations: SR2, SR3, SR4, SR6, TR3, TR4, TR5, TR7, TR8, OR1, OR2, OR3, OR4, OR5, OR7, OR8, OR10, OR11, OR12, OR13

Context

This group is composed of large cities with a well-established UPT multimodal network, including metro, tramway and/or bus services. In this situation, the innovative approach should be focused on the tactical and operational levels.
**Strategic level**

On a strategic level, whenever a new infrastructure is planned, PTAs should elaborate a diagnosis on their funding scheme and study the creation of new revenue sources to support the financing of such investments. Private participation options could be envisaged.

**Tactical level**

On a tactical level, new revenue sources should be explored if there is a need for further expansion or significant improvement of the UPT network. Whilst congestion charges might imply excessive implementation costs for cities of this size, the application of workplace parking levies may be a suitable option to generate earmarked revenues for UPT and increase ridership. Where this is the case, it is essential to link the introduction of earmarked charges to a short list of identifiable transport projects to boost acceptability. In addition, innovations in on-demand/shared services could be promoted and the business model of PTAs should evolve towards an integral regulator of mobility services.

**Operational level**

On an operational level, a further involvement of financial experts into the UPT sector would open a wider range of financing solutions for non-infrastructure investments, such as the issuing of green bonds or EU-wide financial programmes for the purchase of cleaner vehicles. Innovation efforts should also be put on the pricing scheme. First, it is essential to reach a stable consensus on a fare review mechanism to reduce the financial risk of the O&M deficit. Second, the introduction of ICT-based ticketing systems enables user-based pricing schemes, which could increase loyalty to UPT and, in turn, fare revenue. This group of cities could, in most cases, improve the contractual arrangements with PTOs by including performance-based schemes and a partial transfer of operational risk. This would lead to increased cost-efficiency and quality of service in UPT operations.

### 8.3.5. Cluster 5: Cities with population between 350,000 and 1,000,000 inhabitants and a developing UPT network

**Suited recommendations:** SR1, SR2, SR3, SR4, SR6, TR1, TR4, TR5, TR7, TR8, OR1, OR2, OR3, OR4, OR5, OR7, OR8, OR10, OR11, OR12, OR13

**Context**

This group is composed of large cities with an undersupply of UPT services. This means that financial issues are mainly related to infrastructure investment needs. In this context, the innovation approach on the strategic level is particularly relevant.

**Strategic level**

On a strategic level, this kind of cities would clearly benefit from specific regulations in the EU to support UPT infrastructure based on a sustainable finance vision and from the creation of an UPT Investment Platform. The application of adapted debt/deficit accounting standards for such investments would better match investment needs with current financial options and enable a further collaboration with private and institutional investors. This group of cities should establish a clear link between investment strategies and financial programmes. With this aim, they should elaborate a diagnosis on the available revenue sources and on the distribution of the financial burden to assess the introduction of new revenue sources and propose an enhanced allocation of UPT contributions.

**Tactical level**

On a tactical level, the implementation of pricing schemes for traffic externalities (congestion charges or workplace parking levies) might be hardly acceptable where the UPT alternative is undersupplied. Thus, this group of cities should explore enhanced parking regulations to increase UPT ridership and/or the earmarking of existing taxation
such as fuel taxes to increase revenues for UPT expansion. The option to use land value
capture mechanisms to finance infrastructure developments should be carefully
considered. In parallel, this group of cities ought to consider new forms of mobility in their
planning process and their investment needs and advance towards an integral regulation
of mobility services.

**Operational level**

On an operational level, innovative financial instruments such as the issuing of green bonds
or the participation in EU-wide specific financial programmes, such as EFSI, should be
considered for investment financing. Some blending options could be particularly
interesting when private agents are involved in the financing of the facilities. In addition,
 improved pricing schemes based on a further adoption of ICT and user-based fares ought
to be developed to promote a modal shift towards UPT.

**8.3.6. Cluster 6: Cities with more than 1.000.000 inhabitants**

**Suitable recommendations:** SR1, SR2, SR3, SR4, SR5, SR6, TR1, TR2, TR3, TR4, TR5, TR7,
TR8, TR9, OR1, OR2, OR3, OR4, OR5, OR7, OR8, OR10, OR11, OR12, OR13

**Context**

This group is composed of metropolitan areas with complex governance structures
involving metropolitan-wide PTAs and multiple government levels. Whereas we may find
UPT systems with different levels of development, they generally count on metro, tramway,
bus and suburban rail services. In a general context of growing population and changing
mobility patterns, metropolitan cities should introduce innovations at multiple levels to
enhance the financial sustainability of their UPT systems.

**Strategic level**

On a strategic level, this group of cities should pursue a further integration between
transport planning, investment plans and financing programmes. In this way, they will
build the required credibility and transparency to engage private and institutional investors
in the financing of infrastructure investments. In addition, these cities would benefit from
an integration of existing governance structures towards the creation of a mobility agency
with powers on the management of most of UPT financial flows, on planning and
implementing investments, on regulating all mobility services and with a degree of financial
independence. This would ease the implementation of comprehensive financial strategies
in UPT and would enable an integrated regulation in a context of disruptive mobility
services.

**Tactical level**

On a tactical level, this group of cities ought to focus on developing appropriate pricing
schemes under a multimodal approach, which may include congestion charges or
workplace parking levies. In principle, congestion charges are the first-best choice to
manage travel demand and favour a modal shift to UPT. However, workplace parking
levies, although second-best instruments, may be more effective in terms of net revenues
for UPT financing. In addition, these pricing instruments should be adapted to emerging
mobility services and to a Mobility-as-a-Service framework. In this sense, PTAs should, on
the one hand, promote and find synergies with private initiatives of innovative services in
urban mobility, and, on the other hand, have the required powers to regulate the licensing
of new players and ensure an efficient pricing among all transport modes. Finally, this
group of cities ought to work on the exploitation of UPT assets through leasing and
advertising activities to increase revenues for the financing of UPT operations.
**Operational level**

On an operational level, this group of cities should consider a wide range of financing options, including green bonds and tailored EU-wide programmes, to finance the replacement of their fleets or rolling stock, especially when there are technological risks into play. When undertaking investments in breakthrough ticketing and information systems, the value of generated data should be carefully taken into account. Moreover, this kind of cities ought to put special emphasis on seeking stable consensus regarding both UPT fare review mechanisms and the allocation of subsidies from involved public administrations. This would definitively enhance the financial sustainability of UPT operations because of an increased predictability of available revenue. It is also important to provide the right incentives for cost-efficiency and quality of services by introducing specific performance-based schemes and/or a partial transfer of operational risk in contracts with PTOs.
Annex A. Experts’ consultation
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2. Interviews and questionnaires about the innovative approaches | 7
1. General interviews and questionnaires

Overview

The team contacted more than eighty UPT experts and representatives from the following sectors:

- International Financing Institutions
- European and international urban mobility associations
- Associations of UPT users
- Public transport vehicle manufacturers
- Academic and professional experts in UPT
- Metropolitan Public Transport Authorities
- UPT operators

A specific questionnaire was designed to gather expertise on trends in urban mobility and financing challenges for urban public transport. Experts were also consulted about their own ideas and proposals for innovative ways of financing UPT.

Institutions and experts contacted

Based on the designed questionnaire, experts were consulted either in terms of direct interviews or written responses to the questionnaire. Table A-1 below shows the agencies/institutions who provided feedback, including person and position.

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<tr>
<th>Association</th>
<th>Contact person</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FINANCING INSTITUTIONS</strong></td>
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<td></td>
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<tr>
<td>EIB (The European Investment Bank)</td>
<td>Marta Sánchez</td>
<td>Public Transport Specialist – Mobility Department (PJ)</td>
</tr>
<tr>
<td>World Bank</td>
<td>Adriana Ortegón</td>
<td>Leader Accessibility Research Group in UCL (UK). Former consultant at World Bank</td>
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<td><strong>EUROPEAN AND INTERNATIONAL ASSOCIATIONS OF URBAN MOBILITY</strong></td>
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<tr>
<td>International Association of Public Transport (UITP)</td>
<td>Hilia Boris</td>
<td>Manager-Transport Economics Commission</td>
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<tr>
<td>Polis Network</td>
<td>Ivo Cré</td>
<td>Deputy Director</td>
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<td><strong>PUBLIC TRANSPORT VEHICLE MANUFACTURERS</strong></td>
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<td>European Automobile Manufacturers’ Association (ACEA)</td>
<td>Fuensanta Martinez Sans</td>
<td>Transport Policy Director</td>
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<td><strong>ACADEMIC AND PROFESSIONAL EXPERTS IN UPT</strong></td>
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<tr>
<td>KIM (Netherlands Institute for Transport Policy Analysis)</td>
<td>George Gelauff</td>
<td>Director</td>
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<td>OLMP Consulting</td>
<td>Olivier Paturet</td>
<td>Former manager of Zero Emission Strategy for Nissan</td>
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<tr>
<td>University of Sydney</td>
<td>David Levinson</td>
<td>Professor. Networks, Economics, and Urban Systems</td>
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**LOCAL/METROPOLITAN TRANSPORT AUTHORITIES AND UPT OPERATORS**

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<td>CRTM (Public transport authority of Madrid)</td>
<td>Carmen Sanz Pardo</td>
<td>Business Department Responsible</td>
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<td>Metrolinx Transport Authority (Ontario, CA)</td>
<td>Steve Naylor</td>
<td>CEO</td>
</tr>
<tr>
<td>ATM (Public transport authority of Barcelona)</td>
<td>Lluís Alegre Carles Labraña</td>
<td>Technical Director</td>
</tr>
<tr>
<td>AMTU (Association of Municipalities with urban public transport in Catalonia)</td>
<td>Carles Labraña</td>
<td>Technical Director</td>
</tr>
</tbody>
</table>

**Interview and questionnaire summaries**

The main outputs from the associations/persons that were consulted are shown below.

**Box 1. EIB’s insights**

**Association/Expert: The European Investment Bank (Marta Sánchez)**

**Interview Summary:**

UPT in Europe walks, slowly, towards cleaner public transport. Decarbonisation is actually a major goal in terms of sustainability but there is not a massive introduction of electrical buses yet. On the other hand, the ageing society introduces new needs for accessibility. MaaS (information + intermodality) and new mobility services are important future trends. In any case, real demand is required for a project to be sustainable. The EIB provides tailored facilities for UPT challenges as well as financing solutions with advantageous conditions. The Bank is working on the use of investment platforms for UPT financing.

**Interview date:** 03/08/2017
Box 2. WB’s insights

**Association/Expert: WORLD BANK (Adriana Ortegón)**

**Interview Summary:**

Innovations in UPT financing are about tailoring tools for effectively obtaining resources from the different sectors involved (benefited) by public transport. This means allowing each sector to do what it does best, identifying what should be financed by the public sector and in which ways investment from the private sector can be sustainably attracted.

Private investors are attracted to invest in more financially ‘profitable’ infrastructure projects, but in order to do so they have to invest in projects which might not be so attractive financially but have a good performance in other areas, for example economic terms (value for society). Having a portfolio of investment projects rather than of financing instruments would be useful to attract capital from the private sector in a sustainable way.

Borrowing tools such as Municipal Bonds or value capture mechanisms such as Community Infrastructure Levy have been recently applied in the UK and USA.

In order to be able to implement other financing instruments and attract more funding (through bonds, user charges or value capture strategies) the system needs to be successful at delivering good quality mobility and accessibility (safely, reliably and conveniently) therefore having high patronage levels and allowing fare revenue to still be a significant and continuous source of revenue.

Regarding the governance structure, having an integrated transport authority in charge of the planning and operation of all public transport modes and the road network (for private vehicles), which is responsible for collecting the revenue for all the system, is a key feature for being able to provide good quality service throughout the system.

**Interview date:** 10/05/2017

Box 3. UITP’s insights

**Association/Expert: UITP (Hilia Boris)**

**Interview Summary:**

The main insights are: 1) densification of cities and urban areas, 2) increased motorization levels, 3) reduction of passengers.km in private vehicle within metropolitan areas, 4) need of digitalisation for a more efficient operation of UPT services, 5) smartcards and other integrated payments methods are increasingly seen as the best way for seamless commutes, 6) UPT should be the backbone of mobility services, 7) congestion charging is key for a more sustainable mobility, 8) More decentralisation to transport authorities is recommended, 9) the financing of Capex and Opex should be approached in different ways.

**Interview date:** 22/05/2017
Box 4. POLIS NETWORK’s insights

Association/Expert: POLIS NETWORK (Ivo Cré)

Interview Summary:
Main trends in UPT are: 1) demographic change (senior population is growing), 2) digitalisation and e-ticketing tend to increase the added value of UPT, 3) emerging transport options should be integrated in UPT planning and operation, 4) on demand mobility may contribute to a more sustainable mass transit network, 5) decarbonisation is a major topic in the EU. The point is that UPT is not flexible enough to adapt itself to these challenges, so transport authorities should try to find out innovative funding sources, as for example land added-value capture in metropolises.

Box 5. ACEA’s insights

Association/Expert: ACEA (Fuensanta Martinez)

Interview Summary:
The “lesson learned” for sustainably financing public transport in the past is that decision-makers should focus on the total cost of ownership and not only on investment / system costs. Funding, investment and generated turnover cannot be separated.

Interview date: 03/05/2017

Box 6. KIM’s insights

Association/Expert: KIM (George Gelauff)

Interview Summary:
Own ideas for sustainable financing: 1) More freedom for operators to set fares and develop services, even within a concession system. 2) Unless major automation will take place, there is not too much room for further substantial cost reductions. 3) To find the proper mix between user payments, subsidies, third party contributions and value capturing. 4) To get companies and other organizations who benefit from the presence of high quality public transport to contribute in a fair share.

Interview date: 10/05/2017
**Box 7. OLMP’s insights**

**Association/Expert: OLMP Consulting (Olivier Paturet)**

**Interview Summary:**

Own ideas for sustainable financing: 1) funding instruments should capture revenue streams from externalities of private vehicle emissions. 2) Urban parking enforcement for non-residents must be applied and parking a vehicle inside a city center for non-residents should become the “exception”. 3) Smart energy management systems must be implemented. 4) It is difficult to consider sustainability in financing public transport if considered in isolation. The subject of sustainable UPT should be included in a wider encompassing scope of: Public Health, Transport and Energy.

**Interview date:** 24/05/2017

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**Box 8. Academic insights**

**Association/Expert: UNIVERSITY OF SYDNEY (prof. David Levinson)**

**Interview Summary:**

In US cities, whilst subsidies are always needed for UPT, land-value capture mechanisms are increasingly required as new sources of funds. Sell taxes are also seen as an innovative financing source in the US. New technologies (electric, hybrid…) are a relative small market compared with the scope of UPT. No threat for UPT within next 10-15 years.

**Interview date:** 27/04/2017

---

**Box 9. CRTM’s insights**

**Association/Expert: CRTM (Carmen Sanz)**

**Interview Summary:**

A priority objective for transport authorities is to incorporate private-vehicle users into public transport. Decision makers should seize the opportunity that particular scenarios offer (e.g., the recent global financial crisis) in order to make strategic changes in the adoption of measures that can be sustainable in time as well as capable of turning certain unsustainable habits. At national level, promoting fiscal benefits for workers using UPT can be an effective measure to change such behaviours. In addition, indirect beneficiaries should contribute to UPT funding through specific mechanisms.

**Interview date:** 12/05/2017
### Box 10. ATM’s insights

**Association/Expert:** ATM (Lluís Alegre)  

**Interview Summary:**  
Suburbanisation increases and creates new mobility patterns. In these cases, in low density areas, on-demand and shared mobility services are an opportunity. In his view, public transport authorities should not directly provide these new services but plan and coordinate them. Public transport shows leadership in sustainable transport solutions but this represents a significant financial effort for UPT systems.

**Interview date:** 29/05/2017

### Box 11. METROLinx’s insights

**Association/Expert:** METROLINX (Steve Naylor)  

**Interview Summary:**  
The financial sustainability of the overall public transport system soundly improves when decision makers are aware of the necessity of clear long-term strategies encompassing, on the one hand, financial commitments for pressing investments in the short run, and on the other hand, tailored instruments for additional revenue generation as well as implementation of legal frameworks to support such actions in the long run. It leads to a funding model that can provide higher amounts of more stable and predictable flows of economic resources, which in turn should favour both operational deficit financing and financial sustainability of new investments.

**Interview date:** 20/08/2017

### Box 12. AMTU’s insights

**Association/Expert:** AMTU (Carles Labraña)  

**Interview Summary:**  
Upper-level institutions providing subsidies for UPT deficit financing should take into account both local authorities’ characteristics and their diverse reality (economic, social and environmental conditions) in order to distribute such funds more efficiently. Moreover, equity considerations should be addressed properly.

**Interview date:** 21/07/2017
2. Interviews and questionnaires about the innovative approaches

**Overview**

Once innovative approaches were identified, a second round of interviews and questionnaires were designed ad hoc to ask experts about their view on specific innovative approaches (strategic, tactic or operational). In particular, experts were asked to assess the performance and replicability of the innovative approaches. 30 experts where consulted in total and the ones that provided feedback are shown in Table A-2.

Table A-2. Experts contacted with feedback in the second round of interviews

<table>
<thead>
<tr>
<th>Innovative approach</th>
<th>Contact person</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>STRATEGIC</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Specific regulations for sustainable UPT investments</td>
<td>Vicenç Pedret</td>
<td>Retired European Commission Official</td>
</tr>
<tr>
<td>Development of comprehensive financing strategies</td>
<td>Arturo Ardila - Sánchez</td>
<td>Lead transport economist at World Bank</td>
</tr>
<tr>
<td><strong>TACTIC</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New sources of incomes from UPT beneficiaries and private vehicle negative externalities</td>
<td>Wylde Declan</td>
<td>Financial Director of the Railway Procurement Agency in Dublin</td>
</tr>
<tr>
<td></td>
<td>Todd Litman</td>
<td>Director of the Victoria Transport Policy Institute</td>
</tr>
<tr>
<td>Developing new business models for UPT</td>
<td>Manel Villalante</td>
<td>Director of Barcelona Regional</td>
</tr>
<tr>
<td></td>
<td>Niko-Matti Ronikonmäki</td>
<td>Transport economist at Helsinki Regional Transport Authority (HSL)</td>
</tr>
<tr>
<td><strong>OPERATIONAL</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Improved financing solutions for non-infrastructure investments</td>
<td>Carmen Sanz</td>
<td>Director of the Commercial Area at Madrid Transport Authority</td>
</tr>
<tr>
<td></td>
<td>Halina Rakowska</td>
<td>Coordinator of European affairs at public transport authority in Warsaw (ZTM)</td>
</tr>
<tr>
<td>Improved financing solutions for non-infrastructure investments</td>
<td>Kevin Cheung</td>
<td>Public Transport Specialist at European Investment Bank (EIB)</td>
</tr>
</tbody>
</table>
**Interview and questionnaire summaries**

The main outputs from the consulted experts are shown below.

**Box 13. European commission’s insights (retired officer)**

<table>
<thead>
<tr>
<th>Decision level: STRATEGIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Association/Expert: European Commission (Vicenç Pedret, retired officer)</td>
</tr>
<tr>
<td><strong>Interview Summary:</strong></td>
</tr>
<tr>
<td>Projects considered sustainable and fair could be labelled as “productive investment” if they will provide a “productive profitability” for future individuals. A major point is how to define and deliver the “productive” label. As a result, the EU State Members could deliver a set of “labelled” projects representing the “stock of capital” of the transport sector. This might make sense for very long-term investments, such as major projects of transport infrastructure, as in this case the socioeconomic profitability is deferred across time spans that usually go beyond the financial markets’ target.</td>
</tr>
<tr>
<td>In the EU, debt and deficit rules have a sound arithmetic foundation that, however, has not too much economic sense, as they do not take into account to what extent marginal expenditure can be useful for Economy. Accordingly, ESA rules should be modified to include the “stock of capital” of a country.</td>
</tr>
<tr>
<td>The EIB and the EBC could produce a portfolio with European projects providing high strategic value in the long run, i.e. labelled as “productive investments”. This stock of capital could be used to obtain funding streams for investment in transport infrastructure through a mutualised portfolio offering attractive long-term yields for private investors and financial markets. However, moving ahead this proposal will require strong political support and consensus in the EU.</td>
</tr>
<tr>
<td><strong>Interview date:</strong></td>
</tr>
</tbody>
</table>
Box 14. European commission’s insights (retired officer)

Decision level: STRATEGIC
Association/Expert: World Bank (Arturo Ardila-Sánchez)

Interview Summary:
A comprehensive financing strategy for UPT should be assessed in terms of the “Who Benefits Pays” concept. The mix of financial mechanisms should be such that balances costs and benefits of UPT across different social sectors. For example, the use of property taxes, although representing an effective financial instrument for capital, maintenance and operation expenditure, might only be acceptable to finance city-wide transport projects. In addition, following this approach, the benefits of an electric bus fleet go beyond a single corridor and, thus, investment costs should be covered by a city-wide financial mechanism.

Value capture mechanisms are often difficult to implement because of the “asset rich but cash poor” issue. A bottom-up initiative on value capture mechanisms based on citizen's needs will be more successful than a top-down government plan.

Interview date: 05/10/2017

Box 14. Dublin Railway Procurement Agency’s insights

Decision level: TACTIC
Association/Expert: Dublin Railway Procurement Agency (Wylde Declan)

Interview Summary:
Transport authorities need sufficient, stable and predictable financial resources to carry out their integrated investment programmes. As it is necessary to smooth the requirement for public budget funding, it is always important to set a sustainable blending of exchequer (public budget) funds, development levies, bilateral agreements with developers involving funding, property and direct infrastructure provision, deposit interest and accumulated reserves from the ongoing business of transport authorities.

The use of development levy schemes can be a complementary source to obtain financing, although, over a long property cycle, the revenue from levies will vary considerably. On the other hand, the former housing crisis has brought such schemes under scrutiny due to general government funding constraints as well as a mounting objection to development levies, as they are seen to raise the cost of residential housing.

Former experience in managing the major risks of railways projects has led them to consider that the risks of a transfer to a public-private partnership are not of the type or quantum that would be better managed under that procurement option.

Interview date: 14/12/2017
**Box 15. Railway Victoria Transport Policy Institute insights**

**Decision level: TACTIC**

**Association/Expert: Victoria Transport Policy Institute (Todd Litman)**

**Interview Summary:**

The interview was about funding sources from indirect beneficiaries, focusing on land value capture mechanisms, LVC (land sales, betterment taxes, joint ventures, etc.) and pricing for traffic externalities (congestion tolls, pollution charges, parking charges, etc.).

About LVC, the expert states that it is an efficient and fair mechanism but it should not be so high to discourage dense development near stations, in order to maximize transit oriented development benefits. The revenues obtained should primarily be used to improve local services rather than to public transport or other transit systems development. These instruments would be more appropriate for major transit projects such as urban rail and Bus Rapid Transit (BRT).

About pricing for traffic externalities, the expert states that congestion pricing and transit development are complements. Road pricing encourages transit ridership, and transit improvements increase the price elasticity of vehicle travel, reducing the fee that must be charged to achieve a given reduction in traffic volumes and congestion. Parking pricing may be useful if it is applied throughout the whole region, but it may be harmful if parking fees only apply in transit station areas.

In all of those cases, the main implementation challenge or difficulty is the political opposition by people who consider these fees unfair.

**Interview date:** 15/11/2017
Box 16. Barcelona Regional insights

**Decision level: TACTIC**

**Association/Expert:** Barcelona Regional (Manuel Villalante)

**Interview Summary:**

The interview relied on the topic of Mobility as a Service, and addressed the challenges in UPT, PTA roles, open data and implementation factors.

On-demand and shared mobility services provide capillarity to public transport with no need of car ownership. The challenge is to move from competition to integration. PTAs play an important role because they have to lead the initiatives while enhancing the collaboration with all public and private operators.

Open data has to be promoted. In the framework of the digital transformation, the share of data is basic and remarkable. Nevertheless, there are some risks, confidentiality, for example.

Regulation and culture changes are the most important basic context factors that would enable the new business model for UPT based on integration. The morphology of the city and the number of services in the whole territory may be seen as secondary context factors.

**Interview date:** 23/11/2017
Box 17. Railway Helsinki Regional Transport Authority insights

<table>
<thead>
<tr>
<th>Decision level: TACTIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Association/Expert: Helsinki Regional Transport Authority, HSL (Niko-Matti Ronikonmäki)</td>
</tr>
</tbody>
</table>

**Interview Summary:**

The interview relied on the topic of Mobility as a Service, and addressed the challenges in UPT, PTA roles, open data and implementation factors.

The possible financial challenge emerge if the new on-demand and shared mobility services shift demand from the traditional urban public transport. This would result into transformations and decrease in the coverage in public transport network, which would even accelerate the impact of the new services.

By taking the role of collaborator with emerging mobility services, PTA would allow market powers to compete and innovate the best solutions for the customers. If PTA would become partner of new mobility provider, there could be risk for uneven competition between new mobility providers. If PTA will just collaborate, there is a strong need to increase the policy role of the PTA or the appropriate transport policy officer in the urban area, as private MaaS operators will not have incentives to take all the societal costs into account in their optimization.

Open data policy should be a key policy measure for the PTAs. Open data should be a requirement for both private and public companies providing transport services, as there are possibilities to increase efficiency in PTAs planning and new mobility providers would benefit from the customer data in their development of the new services.

The basic context factors are regulation and governance, which should allow new innovations to develop. City size and urban structure are also two context factors that have an important impact on the demand for certain modes. Culture is a factor that may have an impact on the speed of the evolution, but it is not so strong compared with the other factors mentioned.

**Interview date:** 27/11/2017
**Box 18. European Investment Bank insights**

<table>
<thead>
<tr>
<th>Decision level: OPERATIONAL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Association/Expert:</strong> European Investment Bank (Kevin Cheung)</td>
</tr>
</tbody>
</table>

**Interview Summary:**

The EIB offers a broad spectrum of financing instruments which are not specifically targeted only to public transport. Typically EIB offers the three basic financing groups of loans, guarantees and equity. All of the above benefits may or may not apply depending on the particular situation.

For urban public transport, typically, EIB can offer long-term finance at attractive rates for eligible borrowers/projects. Financing may be combined also with EU or national (grant) funds and may be eligible from EU guarantees – further enhancing financing benefit. Some EU funding initiatives are administered through the EIB. Projects which are immature or have low social-economic impact, or do not meet the EIB’s environmental and social standards are ineligible for EIB financing.

EIB can provide attractive financing terms for eligible projects consistent with EU and EIB lending policy. Through a number of joint EIB-EU initiatives such as EFSI, CEF or InnovFIN – the EIB may be able to support a higher volume of riskier operations or able to support them to a greater extent. EIB in any case is typically limited in its financial support to 50% of the investment cost. The remainder may be financed by the promoters own funds or other financing sources.

EIB has particular financing products that may be suitable for larger or smaller borrowers that may or may not be related to the size of city. For example, investment loans to larger projects may be naturally fewer in smaller cities due to overall size of city requirements and borrowing capacity.

The definition and meaning of investment platforms may cover a number of different areas. In relation to finance in this context – they are dedicated financing structures, co-financing or risk-sharing arrangements, channelling public and private financing from entities, to finance a number of investment projects. They may have a defined geographical or sectoral/thematic scope that may be used to support a specific policy objective or to facilitate/organize co-funding and financing from other sources/entities. However, they are not magic tools that would transform non-bankable to bankable projects.

**Interview date:** 27/11/2017
Box 19. Transport Consortium of Madrid insights

**Decision level: OPERATIONAL**

**Association/Expert: Transport Consortium of Madrid (Carmen Sanz)**

**Interview Summary:**

The interview consisted in addressing some aspects and mechanisms to reduce the operational deficit of a UPT service to then focus on the Madrid case, by understanding their organisation, subsidies and lines of work and improvement.

In general, it is difficult to transfer the operational risk to operators because they have a lot of restrictions regarding demand and production. Nevertheless, in some cases, production risk is transferred or shared, as well as the demand risk, for example in PPPs contracts that may imply a compensation to the concessionaire defined by the total amount of kilometres produced or passengers transported. About the technological risk, it is usually born by operators.

Regarding performance based schemes, the bonus/malus systems only works with private operators, while malus systems would fit with all governance models.

For Madrid’s case in particular, the yearly operational subsidy is financed by the three administration levels (national, regional and local), but the regional participation is higher compared to others. The management model is mixed, combining a partial operational risk transference with operators (production risk basically) and a bonus/malus scheme.

As future lines of work and recommendations, it is suggested that there is a need for a higher contribution in the operational subsidy by the local administrations, as well as some type of financing measures involving indirect beneficiaries. In addition, it is also recommended to incentivise and develop the use of IT technologies in order to, for example, adjust the supply to the transport demand, which is becoming more diversified nowadays.

**Interview date:** 12/12/2017
## Box 20. ZTM insights

<table>
<thead>
<tr>
<th>Decision level: OPERATIONAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Association/Expert: ZTM, Public Transport Authority in Warsaw (Halina Rakowska)</td>
</tr>
</tbody>
</table>

### Interview Summary:

The interview was mainly focused on the UPT operational deficit financing in the city of Warsaw, where ZTM is the public transport authority who organises, manages and supervises the public transport.

ZTM has executive agreements with public operators (Warsaw Metro, Fast Urban Railway, Warsaw Trams and Municipal Buses) and private operators. Remuneration depends on the number of completed vehicle.kilometers and the rate set. There is no risk transference to operators, so ZTM bears the risk. The bonus-malus mechanism has been used in contracts only since 2016 and its impact on the quality of services provided is constantly being analysed.

Regarding the model of governance with operators, it is concluded from their experience that there is no difference in the quality of services provided depending on the operator's owner - private or public.

| Interview date: | 12/12/2017 |
Annex B. Case studies
Contents

Case studies

1  The Big Move. Toronto    4
2  Workplace parking levy. Nottingham  12
3  Yélo public transport system. La Rochelle  19
4  Funding by leasing and advertising. Singapore  24
5  Local bonds. Krefeld, Germany  29
6  Redistribution formula for subsidies - Catalonia  33
Case studies

Selection criteria for case studies
A series of case studies have been selected to illustrate and assess the identified innovative approaches. One or two case studies are included from each innovative approach according to the following criteria:

i. Potential to enhance the financial sustainability
ii. Transferability to other urban areas
iii. Representativeness of different city sizes
iv. Representativeness of different geographical locations
v. Representativeness of different governance structures

Table B-1. Case studies of innovative approaches in UPT financing

<table>
<thead>
<tr>
<th>Innovation approach</th>
<th>Case study</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Strategic</strong></td>
<td></td>
</tr>
<tr>
<td>Specific regulations for sustainable UPT investments</td>
<td>-</td>
</tr>
<tr>
<td>Development of comprehensive financing strategies</td>
<td>The Big Move – Toronto, Canada</td>
</tr>
<tr>
<td><strong>Tactical</strong></td>
<td></td>
</tr>
<tr>
<td>New sources of incomes from UPT beneficiaries and private vehicle negative externalities</td>
<td>Workplace parking levy – Nottingham, UK</td>
</tr>
<tr>
<td>Developing new business models for UPT</td>
<td>Yélo system – La Rochelle, France</td>
</tr>
<tr>
<td></td>
<td>Leasing and advertising activities – Singapore</td>
</tr>
<tr>
<td><strong>Operational</strong></td>
<td></td>
</tr>
<tr>
<td>Improved financing solutions for non-infrastructure investments</td>
<td>Local bonds – Krefeld, Germany</td>
</tr>
<tr>
<td>Improvements in the financing of the operating deficit</td>
<td>Redistribution formula for subsidies – Catalonia, Spain</td>
</tr>
</tbody>
</table>

Case studies are assessed in terms of the following criteria (Table B-2):
### Table B-2. Assessment criteria for case studies

<table>
<thead>
<tr>
<th>Assessment outcomes</th>
<th>Criteria</th>
<th>Indicators/Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance</td>
<td>Financial sustainability</td>
<td>To what extent does the solution generate more revenues for public transport?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>To what extent does the solution contribute to diversify revenue sources?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>To what extent does the solution contribute to improve the predictability of revenues?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>To what extent does the solution reduce the financial costs of public transport investments and/or operations?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>To what extent does the solution ensure financial stability in the long-term?</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>Other</td>
</tr>
<tr>
<td></td>
<td>Urban mobility performance</td>
<td>To what extent does the solution contribute to increase the ridership of public transport?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>To what extent does the solution contribute to reduce traffic externalities?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>To what extent does the solution contribute to improve transport accessibility?</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>Other</td>
</tr>
<tr>
<td>Replicability</td>
<td>Feasibility</td>
<td>Which are the main enabling factors to adopt the solution?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>In which implementation contexts the solution is not feasible at all?</td>
</tr>
<tr>
<td></td>
<td>Suitability</td>
<td>Which are the main success factors of the solution?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>In which implementation contexts the solution might be convenient?</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>Other</td>
</tr>
</tbody>
</table>
1. The Big Move. Toronto

Overview
In 2006, “The Big Move” arose as the solution for a more sustainable transportation future. In 2008 METROLINX, the first Regional Transportation Agency for the Greater Toronto and Hamilton Area (GTHA), delivered “The Big Move” to public authorities with the aim of responding to pressing mobility demand. With this purpose, a set of investment strategies, priority actions and supporting policies were defined to provide guidance for decision-making and planning at all levels. Nine of these priority actions were highlighted as “Big Moves” due to their potential to transform the GTHA transportation system. In particular, this case study is mainly based on the description and lessons learned from the Big Move number 9 “An investment strategy to provide immediate, stable and predictable funding”.

“The Big Move” is a long-term strategy of regional scope produced by Metrolinx that encompasses investments and supporting policies for people to get the places they need faster and more efficiently. To guide the process towards this vision, it includes a Regional Transport Plan (RTP). The RTP addressed years of under-investment in transport infrastructure through the proposal of new infrastructure projects amounting to $2.5 billion annually during the period 2008–2033 (25 years). Metrolinx updated this strategy in 2013 with the aim of proposing recommendations on how to fund the expansion of the GTHA transport network.

1.1. Understanding the innovation

Implementation context
The Greater Toronto and Hamilton Area (GTHA) is located in southern Ontario and it is the Canada’s largest urban region (8,242 km²). It comprises two single-tier municipalities (Hamilton and Toronto) and four regional municipalities (Durham, Halton, Peel and York), along with their 24 lower-tier municipalities. The GHTA is also one of Canada’s fastest growing urban regions. With a current population of over six million people, it is forecasted to be home to 8.6 million people by the year 2031. According to estimates from the Ministry of Energy, the GHTA generates 20% of Canada’s GDP.
The GTHA is a region with a diverse spectrum of urban, suburban and rural land use where one of every four trips crosses a regional boundary. In fact, individuals have become increasingly dependent on private automobile for mobility. The number of trips made by automobile on the GTHA roads increased between 1986 and 2006 56% compared to a population increase of 45%.

Dependence on cars is in part a result of how communities have been built in this region. Dispersed development has resulted in a pattern of travel that is less and less focused on downtowns and other core urban areas, and hence more difficult to serve through urban public transport (UPT) services. Associated to the increasing reliance on cars, the GTHA was experiencing ever-worsening traffic congestion in 2006. More than two million automobile trips were made during the peak travel period each morning, with an average commute time of some 82 minutes. According to a study commissioned by Metrolinx on the economic costs of congestion in the GTHA, the annual cost of congestion to commuters was $3.3 billion per year, with a negative impact on the economy of some $2.7 billion yearly.

Public transport use in the GTHA was also highly variable in 2006, with much higher intensity in the City of Toronto than in the surrounding regions. This patchwork of systems made travel across boundaries by public transport an unattractive and costly option for many travellers. In addition, the transportation system faced a lack of investment that led users to suffer frequent traffic jams and congestion.

Because of the population growth and pressing challenges (climate change, efficiency on energy, congestion reduction, etc.), politicians and decision-makers decided to act. A massive investment in transport infrastructure was required to become less dependent on private automobile for mobility. The arrangements among transport authorities also needed to change to attract a larger share of trips towards UPT and, further, to enhance the performance of the GHTA transport network.
The challenges

In 2006, the public transport system in the GTHA was comprised of nine poorly integrated governed local transport agencies and one regional provider of transport services (Metrolinx) shared by the Government of Ontario via Ministry of Transportation.

Public authorities agreed on the need to improve the GTHA transport network through enhancing and extending over 1,200 Km of public transport network so that over 80% of residents in the region could get around daily by using public transport services seamless. Therefore, they endorsed the Regional Transport Plan (RTP), as it should provide significant socioeconomic benefits in the region and for the different municipalities of the GTHA, such as reduced commuting times, enhanced access to the regional transport system as well as an increase of the use of UPT in urban areas, and more walking and cycling. In the first 15 years of the RTP implementation, the priority was placed on improving the connectivity in the GTHA region. A number of key investments to increase the capacity in the main transport corridors were scheduled as well as the development of new transport services to areas with little access to UPT. In years 16 to 25 of the RTP, projects with the ability to strengthen the first 15-years network were addressed to obtain additional gains for the public transport system. Finally, the RTP included specific projects and actions for beyond its 25-year time horizon, even though, these initiatives could be developed earlier as a result of a comprehensive review of the RTP outcomes in terms of environmental, social and economic benefits during its early years.

Transport authorities committed to raise in revenues through funding tools of ease implementation, with capacity to increase the efficiency of the overall transport system, foster environmental sustainability, favour social equity and enhance the positive impact of public transport on economy. Moreover, they agreed to endorse Metrolinx to develop an integrated fare system with the aim of providing a seamless mobility experience for both the regional and the different local mobility systems. Metrolinx had to produce a set of fare-policy recommendations to raise in earmarked funds to develop the RTP focused on consumption and user beneficiary-pay tools (rather than taxes on income and savings).

1.1.1. Governance

The promoter: mandate, structure & responsibilities

The Big Move is a strategic plan produced by Metrolinx but promoted and launched by the Premier of Ontario and the Minister of Transportation.

Metrolinx was created as the first Regional Transportation Agency with the purpose of delivering transport services in the GTHA seamless, and it is currently responsible for planning, delivering and operating public transport services of regional scope within the GTHA. Its key business units comprise the following three operating divisions:

- **GO Transit**: division evolving from a commuter service, carrying customers to and from the suburbs to downtown in the mornings and evenings, to a true regional transit service, providing customers along the entire network with frequent, two-way travel options, throughout the day, evenings and on weekends.
- **UP Express**: division dedicated to provide railway services between Canada’s two busiest passenger transportation hubs: Union Station and Pearson Airport. The express train service is optimised for air travellers rather than commuters.

- **PRESTO**: division dedicated to the region’s integrated fare card system. This system accommodates all the business requirements for 10 different local and regional UPT systems including various fares and fare structures.

With the approval of the RTP in 2008, Metrolinx also became responsible for providing stable and predictable capital and operating funding to support the implementation of the Investment Strategy (IS). Besides, Metrolinx is engaged in collaborative partnerships to enhance public transport services with local authorities with the aim of lowering average commute times.

**The present and the future of the GHTA’s transport network**

In The Big Move, Metrolinx identified 17 urban growth centres in the GTHA and direct municipalities as focal points for growth and development. However, the existing transport network did not offer travelers an adequate level of reliability on public transportation services or assurance that public transport users could get where they need to go on time and comfortably. In 2006, the GTHA was served by a loose network of regional transportation corridors that had been mostly developed several decades ago.

![Figure B-2. The GTHA’s network in 2006](source: Metrolinx)

With the approval of The Big Move, the objective was focused on linking every urban growth centre through the regional transport network. This implied in turn to develop comprehensive and robust local transport networks, cycling and pedestrian networks, transit-supportive land uses, and supporting policies and programs. With its implementation, the GTHA transportation system should be transformed into an effective, integrated multi-modal transport system by 2031.
1.1.2. Financing strategy

Financing needs and sources to cover them

The costs of the RTP were estimated at approximately $50 billion in present value. However, local transport authorities counted with poor revenue strategies in 2006 (typically pay-per-use for UPT services), so they decided to assume the Metrolinx’s recommendations to develop the projects in the RTP.

In terms of financing strategy, Metrolinx identified and reviewed worldwide best practice in terms of funding tools for transport financing. Information from major metropolises (Vancouver, Montreal, New York, Chicago, London, and Paris) was gathered. In addition, Metrolinx received inputs from the different transport authorities within the GTHA through public discussions. As a result, Metrolinx proposed a set of key principles as a guideline to choose the most suitable investment tools for the RTP:

- **Dedication of revenues to specific outcomes**: Citizens should be able to know exactly what they are paying for and have an assurance that funds are not diverted to other expenditures.

- **Equity/fairness**: The costs and benefits of the investment programme should be distributed in a balanced way across territories and population groups within the GTHA. Besides, all local authorities should pay a fair share proportionally to the benefits obtained.

- **Transparency and accountability**: Progress should be visible and the plan’s results visible and disclosed on a regular basis, including how funds were collected, managed and spent.

On the other hand, Metrolinx defined a two-fold Investment Strategy (IS) to develop the RTP. In the short run, it was assumed that decision-makers have to carry out “bold actions” (construction of pressing projects ready-to-be-built) to preserve public acceptability, because people are sceptical about continuing re-announcements with no ground-breaking construction in sight. Besides, public managers understood that Metrolinx had to show its credibility in the use of existing resources before seeking any new revenue or implementing new funding tools. In addition, decision-makers understood that institutional investors need to check the politicians’ determination to carry out their own plans before sharing long-term financial risks. In the long run,
Metrolinx prosed a set of “next wave projects” that should be attractive enough to meet capital from financial markets.

Following the IS, Metrolinx and its partners (UPT operators at local scale) moved forward with the construction of key major projects with capability to improve mobility within 5 years or less (new lines of light-train, subway extension, bus rapid services). This was possible thanks to a funding package of almost $750 million from the Ontario’s provincial budget. Afterwards, in the period 2009-2020, Metrolinx has focused on carrying out key corridors to improve regional connectivity. To achieve the milestones in the RTP, Metrolinx counted on $11.5 billion until 2015 from the Ontario’s budget, with the possibility of some extraordinary $6 billion until 2018.

One of the cornerstones of the Metrolinx’s financing strategy to develop the RTP relied on the previous arrangements among Metrolinx and the administrations involved (Ontario’s province and the local authorities involved, as for example the city of Toronto). These arrangements provided financial coverage to the IS through financial commitments endorsing the construction of both significant bold actions and other projects in the long run. In turn, the financial commitments fed a Transportation Trust Fund (TT Fund) created to enhance transparency and accountability in the use of public resources. This TT Fund aimed at providing with resources the Ontario Financing Authority (OFA), whose mandate is to meet long-term capital from financial markets for financing the projects included in the RTP.

Decision-makers decided to finance the upfront capital expenditures of the RTP through long-term debt emissions. Most debt emissions have been issued through green bonds to foster sustainability goals, as there exists a strong market demand of such green issues (even if they offer no special tax treatment).

The commitments of both the Ontario’s province and local authorities to achieve environmental goals are still key for the investors’ appetite of these kind of bonds. Decision-makers assumed that very long-term debt emission through green bonds should be sufficient to distribute the RTP’s financial impact among beneficiaries over time fairly.

Beyond 2015, Metrolinx has recommended new ways to generate revenues and finance transport projects with the aim of meeting capital for the network expansion, as well as maintenance and operating requirements. The goal is to raise $1.7 to $1.8 billion annually for the transport sector (earmarked funds) through combining rises of traditional and earmarked taxes and levies on consumption following four principles:

- Phased increase in fuel tax
- Dedication of the provincial sales tax charged upon fuel tax
- Modest increase in corporate income tax
- Modest and optional increase in general provincial sales tax

Whilst it is assumed that the more earmarked funds for the transport sector the more sustainable UPT system in financial terms, local authorities in the GHTA agreed to implement innovative funding to support transport policy objectives. These tools (see below) are focused on raising funds from users and both direct and indirect beneficiaries of the transport system.

- Employer Payroll Tax
Pilot project study on innovative ways of sustainably financing public transport

- Increase in Fuel and Gasoline Tax
- High Occupancy Toll (HOT) Lanes
- Business Parking Levy and Parking Space Levy around transport facilities
- Development charges through Land Value Capture mechanisms (LVC) and property taxes
- Uplift of Harmonized Sales Tax
- Transport Fare Increase and Vehicle Kilometres Travelled (VKT) Fee

Metrolinx proposed an alternative method of financing and procuring infrastructure (AFP, alternative financing procurement) to enhance the private sector (institutional investors) participation in the RTP through PPPs. Briefly, this method simplified project management and favoured transferring the risk of cost overruns, financing, project delays and asset longevity to the private sector.

1.2. Innovation rationale and results

Objectives and challenges

The Metrolinx’s mandate was to develop the Regional Transport Plan (RTP) whilst spreading its costs over the life of the assets. With this purpose, Metrolinx drew up a comprehensive strategy for sustainably financing the construction of key major projects. A major challenge consisted in providing certainty to stakeholders, investors and public in general.

Outcomes

According to Metrolinx, the former strategy has succeeded in providing sustainable financing for the upfront capital expenditures of the RTP. The overall strategy has encouraged institutional investors to share specific projects through PPPs, and the benefits in terms of sustainability of the new mobility path have also favoured the strong demand on green bonds issued by the OFA. Besides, according to ex-ante estimates, the implementation of new funding tools at local level has succeeded in providing the revenues needed to develop the RTP in the long run. Furthermore, these extraordinary incomes have diminished the operational deficit of the overall public transport network in the GTHA. Thus, local authorities have decidedly contributed to a more efficient and sustainable transport system. It also has been key for private investors to provide long-term financing.

Finally, it is worthwhile noting that the plan has performed well, as it was born from the political consensus and because it has been developed within a context of predictability in legal and political terms (stable policy framework). On the other hand, the financial situation of the main stakeholders, in particular of the Ontario’s province, was key for Metrolinx to move forward with the RTP in its early years. This allowed public managers to show the benefits of the plan for UPT users, direct and indirect beneficiaries of the new mobility conditions and for the overall society in the GTHA.
1.3. Assessment of the innovation

Performance

Some conclusions rise in the light of the experience gained. The financial sustainability of the overall UPT system soundly improves when decision-makers are aware of the necessity of clear long-term financing strategies encompassing, on the one hand, robust financial commitments in the short run (for pressing investment needs) and, on the other hand, tailored solutions for additional revenues generation as well as implementation of legal frameworks to support such actions in the long run. In the case study, such combination of strategies has proven to be useful to enhance the transport authority’s capacity to meet sustainable financing for its overall long-term investment needs, as the enhanced funding schemes have been able to provide higher amounts of more stable and predictable flows of economic resources. This increase in the transport authority’ solvency has encourage, in turn, institutional investors to get involved in major transport infrastructure projects. In the case study, these enhanced funding models have favored both operational deficit financing and the financial sustainability of new investment projects in the GTHA.

Replicability

This innovation refers to financing strategies of regional scope as well as great metropolitan areas involving a significant number or municipalities served by a common UPT network. Thus, there are some important challenges to perform a long-term financing strategy properly:

- Firstly, the transport authority has to count on sufficient level of transversal authority as to play a strategic role in the planning, formulation and coordination of investment programmes with local authorities.
- Second, the transport authority has to be able to formulate and enforce the policies needed to support the investment programme in the short and the long run, as the development of new funding tools very often requires to impose levies and/or to provide incentives for people to take awareness of the social costs and benefits of the enhanced UPT network.
- Third, the transport authority should count on a team with the skills required to develop a strategic long-term investment plan to raise efficiency in the overall UPT system. According to the experience gained, the team has to define bold actions and priority projects as well as complementary initiatives to raise in revenues from the UPT system.
- Fourth, the transport authority has to count on financial independence, i.e. sufficient empowerment level as to come to arrangements with third parties (public institutions, e.g. IFIs, and private actors, e.g. institutional investors) to provide financial coverage to the investment programme.
2. Workplace parking levy. Nottingham

2.1. Understanding the innovation

Implementation context

Nottingham is the largest city in the East Midlands region and counts on a population of 308,700 inhabitants (675,000 if Greater Nottingham Area is considered). The population for the Nottingham-Travel-To-Work Area is estimated at 1.3 million and 55% of the employees with jobs in the City of Nottingham, reside outside the City boundary in the County area.

The administrative boundary for the Nottingham City Council does not encompass the entire Greater Nottingham Area. This is because the governing structure of Greater Nottingham is split between five councils (City of Nottingham, Ashfield District, Broxtowe Borough, Gedling Borough, Rushcliffe Borough). There are four District and Borough councils enclosing the City of Nottingham and they are a part of and share responsibility of services with Nottinghamshire County Council whilst Nottingham City Council, a unitary local authority governs the City. Due to the number of councils in operation as well as the different electoral cycles in which they operate, it requires ‘political and legislative co-operation between councils which can present significant political difficulty’ (Frost and Ison, 2009).

Nottingham has earned a good reputation in the UK for the management of its public transport system. It has been awarded as “Transport Authority of the Year” in 2002 – 2003, ‘Centres of Excellence’ status for Integrated Transport in 2001, Local Transport Delivery in 2005 and Transport City of the Year and the Transport Local Authority of the Year in 2012.

Nottingham counts on a public transport network composed of bus, tramway, rail and community transport services. Buses are the major provider of passenger transport. They offer multiple links both within the City of Nottingham and to the rest of the Nottinghamshire area. The light rail system, Nottingham Express Transit Line 1, provides services between the city centre and the northern local centre of Hucknall. NET Phase Two, the new lines opened for service on 25th August 2015, extends Nottingham’s tram service to the south and south west of the city and directly link with train services at Nottingham Station. The total tram network is 32km in length.

The opening of NET Phase 2 in August 2015 has resulted in an increase in public transport usage, up to 60.56 million bus and tram passengers in 2016/17. Mode share of public transport stands at 39%.

Organisation

The Nottingham City Council shares powers with the Nottinghamshire County Council to plan and manage public transport in the Greater Nottingham Area. There are proposals to create a Combined Authority representing the whole Greater Nottingham Area that would undertake the functions of a single local transport authority, as set under the Transport Act 2000.

The passenger transport network is made up of commercial and publicly supported services, both from the City Council and from the County Council. Commercial services
are self-financed by fare revenues whereas publicly supported services have a fixed budget allocation to cover their operation deficit.

In the UK, the bus industry is de-regulated since 1986. There are 32 bus operators running registered services in the Nottinghamshire County. The predominant commercial operator is Nottingham City Transport, which operates the majority of bus services in the city and, differently from most of cases in the UK, is still in public ownership. Trent Barton is another bus operator that operates some local services around Nottingham and to other towns nearby. In 2004, the Nottingham City Council introduced a publicly supported bus network called Link aiming at serving areas that are not sufficiently covered by commercial services.

The tramway network has been implemented through a Public Private Partnership (PPP) in a Design, Build, Finance and Operate (DBFO) fashion. In the first phase, the concession was awarded to the Arrow Light Rail Ltd consortium. However, the introduction of the second phase extension implied a retendering process. A new concession put out to tender to design and build phase two, to operate and maintain the existing system in the meantime, and to operate and maintain the extended system once completed. This time, the concession was awarded to Tramlink Nottingham Limited, made up of Meridiam (30 per cent), OFI InfraVia (20 per cent), Alstom Transport (12.5 per cent), Keolis (12.5 per cent), Vinci Investments (12.5 per cent), and the Wellglade Group (12.5 per cent). Operation was further sub-contracted to a consortium of Keolis (80%) and Wellglade (20%), with maintenance sub-contracted to Alstom Transport.

Under the de-regulated framework, operators set fares and ticketing offers with no obligation to consider integrated ticketing but public institutions have actively pursued a ticketing integration in the area. The Robin Hood Network is a partnership of bus, tram and train operators working together with both Nottingham City Council and Nottinghamshire County Council. The Robin Hood smart card allows travel on any bus, tram or local train service within the Greater Nottingham area and includes "pay as you go" ticket use alongside the "season ticket" for weekly, monthly or annual travel. The card includes "fare capping" which means that fares are capped at the cheapest price for travel.

Financial context

Public transport funding on public transport depends heavily on central Government funds. The integrated transport block from the Department for Transport (DfT) constitutes the main secured fund for investment in transport-related policies, including public transport.

Funds to support transport operations are offered by the central Government through a bid process. With this, Council provides revenue funding in supported bus services, community transport, home to school transport and special needs passenger transport services and concessionary fares.

Nottingham has been recently awarded with Better Bus Area Funding. Under the bid, Bus Service Operator Grant (BSOG) is devolved from bus operators (with their agreement) to Nottingham City Council. This would be used by the Council, working in partnership with the local bus operators, to implement a programme of measures, including bus priority schemes and the enhancement of the ticketing system.
Recently, the fix transport-related grant from central Government has been reduced by a 50% approximately and more funding comes from “funding competition” through bids. The City Council regularly bids for external funding to improve local transport. A recent example is the Nottingham Go Ultra Low City Bid, which supports the introduction of electric vehicles, including electric buses.

**Challenges**

Previously to the introduction of the workplace-parking levy, 61% of trips to the city of Nottingham were using private cars. Some studies suggested that future congestion levels would damage local economy if no measure were adopted. There is a low margin for road capacity increases because of the lack of available land. Thus, the only way forward at this time was introducing demand management tools to reduce or, at least do not increase, the number of trips in private vehicle.

Furthermore, an increasing gap was identified between future demand for public transport and supply. To increase the supply for public transport, the Nottingham City Council identified three priority public transport projects: an extension of the tramway network (Nottingham Express Transit, NET), an upgrade of the Link bus service, and the renewal of the main train station to transform it into a multimodal hub.

NET Phase Two was expected to cost £400 million. Three quarters of this was agreed to be paid by central government under a Private Finance Initiative (“PFI”) funding arrangement, which was awarded to Tramlink Nottingham Limited consortium. This meant that the 25% of the cost had to be met locally by Nottingham City Council and Nottinghamshire County Council. The financial model for NET Phase Two requires an annual local contribution by Nottingham City Council of £11.2m per annum.

The Link bus service, supported by the Nottingham City Council, has been regarded as a success as it carries over 3 million passengers per annum but was however dependent on fragile funding. This meant that the Nottingham City Council was not able to ensure mid and long term funding for the operational deficit of this bus service.

A local funding source was required to ensure the financial sustainability of the Nottingham City Council participation to the tramway PPP and the rest of the public transport projects. Several financial instruments were considered. An increase in local taxes was disregarded because tax increases are capped and revenues are spread beyond the City boundary. The option of applying for European grants was considered but the amount of available funding was deemed insufficient. The sale of land was also disregarded because direct revenues could not be entirely allocated to public transport projects. Finally, the application of road use charges was considered as both a demand management tool and a source of revenue. However, it was deemed to perform worse than a workplace-parking levy in terms of required up-front investment, operational costs, technology risks and acceptancy levels.
2.2. Innovation rationale, implementation and results

Objectives

The introduction of the Workplace Parking Levy (WPL) followed a strategy to reduce congestion in access roads to the City of Nottingham and, at the same time, responded to the financial challenge of significantly improving the public transport supply. The expected benefits for urban mobility derived from the application of the WPL were a growth in the usage of public transport to access to the city centre, a lower growth in road traffic, and an increase in park and ride usage.

Implementation

The Transport Act 2000 gives powers to municipalities to introduce Congestion Charge (CC) or Workplace Parking Levy (WPL) schemes. The Nottingham City Council decided that a WPL was preferable over a CC because a CC would imply excessive implementation and operation costs in a medium city like Nottingham. In any case, the legal framework for the introduction of a WPL scheme was already set and only the final design of the scheme was subject to approval from the Central Government.

After a long period of feasibility studies and a benchmarking analysis of similar schemes in Vancouver (Canada), and Perth and Sydney (Australia), a first draft of the scheme was developed. Then, with the aim of reaching sufficient acceptability levels among the Greater Nottingham population, a public consultation was organised despite not being a requirement. The main stakeholders, notably representatives of main business in the area, were present in the consultation and could express their concerns and proposals.

The Nottingham City Council released a final design of the WPL that incorporated feedback from the consultation. The WPL was designed in such a way that it allowed financing a 23-year investing program in public transport. This program consists of the investments described above (extension of the tram network, Link bus service and railway station) and the greatest proportion is the 25% stake of the Nottingham City Council in the expansion of the tram network. A financial model sets the required annual revenue and the charge per parking space is estimated to provide this revenue, according to a specific business model.

The Nottingham City Council estimated the total cost of developing the scheme as well as the consultation at £990,000.

Operation

The WPL applies within the Nottingham City Council administrative boundaries, where most of the employment of the area is located. Employers with 11 or more workplace parking spaces are obliged to license the maximum provision of parking spaces at one time and pay a charge of £381 (2016) a year per licensed space. Parking spaces for loading/unloading, motorcycles, business customers and occasional visitors are exempt.

A specific unit within the Nottingham City Council consisting of seven workers manages the WPL scheme. Operation costs are £475,000 annually; this is, around 5% of total revenues. The control of the system is based on regular inspections that count the
number of parked vehicles in each facility by using an Automated Number Plate Recognition (ANPR) technology.

**Outcomes**

In the fifth year of charging (2016/17), the WPL raised £9.4 million from 491 liable organisations. There are around 40,000 licenced parking spaces. From these, 24,000 are liable for payment. Over the last years since implementations, the accumulated amount represents a 99% of revenues foreseen in the original business model.

Employers can choose whether they transfer WPL costs to employees. Currently, 54% of employers pass on the levy to their employees. The number of liable workplace parking spaces has dropped by 25% of the initial quantity but the impact on congestion levels is not straightforward to derive because of road works during this period. A drawback of this measure is the risk of parking displacement to on-street spaces. Proactive traffic management work has been undertaken to avoid any displaced parking arising from the scheme, especially in identified “hot spots”.

Fears that the WPL would have a significant impact on business location decisions and inward investment do not appear to have materialised although more work is necessary to properly evidence this.

In spite of initial strong opposition by employers and part of the public opinion, the acceptability levels have improved over time, especially when the first phase of the tramway extension project was completed. Overall, the Nottingham City Council states that the measure has been a success in that it has effectively accomplished the expected results in an efficient way, with low administrative costs.

### 2.3. Assessment of the innovation

**Performance**

The workplace-parking levy clearly contributes to enhance the financial sustainability of UPT because it ensures a stable and sufficient source of revenues for the financing of UPT priority projects in Nottingham. It contributes to both the financing of UPT investments (extension of tramway network) and of operation deficit (Link bus services). Although revenues from the workplace-parking levy depend highly on the amount of liable parking spaces (employer-provided parking spaces in use), the amount of annual revenues has been rather stable. The largest reduction in workplace parking usage happened just before the entry into force of the levy. Since then, the number of liable spaces has been stabilised and so did revenues. On top of this, the levy constitutes a diverse source of revenue with respect to traditional funding sources such as fare box or national funds through bids. This diversifies financial risks and, thus, lowers financial costs. The WPL can also be considered a long-term measure. Despite being designed to finance a 23-years investment programme, it seems reasonable to maintain it after that once it has proven to be acceptable and beneficial.

The effects on the performance of urban mobility are no less important. The measure is expected to reduce the provision of (free) parking spaces by employers. As this is considered to be a main cause for solo driving to work, traffic levels and congestion are...
also expected to drop. However, although the number of workplace parking spaces in use has decreased, congestion levels have not been reduced.

The two-fold objective of the measure often implies a trade-off between UPT financing and traffic demand management when designing the levy. For example, the introduction of bonus may favour more efficient travel behaviour (use of electric vehicle or car pools, for example) but would clearly cause a reduction in revenues. In the case of Nottingham, it seems that financial objectives have been slightly prioritised over demand management objectives, as the levy has been designed in terms of a business model for UPT projects.

**Replicability**

The implementation of the WPL in Nottingham was possible because the Transport Act 2000 gives powers to local authorities to introduce either congestion charges or workplace parking levies, so the legal framework was already set. Another enabling factor was the reaching of a stable political consensus in favour of the measure. According to experts, a combination of strong political leadership and coherent transport planning is essential for successful implementation and acceptability of the measure. In this sense, Nottingham took the political risk of introducing the measure for the first time in a European city. The Nottingham experience constitutes a benchmark for other urban areas willing to take a similar scheme forward with less political risks, reduced implementation costs and quicker timescale.

A key success factor has been the transparent use of WPL funds for a short list of public transport projects. Acceptability increases when employers and employees see the benefits of projects they paid for. Hence, the measure is suited for cities willing to deliver public transport projects with mid-term and visible benefits and link them to the WPL scheme.

The implementation context should also have clear urban mobility problems (congestion, pollution, etc.) to justify the measure. The measure should not be seen as an extra tax but as a useful demand management tool for congested cities. In this sense, local congestion should be strongly linked to commuting travel to work and, in particular, to employer-provided parking. Indeed, if the proportion of employer-provided parking is too low, the scheme will neither be an effective demand management tool nor have the potential to raise sufficient funds.

Finally, it should be highlighted that the measure will not work without an accompanying integral parking policy. If on-street parking is not properly regulated or priced, the introduction of the WPL will basically displace workplace parking to on-street parking. This would be counter-productive because it would only increase parking search costs without generating revenues or dealing with congestion. Hence, a WPL is suited for cities with a widespread regulation of on-street parking, including industrial areas.
3. Yélo public transport system. La Rochelle

3.1. Understanding the innovation

Implementation context

La Rochelle is a city with 74,998 inhabitants (2014) located in the south-west of France, in the region of Nouvelle-Aquitaine and capital of the Charente-Maritime department. The population density is 2,638 hab./km². The urban structure of the city is oriented towards its important maritime port and constraint by natural barriers, which limit the free urban space. La Rochelle’s historical heritage and the strong links with the sea make the city one of France’s most popular destinations for tourism.

The urban agglomeration of La Rochelle encompasses 28 municipalities in the area, with 166,235 inhabitants. The Communauté d’Agglomération (CdA) de La Rochelle has some powers across the urban agglomeration, including mobility and urban transport.

La Rochelle has a long tradition of innovation in urban mobility. For example, a pedestrian exclusive area was implemented in 1973 and a first bike-sharing system was introduced in 1976. Very recently, La Rochelle has been a testing site for electrical autonomous vehicles within the framework of the European project CityMobil.

The city counts on a public transport network composed of urban and interurban bus services, interurban train connections and boat links. Beyond mass public transport services, the city counts on a bike-sharing system, an electrical car-sharing system, a ride hailing service at night and several park and ride facilities.

According to a 2011 survey, the modal split of private car is 58%, walking represents the 27% of trips, cycling 8%, and public transport 5%. The modal split of private cars is low when compared to similar agglomerations, whereas the proportion of walking and cycling is relatively high.
Organisation

La Communauté d’Agglomération (CdA) de La Rochelle acts as a Transport Authority (Autorité Organisatrice de Transports, AOT) within the urban agglomeration of La Rochelle. In France, AOTs are in charge of planning and managing passenger transport services and of fare policy. Generally, they delegate the operation of transport services to external companies, through several contract arrangements.

In La Rochelle, the CdA delegates to the public company RTCR (Régie des Transports Communautaires Rochelais) the operation of central bus services, the bike-sharing system, the on-demand service at night (Yélo la nuit), the special transport service for handicapped, some park and ride facilities and boat links. Likewise, Transdev operates urban bus lines in the outer ring and the electrical car-sharing system (Yélomobile). SNCF operates the interurban train services and Vinci Park Gestion manages a park and ride facility.

Financial context

The transport budget of La Rochelle CdA is fed by several funding sources. The main funding source is the Versement transport, a payroll tax earmarked to public transport that, in La Rochelle, charges to employers 1,7% of total wages. This constitutes a 70% of the total budget. Fare box revenues contribute to a 20% of the total budget whereas the remaining 10% is basically funded through compensation agreements with the overarching region. In addition, the general budget of the agglomeration is funded by local taxes, but it represents a very small proportion.

La Rochelle CdA may receive extra funding for investment and improvement of UPT services from national environmental agencies, Europe funding (FEDER, for example), CIVITAS framework for innovations, etc. Within the CIVITAS SUCCESS project, several measures were funded and tested in La Rochelle such as a new EEV and hybrid bus fleet.

3.2. Innovation rationale, implementation and results

General description

La Rochelle CdA is not only in charge of public transport modes but also promotes and manages emerging mobility services. In this sense, the transport authority of La Rochelle has developed a business model beyond its traditional role, encompassing multiple public mobility services in an integrated way.

All the above mentioned transport services (bus, bike-sharing, car-sharing, on-demand service, boat and park and ride) operating in the urban agglomeration of La Rochelle share a common brand and ticketing system called Yélo. A single smartcard, managed by the CdA, provides access to all public transport services with fares varying according to mode and purchasing options. This integrated ticketing system enables multimodal pricing options. For example, park and ride facilities are free for Yélo subscribers.

Shared mobility services are designed to complement mass transport services where and when they are not efficient. There are also synergies between these services, for
example, electric car-sharing vehicles are used at night for the ride hailing service (Yélo nuit).

Implementation

A first version of the bike-sharing system was implemented in La Rochelle in 1976. Since then, the system has been successively updated. The electric car-sharing system started in 1999 as a test for electric vehicles and has been further developed as a consolidated and functional service.

The integrated smart card Yélo was implemented in 2009 following a step-by-step process. During the implementation process, operators were not reluctant to introduce the Yélo smart card and this ease the negotiation. At that time, the barriers were basically technological. Very recently, train services were also included in the Yélo system. Although SNCF had some initial opposition, they could find ways to solve financial and contractual issues.

Organisation

The CdA tenders the provision of these services and manages contracts with operators. RTCR has the special mission to coordinate and commercialise the whole Yélo system, not only their own transport services but also the tickets for other services. This is explicitly stated in their contract with the CdA. RTCR collects data and revenues from the Yélo system and then delivers them to the CdA according to their contractual arrangement. Contracts with the other three operators include only the provision of transport services. Contracts are renewed every 7 years and the Yélo pricing and ticketing system is a requisite for the tender. The CdA covers the operational deficit of operators according to the respective contracts.

The region (Nouvelle-Aquitaine) manages the contracts with train services and busses running routes out of the agglomeration. Train services managed by SNCF (Société Nationale des Chemins de Fer) within the Rochelle urban agglomeration are part of the Yélo pricing and ticketing system. Because the Yélo price is lower than the general SNCF price, the Rochelle CdA compensates this gap to the region through a contractual arrangement.

Outcomes

The introduction of emerging mobility services and the integration of services within a common pricing and ticketing framework has resulted in an improvement of the overall public transport supply. The Yélo system contributes to the adaption to seamless multimodal transport services. An important additional benefit of the smart card is the generated data. Despite gathering only data on trip origins (boarding data) and not on destinations, this information is used to plan and operate services on a day-to-day basis.

La Rochelle CdA will launch soon an updated smart card system, including ticketing by phone. They are also working on new business models to accommodate the MaaS concept and autonomous vehicles.
3.3. Assessment of the innovation

**Performance**

In La Rochelle, the introduction of several innovative transport services over the past years has been followed by an integration in terms of ticketing, pricing and marketing. This is a promising new business model for transport authorities to take the lead of urban mobility innovations and keep a predominant market position. Because public transport and shared mobility modes are under the same umbrella in terms of management, pricing and ticketing, the CdA can plan mobility services in an integrated way. In this sense, the urban area is more ready for a successful implementation of upcoming business models such as MaaS or autonomous vehicles.

In medium-sized cities such as La Rochelle with low demand density, both mass public transport and shared mobility services may be unprofitable and require public funding. Thus, whereas it is clear that the introduction of shared mobility services enhances the overall supply for mobility, it is not straightforward to derive the efficiency gains in terms of overall operation costs. This will depend on the synergies between services. If shared mobility modes complement mass transport services where and when they are less efficient, overall operation costs can be reduced.

Hence, the introduction of shared mobility modes in medium-sized cities will enhance the financial sustainability of the UPT as long as shared mobility services complement efficiently mass public transport. This requires an integrated planning of mobility services and a centralised management.

Regarding the effect on traffic externalities, the integration of shared mobility modes tends to decrease the rate of private vehicle ownership but this effect may be less significant in small or medium cities because the proportion of intra-urban trips is generally lower. Thus, the effect on a reduction of car use and traffic externalities may be more modest compared to the potential effect in larger cities.

On the other hand, it is clear that the integration of a multimodal transport supply will respond to a wide range of transport needs in terms of coverage, capacity, flexibility, etc. This leads to an improvement of the transport accessibility within the urban area.

**Replicability**

The integration of traditional public transport and shared mobility modes in a single pricing, ticketing and branding framework has been successfully implemented in La Rochelle. This required, in the first place, a strong political consensus and leadership. It should also be highlighted that the aggregation of multiple mobility services may be much easier in smaller cities because the negotiation is limited to fewer operators and the transport network is less complex.

Finally, the Versement Transport tax applied in La Rochelle (and in most French cities in general) constitutes an enabling or, at least, a facilitating factor. The earmarked tax, which represents a 70% of the transport budget, provides a long-term financial sustainability of UPT. This allows for risk taking in implementing such new business models, considering that the total amount of public funding for the provision of public mobility services might increase.
Thus, in small of medium cities where the profitability of shared mobility services is not ensured, the transport authority requires a stable funding and/or an integrated and optimised planning of mobility services to implement these new business models.
4. Funding by leasing and advertising. Singapore

Overview

The case study analyses the funding by leasing and advertising in Singapore. It consists in a business model based on a high share of the public transport operators’ revenue from rental and advertising services.

4.1. Understanding the innovation

Implementation context

Singapore is a city state and an island on the southern tip of the Malay Peninsula in Southeast Asia. It has a population of 5.6 million people and the third highest population density of all countries; with 7,800 inhabitants/km² even higher than that of Hong Kong (7,000 inhabitants/km²) and surpassed only by Macao (20,200 inhabitants/km²) and Monaco (19,200 inhabitants/km²) (World Bank 2016 population estimates).

The former British colony gained independence in 1963 and became a sovereign state by splitting from Malaysia in 1965. Today, Singapore is a global trade and financial centre with a high GDP per capita (ranked 9th by the World Bank and the International Monetary Fund in 2016). The Port of Singapore is the third largest in the world measured in tonnes shipped through the port and particularly important for crude oil and container transport (2015 ranking by the American Association of Port Authorities).

Private car use is restricted in Singapore through a congestion road pricing system and Certificates of Entitlement, which allow owners to run their car on public roads for up to 10 years and are sold through auction. Nonetheless, Singapore has a significantly higher modal share of private motorized transport than Hong Kong with 29% compared to 11% (2011 estimate by Singapore Land Transport Authority). Overall, the modal split in Singapore was 29% private motorized transport, 19% rail, 25% tram and bus, 4% taxi, 22% pedestrian, and 1% cycling in 2011. Innovation rationale, implementation and results

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1 Sreyus Palliyani and Der-Horng Lee, Sustainable transport policy – An evaluation of Singapore’s past, present and future, Journal of Infrastructure, Policy and Development (2017) Volume 1 Issue 1, p.112-128
Figure B-5: Singapore train system map (operating trains only)


**Organisation**

In Singapore, the Land Transport Authority (LTA) plans, designs, constructs and maintains the mass rapid transit (MRT), which consists of train and light rail and decides, which bus services should be provided. The LTA is the statutory board under the Ministry of Transport responsible for primary decision-making in the transport sector and licencing of transport services. In 2016, the SMRT Corporation Ltd (SMRT) and the SBS Transit Ltd (SBS) were the main license holders.

Currently, the SMRT holds a 30-year license (1998-2028) for operation of the North-South and East-West Lines and a 10-year license (2009-2019) for operation of the Circle Line. In 2016, the North-South and East-West Lines had a combined ridership of 685 million passengers. SMRT also held a 10-year license (2006-2016) for operation of busses and is currently holding a 10-year license (2013-2023) for operation of taxis.

Until recently, SMRT owned and maintained the operating assets of the MRT, while property of the infrastructure (tracks, tunnels, viaducts, stations) was with LTA. In 2016, ownership of operating capital (trains and signalling systems) was also transferred to the LTA from SMRT under the New Rail Financing Framework (NRFF). In addition, the operating licences for MRT lines were shortened from 30-40 years to 15 years under the NRFF. While ownership of busses remained with the operators SMRT and SBS, the LTA announced that it will lease the busses for a more competitive tendering.
Financial context

In addition to being responsible for Singapore’s public transport system, LTA manages projects related to road construction and construction and maintenance of public buildings on behalf of the Singapore Government. Its operating revenue is composed of management fees paid by the Singapore Government, MRT license charges as well as bus fare revenue and bus leasing revenues. The LTA also receives operating and long-term grants from the Singapore Government and earmarked revenues from Certificate of Entitlement auctions and Electronic Road Pricing. In 2017, the total sum of LTA’s operating revenue was 1,506 million Singapore Dollars and grants amounted to 1,231 million Singapore Dollars.

The public transport operators SMRT and SBS set their own fee schedules, but any fee changes are subject to approval by the Public Transport Council and the maximum annual fare adjustment is limited by a formula (function of consumer price index, wage index and energy price index). In addition to revenues from rail and bus services, the licensees receive grants from the LTA for special purposes like the improvement and expansion of bus service reliability (in 2012, grants from the Bus Service Enhancement Fund amounted to 1,100 million Singapore Dollars).

4.2. Innovation rationale, implementation and results

General description

Singapore stands out for the high share of the public transport operators’ revenue from rental and advertising services. SMRT’s total revenue of 1,296.6 million Singapore Dollars in 2016 consisted of 681 million (51.7%) from train and light rail services (North-South, East-West and Circle Lines), 248.5 million (19.2%) from bus services and 147.9 million (11.4%) from taxi services. A significant share of 174.6 million Singapore Dollars (13.5%) came from rental and advertising. In terms of the company’s operating profit, rentals and advertising made up 76.6% of the earnings before interest and taxes (EBIT).

Source: own visualization of SMRT Corporation Ltd Annual Report 2016, p.34ff
**Implementation**

The SMRT Advertising & Properties Pte. Ltd (SMRT A&P), which is wholly owned by SMRT, conducts the corporation’s business activities in advertising and real estate with owned or leased property within the public transport network. These activities include marketing and leasing commercial spaces, retail management and operations, advertising and marketing, digital and e-commerce. For example, the company leases approximately 34,000 sqm of commercial space at MRT stations and offers advertising space in stations, on trains, busses and taxis.

**Outcomes**

The role of rental and advertising in SMRT’s business portfolio is readily visible from the revenue and income figures displayed above. Particularly the rental business with annual or multi-year commercial leases offers a plannable and steady revenue stream, as illustrated in the figure below.

![Figure B-7. Rental revenue](source: own visualization of SMRT Corporation Ltd Annual Reports 2006-2016)

Since the commercial properties are situated in and around MRT stations, their viability does depend on the system’s patronage. If ridership declined, so would the attractiveness of the properties. However, SMRT A&P has the freedom to develop its own real estate strategy and is not subject to pricing regulations as the fee schedules for riders. Thus, it can freely respond to demand fluctuations in the commercial rental market to ensure high occupancy and attractiveness of the stations.

**4.3. Assessment of the innovation**

**Performance**

SMRT’s revenues from rental activities have steadily increased from 26 million Singapore Dollars in 2006 to 135.6 million Singapore Dollars in 2016 as shown in the figure above. The growth is certainly due in part to the expansion of its rental space from 20,400...
square metres to 34,000 square metres over this period. While the expansion indicates that the business model is successful, it does not make the operator independent from public funding.

In fact, the recent changes implemented under the NRFF and under the new bus contracting model indicate that the Singapore Government has not been wholly satisfied with the management of the public transport system’s assets through its operators. The LTA explains that the main goal of the NRFF is to enable more timely investments in capacity expansion and replacement and upgrade of operating assets of the MRT. Furthermore, the new and shortened operating licences for the MRT lines entail some risk and profit sharing between SMRT and LTA, which – in the words of LTA – are meant to “[...] make for a more financially sustainable rail system.” (LTA Press release July 15th, 2016).

**Replicability**

In principle, the rental and advertising business model of SMRT can be replicated by other public transport companies, if they own or lease (some of) the fixed and/or operating capital of the public transport system have the right to re-lease these assets for commercial purposes. In addition to the legal right to engage in real estate and advertising activities, the business strategy requires knowhow. While it may not be necessary to start an entire subsidiary company like the SMRT A&P, own personnel with adequate training and knowledge of the local real estate market is likely indispensable.

The business strategy’s potential depends on the attractiveness of public transport stations as “shopping malls” and the possibility to turn trains and busses into “moving billboards”. This will not work in places, where shopping opportunities and advertising spaces that reach the daily commuters are either not realizable or already oversaturated.

A positive signal for replicability is that in addition to managing the rental and advertising business of SMRT, its subsidiary SMRT A&P offers consulting services to public transport providers worldwide regarding the development of their own rental and advertising businesses.
5. Local bonds. Krefeld, Germany

Overview
The case study analyses the purchase of tramways financed through bonds issued to public transport users in Krefeld, Germany.

5.1. Understanding the innovation

Overview
Krefeld is a medium size city on the Lower Rhine in western Germany with 225,000 inhabitants. It lies on the western bank of the Rhine, opposite from the larger city of Duisburg in the south of the Ruhr Area. The city of Krefeld belongs to the metropolitan region Rhein-Ruhr, the largest polycentric urban agglomeration in Germany.

The historical silk and cotton production centre has also become an important location for the chemical industry with chemical parks housing production sites of Bayer AG and Evonic Industries AG as well as electronics, machine and vehicle construction. However, structural economic change in the region and Germany as a whole led to a significant loss of manufacturing employment in Krefeld in the 1980s to the early 2000s. Today, the unemployment rate of 7,8% is higher than the German average of 5,3%, but significantly lower than the unemployment rate of 11,8% in neighbouring Duisburg (Statistics for 2016 of the German Federal Agency for Employment).

Tram service started in Krefeld in 1883 and expanded continuously until the 1960s, when parts of the network were taken out of service. Today, the light rail network has a total length of 43 km, of which 14,8 km are not shared with road traffic. According to a survey carried out between March and June 2017, the modal split in the city of Krefeld is 51% private car, 21% bicycle, 15% walking, 9% light rail and rail and 4% bus (Ingenieurbüro Helmert, Mobilitätsbefragung zum werktäglichen Verkehrsverhalten 2017 - Ausschusssitzung der Stadt Krefeld, 14.9.2017).
Organisation

Urban public transport services are offered by the SWK MOBIL GmbH, which is a 100% subsidiary of the public utility company SWK AG owned by the city of Krefeld. The SWK MOBIL GmbH is tasked with providing public transport services with busses and light rail by the city of Krefeld as well as the neighbouring cities and counties of Viersen, Duisburg and Neuss. In 2016, the SWK MOBIL GmbH operated 23 bus lines and 4 light rail lines and had a total of 39.2 million passengers.

The city of Krefeld is a member of the special purpose association Verkehrsverbund Rhein-Ruhr (VRR), in which 25 cities and counties with approximately 8 million inhabitants coordinate their public transport services and finance measures that fall under their joint responsibility. The VRR sets the fare system for multiple-city journeys and administers the allocation of revenues from these tickets. In addition, the state of North Rhine-Westphalia, in which all members of the VRR lie, has tasked the association with the procurement of infrastructure grants from the state’s budget.

Within Krefeld, the SWK MOBIL GmbH is also responsible for maintaining and upgrading the bus and light rail fleet, operating and maintaining workshops, and maintaining the rails and overhead lines of the light rail network. The extension or construction of new light rail lines and stops is under the responsibility of the city, but the improvement of existing stops also falls within the responsibility of the SWK MOBIL GmbH. Financial instruments for the necessary investments include intra-company loans between the subsidiaries of the SWK AG, which allow for interest rates below the open market level.
**Financial context**

The parent company of the SWM MOBIL GmbH, the SWK AG, is a large public utility providing electricity, natural gas, joint district heating, drinking water and sewage treatment. The total revenue of the SWK AG in 2016 was 1.059 million Euro with 40 million Euro coming from public transport. The large size and diverse revenue streams of the SWK AG allow for cross-lending between the firm’s subsidiary companies. As a result, the SWK MOBIL GmbH can take advantage of intra-company loans at below open market rates for its investment needs and is not dependent on outside financial resources.

**5.2. Innovation rationale, implementation and results**

**General description**

Krefelder Bürgerbahn is the title of a campaign carried out by the SWK MOBIL GmbH in 2014 and 2015 as part of the renewal of its light rail fleet. For this renewal, 31 new vehicles were purchased between 2010 and 2015 for a total volume of 75 million Euro. Although the entire investment could have been financed with intra-company loans, the SWK MOBIL GmbH decided to partner with the local bank Volksbank Krefeld to give out bonds for two of the 31 trams. The Volksbank raised the entire investment through local bond issue and lent the sum to SWK MOBIL GmbH.

With the motivation to increase consumer loyalty among the light rail riders, the 5-year fixed interest bonds were given out in small denominations up to a maximum of 5,000 Euros with pre-emption to ticket subscribers. Although the offered interest rate was comparable to the market rate for fixed deposits at the time with between 0.4% p.a. and 1.0% p.a. over the 5-year loan period, the entire volume of 4 million Euros was successfully signed. In addition, several bond holders agreed to have their photos displayed on the design of the new trams, further adding to the marketing effect.

**Objectives**

The campaign succeeded in increasing the identification of Krefeld’s inhabitants with its public transport system according to the SWK MOBIL GmbH, which can also be seen in the observed reduction of vandalism against its trams. In this sense, the campaign contributed to the sustainability of public transport financing in Krefeld by raising consumer loyalty and identification with local public transport.

**5.3. Assessment of the innovation**

**Performance**

The Krefelder Bürgerbahn was launched as a marketing tool to increase awareness of and identification with the city’s public transport system. Its direct impact on investment is negligible and it is doubtful that the model could be replicated exactly to raise significant sums for larger investment projects in the transport sector.
Since the public transport provider SWK MOBIL GmbH primarily uses intra-company loans from its parent for investments, the Bürgerbahn should not be evaluated in terms of its direct contribution to public transport financing. Instead, it should be viewed as a marketing tool that helps to familiarize residents with working of their local public transport system. By showcasing new investments like a fleet renewal or the construction of new train stops through a local bond sale, the public transport provider can teach residents about the financial needs of public transport and the importance of continued support from the city and its users.

Identification with the local public transport system can be an important asset for the provider when traditionally steady revenue streams from school ticket subscriptions are dwindling in many regions due to demographic and structural economic change. Therefore, the Krefelder Bürgerbahn presents an example for successful local marketing in support of preserving future public transport demand.

**Replicability**

For the ‘Krefelder Bürgerbahn’ to be implemented by other public transport providers, there needs to be local demand for savings bonds and a financial institution willing to cooperate in the campaign. Only when the savings bonds can be marketed locally, can there be an effect of increased awareness and identification with the local transport system.

Depending on alternative sources of financing, the transport provider needs to be prepared to incur relatively high borrowing costs for the project’s realization. These costs depend on the willingness of local residents to lend their savings for a relative low interest rate given the ‘good cause’ and the bank’s willingness to agree to low or no service fees for marketing the bonds.

When these prerequisites – local demand for savings bonds and acceptable borrowing costs – are satisfied, the marketing tool can present a relatively simple way to engage public transport users by turning them into public transport ‘owners’.
6. Redistribution formula for subsidies - Catalonia

Overview

UPT needs a subsidy to compensate exploitation deficit coming from operation and/or improvements in the service. In order to overcome these deficits, public administrations may provide additional funds.

There is an example in Catalonia, where an additional fund coming from the public transport authority of Barcelona (ATM) is distributed to a set of cities placed in the outer zones of the metropolitan area. AMTU (Municipality Association for Mobility and Urban Transport), a public transport association of cities of the outer metropolitan area of Barcelona, is the responsible for the allocation of this fund.

This case study explains a proposal to redesign the current distribution of the fund among the municipalities. The objective was to design an efficient, fair and sustainable distribution formula, achieving at the same time the acceptability of all the members.

6.1. Understanding the innovation

Implementation context

Catalonia is an autonomous region of Spain located on the northeastern part of the country. With 7,5 million population, is in Barcelona, the capital, and its metropolitan area where most of the population is concentrated. So called the first ring concentrates 3,5 million people and acts as an engine for economic growth of the whole region.

Next to the boundaries of this metropolitan area, there are a set of municipalities, going from the second ring to the third ring with very varied characteristics among them. They concentrate, approximately, 2 million people. So, in fact, the “extended” metropolitan area of Barcelona concentrates 5,5 million inhabitants, with an extension of 4.268 km$^2$ and a density of 1.255 inhab/km$^2$.

Organisation

In Spain, the provision of UPT services is mandatory for cities with more than 50.000 inhabitants. Due to the governance model of the country, decision-making in public transport includes all the decision levels: national (central Government), regional (Government of Catalonia) and local (City Councils and/or other local institutions).

In the metropolitan area of Barcelona, the Government of Catalonia and the central Government of Spain are both in charge of providing subsidies to municipalities with UPT according to a global commitment called contract-program. In this “contract”, the administrations involved agree on a set of investments and actions, while each part also provides a certain percentage of their budget.

Nevertheless, because the delivered subsidies may be not enough to cover exploitation deficits, the Government of Catalonia and the metropolitan transport authority of
Barcelona (ATM) need to provide **additional funds** that, by the way, cannot be labelled as subsidies due to certain legal constraints.

One of these additional funds is channeled through **AMTU (Municipality Association for Mobility and Urban Transport)** and distributed among their members. AMTU is an association composed of several municipalities placed between the second and the third rings (see Figure B-9) with the aim of supporting them regarding mobility and public transport issues.

**Financing strategy**

AMTU manages a fund of approximately 6M€ from ATM every year. The purpose of this funding source is to enhance public transport within outer municipalities of the metropolitan area of Barcelona.

As previously indicated, these yearly funds ($F_{AMTU}$) are an **extra income** that, added to fare revenues coming from users ticketing revenues ($R_U$) and asset exploitation ($R_F$) as well as the operation subsidies coming from upper-level administrations ($S_{PA}$) have to compensate the total costs of operating the service ($C_T$). Total costs include the operation cost of the public transport ($O_{PT}$) as well as investments in UPT improvements ($I_M$) (see Figure B-10).

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**Figure B-9. ATM area. In green, municipalities conforming the first crown and Barcelona. In red, municipalities conforming the second and the third crown, composing AMTU**

**Figure B-10. Illustrative cost and revenues of UPT services**

\[
C_T = (I_M + O_{PT})
\]
Before the new allocation model of the AMTU fund that will be explained in the next section, the redistribution model had the following indicators and weights, respectively, presented in the Table B-2.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Weights (%) in AMTU’s formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhabitants</td>
<td>25%</td>
</tr>
<tr>
<td>Validations</td>
<td>50%</td>
</tr>
<tr>
<td>Deficit + Improvements</td>
<td>25%</td>
</tr>
</tbody>
</table>

The distribution formula considers the following indicators: inhabitants, validations, deficit and improvements. The number of inhabitants is a common indicator for allocating subsidies in Spain and other countries, and validations is an indicator that refers to the total number of passengers transported during a year. Regarding deficit + improvements indicator, deficit refers to the total amount to be allocated to compensate the exploitation deficit, while improvements refers to UPT expenditure costs to improve the service at an operational level.

However, there are some comments or suggestions to point about these indicators. While deficit and improvements are indicators considered with a high level of efficiency, validations and inhabitants are indicators considered with a medium and low levels. In the following Table B-3 there is the justification of these conclusions.

Challenges
Added to these considerations about the indicators, two context factors lead to the need for a new redistribution formula of the AMTU fund. On the one hand, new members become part of AMTU, which will have an impact on the funds typically available for current members. On the other hand, a change in the Catalan laws for public transport financing (Law 21/2015 of July 29th) which indicates new variables to consider, apart from inhabitants: density, territory extension and public transport network extension.

As a result, AMTU is willing to allocate funds to their members more efficiently, taking into account the diverse context of its members as well as other equity considerations. **The new redistribution formula should lead to a fair and sustainable distribution of the funds available to finance UPT.**

### 6.2. Innovation rationale, implementation and results

**Objectives**

Considering the challenges presented previously, and with the main objective of achieving a more efficient, fairer and more sustainable allocation of the AMTU funds, a new distribution formulation was proposed.

In addition, this new formulation has to be simple and with easily understandable variables in order to ease the acceptability of these new proposal among all the members.

**Implementation**

According to this objective, a top-down methodology was proposed (Figure B-11). It consists of defining a set of criteria (4 criteria) according to the requisites established, which will end up with a set of indicators to consider. In parallel, a classification of the city members is proposed (5 groups), due to their heterogeneity. Considering these issues, a set of indicators of application are defined per each city group.

![Figure B-11. Methodology](image)

Four general criteria where established in the new formulation:
1. Exploitation costs.
2. Efficiency in the service production.
3. Economic effort of the City Council.
4. UPT expenditure (improvements or services).

Based on that, a set of indicators were defined in order to reflect those criteria. In particular, three: Costs, Efficiency in the UPT provision and UPT expenditure.

- **Costs.** This indicator defines the exploitation costs by considering population (inhab.), public transport offer (km per year) and extension (ha).

- **Efficiency in the UPT provision.** This indicator evaluates the performance of a UPT service, using the ratio number of validations/veh-km.

- **UPT expenditure.** This indicator evaluates the quality perception about the expenditure invested in improvements or services in the municipality. To evaluate that, a set of PT actions were defined as well as a score associated with them.

In addition, in order to reflect the economic effort of the City Councils, a maximum amount of subsidy per municipality was set. This maximum was established as the half of the total amount of the UPT exploitation deficit.

Regarding city members classification, five groups were defined considering population and public transport service offered in the municipality. They are the following:

1. **Urba 100.** Municipalities with more than 100,000 inhabitants. They have the obligation to offer the public transport service.

2. **Urba 50.** Municipalities with a population between 50,000 and 100,000 inhabitants. They also have the obligation to offer the public transport service.

3. **Urbanet.** Municipalities with less than 50,000 inhabitants, with a segregated public transport line. They do not have the obligation to offer the UPT service.

4. **Urbanet NS.** Union of different municipalities with less than 50,000 inhabitants, which offer a UPT service together. They do not have the obligation to offer the UPT service.

5. **Long-distance.** Municipalities with no UPT offered. They only have long-distance lines and they do not have the obligation to offer the UPT service.

Considering the indicators defined and a principle of equity among the different groups, a distribution of a certain amount of funds per each group is decided. This is based on a four levels structure (see Figure B-12) and takes into account the criteria and their indicators defined.

*Figure B-12. Distribution level of the funds*
Level 1 consists of a predefined amount of the total fund to the long-distance group. In particular, a 2% of the total.

Level 2 refers to the distribution between groups 1 and 2, with more than 50k inhabitants, and 3 and 4, with less than 50k inhabitants, but with an urban public transport supply. The distribution is based on the following formula:

\[
\frac{S_U}{V_U} = \frac{S_{Urb} + S_{UrbNS}}{V_{Urb} + V_{UrbNS}}
\]

Where \(V_i\) are the total amount of yearly validations for each \(i\) group of municipalities, while \(S_j\) refers to AMTU yearly subsidy allocation for each \(j\) group of municipalities, being \(i, j \in \{U100, U50, Urb, UrbNS\}\). \(U100\) refers to the Urba 100 group of cities, \(U50\) refers to Urba 50, \(Urb\) refers to Urbanet and \(UrbNS\) refers to Urbanet NS.

This implies that both “macrogroups” have to have the same ratio between their variables.

Level 3 consists of the distribution of the total available amount by each of the groups defined (from 1 to 4). Between groups 1 and 2, the distribution considers indicators of cost, efficiency and expenditure (investment in improvements and services). Between groups 3 and 4, the distribution considers indicators of population, territory extension and expenditure (investment in improvements and services).

Level 4 consists of the distribution of the corresponding amount per each municipality belonging to a certain group. The distribution is based on measuring each indicator and applying the respective weight. Nevertheless, in some cases some of the indicators do not apply. Below are presented which was the proposal on that particular case, carried out by CENIT, applying their knowledge and expertise in UPT.

Table B-5. Indicators and their corresponding weight proposed
### Pilot project study on innovative ways of sustainably financing public transport

<table>
<thead>
<tr>
<th></th>
<th>Population (inhab.)</th>
<th>Supply (km per year)</th>
<th>Extension (Ha)</th>
<th>Efficiency (valid./veh·km)</th>
<th>UPT Expenditure</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Urba 100</strong></td>
<td>18%</td>
<td>48%</td>
<td>4%</td>
<td>20%</td>
<td>10%</td>
</tr>
<tr>
<td><strong>Urba 50</strong></td>
<td>18%</td>
<td>48%</td>
<td>4%</td>
<td>20%</td>
<td>10%</td>
</tr>
<tr>
<td><strong>Urbanet</strong></td>
<td>18%</td>
<td>48%</td>
<td>4%</td>
<td>20%</td>
<td>10%</td>
</tr>
<tr>
<td><strong>Urbanet NS</strong></td>
<td>71%</td>
<td>-</td>
<td>14%</td>
<td>10%</td>
<td>5%</td>
</tr>
<tr>
<td><strong>Long-distance</strong></td>
<td>60%</td>
<td>-</td>
<td>35%</td>
<td>-</td>
<td>5%</td>
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</table>

**Outcomes**

Applying the funds available per each group, indicators evaluation and weights, a final fund is distributed per each municipality according to the main objectives defined.

**6.3. Assessment of the innovation**

**Performance**

The new formulation proposed rewards the most efficient municipalities, both in terms of a better supply and extended network and in terms of an expenditure in some improvements in the service.

“Best graded” cities will also collect more revenues coming from ticketing because they will have better UPT conditions offered to their citizens. In addition, they will have less uncertainty with the fund allocation, so their funding model will be more stable and predictable. This aspect has some positive results, for example, it will reduce some financial costs and it will enhance the planning of UPT improvements, etc.

Although the distributed fund is not a very high amount for the municipalities, it has to be pointed that every extra income is welcome considering that the service always has a deficit associated.

Focusing on urban mobility advantages, the indicators proposed will increase the ridership of public transport, as a result of a better UPT coverage and with a reduction of externalities, because with the UPT improvement it is expected a private vehicle use decrease. Some other advantages may be new transport apps, green fleet renewals, improved accessibility, etc.

**Replicability**
The replicability of this innovation in other contexts may basically depend on the legal framework, acceptability and size and geographical aspects of the cities, apart from the essential requisite that is to have an initial fund to be distributed with some strong compromise to be procured along the following years.

The legal framework has to allow distributing this type of fund, as well as applying the criteria defined.

Acceptability may be the most important enabling factor. To achieve that, it has been seen that an intermediate organism responsible for the distribution (AMTU in this case) and composed by all the city members was a key success factor. In addition, it helped a simple and understandable formulation as well as a weight ponderation defined by a technical and external organism. Considering all these factors, it was possible to settle meetings and arriving to a common agreement of the allocation, as it was achieved in that case.

Regarding geographical aspects, it can be said that it is important that the cities to allocate the funds have a relation of proximity and connection between them. About the size aspect, the total amount has to be proportional and have a significant impact in UPT of the city. Considering both aspects, it is concluded that this case would not be replicated in major cities or centers of population; it would be indicated to be applied to zones placed in the boundaries of this major cities, as well as low-density zones.
Annex C. Cluster analysis database
Table C-1. Database of cities consulted

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<th>City</th>
<th>Country</th>
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# Pilot project study on innovative ways of sustainably financing public transport

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<th>Modes of transport</th>
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2
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