

Faculty of Engineering of the University of Porto

Master of Science in Transportation

Organization of Metropolitan Transport Systems

- The Portuguese Case -

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Abstract

The increasing concerns with financial, social and environmental sustainability, have forced Public Authorities to adopt more efficient forms of organization and regulation of transportation in the metropolitan areas. The metropolitan transportation framework is characterized by multiple objectives, multiple stakeholders, a enormous social (through its importance in assuring the movement of both persons and goods), environmental (the transportation sector is one of the most significant in what concerns green house effect gases) and financial impact (investments in transportation infrastructures are capital intensive, and operation costs are rarely covered by ticket revenues), which explains the importance of having an institutional and organization model well adapted and highly efficient.

Over the past years, Metropolitan Transport Authorities have been created with different forms and objectives, where different levels of administration are represented, as a way to achieve a more sustainable transport system. In spite of the multiple models defined, it's possible to find some stable core functions on those authorities, like planning, organizing and financing the system and defining contracts with public transport operators.

The regulatory framework for the transportation sector in Portugal is out of date, and the competences related to this activity are dispersed by different entities, which have different objectives towards transportation. The increasing loss of demand and the difficult financial situation of the metropolitan transport systems, forces the authorities to adopt a more flexible, efficient and transparent model. The International Benchmark indicates the necessity of progressive decentralization of competences in what concerns the design, management and financing of metropolitan transport systems. To manage the relations between authorities and operators, the preferable instruments are contracts. In spite of the different models and approaches towards the definition of contracts, the use of such an instrument where compensation are previously determined based on variables of service and quality, while assuring a crucial alignment between the strategies of both operators and authorities, seems to constitute the best alternative to the ambiguous relation now established.

Resumo

As crescentes preocupações em torno da sustentabilidade financeira, social e ambiental, têm forçado as autoridades públicas a adoptar modelos mais eficientes de organização e regulação do sistema de transportes nas áreas metropolitanas. Um sistema de transportes metropolitano é caracterizado por múltiplos objectivos, vários stakeholders, um significativo impacto social (pela sua importância como garantia do movimento de pessoas e bens), ambiental (o sector dos transportes é um dos sectores com maiores responsabilidades na emissão de gases com efeito estufa) e económico (os investimentos e infraestruturas de transportes são muito significativos e os custos de operação dificilmente são cobertos pelas receitas tarifárias), facto pelo qual se explica a importância de modelos institucionais e organizacionais adaptados e eficientes.

Nos últimos anos, foram criadas Autoridades Metropolitanas de Transporte com formas e objectivos variáveis, onde se encontram representados diversos níveis da Administração Pública, como forma de definir um sistema de transportes mais sustentável. Apesar da multiplicidade de modelos existentes, é possível definir um conjunto de atribuições comuns, como o planeamento, a organização e o financiamento do sistema e a definição de contractos com os operadores.

O enquadramento jurídico da regulação do sector dos transportes em Portugal, está desactualizado, e as competências relacionadas com esta actividade encontram-se dispersas por diferentes entidades, com objectivos distintos em relação ao sistema. A contínua diminuição da procura e a complexa situação financeira dos sistemas metropolitanos de transporte, obriga à adopção de um modelo mais transparente, mais flexível e eficiente. O benchmarking internacional realizado aponta para a necessidade de uma progressiva descentralização de competências no que respeita ao planeamento, gestão e financiamento do sistema metropolitano de transportes. Na gestão das relações entre as autoridades e os operadores, o instrumento mais utilizado são os contratos. Apesar dos diferentes modelos e abordagens relativamente à contratualização, a utilização destes instrumentos que previamente determinam as compensações, com base em variáveis relacionadas com o serviço prestado e a qualidade, e que assegure uma convergência entre as estratégias dos operadores e das entidades públicas, constitui a melhor alternativa à actual relação ambígua.

1. Introduction

1.1 Background

The purpose of the transportation system is to enable people or freight to move between origins and destinations. The demand for transportation is by and large a derived demand from social activities (SACTRA 1999)

Today's economic development and the increasing importance of environmental issues as forced a greater concern with transportation systems. The importance of providing good transportation services to the society has been a concern of the authorities, but the problems to solve and the constraints involved, have been changing over time.

Today the main challenges concerning transportation are related to congestion and declining air quality, which are threats to our quality of life, the increasing cost of public services, changes in the mobility patterns with more diffuse and unpredictable journeys, inadequate institutional environment: fragmented responsibilities, regulatory constraints, conflicting policies and goals, organizational cultures and dynamics that are resistant to change and that are reinforced by outmoded policies, programs, regulations, and attitudes, continuing subordination of resident's needs for overall mobility and quality of the customer's travel experience to operational concerns, and lagging progress in the deployment of state-of-the-art information systems and other emerging technologies that have become essential in today's internet age.

While the world population in urban areas will reach the threshold of 50% during the next decade, the mobility patterns and the mobility needs are changing towards a more complex system, (75% of the European population lives in urban areas). Urban sprawling, congestion, increase in car ownership, shortage of available public funds are leading to a decreasing attractiveness of public transport.

At the same time, environmental concerns such as energy consumption, green house effects, public space occupation, have pointed out public transport has an efficient mobility solution.

The dominance of car over public transport is affecting the wealth of the cities, and has lead public decision makers to start a mobility policy towards a greater equilibrium in the modal split, and a more sustainable both economic and environmental, urban mobility.

The damages to the quality of life and public health (time spent in transport, road accidents, breathing difficulties, psychological trouble and sleep disorders linked to noise), the economic inefficiency (congestion), damage to the environment (air pollution, artificialisation of grounds, reduction of biodiversity), social segregation and creation of urban ghettos, damage of urban landscape with the monopolization of space, represent some of the damages resulting from an inefficient transport system.

Yet, public transport systems have never been as useful as today, more especially in the case of metropolitan areas, since the public transport provides mobility for all, while the private car, although widespread as it can be, doesn't benefit all the population. The freedom of movement which it brings depends on the age and the ability to run a car and to have sufficient means. Youngsters, elderly people, deprived persons, people suffering from a handicap, are generally excluded from the mobility provided by the private car. Only public transport is capable of carrying fast hundreds of thousand of persons, for example at peak hours and provide the best ratio to number of passengers carried vs space consumption, and is therefore very well adapted to dense urban areas.

Literature points out some key factors important to increase the attractiveness and usage of public transport systems:

- An increase in the provision of services and an adaptation to the new mobility needs: to decrease the car usage is important to ensure a good service of the territory, large amplitudes of service, and a capacity in line with the demand;
- A strong integration of networks: this integration must cover the various transport companies of a given territory, as well as all the different public transport modes available, it must include other transport means (private car, walking, cycling), and it must be functional (networks are structured in a logical way), physical (no barriers from one mode to the other) and cover also fares and information;
- An improvement in the quality of service: is important to guarantee a level of quality similar to the one in the private car, by real time information, regularity of service, commercial speed, comfort of waiting conditions and on-board and the level of accessibility to people with reduced mobility;
- An attractive fare policy and a dynamic communication: it should be cheaper for people to use public transport rather than private car, since the social cost of public transport is much lower than the private car, it should be provided a fare policy that concerns different

financial capacities of people and public transportation should use communication and marketing to improve its image among potential clients;

- A strong focus on funding issues: usually public transportation is not profitable without public subsidies, the break even points of the operating companies are generally above the fare level. To compensate this situation, public authorities have to agree on bringing money from the public budget or from dedicated resources (internalization of external costs of the private car, charging of road usage by private cars or funding of public transport projects through capture of land value);
- A co-ordination with policies of land planning and urban development: to guarantee that the extension of urban areas are compatible with public transport service.

There's a need for a stronger involvement of public authorities. They are responsible for the definition of the objectives for the mobility policy. For example, what should be the place for the private car and what public service should be provided? Concerning the public service, public authorities should define the size of the network and the transport modes provided, the fare policy (special fares for some social groups: disabled, elderly, students), the quality levels, etc.

It's essential to guarantee the co-ordination of the policy in terms of public transport with other mobility issues (alternatives like walking or cycling) and with land use and housing, since mobility and land use are extremely connected, and to ensure a more efficient and sustainable urban development is important to analyse both these issues at the same time. It's also important that the authorities involved in a public transport system cover pertinent territories which represent the reality of everyday trips of people.

In order to provide a system capable of satisfying the need for travel, it's crucial to have a transportation system, composed by an integrated network of highways, roads, railways, walkways, bike paths, canals, rivers and air corridors. Each of these subsystems is characterized by an infrastructure type, a transportation mode or the subsystem's purpose. The importance of having matching different interests of various stakeholders, to define and implement transport strategies which assure a provision of a good transportation service, requires an efficient model of organization in the transportation system. A good transportation system involves interaction between the sub-networks, in order to form an intermodal and

integrated system. We can say that a transportation system is composed by a network of infrastructures¹, that connect themselves in interchanges.

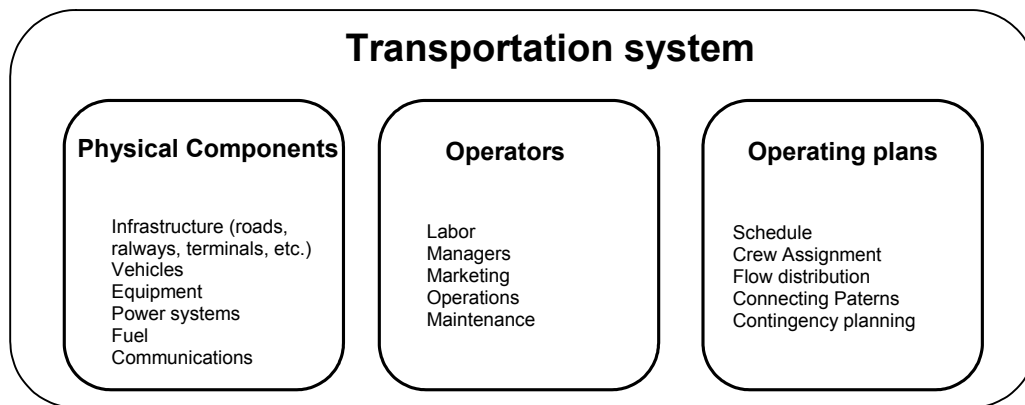


Figure1 - Internal Components of the Transportation System

SOURCE: Adapted from Sussman (2000)

Sussman (2000) suggests three main components of the transportation system: physical components (which are the networks and the equipment necessary in order for the system to work properly), operators, (which are responsible for the functioning of the system) and operating plans, that consists in non-physical components but indispensable to the weel functioning of the system.

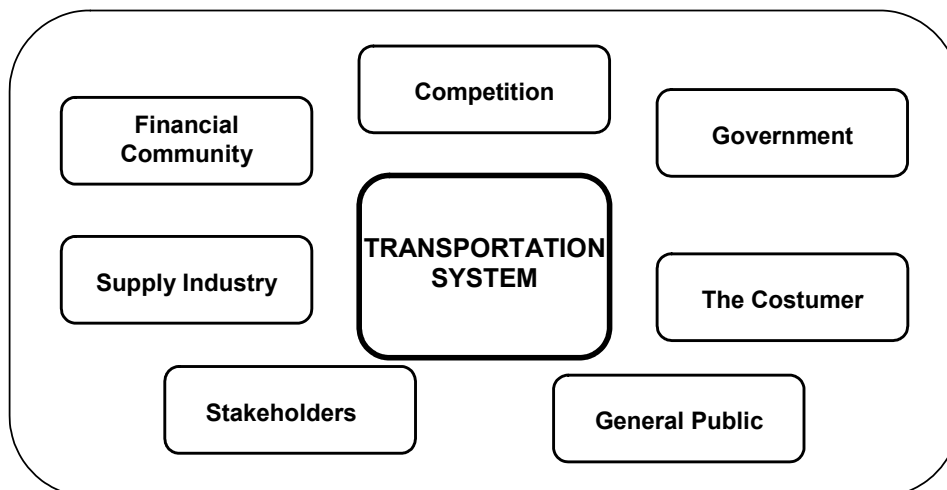


Figure2 - External Components of the Transportation System

SOURCE: Adapted from Sussman (2000)

The transportation system is also a part of a more wide range of system and sub-systems, which Sussman calls external components of the transportation system and are represented in Figure 2.

¹ In this context, infrastructure should be the considered the infrastructure itself, the vehicles and all the "software" necessary to provide a transportation service.

1.2 Research objective and methodology

This thesis will concentrate on the changes that will occur on the organization of the metropolitan transport systems in Portugal.

The new European legislation concerning public transport services will force the Portuguese Government to change the actual relations between operators and authorities. These relations will have to assume the form of contracts, in which the operator takes the responsibility for provide a certain service, while the authority takes the responsibility to “compensate” the operator for the public service.

In certain cases, the authority might in fact “buy” a service to operator. This consists in different types of contract which will be analyzed in this research. But before the design of these specific instruments to regulate the relations between authorities and operators, a organizational change is required.

Therefore in this thesis a comparative analysis will be made. Looking to several countries around Europe, we will try to understand the new forms of organization that are being adopted, drawing lessons for the Portuguese case. Obviously, a brief description of the actual regulatory regime in Portugal will be made, pointing out it’s assets and it’s weaknesses. This analysis will comprehend not only the organizational form, but also the instruments used by authorities to regulate and manage it’s relations with the operators, contracts.

1.4 Thesis contents

The thesis is divided in two different parts.

- Part I –METROPOLITAN TRANSPORT AUTHORITIES: Benchmarking
The purpose of this first part is to provide the reader a perspective over the different organization forms of MTA, different missions and the way the different levels of administration are involved in the financing.

- Part II – RELATIONS BETWEEN OPERATORS AND AUTHORITIES: Contracts
In the second part different models of contracts will be presented and discussed, pointing their advantages and disadvantages, the way contracts should be designed and the critical aspects in establishing contracts with operators.

- Part III – THE PORTUGUESE CASE

In Part III, we will look at the Portuguese case, namely the Metropolitan Areas of Lisbon and Porto, doing a brief description of the respective transportation systems from an institutional and economical point of view. This analyses, as well as the others parts of this dissertation will constitute the basis for the definition of some guidelines to what should be the organization of the metropolitan transport systems in Portugal, based on the main conclusions of the previous parts.

The next diagram illustrates the articulation of the diferent parts of this thesis

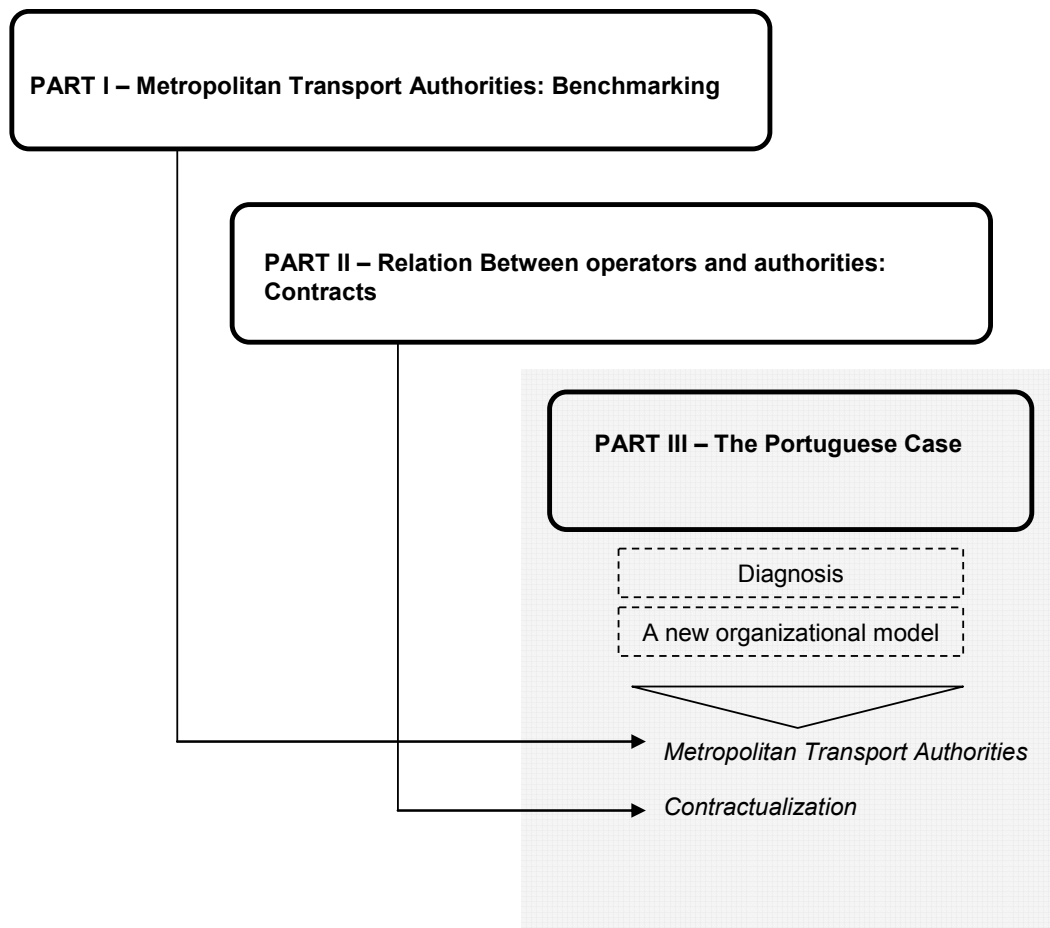


Figure 3 – Thesis organization

PART I - METROPOLITAN TRANSPORT AUTHORITIES: Benchmarking

2. Metropolitan Transport Authorities

The first Metropolitan Transport Authority in Europe, with the characteristics that we now assume an authority should have, appeared in 1959 (Paris, STIF), which has followed by Manchester, Liverpool and Sheffield in 1968. The problems of the transportation system by that time were significantly different from what are today's challenges. Those authorities have been changing over time, adapting themselves to the new political, economical and social frameworks, and especially to new problems and challenges.

MTA	Date of Creation	MTA	Date of Creation
Amsterdam (ROA)	1993 (*)	London (TfL)	2000
Athens (OASA)	1977	Lyon (SYTRAL)	1983
Barcelona (ATM)	1997	Madrid (CTM)	1985
Berlin (VBB)	1996	Manchester (GMPTE)	1968
Bilbao (CTB)	1975 (**)	Munich (MVG)	1975
Bremen (VBN)	1989	Newcastle (Nexus)	1968
Colonia (VRS)	1987	Paris (STIF)	1959
Copenhagen (HUR)	2000 (*)	Prague (ROPID)	1993
Dublin (DART)	1995	Rhine-Ruhr (VRR)	1990 (*)
Frankfurt (RMV)	1994	Sheffield (SYPTE)	1968
Glasgow (SPT)	1973	Stuttgart (VVS)	1978
Hamburg (HVV)	1996 (*)	Valencia (ETM)	2000
Helsinki (YTV)	1996 (*)	Viena (VOR)	1984
Leeds (YTV)	1985	Zurich (ZVV)	1990
Liverpool (Merseytravel)	1968		

(*) Date of creation of its actual functions and responsibilities.

(**) Its original function was to construct the subway. Fare integration only took place in 2000.

Table 1 – Date of creation of Metropolitan Transport Authorities

Source: EMTA

While those authorities were changing some others appeared all over Europe, with the exception of Portugal, which as not yet any Metropolitan Transport Authority². For example in the case of Paris the authority has changed from a model in which the Government had a

² There's a Law D.L. n.o 232/2004, which created the MTA for Lisbon and Porto, but as never been effectively put into practice, and was announced by the present Government the reformulation of the model. For the present thesis it can be assumed the absence of MTA's in Portugal.

central role, towards an increasing participation of the local authorities. The next table presents a chronogram of the creation of the European Transport Authorities.

In this chapter a “benchmarking” will be made in order to understand the different models that have been created, and the financial schemes developed in each case to finance the operation and the investments in the transport system.

2.1 Paris: Syndicatt des Transports d’Ile-de-France (STIF)

The Syndicatt des Transports d’Ile-de-France (STIF) was created in 1959, and was entrusted with the responsibility for public transport whatever the mode and transport companies concerned. The STIF authority was initially confined to the Parisian transport area, and was latter extended in 1991 to the Ile-de-France region.

Organization

STIF organization has recently changed. From 2000 to 2005, it was composed by 34 members:

- 17 representing the French state
- 17 representing the local authorities (5 for the regional council, 5 for the city of Paris and one for each remaining “departments”, and it was presided by th Prefet)

In July 2005, the national government representation has ended, and now the region has the majority and the presidency (the Board is headed by the Chairman of the Regional Council of Ile-de-France, or by an elected regional representative appointed by the Chairman from amongst the members of the STIF Board).

Now STIF is a local public body, operated by a Board of 29 members, in which 15 representatives are from the Region, 5 representatives for the Ville de Paris, 1 representative from each of the seven other counties in Ile-de-France, as well as two new members: 1 representing the Regional Chamber of Commerce and Industry of Paris - Ile-de-France, and 1 representative elected by the chairmen of the Public bodies for intercommunal cooperation.

STIF structure is divided in 4 main departments (transport operations, projects of infrastructure, development (mobility and fare policy) and secretariat general) in a total of 142 staff members.

The officers are under the authority of a managing director appointed by the Chairman, after consultation of the Board.

Missions

STIF current responsibilities are:

- appointing operators and defining general operational conditions;
- creating tickets and formulating pricing policy;
- setting transport services and levels of quality of service within the framework of the contracts accorded with service operators;
- modernizing the transport system within Ile-de-France through major infrastructure projects, particularly those scheduled under the State-Region planning contract;
- improving quality of service by funding the necessary equipment through the implementation of the plan de déplacements urbains (PDU - urban transport plan);
- heading studies into opportunities for and the feasibility of new infrastructure;
- financing the major part of the operational costs of public transport (€3.7 billion), the remainder being received by transport companies from passengers (€2.63 billion) - 2005 data.

Within the framework of decentralization (law of 13th August 2004), STIF was entrusted with the following:

- drafting and revising the *Plan de Déplacements Urbains* (PDU - urban transport plan);
- the option of taking control of the implementation of investment project, with the exception of those relating to the French national rail network (RFF monopoly);
- setting levels of transport tax while respecting limits laid down by law;
- responsibility for school transport;
- the possibility of organizing on demand transport;
- organizing regular river passenger services.

STIF may also delegate some of its competences (with the exception of pricing policy) to local authorities or groups of local authorities, and access new finance options through borrowings.

Characterization of the Public Transport System

The public transport system is operated by 95 companies:

RATP - state owned operating metro, tramway, bus services in the central area and 2 heavy rail lines. RATP employs 42.000 staff members and had a turnover of 3.0 billion euros in 2003. RATP carries 75% of passengers (50% of passengers.km)

SNTF – state owned national railway company, employs 20.000 staff members in Ile de France and operates suburban rail services wich carries 17% of passengers (40% of passengers.km)

Optile – association bringing together 93 private bus companies which employs 5.000 staff members and represent 8%of trips

Financing of Public Transport in 2005

In 2004 the public transport system had 7.22 billion euros (6.56 operations and 0.66 of investments), and had a total farebox revenue of 1.82 bn (27.7%)

In 2005, the total needs of financing (operation and investments) for the public transport in Ile-de-France was around €7,37 billion. It's STIF's responsibility to assure the financial equilibrium of operations, meaning a total of €3,7 billion paid in 2005. It's financing sources are the "Versement Transport"³ and the contributions maid by it's members (Local and Regional entities).

Contracts

The Relation between STIF and RATP / SNCF is governed by contracts, considering the service level and quality and the pricing policy. These contracts will be analyzed in Chapter 6.

³ "Versement Transport" is a tax on wages paid by administrations and companies with more than 9 salaried employees.

2.2 Barcelona: Autoritat del Transport Metropolita (ATM)

In 1996 a Framework Agreement between the State, the Autonomous Government of Catalunya and the local Administrations (Barcelona City Council and the EMT), recognizing the need for a consortium-based local collaboration agency responsible for organizing the public transport system, created the basis for the future authority.

In 1997 the Agreement of the Constitution of the ATM was signed creating an inter-administration consortium open voluntarily to all authorities responsible for collective transport services in the Metropolitan Region of Barcelona. The consortium is composed by: Generalitat de Catalunya (the autonomous government, 51%), the Ayuntamiento de Barcelona (the city council, 25%) and the Entitat Metropolitana del Transport (the metropolitan transport organization, 24%).

Organization

The ATM is composed by a Board of Directors and an Executive committee.

The Board of Directors is the highest directing body of ATM and it's constituted by 20 members:

- 9 nominated by the *Generalitat de Catalunya*
- 9 by the local administrations
- 2 representatives of the nation's Government as observers, the managing director and the board's secretary.

The canceller (minister) of Territorial Policy and Public Works of the Generalitat de Catalunya is its president, and its two vice-presidents are the Major of Barcelona and the President of the Entitat Metropolitana del Transport, or the persons delegated by them. The Executive Committee of the Board of Directors is made up of four members of the Board, two representing the regional government and two representing the founding local authorities. The Executive Committee has the general function of examining and elevating to the Board the Directors proposals.

Missions

The ATM has the following competences:

- The planning of public transport infrastructure in its territory, defining characteristics, the scheduling of investments, proposing funding agreements to be subscribed, and supervising the relevant projects to verify fulfillment of planning objectives;
- The planning of services and the setting up of operating programmes coordinated by all the companies rendering them, and the monitoring of the evolution of travel, with particular attention to the monitoring of the behavior of private transport;
- The preparation and approval of a common framework of fares in a funding policy that defines the degree of coverage of costs of income from fares and the definition of the integrated fare system;
- Agreeing to programme-contracts or other types of agreements with the companies rendering the public transport services in its territorial area;
- Funding agreements with the public administrations to subsidize the service deficit and the operating costs of the management structure;
- Ownership of the income from rates from the combined tickets and the distribution between operators;
- Control of income, costs and investments of the companies rendering the services for the purposes referred to in the previous sections;
- Use of administrative powers in service planning in its territorial area which the public administrations that signed the Framework-Agreement of July 28 1995 and those that also joined it decide to attribute to it;
- Advertising, information and user relations.

Characterization of the Public Transport System

There are 4 main operators in the Metropolitan Region of Barcelona:

- Transports Metropolitans de Barcelona (TMB), provides metro and Barcelona urban bus systems;
- Ferrocarrils de la Generalitat de Catalunya (FGC), runs 3 lines of the urban metro plus 2 suburban lines;
- Renfe Cercanías, is the local trains section operated by the Spanish railway company;
- Tramvia Metropolità, is the new operator, created in 2001 with PPP4 agreement.

⁴ Public and Private Partnership

	Lines	Length (km)	Bus Stops	Trips (million)	Vehicle.km (million)
Railway services					
FMB (Metro)	5	83,6	115	305,1	59,6
FGC	2	143,7	69	63,2	27,13
Railway RENFE	4	426	102	103,6	59,5
Total	11	653,3	286	471,9	146,23
Bus Services					
Urban Bus TM					
(Barcelona ciudad)	90	801,5	2.157	184	38,2
Bus EMT	68	848,3		47,8	19,25
Bus Generalitat	196	4.910	5.000	22,1	26
Other urban bus	72	521		29,6	8,65
Total	426	7.080,8	7.157	283,52	92,1
	Trips (million)			Vehicle. Km (million)	
TOTAL	755,4			283,33	

Table 2 - Public transport in the Region of Barcelona, 2001

SOURCE: Carreteras, Revista Técnica de la Association Española de la Carretera, Marzo/Abril 2003

More than 25 municipalities have their own urban bus network and many suburban lines are run by private companies under concessions and agreements with regional government.

Financing system

In mostly all European Metropolitan Areas public transport system are operated at a structural loss because fare incomes plus social levels of fares don't cover the operating costs. In each metropolitan area, a funding scheme has been developed which incorporates different levels of participation.

The following diagram illustrates the funding scheme of ATM.

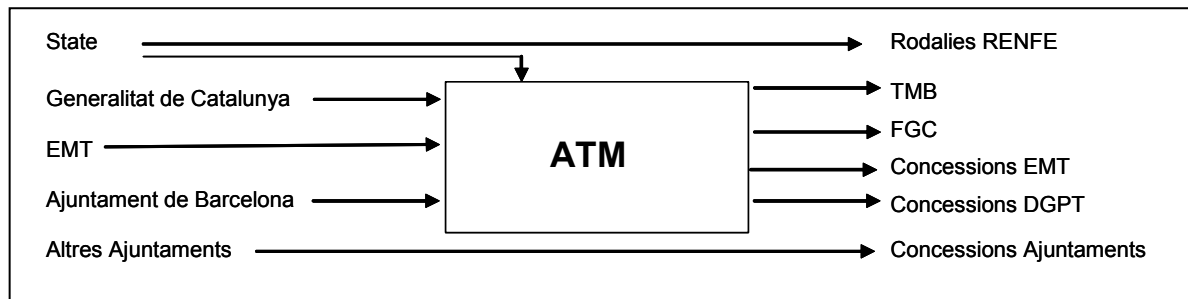


Figure 4– Financing Scheme in ATM

ATM works like the central agent in the funding system, even though some investments (like in railways through RENFE) are under the competence of the Central Administration.

A key element in this scheme is the Contract-Programme. Those programmes are established at different levels and assure the participation in financing of all agents.

In the case of Barcelona, there are the following contracts.

- between the State and the ATM;
- between the ATM and the administrations of the Consortium that cover the needs of the operators for four-years periods;
- between the ATM and the TMB and FGC public operators;
- between the State and RENFE.

There are also some risk venture franchises between the Autonomous Government of Catalunya and the EMT and the different private bus operators.

Contracts

The ATM has established different contractual relationships with the transport operators:

- With public operators (TMB, FGC): the ATM has signed programme contracts detailing the coverage of the operating deficits, investments in maintenance and replacement, and loans. The operator's obligations set forth in the programme contracts consist of a series of quality and service requirements that they must fulfill during the contract's term: coverage coefficients, quality coefficients, supply and demand undertakings, fare undertakings, etc.

- With subsidized operators: some road service companies operate under a concession system with subsidies to cover the deficit generated. In this case too, there are obligations such as supply and demand undertakings, coverage deficits, etc.
- With non-subsidized operators: other bus operators offer a service under a pure concession system, without any subsidies.
- With Rodalies Renfe: Programme Contract with the Central Government. There is a Cooperation Agreement signed in 1999, which provides for the integration of Renfe's services in the ATM's fare system.

2.3 Madrid: Consorcio Regional de Transportes de Madrid (CRTM)

The CRTM was created in 1986, with the purpose of coordinating services, networks and fares and combining efforts of public and private institutions. CRTM depends functionally on the Regional Government.

Organization

CRTM is constituted by an executive board which includes 15 members:

- 5 of Madrid Municipality
- 3 of others municipalities of the Region
- 2 members of Central Government
- 2 members of the private operators association
- 2 members of trade unions
- 1 member of customer associations

The CRTM President is a representative member of the Madrid Region, and the Vice-President is a representative member of the municipality of Madrid. CRTM has 119 staff members, in 4 main directions: technical, economic-financier, quality and general secretary.

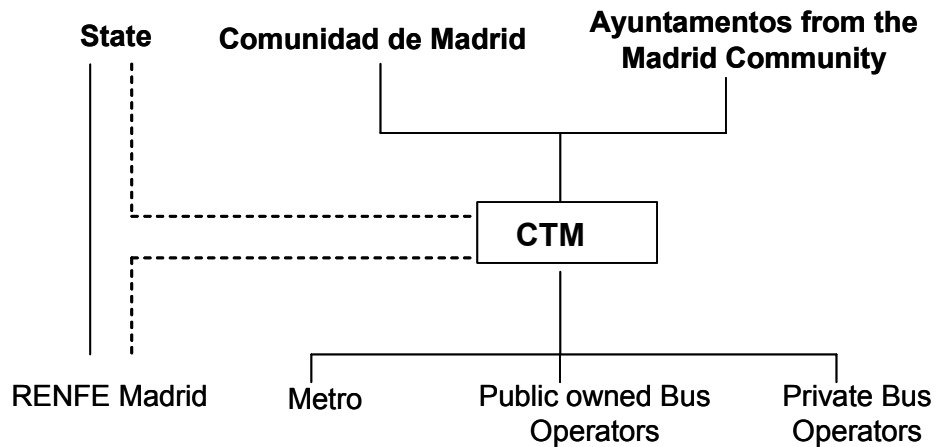


Figure 5 – Constitution of CRTM

Mission

CRTM is responsible for:

- planning of public transport infrastructure, metro extension, interchanges, bus lanes;

- surveys and mobility's models;
- planning and definition of coordinated management of transport services: definition of routes in the network, stops, timetables and control of the quality level of service;
- Definition of the ticketing for the public transport system; management of the monthly and annual travel card (Abono Transportes), multimode tickets and integrated tourist tickets;
- Unique image of Public Transport for the citizens.

Characterization of the Public Transport System

The Madrid transport network is constituted by:

- MetroMadrid, metro in Madrid city
- MetroSur, metro in the South metropolitan ring
- TFM, suburban metro under public concession
- ETM, Madrid urban buses
- Suburban buses, private operators
- RENFE, suburban rail

CRTM has established contractual relations with 33 private bus companies to provide suburban services.

Mode	Lines	Lengh (km)	Bus Stops	Vehicles.Km (10 ⁶)	Fleet	Demand Passengers (10 ⁶)
Metro	11+1	171,4	160	123,2	1.338	543,0
Autobús						
EMT	185	3.061	8.660	95,9	1.900	501,9
Corona A						
Autobús						
Coronas B y C	357	18.048	14.968	143,9	1.512	284,9
Cercancias						
Renfe	9	317,6	91	97,6	868	176,5

Table 3 - Public transport in the Region of Madrid (2001)

Funding of Public Transport in 2003

Metro and ETM are the only operators that manage directly some revenues (single tickets).

In what concerns infrastructure investment, it's made by different levels of the Administration: Regional Government supports the financial needs of the metro extension plans and the National Government manages the suburban rail investments.

The financing of the public urban transport is regulated by legislation of the local finances from 1988. This law, defined the transference of funds from the central administration general budget to the local authorities in charge of the urban transport, and was distributed in two ways:

- Contracts: programs to the financing of the system;
- Subventions to finance the infrastructures.

Nowadays, the State involvement in the financing of the metropolitan urban transport comprehends a large series of conventions and contracts-programs with certain autonomies and local entities, subventions and compensations to public companies (RENFE).

Expenses	Million Euros
Expenses Consorcio de Transportes	39,6
Expenses Zone A	728,7
Expenses Zone B	295,5
Other Expenses	66,7
Total	1.130,5

Revenues and subventions	Million Euros
Operational revenues	602,6
State subventions	153,4
Comunidad de Madrid subventions	261,3
Ayuntamiento de Madrid subventions	109,6
Others	3,6
Total	1.130,5

Table 4 – Balance sheet for 2002 in CTM

The subventions necessary to finance the transport system where in 2002, of approximately 527,9 million euros, divided between the Comunidad de Madrid (49,5%), the Central Administration (29,1%), the Ayuntamiento de Madrid (20,8%) and other local corporations (0,7%).

In the Madrid case, the local authorities (La Comunitade de Madrid) assume almost 50% of the financial need of the system. It's important to notice that in Spain, the political decentralization process took place years ago, allowing the region to detain a high level of autonomy, not only political, but also financial.

The "maturity" of the regions allows them to have the central role in the Metropolitan Authority. The implementation of this model in a contry like Portugal, far from having a decentralized administration, is extremely difficult, if not impossible in the short term.

2.4. London: Transport for London (TfL)

Transport for London (TfL) was created in 2000 as the integrated body responsible for the Capital's transport system. Initially TfL was a functional body of the Greater London Authority, responsible for the implementation of the Mayor of London's Transport Strategy and for managing transport services. The Mayor of London publishes its Transport Strategy on 2001, and revised it on 2004. Together with the revision of the Plan, it was presented a 5 year investment programme of £ 10 billion. The purpose of this Plan, is to develop the London transportation system in order to face the challenges of an increasing demand.

Transport for London manages one of the largest bus system in the world with more than 6.000 vehicles and a service area population of around 7 million.

Organization

TfL is directed by a management Board chaired by the Mayor of London who appoints the other members.

The cooperation between the TfL and boroughs is crucial for the implementation of the Transport Strategy and the development of the transportation system, which is why there is the Borough Partnerships Group, part of TfL's Finance & Planning Department and divided into 4 teams: land use planning, borough liaison, borough funding and borough programmes.

Transport for London, is composed by a number of different companies:

London Underground Ltd : responsible for operating the London Underground train network and owns (in whole or in part) over 250 London underground stations.

London Buses Limited: responsible for operating certain bus routes in East London and Dial-a-Ride which provides door-to-door transport for disabled people.

London Bus Services Limited: responsible for the regulation of the London bus network, including planning bus routes and setting bus services level. The company also monitors service quality. It is responsible for the provision of bus infrastructure and for certain support services, regarding the bus network and the management of Croydon Tramlink.

Victoria Coach Station Limited: Victoria Coach Station Limited operates Victoria Coach Station, which is responsible for providing an arrival and departures facility for coaches in London.

London River Services Limited: London River Services Limited operates and manages eight piers on the River Thames, licences boat services using those piers and subsidises multi-stop commuter services provided by a private operator.

Docklands Light Railway Limited: owns the land on which the Docklands Light Railway is built and is responsible for the operation of the railway.

TfL Trustee Company Limited: trustee of the TfL Pension Fund.

Transport Trading Limited: is a holding company for all the operating transport companies owned by TfL and it also carries out certain other trading activities such as running London's Transport Museum.

London Transport Insurance (Guernsey) Limited: is an insurance company based in Guernsey which provides insurance services to TfL, its subsidiary companies and some of their contractors.

Dial-a-Ride Limited: is a contingency measure should it have become necessary at that time for certain services to be operated directly. However it has never traded. It is own by London Bus Services Ltd.

UKTRAM Limited: is an associate company of London Bus Services limited (LBSL) and it's main purpose is to represent the UK tramway industry in dealing with government and statutory bodies in developing a co-ordinated and structured approach to regulation, procurement and standardisation within the industry.

Cross London Rail Links Limited: is a joint venture company that was formed by Transport Trading Limited and the SRA Investment Company Limited (SICL), then a wholly owned subsidiary of the Strategic Rail Authority. All of the SRA's shares in SICL have been transferred to the Department for Transport. CLRLL is responsible for developing two new rail routes through London going from East London to West London and North-East London to South-West London (the Crossrail Project).

Mission

TfL's role is to ensure that Mayor's Transport Strategy is implemented, and is also responsible for managing the transport services across the capital: London's buses, the Underground, the Docklands Light Railway (DLR) and Croydon Tramlink and has a strategic role in proactive road network and traffic management.

The National Rail is not TfL responsibility, but the authority works closely with the Network Rail to improve rail services in and out of London. TfL also runs London River Services, Victoria Coach Station and London's Transport Museum, and regulates taxis and private hire trade. TfL also provides special services like a Dial-a-Ride service to those who need door to door transport, and also focus it's attention to non motorized modes of transport: pedestrians and cyclists. Road safety, street environment, congestion are also concerns of TfL.

Characterization of the Public Transport System

Main operators in London:

- TfL Surface Transport (Urban bus, Tram and Ferries)
- London Underground Limited (Metro)
- TfL London Rail (Heavy rail)
- TfL Surface Transport (Suburban bus)

Operator	Passenger journeys (10 ⁶)	Vehicles.Km (10 ⁶)
London Buses	1.1816	454
London Underground	971	69
London Rail (DLR)	53,07	3,6

Data of supply and demand for the year 2005/06

Table 5 – Figures of the public transport system in London

Funding of Public Transport in 2003

TfL system is financed from the government grants (£2.821 bn, including £57.8 m from the Mayor's precept) and sales revenues £2.321 bn.

2.5 Conclusions

The next table shows some of the competences of others MTA.

	Metropolitan Transport Authority	Administrations	Functions				Modes
			Planning the services	Operation	Fares	Planning infrastructures	
Amesterdão	GBVA (Gemeentevervoerbedrijf)	Municipalitie of Amsterdam	X	X		X	Urban Bus
			X	X		X	Metro
			X	X		X	Tramway
			X	X	X		Ferry
	ROA (Regional Organ)	Regional Council	X			X	Interurban Bus
			X				Trains
Copenhaga	HT (Copenhagen Transport)	Comitte of Frederisksborg Roskilde and Copenhagen	X		X	X	Urban Bus
			X		X		Trains
Estocolmo	SL (AB Storstockholms Lokaltrafik)	Comitte of Stockolm (regional administration)	X		X	X	Urban Bus
			X		X	X	Metro
			X		X	X	Tramway
			X		X		Trains
			X		X	X	ferry
Lyon	SYTRAL (Syndicat Mixte des Transports pour le Rhône et l'Agglomération Lyonnaise)	Regional Council of Rhône Municipality of Lyon	X		X	X	Urban Bus -troll
			X		X	X	Metro
			X		X		Trains
Manchester	GMPTA/GMPTE (G. Manchester Passenger Transport Authority/Executive)	Local Authorities from the communities of "Great Manchester"				X	Urban Bus
			X		X	X	Metrolink
							Trains
Milaõ	ATM (Azienda di Transporti Milanesi)	Municipalitie of Milan	X	X	X	X	Urban Bus - troll
			X	X	X	X	Metro
			X	X	X	X	Tramway
							Trains
Munique	MVV (Müchener Verkehrs-und Tarifverbund GmbH)	State of Baviera Local Administration of Munich	X		X	X	Urban Bus
			X		X	X	Metro
			X		X	X	Tramway
			X		X		Interurban Bus
			X		X		Trains
Zurique	ZVV (Zurcher Verkehrsverbund)	Canton of Zurich	X		X	X	Urban modes
			X		X		Interurban Bus
			X		X		Trains
Madrid	CRTM (Consorcio Regional de Transportes de Madrid)	Municipalitie of Madrid, Madrid Communities and Central Government	X		X	X	Urban Bus
			X		X	X	Metro
			X		X	X	Interurban Bus
			X		X		Trains
Barcelona	ATM (Autoritat del Transport Metropolità)	Generalitat da Catalunha and local administration (plus some observers appointed by the Government)	X		X	X	Urban Bus
			X		X	X	Metro
			X		X	X	Interurban Bus
			X		X	X	Trains

Table 6 – MTA's competences

Source: EMTA

Trough the information presented is this table and the cases studies analyzed, is possible to define some core activities, which are present is most cases of MTA.

Those core activities incorporate the planning, organization, financing, fares, promotion of public transport services and R&D.

Planning of the system	Develop Transportation Plans integrated with land use plans, which contains the main orientations for the development of the transportation system (in some cases contains also an investments plan, with the definition of the developments in the infrastructure in the medium/long term); Definition of transport service (networks, service provided, quality standards, etc.).
Organization of the system	Evaluate the efficiency and the quality of the transport system; Define contracts and concessions; Monitor the efficiency and the quality of the service; Monitor contracts and concessions.
Financing and Fare system	Manage the available financial resources for the financing of the system (defining investments in rolling stock and assure the payment of the public service obligations; in some cases the authority is also responsible for defining the long term investments in infrastructures); Develop and manage integrated fare systems.
Promotion of public transport services	Develop marketing and promotion initiatives in order to attract more passengers to the system.

Table 7 – Core functions of MTA's

Considering the importance of the transport activity, is important to ensure the coordination on the planning of the supply services and the fare integration, contributing to a higher accessibility in the collective transport system and a decrease in the generalized cost for the passengers.

The final objective of a transport authority should be the development of an efficient public transport network, able to respond to an increase in the mobility needs, considering a strategy that promotes the complementarities and the connexion between transport modes. To achieve the objective previously stated, authorities need to act in different but complementary areas. After analyzing some of the organizational schemes around Europe, it's impossible to define a single organizational model, even though it's possible to find some common characteristics.

There is a tendency to the decentralization of the urban and metropolitan transport responsibilities, which consists on the transference of responsibilities in the financing and management of the services to the local and regional authorities.

Some federalist countries like Germany and Switzerland were the firsts to apply the principle of decentralization of competences in the urban transport, while Nordic and Mediterranean countries have been adopting the concept more recently.

The decentralization is extended to the various transport modes with the exception of railways. Due to their scale, larger than bus or metropolitan services, it faces more difficulties in being managed by local or regional authorities. That's why in some cases, like Barcelona or Madrid, the State intervention remains strong in this specific mode.

Even though the tendency is the same, the way the different countries and regions have found to implement the solutions, where very different. On one hand we can find authorities who have a high degree of independence and who are an extremely professional organism. On the other hand there are some cases, more frequent, of authorities who largely depend on the public administration, and are composed by all the administration levels: national, regional and local with a strong political commitment.

The competences of those authorities are, on certain cases, wide and comprehend not only the collective transport but also the private, regulating the circulation, the parking and the management of the infrastructures. This is the case of the STIF(Syndicatt des Transports d'Ile-de-France) or ATM (Autoritat del Transport Metropolitana) , where are represented all administration levels and have competences on the regulation of both collective and private transport.

3. Financing the metropolitan transport system

3.1 Financing sources

Provide a certain area with transportation services involves major capital investments, especially in cases where infrastructure, is a significant part of the investment required.

Transport infrastructures are capital intensive, and the revenue from the transportation service is not enough for covering the investment. The revenues resulting from the commercial activities (ticket sales, publicity, etc.) are not sufficient to ensure the investor (public or private) an interesting return in the capital invested. In most cases, it isn't even enough for covering the operating expenses.

The deficit of the system is usually covered by the State, under contracts or simply subsidies given to the operators. Especially in the case of urban transport, it is extremely difficult to assure an appropriate balance between expenses and revenues. The investments in rolling stock, the high level of frequencies required and the social role of fares makes profitability almost impossible to achieve.

The EU regulatory regime in what concerns State help to companies is becoming more restricted, as it will be seen in Chapter 4. Therefore, there is the need to find alternative sources of financing, both for infrastructure and for operation.

In this chapter will be focus on the actual financial schemes that exist in different areas, and then try to establish some principles for an efficient, transparent and rational financial model. It can be identified two types of financing sources for public transport operators: commercial and public subsidies.

Regarding the financing is important to distinct between financing the operation and the investments, since they represent different objectives, returns and especially completely different capital necessities.

Commercial revenues

Public subsidies

Commercial revenues come from the **fares** applied by the operators and paid by the passengers, publicity, **products sales**, **commercial operations** (rents of stores, ...).

There are different types of public subsidies:

- **Subventions**: the public authorities in order to stimulate the use of public transport gives operators subventions to decrease fares, increasing public transport attractiveness. Theoretically these subventions should be determined on an annual base, under a contract-program with longer duration, an they should be fixed a priori based on predetermined variables ;
- **Compensations**: these subsidies are related to some social groups (students, erderly, handicaps) to allow these groups to have a lower fare; it's essentially an social group oriented financial support;
- **Indirect subsidies**: the operator can have some benefits from taxes exemptions, like the fuel taxes.

Table 8 – Financing sources for public transport operators

Source: EMTA

To finance the operation on non-profitable services, public authorities have two different instruments:

- financing with public funds: using the general budgets or specific taxes for financing the system, and they can be:
 - pluriannual program contracts: the public administration pays the total deficit;
 - concession contracts: net cost and gross cost, that might transfer some commercial risk to the operator;
- using contracts⁵ with risk, concession the operation to private companies:

The modes of financing the investment can be divided into 2 groups according to the source of the funds: directly from the budget or extra-budget. Some funds can come from the budgets of the central (national), regional and local administration. These funds can be divided into:

- Funds coming from taxes exceptions;
- Loans and definition of obligations to cover the deficits: participation of private investors with a profitability guaranteed. This model is limited by the EU convergence criteria;

⁵ In Chapter 5 different types of contracts will be analyzed.

- Consigned taxes and specific contributions.

Financing investments through public funds is a common practice but the way the different administration levels participate in the scheme varies from country to country, and it's also important to distinguish between different modes of transport that need large investments in infrastructures, namely, railways, metro, and the other transport modes:

Infrastructure

- *Railways infrastructure*: due to its importance, and being a massive capital intensive action, this type of investment is generally financed by the State and sometimes by local administrations.
- *Metro infrastructure*: the metro infrastructure is similar to railways, in what concerns to financing, the State is the main source of funds. In Amsterdam and Milan, the State subventions covered 100% of the investments, on the other hand in the case of Lyon, local authorities were responsible for financing the investments of the transport authorities, using loans from financial institutions. The Munich case, for example, it's a mix of both these situations, the metro infrastructure is 60% financed for the State and the rest in equal parts between local and regional administration. In Spain, the State is responsible for one third of the investment and the regional administration guarantees the rest.

Rolling Stock

- *Metro and railway vehicles*: usually the operator through its own capital or loans, finances the acquisition of vehicles. This happens especially in countries where the railway system has been open to the entrance of private operators, and where companies should be treated equally.
- *Other modes vehicles*: (autobus and tramways): the investment in vehicles for the autobus and tramways varies from case to case. In Manchester, Zurich, Copenhagen and Milan these investments were financed by the operator's capital and loans, and in Munich the State financed 60%. In Barcelona and Madrid, the State contribution to investments in maintenance material is limited to 45% and the investments in service extension to 33%, while the local and regional authorities are responsible for 50% of the necessities not covered by the central administration. The interurban autobus operators in the case of Madrid, only have support to cover the financial costs, while in Barcelona, under the renewal fleet plan, State participates with 45%.

Extra Budget Financing

Public authorities, due to budget constraints are now facing difficulties to finance the transport system. These restrictions are forcing the transport authorities to search for new types of extra budget financing sources. There are different financing models:

- Financing and private management in concession regime. The financing is guaranteed by the concessionaire, which implies that there's should be a high probability that the project is financially profitable, which makes it difficult to use in metropolitan transport infrastructures, where there's a high uncertainty and profitability is only possible in the very long term.
- Private financing and public management, through a public agency with the capacity of acquiring loans in the capital market. This is the case of the agency de la Generalitat GISA, the public company ARPEGIO and the agency MINTRA in Madrid, to finance and manage the extensions of the metro. In the case of the Metro of Copenhagen concession, the real state valorization resulting from the alienation of public terrains that benefit with the infrastructure, were used to decrease the loans.
- Public and private association: private management and financing, under a concession regime. The financing is structured with private capital, specific guarantees from the public sector, and eventually subventions. BOT is a case of the application of this model, and was applied to the construction of the railway line to the airport of Arlanda in Stockholm, to the Metrolink in Manchester, to the construction of the extension of line 9 in the Madrid metro and the tramway Diagonal-baix Llobregat.

3.2 Financing schemes

Combining different financing sources, each authority found a way to finance the investments and the operations.

	Amesterdão	Copenhaga	Estocolmo	Lyon	Manchester
Etat	<ul style="list-style-type: none"> - finance de nouveaux projets d'infrastructure importantes, suivant le Programme d'infrastructures et Transport - subventionne l'acquisition d'autobus par les opérateurs régionaux, au travers du ROA - est responsable du financement d'infrastructures sur le réseau ferroviaire ainsi que de l'acquisition ou de l'amélioration du matériel mobile 	<ul style="list-style-type: none"> - responsable de la maintenance et des nouveaux investissements en infrastructures ferroviaires - jusqu'en 1999 les investissements en matériel de l'entreprise ferroviaire nationale ont été financés par l'Etat (crédits et subventions). Depuis cette date il doit être couverts par DSB au travers de recettes et d'emprunts externes de même que les opérateurs privés. 	<ul style="list-style-type: none"> - l'entreprise nationale, gestionnaire des infrastructures ferroviaires (BV Banverket) réalise les investissements en infrastructure à charge des budgets de l'Etat, alors que l'opérateur privé, City Pendeln est le responsable de l'entretien des gares du réseau qu'il exploite. 	<p>Comme titulaire du réseau ferroviaire, finance la majeure partie des investissements sur celui-ci au travers de son entreprise gestionnaire "Réseau Ferre de France" (RFF)</p>	<p>Railtrack est le responsable de tous les investissements en infrastructure ferroviaire, signalisation et stations, en recevant pour ce faire les apports nécessaires du gouvernement central.</p>
Regions	L'autorité régionale ROA, administre les subventions nationales pour le financement des investissements en matériel mobile aux opérateurs d'autobus interurbain.	-	<ul style="list-style-type: none"> - les investissements réalisés par SL dans les gares, unités de metro, et installations ainsi que sur les lignes de tramway sont financés par l'autorité (SL), qui reçoit à son tour les apports de l'Etat et de la région et au travers d'emprunts. 	<p>Les investissements dans le réseau gère par SYTRAL sont à charge de cette organisation, dans laquelle participent la région et l'administration locale avec l'origine suivant des fonds:</p> <ul style="list-style-type: none"> - 30% autofinancement - 60% prêts d'entités financières - 10% subventions de l'administration <p>La région réalise des apports pour les investissements dans le réseau ferroviaire.</p>	
Administration Locale	<ul style="list-style-type: none"> - finance des petits investissements, inférieurs à 250 000 florins en infrastructures, fondamentalement adressés à améliorer la vitesse d'exploitation - finance les investissements en matériel mobile dans tous les modes opérés par GVBA 	<ul style="list-style-type: none"> - Les investissements en gares, arrêts d'autobus, systèmes d'information et actions sur la voirie sont financés par les mairies au travers de HT - Le matériel roulant est propriété des opérateurs, responsables des investissements et de la fourniture de garages. 			<ul style="list-style-type: none"> - les opérateurs d'autobus sont responsables des investissements en véhicules, GMPTE l'est des arrêts et gares et des investissements pour donner la priorité à la circulation - il est propriétaire des lignes Metrolink. Leur construction a été réalisée par un contrat de concession de la construction et de l'exploitation à un consortium à participation privée.

Table 9 – Financing scheme in Metropolitan Transport Authorities (1/2)
Source: EMTA

	Milan	Munich	Zurich	Madrid	Barcelone
Etat	<p>Réalise les apports nécessaires à l'entreprise nationale pour le financement des infrastructures ferroviaires et en matériel roulant</p> <p>Le Contrat-Programme entre Ferrovie dello Stato et l'Etat définit les mécanismes de participation financière de celui-ci dans les coûts d'exploitation et d'investissement de l'entreprise</p>	<ul style="list-style-type: none"> - finance 60% des investissements en infrastructure de transport urbain subventionné jusqu'à un maximum de 60% de leur coût les investissements en véhicules (autobus urbains, tramways et métro) 	<ul style="list-style-type: none"> - Ne réalise pas de apports directs pour matériel, bien qu'il indirectement (amortissements sur comptes d'exploitation). - Réalise des apports pour les infrastructures ferroviaires. Celles-ci sont financées en partie par la redevance et les coûts non couverts sont assumés par l'Etat et les crédits de la Fédération et de ZVV. 	<p>Matériel Roulant Métro et EMT: 45% des investissements en maintenance et agrandissements.</p> <p>Infrastructure Métro: les investissements en infrastructures sont financés à 33% par l'Etat.</p> <p>Chemin de Fer de Banlieue: le renouvellement des lignes est financé par les apports budgétaires, fonds européens et emprunts.</p>	<p>Matériel roulant TMB et FGC: 45% des investissements en entretien et 33% en agrandissement. RENFE: 100% des investissements.</p> <p>Autobus interurbains: dans la période 1999-2001, participe à 45% des les investissements en matériel roulant et dans les systèmes d'exploitation</p> <p>Infrastructure Un tiers du total des investissements</p>
Regions	<p>En 1998 ATM à réaliser des investissements pour un montant de 171,3 millions de lires (sans inclure les investissements en infrastructures de métro, financées au travers de la "Società Metropolitana Milanese p. A.")</p> <p>Ces investissements ont été financés par:</p> <ul style="list-style-type: none"> - La mairie (58,686 M. L.) - La Région de Lombardie (29,9 M de lires) - L'Etat (1,104 M de L.) - Ressources du bilan d'ATM (81,6 M de lires). 	<p>Administre les fonds d'investissements ferroviaire:</p> <ul style="list-style-type: none"> - le Fonds Fédéral de Régionalisation de la taxe sur les carburants. - Budgets Généraux de la fédération: <ol style="list-style-type: none"> 1. Par la loi de l'extension, amélioration du réseau ferroviaire: subside et emprunts sans intérêts. 2. Par la loi du financement des transports locaux: les mariées demandent des subventions à la Fédération pour un maximum de 60%. <p>Il dispose en outre de deux sources propres:</p> <ul style="list-style-type: none"> - par la loi de la compensation financière: peut affecter 65% des impôts sur les automobiles. - les fonds pour les investissements envisagés par la loi bavaroise pour le développement du transport public, (budgets généraux). <p>Apporte 20% pour infrastructures de métro, autobus et tramways.</p>	<p>Pour les investissements en matériel roulant, il existe des accords entre la banque du Canton de Zurich et les opérateurs. ZVV étant une institution cantonale, les opérateurs de l'aire du ZVV, obtiennent de meilleurs conditions pour les emprunts que celles qu'ils peuvent obtenir sur le marché.</p>	<p>Mériel roulant Métro et EMT: Apporte 27% des investissements en maintenance plus 33% de ceux d'agrandissements.</p> <p>Infrastructure Métro: Apporte 66% des fonds pour les investissements en infrastructures. Autobus interurbain: La communauté finance les investissements en arrêts et auvents et subventionne les coûts financiers de l'acquisition de matériel roulant au travers du CRTM.</p>	<p>Matériel roulant TMB: 28% des investissements en entretien plus 34% de ceux d'agrandissement. FGC: 55% des investissements en entretien plus 67% de ceux d'agrandissement. Autobus interurbains: 55% sur les lignes sous tutelle.</p> <p>Infrastructure Deux tiers du total des investissements</p>
Administration Locale		<p>Leurs apports supposent 20% pour le financement des infrastructures de métro, autobus et tramways, comme complètement des apports de la Fédération (60%) et l'Etat de Bavière (20%).</p>	<p>Les administrations locales à subventionner les investissements en véhicules sous forme de crédits à l'opérateur.</p>	<p>Matériel roulant Métro et EMT: 27% des investissements en maintenance plus 33% de ceux d'agrandissement Infrastructure EMT: 100% des investissements en auvents et arrêts.</p>	<p>Matériel roulant TMB: 27% des investissements dans l'entretien plus 33% de ceux d'agrandissement. Autobus interurbains: 55% sur les lignes sous sa tutelle.</p>

Table 9 – Financing scheme in Metropolitan Transport Authorities (2/2)
Source: EMTA

It is shown that financing investments in the transportation sector, could incorporate different sources and types of capital. Usually, there is not one single solution rather a mix of sources involving public investment and private capital (either by loans or by concession and public-private-partnerships).

Table 10 summarizes the participation of each of the agents on the financing of the system.

		Commercial Revenue		Other revenues	Operation costs	Revenue/costs	Financing			TOTAL
		Fare revenue	Compensations				Central Authorities	Regional Authorities	Local Authorities	
Amsterdam	metro, tramway, buses, trolleybus	91.7		37.7	306.5	30%	100%	-	-	100%
Copenhagen	buses	143.5	3.9	2.8	265	54%	-	100%	100%	
Stockholm	metro, tramway and trolleybus	310.7		76.2	746.3	42%	-	100%	-	100%
Lyon	metro, buses and trolleybus	97.8		13.1	227	43%	6%	47%	47%	100%
	railways	103		ND	238.3	43%	100%		100%	
Manchester	buses e metrolink	ND	68.7	ND	ND	ND	86%	14%	100%	
Milan	metro, tramway, buses, trolleybus	210.1		48.9	537.2	39%	99.4%	0.6%	100%	
Munich	metro, tramway, buses, trolleybus	234.4		40%	ND	60%	-	-	-	-
	railways	153.7		ND	ND	60%	100%		-	100%
	interurban buses	15.6		ND	44.5	35%	-	-	100%	100%
Zurich	buses	153.9		39.3	405.2	38%	12%	44%	44%	100%
Madrid	metro	133.8		10.7	229.4	58%	45%	27.5%	27.5%	100%
	buses (EMT)	165		9.7	205.3	80%	45%	27.5%	27.5%	100%
	railways	108.1		12	115.9	66%	100%	-	-	100%
Barcelona	TMB: metro and buses	186		15.5	253.2	73%	45%	28%	27%	100%
	FGC	35.1		2.6	56.7	62%	45%	55%	-	100%
	RENFE	70.7		6.8	115.9	61%	100%	-	-	100%

Table 10 – Financing of operations in Metropolitan Areas (2001)

Source: EMTA

The types of financing schemes for operations are completely different. In some cases 100% of the funds are provided by one single authority: Amsterdam (100% by Central Authorities), Stockholm (100% regional authorities) and Copenhagen (100% local authorities).

In most of the cases the financing of the system is divided by the different levels of administration (Lyon, Manchester, Milan, Zurich, Madrid and Barcelona).

The case of railways is a particular one due to its scale (larger than metropolitan), its financing always involves the Central Authorities (Lyon and Munich), in the case of Madrid and Barcelona, the financing is assured 100% by central authorities.

It's important to refer that the existence of an effective financing system benefits directly the users of the system, and indirectly economic and social agents.

The benefits for the non users can be divided into two different groups:

- Benefits associated to the more efficient use of rare resources: energy economic, reduction of congestion problems, environmental impact and accidents rates.
- Improvements in the economic effectiveness, improvements in the effectiveness of some public services who need high accessibility index (schools, leisure places,...)

Since both users and non users, benefit from an efficient and affective transport system, both should contribute to the financing.

One of the purposes of the financing system should be to ensure the contribution of all agents that benefit from the existence of the transport service (users, private transport users, real state investors, etc) to its financing.

The tendency to solve the financial problems of the transportation system is to cover the deficit through an agreement between the public administration and the operator, like a Contract.

The next chapter will focus on this issue, analyzing the different types of contracts and the main issues regarding the use of this instrument as a way to, one hand finance the system with transparency and according to the EU regulations, and on the other hand, increase efficiency and the quality of the service.

PART II - RELATION BETWEEN OPERATORS AND AUTHORITIES: Contracts

4. Contracts between operators and authorities

4.1 The EU regulatory framework (OSP)

The European Commission is presently preparing a new regulatory framework for the public passenger transport services by rail and road.

This new regulatory framework will clarify and define rules for the relation between the authorities and operators, deleting the existing regime of public aids provided to operators by the State, without any type of control.

The principles supporting this proposal are essentially to ensure lower costs and higher quality services, to ensure access to the market on equal terms throughout the EU and harmonize competitive procedures without impose single European mechanisms to be used in all member states.

The proposal suggests tendering for the award of all exclusive rights and the corresponding financial compensation, with contracts period with a maximum of five years, although it allows some exceptions.

Those exceptions, where direct awards without tendering are allowed, concerns rail services when safety is a sensitive question and integrated services that are divided between several operators⁶.

Member States will be obliged to notify and request the Commission, in cases where the measured is classified as State aid prohibited by the EC Treaty.

The Regulation 1191/69, as amended by Regulation 1893/91(version presently in force) provides for three possibilities for contracts with the operators:

- Contracts of supply of transport services
- Contracts for the provision of services or concession contracts
- Compensation (for public service obligations) must be defined in advance

⁶ Like the case of RATP.

The concept of Public Service Obligation (PSO) is also developed and recommended to State Members in order to define those obligations and the respective compensations.

Its also created the figure of Internal Operator, which can be an operator, stated owned in which the authority has a important participation. In the cases of companies that can be classified as Internal Operators, the general principles and the revised proposal for a Regulation of the European Parliament and the Council on Public Passenger Transport Services by Rail and by Road under discussion (COM (2005) 319 final) allow the direct award or direct granting of an exclusive right to an Internal Operator.

4.2 The importance of contracts

White and Tough (1995) affirm that contracts represent a balanced attitude towards the management of public services, because between the two extremes of a public monopoly on the one hand and total deregulation on the other hand, the contract allows a precise definition of the responsibilities of the public authorities and of those which may or must be assumed by the outside operators.

The International Study ISOTOPE concluded that long lasting concessions lead to high service level but also high costs, while free access to the market allows lower costs but also lower service level. Using contracts, which correspond to a “controlled competition”, would mean low cost while keeping good service levels.

Essentially contracts pretend to achieve economic efficiency while meeting public interest.

These two objectives are not always, or we must say, never, convergent. There is a trade-off between economic performance and public interest. What is important to pursue is to guarantee public interest with the minimum economic resources.

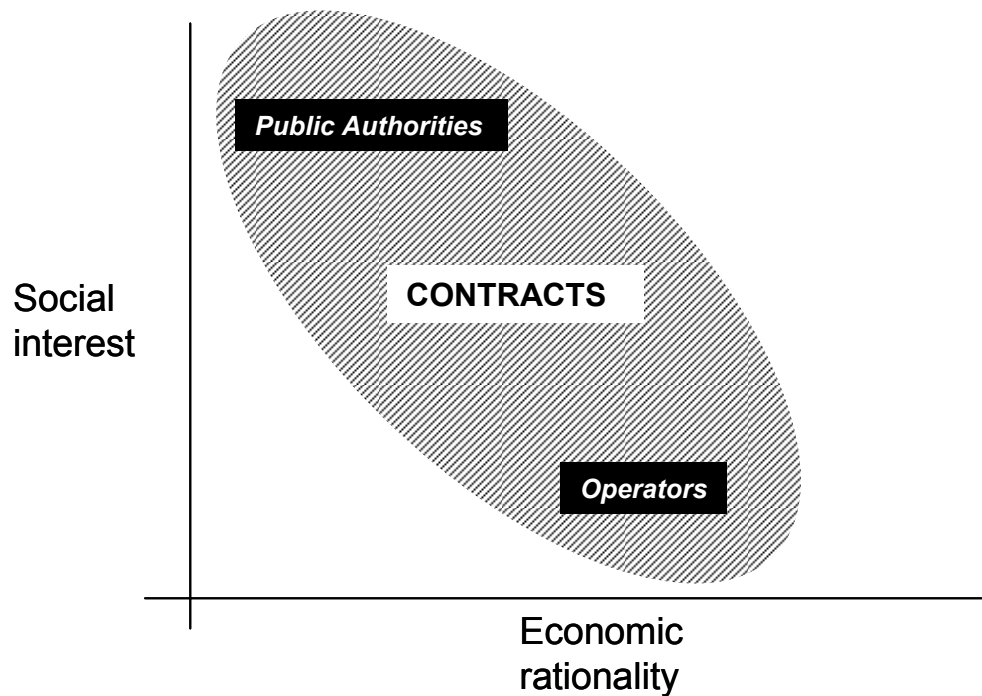


Figure 6 – Social interest vs Economic rationality

The transportation sector is characterized by huge subsidies, and the absence of an instrument like the contracts, that continually reminds all players of all costs involved, will result in enormous financial deficits. The absence of contracts makes more difficult to acknowledge the full extent of costs, which is precisely what is happening in Portugal as it will be seen in Chapter 7.

At the same time, contracts express reciprocal commitments, defining responsibilities for all stakeholders involved.

Contracts may also assure good governance practices, because the responsibilities of the players are transparent, everyone knows the rules of the game, and therefore each player must maximize its welfare, while contracts (or the “rules”) assure that the best public interest is attended.

Contracts might be extremely useful, by allowing to take the factor time into full consideration, through investment planning, quality of service enhancements, improvement of timetables or the scheduling of public appropriations which can be set out and quantified clearly, providing the public authority and the operating company with medium or long term vision.

Another advantage of contracts it's their adaptability to highly diverse situations. There are examples completely different of contracts covering: investment, concessions, management, sub-contracting/outsourcing, quality, objectives and integration of pricing. Besides covering different areas, they also are adaptable to different financial arrangements and different institutional frameworks, through management contracts, gross cost or net cost contracts and bonus/malus incentive schemes that will be discussed in this chapter 5.

Diferent types of contracts may be found in different cities, and even in a same city it can be found different contracts covering different modes of transport. Although some common characteristics may be observed such as the importance of quality indicators, adaptation of service to needs and quality and transparency of the relations between authorities and operators.

Establishing some objectives and quality levels, is important to design and provide an monitoring and assessment scheme, to keep up-dated information to operators and authorities, which might also help in introducing adjustments during the contract term avoiding possible tension between parties.

4.3 Types of contracts

Contracts offer a precious tool towards an increase in the efficient management of public transport (Shaw, 1996). Depending on the risk assumption (commercial and industrial) by the operator, there can exist the following type of contracts.

Net cost contracts

The public transport company operates at risk, but the fare level is not enough to cover operating costs. The public transport authority allocates a fixed amount of subsidy to complete fare revenues. Hence, there is no risk in public grants.

These contracts are also known as minimum or net subsidy. The operator keeps the revenue and receives an additional sum from the authority. Competition for the franchise is based on lowest amount (typically a fixed sum) requested from the authority. The authority carries no risk, excepting operator default or failure, while the operator carries the cost and revenue risks, though he has some guaranteed income. Hence the risk to the operator is slightly lower than under a commercial operation since some income is guaranteed. Net cost contracts are used in some UK contracts.

This kind of contracts is mostly used in Norway.

Gross Costs contracts

The industrial risk is for the operator and the commercial risk is for the Public Transport Authority. In gross costs contracts all fare revenues are transferred to the authority which selects the operator offering to provide the service required for the lowest gross cost. The contracted payment to the operator is that contained in the bid.

The operating company receives a fixed price for operating the given network. It collects fare revenues on behalf of the authority. The authority receives fare revenue as a receipt, and pays a fixed amount of money to the operating company.

In this kind of contracts, the operator carries no revenue risk, only the operating cost risks. This means the operator has no incentive to increase the quality of the service or try to increase the demand, even though the contract may contain premiums or penalties for some items, such as, late running, traffic, etc.

The gross schemes are used in some UK areas and in the New Zealand for example.

Gross costs contracts with incentives

In this variant of the gross cost, contract revenue is still transferred directly to the authority but operators are remunerated on the basis of a contracted rate per passenger carried, the level of which is the criterion of competition. This gives the operator incentive to operate services to maximize their income by attracting new passengers. In this case the operator carries none of both cost and revenue risks.

Management contract

The industrial risk (on operating costs) and the commercial risk (on fare revenues) are on public authority's side. The operating company makes expenses or collects revenues on behalf of the PTA, in sort of state-owned company. It receives a fee depending on the size of the network operated and on the quality of its management (administration). Usually, the length of contract is mainly 5 years.

Cost plus contracts

The operator keeps none of revenue but their operating costs are reimbursed by the authority which also pays a management fee. Operators carry neither cost or revenue risk and their only incentive to control costs is the risk that they will not be able to renew the contract. This system is frequently used in the U.S. Awarding these contracts is problematic because there is no secure and transparent basis on which to distinguish between bidders.

Guaranteed revenue contract

This case may also be considered a variant of gross cost contracts, the public transport company is supposed to operate at risk, but the public authority guarantees a minimum level of fare receipts. The industrial risk is for the operating company, and the commercial risk is shared between the two partners. This may be considered a variant of gross cost contracts. Especially used in France.

“Commercial Services”

Even if services are commercially viable they are sometimes operated under franchises (e.g., Buenos Aires and Santiago). In this case the operator carries both cost and revenue risks and may pay a fee to the authority for the right to operate, which can be determined either directly through competition or as a rate to be paid per passenger kilometer or trip. This is a special

case of the net cost contract in which any payment is from the operator to the authority, rather than vice versa.

4.4 Criteria for choosing between contract types

Essentially the principal distinction is between the net and gross cost contracts, and it concerns the difference in risk allocations. In the gross cost contracts the revenue risk is assumed by the authority while in the net cost, the operator retains both risks, commercial and industrial risks.

In cases where the main reason for choosing the private sector operation is to transfer those risks out of the government, which might lead to the conclusion that net cost contracts should be preferred. Nevertheless, there are other important considerations to take before choosing the type of contract (Halvonsen, 1993), such as competition, cost, efficient operating incentives and ease of contract management.

Considering that in the net cost scheme, operators can increase revenues by operating a service which attracts new passengers, it's seems reasonable to conclude that competition would be high. White and Tough have used UK evidence to illustrate the different types of competition for contracts awarded competitively under gross and net cost schemes.

It's interesting to see that the higher the risk for the operator, the lower the number of bids. This shows that operators are somehow "risk averse", and are more interested in contracts where a pre-determined compensation will be paid. It's not surprising because it's known that public transport utilization does not depend solely in the quality of transport provided.

Authority	Total contracts analyzed	Bids per contract	
		Net cost	Gross cost
Wiltshire	113	4.1	4.61
E. Sussex	212	3.29	3.75
Cheshire	53	3.84	4.22
Norfolk	31	1.03	3.23
Shropshire	37	4.40	4.60
Gloucestershire	37	3.10	4.40
Lancashire	300	3.05	3.66

Table 11 - Average number of bids per contract by authority

Source: White and Tough (1995)

The impact of different types of contracts in costs is extremely important, because the authority searches for a contract that assures the minimum level of costs.

Economic theory suggests that the higher the competition level, the lower the prices⁷.

Authority	Method	Number of bids	Av. Cost/Mile (pounds)
Oxon	Net cost	1 to 3	0,58
		More than 4	1,25
Wiltshire	Gross / Net Cost	1 to 3	0,62
		More than 4	0,45
E. Sussex	Gross / Net Cost	1 to 3	0,79
		More than 4	0,58
Essex	Gross Cost	1 to 3	0,83
		4 to 6	0,54
		More than 7	0,74

Table 12 - Cost/Mile by contracting method by authority⁸

Source: Halvorsen 1993

Results show that, with the exception of Oxon, the cost decreases when the number of bidders increased⁹.

When estimating the cost of contracts it's important to notice that different types of contracts will have different costs with monitoring operations and the management of the contract itself. Net cost contracts will obviously incur in higher costs with monitoring activity when compared to gross cost contracts.

On the contrary in what concerns the collection of revenues, gross cost contracts do not provide any incentive to decrease the level of cheating. There is also the problem of assuring that the operator will deliver the full revenue to the authority. This can be overtaken by smart ticketing or passenger's counters.

⁷ This is suggested by auction theory or simple application of the Bertrand equilibrium in game theory.

⁸ The costs in Table 3 are compared on the basis of net cost to the authority i.e., fare revenue is removed from the gross cost price to allow equitable comparison.

⁹ The exception of Oxfordshire is explained by the authors due to the size of the operators, which smaller (less than 50 vehicles), though less interested in net cost contracts, but when a contract appears that might interest the smaller operators, they bid but with a conservative approach. Net cost contracts are less interesting to small operators, because they don't have ability to manage with risk.

The provision of subsidies for particular social groups (e.g., children, students, or the disabled) can be difficult under a net cost system, because operators may have little incentive to carry passengers paying lower fares. Ensuring that the operators do carry all passengers and that passengers are correctly counted, increases the cost of monitoring net cost contracts. The costs of these monitoring programs are typically not accounted for separately, White and Tough analyzed these costs and concluded they can vary significantly according to the type of contract, and in gross cost contracts can vary between 2% and 8% of the franchise.

	Gross costs	Net costs
Competition	XX	X
Costs	XX	X
Effective Operating Incentives	X	XX
Ease of contract management	X	XX

Table 13 – Gross cost contracts vs Net cost contracts

During the 70's, management contracts represented more than two thirds of all contracts. By now, they are about one third, as gross cost contracts are. Net cost contracts represent approximately 25%. According to the evolution of their transport policy, public authorities adapted the content of their contracts. After recession of public transport during the 60's, they have had to develop it and they accepted the risks: the management contract was the right tool for that. When the networks stabilized, they adopted gross cost or net cost contracts.

5. Designing contracts

5.1 Introduction to contract economics

Through the process of contracting is important to take in consideration “Contract Economics” (Halvorsen 1993).

Contract economics is a specific field of economics, because it deals with situations where information is asymmetric:

- in some cases one of the parts possess information that the other does not possess ;
- in some cases, important information cannot be verified by a third party, impartial (eg: a court)

When two entities establish a contract, both of them have to be in possession of information regarding the object of the contract. It's very difficult to design a contract, where one of the parties knows *a priori* that the other part is in possession of important information.

When an authority wants to create any contract, the contract should be attractive to the operator and assure that the operator will behave as the authority desires: it's assumed that each stakeholder wants to maximize it's interest¹⁰, so it's important that the maximization of the operator's interests converge to the best interest of the authority.

The contract will contain only the matters that are know by both parties and/or can be verified by an impartial third party.

The standard model for designing an incentive contract, as it is discussed in the transportation literature, is described as a method for affecting the agent's behavior by rewarding, or punishing, the agent based on whether specific service are meet. Designing the contract is a sequential process in which the first step is to define what should e the desirable performance for a certain operator, then define indicators to monitor it's performance and then set some incentives in order to stimulate the performance of the operator.

¹⁰ In a simplistic way it can be said that the authority best interest is to maximize the well fare of the citizens, through an efficient and effective transportation system, minimizing the costs for the State, while the operator will be concerned in obtaining the largest profit possible (which may be seen as short term maximization or a long term profitability).

Using the ideas of contract economics involves designing a contract based on simultaneously four factors:

- 1- the objectives of the principal
- 2- the objectives of the agent
- 3- the cost to the agent of each of its possible actions and
- 4- the parties understanding about what can be measured, and verified, in terms of an outcome

The objective is to create a contract that will cause an agent to behave in the manner that provides the greatest benefit to the principal.

Contract economics explicitly considers the net benefit to the principal, the net benefit to the contractor, and the verifiability of the outcome. Utilizing the theory of contract economics provides an opportunity to increase the principal's net benefit and reduce substantially the problems of monitoring the contractor's performance and of enforcing the contract provisions.

Contract economics makes two major assumptions regarding the nature of the environment in which a contract is celebrated. Those assumptions are, first there is a single authority who drafts the contract and a certain number of agents competing to win that contract and second the authority who designs a contract need to understand the competitor's objectives and cost functions, in order to design attractive contracts.

Prior to the definition of contracts, information is required. This information as associated a certain cost. If an authority wants to provide any information to a potential contractor or obtain any information about either a potential contractor or the performance of a contractor, there is a cost which may vary according to the type of information, its detail and accuracy.

According to Holmstrom (1979), information is considered valuable if both the authority and the principal and the agent can be made strictly better off with a contract that uses the information that with a contract that does not use the information, ignoring the cost of acquiring the information. It's clear that in real processes, the cost of obtaining the information is important, and it may be determinant in determining whether information will or will not be collected. The cost in obtaining information should be assumed by all players in the proportion of the interests each player has in that information.

The cheapest and easiest information to obtain is the one resulting from public announcements by a principal about a contract that it intends to offer, this information is not target oriented and the cost in obtaining this information is practically zero. This type of information is known as “cheap talk”.

The economics of contracts pointed out contests as an efficient way to get the maximization of the authority’s interest by the lowest price; nevertheless it calls the attention for the possibility of “collusion”¹¹, which makes the contest less effective, if not effective at all.

5.2 Incentives vs Penalties in contracts

When an authority establishes a contract with an operator, it must include incentives or penalties, in order to assure that the operator will behave according to the expectations. These types of incentives should be carefully designed in order to accommodate the authority expectations and objectives. At the same time, they should be significant to assure attractiveness to the operator, and be able to change its behavior.

A net cost franchising scheme could contain an incentive system in order to increase the quality of service, the farebox revenue, the number of passengers or even to reduce costs.

If an operator as a monopoly of a certain area, under a net cost scheme agreement, it has an incentive to increase passenger’s traffic, by providing a better service¹², while this means more profit. This may be a problem in situations where there is competition because of predatory operating practices.

The gross cost contracts offer the operator an incentive to reduce operating cost, and consequently increase its profits, but there is not an incentive to increase demand, which could be provided by introducing into the contract a premium to the operator if a certain increase in passengers is registered. By this way, the operator not only as an incentive to decrease costs but also to increase demand.

In gross cost contracts, the level of competition is not as important as it is in net cost contracts. The question of demand is a particularly sensitive question because it’s extremely difficult to determined whether the passenger levels are an operator responsibility or if it’s due to the general economic situation. If an operator does not control fares or car utilization, and he is

¹¹ Collusion may be defined as any cooperative effort by a group of agents to circumvent the principal’s intent in creating the contest.

¹² Only in situations where there is some elasticity of demand regarding quality.

“awarded” with revenue risk, it’s expected he will demand a higher price to compensate that risk.

Cost-plus contracts provide no direct financial incentive for controlling costs. In fact an increase in cost might be expected when the operator tries to improve service, maximize employee satisfaction, and minimize the probability of accidents or waste. The first three of these causes can often result in political support from riders, politicians and/or labor for the contractor to continue to provide service under the contract, increasing the chance for the contractor to continue to profit from the service in the future. Therefore, a contractor operating under a cost-plus contract might be expected to pay higher wages or provide additional benefits to its employees, offer expanded or higher quality of service and/or perform more maintenance than would be the case if the contractor was operating under a different type of contract.

Incentives are designed to guide the operator behavior towards a specific aspect to the interest of the authority, but, on the other hand might lead to some “little effort” in other matters of it’s responsibility.

Another important question regarded with the increase of quality and incentives is the duration of the contract. The operator might increase the quality of the service (more reliability, more safety and security, more marketing, better public information) but certainly this will represent higher costs. Therefore incentives should be attractive and the duration of the contract has to assure that the operator will receive additional revenue due to the investments made in increasing the quality and consequently, passengers.

By establishing an operating incentive scheme, the authority is obliged to develop a monitoring plan, which contains a number of variables (in which incentives are based). That monitoring plan should be executed by the authority or, preferably by an independent third party. Although this is an important subject, is not the purpose of this thesis to analyze those types of plans. It’s important to emphasize that special care needs to be taken if an incentive scheme is based on a factor that a contractor can affect through more than one type of action. For instance if an incentive is based on the complaints presented by passengers, the operator can complicate the complaint procedure in order to diminish the number of complaints.

5.3 Important issues to take into consideration when defining contracts

Halvorsen (1993) looked at different contracts and defined some important aspects to consider when designing contracts. The next table contains a summary of those questions.

<p>Selecting the operator</p>	<p>The choice of an operator should be based on a multi-criterion analysis based on previously defined elements, and not just costs. If a certain operator is chosen only because it offered the cheapest bid, some difficulties might be expected in the future.</p>
<p>Duration of the contract</p>	<p>The length of a contract is a very sensitive question. It has to represent a balance between contracts sufficiently long to allow return on the investments and not too short to encourage the operator to rapidly realize its profit, deteriorating the service.</p> <p>For urban bus contracts, a 5 year period seems reasonable even though some authors defend longer periods up to 8 years.</p>
<p>Transparency of contracts</p>	<p>To assure the transparency of contracts, operators must submit annual reports on their performance. These reports should be audited or elaborated by a third impartial agent.</p> <p>The information on that report should be clear and extensive, even though should respect the management methods of the operator who certainly doesn't want it to be public.</p>
<p>Actualization methods</p>	<p>Actualization methods should reflect the structure of the company's costs in order to avoid the company playing a game of change unrelated to the volume of business.</p>
<p>Expectations in terms of contractual relations between the operator and transport authority</p>	<p>The operator is best placed to understand the needs of passengers, market services and purpose fare changes according to expressed expectations.</p> <p>If the transport authority wants to achieve maximum added value from the company, it must involve it in the development of traffic.</p> <p>The quality of service provided must be measured according to criteria and methods set out in the contract, and are accompanied by a bonus/malus system.</p>

Definition of services	<p>Rather than a rigid system of specified services where any change must be decided by the public authority, it would be more interesting to allow a certain degree of initiative to the operator, because, like it was said previously, he is the entity best placed to understand changes.</p> <p>A system comprising clearly specified reference services, to which additional services could be added, provides the operator with the margin for maneuver contributing to market share growth objectives</p> <p>It is however, necessary to precisely calibrate the payment scheme compatible with this margin of maneuver, and which ought to represent 15 to 20% of kilometers covered.</p>
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Table 14 – Important aspects to considerer when defining contracts

Source: Halvorsen (1993)

5.4 Conclusions

By transferring a great proportion of the risks to the operator, net cost contracts might be thought as preferable, but gross cost contracts also have several advantages, namely a greater compatibility with integrated multimodal system planning and with complex subsidy mechanisms and also doesn't provide incentives for predatory operating practices. However, it's effectiveness depends on measures to monitor performance and also secure revenue collection and transfer mechanisms. It can be concluded that the best form of contract for a particular situation will depend not only on the objectives pursued and the direct cost of the contract but also, and extremely important, on the authority's ability to manage and enforce the contract and it's objectives. A privately owned company can only operate with the backing of private shareholders who must be able to obtain a decent return on their investment, as is the case for companies in other sectors. Profits made by the operator are justified, necessary, and not undue. Profits, however, can only be generated by the progress achieved by the operator as a result of increase in traffic, control of operating costs, and quality of service. It is, then, only fair that the operator should benefit. Although many subjects can be included in contracts, service and quality are certainly the two most important subject that need to be covered by contracts:

Service	Contracts should contain a precise description of the service and the performance	Timetables Vehicles/km Capacity
Quality	Quality standards should be described in contracts	Vehicle (accessibility, air conditioning, seats, information, luggage space) Stations (height of platform and accessibility, waiting rooms, information, lighting) Railway infrastructure (signals, speed, etc.) Quality of service (punctuality, easy connections, train configuration, cleanliness and stations, staff attitude towards passengers, maintenance, fighting fare-cheating, safety, passenger information)
Pricing policy	The potential changes in the pricing policy should be included in the contract, meaning compensation mechanisms should be predicted,	Variation of fares

Table 15 – Service and quality description in contracts

The operator's obligations set forth in the programme contracts consist of a series of quality and service requirements that they must fulfill during the contracts term: coverage coefficients, quality coefficients, supply and demand undertakings, fare undertakings.

The duration of the contract, risk allocation, property of assets and the pricing policy are certainly essential elements of contracts structure although they can vary significantly according to each case.

Some of the following elements should be included in contracts:

- customer satisfaction index (as in Oslo), used as an indicator of quality, allowing the contract to be terminated or renegotiated in the event of the indicator falling below a specified level;
- the area coverage, defined as the number of bus/tram stops or stations per square kilometer shall not be below the agreed-upon level;
- the average fare rate shall not rise above a level that has been predetermined.

Contracts should be regarded as the most effective tool to manage the relations between authorities and companies. They should define the responsibilities of all stakeholders and the amount of public funds that should be paid for public service obligations. Contracts shouldn't only contain quantitative indicators (ex: vehicle * Km) but also some qualitative indicators in order to evaluate the quality of the service.

6. Contract analyses

In this chapter a short analyses will be made to an example of a contract, specially looking at the incentives mechanism.

STIF

In 1999, the public authorities took the decision to modernize relations between the Syndicat des Transports Parisiens (STP), now STIF (Syndicat des Transports d'Ile de France), and the public companies operating the transport networks in Ile de France (SNCF and RATP).

The purpose was to define a system that instead of the old system of compensating the operators in order to equilibrate its accounts at the end of the year, could introduce a greater degree of responsibility from the enterprises and to provide them with rewards for their efforts.

A four year contract was established including aspects such as the service level provided and incentives to increase the volume of ticket sales.

In 15th January 2004, STIF approved new contracts between STIF and RATP and between STIF and SNCF for the period of 2004-2007. This new contracts remained based on a bonus/loaded premium system linked to the quality of service produced, in which the profit-sharing scheme representing 0,57% of overall revenue for RATP and 0,60% to SNCF.

To earn this remuneration, companies must follow what is established in the contract particularly in what concerns transport services and quality.

6.1 STIF / RATP

The contract established between STIF and RATP concerns regular services open to the public, grouped into networks and sub-networks by mode of operation:

- Metro network;
- RER (*Réseau Express Régional*) network divided into 2 sub-networks: RER line A and RER line B;
- the road-level network divided into 4 sub-networks: "transport en site propre" (TCSP – transport with exclusive right-of-way), PDU buses, other Paris buses and other suburban buses.

The contract contains several issues that are object of evaluation and will define the amount of the premium rewarded by STIF to RATP.

The next table shows which are those points of evaluation and their respective weight.

RATP indicators for calculating bonus/loaded premium			
	Indicator	Avaliation (from -10 to 10)	2004 results in euros
Metro	Availability of ticket offices	9,2	3.347.100 (4.600.000)
	Availability of escalators	1,5	
	Availability of ticket machines	2,5	
	Station cleanliness	10	
	Treatment of passengers at ticket counters	10	
	Waiting times	10	
RER line A	Availability of escalators	5	1.207.500 (1.450.000)
	Availability of ticket machines	0,5	
	Station cleanliness	10	
	Treatment of passengers at ticket counters	10	
	Regularity	10	
RER line B	Availability of escalators	7	517.083 (725.000)
	Availability of ticket machines	6,5	
	Station cleanliness	10	
	Treatment of passengers at ticket counters	10	
	Regularity	5,7	
TCSP	Information at bus stops	4	-270.000 (350.000)
	Regularity	-9,7	
PDU buses	Information at bus stops	6,7	1.043.334 (1.800.000)
	Service provided by the bus conductor	7,3	
	Regularity	3,7	
Suburban buses	Information at bus stops	10	1.300.000 (1.300.000)
	Service provided by the bus conductor	10	
Paris buses	Information at bus stops	6,7	473.333 (550.000)
	Service provided by the bus conductor	9,3	
			7.636.350 (10.775.000)

Table 16 – RATP indicators for calculating bonus/loaded premium

Source: STIF

The regularity on the metro is assessed by the percentage of passengers waiting more than 3 minutes in peak hours, 6 minutes in off-peak hours and 10 minutes at night. The regularity on the RER was measured by the percentage of passengers arriving at their destinations on time

or with a delay of less than 5 minutes. It can be seen that aspects such as the quality of the service provided and the regularity of the service it self are the core issues under such a bonus/malus financial scheme. It's important to notice that the results are very interesting; RATP was awarded 7.636.350 Euros, of a total possible of 10.775.000 Euros. Only the regularity of TCSP was evaluated negatively, which shows that effectively the operator was very interested in assuring a good quality of the service.

6.2 STIF / SNCF

The contract with SNCF looks at 13 SNCF sub-networks in Ile-de-France.

The contract looks specifically at regularity, which is measured by the number of trains arriving at the terminus with a delay of over 5 minutes (considering also cancelled trains).

SNCF indicators for calculating bonus/loaded premium			
	Indicator	Avaliation (from -10 to 10)	2004 results in euros
SNCF	Train cleanliness	9,4	3.200.000 (4.200.000)
	Station cleanliness	10	
	Handling of passenger claims - RER lines A, B, E	10	
	Availability of escalators and elevators - RER lines A, B, E	10	
	Availability of ticket offices - RER A, B, E	10	
	Passenger information	-3	
	Regularity of trains	-3,5	-1.390.000 (4.000.000)
			1.810.000 (8.200.000)

Table 17 - SNCF indicators for calculating bonus/loaded premium

Source: STIF

Results of SNCF were globally positive, but their performance in what concerns regularity was bellow the target, therefore was penalized, and affected significantly the results of the bonus received.

The importance given to regularity of service is extremely high, which means that even considering an overall analyses very positive, the final result is strongly penalized.

PART III: THE PORTUGUESE CASE

7. The Portuguese case - case study Porto

7.1 Institutional Organisation of the Transport Sector

The Portuguese Framework Law for Public Transport is defined by *Lei de Bases dos Transportes Terrestres*, Law 10/90 – LBTT, which has not been regulated. The LBTT contains a “Transport Plan”, who also have not been regulated, but not a “Mobility Plan”.

There is also the Regulation of Automobile Transportation (*Regulamento dos Transportes Automóveis*, “RTA”, from 1948) which is still in use in spite the fact the date of it’s creation, and the completely different economic, social and political framework at the time.

The institutional organization is composed by the following entities:

- the Government, responsible for decisional and financial levels;
 - o directly dependent on the Government there’s the General Directorate for Land and Inland Waterway Transport (*Direcção-Geral dos Transportes Terrestres e Fluviais, DGTTF*), which assumes the competences of regulating the land and inland waterwaytransport sector¹³; regarding railways, there is the National Institute of Railway Transport (*Instituto Nacional do Transporte Ferroviário, INTF*);
- Municipalities, responsible for urban and local transport: concessions for urban and municipal road operators, school lines and design of road municipal network (Law 10/90, LBTT);
- Metropolitan Areas and Regions, which competencies are dependent on the creation of the future Metropolitan Transport Authorities (*Autoridades Metropolitanas de Transportes, AMT*, created by Decree-Law 268/2003, of 28 October) and that are at the moment, being revised by the Government.

Concerning transport infrastructures, there are different distributions according to the type of infrastructure:

- rail infrastructures (LRT, subway and train): State

¹³ It may be considered that this General Directorate also possesses some competences on the financial level, due it’s financial support to fleet renewal and transports plans elaboration, eventough the first depends directly on the Government authorization.

- interfaces and parking: State and Municipalities
- road infrastructures: state and municipalities

In what concerns operators, it may be found different types: public (State owned or controlled), municipal operators and private operators.

The relation between the State and the public operators is diverse:

- “exclusive right”: CP (rail operator), STCP (bus operator in Porto) and Transtejo (ferry operator in Lisbon)
- Concession: Metro do Porto (Porto LRT), Carris (Lisbon Bus and tram operator), FERtagus and Metro do Sul do Tejo (LRT in the south of Lisbon Metropolitan Área)
- Hybrid regime (after nationalization): Lisbon Subway

Regarding bus transport there is a concession contract with a fixed term (renewable) – suburban and regional networks. The initiative is from the private parties, and there is no public initiative.

7.2 The urban transport system in Lisbon

The Metropolitan Area of Lisbon (AML – Área Metropolitana de Lisboa) has approximately 2,7 million inhabitants over 2.963 km² and a total of 18 municipalities. Data from 2001 shows that there is around 1,4 million travels everyday in AML, with 37% in public transport and 45% in car.

7.2.1 Stakeholders of the metropolitan transport system

Table 17 describes the main stakeholders of the system in what concerns regulation and infrastructure management.

<i>Stakeholders of the metropolitan transport system</i>			
Transport authorities	National	DGTTF ¹⁴ /DTL INTF ¹⁵	
	Municipal	Municipalities of the Metropolitan Area of Lisbon	
Infrastructure Management	Networks	Metropolitan Roads	IEP BRISA LUSOPONTE SCUT
		Municipal Roads	Municipalities
		Railways	REFER
		Ports	APL ¹⁶ APSS ¹⁷
	Terminal/Parking	Terminals Public Transport	Municipalities
		Parking Companies	ESLI
			GISPARQUES
			EMEL
			Municipalities

Table 18 – Stakeholders of the Metropolitan Transport System of Lisbon

As shown by Table 13, there are various stakeholders in the metropolitan transport system of Lisbon responsible for different components of the system. This number of stakeholders and

¹⁴ General Directorate for Land and Inland Waterway Transport

¹⁵ National Institute for Railway Transportation

¹⁶ Lisbon Port Authority

¹⁷ Setubal and Sesimbra Port Authority

specially the absence of interconnection between them, is one of the factors that makes almost impossible to define and implement a common transport strategy.

The next table presents the public transport operators in Lisbon according to the transport mode.

Mode of Transport	Operator
Railway	CP (rail operator)
	ML (Lisbon Subway)
	CARRIS (trams)
	FERTAGUS (private rail operator)
Urban Bus	CARRIS
Suburban Bus	Private companies
RIVER TRANSPORT	Soflusa
	Transtejo

Table 19 – Public transport operators in the Metropolitan Area of Lisbon

7.2.2 Actual concessions

The next table shows the actual concessions in the metropolitan transport system of Lisbon. These concessions vary from contracts (with a rail operator), exclusive rights and the general legislation for transportation, which is based on a line by line concession, renewable. There are also many agents with power to attribute a concession: Local Authorities (Municipalities) and Central Authorities (Government and Governmental Agencies).

	Type of Concession	Time limite for the concession	Authority who is responsible for the concession
CARRIS	Exclusive right to operate in Lisbon city, concessions are granted by Decree-Law (by legislative means)	50 years	Municipality of Lisbon DGTTF
Lisbon Subway (ML)	Exclusive right to operate in Lisbon city, concessions are granted by Decree-Law (by legislative means)	75 years	Government Municipality of Lisbon INTF
Metro Sul do Tejo (light rail system which as not started to operate)	Contract	30 years	Government INTF
Transtejo	-	-	Government
Soflusa	Inheritance of the contractual position of CP	-	Government
Fertagus	Contract provided under a international contest	30 years Renewable	Government INTF
CP- suburban	Concessions are granted by Decree-Law (by legislative means)	-	Government INTF
TCB – Transportes Colectivos do Barreiro (Municipal - bus urban transport companie)	Direct operating concession Rules defined by the general legislation (RTA)	-	Municipality of Barreiro
Bus private companies (14)	Concession by line Rules defined by the general legislation (RTA)	Renewable each 5 years	DGTTF and Municipalities

Table 20 - Actual concessions in the Metropolitan Area of Lisbon

Source: DGTTF

7.2.3 Characterization of demand

In order to understand the changes occurring in the Metropolitan Area of Lisbon from the demand point of view, a short analysis to some mobility patterns indicators will be made.

Table 20 shows in general the number of daily travels in AML

	Total			
	1991		2001	
	Nº	%	Nº	%
Intra AML	1 261 411	97	1 309 617	95
Entries in AML	30 811	2	47 436	3
Exists from AML	13 034	1	23 980	2
Total	1 305 256	100	1 381 033	100

Table 21 – Daily travels in AML
Source: INE

As expected, the number of displacements as increased between 1991 and 2001, around 5,8%.

Modal split in AML

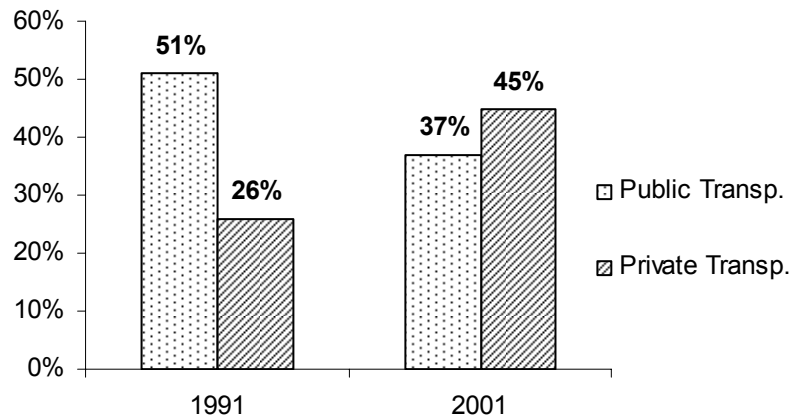


Figure 7 – Variation of modal split between 1991 and 2001 in AML
Source: INE

Regarding to modal split, the usage of public transport has decreased comparatively with the usage of private transport. This contradicts the strategy for developing a more sustainable transportation sector, by promoting the usage of public transport.

Table 21 shows the variation between 2004 and 2005 of the number of passengers and passengers.kilometres transported by the public operators in the transportation system.

	<i>Passengers (10³)</i>			<i>Passengers.Kilometres (10³)</i>		
	2004	2005	% 04/05	2004	2005	% 04/05
Carris	238 516	222 774	-6,6%	850 000	796 000	-6,4%
ML	179 651	185 444	3,2%	801 210	862 313	7,6%
SL	10 017	9 926	-0,9%	100 172	99 263	-0,9%
TT	21 187	19 765	-6,7%	79 906	75 265	-5,8%
CP	99 891	96 336	-3,6%	1 303 000	1 271 000	-2,5%
Total	549 262	534 245	-2,7%	3 134 288	3 103 841	-1,0%

Table 22 – Demand in Public Operators between 2004 and 2005 (AML)
Source: Companies

Excepting the Lisbon Subway (ML) there's a generalized decrease in demand, which shows that the increasing mobility is using car and there is some shift from public transport to private.

7.2.4 Characterization of the supply

Table 22 contains information regarding the transport system supply in Lisbon.

N° of Seats X N.º of Kilometres (10⁶)

	2002	2003	2004	2005
CARRIS	4158	4074	3847	3774
ML	3283	3284	3783	3997
TT/SL	772	755	591	591
CP	6155	6196	6510	6774
Total	14368	14309	14731	15136

Table 23 - Lisbon transport system supply
Source: Companies

Even though supply has been increasing since 2003, the number of passengers and the number of passengers.kilometres has been decreasing, while, as it's shown by Figure 7, the usage of cars has been increasing. This reflects the absence of an effective strategy towards an increase in the usage of public transport.

7.2.5 Financial performance of the system

The next table shows the operational results of the public owned companies in the Metropolitan Area of Lisbon.

Mode of transporte	Company	2003	2004	2005	2006
Bus	Carris	-99.913.588	-83.680.635	-86.766.379	-90.772.777
Metro	Metro de Lisboa	-106.158.696	-98.196.283	-107.387.498	-111.579.666
Railway	Fertagus	-252.762	-1.274.195	-1.284.835	-6.554.026
	CP Lisboa	-9.443.963	-7.927.117	-5.532.523	-5.748.292
WATER	Transtejo/Soflusa	-19.123.229	-21.729.452	-23.286.475	-18.097.147
Total		-234.892.237	-212.807.682	-224.257.710	-232.751.909

Table 24 – Operational results of public operators in the Metropolitan Area of Lisbon (Euros)
Source: Companies

The highest value was in 2003, with a global operational result of approximately -234 million euros. In 2004, it decreased but in the next year the values start to increase again. Table 24, represents the public subsidies given by the Government to the companies.

	2003	2004	2005	2006
Subsidies	66 707 688	64 080 194	79 587 402	79 561 548

Table 25 – Government subsidies to public companies in the Metropolitan Area of Lisbon (Euros)
Source: DGTTF

When comparing the operational deficit with the subsidies, it's obvious the existence of a Gap, which conduces to high level of indebtedness. In 2002 the global indebtedness of the metropolitan transport system of Lisbon was around 2.400 million Euros, which increased up to almost 3.300 million Euros in 2004.

This is the result of the inexistence of alternative financing sources. The funding of the system is highly or we must say, exclusively dependent on State subsidies, which are clearly insufficient to assure a financial equilibrium.

While in the cases described in Chapter 3, where public authorities both central, local and regional are responsible for financing some specific components of the system (infrastructure, rolling stock, public service obligations, etc.), in Lisbon, as in Porto, apart from the Government, there is no other alternative funding.

7.3 The urban transport system in Porto

The Metropolitan Area of Porto (AMP – Área Metropolitana do Porto) has approximately 1,3 million inhabitants over 815 km² and a total of 14 municipalities. Data from 2001 shows that there is around 0,7 million travels everyday in AML, with 28% in public transport and 52% in car.

7.3.1 Stakeholders of the metropolitan transport system

Table 25 contains the main stakeholders of the metropolitan transport system of Porto.

Stakeholders of the metropolitan transport system			
Transport authorities	National	DGTTF ¹⁸ /DTN INTF ¹⁹	
	Municipal	Municipalities of the Metropolitan Area of Porto	
Infrastructure Management	Networks	Metropolitan Roads	IEP BRISA
		Municipal Roads	Municipalities
		Railways	REFER
	Terminal/Parking	Ports	APDL
		Terminals	Municipalities
		Parking	Municipalities

Table 26 – Main Stakeholders of the Metropolitan Transport System (Porto)

In Table 26 – there's a short list of the operators in Porto, according to the transport mode.

Mode of Transport	Operator
Railway	CP
	Metro do Porto
	STCP (trams)
Urban Bus Operator	STCP
Suburban Bus Operators	STCP
	Private companies (more than 35)

Table 27 – Public transport operators in the Metropolitan Area of Porto

There's a high number of private operators, which are in most cases small firms with few concessions in the Metropolitan Area. The problem is that the mechanism of concessions in

¹⁸ General Directorate for Land and Inland Waterway Transport

¹⁹ National Institute for Railway Transportation

Portugal, which does not allow for a company to tender for a certain concession, forces the operators to look at their concessions as their main assets even when they don't operate a certain line in which they own the right to operate.

7.3.2 Actual concessions

The next table shows the actual concessions in the metropolitan transport system of Porto. Like in these concessions vary from contracts (with a rail operator), exclusive rights and the general legislation for transportation, which is based on a line by line concession, renewable. There are also many agents with power to attribute a concession: Local Authorities (Municipalities) and Central Authorities (Government and Governmental Agencies).

	Type of Concession	Time limite for the concession	Authority who gives the concession
STCP Porto	No contract, exclusive right to operate inside the city of Porto	No limite	Municipality of Porto
Concelhos limitrofes	Rules defined by the general legislation (RTA)	Concession for 10 years, renewable every 5 years	DGTF
CP (suburban lines)	Rules defined by the general legislation (RTA)		Government INTF
Metro do Porto	Contract	50 years	Government INTF
Private road operators	Line by line concession Rules defined by the general legislation (RTA)	Concession for 10 years, renewable every 5 years	DGTF Municipalities

Table 28 - Actual concessions in the Metropolitan Area of Porto

Source: DGTF

7.3.3 Characterization of demand

In the next table it can be found some figures regarding the daily travels in Porto.

	1991		Total		2001	
	Nº	%	Nº	%	Nº	%
Intra AMP	569 597	89	590 226	86		
Entries in AMP	46 051	7	62 389	9		
Exits in AMP	22 661	4	37 219	5		
Total	638 309	100	689 834	100		

Table 29 – Daily travels in AMP

Source: INE

The increase in the number of daily displacements in Porto was around 8% between 1991 and 2001.

Modal split in AMP

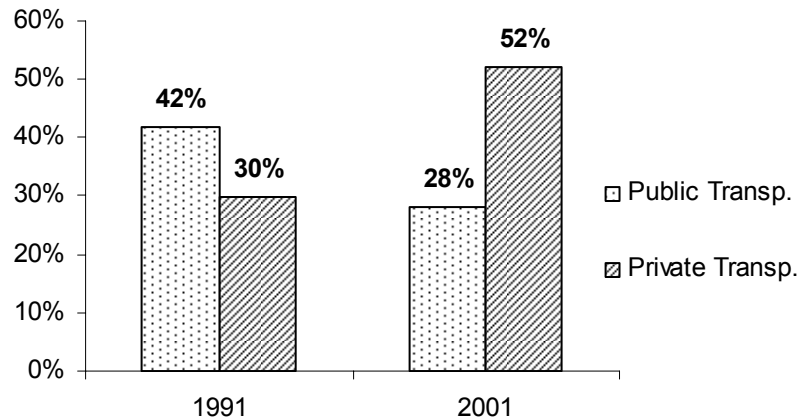


Figure 8 – Variation of modal split between 1991 and 2001 in AMP

Source: INE

In the Metropolitan Area of Porto, in 1991 public transport had a modal share higher than private car, and ten years after, a shift occurred with an enormous increased in the usage of private car, and a significant decrease in public transport.

	<i>Passengers (10³)</i>			<i>Passengers.Kilometres (10³)</i>		
	2004	2005	% 04/05	2004	2005	% 04/05
STCP	219 159	209 100	-4,6%	869 981	830 051	-4,6%
MP	10 067	18 725	86,0%	46 569	96 742	107,7%
CP	15 682	16 574	5,7%	408 000	446 000	9,3%
Total	244 908	244 399	-0,2%	1 324 550	1 372 793	3,6%

Table 30 - Demand in Public Operators between 2004 and 2005 (AMP)

Source: Companies

Over the last two years the number of passengers and passengers.km remained approximately constant.

7.3.4 Characterization of supply

Table 30, contains information about supply in Porto transport system.

N° of Seats X N.º of Kilometres (10⁶)

	2002	2003	2004	2005
STCP	2930	3185	3144	3127
MP	0	290	440	1457
CP	1122	1035	1409	1606
Total	4052	4510	4993	6190

Table 31 – Porto transport system supply
Source: Companies

It's interesting to see that a 24% increase in the supply from 2004 to 2005, only represented an increase of 3,6% in the number os passengers.kilometres and a decrease in the number of passengers. This evidences the lack of strategy towards a more sustainable transport system. The next point where the financial performance of the system is analyzed, this gap is even more evident.

7.3.5 Financial performance of the system

The next table shows the operational results of the public owned companies in the Metropolitan Area of Lisbon.

Mode of transporte	Company	2003	2004	2005	2006
Bus	STCP	-28.178.000	-8.924.000	-21.901.000	-22.756.465
Light Rail	Metro do Porto	-9.673.933	-25.647.493	-48.591.686	-50.486.762
Railway	CP Porto	-17.306.150	-15.623.915	-14.664.884	-15.236.815
Total		-55.158.083	-50.195.408	-85.157.570	-88.480.041

Table 32 – Operational results of public operators in the Metropolitan Area of Porto (Euros)
Source: Companies

In Porto, the deficit of public companies as increased over 60% over the past 3 years. This extraordinary increase is due to Metro do Porto, the light railway companie, whose deficit was in 2003 around 9 million euros, and was in 2006 over 50 million euros. STCP and CP Porto have been able to decrease the deficit in the last years.

	2003	2004	2005	2006
Subsidies	15 977 563	31 104 280	21 703 500	23 222 745

Table 33 – Government subsidies to public companies in the Metropolitan Area of Porto (Euros)
Source: DGTTF

The situation in Porto is the same as in Lisbon, the subsidies paid by the Government are not enough to fulfill the financing need of the system.

This means that the financial deficit of the system has been increasing in a preoccupant way. In 2002 the indebtedness was around 550 million Euros, increasing up to 1.300 million Euros in 2004.

In both metropolitan areas, one of the problems is to identify and quantify the origin of this deficit. We know part comes from social fares, part from some inefficiency, part from public service (night service, low density areas service, etc.) but the impact of each factor remains unknown.

This is one of the aspects for which earlier in this dissertation was said that contracts constitute a precious tool in clarifying the costs of the transport system. By having contracts to compensate each of the public service obligations, the costs are clear for the public authorities, and those contracts will force the authorities to pay for the right value, avoiding the accumulation of deficits.

7.4 A new model for the organization of the Portuguese metropolitan transport systems

The metropolitan transport systems of Lisbon and Porto are lacking sustainability due essentially to the increasing deficit that results from an inadequate financing system that does not promote efficiency and does not compensate the public service, and also a decreasing in demand, mainly due to the lack of a transport policy favoring public transport, whose image is also deteriorating.

In order to define a common transport policy and especially to assure it's implementation, is essential to concentrate competences and establish an equilibrium between the distinct interests of stakeholders.

This dispersion of competences results in multiple objectives, not always convergent towards the system, leading to difficulties in obtaining synergies between operators, in properly financing the system, with an important impact on the efficiency of the operators, and on the global indebtedness level of the system. As shown previously, the lack of integration and coordination between the different stakeholders of the system is clearly one of the most important gaps the system faces.

The institutional (dis)arrangement of the system, conducts to an ambiguous relation between authorities and operators. There is no such thing as definition of the public service obligations, or a compensation for those obligations, leading to a critical economical situation.

Depending only on State subsidies, clearly insufficient to cover the operational deficit as showed, and fare revenue, which is also insufficient and considering the decrease in demand, financial equilibrium seams virtually impossible to achieve.

This requires the definition of a new institutional and organization model for the metropolitan transport systems. Metropolitan Transport Authorities are the adopted model by various cities around Europe, and it is a consensus that there creation is crucial in Lisbon and Porto.

<p>Planning the system</p>	<p>DGTTF – Has the ability of defining concessions and authorize changes in the bus transport network (only if the operator has the initiative to change);</p> <p>Municipalities – can attribute municipal concessions ;</p> <p>Operators – operators can propose changes in the network, or can ask for a certain concession, submitting the request to DGTTF;</p> <p>State – investments in new transport infrastructures are directly dependent on the Government.</p>
<p>Organization of the system</p>	<p>DGTTF – Gives concessions when required by the operator (the initiative is from the operator); defines and apply the regulation on public transport; fixes in accordance to the Government orientations the fares each year;</p> <p>Municipalities – Can define contracts with operators for municipal transport.</p>
<p>Financing and Fare system</p>	<p>State – provides subsidies to state owned operators, and finances infrastructures investments;</p> <p>TIP²⁰– manages the integrated fare system in Porto;</p> <p>OTLIS²¹ – manages the combined transport titles in Lisbon.</p>
<p>Promotion of public transport services</p>	<p>Operators - Each operator develop it's own marketing, and there's not such thing as a unique image for the global transport system.</p>

Table 34 – (dis)arranged on the Portuguese institutional framework.

Table 33 shows the present (dis)arrangement of the institutional framework concerning urban transportation. It's shows how complementary and interconnected areas like the planning, organization and financing of the system, are divided through different entities without any logical and formal interconnection mechanisms. Similarly to what has been the European experience towards the organization of urban systems, the need to end with pulverized responsibilities and competences is of extraordinary importance.

Although the degree of participation of the different levels of public administration is different on the various MTA's, it's a fact that they must involve those different levels. In Portugal, MTA

²⁰ TIP (Transportes Intermodais do Porto), is a consortium of public operators (STCP, METRO DO PORTO and CP –PORTO).

²¹ OTLIS is a consortium of 4 public operators and 3 private.

should be constituted by both local and central authorities, grouping competences of both levels on different areas.

The next figure represents the proposed model for what should be the Metropolitan Transport Authorities of Lisbon and Porto.

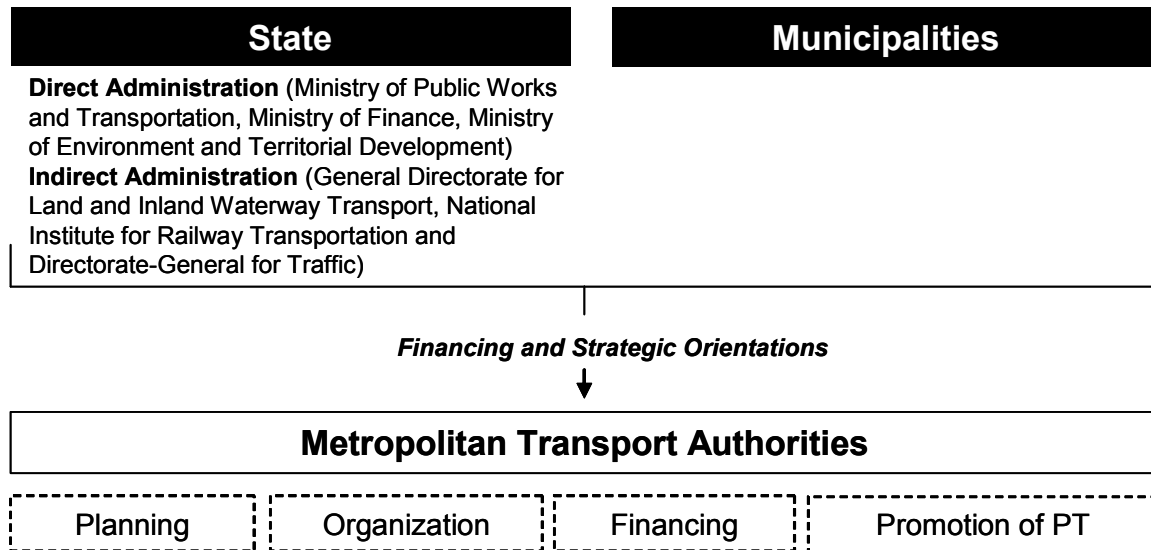


Figure 9 – Institutional arrangement of the MTA

Based on the objectives and functions of the MTA's analysed in Part I, and the specificities of the case study, is possible to define some functions for which the Portuguese MTA's should be responsible.

In what concerns Planning:

- elaborate Metropolitan Mobility Plans, articulated with land use plans, and infrastructure development plans;
- planning public transport networks and services (including parking);
- promote the physical and technological (electronic ticketing) integration of the various transport modes.

Planning the metropolitan transport system has to be necessarily made on a metropolitan scale, which is in fact what happen when looking to the other European Metropolitan Areas.

This planning must involve the definition of public transport networks and services, like it's done by the French plan PDU.

This networks and services are the ones they will be tendered, which leads to the other core function that the Portuguese MTA's should have, which is the organization of the system.

In matters of Organization:

- evaluate the quality and efficiency of the public transport system;
- defining contracts with operators;
- monitor those contracts and assure that the application of the regulations.

These functions are in accordance to what has been the role of MTA's concerning organization.

Related to the financing issues:

- define the public service obligations;
- manage the funds provided by the Government and Local Authorities, as well as commercial revenues;
- develop and manage an integrated fare system;
- define the principles in the pricing policy of all transport infrastructures, including parking and interfaces.

A number of researchers have concluded that the primary reason for the increase in costs is that public funding of transit by several levels of government has resulted in neither the transit agency nor any single level of government being confronted with full impact of transit costs escalation, and therefore the need to control these costs (Love, 1991; Talley, 1991).

On the other hand is essential that local authorities also participate in financing the transport system, as way to be involved in the process and take action towards a increase in the performance and quality of the system.

Conciliating these aspects, implies that the MTA should be responsible for allocating and manage the different funds, and, since is a single authority controlling funds and expenses, the is not the risk of cost escalation due to the lack of control over costs.

The MTA should also promote the public transport use, by defining a global image to the system and therefore improve the perception by potential passengers of the quality of the transport system.

The degree of participation of Local and Central Authorities is a critical aspect. International examples show an increasing degree of decentralization on responsibilities concerning transportation. Nevertheless, this must be done progressively, like the case of STIF (Paris) where the role of the central authorities was decreasing, simultaneously with an increase in the STIF competences, and now STIF is composed essentially by local authorities. Or like the case of Barcelona, where the Government appoints 2 representatives in the authority as observers.

A similar process should be adopted in Portugal, where the central government needs to have a significant involvement in the MTA, but with the “maturation” of the transport authority, and its increasing role on the definition of policies and investments for the metropolitan area, that involvement should decrease over time.

On that stage, which will probably happen in the very long term, Government should provide only financial support, through contract-programms, to the MTA which will be responsible for the investments in the metropolitan transport infrastructures (for example: Paris, Madrid or Barcelona). Of course some metropolitan transport infrastructures have a national impact, like for example the localization of a high-speed railway station, in which a coordinated effort must be expected from the Government and the MTA.

Regarding the financing issues, the Metropolitan Transport Authorities can be the instrument to define alternative sources of financing, and implement and manage a common fare system, like for example CTM in Madrid. The authority might be responsible for collecting all fares and distributed them by the operators or just define the fare system and the operators are autonomous in collecting the fares, this depends only on the type of contracts defined with each operator.

The questions related with the increase in demand are become easier to deal with the creation of an authority. By having represented in the authority all the main stakeholders of the system, it becomes easier to establish a common transport policy, in which supply is adapted to demand and assuring that all the agents take actions towards the same objective²². This

²² For example the Government determines the importance of increasing efficiency and diminishes costs, while assuring an adequate level of service quality. For a bus company this depends strongly on increasing commercial speed, which on the other hand depends on traffic conditions and in the existence/absence of Bus lanes. Bus lanes and the management of the urban roads are a responsibility of the Local Authority, which is more concerned on improving the traffic conditions for cars. This short example shows how difficult and negative could be the dispersion of competences related to the transport sector.

common transport strategy might result from a transport plan like the “Plan de Deplacements Urbains” (Urban Transport Plan) which is developed and implemented by STIF, Paris.

The metropolitan transport authorities can also give an important contribution towards an increase in synergies between operators. By establishing a common transport policy, it will extract the maximum benefit by each mode and each operator. Under it’s authority should be also the responsibility for the definition of Public Service Obligations and establishment of contracts incorporating those obligations, and previously defining the compensations, as determined by the European Commission²³.

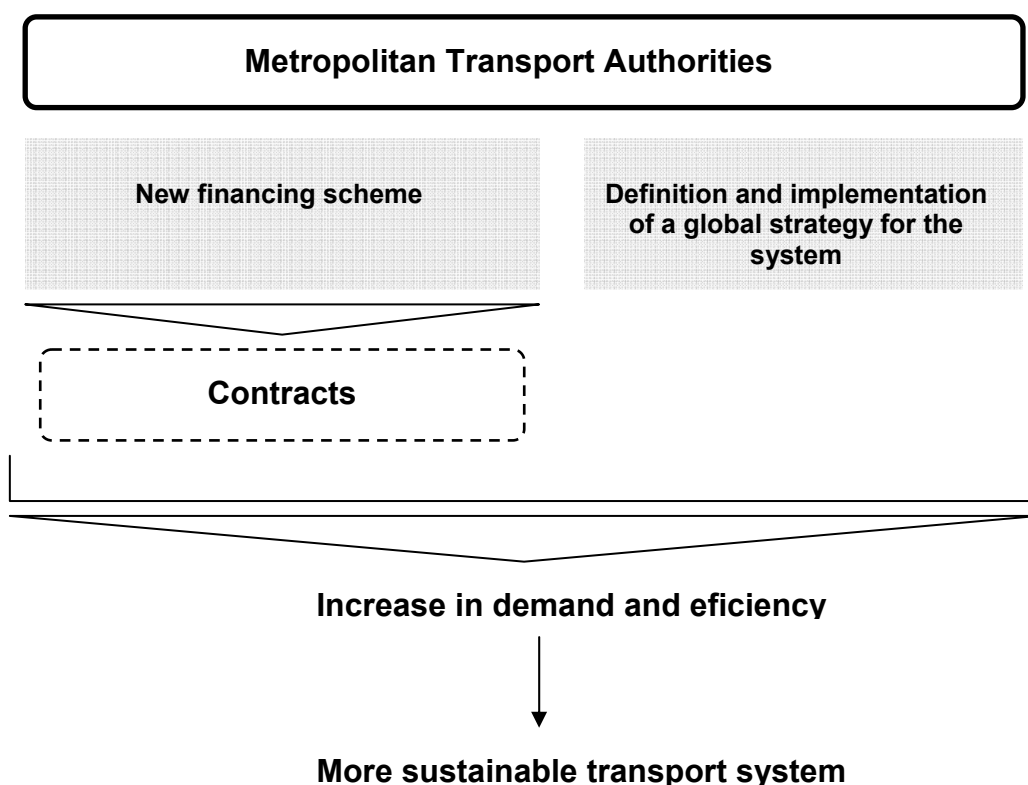


Figure 10 – The new model for the metropolitan transportation system

Probably the most significant asset for the metropolitan transportation system, from the creation of the MTA, is the concentration on one single authority of competences dispersed by the different level of the public administration as well as the ability to have an organization planning the transportation system at the metropolitan level. Municipalities are concerned about their intramunicipal transportation problems, forgetting that the solution for those problems is, frequently, in a supramunicipal level. On the other hand, Government should be

²³ See Chapter 4.1. “The EU regulatory framework”

concentrated on the macro questions of the transportation system, and not on the metropolitan issues, which must be solved by entities who have the local knowledge required to find a solution.

Contractualization

The use of contracts to balance the relation with operators, not only is imposed by the European Commission²⁴ as also has been the preferred instruments by the existing authorities to assure the provision of public transport²⁵ (used in UK, France, Spain, Norway, U.S., New Zeland, and many other countries).

Contracts are essential to assure a most transparent and efficient relation between authorities and operators. They contribute to an important increase on the efficiency of the companies (which is one of the important aspects in the Portuguese public transport companies).

A shift in the present situation is required.

	Present	Future
Compensation for the service	Public operators are compensated without previous definition of objectives Private operators are not compensated	Contracts with one single authority, in which compensation is calculated according to certain objectives (use of tendering process to concessions)
Incentives to increase demand and quality	No incentives from public authorities (private operators have an indirect incentive which is increase profits)	Financial incentives for increasing demand and quality of service

Figure 11 – Compensation and incentive mechanisms

The question is what type of contracts and to who apply?

The definition of contracts with operators needs to take into consideration the different reality between public and private operators.

²⁴ See Chapter 4.1. "The EU regulatory framework"

²⁵ See Chapter 4.3 "Types of contracts"

As earlier described in this work, public owned operators are facing a significant financial disequilibrium, result from years of insufficient compensation for the service provided, both by insufficient fare revenue and low subsidies from the Government.

This means, that in the case of these operators (specially, CARRIS; STCP and ML) it's important to separate two different questions. The accumulated deficit needs to be solved independently from the commercial deficit.

Then different options might be adopted. The concessions, the fleet, staff and other assets might be tendered under a management contract, or, since these are state owned operators, MTA could establish directly, without a tender procedure, a contract.

With private operators the situation is quite different.

Although in this dissertation no financial information is given regarding private companies, they operational results should be in the minimum close to zero, otherwise they have been bankruptcy. Therefore, it's seams rather easier to establish contracts with private bus operators.

It remains the question of what kind of contracts.

In Chapter 4, was concluded that gross cost contracts generate more bids, lower prices and that small enterprises have difficulty dealing with net cost contracts. Having this in mind, and considering that especially in Porto, the size of the companies is relatively small, the first contracts should be gross cost contracts. The small firms that operate nowadays in Porto, will face difficulties in bidding for net cost contracts.

Nevertheless, it's important to define some mechanisms to stimulate the increase in demand for public transport, which is why some incentive mechanisms based on the number of passengers or passengers.kilometers should be incorporated.

There is also the question of information. Many of the private bus companies, have not a good information system, and the Public Authorities have very few information regarding private companies, and don't have quality information about demand in areas operated by privates. This represents an "asymmetric information problem", making it more difficult to apply the concepts under contract economics that concern very transparent and theoretical situations.

The development of more sophisticated information systems permanently actualized, seems an important step towards a more efficient negotiation between authorities and operators.

For all this, pure net cost contracts will be very difficult to apply. There is no knowledge on the cost functions of private operators neither accurate value for passenger's traffic. The negotiation process is highly disturbed by this asymmetric information.

In the future, with a better information exchange, and with operators used to contracts, then it will become easier to developed net cost contracts.

It also seems rather difficult to develop net cost contracts in urban transportation mainly due to the fact that operators do not have freedom to determine fares, can't change the network or the service, they won't have any interest in assuming commercial risk if the main factors regulating demand, are not over control.

8. Conclusions

Over the last decades there has been a redefinition of public transport policies under which three major changes occurred or are occurring: an increasing decentralization on the management of urban transport, opening of the market of urban transport to private operators under a more competitive environment accompanied with a more sensitive regulation.

While this major changes took place, new models of organization of public transport where adopted, namely Metropolitan Transport Authorities.

The Metropolitan Transport Authorities were the model defined by various countries to assure the management and planning of transportation systems. MTA's assume various configurations according to their mission and according to the organization of public administration in each country. However there's a main core of missions that is common, such as responsibility for planning organizing and financing the transportation system, promote and attract more passengers to the system, manage the integrated fare system and define contracts with operators.

MTA's have an important role in the definition of the financing scheme of transportation systems. For the financing of the system, both operations and investments, there is an involvement of the various levels of administration, Central and Local, and, in cases where exists, Regional.

There's a need to find equilibrium between monopolies of long term concessions, mainly to public owned companies, and an unrestricted market.

The search for more financially sustainable transport solutions while improving service quality, has conducted to a wider use of contractualization procedures.

Contracts are used by the MTA as an instrument to assure the maximization of the public interest with the lowest financial impact. The importance of contracts and the advantages of using such an instrument in the transportation sector, explains why the European Comission as been enforcing the Member States to use this type of regulation, which is in line with the more global policy of European Single Market.

There are essentially 2 types of contracts: net cost contracts (commercial and industrial risk on the companies side) and gross cost contracts (commercial risk on the authority side and industrial on the operators). Each of this type as it's specific advantages and disadvantages, and choosing one or another has to take into considerations the specificity of each transportation system.

The Portuguese regularity regime for transportation is out of date, with the legal competences dispersed by the Central and Local Administration without integration. These authorities do not share the same objectives and so their actions are not directed to the same goal. This leads to an inefficient system where financial difficulties are increasing year after year. The metropolitan transport system of Lisbon and Porto are facing enormous financial difficulties, and lack a global strategy towards a more sustainable (financial, environmental and social) system.

MTA's by agglutinating in one single authority most of the competences dispersed, and trough the development of a common strategy which tries to establish a consensus between the interests of the different levels of the public administration, the authority maximizes the public welfare at the same time, searching for the solution financially more attractive. Therefore, MTA's need instruments to materialize this common strategy and align private companies with the publics best interest. Those instruments are contracts.

The EU regulation imposes the definition of contracts between operators and authorities. All State members have to stop providing state help to the companies without defining first what will be compensated and fixing objectives to operators. This would mean more transparency in the public subsidies to public transport operators, while simultaneously evidences the costs of the transportation system.

The financial performance of the Metropolitan Transportation Systems of Lisbon and Porto, are, among other factors, a result of the lack of transparency and knowledge on the real costs of providing public transport. The subsidies given, at the end of each year to public operators in order to "compensate" for the public service, are not enough, and do not provide any incentive to decrease costs and increase demand. The insufficiency of those subsidies forces the acquisition of loans in the credit market, and leads to enormous financial deficits.

Portuguese regulatory regime, in which a concession to bus operators in made with lines instead of networks, makes it difficult to establish net cost contracts. Operators have not the regulatory or the institutional flexibility to be attracted to this type of contracts. The high number

of private bus operators, especially in Porto, with a relatively small size, in addition to the lack of information, are some factors which can affect negatively the process of contracting. The information is highly asymmetric, with the private operators having some information about demand in the areas where they operate, and public authorities do not possess that information, which is crucial for the development of contracts.

The case of public operators is more complex. It's important to define of the contracts to operate also include the companies assets like rolling stock and employees. There is also the question of the accumulated financial deficit, which needs to be solved before any type of tendering or contractualization is conducted.

Nevertheless, it's reasonable to conduct the contractualization process in a step by step way. This means, it's not recommendable to change from a completely inflexible market to a huge process of defining contracts with all the operators for all the concessions, when most of the private bus companies don't have accurate information on demand and costs, and are not clearly prepared to this process. Contracts should be implemented in a continuous learning process, learning from past contracts to improve future ones. This means it's important to start with low risk contracts for operators, while establishing some "experiences" with a small number of enterprises.

This research makes clear that the sustainability of the metropolitan transportation systems is only possible through a more adequate regulatory framework and through a transparent and oriented financing system.

Contracts guarantee an efficient use of public subsidies while increasing service quality, and therefore attracting more passengers.

The option whether is better to use net or gross cost contracts (with or without incentives) depends on many questions like the service provided, the transport mode, the degree of competition, the characteristics of the operator, among others.

Nevertheless, it can be concluded that in a scenario where operators have not the flexibility in order to design their own networks, gross cost contracts should be adopted. The authority cannot transfer the commercial risk to operators if it's not accompanied by the necessary instruments to assure an increase in demand. The operator can control variables like comfort,

reliability but it cannot control frequencies, routes, which are the main aspects in increasing demand.

On the other hand if the operator has the ability to design it's own network, then net cost contracts seems to be the best solution, since the operator controls the major variables affecting demand.

Concluding, the reorganization of the metropolitan systems of Lisbon and Porto needs to be hell in two different phases: first an institutional reorganization with the creation of MTA and then the contractualization with operators, both public and private.

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