WORKING PAPER

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CIRIEC N° 2010/02

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ISSN 2070-8289

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Working paper CIRIEC No. 2010/02

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CONTENTS

0. INTRODUCTION

The Spanish urban transport is determined by the administrative structure and the regulation in the different levels of the mentioned structure. The scope of competence can be summarized as:

- Urban transport has a municipal jurisdiction.
- In the area of the Autonomous Community of urban transport responsibility has been transferred to autonomous management.
- Finally, urban transport between communities and suburban rail transport is the responsibility of the state.

The definition of urban transport comes from the State Sector legislation on passenger transport LOTT that distinguishes between two categories: Transportation, which runs entirely urban land, building land and linking different areas of the same municipality. Intercity transportation, which does not meet the above conditions.

The metropolitan concept applied to urban transport arises in the legislation concerning the autonomous communities as a solution to the economic and social links that emerge between various municipalities that are part of a single conurbation. When these linkages result from the institutional perspective, the creation of a partnership approach between the authorities concerned to better meet the requirements arising is the metropolitan area.

In the Spanish case, another figure that could be taking in account is the Public Transport Authority that the proposed Sustainable Mobility Act defines "public agency responsible for planning and managing the public transportation system in a metropolitan area. Their role is crucial in the field of finance to channel the aid received from government service to operators of urban and metropolitan transport.

Finally and in relation to the first paragraph of this introduction, there are different population areas, and as a result different mobility needs and also different amount and systems to finance transport systems. In the Spanish case can differentiate four main groups: Main metropolitan areas, no more than 2 (Barcelona and Madrid) have above 4 million of inhabitants. Medium size metropolitan areas (above 1.5 millions of inhabitants) Valencia and Seville. From 0.5 millions inhabitants to 1 million, 11 Spanish metropolitan areas. The remainder until 24 have les than 0.5 million of inhabitants in their metropolitan areas.

In the following points the research recovers the Spanish public transport in their main points of approach: legal framework, the regulation of the public transport services, the system funding and the quality of the public transport.

1. LEGAL FRAMEWORK

This chapter develops legislation affecting public transport in Spain. In Spain, the legislative framework for transport in general and to public transport in particular is structured into three levels the same in the ones organized political levels of government: local, regional and national levels.

One example is that in Spain, the Autonomous Communities (regional level) have exclusive jurisdiction over the transfer of railways and roads whose routes lie exclusively within the territory of the Community.

In short, for a more efficient performance issues both to the organization, financing and competence of the legislative framework does not give concrete solutions to the reality of municipal public transport development. The actions in question are marked in an area that affects several municipalities without being extended to the Autonomous Community level, necessitating the creation of a specific figure are the Public Transport Authorities. The role of this instrument is to organize and channel the financing of several municipalities in the most efficient way to developing a quality public transport to cover as much as possible the mobility needs of its citizens. In the next chapters will discuss at length this instrument mobility.

Deserve mention some great cities Madrid, Barcelona, Valencia, Seville, Bilbao, etc. with a special funding scheme is also developed in the chapter on financing. These large capital developments have concrete and specific to their urban and metropolitan conurbations and with various public transport modes (rail, underground, tram, city and intercity buses, etc.) to be included. Environments In this field is dominant metropolitan mobility needs and in this sense also means the integration of smaller municipalities that are situated in the vicinity of the great capital.

The law therefore is limited to administrative areas marked (municipality, autonomous region, National), but implementation of it to the territory has necessitated new forms of action that affect and inter-metropolitan area such as the Public Transport Authorities.

Overall, skills in passenger services under the three levels described above as follows:

- Local or municipal level: local authorities have powers in urban transport services in their municipality. In Spain there are 8180 municipalities, of which over 300 have been taken to improve mobility (data mobility week 2009). Spanish municipalities that have already implemented more than 3,600 permanent measures to improve mobility in cities, the quality of life and transportation.

  Data from the European Mobility Week 2009 results reflect that Spain, with 358 municipalities, is the 2nd European country after Austria and ahead of France, with larger numbers of participants in the European Mobility Week, which means that almost 22% of cities at European level are Spanish.

- Regional level or Autonomous Community: the regional governments are empowered to serve two or more municipalities of the Autonomous Community. In Spain there are 17 regions, of which the province in 8 matches with the community and the rest is up more than one province.

- National or State Level: The Development Ministry has responsibility for public transport services between two or more autonomous communities.

Urban transport is one of the key elements within the mobility management. As regards the three levels mentioned above is crucial that the state government acted as a catalyst for defining a strategic policy and contribute to its implementation through financial development.

The three aforementioned levels do not appear so clearly different in their implementation in the territory. The mobility management is a transversal policy which can not be separated or planning or land use or environmental policy. In these cases, coordination between policies at all levels is essential.

1.1 State legislation

The Spanish Constitution, the Organic Law 5 / 1987, Law 16/1987, Law 30/1992, Law 13/2003.

- **Spanish Constitution**. Text that reflects the principles and mechanisms of organization of the State, the rights and duties of citizens, to protect against possible injustices committed by the State or by private entities. It is a compilation of legal and technical standards, and a statement of principles that reflected the ideas and aspirations of the State.

  In urban transport, the main items on the national level are:

  - In Article 19 mentions the right to mobility.
  - Article 148.5 ª mentioned the powers of the Autonomous Communities.
  - Article 149 mentioned the powers of the State in transport.
- **Law 16/1987 of 30 July**, the Land Transport Management (LOTT) and subsequent Regulations on Administration of Land Transport (ROTT), approved by **Royal Decree 1211/199** of 28 September. The business of providing transport services by road and rail (both freight and passenger) is regulated, in general, the LOTT and has been developed by the ROTT regulation has since undergone several modifications to suit practical needs and to changes in the transport sector have occurred.
- **Organic Law 5 / 1987** of 30 July on Colleges of the State Delegation in the Autonomous Communities with regard to the Road Transport and Cable. This Act completes the regulation provided for in the Law of Land Transport (LOTT), making the delegation of functions in state-owned Road Transport and Cable to the autonomous communities. Autonomous attributed to the powers of management of regular public transport services, transport services discretionary public, private transport, activities ancillary and incidental transport, cableway and inspection, punishment and control, except those attributed to other organs.
- **Law 30/1992** of 26 November on the Legal Regime of Public Administrations and Common Administrative Procedure (LRJAP-PAC), which sets out the general principles of delegation of powers, and that, should govern relations between Public Administration.
- **Regulatory Law 13/2003 of the Concession of Public Works**, which configures a new model concession. This Act deals on the Highway Act and the new model concession extends to all public works and public entities dependents.
- Other provisions of interest:

  - Transposition into Spanish law of Commission Regulation (EC) No 1370/2007 on public passenger transport services by rail and by road and repealing

Regulations (EEC) No 1191/69 and (EEC) No 1107/70 Council. (OJEU L 315, 3.12.07).

- In July 2009 the Government has approved the 'Omnibus', a package of 47 measures that will simplify the most of all administrative procedures in the service sector. This law is called on free access to service activities and exercise.
- Law 39/2003 of 17 November, the Railway Sector which aims the regulation of railway sector, within the jurisdiction of the state.
- Law 51 / 2002, reform of Law 39/1988, which regulates the local treasuries. This law allows mandatory tax subsidize the Economic Activity Tax (IAE) of up to 50% share of taxpayers to establish a transportation plan for their workers, which aims to reduce energy consumption and emissions caused by displacement to the workplace and promote the utilization of efficient transport as public transport or shared (IAE Regulatory Ordinance, Móstoles, 2002).
- Royal Decree Law 2 / 2004 of March 9. This decree approves the revised text of the Law Regulating the local treasuries. The decree is allowed to grant subsidies of up to 50% in the Economic Activity Tax (IAE) to taxable persons to establish a transportation plan for their workers, and up to 75% of motor vehicles according to class of motor fuel and its impact on the environment.

- Other plans, programs and proposed laws of importance for urban transport at the national level:
  - Proposal for Sustainable Mobility Act. The purpose of the law is that eight years before the Development budget devoted more than 50% for infrastructure and other sustainable management of transport.
  - Strategic Plan for Infrastructures and Transport 2005-2010. Ministry of Public Works (2005).
  - Strategy for Energy Saving and Efficiency in Spain 2004-2012. Ministry of Industry, Tourism and Trade. Institute for Energy Diversification and Saving of Energy (2005).
  - Renewable Energy Plan 2005-2010. Ministry of Industry, Tourism and Trade. Institute for Energy Diversification and Saving of Energy (2005).
  - Spanish Strategy for Sustainable Mobility. Ministry of Environment and Rural and Marine (2009).

1.2 Regional standards

The main regional legislation on urban transport in Spain is as follows:

- Autonomous community of Andalusia. Act 2 / 2003 of 12th May, Management of Urban and Metropolitan Transportation in Andalusia.
- Autonomous Community of Castilla y Leon. Law 15/2002 of November 28 urban and metropolitan transport.
- Autonomous Community of Catalonia.

  Law 7 / 1987 of April 4 by establishing and regulating special public performances in the conurbation of Barcelona and in the counties within its area of direct influence.

Law 12/1987 of 28 of 12 May, the regulation of road passenger transport by motor vehicles.

Law 9 / 2003 of 13 June mobility. This law is considered at European level as a legislative reference in Europe in terms of mobility.

- Autonomous Community of Valencia.

  Law 1 / 1991 of 14 February, regulating the Sector Plan for Passenger Transport.

  Law 9 / 2000 of 23 November, constitution of the public entity Valencia metropolitan transportation.

- Autonomous Community of Galicia. Law 6 / 1996 of July 9 the Coordination of Urban Transport Services and Interurban Road in Galicia.
- Autonomous Community of Madrid.

  Law 5 / 1985 which refers to all passenger services on the territory of the Community by establishing a Consortium as a single authority.

  Law 20/1998, Management and Coordination of Urban Transport.

- Basque Country. Law 4 / 2004 of 18 March, Passenger Transport by Road.
- Asturias Law of Principality of Asturias 1 / 2002 of March 11 for joint cooperation and participation of the Principality and the municipalities belong to the joint management of public transport services for passengers.
- Autonomous community of Castilla-La Mancha. Law 14/2005 of 29 December, the management of passenger transport by road in Castilla-La Mancha.

1.3 Local rules

- Law 7 / 1985 of 2 April, Regulatory Rules of the Local (LRBRL):
  - Article 25.2, Chapter III of skills. "1. The Municipality, to manage their interests and the scope of its powers, can promote all manner of activities and provide public services as help meet the needs and aspirations of the local community. 2. The Municipality shall, at all events, competitions, in terms of the law of the State and the Autonomous Communities, in the following fields: ... .. : ... ... Public passenger transport. "
  - Article 26. 1. The municipalities themselves or partners must provide, in any case, the following services:. .... In municipalities with population above 50,000 population equivalent, also: urban public passenger transport and environmental protection .... "
- According to the 2001 census (National Statistics Institute), in Spain there are a total of 116 municipalities with a population over 50,000.
- Royal Decree Law 781/1986 of 18 April by approving the revised text of the laws in force concerning local government.

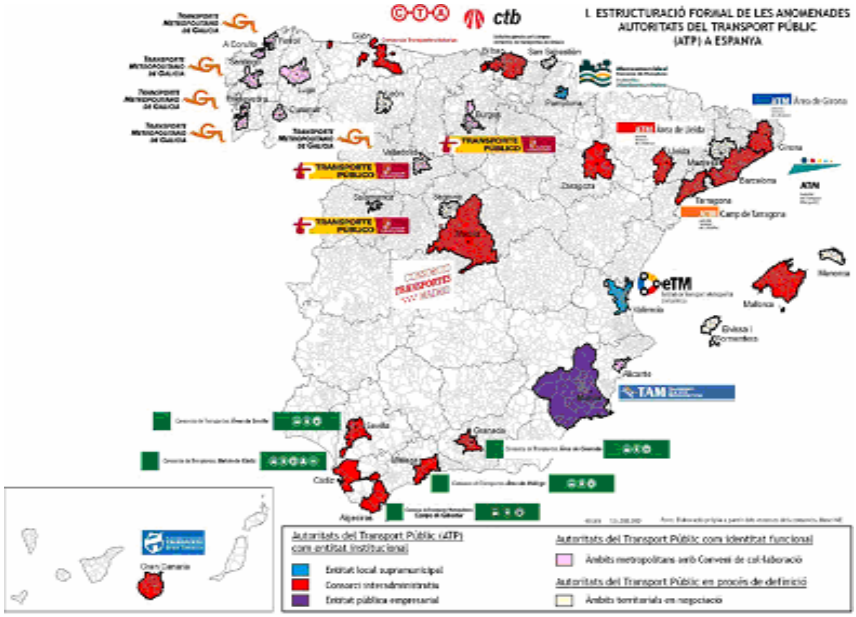
2. PROVISION AND REGULATION OF LOCAL PUBLIC TRANSPORT SERVICES

2.1 Prevailing organizational forms:

2.1.1 "Public Transport Authorities"[1]

In Spain there is no a specific regulatory framework for the "Public Transport Authorities". The political necessity arose in the last decade, has been transformed by administrative virtue, promoting a new type of organizational entity with a wide range of legal nature, generically known as "Public Transport Authorities" (ATP is the Spanish acronym). ATP's emergence has accelerated in recent years, from 4 existing in 1997 to 18 in 2007.

Map 2. Public Transport Authorities in Spain



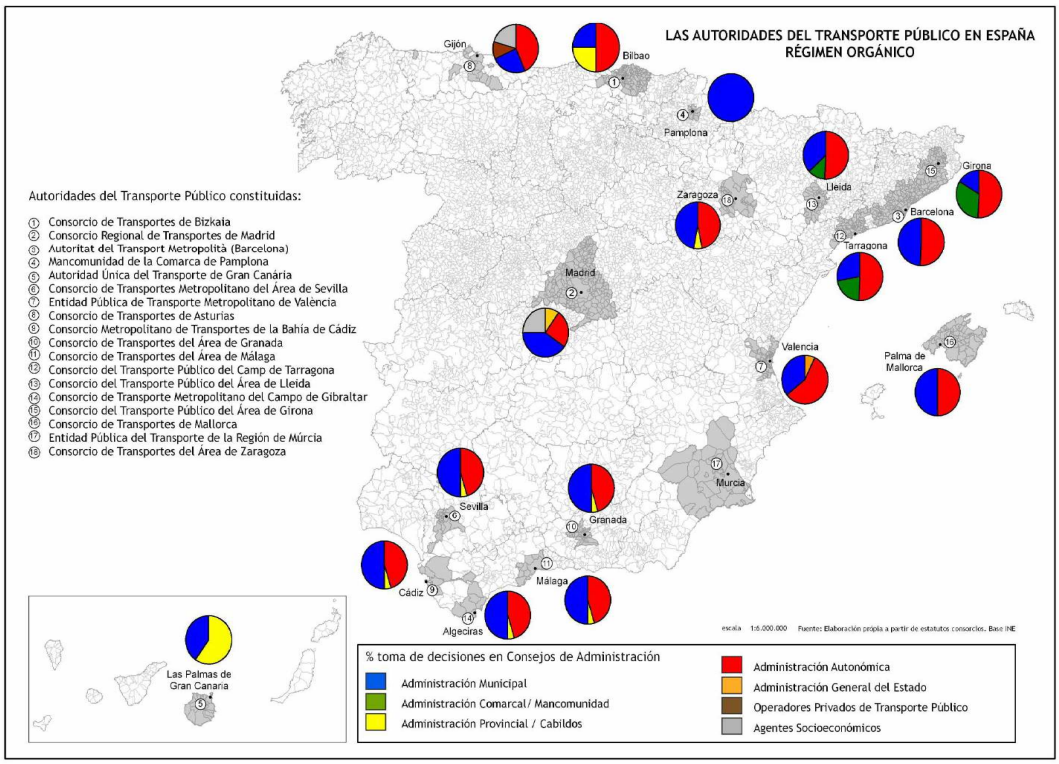
Source: Medina, P. (2007): IV Jornada Técnica. El papel de las Autoridades de Transporte en la Integración Modal, Barcelona, 27 de marzo de 2007.

The new field of decision, made voluntarily by competent government, tries to overcome, thanks to strong political will, the dysfunctions generated by the current pattern of distribution of responsibilities with regard to mobility, which assigns "several powers" but not a "single authority".

Basically, the partners are local authorities, involved in every ATP, although the presence of the regional governments is also very wide; with the only exceptions of Pamplona and Las Palmas. Moreover, in many cases, the regional presence usually means more weight in decision making. Other administrations present at the ATP, but more irregular and with less weight in decision making, are the province (predominant in the ATP of Las Palmas), county or even national authorities, as well as socio-economic and private operators.

[1] See Medina, P. (2007): "Aproximación al marco institucional de las Autoridades del Transporte Público (ATP) en España", IV Jornada Técnica. El papel de las Autoridades de Transporte en la Integración Modal, Barcelona, 27 march 2007, which has provided the basis for this section.

Map 3. Spanish Public Transport Authorities by partners' share



Source: Medina, P. (2007): IV Jornada Técnica. El papel de las Autoridades de Transporte en la Integración Modal, Barcelona, 27 de marzo de 2007

The ATP's purpose is facing metropolitan mobility from new basis, guiding this phenomenon through negotiation and dialogue between public not hierarchical, but interdependent institutions, with the exchange of information and approaches, the functional integration of the different policies and services and the political will of institutional coordination, all of which constitutes the only guarantee for success.

In this regard, as shown on the attached map, the competences conferred on the ATP's statutes reveal a different functional ambition: ATP of Barcelona and Zaragoza are the most complete. They are provided with six types of functions: spatial planning, financial planning, tariff regulation, infrastructure construction, service provision and evaluation. Another six ATP (Madrid, Vizcaya, Valencia, Cadiz, Granada and Malaga) have all these functions, except for evaluation. With four functions are five ATP (Seville, Pamplona, Las Palmas, Mallorca and Murcia). The remaining (Girona, Lleida, Tarragona, and Bahía de Cádiz) have only three: spatial planning, financial planning and tariff regulation.

ATPs are the paradigmatic example of the new "governance" of the current city, real and dispersed, which requires the culture of institutional responsibility and administrative coordination. In short, the development of so-called ATP in Spain doesn't respond to a pre-defined strategic framework for action. On the contrary, it is the answer to the need for coordination of the complex phenomenon of mobility.

Spanish Strategic Plan for Infrastructures and Transport (PEIT in Spanish acronym), by the Ministry of Public Work and Transport [2](2005), raise the need to formalize "a new framework for planning and management, including systems for development, monitoring and review of mechanisms for interagency cooperation, in order to develop integrated policies on mobility. This is a formula consistent with the "context of increasing European integration of transport policy and of growing commitment to open government to the citizenry."

Spanish Strategy for Urban Environment (EMAU is the Spanish acronym), by the Ministry of Environment, records that "mobility is determined by the appropriate institutional framework in which each mode of transport is developed." Thus, the different levels of administration have normative, organizational and fiscal instruments that encourage or restrict the ownership or use of different transport modes. In this sense, the EMAU drives the review of legal, administrative and tax instruments, to promote more sustainable and safer mobility than the currently available.

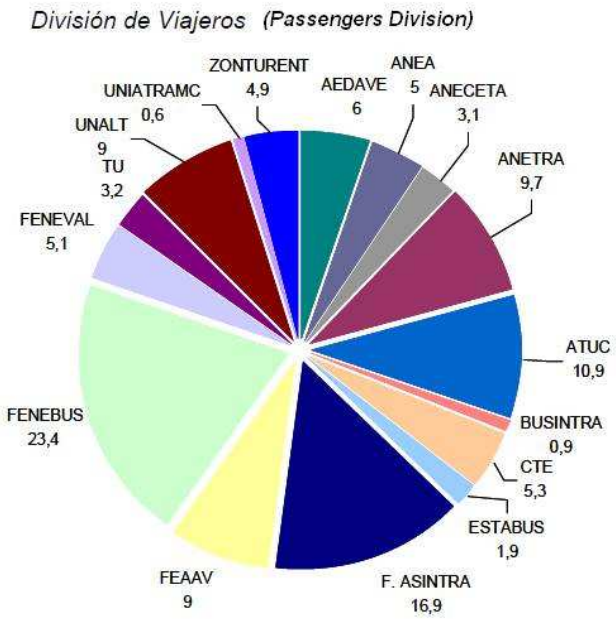
2.1.2 Coordinating bodies

Coordination and cooperation between central and regional governments are structured, according to Articles 9 to 11 of the Land Transport Planning Law (LOTT is the Spanish acronym), through the National Conference of Transport. This is an advisory and deliberative body. It comprises the Minister of Transport and the regional Directors with competences in the field of transport. The purpose of the National Conference is to promote the maintenance of a common transport system throughout the country. When the nature of the matters to be addressed requires, the aforementioned Conference can be extended with representatives from other Departments of the Central Administration or the Regions. For the immediate and regular coordination of state and regional competences, as well as for ensuring an effective implementation of the objectives assigned to the National Conference of Transport, is responsible the "Committee of Transport General Directors". This is also a key deliberative body and it is composed of the heads of the Directorates General responsible for land transport in the Central and Regional Administrations.

Coordination and cooperation between different stakeholders involved in road transport has been promoted by the Directorate General of Road Transport of the Ministry of Public Work and Transport in recent legislatures. The consensus of the actors is a prerequisite to improve and modernize the sector. A basic reference on sectorial cooperation and coordination is the National Committee of Road Transport (CNTC according to the Spanish acronym), a body which houses the employers association representative of road transport (passengers and freight) companies. It aims to establish itself as a meeting point within the sector and to coordinate the national dialogue with the Administration. The representativeness of each association within a specific CNTC section is updated every four years. The current composition of the Council in the passengers sections is represented in the accompanying graph.

[2] Ministerio de Fomento is the Spanish current name of the Ministry competent in Public Work and Transport.

Figure 1. CNTC membership by Professional Associations' share



Source: Directorate General of Road Transport Annual Report 2006

2.1.3 Professional associations

Among different associations of passenger transport companies the most representative are:

a). National Business Federation of Bus Transport (FENEBUS), senior member organization in the transport of passengers. It is currently the most representative organization of the sector in the CNTC (76% of regular services, 26.56% of occasional services, 21.24% of urban/suburban buses and 61.55% of bus stations). It currently consists of 33 regional and sectorial associations and companies, representing 2753 companies with a fleet of 18613 buses.

b). The Spanish Federation of Passenger Transport Companies (ASINTRA) dates represents all modes of road passenger transport; regular, occasional and urban/suburban, regardless of size and location of the company, and all its complementary activities. It counts with 26 federated organizations and direct carriers' affiliation. ASINTRA consists of 1869 companies, with a fleet that exceeds 19680 units and directly employs 40000 workers.

c). Association of management companies for collective urban transport (ATUC), s integrated for buses, subways and railways public and private companies, responsible for urban public transport in major cities of the State. Its participation rate in this area is over 78% of bus passengers and 100% of Metro and suburban railway (RENFE Cercanías) passengers. The representative assigned by the Ministry of Development to this Association in the CNTC - Urban section, according to the fleet and the number of associated companies, reached 72.62%.

2.1.4 Unions

Labour union hearing in Spain takes place through two ways. First, the representativeness, product of unions' elections. Second, affiliation, product of joining to unions. Each of these pathways can act as a channel for collective bargaining. The most representative trade unions in the demarcation of the road transport sectorial agreement and the railway enterprise agreement, normally on a provincial level, lead the collective bargaining. "Collective agreement" is the result of the free agreement adopted by the representatives of workers and employers, under their collective autonomy, as stipulated by Article 82.1 of the Statute of Workers.

The most representative trade unions at a national level, CCOO and UGT, are also among the most representative of the subsector, both in the road transport agreements and, especially, in the transport services managed by public companies. USO and CGT, unions with a smaller audience nationwide, also representative in some provincial (USO in passenger transport of La Rioja) and enterprise (CGT in Metro de Barcelona) agreements. ELA, Basque trade union, is the majority in the Metro of Bilbao. Independent unions have unequal presence in the agreements: Plataforma sindical de autobuses, Solidaridad Obrera, Sindicato Ferroviario Independiente, etcetera. Of note is the presence of two trade unions representing the drivers in the state-owned rail operator RENFE (SEMAF) and Metro of Madrid (Drivers' Union).

2.1.5 Collective bargaining[3]

The figures for collective bargaining in Spain are obtained by gathering agreements information according the starting year of the economic effects. Data is provided classified according to functional, sectorial and territorial areas.

At a functional level, the difference is between "enterprise agreements" and "agreements of other scope". The former encompasses both agreements affecting the entire workforce of a company as a part of it, while the latter refers to every agreement of upper-level to the company.

At a sectorial level, data are available by economical sector, and a more disaggregated level, following the classification used by the General Department of Labour and Social Statistics in its publications.

At a territorial level, data are offered by regions, encompassing the agreements that affect one or several provinces of the same region. The "Interregional" section gathers agreements affecting provinces of different regions.

According to statistics from the Ministry of Labour in 2007, in the land transport sector (rail, road and pipe) a total of 220 agreements were signed, covering 376414 workers, with an agreed wage increase of 5.03 %. From this total, 115 agreements (52.3%) were enterprise agreements, affecting 52778 employees, with an average wage increase of 4.22%. The 105 remaining agreements are other scope agreements, mainly provincial, including 323696 workers, with an average wage increase of 5.17%. In the urban transport sphere enterprise agreements are very important because of the greater presence of public enterprises, as opposed to interurban transport. Notably, however, is the significant drop in the volume of workers affected by enterprise agreements in recent years, due to privatization or outsourcing.

[3] Directorate General of Road Transport, Ministry of Public Work and Transport (2008): "Evolution of economic and social indicators of road transport", Madrid.

2.1.6 Access to the profession

The LOTT in Article 47 provides that "for the provision of road transport and ancillary and complementary activities it will be necessary obtaining an administrative title". Therefore, in compliance with current regulations, the new professionals have to overcome the trials to obtain the official certificate of professional qualification issued by the Ministry of Public Work and Transport or by the competent regional departments and that give access to the practice of passengers transport.

Royal Decree 1032/2007, which incorporates into national law the EU Directive 2003/59, on the initial qualification and periodic training, since it came into force, is the standard legal reference to for training in this sector. This Royal Decree establishes the obligation of the Professional Competence Certificate (CAP in Spanish acronym), to undertake the occupation of driver in the field of road transport, which will be implemented from 11 September 2008 for drivers of passenger vehicles. CAP is obtained justifying initial professional qualification, which is achieved by attending a required course and passing an exam. To maintain the professional training, it is necessary a periodic updating of essential knowledge to the exercise of the activity. In the case of railways, Article 60.2 of the Railway Sector Law - number 39/2003 (LSF in Spanish acronym), provides that, Ministry of Public Work and Transport will define the conditions and requirements for qualification and ratings necessary to perform the functions related to security in the railways. It also establishes the system of licensing and operation of centers for the training of such staff. The Ministerial Order FOM/2520/2006, put into effect these LSF determinations. Resolution of 15 October 2007 by the Directorate General of Railways provides basic training routes and minimum workload of the training programs. As a general rule, the training program will comprise 50% of theoretical training and 50% of practical training. Driving simulators allow training closer to practice.

As a condition to access, it is demanded the medium-level vocational training or high school. In general, these same requirements serve for Metro drivers to who is required a medium-level vocational training in electricity / electronics.

2.1.7 Employment

According to data from the Annual Survey of Services, which compiles the National Statistics Office (INE in Spanish acronym), the number of workers in the land transport sector in 2006, including all subsectors (road, rail, pipe), was 598253, representing a 2.96% of the national workforce. A 32.8% of the sector employment is dedicated to passengers transport, although it must be considered that the 20721 railway workers (3.5% of land transport) serve to passenger traffic and freight indistinctly.

A significant difference in employment between the transport of passengers by road and by rail is the extent of temporary employment, which affects 24.7% of those ones employed in road, but only 4.43% of those occupied by railway operators.

Table 1. Employed in Land Transport Sector, by subsector, type of contract and genere (2006)

	Total Land Transport (Road+Railway)	Freight Transport by Road	Urban & interurban Bus	Taxi	Railway Transport	Metro
TOTAL EMPLOYED	**598,253**	**401,770**	**86,846**	**78,982**	**20,721**	**9,934**
	100%	67.20%	14.50%	13.20%	3.50%	1.70%
PAID	**414,104**	278,967	84,146	20,336	20,721	9,934
Indefinite duration	**308,785**	201,181	63,339	14,967	20,175	9,123
Males	**278,404**	181,683	57,685	14,056	18,114	6,866
Females	**30,381**	19,498	5,654	911	2,061	2,257
Temporary	**105,319**	77,786	20,807	5,369	546	811
Males	**94,437**	72,654	15,977	4,967	376	463
Females	**10,882**	5,132	4,830	402	170	348
UNPAID	**184,149**	122,803	2,700	58,646	0	0
Males	**174,902**	116,131	2,395	56,376	0	0
Females	**9,247**	6,672	305	2,270	0	0

Source: INE. Annual Service Survey 2006.

2.2 Productive efficiency

Productive efficiency of local urban transport is a central issue in the debate on the provision of public transport services in the local sphere.

Some indicators of local urban transport productive efficiency in Spain can be constructed through certain information contained in the Metropolitan Mobility Observatory (OMM is the Spanish acronym), an initiative of the competent Spanish Ministries for Environment and Transport, together with the Spanish transport public authorities of metropolitan range[4]. Therefore, for the information origin, the indicators detailed below refer to the metropolitan areas that have a public transport authority in charge of planning and management of their internal transport systems.

The unitary production costs per vehicle-km. vary considerably among areas and also among modes, as shown in Table 2. The drawback when making this comparison is that there is no operating cost data available for suburban rail service provided by RENFE-Cercanías, state-owned operator in several metropolitan areas included in the OMM. The unitary cost in urban bus services shows a lot of variability: ranging usually from 2.5 to 6 € per vehicle-km. Vigo and Granada bus operators bear the lowest production costs in relation to the supply of provided services. The largest costs are incurred by bus operators of Barcelona, Malaga and Valencia. In suburban buses, unitary production cost is comparatively lower and more uniform among areas, with figures ranging from 1.5 to 3.2 € per vehicle-km. The lowest costs are for suburban services in Mallorca, Valencia, Barcelona and Granada and the largest for Alicante and Pamplona. The unitary production costs of Metro in Madrid and Barcelona are around 4 € per vehicle-km. The only data available for suburban railways are those relating to FGC, regional-owned operator, in Barcelona, with nearly 3 € / vehicle-km. Finally, the higher cost of the various modes of local public transport is in the service of tram and light Metro, mainly in Madrid and Barcelona, with 10.7 - 11 € per vehicle-km. and 6.4 € in Alicante.

[4] The aim of OMM is "emphasizing the public transport contribution to the improvement of quality of life and sustainable development in cities" (OMM, 2009: 7).

Table 2. Unitary (€/Veh.-Km.) production costs

€ 2007

Metropolitan Area	Urban bus	Suburban bus	Metro	Light Metro/Tram	Sub. railway (1)	Sub railway (2)
Madrid	3.854	2.181	3.815	10.733	n.d.	---
Barcelona	6.146	1.606	4.043	11,032	n.d.	2.932
Valencia	5.154	1.539	n.d.	n.d.	n.d.	---
Murcia	3.548	n.d.	---	n.d.	n.d.	---
Sevilla	5.179	n.d.	---	---	n.d.	---
Asturias	3.328	n.d.	---	---	n.d.	---
Málaga	5.500	n.d.	---	---	n.d.	---
Gran Canaria	3.972	1.863	---	---	---	---
Mallorca	3.446	1.442	n.d.	---	n.d.	n.d.
Bahía de Cádiz	---	n.d.	---	---	n.d.	---
Granada	2.750	1.644	---	---	---	---
Alicante	4.355	2.997	---	6.400	---	---
Vigo	2.522		---	---	---	---
Pamplona	3.214		---	---	---	---

Data of Urban buses in Asturias refer only to the city of Oviedo
(1) State-owned operator (2) Regional operator
Source: Own elaboration with OMM 2009 data.

The unitary revenues for ticket sales, as shown in Table 3, have lower values than unitary production costs and also less disparity among areas and modes. Bus operators receive from the sale of tickets between 1.8 and 2.7 € per vehicle-km. Malaga, Asturias, Barcelona, Madrid and Pamplona are the areas with the highest unitary revenues, while the lowest are the ones of bus services in Murcia, Vigo, Gran Canaria, Mallorca and Granada. In the case of suburban buses, unitary revenues from the sales are concentrated on values close to 1 - 1.2 € per vehicle-km. The lowest values correspond to the services of Madrid, Barcelona and Malaga. There are some cases; Gran Canaria, Granada and especially Alicante in which unitary revenues are comparatively higher than average. Suburban buses have not only lower unitary costs than urban buses, but also lower unitary revenues. Metro Unitary revenues don't differ from those received, as average, for urban buses services. Slight differences are evident between the two areas for which data are available. In Barcelona Metro revenues are nearly 2.6 € per vehicle-km., just as the bus. In contrast, Madrid Metro barely reaches 2 €, lower than urban buses services. Revenues from the sale of suburban rail tickets in most cases are around 1.4 -1.8 € per vehicle-km., although in some areas are significantly lower, closer to 1 € / vehicle-km. This is the case of Murcia, Seville and Asturias. In other areas, such as Malaga and Mallorca, the service unitary revenue doubled that figure, with around 3 € / vehicle-km. Light Metro and Tram services unitary revenues are similar to those provided by bus and Metro within the same metropolitan area. Thus, in Madrid and Mallorca are around € 2 per vehicle-km. and, conversely, in Barcelona unitary revenues from light Metro public transport modes, or tram (about 4.2 € per vehicle-km.) are noticeably higher than those of all other public transport modes.

Table 3. Revenues from fares for Veh.-Km.

€/Veh.-Km. 2007

Metropolitan Area	Urban bus	Suburban bus	Metro	Light Metro/Tram	Sub. railway (1)	Sub. railway (2)
Madrid	2.335	0.932	1.978	2.000	1.674	---
Barcelona	2.507	0.951	2.573	4.155	1.364	1.881
Valencia	2.034	1.292	n.d.	n.d.	1.444	---
Murcia	1.744	n.d.	---	n.d.	1.063	---
Sevilla	2.101	n.d.	---	---	1.029	---
Asturias	2.559	1.187	---	---	1.138	---
Málaga	2.750	1.052	---	---	2.906	---
Gran Canaria	1.888	1.416	---	---	---	---
Mallorca	1.890	1.291	n.d.	---		3.085
Bahía de Cádiz	---	n.d.	---	---	1.413	---
Granada	1.987	1.524	---	---	---	---
Alicante	2.624	1.862	---	1.820	---	---
Vigo	1.862		---	---	---	---
Pamplona	2.328		---	---	---	---

Data of Urban buses in Asturias refer only to the city of Oviedo
(1) State-owned operator (2) Regional operator
Source: Own elaboration with OMM 2009 data.

In unitary terms, the subsidy granted by the Administration, for the provision of local public transport services in different metropolitan areas, varies significantly in each case, as shown in Table 4. Some services are justified only by their utter dependence on government subsidies, like trams and light Metro or, to a lesser extent, certain bus networks: Barcelona and Malaga. In other cases, however, the service provision hardly depends on public subsidies, reflecting its auto finance ability, as in Valencia, where the unitary subsidy is less than 3 cents per vehicle - km, and Seville (2 thousandths of € per vehicle-km.). Suburban buses dependence from public funding is more limited and cases are more homogeneous. Nevertheless, in most areas (Madrid, Barcelona, Alicante and Vigo) the service is largely subject to the availability of public funds, in an even higher proportion than the revenues received for the service, presenting values that ranging between 1.1 and 1.3 € / vehicle-km. By contrast, in other areas, like Mallorca, Gran Canaria, Valencia and in particular, Granada, the unitary subsidy is a mere supplement to sales unitary revenues unit, with figures of between 0.15 and 0.37 € / vehicle-km. The supply of conventional Metro services also shows a strong dependency on government subsidies, especially in Madrid, where the subsidies received by vehicle-km, amount to 1.85 €, slightly smaller than the unitary revenue of the service. As with unitary costs, there is no RENFE-Cercanías subsidies information either. Thus, the only available data with regard to the suburban rail service is the regional operator FGC in Barcelona. In this case, the figure of about 1.8 € per vehicle-km. -practically the same as that obtained as a sales unitary revenue- shows the necessary use of public funds for the subsistence of the service.

Table 4. Public subsidy for Veh.-Km.

€/Veh-Km. 2007

Metropolitan Area	Urban bus	Suburban bus	Metro	Light Metro/Tram	Sub. railway (1)	Sub. railway (2)
Madrid	1,519	1,248	1,837	8,733	n.d.	---
Barcelona	2,870	1,262	1,231	19,036	n.d.	1,761
Valencia	0,024	0,292	n.d.	n.d.	n.d.	---
Murcia	n.d.	n.d.	---	n.d.	n.d.	---
Sevilla	0,002	n.d.	---	n.d.	n.d.	---
Asturias	1,444	n.d.	---	---	n.d.	---
Málaga	2,315	0,429	---	---	n.d.	---
Gran Canaria	0,477	0,368	---	---	---	---
Mallorca	1,827	0,368	n.d.	---		n.d
Bahía de Cádiz	---	n.d.	---	---	n.d.	---
Granada	0,763	0,121	---	---	---	---
Alicante	1,733	1,136	---	4,580	---	---
Vigo	1,070		---	---	---	---
Pamplona	0,803		---	---	---	---

Data of Urban buses in Asturias refer only to the city of Oviedo
(1) State-owned operator (2) Regional operator
Source: Own elaboration with OMM 2009 data.

In short, despite the significant diversity of cases in areas and in modes, we can come to the general conclusion of a local public transport services subjection to government subsidies. Thus, less efficient modes are rail services, especially trams and light metro, compared with buses. For locations, suburban services show less efficiency than urban services.

2.3 Production and use of the service

Although there are no exact data of the number of journeys within the local public transport system in the country, according to the different modes, it can be approximated from the figures given by various sources of statistics and corporate reports. It is estimated that during 2007 the number of trips by the Spanish local public transport system is around 3650 million[5]. Approximately 52% of these correspond to bus services (urban and suburban), 33% to Metro, 14% to suburban rail and 1% to tram and light Metro. The average local public transport use per capita is, therefore, 83 trips per year, a low figure if it is felt that, on average, over a year a person makes about 3 daily trips on weekdays and slightly more than 2 each day of the weekend (Movilia 2006/2007). However, this finding is consistent with the limited participation of public transport modes in the daily mobility of Spanish local areas, representing only 9% of total journeys (Movilia 2006/2007). Private vehicle concentrates a 43% of daily trips. The participation of pedestrian (and cycling) trips is almost a 45.5%, while 'other modes' contribution is slightly higher than 2%.

The low overall use of public transport modes could be closely related to the fact that only 120 of the more than 8100 Spanish municipalities have local public transport systems (see Zamorano, C. et al., 2004: 17). However, it is logical to think that these 120 municipalities, mostly provincial capitals and cities with more than 50000 inhabitants, concentrate a high proportion of the State population. Consequently, it

[5] Using another source, the survey on resident population mobility in Spain (Movilia 2006/2007), which offers weekly data of number of trips in daily mobility patterns, can be estimated for the whole year a total figure of 3.666 million trips in local public transport modes.

should be understood that the small share of public transport in the local modal split responds primarily to an overall option for private vehicle.

Moreover, suburban transport networks, bus and rail modes, which exceed the municipal level, covering and linking different municipalities, represent an essential part of local public transport system. Thus, they extend the public local transport system to some 1000 municipalities in the Spanish State, organized in metropolitan areas with public transportation systems planned and managed by the aforementioned Public Transport Authorities (ATP). Sometimes, as in the case of Madrid and Murcia, the metropolitan transportation system covers the entire region, being complex to differentiate local transport (urban or metropolitan) ant the regional interurban transport.

In these metropolitan areas of the country is where a higher number of daily trips take place and where public transport modes share is more important. In addition, among the action purposes of ATP is usually the generation of information, which is annually collected in the OMM. It is, in fact, as it was already advanced when speaking of efficiency, the main source of data on metropolitan public transport systems, with the level of detail and consistency required to carry out a thorough analysis of local public transport in Spain and to make comparisons among different geographical areas of the country, as well as with other international experiences, such as EMTA Barometer of Public Transport in European Metropolitan Areas.

If, as noted before, the average number of annual trips per capita in local public transport modes amounted to about 83 in the whole Spanish territory, in the metropolitan agglomerations of the country this number is higher, although this is entirely due to the demographic share of the two largest metropolitan areas in the country (the Community of Madrid and Barcelona), the only metropolitan areas where the average number of trips per inhabitant and year is substantially higher, with figures of 276 and 192, respectively (see OMM, 2009: 30).

In the analysis of transport demand, a frequently used indicator is the number of passenger-km., which provides jointly information of the volume of passengers and the distance they travel in their trips, being able to make comparisons between modes and areas.

Table 5 shows this information for the metropolitan areas represented in the OMM, as for the different modes of local public transport. The first result to note is demand differences between the two more populated metropolitan areas (Madrid and Barcelona) and the other areas considered. This naturally can be explained by the greater potential demand arising from its demographic entity and the longer public transport network needed to serve the largest possible part of the territory. It is also noted in the information contained in Table 5 that the highest values recorded in passenger-km. for rail modes (Metro and suburban railway) over buses services within the same metropolitan area, due to the frequent use of railways for longer trips than those made by bus (see OMM, 2009: 31).

Table 5. Demand trend per modes

Pax-Km./year (Millions). 2007

Metropolitan Area	Urban bus	Suburban bus	Metro	Light Metro/Tram	Suburban railway	Total
Madrid	1,762	4,118	4,807	121	3,532	**14,340**
Barcelona	799	1,690	2,162	104	3,586	**8,341**
Valencia	313	195	433	35	750	**1,727**
Murcia	128	n.d.	---	n.d.	163	**291**
Sevilla	291	162	---	n.d.	153	**606**
Asturias	86	n.d.	---	---	230	**315**
Málaga	228	n.d.	---	---	163	**391**
Gran Canaria	n.d.	503	---	---	---	**503**
Mallorca	n.d.	185	n.d.	---	95	**280**
Bahía de Cádiz	---	101	---	---	65	**166**
Granada	n.d.	144	---	---	---	**144**
Alicante	55	142	---	10	---	**207**
Vigo	61		---	---	---	**61**
A Coruña	77		---	n.d.	---	**77**

Data of Urban buses in Asturias refer only to the city of Oviedo
Source: OMM 2009, OMM 2008.

Therefore, in view of these differences, a strict and rigorous comparison of the public transport demand must take into account dissimilarities in the geographic or demographic entity of the different metropolitan areas concerned and on the average length of trips made in any mode of public transport. It is necessary to make relative the given figures, according to the resident population or the land area of each one of the analyzed areas. We consider the number of resident inhabitants in the metropolitan area for the suburban modes analysis, and the resident population in the main city for the urban modes, as EMTA does in its aforementioned Barometer. Thus results are now significantly more balanced among areas and among modes. Even though a high relative use of public transport remains in Madrid and Barcelona, although in urban buses stands far above any other area the service of Malaga. In suburban buses stands out the high relative use of the service in Madrid and Gran Canaria. Among all the local public transport modes, the greatest relative use, far superior to other options manners, corresponds to the Metro service in Madrid and Barcelona. The suburban railway has a similar demand to the suburban buses, standing out only the use of the service in Barcelona, where can be found two operators network, one state-owned and one regional.

A percentage share analysis of demand by mode can be done for the four main metropolitan areas of the country, since on the other cases there are no data on the number of passenger-km. for all public transport modes of transportation are available or simply falls entirely within the bus services, for having not railway networks. With the exception of Seville, as shown in Table 6, in the remaining three areas (Madrid, Barcelona and Valencia) is remarkable the dominance of railway-based modes over bus-based modes. In Madrid stands out the Metro, which accounts for one third of the demand. In Barcelona and Valencia the predominance is for the suburban railway, with 43% of demand in both cases. In Sevilla, almost half of the demand falls on the urban buses, contributing the suburban buses with more than another quarter of total demand.

Table 6. Demand trend per modes. *Spanish four larger metropolitan areas Pax-Km./year (% of single mode). 2007*

Metropolitan Area	Urban bus	Suburban bus	Metro	Light Metro/Tram	Suburban railway	Total
Madrid	12.3%	28.7%	33.5%	0.8%	24.6%	100%
Barcelona	9.6%	20.3%	25.9%	1.2%	43.0%	100%
Valencia	18.1%	11.3%	25.1%	2.0%	43.5%	100%
Sevilla (1)	47.5%	26.2%	---	1.5%	24.8%	100%

Source: Own elaboration with OMM 2009 and OMM 2008 data.

As regards the supply of local public transport services, the highest values in terms of seats-km./year, corresponds to the most populated areas: Madrid, Barcelona and, in lesser extent, Valencia. The most significant case is Madrid Metro which represents more than 50% of the local public transport supply of this metropolitan area. In Madrid and Barcelona the higher supply falls on railway-based modes, although in other areas, such as Sevilla, Murcia, Mallorca and Bahía de Cadiz, bus services supply beat suburban railway and also, where appropriate, Metro supply. Finally, some metropolitan areas, such as Gran Canaria, Zaragoza, Vigo, and Pamplona have not railway-based modes, so the entire supply of local public transport is provided by road. With the exception of Madrid and Barcelona, the provision of suburban services, both rail and bus, is inferior to that of urban services, highlighting the lack of consolidation of their respective metropolitan transport systems, which seems to suggest the noticeable presence of private vehicle in the interurban daily trips within the metropolitan area.

Table 7. Trends of seats-Km. for each mode
Millions. 2007

Metropolitan Area	Urban bus	Suburban bus	Metro	Light Metro/Tram	Suburban railway	Total
Madrid	7,581	10,494	32,941	280	10,091	**61,387**
Barcelona	3,881	5,752	13,030	418	11,453	**34,534**
Valencia	2,310	794	2,820	259	1,716	**7,899**
Murcia	633	n.d.	---	n.d.	412	**1,045**
Sevilla	1,430	720	---	---	622	**2,772**
Asturias	445	n.d.	---	---	1,073	**1,518**
Málaga	964	554	---	---	263	**1,781**
Gran Canaria	1,094	1,508	---	---	---	**2,602**
Mallorca	1,226	532	n.d.	---	513	**2,271**
Bahía de Cádiz	---	300	---	---	244	**544**
Alicante	406	371	---	107	---	**884**
Vigo	928		---	---	---	**928**
Pamplona	836		---	---	---	**836**
A Coruña	614		---	n.d.	---	**614**
Zaragoza	2,144	299	---	---	---	**2,443**
Vizcaya	n.d.	n.d.	2,392	n.d.	n.d.	**2,392**

Data of Urban buses in Asturias refer only to the city of Oviedo
Source: OMM 2009, OMM 2008.

The length of the local or metropolitan public transport network varies with the geographic and demographic dimension of the concerned area. Obviously, the largest metropolitan areas in the country have the largest networks. In the case of railway-based modes, restricted to the railway infrastructure available, the length of the network is significantly lower than that of the buses, favoured from the flexibility offered by the urban and interurban road net.

Table 8. Total length of public transport

Km. 2007

Metropolitan Area	Urban bus	Suburban bus	Metro	Light Metro/Tram	Suburban railway	Total
Madrid	3,725	21,035	283	36	367	**25,447**
Barcelona	1,808	9,001	110	28.4	561	**11,508**
Valencia	871	2,126	122	15.9	355	**3,490**
Murcia	788	n.d.	---	2.2	203	**993**
Sevilla	531	1,567	---	1.3	622	**2,721**
Asturias	196	n.d.	---	---	577	**773**
Málaga	613	2,039	---	---	68	**2,720**
Gran Canaria	713	3,113	---	---	---	**3,826**
Mallorca	640	2,110	12	---	82	**2,844**
Zaragoza	557	3,551	---	---	---	**4,108**
Bahía de Cádiz	---	2,586	---	---	51	**2,637**
Granada	345	1,502	---	---	---	**1,847**
Alicante	246	510	---	18,4	---	**774**
Pamplona	359		---	---	---	**359**
Vigo	n.d.		---	---	---	**n.d.**
A Coruña	147		---	6,3	---	**153**

Data of Urban buses in Asturias refer only to the city of Oviedo

Source: OMM 2009, OMM 2008.

For a more precise comparison which allows to make relative the importance of networks length in such a heterogeneous areas, it is more appropriate to use as indicator the network density, i.e., the ratio between the network length and the area. Thus, it can illustrate the spatial coverage of the local public transport network. The density of urban buses network is much higher in Barcelona and Granada, with over 18 km of network per km^2, than in the remain urban areas considered. On the contrary, in cities such as Zaragoza and Murcia, the urban bus network density is invaluable, because of their small population density, according to their large municipality areas. In these particular cases could have work better an analysis of the network length in per capita terms. There are generally large differences between some areas. Compared to the urban buses, the network density of suburban bus services is significantly smaller, corresponding the higher values, within 2.5 and 3.0 km. / km^2, to Madrid and Barcelona. Metro and, particularly, suburban railways network densities are, as advanced, comparatively very small, highlighting only the value of the Barcelona Metro network, with less than 1.1 km./km^2 and, to a lesser extent, Valencia, with 0.9 km./km^2. Among the suburban rail networks, the highest densities are those of Seville (0.34 km./km^2), Valencia (0.25 km./km^2) and Barcelona (0.17 km./km^2) and the lowest those of Asturias (0.06 km./km^2), Madrid (0.05 km./km^2), Malaga (0.05 km./km^2), Mallorca (0.02 km./km^2) and Bahia Cadiz (0.02 km./km^2).

3. URBAN TRANSPORTATION FUNDING: THE SPANISH CASE

The financing of urban transport in Spain is determined by the jurisdiction, by the tariff system and the law on the financing of public transport.

The scope of competence can be summarized as:

- Urban transport has a municipal jurisdiction.
- In the area of the Autonomous Community of urban transport responsibility has been transferred to autonomous management.
- Finally, urban transport between communities and suburban rail transport is the responsibility of the state.

There is another condition that must be taken into account, the definition of urban transport. In the State Sector legislation on passenger transport LOTT distinguishes between two categories: Transportation, which runs entirely urban land, building land and linking different areas of the same municipality. Intercity transportation, which does not meet the above conditions.

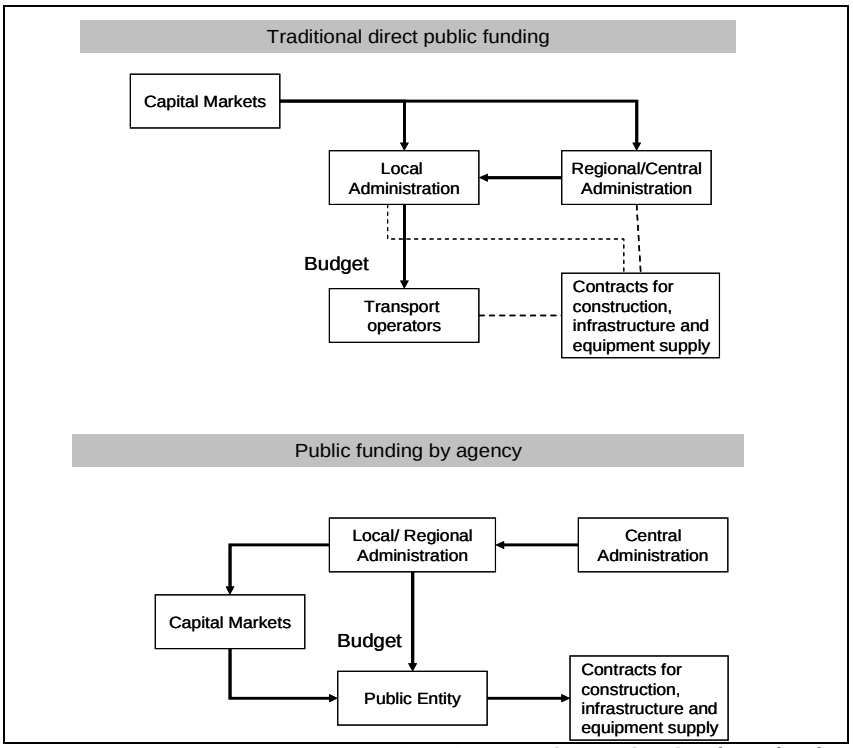
These are not the only definitions needed to understand the financing of urban transport in the Spanish case, the metropolitan transportation. The concept of metropolitan arises in subsequent legislation concerning the autonomous communities as a solution to the economic and social links that emerge between various municipalities that are part of a single conurbation. When these linkages result from the institutional perspective, the creation of a partnership approach between the authorities concerned to better meet the requirements arising is the metropolitan area.

Also bear in mind the figure of the Public Transport Authority that the proposed Sustainable Mobility Act defines "public agency responsible for planning and managing the public transportation system in a metropolitan area. Their role is crucial in the field of finance to channel the aid received from government service to operators of urban and metropolitan transport.

Major points of the Financing of Urban and Metropolitan Transportation could define through the data provided by ATUC (The Association of Business Managers Collective Urban Transport) in the conference on metropolitan transport funding on 10 July 2008 in Malaga "Mobility is a basic right of citizens enshrined in the Spanish Constitution, and its treatment and solution depend heavily on the level and quality of life in our cities. Responsibility for the urban and metropolitan transport are transferred to municipalities and communities. In Spain there are 8108 municipalities of which 120 are urban transport and 87 are included in the General State Budget appropriated for those 63 million euros. This contribution is distributed to cities as the length of the network (5%) and the average deficit (90%). This criterion, one might say that discourages good mobility management. In 1990, the grant covered 33% of the deficit of the operating companies, but in 2007 the coverage reached, only 16%."

The four models are usually identified funding for urban transport are: public funding budget models, non-budget public funding through business entities (such as RENFE Operator and ADIF in the case of railways), private funding models typically through of grant and funding models which jointly participate mixed public-private partnerships. In the Spanish case other than those specified for rail transport are of great importance in understanding the financing of urban and metropolitan transport, urban transit authorities and metropolitan who also have responsibilities not just for funding but also in management transport services.

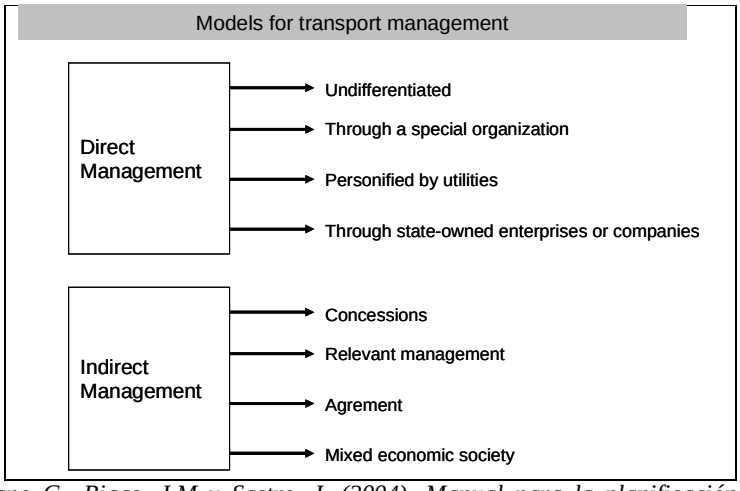
Graph 1. Financing systems of urban and metropolitan transport



Source: Zamorano C., Bigas, J.M y Sastre, J. (2004). Manual para la planificación, financiación e implantación de sistemas de transporte urbano.

In regard to public transport, management analysis is needed because the provision of services of urban and interurban transport receives subsidies from current spending to operate the service. In Spain, the degree of coverage represents a basic tool for action in this area. Two great models can be distinguished: direct management in which the government itself or by an autonomous public company conducted the service, and indirect management in which the administration gave the service management to a private company through a contract under the legislative provisions in force.

Graph 2. Management systems for public transport. (LOTT, 1987)



Source: Zamorano C., Bigas, J.M y Sastre, J. (2004). Manual para la planificación, financiación e implantación de sistemas de transporte urbano.

3.1 Public financing and investment of urban transport

3.1.1 The degree of coverage of public transportation: management indicator

The degree of coverage is derived from the relation: public contributions Income = tariff + operating costs + replacement investment. This formula is derived input requirements and the degree of coverage.

The management of urban and metropolitan transport is very focused on the production of car-km, as the rates that the extent and conditions of the tender is the responsibility of the competent authority, municipalities or consortia. In recent years, the coverage rate has a clearly declining trend because the rates have a strong social component and can not adequately reflect the production costs that grow progressively. Therefore, the management capacity on limited incomes is compounded at the moment because the demand is closely related to economic activity and business cost structure is rather rigid. The revenue falls and costs rise or what is the same, the financial balance requires higher contributions.

Metropolitan Mobility Observatory indicates that there is heterogeneity among the water tariff Spanish metropolitan areas. Large areas have crowns or fare zones, the fare is defined by the crown that used or areas that stand in the displacement.

Some of the consortia are implementing an integrated ticket valid in various modes of public transport, which is intended to facilitate intermodality between the different networks and businesses they serve.

Table 9. Ticket income

Millions €

Metropolitan Area	Urban bus	Suburban bus	Metro	Light Metro/Tram	Sub. railway (1)	Sub. railway (2)
Madrid	226.7	143.4	367.3	3.0	191.7	
Barcelona	110.6	71.1	188.3	9.1	113.0	56,6
Valencia	42,3	11,5	n.d.	n.d.	31,2	---
Murcia	14,3	n.d.	---	n.d.	6,6	---
Sevilla	36,1	6,7	---	---	6,8	---
Asturias	10,0	40,2	---	---	13,1	---
Málaga	26,4	8,1	---	---	9,6	---
Gran Canaria	20,2	42,5	---	---	---	---
Mallorca (3)	21,7	17,3	n.d.	---	---	4,0
Bahía de Cádiz		n.d.	---	---	3,4	---
Granada	15,1	9,6	---	---	---	---
Alicante	11,0	7,3	---	0,9	---	---
Vigo		13,6	---	---	---	---
Pamplona		16,5	---	---	---	---

Data of Urban buses in Asturias refer only to the city of Oviedo
(1) State-owned operator (2) Regional operator
Source: OMM 2009, OMM 2008.

The financial situation of public services, the coverage ratios are higher for bus services in the modes. With regard to other income chapter include some areas, especially larger ones, manage large amounts of money through advertising, which helps them to balance the costs.

Table 10. Financial coverage

% of costs covered by fares and other private and public sources. 2007

Metropolitan Area	Urban bus	Suburban bus	Metro	Light Metro/Tram	Sub. railway (1)	Sub. railway (2)
Madrid	60.6	42.8	51.8	18.6	n.d.	---
Barcelona	48.6	59.2	69.0	37.7	n.d.	77.0
Valencia	42.4	84.5	n.d.	n.d.	n.d.	---
Murcia	51.2	n.d.	---	n.d.	n.d.	---
Sevilla	46.3	40.4	---	---	n.d.	---
Asturias	78.4	n.d.	---	---	n.d.	---
Málaga	58.0	n.d.	---	---	n.d.	---
Gran Canaria	48.9	77.2	---	---	---	---
Mallorca	54.8	89.5	n.d.	---	n.d.	n.d.
Bahía de Cádiz	---	n.d.	---	---	n.d.	---
Granada	72.2	92.7	---	---	---	---
Alicante	60.3	62.1	---	28.4	---	---
Vigo		81.1	---	---	---	---
Pamplona		72.7	---	---	---	---

Data of Urban buses in Asturias refer only to the city of Oviedo
(1) State-owned operator (2) Regional operator
Source: OMM 2009, OMM 2008.

3.1.2 Specific programs funding the Spanish public transport

In the Spanish case in urban transport occurs both public funding and private funding.

Within public funding include those dedicated to investment and dedicated to finance current expenditure of the companies that perform services for urban public transport. Within the State contributions to these two concepts should be noted that in Spain there are three programs entered in the general state budget devoted to this end:

- 912 C Program dedicated to providing funding for the provision of urban public transport service to local corporations. The aid is granted to the holder of the service council and it is he who provides the subsidy to the municipal public corporation or the operating company as payment for the service of urban public transportation service.
- 513 B Grant Program and support to land transport, for the financing of current spending and the purchase of rolling stock required for the operation of metropolitan transportation. It is structured through program-contracts that aim to establish a stable funding framework for operating companies, so that all their needs are met during the contract period. Character is the entity responsible for the metropolitan transportation planning organization and responsible for signing the Contract Program and therefore receive the grant. Items of investment in rail infrastructure are outside this area because they have a specific program.
- Program 513 to rail transport infrastructures. Program to finance the construction of new rail infrastructure: Metro, tram commuter rail system.

We turn now to examine all these instruments in more detail.

Spanish Urban transport is a main focus on improving the mobility of citizens. The increasing mobility in cities has negative effects regarding the congestion and saturation of road infrastructure. Improved mobility has proven to be conducted through the development of public transport. Because of the strong support and funding requirements, development of public transport has only been carried out with strong support from public funding.

Specifically since 1990, the General State Administration has been funding urban transport through various procurement-Programs and Funding Agreements Railway Infrastructure. Following the promulgation in 1978 of the Spanish Constitution and the first statutes of autonomy, was transferred to the Autonomous Communities competencies in transport.

As funding affects the legal framework developed in the previous chapter, the law governing local government finances Law 39/1988, of December 30 stated in his fifteenth additional provision that the General State Budget would include in its credit for companies that operate the city public transport service. These precepts have been incorporated in the Royal Decree-Law 2/ 2004 of March 5 (fifth additional provision) for approving the revised text of the Law Regulating the local treasuries. Over the years the General State Administration has signed several contracts, programs and infrastructure funding agreements with the competent authorities.

The basic legislation on the financing of public transport is reflected in the Law Regulating the Basis of Local Government 7/ 1985 of April 2, Article 26.1.d in the Consolidated Local Treasuries, Royal Decree-Law before mentioned and the Laws of the State Budget.

The State General Administration provides funding for public transport through three budget programs:

3.1.2.1 Program 912 C Other contributions to local government: The Fund for the provision of urban public transportation service by local corporations

The Directorate General of Financial Coordination with local authorities manage urban transport subsidies to finance the provision of public transport service to municipalities over 50,000 population or more than 20,000 in each case.

This program is designed for urban public transport subsidy at least since the mid-'80s, when endowed with 5,000 million pesetas (known as Fund 5000).

The aid is granted to the holder of the service council, and this is who provides the subsidy to the municipal public corporation or the concessionary company transport service repayment.

- This fund has grown over the years in size and number of municipalities benefiting, as new cities were incorporated to seek help. In 1985 the fund was endowed with 5,000 million pesetas and were covered 25 cities in 1991 the fund increased to 5.250 million pesetas, the cities received was 64, in 2000 the fund amounted to 6927.8 million pesetas and 79 cities benefiting from the fund, in 2001 the fund amounted to 44.09 million euros (7.336,6 million pesetas) in 2006 the city hosted the fund were 84 and totaled 59 million euros in 2007 the fund is 62, 78 million euros (10,445 million pesetas).
- In 1985 the main beneficiaries were the municipalities of over 100,000 inhabitants, except Madrid and Barcelona, who had another form of management and since 1986, were incorporated municipalities of more than 50,000 since 1993 from over 20,000 people (only those that were more than 36,000 urban units). In 1998 local authorities are excluded that pass the Canary Islands have a particular program contract from 2002 and joined the provincial capital municipalities that have other transportation system.

The global fund is distributed among the different cities of the applicants based on specific criteria:

- 5% is given credit in terms of network length.
- A further 5% in terms of potential demand, ie the number of passengers depending on the number of inhabitants,
- The remaining 90% is for the average deficit per ticket, encouraging those who stained lower deficit. In virtually all cases the larger cities, not including Madrid and Barcelona, accounts for more than half of the endowment fund.

3.1.2.2 513 B Program Grants and land transport support: Contracts Program

The Ministry of Finance and Economy also provides state funding for public transport through the signing of a Contract, which represent a far greater contribution to the city you can get any Fund 5000.

The Contract-Programs are conceived as an instrument of support for public transport that is intended to improve regional mobility in a given geographical region. The specific objectives pursued are:

- Increasing public transport as a means of addressing the mobility needs and solve traffic congestion.
- The definition of a stable funding framework for companies that operate the transport service, compatible with the various budget scenarios Administrations involved.
- The financial recovery and to obtain an adequate level of coverage by the company, as a way to ensure greater efficiency in the provision of public passenger transport.
- Planning and integrated management of networks served by public transport companies, both those run by road or urban road infrastructure such as those of their own.
- Improving the quality of services, carrying out programs necessary investments.

The program is intended to finance current expenditure and the purchase of rolling stock necessary for the holding, investment items in rail infrastructure have a specific program.

The Contract Program aims to establish a stable funding framework for operating companies, thus attempts to cover all their needs during the signing of the Contract. This forces each part of the administration takes its rightful provide, the operating companies can not rely on increased borrowing.

In regard to financial restructuring, the General Administration of the State through the various contracts, and with the cooperation program of territorial governments, has been contributing money to the total extinction of the debts incurred by the operating companies, starting a consolidation path that remains today.

Regarding the State's economic contribution to the current needs, the approach adopted by the General State Administration has been changing over time. In this respect, we can identify four stages: from 1990 to 1993, from 1995 to 1997, from 1999 to 2001 and from 2002 to 2004.

Between 1990 and 1993, funding was based on a subsidy per passenger or passenger-km. During the second phase (1995 to 1997), binds to the above criteria determining a minimum operating coverage ratio and territory administrations undertook to finance,

having taken into account the contributions of the General State Administration, all operational and needs investment, so as not to allow the use of debt.

Between 1999 and 2001 eliminated the subsidy per passenger or passenger-km, keeping the other criteria. In this period the state went to finance a third of investment in expansion and 45% of operating losses, investment maintenance and financial expenses.

From 2002 to 2004 the General Administration of State Financial became a percentage of the needs of the period, so that these needs were financed by contributions from users and governments. No specific coverage ratio and minimum operating limit for borrowing.

Governed since 2005 as indicated in the PEIT (Strategic Infrastructure and Transport) 2005-2020 which includes a chapter (section 6.9.4.2 of the document) on improving the management and financing of urban mobility: "Within the respect to the competence framework in force is necessary to establish a stable base for management and financing of urban mobility during the first phase of PEIT as to maintain an active commitment to participation and support of AGE to solving the problems of urban mobility and metropolitan. This stable framework will be established in legislation with the appropriate range that includes:

- Fiscal instruments more flexible to local authorities, voluntary, linked to urban mobility, based on existing (review of the current road tax) or new figures.
- Defining the framework for allocating the contributions of AGE to metropolitan and local authorities for funding and improving public transport systems.
- Contracts Drive - Program as a framework for the development of the activity of public transport companies, as particularly effective tool for improving service quality and management of urban transport companies in big cities.
- Enabling a greater contribution from those beneficiaries of urban infrastructure, not being direct users, derive obvious advantages of its implementation.

Among the regulations is included in the PEIT as necessary development: Financing Framework Act and Transport Management Act and tariff systems for sustainable mobility.

A summary of the objectives of the Concession Contract and the main criteria used by the General State Administration when the current needs of the operating companies of urban and metropolitan public service.

This type of contract services are not accessible to all metropolitan areas, Valencia has taken over 10 years of negotiating the Concession Contract with the State in order to reach an agreement.

To qualify for this aid appears to be at least two preconditions: that there is an entity of metropolitan character has to take over the management and transport planning, in charge of managing the grants. And that the applicant metropolitan area also has a railway network of public transport (underground, in the case of Valencia and Barcelona have a well near Railway loan from their own), as this will incur an offer in bed-mile very than areas that only have bus service.

- Initially, and at least since 1985, this type of financing only given to Madrid and Barcelona. However, since 2004 has joined the Canaries and Valencia.

Table 11. Annual Total Funding for Program 513 B
Millions €

Metropolitan Area	2002	2003	2004	2005	2006	2007	TOTAL
Madrid	159.80	153.60	154.12	157.20	168.89	145.47	939.09
Barcelona	92.36	94.21	115.63	117.95	155.47	162.26	737.90
Valencia	13.70	13.97	37.76	37.76	35.87	36.44	175.51
Canarias			25.79	18.4	35.33	25.33	104.86
Annual Total Program 513 B	265.87	261.79	333.31	331.31	395.57	369.52	1957.38

Source: AGE.

- The purpose of the grant is more extensive than in the previous program as well as the urban service includes metropolitan service (urban and interurban transport of the municipality). In these cases it is considered both bus and rail service.
- As already mentioned the contribution of the State Contract Program is signed by the entities/authorities in the management and planning of public transport in the metropolitan area. These entities are: Consorcio Regional de Transportes de Madrid. Barcelona Metropolitan Autoritat. Entitat of Metropolitan Transport of Valencia ...).
- The criteria to quantify the contribution of the General State Administration (AGE) were initially a subsidy per passenger. In a second step these criteria to fixed percentages vary on different concepts: the operating deficit of the companies and currently the negotiation has abandoned all these technical concepts to be placed on the political relationship between administrations. It takes into account the overall needs and a certain per capita contribution of AGE on that basis. One example is that Barcelona is around 32 Euros per inhabitant per year and Madrid in some 28 Euros.

3.1.2.3 Program 513 A Rail Infrastructure

Program to finance the construction of new rail infrastructure. In the case it is the Valencia's metro infrastructure as well the tram.

Table 12. Annual Total Funding for Program 513 A
Millions €

Metropolitan Area	2002	2003	2004	2005	2006	2007	TOTAL
Bilbao	5.95	0.80					6.76
Barcelona	25.51	26.91	48.08	45	40	40	225.51
Valencia	14.12	14.90	15.83	18.23	17.3	15.11	95.50
Madrid	36.06	36.06	36.06	25.48	40	40	213.66
Sevilla				20.80	17.08	17.08	54.96
Málaga				5.59	9.31	9.31	24.21
Santa Cruz						10.18	10.18
Annual Total Program 513 A	81.65	78.68	99.97	115.11	123.69	131.69	630.81

Source: AGE.

The State contribution to investment is through the agreement signed with the Autonomous Communities (Catalonia. Board. Government ....).

The criteria for rail investment contribution for each city are unique but can distinguish a pattern of behaviour distinguishing between two specific periods: 1990-1993 and 1995-2005 (from this year is yet to develop the items included in the PEIT as mentioned above).

During the phase 1990-1993, the AGE finance, under the general budget of the state, the third of the cost of committing certain acts by the corresponding Autonomous

Community. In this period the activities funded were only considered priority by the State.

In the 1995-2005 period, this breaks the previous scheme and move to part-finance a third of those initiatives that meet minimum requirements:

- Budget Requirement: The final investment should not exceed a ceiling.
- Requirement of responsibility: The remaining two thirds of the investment should be financed by Regional Authorities under their budgets. The goal is clear, engaging through their budgets to the Regional Authorities.

At present it is pending for the development as agreed in the PEIT and as mentioned in relation to the Contract Program includes the development of legislation by at least two laws, one of funding and a sustainable mobility. In any case, the PEIT is approved and committed an expected financing of measures in urban and metropolitan for the period 2005-2020 to 32.527 million Euros.

The economic and financial framework governing the Strategic Infrastructure and Transport 2005-2020 (PEIT) is as follows:

- Given the political and strategic decision to meet: Demands of society and the needs of land vertebrate.
- Funding: It must guarantee the resources and delivery dates and must respect the goal of fiscal stability.

The input data for the implementation of this plan are: budgetary allocations for 2005, with average growth of 6% in nominal terms, public bodies and financially self-sufficient budgetary resources optimization and analysis of alternative ways of financing.

Below are specific cases of financing for each of the cities listed in the table above:

- Malaga.- For the financing of infrastructure (lines 1 and 2), the AGE contributes 33% of the 450 million estimated cost of construction of two subway lines about 175 million Euros, the Municipality accounts for 17% and the remaining 50% of the Andalusia. For this case, the European Investment Bank (EIB) has granted a loan of 260 million Euros for managing the society of suburban Malaga metro, which will have an amortization period of 30 years with minimal interest and five years lack.
- Seville.- It is estimated that construction of the metro will cost approximately Euros 660 million signed an agreement with the AGE and the Junta de Andalusia for the first third of the funds (218 million Euros). This contribution from the central government will be held for 30 years, with the following assignments: 20.8 million Euros in 2005, 17.08 million Euros in 2006 and 2007 and from 8.05 to 2008 and gradually decreasing until 2035 and in which will make a final payment of 3.6 million Euros.
- Granada.- The construction of the metro is estimated at a cost of about 276.22 million Euros excluding rolling stock. Awaiting central government that determines its contribution, the board has some agreements signed in 2006 with the municipalities of Granada and three other municipalities where an initial set of 83% funding by the board and 17% by the four municipalities.
- Canarias. Santa Cruz.- The construction of the tram line between Santa Cruz and La Laguna, whose cost is estimated at 172 million needs to be funded approximately 40% of the Canarian Government, 40% of the Cabildo of Tenerife and the 20% of other government and private contributions.

- Valencia annual spending on infrastructure FGV declared as follows:

Table 13. Annual spending on infrastructure FGV
Millions €

	2002	2003	2004	2005	2006	2007	TOTAL
FGV	81.64	85.47	91.23	64.24	56.56	22.31	401.47
AGE	14.12	14.90	15.83	18.23	17.3	15.11	95.50
% state contribution	17.3%	17.4%	17.4%	28.4%	30.6%	67.8%	23.8%

Source: AGE and FGV.

- In the Basque Country autonomous financing system is different from the general applied in the rest of the autonomous communities. Financing rail infrastructure in San Sebastian and Vitoria Trolley receives the Basque Government, through its Department for Transport on 60%, the Provincial Government of Guipuzcoano contributes 25% to 15% the Municipality of San Sebastian. In Bilbao, to rail transport infrastructure Ría 2000, the Basque Government contributes 65%. Bilbao Ria 2000 The foundation, composed of the Provincial Council of Bizkaia and the Basque executive takes 23.5%. the city of Bilbao 11.5% balance.
- Canarias, Santa Cruz, the construction of the tram line between Santa Cruz and La Laguna, whose cost is estimated at 172 million needs to be funded approximately 40% of the Canarian Government, 40% of the Cabildo of Tenerife and the 20% of other government and private contributions.

3.2 The private placement in the Spanish public transport

Spanish for private initiative has been incorporated in recent years mainly for construction and operation of various tram lines, establishing a new pattern of public-private participation.

Some cases that can be highlighted are:

- **Barcelona.** The local government through the Metropolitan Transport Autoritat (ATM) hires a contractor for the construction, equipping, financing and operation of the service. A licensee whose equity interests in construction companies (mainly FCC), system suppliers (Alstom), Operators (Coñees, CGT, behind, Sarbus) and banking companies (Societe Generale and Banco Sabadell).

  In this case the return to the contractor is assured by the operation of the system for 25 years and through transport subsidies provided by the public sector as operating aid.

  The public authority sets the rates and provides aid based on the number of passengers and the difference between the technical rate defined by the contractor in terms of operating costs and the actual average rate which is fixed about 50% the technical rate. Half of the group's revenues come from the contractor bills and other operating income and parallel to the half of the public subsidy.

  The contract system allows financial penalties based on the quality of service (mean in terms of timeliness. trade dress, cleanliness, service cancellation and vehicle availability installations).

  The start-up investment of Trambaix (15.2 km long) remain around the 231 million Euros, 146 for investment in infrastructure and civil works, 38 and 47 systems rolling. The Trambesós (14.1 km long) reaches an investment of 205 million euros, 111.5 in infrastructure and civil works, systems and 48.5 for rolling 45.

- **Madrid Metro line 9**, which links the towns of Rivas-Vaciamadrid and Arganda del Rey with the rest of the network. has a similar scheme to that of Barcelona. Private funding and public support to the difference in the operation. in this case is in charge of a public company, Madrid Rail, owned by Metro de Madrid.
- **Parla** municipality located in the conurbation of Madrid, has also recently undertaken the development of a tram system along the characteristics of public-private participation mentioned above. In this case the concessionaire in charge of project construction, operation, maintenance and acquisition of rolling stock in line 1 is Parla Tram Company Parla Tram SA. This company is owned by two of the most important Spanish construction group FCC (32.5%) and Acciona (42.5%), the bank Caja Castilla-La Mancha Corporation (15%) and the only Spanish tramway operator Detren (10%).

4. QUALITY OF URBAN TRANSPORT IN SPAIN

The quality of transport is determined by different variables fundamentally related to components of service such as speed, frequency, comfort, etc. For a complete perspective, the quality has to be evaluated considering processes before the actual transport service, that is, contracting and adjudication.

4.1 Quality of service in the process of contracting[6]

The system of public contest for the adjudication of urban transport is typical in cities of average size where the indirect management is more widespread. In big cities, the services of transport, in general, fall to a public company.

4.1.1 The quality in the regulation of transport

Spanish legislation establishes some directives about quality criteria in urban transport by road and railroad.

The law of the Arrangement of Terrestrial Transport (LOTT) and its Regulation (ROTT) establish the fare system by the grant of a special fare for those services that need it because of their comfort, quality, or other circumstances (article 87 now 86.2.c).

Regarding the railroads, the obligation is established by which the concessionaires must comply, in both construction and development, with the quality and safety criteria determined by the government.

The Strategic Plan of Infrastructure and Transport (PEIT) raised as one of its priorities the improvement of the quality of public transport by road by proposing a Letter of Rights and Obligations of the user where the conditions in which the services must be given are recognized, being expected that the quality criteria are to be included in the documents of conditions for the public contests of adjudication of grants of transport dependent on the Ministry of Public Works and Transport.

At the regional level, the decree 128/2003 highlights the disposition of the Government of Catalonia in that it establishes measures of innovation and improvement in the quality of regular transport travel in Catalonia, binding the titular companies of the grants to present a plan of innovation and improvement of quality in reference to the

[6] Vid. López-Lambas, M. E. y García Pastor, A. (2008): La calidad en el transporte público: el difícil equilibrio entre precio y nivel de servicio, *Estudios de Construcción y Transporte*, Revista del Ministerio de Fomento, num. 109, p. 153-167. That is used as a base to the paragraphs 4.1.a) and b).

situation of the fleet, accessibility, fare system, environmental management, disabled persons, etc.

Likewise, the Plan of Lines of Performance for Transport in Bus (PLATA) of the Ministry of Public Works and Transport with temporary force between 2003 and 2007 and participation in its elaboration by all the implied actors, included among its aims the increase of the quality of provision in services both of suppliers and of users.

Regardless of these normative advances, a legal obligation does not exist in relation with the establishment of quality requirements in public transport grants.

These are assumed in general to not include quality commitments, which means economic criteria predominates in the grants that are realized at present. Two questions have reduced the importance of the above-mentioned criteria of quality. The extension of twenty years established in 1987 by the LOTT for a good part of the grants of inter-city transport by bus (85%) end in a period of two years in 2012-13 and the fact that metropolitan and regional railway transport is not completely liberalized.

4.1.2 Quality and contracting

A case study[7] concerning 14 grants (5 subways or metropolitan railways and 9 buses) in different towns with populations between 50,000 and 750,000 inhabitants reveals that in contracts of transport by urban bus the quality elements have only been introduced in a gradual and scanty form, though in the case of subways or metropolitan railways these type of questions are contemplated with greater rigor.

4.2 The quality of service

The quality of service offered by urban transport in our cities is an essential part of attracting users. This quality can be observed across different indicators, among which speed and frequency are more relevant since they determine the time of the trip.

4.2.1 Commercial speed

In general a lesser commercial speed is observed in urban buses, with very low averages because of the infrastructure shared with the particular vehicles in spite of the existence of exclusive lanes whose efficiency is reduced by being little protected.

The speeds obtained in the urban buses is less than the registered speed of intercity buses; these share infrastructure with other vehicles but they have a greater distance between stops than local buses because of their longer run and they suffer less from traffic congestion.

Intercity buses resist well the comparison with traditional speed underground and light rail. The traditional railways, whether state or autonomous, operate at speeds higher than other modes of urban transport, because of the much greater distance between stations that allows for the higher speed of trains.

From the viewpoint of cities, it is not possible to draw many conclusions other than that the less metropolitan areas outperform the middle and large cities.

[7] See López-Lambas y García Pastor (2008).

Table 14. Average commercial speed

Km./h. 2007

Metropolitan Area	Urban bus	Suburban bus	Metro	Light Metro/Tramway	Sub. railway (1)	Sub. railway (2)
Madrid	13.7	n.d.	24.4	22.8	52.6	---
Barcelona	11.6	28.0	27.5	18.0	49.5	40.8
Valencia	11.9	22.0	35.3	17.0	63.9	---
Murcia	15.1	n.d.	---	n.d.	59.3	---
Sevilla	12.2	24.0	---	n.d.	60.9	---
Asturias	15.4	33.0	---	---	48.8	---
Málaga	13.0	36.0	---	---	41.8	---
Gran Canaria	14.8	27.1	---	---	---	---
Mallorca	16.8	34.5	55.4	---	---	54.8
Bahía de Cádiz	---	n.d.	---	---	53.6	---
Granada	11.9	20.1	---	---	---	---
Alicante	11.7	15.8	---	17.0	---	---
Vigo	17.4		---	---	---	---
Pamplona	13.2		---	---	---	---
A Coruña	14.5		---	12.5	---	---
Zaragoza	13.6	29.4	---	---	---	---

Data of Urban buses in Asturias refer only to the city of Oviedo
(1) State-owned operator (2) Regional operator
Source: OMM 2009, OMM 2008.

4.2.2 Frequency

As to the frequency of service, the best records at rush hour are observed also in the biggest agglomerations which are trying respond to the higher demand. Between the modes of urban transport, the highest regularity corresponds to the underground and light rail transit. The suburban trains in the big cities also have a high frequency, though amongst them the time between services becomes especially long. As the buses are concerned, they also register better averages of frequency in big cities than in small ones though only the urban ones approach the standards of the railroads.

Table 15. Average Service Frequency on peek hour

Minutes. 2007

Metropolitan Area	Urban bus	Suburban bus	Metro	Light Metro/Tramway	Sub. railway (1)
Madrid	8.6	15.7	3.8	6.0	5.0
Barcelona	6.0	15.0	2.6	4.0	7.0
Valencia	6.0	15.0	n.d.	5.0	25.0
Murcia	21.3	n.d.	---	n.d.	30.0
Sevilla	8.1	20.0	---	n.d.	30.0
Asturias	22.2	n.d.	---	---	30.0
Málaga	9.0	23.4	---	---	30.0
Gran Canaria	n.d.	23.8	---	---	---
Mallorca	15.0	50.8	15.0	---	---
Bahía de Cádiz	---	15.0	---	---	30.0
Granada	11.0	20.0	---	---	---
Alicante	13.6	12.3	---	11.0	---
Vigo		23.0	---	---	---
Pamplona		13.3	---	---	---
A Coruña		12.0	---	15	---
Zaragoza	8.0	45.4	---	---	---

Data of Urban buses in Asturias refer only to the city of Oviedo
(1) State-owned operator(2) Regional operator
Source: OMM 2009, OMM 2008.

4.2.3 Service timetable

The daily hours of service indicate the availability of the mode during a day. Services are provided in a broad time range from 15.5 hours to 20 hours. Information is lacking on the weekends, where providing service 24 hours a day only takes place in Barcelona on holiday. Rail train services have lower amplitude in the hours of service.

Table 16. Service timetable width

N. of hours. 2007

Metropolitan Area	Urban bus	Suburban bus	Metro	Light Metro/Tram	Sub. railway (1)	Sub. railway (2)
Madrid	19.0	20.0	19,5	19,9	18,0	---
Barcelona	17.0	17.0	19,0	19,0	18,0	19,0
Valencia	19.5	18.8	17,3	18,8	18,0	---
Murcia	n.d.	n.d.	---	n.d.	18,0	---
Sevilla	18.0	17.0	---	---	16,0	---
Asturias	16.5	16.0	---	---	17,5	---
Málaga	18.0	17.6	---	---	18,0	---
Gran Canaria	16.0	19.0	---	---	---	---
Mallorca	19.0	17.8	16,6	---	---	17,5
Bahía de Cádiz	---	19.5	---	---	18,0	---
Granada	17.0	16.0	---	---	---	---
Alicante	16.0	15.5	---	17,0	---	---
Vigo	18.2		---	---	---	---
Pamplona	16.0		---	---	---	---
A Coruña	17.0		---	n.d.	---	---
Zaragoza	18.0	15.7	---	---	---	---

Data of Urban buses in Asturias refer only to the city of Oviedo
(1) State-owned operator (2) Regional operator
Source: OMM 2009, OMM 2008.

4.2.4 Average age of vehicles

The age of vehicles is another determinant of quality because a higher age implies further deterioration of its components. This generates less safety and convenience, which strongly influences the technology in that fleet renewal also means a substitution of improved technologies. The age of buses is low. The average age of the registered bus fleet of 58,248 units was in late 2005, according to the Traffic Department, 10.8 years. The case of Oviedo emphasizes this point in that it presents the lowest age in urban transport and, from further out, the highest age in suburban transport.

Table 17. Bus fleet average age

N. of years. 2007

Metropolitan Area	**Urban bus**	**Suburban bus**
Madrid	5.7	4.9
Barcelona	6.1	7.1
Valencia	6.7	8.9
Murcia	6.6	n.d.
Sevilla	4.7	5.0
Asturias	4.2	18.4
Málaga	5.0	7.4
Gran Canaria	8.5	8.3
Mallorca	6.0	8.2
Zaragoza	5.0	7.4
Bahía de Cádiz	---	6.2
Granada	4.7	7.8
Alicante	6.0	6.0
Vigo	5.4	
Pamplona	5.4	
A Coruña	6.9	

Data of Urban buses in Asturias refer only to the city of Oviedo
Source: OMM 2009, OMM 2008.

Railroads present a higher average ages. The age is lower in the major Spanish metropolitan areas. For comparison, the average ages of RENFE's regional trains is at present 20.4 years.

Table 18. Suburban Railway trains average age

N. of years. 2007

Metropolitan Area	Sub. railway (1)
Madrid	13.0
Barcelona	14.0
Valencia	16.0
Murcia-Alicante	26.0
Sevilla	20.0
Asturias	18.0
Málaga	17.0
Bahía de Cádiz	20.0
Vizcaya	17.0

(1) State-owned operator

Source: OMM 2009, OMM 2008.

4.3 Environmental quality

The replacement of polluting vehicles and the introduction of other more technologically advanced and environmentally friendly vehicles is a quality factor that reduces emissions and improves air quality and thus the health of people.

The percentage of the fleet of buses provided with clean vehicles presents, on the whole, important disparities. A range is observed that goes from very low percentages in Zaragoza or Las Palmas with a scanty 10% to Asturias with the whole fleet provided with clean technologies. In the suburban area, the proportion of buses with low emissions is in general more limited and homogeneous with a range of between 0.8% of Las Palmas and 37% of Pamplona with the exception that here the fleet is common to urban and suburban buses.

Table 19. Clean bus fleet

% over the whole fleet. 2007

Metropolitan Area	Urban bus	Suburban bus
Madrid	61.6	20.8
Barcelona	19.6	n.d.
Valencia	35.4	3.1
Murcia	17.0	n.d.
Sevilla	48.7	4.0
Asturias	100.0	13.8
Málaga	55.8	10.3
Las Palmas de Gran Canaria	9.7	0.8
Zaragoza	9.7	13.1
Bahía de Cádiz	---	11.3
Granada	n.d.	15.8
Alicante	n.d.	6.0
Vigo	21.6	
Pamplona	37.0	

Low emission fuels: Euro IV, Euro V, Hybrid, Biofuel, LPG, CNG

Data of Urban buses in Asturias refer only to the city of Oviedo

Source: OMM 2009, OMM 2008.

4.4 Social accessibility

Observatory of the Metropolitan Mobility with information recounted 2007 where it is observed that most of the cities objected to the study have high percentages not alone of their fleet, but also of their stations equipped totally for persons of limited mobility.

Nevertheless, the information about the latter element still is scanty.

Fares are another favourable element of social accessibility. In this respect, it turns out to be basic to have special fares for segments of population with some type of disadvantage, such as students and seniors citizens. In this regard, the percentage of effective users of these fares changes from some metropolitan areas to others, being more intensive between the seniors citizens, whose beneficiaries change from 0.68% of the whole of users of Asturias to 15.11% of those of Madrid. Between the students, the use of these fares presents a smaller range that fluctuates from 0.50% of the users in Alicante to 9.48% of those in Madrid.

Table 20. Special fares for transport disadvantages (students, senior citizens)
% of effective users involved

Metropolitan Area	Students	Senior Citizens
Madrid	7.14	15.11
Barcelona	1.26	---
Valencia	n.d.	n.d.
Murcia	8.10	10.24
Sevilla	n.d.	n.d.
Asturias	2.29	0.68
Málaga	5.21	9.69
Gran Canaria	0.98	3.32
Mallorca	8.99	8.35
Bahía de Cádiz	---	---
Granada	n.d.	n.d.
Alicante	0.50	3.32
Vigo	9.48	14.98
Pamplona	n.d.	n.d.

Source: OMM 2009, OMM 2008

The cost of the transport can act as a barrier as well as a factor of attraction. In this respect, the evolution of single ticket prices from 1990 until 2007 reveals that all transport services have raised their prices inside a certain homogeneity among the different modes of transport except the state railroad, which has substantially better performance. Between the different areas, only four do not overcome a 100% increase, whereas the rest describe a wide and high range of increases from 102% in Murcia to 344% in Zaragoza. In all the cases, the increases overcome the Regional Consumer Prices Index, with the exception of Vigo and Majorca. In state railway transport, the evolution of the fares, homogeneous for the whole country, has been much more contained, at 32%, and in all the cases below the regional consumer prices index.

Table 21. Single ticket trend with respect to consumer price index
Growth rate 1990 - 2007, except remarked cases

Metropolitan Area	Urban buses	Suburban buses	Metro	Light Metro/Tram	General CPI (Regional)
Madrid	156%	150%	156%	n.d.	87.4%
Barcelona	192%	n.d.	215%	n.d.	103.0%
Valencia	214%	191%	197%	197%	89.0%
Murcia	102%	n.d.	---	---	99.4%
Sevilla	238%	n.d.	---	---	88.0%
Asturias	157%	n.d.	---	---	93.1%
Málaga	58%	n.d.	---	---	88.0%
Gran Canaria	206%	n.d.	---	---	82.2%
Mallorca (1)	10%	30%	n.d.	---	34.6%
Bahía de Cádiz	---	n.d.	---	---	88.0%
Granada	184%	200%	---	---	88.0%
Alicante (2)	32%	32%	---	32%	17.4%
Vigo	88%		---	---	91.0%
Pamplona (3)	122%		---	---	69.1%
Zaragoza	344%	n.d.	---	---	91.6%

Data of Urban buses in Asturias refer only to the city of Oviedo
(1) from 1999 (2) from 2003 (3) from 1993
Source: OMM 2009, OMM 2008.

4.5 Territorial accessibility

The first measure of the territorial accessibility comes from the length of the networks. In this respect, in absolute terms, the length of the bus networks are different in all the metropolitan areas, except Asturias where it predominates over the railroad, the largest, thereby describing a range that goes from 77,10% of all lines up to 100% in four areas that do not have railway transport. The major network of bus transport in absolute terms is that of Madrid, which represents 97.3% of the whole of the extension of its respective regional network. The smallest is A Coruña, representing 95.9% of the total. The networks of suburban transport have in general a larger extension than those of urban transport, as also happens between railroad networks where suburban railroads are also the most extensive.

Table 22. Total length of the network
Km. 2007

Metropolitan Area	Urban bus	Suburban bus	Metro	Light Metro/ Tram	Suburban railway	Total	Area (Km^2)	
							Metrop. Area	Main City
Madrid	3,725	21,035	283	36,0	367	25,447	8,030	606
Barcelona	1,808	9,001	110	28,4	561	11,508	3,239	102
Valencia	871	2,126	122	15,9	355	3,490	1,415	137
Murcia	788	n,d,	---	2,2	203	993	n,d	886
Sevilla	531	1,567	---	1,3	622	2,721	1,851	141
Asturias	196	n,d,	---	---	577	773	10,064	187
Málaga	613	2,039	---	---	68	2,720	1,258	395
Gran Canaria	713	3,113	---	---	---	3,826	1,560	101
Mallorca	640	2,110	12	---	82	2,844	3,624	214
Zaragoza	557	3,551	---	---	---	4,108	2,234	1.063
Bahía Cádiz	---	2,586	---	---	51	2,637	2,425	12
Granada	345	1,502	---	---	---	1,847	861	19
Alicante	246	510	---	18,4	---	774	355	201
Pamplona		359	---	---	---	359	82	25
Vigo		n.d.	---	---	---	n.d.	109	109
A Coruña		147	---	6,3	---	153	37	37

Data of Urban buses in Asturias refer only to the city of Oviedo
Source: OMM 2009, OMM 2008.

In terms of the spatial density of the network, Pamplona obtains the best results with that of (4.38 km/km2), while the least dense turns out to be Asturias (0.08 km/km2). The networks of the big metropolitan areas present amongst all of them high densities with 3.55 km/km2 corresponding to Barcelona and 3.17 km/km2 to Madrid.

Table 23. Local transport density (km/km2)

Metropolitan Area	Bus (urban + suburban)	Rail (metro+ Tram +suburban)	Bus+Rail
Madrid	3.08	0.09	3.17
Barcelona	3.34	0.22	3.55
Valencia	2.12	0.35	2.47
Murcia (1)	0.89	0.23	1.12
Sevilla	1.13	0.34	1.47
Asturias	0.02	0.06	0.08
Málaga	2.11	0.05	2.16
Gran Canaria	2.45	0.00	2.45
Mallorca	0.76	0.03	0.78
Zaragoza	1.84	n.d.	1.84
Bahía Cádiz	1.07	0.02	1.09
Granada	2.15	n.d.	2.15
Alicante	2.13	0.05	2.18
Pamplona	4.38	n.d	4.38
Vigo	n.d	n.d	n.d
A Coruña	3.97	0.17	4.14

(1) Main City
Data of Urban buses in Asturias refer only to the city of Oviedo
Source: OMM 2009, OMM 2008.

The transport networks for bus, given their pre-eminence over railway transport, present densities very near to the values of the whole set of modes, with the densest at 4.38 km/km2 (Pamplona) and least dense at 0.02 km/km2 (Asturias).

Rail networks have comparatively low densities, excluding those that are missing data, they lie in a range between 0.02 km/km2 (Asturias) and 0.35 km/km2 (Valencia).

Another important measure in spatial accessibility comes from the existence of park-and-rides present in suburban or urban spaces to favour the exchange of modes of access to the cities, replacing the private vehicle with collective transport that is trying to be promoted.

Between the metropolitan areas stands out clearly the situation of Madrid and Barcelona with an endowment substantially higher than the rest in the number of park-and-rides.

In terms of density with regard to the inhabitants of every area, a major concentration is also observed in both big metropolitan areas of Spain, with 3,4 park-and-rides for every 1000 inhabitants in Madrid 2.7 in Barcelona. These results contrast with the density of such parking spaces obtained by Vizcaya (0.4 parking spaces per 1000 population) and Seville (0.3).

Another limiting element is the price since it determines in a relevant way the use of the park-and-ride spaces. In this regard, Seville has a comparatively large number of places of where payment is required (50%) in stark contrast to the situation in Mallorca and Valencia where all seats are free.

Table 24. Nº of park and ride spaces for 1.000 inhabitants (2007)

Metropolitan Area	P&R places	Population	P&R places/1.000 inhab.	Payment %
Madrid	20,758	6,081,689	3.4	33
Barcelona	13,290	4,856,579	2.7	21
Valencia	1,662	1,739,946	1.0	0
Sevilla	400	1,246,460	0.3	50
Mallorca	917	814,275	1.1	0
Vizcaya	423	1,139,863	0.4	

Source: OMM 2009, OMM 2008.

The proximity or remoteness from a public transport network acts as an incentive or disincentive to the use of public transport. The percentage of users who have a nearby bus stop (less than 300 meters) is very high in urban transport, exceeding 82%, with the exception of the Bay of Cadiz where it only reaches 39%. The situation is good in the suburban passenger services to most areas with values above 74% except in Barcelona and Cadiz Bay, where only 52% and 25% of the respective users have a stop less than 300 meters away.

5. CONCLUSIONS

Urban transport organization in Spain differs greatly according to the size of the cities. In general, it has a decentralized structure, with competences at local, regional and national levels, as is the case with other policies related to mobility, e.g. urban and spatial planning, environment... Nevertheless, different cooperative arrangements have been fostered, being the most notable the Public Transport Authorities. These have emerged, on the basis of inter-institutional dialogue, as transport management independent agencies in the main urban agglomerations of the country.

Urban transport services receive operating subsidies, both for the direct and indirect management, when there is a contractual relationship with a private operator. There are also grants and support to land transport, for funding part of the current expenditures and the purchase, through program contracts, of rolling stock or vehicles required for the metropolitan transport operation. Investment in infrastructure leans on rail, metro or tram program contracts with the national or the regional Governments. Private initiative funding has been incorporated in recent years, mainly for the construction and operation of various tram and light metro lines, establishing a new pattern of public-private participation.

Local public transport services are generally subjected to government subsidies, as a result of higher operation costs than revenues. According to this, less efficient modes are rail services, especially trams and light metro, compared with buses. For locations, suburban services show less efficiency than urban services.

The Spanish local public transport system shows a modal shift in which a 52% of the trips correspond to bus services (urban and suburban), a 33% to Metro, a 14% to suburban rail and a 1% to tram and light Metro. The average local public transport use per capita is very low: 83 trips per year, which represents a scarce 9% of participation in the urban mobility of the country, compared to private vehicle (43%), and non mechanized modes (45.5%). Spanish mechanized urban mobility pattern responds primarily to an overall option for private vehicle. Madrid and Barcelona, the two biggest metropolitan areas of the country, are the only local territories with a substantially higher average number of trips per inhabitant and year, with figures of 276 and 192, respectively. Within any metropolitan area, highest demand values, in passenger-km.,

correspond to rail modes (Metro and suburban railway) with regard to buses services, due to the frequent use of railways for longer trips than those made by bus. The greatest per capita use of any local public transport mode corresponds to the Metro service in Madrid and Barcelona. With the exception of these two areas, the provision of suburban services, both rail and bus, is inferior to that of urban services, highlighting the overall lack of consolidation of the metropolitan public transport systems, which seems to suggest the remarkable presence of private vehicle in the interurban daily trips within metropolitan areas.

The quality of public transport services is determined by different variables, which, in general, offer big differences among the diverse metropolitan areas, in terms of frequency, comfort, timetable, vehicles average age, environmental impact, social and territorial accessibility, etc. Commercial speeds are, therefore, more homogeneous for areas and result faster in rail modes than in bus services and also in suburban modes than in urban ones. With a few exceptions, increases in local public transport fares overcome the Regional Consumer Prices Index.

Future prospects of local transport are seen positively, considering that the great efforts of lines and equipment modernization which has been done in recent years have improved very noticeable the average quality of services. The limit to these positive perspectives are the increasing urban sprawl, the demand for private car and the growing traffic congestion, elements which determine the efforts for quality.

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  - Autoritat del Transport Metropolità de Barcelona: www.atm-transmet.org
  - Consorcio de Transportes de Bahía de Cádiz: www.cmtbc.es
  - Consorcio de Transportes de Granada: www.ctagr.com
  - Consorcio de Transportes de Málaga: www.consorciotransportes-malaga.com
  - Consorcio de Transportes de Sevilla: www.consorciotransportes-sevilla.com
  - Consorcio de Transportes de Asturias: www.consorcioasturias.com
  - Consorcio de Transportes de Bizkaia: www.cotrabi.com
  - Consorcio Regional de Transportes de Madrid: www.ctm-madrid.es
  - Entitat de Transport Metropolita de Valencià: www.etmvalencia.es
  - Mancomunidad de la Comarca de Pamplona: www.mcp.es

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