# Metropolitan Mobility OBSERVATORY (MMO)

Summary Report
Data **2017**

## The Metropolitan Mobility Observatory (MMO)

The objective of the present document is to summarize the information contained in the 2017 MMO Report, developed by TRANSyT-UPM analyzing the data provided by its members and collaborators.

The MMO is an analysis and observation initiative made up of the Public Transport Authorities (PTA) of the main Spanish metropolitan areas, the Ministry for Ecological Transition and the Ministry of Public Works and Transport. It collaborates very closely as well with the National Railway Operator (RENFE), the Association of Collective Urban Transport (ATUC), the Directorate General of Traffic (DGT), the Spanish Federation of Municipalities and Provinces (FEMP) and the CCOO Trade Union Federation.

Its main goal is to reflect the contribution of public transport to the improvement of the quality of life and sustainable development in the Spanish cities. This contribution is reflected in the analysis of the general mobility tendencies of the main metropolitan areas, which is done through the study of a set of key transport indicators including public transport supply and demand, financing and investments, quality of service and road safety.

For the 2017 MMO Report, **22 PTA*** (out of 24 included in the MMO) provided information, which represents approximately the 54% of the nation's population. The rest of the information was provided by usual collaborators of the MMO, like RENFE, the Directorate General of Traffic and the National Statistics Institute.

## Main Figures

The following figures summarise some important information about the urban and metropolitan mobility in 2017 in the 22 participating metropolitan areas:

- The annual public transport demand for the areas considered in the report is **24.658 billion passenger-km** (33% for bus and 67% for rail modes).
- The **number of journeys per inhabitant per year** differs according to the size of the metropolitan area. The average is **127** journeys per inhabitant per year in large areas and **60** journeys in mid-sized and small areas.
- A total of **3.592 billion public transport journeys** were made, 1.756 billion by bus and 1.835 billion by rail modes. In spite of the similarity of both figures, it is remarkable the great difference between the lengths of the network that support these journeys: 131,151 km for bus lines and 3,210 km of rail network.
- **Investment** in public transport in 2017 was quite high, reaching **920.3 million euros** most of which was dedicated to infrastructure. It is also significant the amount of these investments dedicated to rail modes, 81%.
- The public transport supply is about **677 million vehicle-km for bus** services and **347 million car-km for rail modes** (not included Cercanias RENFE).
- The **average coverage ratio is 52.2%.** While metropolitan area transport systems which include rail modes have an average coverage ratio of 45.5%, those which consist exclusively of buses present an average of 55.5% coverage.

**Madrid, Barcelona, Valencia, Seville, Bizkaia, Asturias, Malaga, Mallorca, Saragossa, Cadiz Bay, Gipuzkoa, Camp de Tarragona, Granada, Almeria, Alicante, Lleida, Pamplona, Campo de Gibraltar, Corunna, Jaen, Leon and Caceres.*

*This summary illustrates key findings on the diversity of public transport systems and public transport policies in the largest Spanish metropolitan areas.*

*For more on previous editions, see the publications section of www.observatoriomovilidad.es.*

## General characteristics of the metropolitan areas on January 1st, 2017

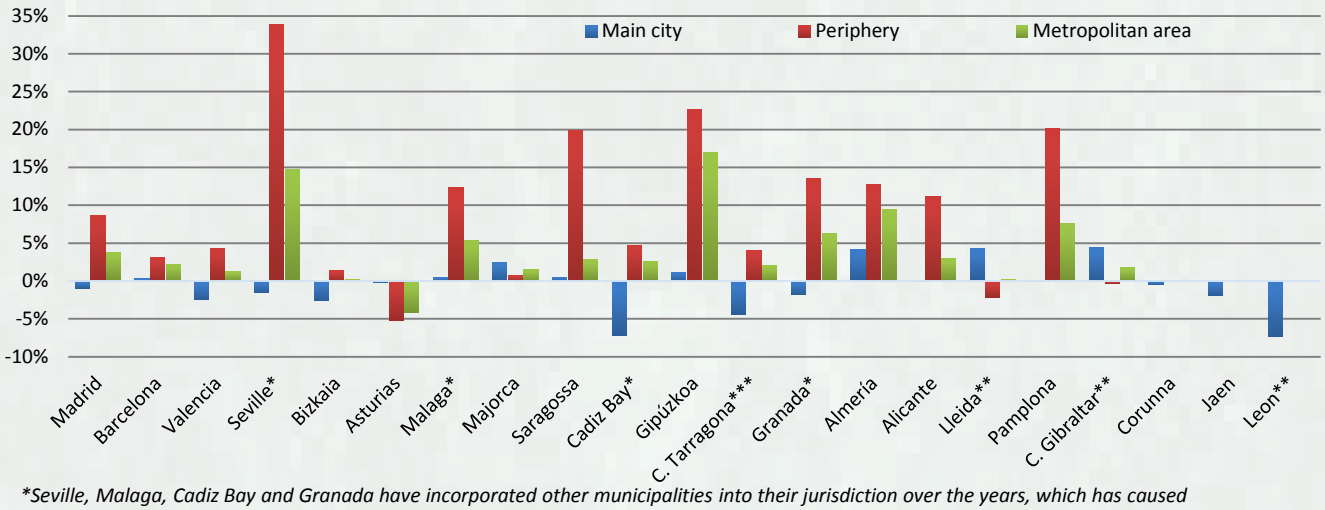
| | Metropolitan area (PTA Action Sphere) | | | | | Main city | | | Main city/ Metropolitan area population ratio |
|---|---|---|---|---|---|---|---|---|---|
| | Surface ($km^2$) | Population (inhab.) | Density ($inhab/km^2$) | Number of municipalities | Built-up area ($km^2$) | Surface ($km^2$) | Population (inhab.) | Density ($inhab/km^2$) | |
| **Madrid** | 8.030 | 6.507.184 | 811 | 179 | 921 | 605 | 3.182.981 | 5.261 | 49% |
| **Barcelona** | 3.239 | 5.034.612 | 1.554 | 164 | 3.242 | 102 | 1.620.809 | 15.969 | 32% |
| **Valencia** | 1.551 | 1.798.608 | 1.160 | 60 | 306 | 138 | 787.808 | 5.709 | 44% |
| **Seville** | 4.221 | 1.484.365 | 352 | 45 | 225 | 141 | 689.434 | 4.879 | 46% |
| **Biscay** | 2.217 | 1.148.302 | 518 | 112 | 241 | 41 | 345.122 | 8.418 | 33% |
| **Asturias** | 10.604 | 1.034.960 | 98 | 78 | n.d. | 187 | 220.301 | 1.180 | 21% |
| **Malaga** | 1.432 | 1.025.267 | 716 | 15 | n.d. | 395 | 569.002 | 1.441 | 55% |
| **Majorca[1]** | 3.623 | 868.693 | 240 | 53 | 212 | 214 | 406.492 | 1.903 | 47% |
| **Cadiz Bay** | 3.312 | 820.489 | 248 | 12 | n.d. | 14 | 118.048 | 8.313 | 14% |
| **Saragossa** | 2.920 | 772.999 | 265 | 30 | 2.863 | 938 | 664.938 | 709 | 86% |
| **Gipuzkoa** | 1.980 | 719.282 | 363 | 89 | n.d. | 73 | 186.370 | 2.553 | 26% |
| **Tarragona Camp** | 2.999 | 612.185 | 204 | 132 | 188 | 65 | 131.507 | 2.017 | 21% |
| **Granada** | 861 | 532.053 | 618 | 33 | 94 | 88 | 232.770 | 2.645 | 44% |
| **Almeria** | 2.154 | 521.053 | 242 | 9 | n.d. | 296 | 195.389 | 660 | 37% |
| **Alicante** | 354 | 465.782 | 1.314 | 5 | 74 | 201 | 331.577 | 1.647 | 71% |
| **Lleida** | 5.586 | 361.138 | 65 | 149 | 182 | 212 | 137.327 | 648 | 38% |
| **Pamplona** | 92 | 343.268 | 3.745 | 18 | 50 | 25 | 197.138 | 7.857 | 57% |
| **Gibraltar Camp[2]** | 1.520 | 268.417 | 176 | 7 | 432 | 88 | 121.133 | 1.376 | 45% |
| **Corunna** | | | | | | 38 | 244.009 | 6.421 | 100% |
| **Jaen** | 1.760 | 225.934 | 128 | 15 | n.d. | 424 | 114.238 | 269 | 51% |
| **Leon** | 913 | 204.281 | 224 | 16 | 21 | 39 | 125.317 | 3.211 | 61% |
| **Caceres** | n.d. | 96.684 | n.d. | 1 | 21 | 1.760 | 96.684 | 55 | 99% |

*1: Built-up area data of 2009*
*2: Built-up area data of 2007. Estimate based on the progress of the Metropolitan Transport Plan for metropolitan data.*
*Source: compiled by authors based on data provided by the PTAs*

## Evolution of population and other socioeconomic indicators

The population in the period 2008-2017 grows by 4.2% in all the whole metropolitan areas; however the population is concentrated in the periphery (+ 9.1%), while in the main cities the population decreases by 0.4%. The peripheries of Seville and Gipuzkoa have increased their population the most since 2008, with increases of 15% and 17% respectively. As for the cities, Leon and Cadiz are the ones are the ones with the sharpest decreases in population in this period, with values over 7%.

***Variation of population in metropolitan areas between 2008 and 2017***

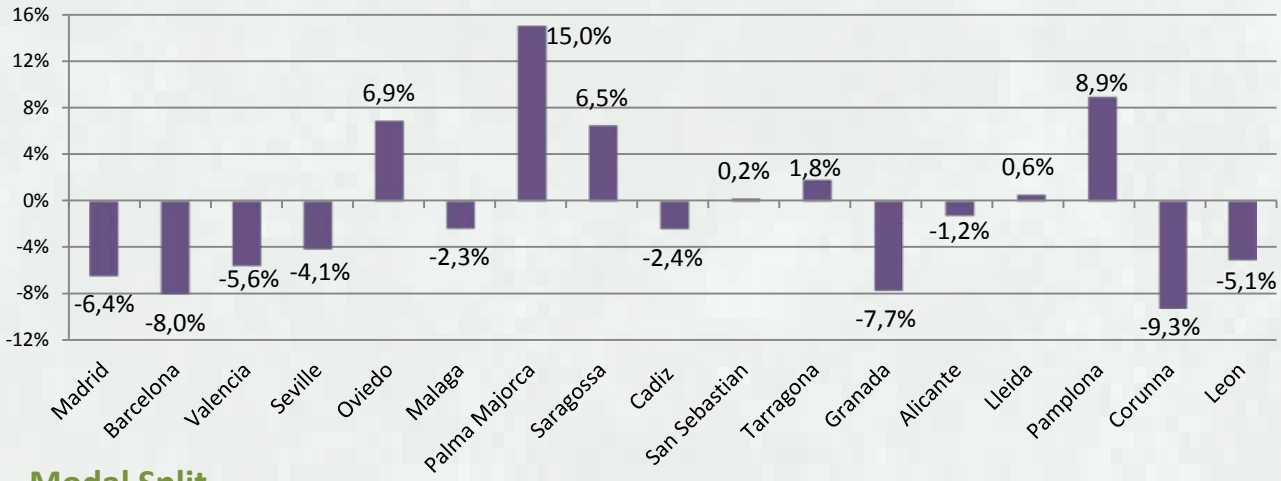



**Seville, Malaga, Cadiz Bay and Granada have incorporated other municipalities into their jurisdiction over the years, which has caused major population variations.*
***Lleida and Campo de Gibraltar, variation between 2009 and 2013. Leon, variation between 2010 and 2017.*
****The loss of population in Tarragona is due to segregation of Canonja township in 2010.*
*Source: compiled by authors based on data provided by the PTAs.*

The economic crisis in recent years influenced very strongly the **unemployment rate** between 2008-2013. Since then, it has been recovering year by year, and in 2017 the average unemployment rate in the areas considered is about 17.7 %, higher than the national average (17.2% ).

The effects and consequences of this economic crisis could be seen in the slight decline of the **motorisation rate** since 2008. The next figure shows that all cities have reduced the motorisation rate between 2008-2017, except for Palma Majorca, Pamplona, Oviedo, Saragossa, Tarragona, San Sebastian and Lleida. In 2017, the number of cars per 1,000 inhabitants, on average, was 471 in the main cities; whereas it was 448 in the metropolitan areas.

***Variation of the motorisation rate in cities (2008-2017)***

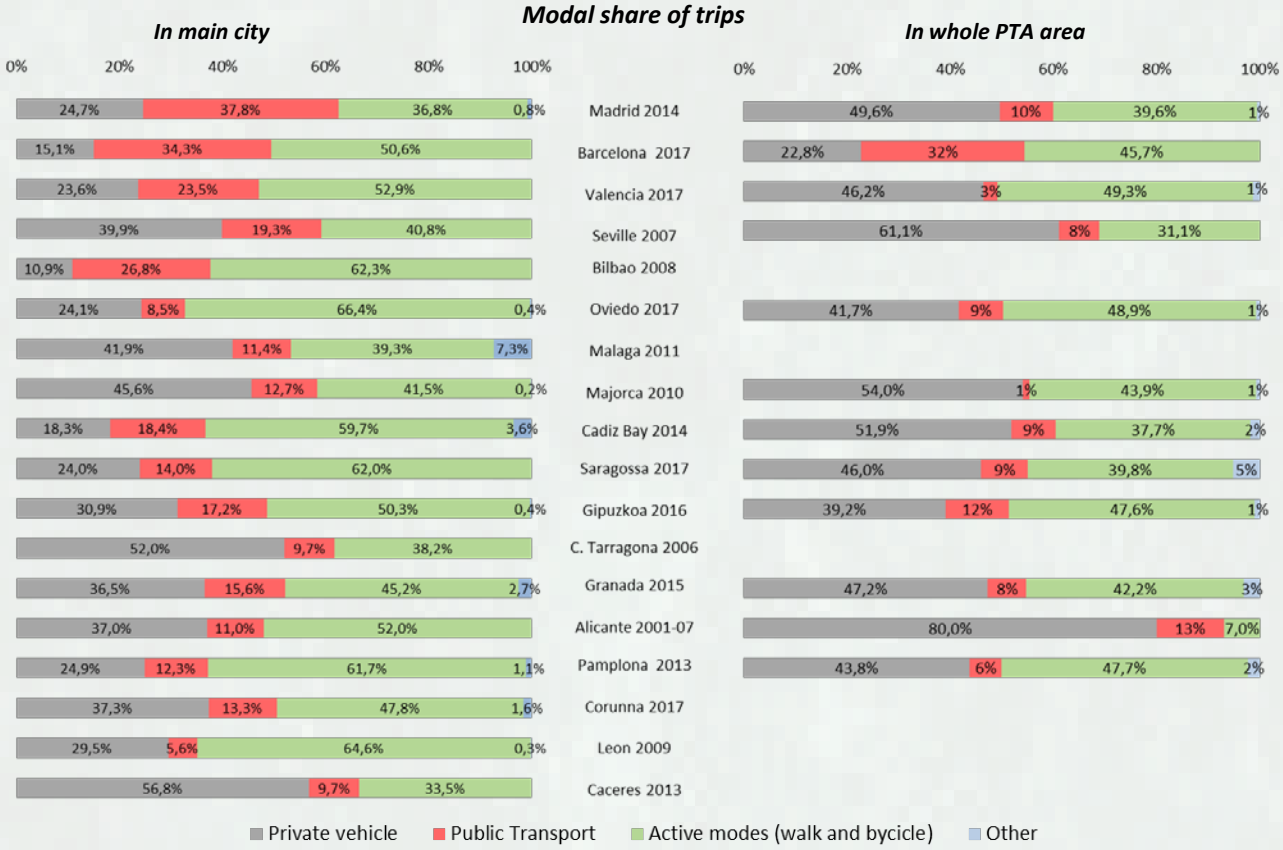



## Modal Split

For all motives, the average modal share for **public transport** in the metropolitan areas is more than 12%; however, in Madrid, it reaches a 28.4% while in Cadiz Bay it is 4.1%.

On average, active modes (walking and cycling) account for 45% of the trips and private cars and motorcycles for 43%. It is remarkable the case of the two main big cities, since Barcelona has a rate of 50.6% in active modes and Madrid accounts for a 37.8% of public transport trips. Those two cities show two different characteristics, while in the first one exists a deep-rooted habit of walking/biking, in the second one it is highlighted the high use of the public transport system.

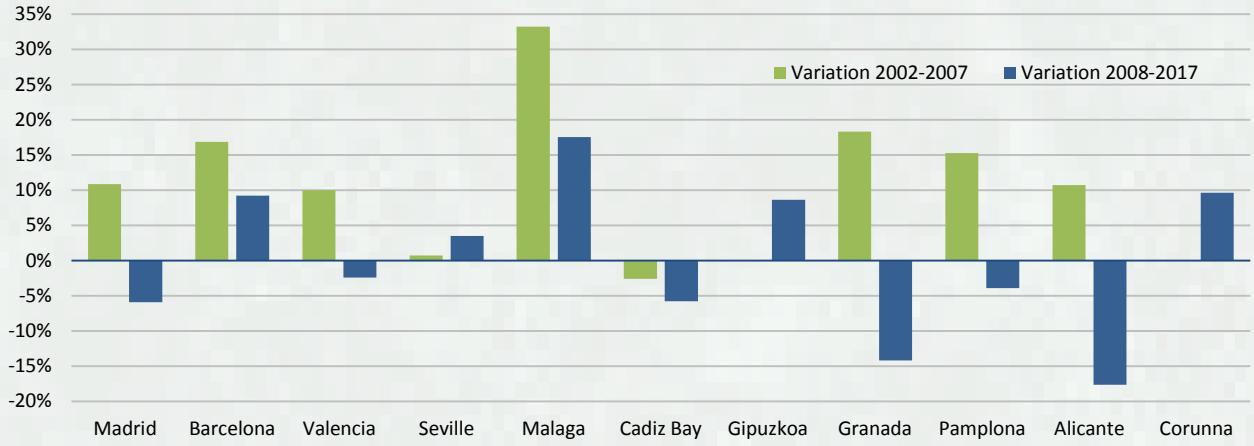
***Modal share of trips***



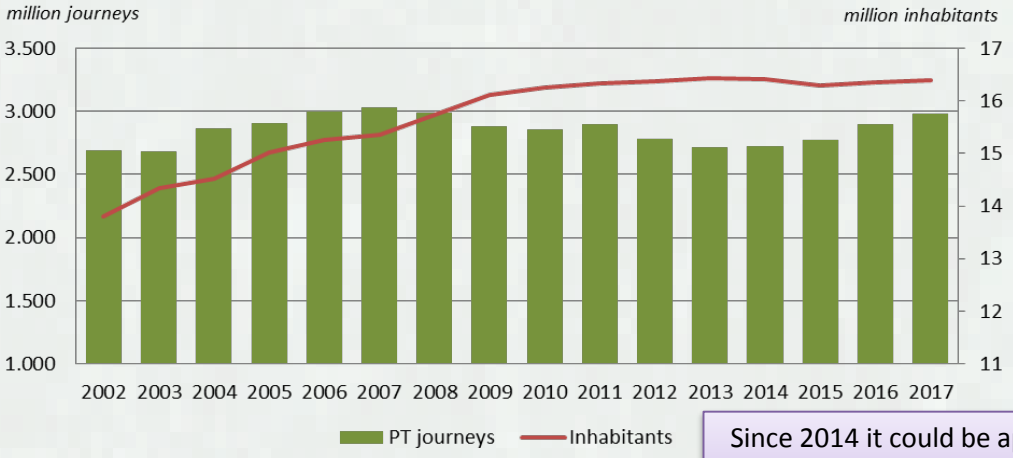
## Demand for Public Transport

Two phases can be distinguished in the variation of the public transport demand between 2002 and 2017. First, on between 2002 and 2007 there is a general growth of a 12.7% in public transport demand, specially in rail modes journeys (22.6%) against the bus journeys (3.3%). And, second, between 2008 and 2017, where there is **an overall decrease of 0.2% in the number of public transport trips;** however, between 2016 and 2017 there is an increase of 2.9 % in the PT journeys. Areas like Malaga, Barcelona or Seville show increase of PT demand in the two periods.

***Variation of public transport journeys between 2002 and 2017***




***Evolution of public transport journeys as compared to population***



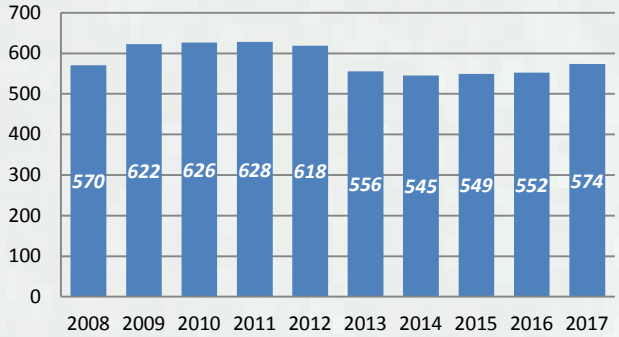

*Only considered Madrid, Barcelona, Seville, Malaga and Granada.*
*Source: compiled by authors based on data provided by the PTAs.*

Since 2014 it could be appreciated a **recovery of the PT demand**, after the strong decrease suffered during the economic crisis.

## Public Transport Supply

The supply of bus services (in terms of vehicles-km) has decreased between 2012 and 2014, when it stabilizes o increases slightly.

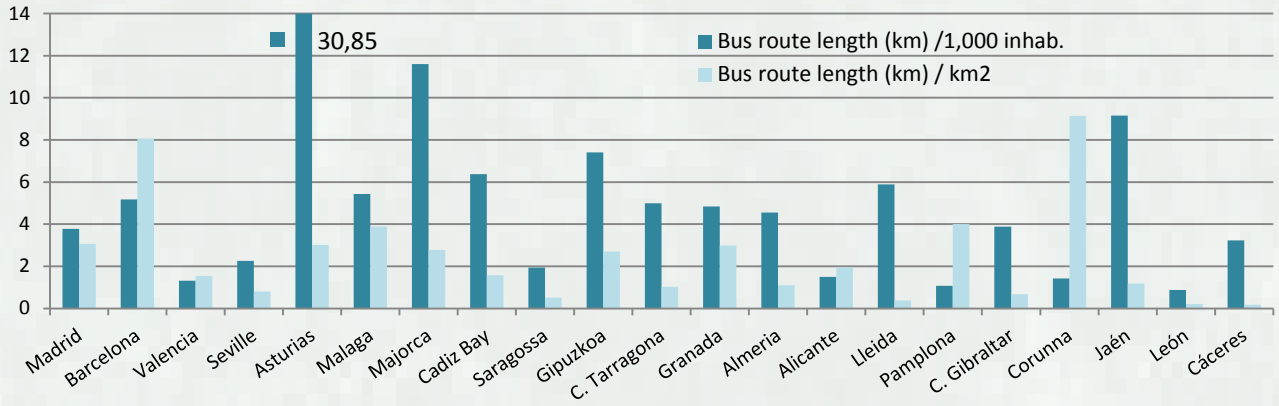
***Public Transport supply of bus services (million vehicles-km)***




Concerning the **bus networks density**, the average is 5.4 km per 1,000 inhabitants, being Asturias and Majorca much above this value, with more than 10 km per 1,000 inhabitants. Relating route density with surface area, Corunna and Barcelona reach the highest figures, with 9.1 km/km$^2$ and 8.1 km/km$^2$, respectively, being 2.3 km/km$^2$ the average.

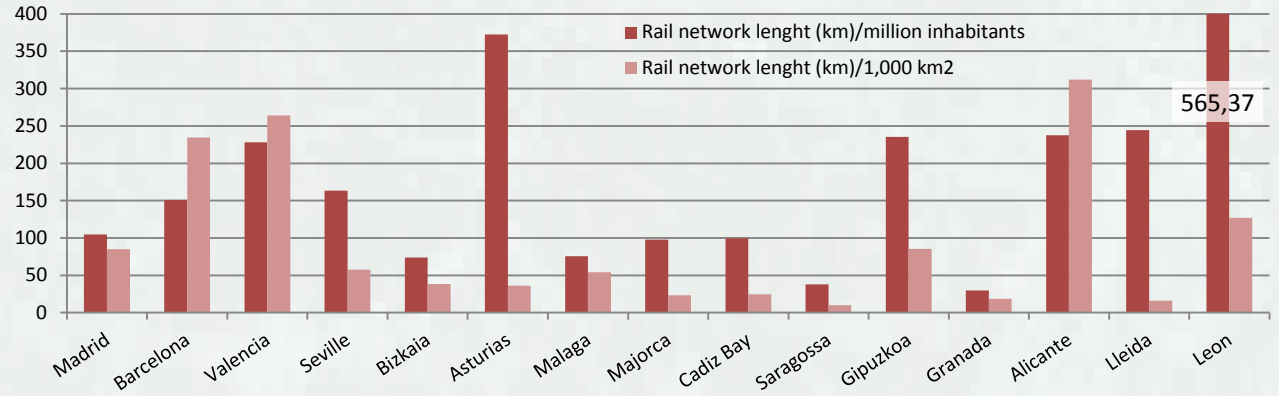
Since rail transports cover long distances as they are more efficient, the **rail network density** is higher for larger population's areas. The average in Spain is 146 km length per million inhabitants and 66 km per 1,000 km$^2$, an average which is exceed in the case of Asturias due to the great length of FEVE commuter lines with a density of 372 km per million inhabitants, or in Valencia, with 264 km per 1,000 km$^2$.

***Bus network density (2017)***




*Cadiz Bay and Campo de Gibraltar: only metropolitan buses.*
*Source: compiled by authors based on data provided by the PTAs.*

***Rail network density (2017)***

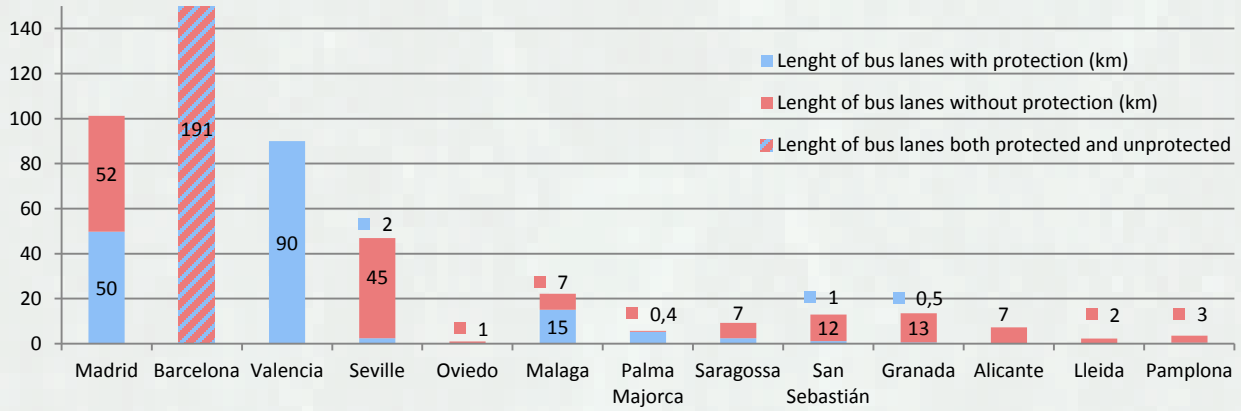



*Source: compiled by authors based on data provided by the PTAs and the RENFE Directorate General of Passengers.*

- ## Bus Lanes

Lanes reserved for exclusive or preferential use of public transport are essential to be competitive with respect to cars. These lanes are more effective if they have some type of protection. In 2017, Barcelona shows the highest length of bus lanes in its network (191 km) which leads it to be the city showing the highest ratio of bus lanes respect to its total bus network (21%). It is followed by Seville and Madrid, with a 12.6% and 6.4% respectively of bus lanes on its bus network, mostly with protection.

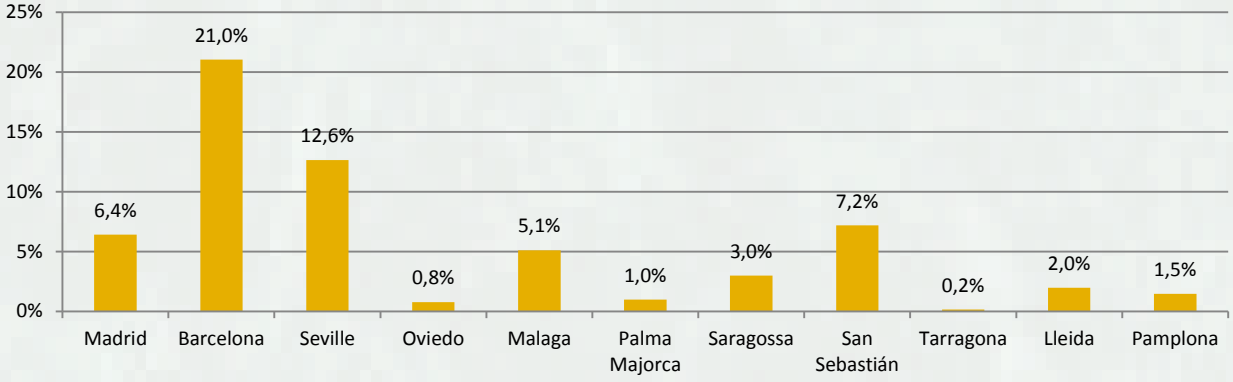
***Length of bus lanes in main city (2017)***




*Source: compiled by authors based on data provided by the PTAs.*

***Percentage of bus network with bus lanes in main city (2017)***

*km bus lane / km urban bus network (%)*

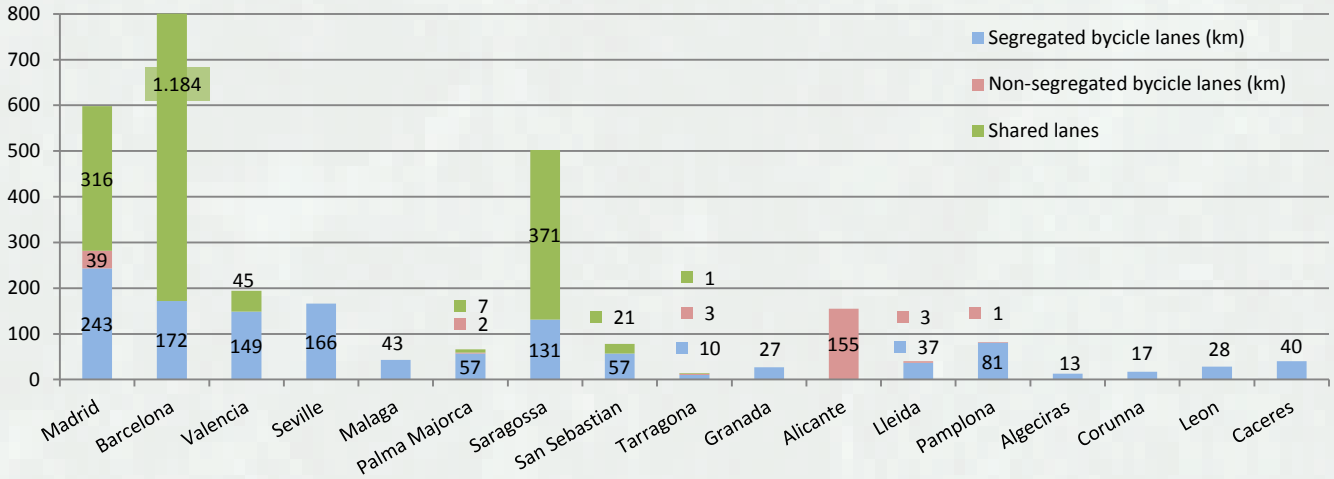



*Source: compiled by authors based on data provided by the PTAs.*

- ## Bicycle Lanes

The promotion of the use of bicycles in cities begins by having a reserved space for the circulation of cyclists, being adequate, safe and efficient. Next figure shows the length of three different types of bicycle lanes in Spanish cities: segregated and non-segregated bicycles lanes, and mixed traffic streets, where cycling is allowed but it is not as safe as in the previous ones. In most cases, the length of these lanes remains stable with respect to 2016. As shown, the bicycle lanes keep increasing, mainly due to the development of public bicycle sharing systems. The cities of Barcelona and Madrid are the ones with de longest lanes.

***Length of the bicycle lanes in the main city (2017)***

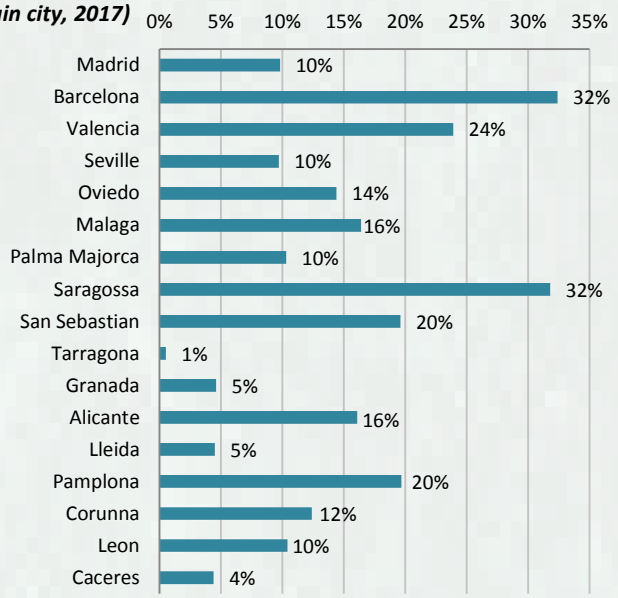



*Source: compiled by authors based on data provided by the PTAs.*

- ## ITS and users' information

Intelligent Transport Systems (ITS) in recent years has allowed an increase in the quality, efficiency, sustainability and safety of public transport. An example is the use of **smart cards**, which have proved to be an useful way to reduce the boarding time, thus decreasing the total travel time. Another key aspect to improve users' satisfaction with the PT services is the information provided to them. The provision of **real-time information at bus stops** has been proved to be very demanded by PT users, especially those do not use smartphones too much. Recently, many **mobile applications** (apps) have emerged in the public transport arena with different functionalities: maps and routes, travel planning, waiting time, real-time disruptions, users' opinion. All these are available in the different areas and for the majority of transport modes. However, there are some areas where the waiting time is not included on the apps.

***% bus stops provided with real-time information screens (buses in main city, 2017)***




*Source: compiled by authors based on data provided by the PTAs.*

## New forms of mobility

These new forms of mobility are based on the renting of a vehicle, where the customer pays for using it and not for owning the vehicle. One of the essential reasons of its expansion along the cities is the use of the smartphone for reserving it and starting and ending the trip.

There are multiple types of vehicles available such as cars, motorcycles, bicycles and Segway.

- ### Car-sharing

In this case the rental service can be charged per minute or hour. There are two different types of renting within this modality: Roundtrip car-sharing or Free-floating car-sharing. In the first one the customers begins and ends their trip at the same location, whereas in the second one they can start and end their trip at different situations.

We must not mistake this mobility form with car-pooling which is another form where the vehicle is privately owned by one of the users.

- ### Moto-sharing

This form of mobility has emerged in big cities, and most of these companies are based on free-floating system. Even though it has the same aim as the car-sharing, it has the advantages and disadvantages of motorcycles in the cities. Most of these vehicles are electric, and they have room for two people.

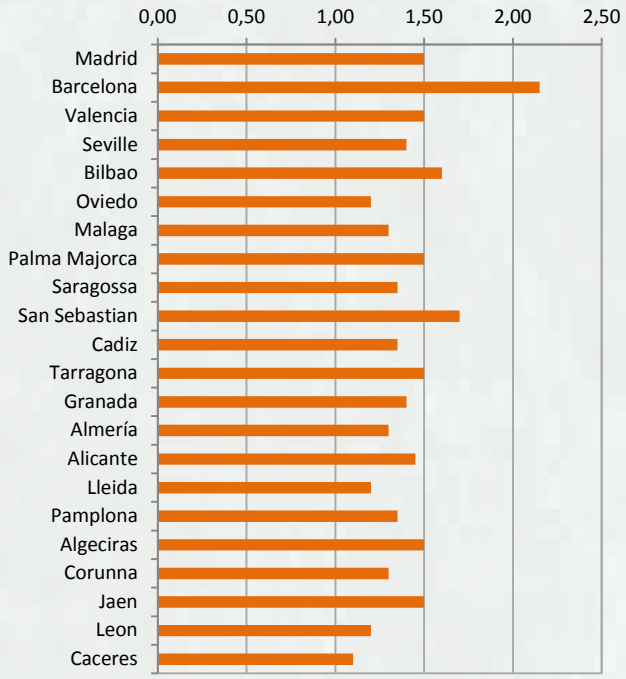
These new forms have become very popular due to their accessibility since the vehicles are usually electric, so they are not affected by the bans on combustion vehicles.

## Economic and fare-based aspects

- ### Ticket and fare types

There are many transport tickets in the different fare systems of the metropolitan areas. Some have wallet cards and others have temporary passes. Some areas have tariff integration, while in others there is not. The only common transport ticket in all areas is the single ticket in the main city, although the co-existence of different transport modes makes their fares different within the same city. In Madrid, the ticket most used is the monthly pass, by a 75% of the users. The wallet cards are the favourite transport pass in Bizkaia, Corunna, Jaen and Gipuzkoa, used by more than 70% of the users. Barcelona is the city with the highest tariff for the single ticket (2.15 €).

***Single ticket price for the main city (Euro, 2017)***



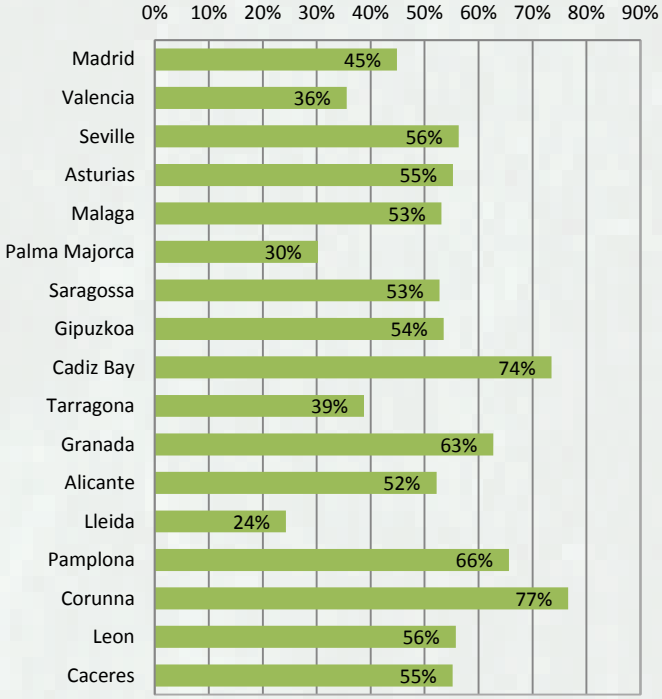

*Source: data provided by the PTAs.*

*Source: compiled by authors based on data provided by the PTAs.*

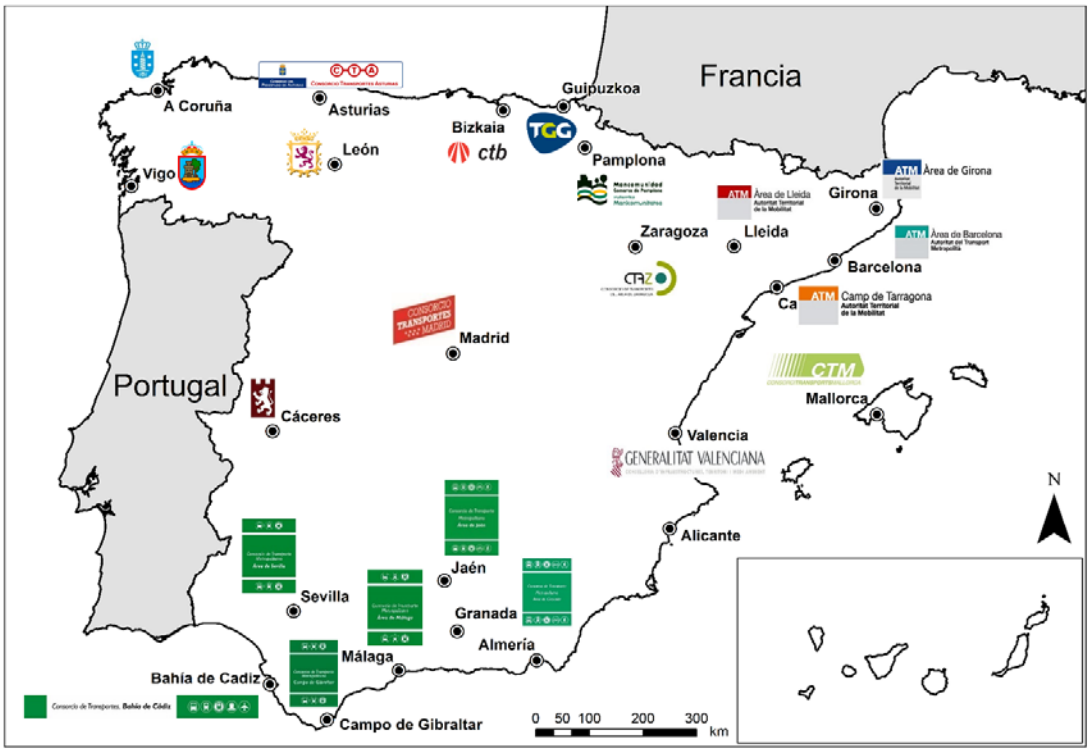
- ### Coverage ratio

The percentage of operating costs covered by fare revenue (coverage ratio) reached on **average a 51.9%** in 2017. In general, metropolitan areas with rail modes present lower ratios (47%) than those without rail modes (58%). The outstanding cases are in the one hand, Corunna and Cadiz Bay, with ratios of 77% and 74%, respectively, and in the other hand, Lleida and Majorca with a ratio of 24.3% and 30.2%, respectively. Finally, it is remarkable that Spanish results are better than European results, where the coverage ratio is on average 45% according to the EMTA Barometer.

***Coverage ratio for PT systems in metropolitan areas (2017)***




*Not included data from Renfe services. Asturias, Malaga, Gipuzkoa, Lleida only urban bus. Saragossa and Cadiz Bay only metropolitan bus. Source: data provided by the PTAs.*




## MEMBERS AS OF 1 JANUARY 2017

| PUBLIC TRANSPORT AUTHORITY | REGION | WEBPAGE |
|---|---|---|
| Consorcio Regional de Transportes de Madrid | Community of Madrid | www.ctm-madrid.es |
| Autoritat del Transport Metropolità de Barcelona | Barcelona Metropolitan Region | www.atm.cat |
| Consellería de Vivienda, Obras Públicas y Vertebración del Territorio | Metropolitan Area of Valencia | http://www.habitatge.gva.es/es |
| Consorcio de Transporte Metropolitano Área de Sevilla | Metropolitan Area of Seville | www.consorciotransportes-sevilla.com |
| Consorcio de Transportes de Bizkaia | Province of Bizkaia | www.cotrabi.com |
| Consorcio de Transportes de Asturias | Asturias Region | www.consorcioasturias.com |
| Consorcio de Transporte Metropolitano Área de Málaga | Malaga Metropolitan Area | www.ctmam.es |
| Consorci de Transports de Mallorca | Mallorca | www.consorcidetransports.org |
| Autoridad Única del Transporte de Gran Canaria | Gran Canaria | www.autgc.org |
| Consorcio de Transportes del Área de Zaragoza | Metropolitan Area of Zaragoza | www.consorciozaragoza.es |
| Autoridad Territorial del Transporte de Gipuzkoa | Province of Gipuzkoa | http://atgipuzkoa.com |
| Consorcio de Transportes de Bahía de Cádiz | Cadiz Bay | www.cmtbc.es |
| Autoritat Territorial de la Mobilitat Camp de Tarragona | Camp de Tarragona | www.atmcamptarragona.cat |
| Consorcio de Transporte Metropolitano Área de Granada | Granada Metropolitan Area | www.ctagr.com |
| Consorcio de Transporte Metropolitano Área de Almeria | Almeria Metropolitan Area | www.ctal.almeria.es |
| Transporte Público del Área Metropolitana de Alicante | Alicante Metropolitan Area | www.alicante-ayto.es/trafico/tam.html |
| Mancomunidad de la Comarca de Pamplona | Pamplona Region | www.mcp.es |
| Ayuntamiento de Vigo | Municipality of Vigo | hoxe.vigo.org/ |
| Consorcio de Transporte Metropolitano Campo de Gibraltar | Gibraltar Camp | www.ctmcg.com |
| Consorcio de Transporte Público del Area de Girona | Girona Metropolitan Area | www.atmgirona.cat |
| Ayuntamiento de A Coruña | Municipality of Corunna | www.coruna.es |
| Autoritat Territorial de la Mobilitat Àrea de Lleida | Municipality of Lleida | www.atmlleida.cat |
| Ayuntamiento de León | Municipality of Leon | www.aytoleon.es |
| Consorcio de Transporte Metropolitano del Área de Jaén | Jaen Metropolitan Area | www.ctja.es |
| Ayuntamiento de Cáceres | Municipality of Caceres | www.ayto-caceres.es |

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