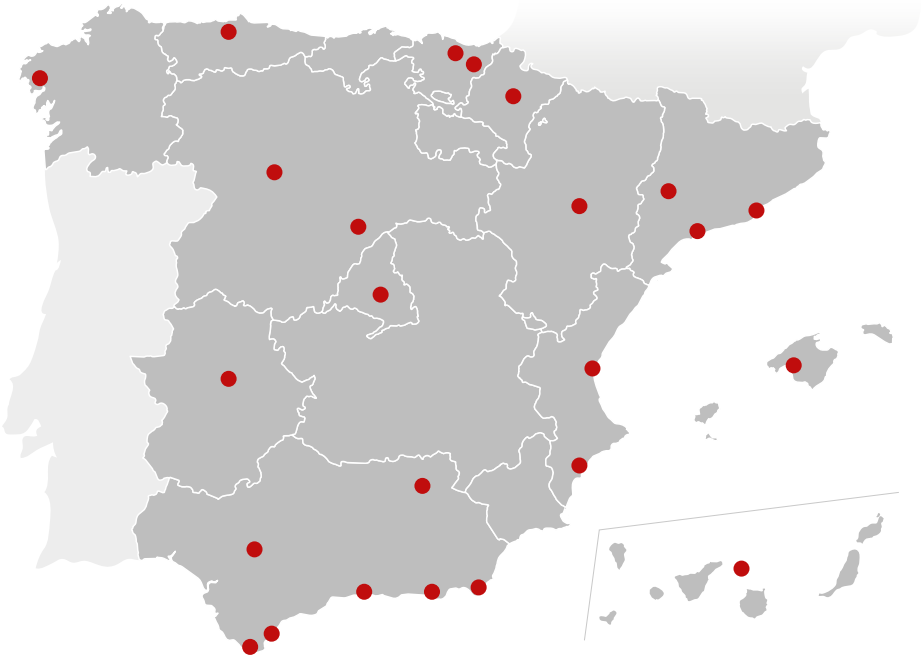
OBSERVATORIO de la Movilidad Metropolitana

Metropolitan Mobility Observatory of Spain (MMO)
Summary for the 2020 Report with 2021 Advance

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



This report includes information from **24 PTA*.** The population residing in these areas represents approximately 55.4% of the nation´s population. The rest of the information has been provided by regular contributors to the OMM, such as RENFE, the Directorate General of Traffic (DGT) and the National Institute of Statistics (INE).

This report contains the **complete information for 2020,** as well as a **preview of the 2021** data available at the date of publication. In this way, the report reflects to a greater extent the current situation of urban mobility at national level and its recovery process after the major restrictions imposed by the Covid-19 pandemic.

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Main Figures 2020-2021

- In **2020**, a total of **2,06 billion public transport journeys were made**: 1,019 billion by bus and 1,041 billion by rail modes. The large difference between the lengths of the two networks is striking: there are 138,212 km of bus lines and 3,679 km of rail network. In **2021, 2,326 billion public transport journeys were made**: 1,128 million by bus and 1,198 million by rail modes.
- The annual **public transport demand** for the 24 areas in **2020** was **14,519 billion travelers-km** (37% for bus and 63% for rail modes) and 16,405 billion travelers-km in 2021, 13.5% more than in 2020.
- In 2020, there was a **public transport supply of 574 million vehicle-km for bus services and 334 million vehicle-km for rail modes.** In 2021, it increased to 567 million vehicle-km for bus services and 350 million vehicle-km for rail modes (excluding Cercanías RENFE).
- Out of the **688 million euros invested in public transport in 2020**, 49% were dedicated to the maintenance or purchase of infrastructure and 51% were used for the acquisition of new material. Around 70% was invested in rail modes.
- The number of public transport journeys per inhabitant per year differs according to the size of the metropolitan area. In 2020, the average was 70 trips per inhabitant in large metropolitan areas, 41 in medium-sized ones and 31 in small areas.
- The **average coverage ratio is 40%.** Transport systems in metropolitan areas that include rail modes have a lower coverage ratio than those that are exclusively bus-based.

*Madrid, Barcelona, Valencia, Seville, Bizkaia, Asturias, Malaga, Majorca, Saragossa, Cadiz Bay, Gipuzkoa, Tarragona Camp, Alicante, Granada, Almeria, Pamplona, Gibraltar Camp, Corunna, Lleida, Jaen, Leon, Caceres, Valladolid and Huelva

General Characteristics of the Metropolitan Areas on January 1st, 2021

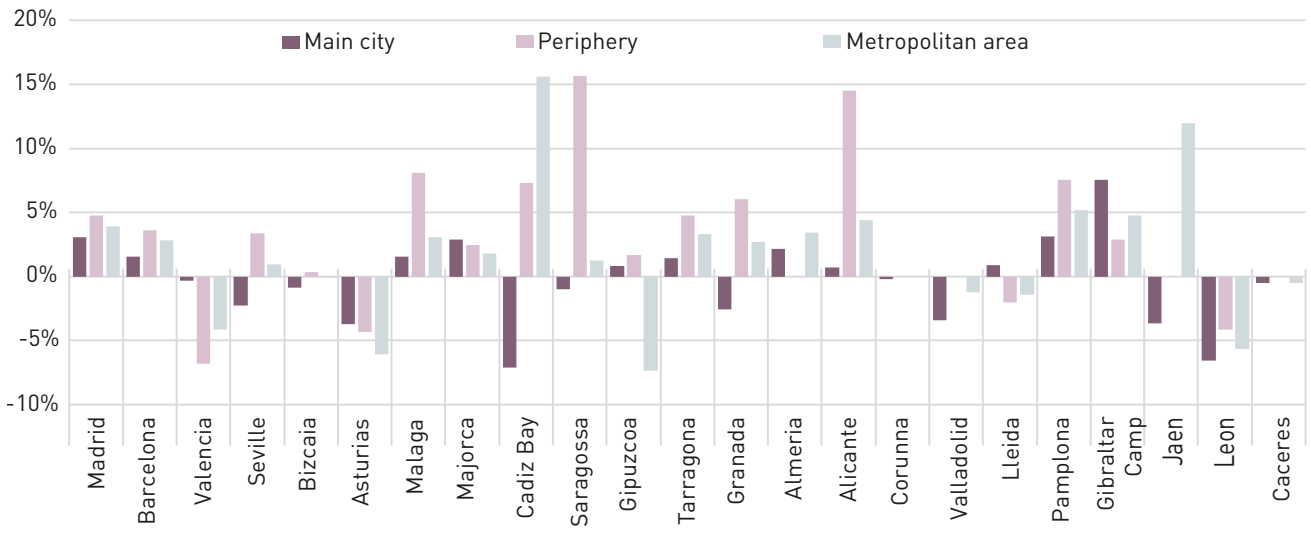
	Metropolitan Area							Main City			Main city/ Metropolitan area population
	Surface (km²)	Population	Density (inhab/ km²)	Number of municipalities	Built up Area (km²)	Ratio Surface*	Urban density (inhab/km²)	Surface (km²)	Population	Densidad (inhab/ Km²)	
Madrid	8,028	6,779,888	845	179	919	12%	7,374	605	3,334,730	5,512	49%
Barcelona	3,239	5,222,384	1,612	164	634	20%	8,049	101	1,664,182	16,420	32%
Valencia	1,551	1,843,186	1,188	60	306	20%	6,024	138	800,215	5,784	43%
Seville	4,221	1,497,779	355	45	227	5%	6,600	141	691,395	4,892	46%
Bizkaia	2,217	1,159,443	523	112	n.d.	n.d.	n.d.	41	350,184	8,541	30%
Asturias	10,604	1,018,784	96	78	1,463	14%	696	187	219,910	1,178	22%
Malaga	1,432	1,061,161	741	15	75	5%	14,187	395	578,460	1,465	55%
Majorca[1]	3,623	880,113	243	53	212	6%	4,152	214	409,661	1,918	47%
Cadiz Bay	3,312	822,197	248	12	n.d.	n.d.	n.d.	1,202	116,027	273	40%
Saragossa	3,258	797,882	245	32	2,873	88%	278	938	681,877	727	86%
Gipuzkoa	1,980	727,121	367	89	n.d.	n.d.	n.d.	73	188,240	2,579	26%
Tarragona	2,999	637,198	212	132	189	6%	3,374	65	136,496	2,093	21%
Granada	861	541,465	629	33	n.d.	n.d.	n.d.	88	233,648	2,655	43%
Almeria[2]	2,127	522,687	246	18	n.d.	n.d.	n.d.	300	196,851	666	38%
Alicante	354	475,402	1,342	5	74	21%	6,424	201	337,482	1,677	71%
Corunna	n.d.	419,926	n.d.	n.d.	57	n.d.	7,421	38	247,604	6,545	59%
Huelva	n.d.	407,238	n.d.	21	n.d.	n.d.	n.d.	151	142,538	945	35%
Valladolid	955	404,305	424	25	125	13%	3,234	198	299,265	1,512	74%
Lleida	5,586	361,911	65	149	182	3%	1,993	212	140,403	662	39%
Pamplona	92	356,212	3,887	18	50	55%	7,073	25	203,944	8,129	57%
Gibraltar Camp[3]	1,530	273,010	178	8	432	28%	632	88	123,078	1,403	45%
Jaen	3,488	223,221	65	15	n.d.	n.d.	n.d.	424	112,757	266	51%
Leon	913	203,203	223	16	21	23%	9,676	39	124,028	3,178	61%
Caceres[4]	n.d.	96,467	n.d.	n.d.	n.d.	n.d.	n.d.	1,760	96,467	55	100%

** Built up Surface/ Total surface.*
1: : 2018 data. Built up Surface: data from 2009.
2: 2018 Data.
3: MA surface: data from 2015. Built up surface: data from 2007. Main city surface: data from 2015.
4: Number of municipalities, built up surface and main city Surface: data from 2017.
Source: compiled by authors based on data provided by PTAs

Population trends and other socio-economic indicators

Between 2013 and 2021, the population in the metropolitan areas has experienced **a slight growth of 0.8%,** most of which has taken place in the periphery (+2.7%). In the main cities, the population has remained almost the same (+1%). The areas of Cadiz Bay and Madrid have had the greatest population growth in the period, with increases of 15.2% and 4.4% respectively. As for the cities, Leon and Cadiz have seen the sharpest declines in population during this period, with values of around -5%.

Variation of population in metropolitan areas between 2013 and 2021

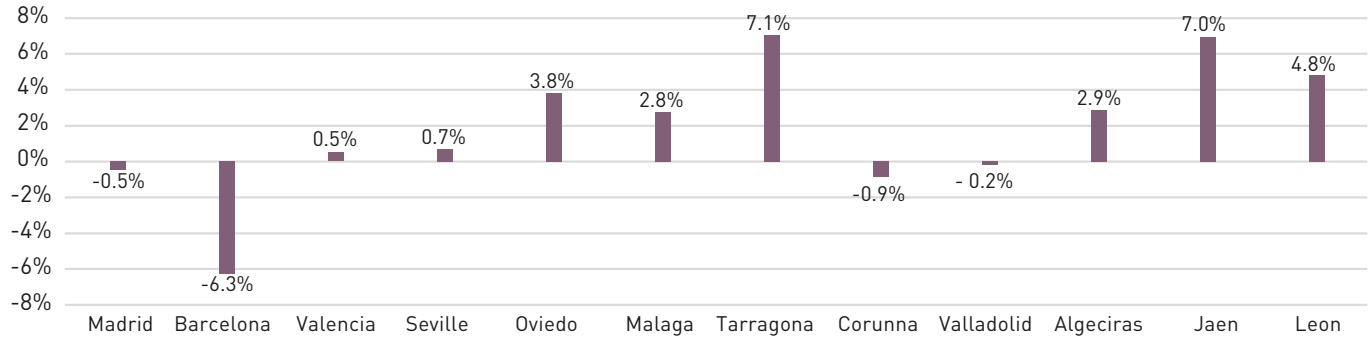


Cadiz Bay and Saragosa have incorporated various municipalities throughout the years, hence the significant variations.
Source: compiled by authors based on data provided by PTA

The trend towards the recovery of employment destroyed during the economic crisis came to an end in 2020 due to the pandemic, year in which **the unemployment rate raised to 16.3%** on a national level. The southern regions of Spain (Caceres and the Andalusian provinces specially) had higher unemployment rates (around 20%), whilst northern regions such as Gipuzkoa, Corunna, Navarra, Bizkaia, Valladolid, Lleida and Pamplona had lower rates (around 10%).

The **motorization rate in 2021 has increased by 0.58% with respect to 2020.** From 2013 to 2021, motorization rate has had a very uneven distribution depending on the area (as shown in the following figure). Tarragona and Jaen have significantly increased their motorization rate (7.1% and 7%, respectively), whilst Barcelona has decreased theirs (-6,3%).

Variation of the motorization rate (nºvehicles/1000 inhabitants) (2013-2021)

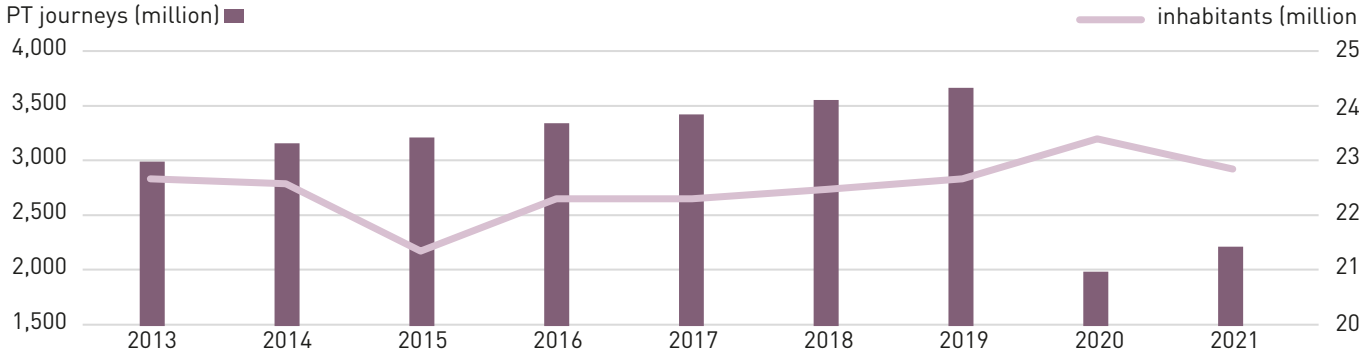


**Valencia: data since 2014. Valladolid: data since 2018. Jaen: data since 2016. Source: compiled by authors based on data provided by PTA*

Demand for public transport and covid-19 impact

The **demand for public transport was growing slowly but steadily up until 2020**, when the Covid-19 pandemic began. During this time, figures never before seen in the observatory were recorded. Public transport travel demand has decreased by -28.9% between 2013 and 2021. **In 2021, travel demand increased by 14.4% compared to 2020:** bus travel increased by 13.1% and rail travel increased by 15.5%. Although 2021 has been a year of recovery, it is still far from the 2019 figures.

Evolution of public transport journeys compared to population (2013-2021)"



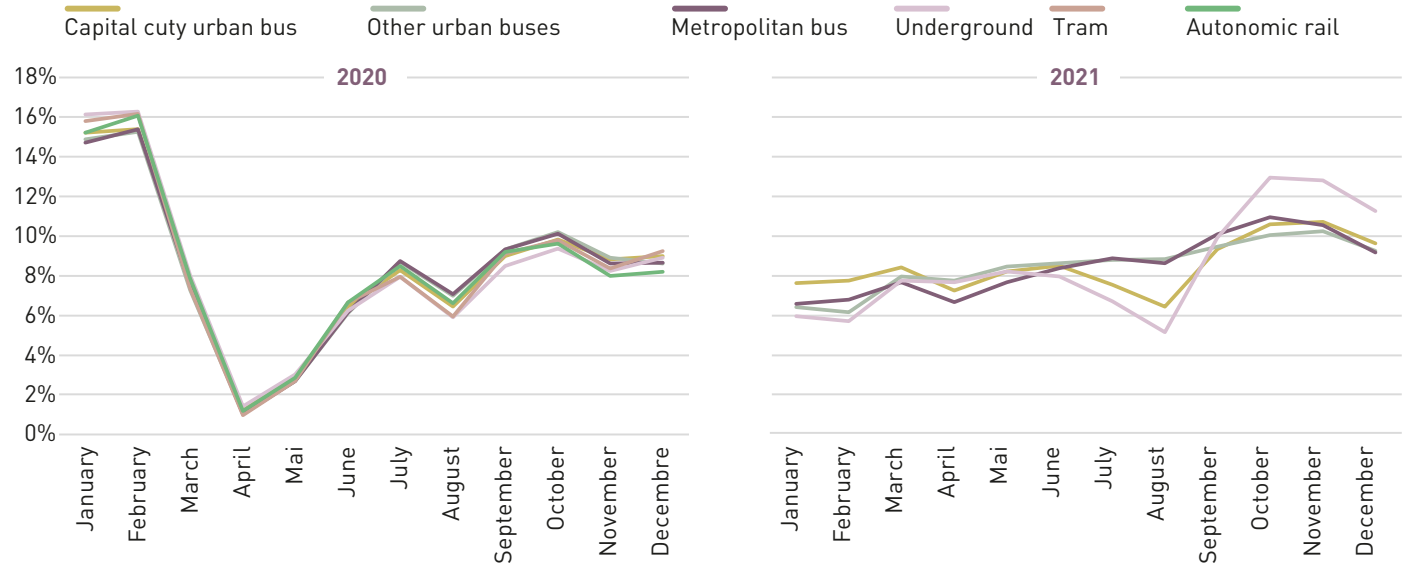
RENFE tram services not included. Seville does not include tram nor metropolitan bus. Cadiz Bay does not include urban bus. Source: compiled by authors based on data provided by the PTA

Impact of covid-19 in demand of PT

Since March 2020, the transport and mobility sector has been profoundly affected (initially by the generalized restrictions on the movement of the population and later due to the reduction in mobility experienced by a large part of the population). There is also a **negative perception** in terms of safety and health which has particularly impacted **public transport,** despite the huge efforts made by the transport authorities in terms of safety and cleanliness to increase travelers´ confidence.

At the time of writing, the pandemic is in its seventh wave, as new variations and mutations of the virus continue to occur. The next figure shows that the slope of the curve reflecting the number of travelers during 2021 is smoother than the one of 2020, although there have still been times (such as in August) where an increase of the Covid-19 cases has caused a sharp decrease of the number of travelers. In September and October demand levels start rising again, experiencing a slight drop in November and December.

Comparison of the evolution of the total number of travelers by month in 2020 and 2021



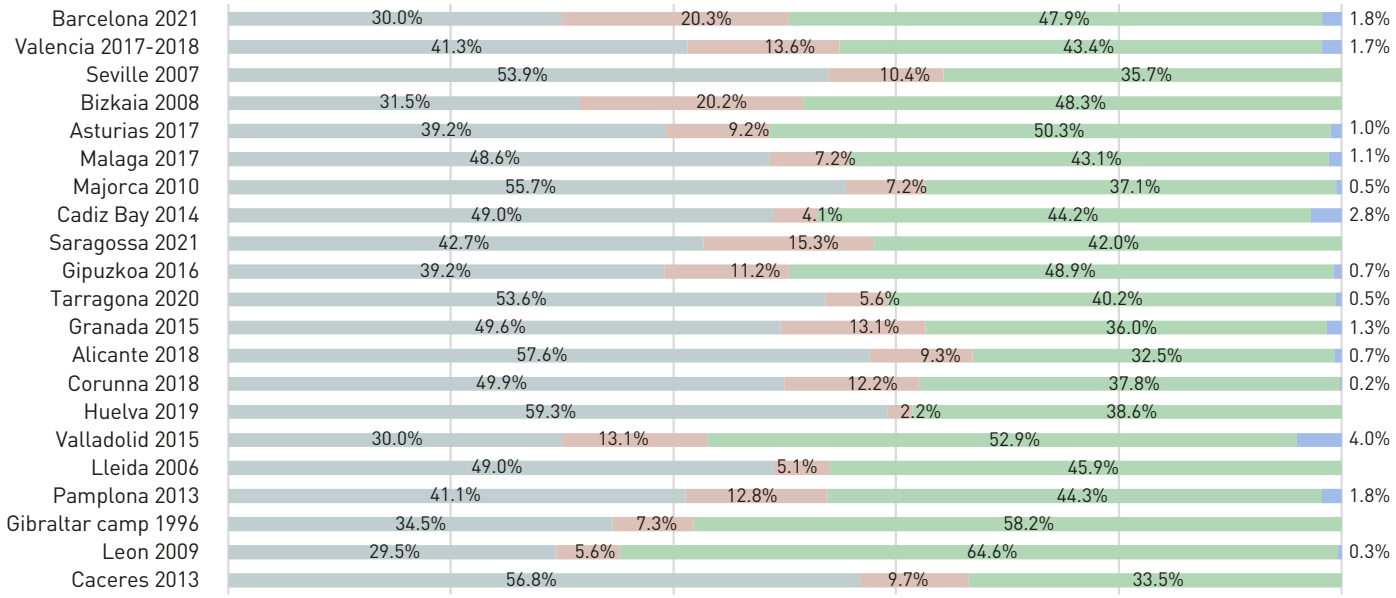
Source: compiled by authors based on data provided by the PTA and the RENFE Directorate General of Passengers

Modal split

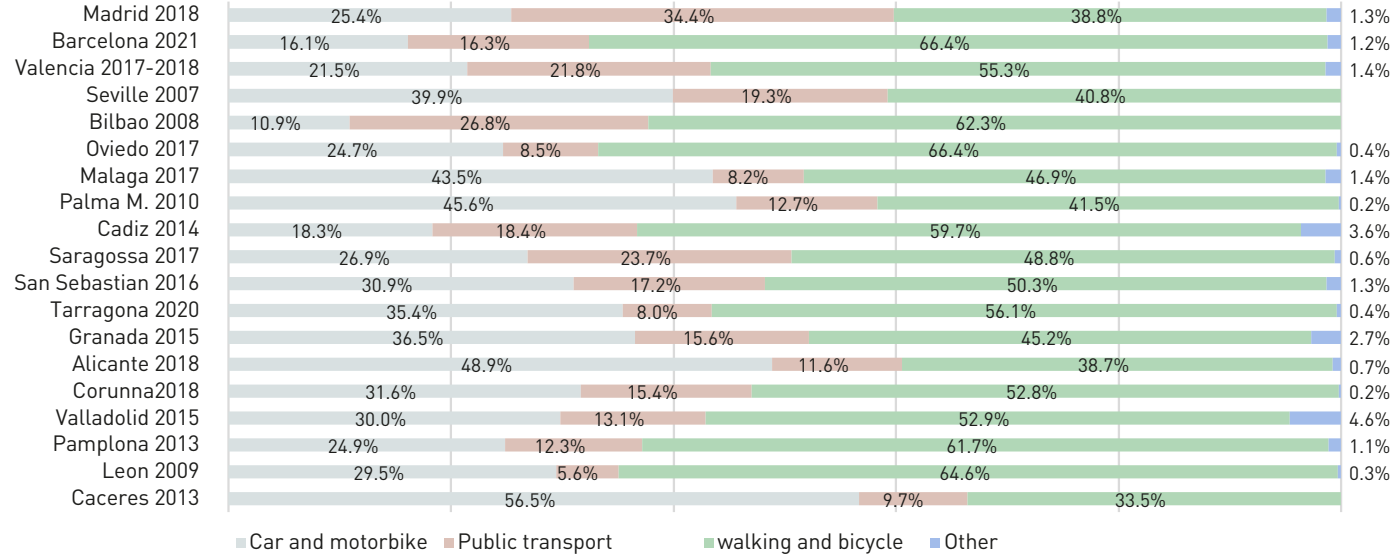
The **average modal share** of public transport in metropolitan areas is 11%. This figure greatly varies depending on the area: in Barcelona it reaches 18.5%, while in Cadiz Bay it is 3.9%. On average, non-motorized travel (walking and cycling) accounts for 44% of the trips, whilst motorized travel (using private cars and motorbikes) accounts for 45% of journeys.

The case of the two main cities, Barcelona and Madrid, is quite remarkable: Barcelona has a non-motorized travel rate of 66.4% while 34.4% of trips in Madrid are made by public transport. These two cities show different characteristics: while in the former there is a deeply rooted habit of walking or cycling, in the latter there is a high use of the public transport system.

Modal share of trips for all reasons



Modal share of trips in the Capital City



Source: compiled by authors based on data provided by the PTA

Public transport supply

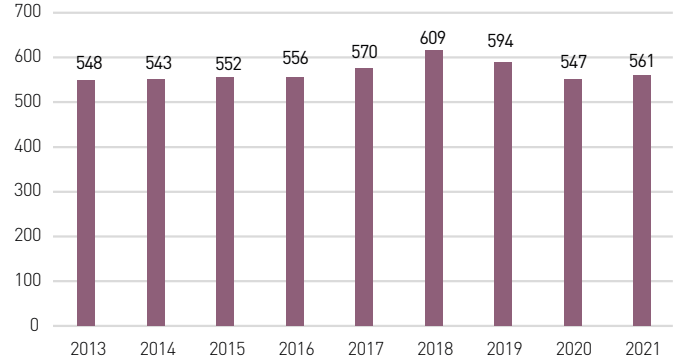
The **supply of bus services** (in terms of vehicle-km) **has increased by 2.7% between 2013 and 2021.** In 2021 it has increased by 4.7% compared to 2020. The average density of bus networks **is 5.54 km per 1,000 inhabitants.** Asturias and Huelva are well above this value, with more than 10 km per 1,000 inhabitants. In terms of route density in relation to surface area, Barcelona and Malaga have the highest figures, with 8.51 km/km² and 4.08 km/km² respectively, the average being 2.08 km/km².

Rail transport covers long distances. The density of the rail network is higher for areas with a larger population. The average **rail network density** in Spain is **205.33 km per million inhabitants and 94.89 km per 1,000 km².** Asturias has a significantly higher figure due to the length of FEVE commuter lines, with a density of 771.51 km per million inhabitants.

In 2020, the **number and length of bus lines** have had an **average increase of 1.94% and 1.4%** (respectively) compared to 2019, continuing the trend of the previous year. In 2020, the rail networks size has remained the same than in 2019, with Madrid (682 km) and Barcelona (756 km) being the largest ones.

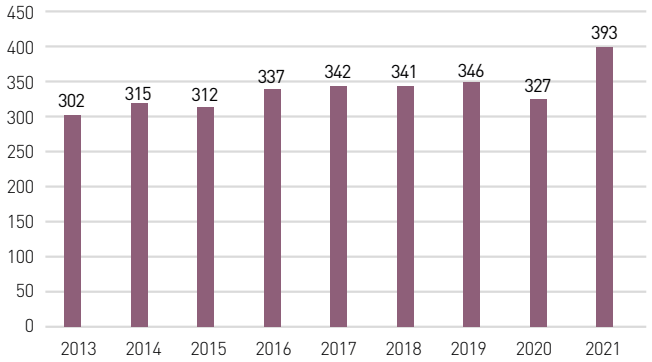
To estimate the passenger capacity offered on public transport networks, the number of seat-km offered by each mode is measured. **In 2020, 40,812 billion seats-km were offered in bus services and 82,634 billion seats-km were offered in rail modes, -21% and -6% less than in 2019,** respectively. Between 2013 and 2021, the length of bus lines in the areas studied increased by 28.1% and the length of the rail network grew by 5.1%.

Public Transport Supply of bus services (billion vehicles-km)



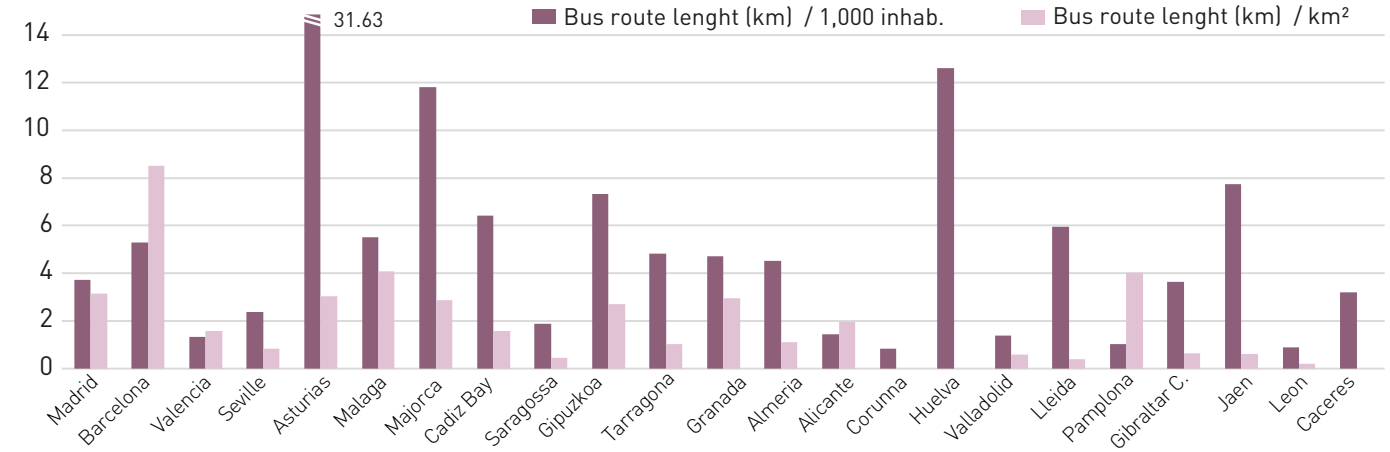
**Bizkaia, Majorca, Granada, Almeria, Huelva and Valladolid are not included.*
***2021 data of Lleida and Alicante is missing*

Public Transport Supply of rail services (billion vehicles-km)



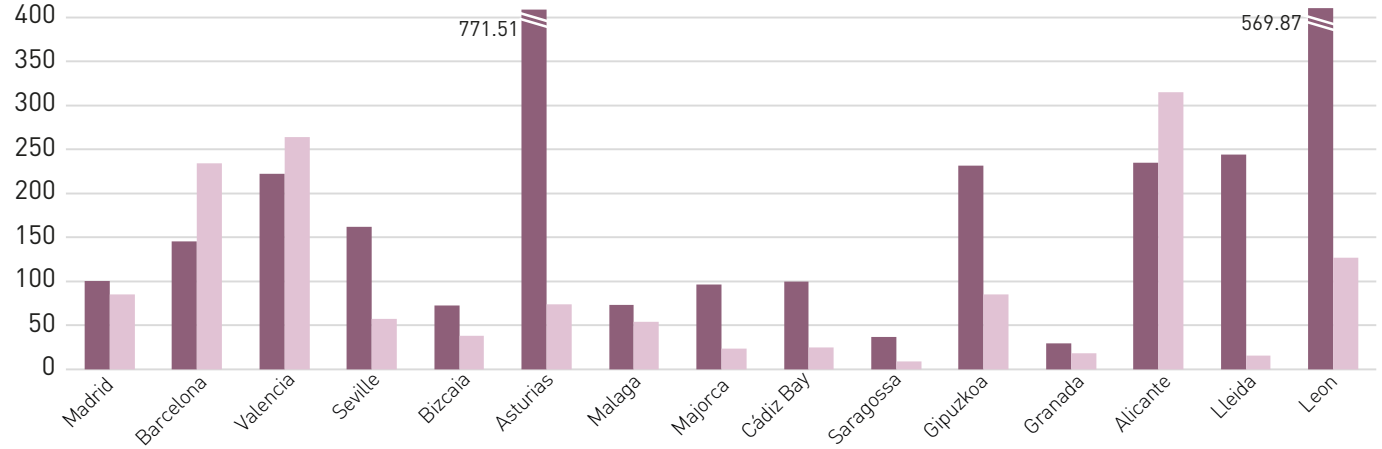
**Bizkaia, Asturias, Málaga, Camp de Tarragona, Granada, Almería, A Coruña, Huelva, Valladolid, Lleida, Pamplona, Campo de Gibraltar, Jaén, León y Cáceres are not included. 2021 data for Alicante is missing*

Bus network density (2020)



Cadiz Bay, C. Gibraltar Camp and Jaen: only metropolitan bus. Source: compiled by authors based on data provided by the PTA.

Rail network density (2020)

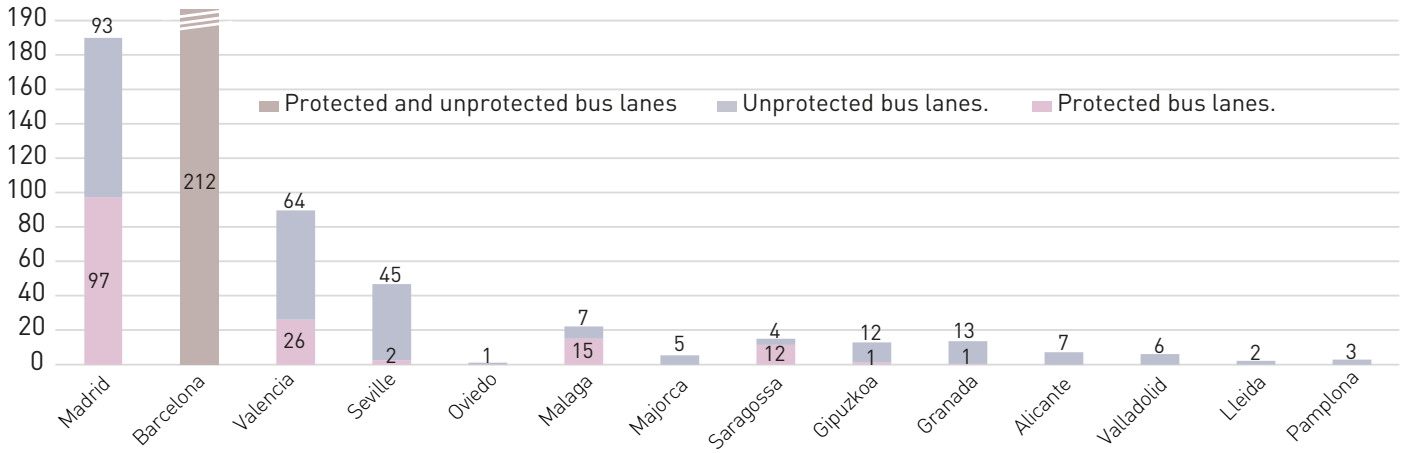


Source: compiled by authors based on data provided by the PTAs and the RENFE Directorate General of Passengers

Dedicated bus lanes

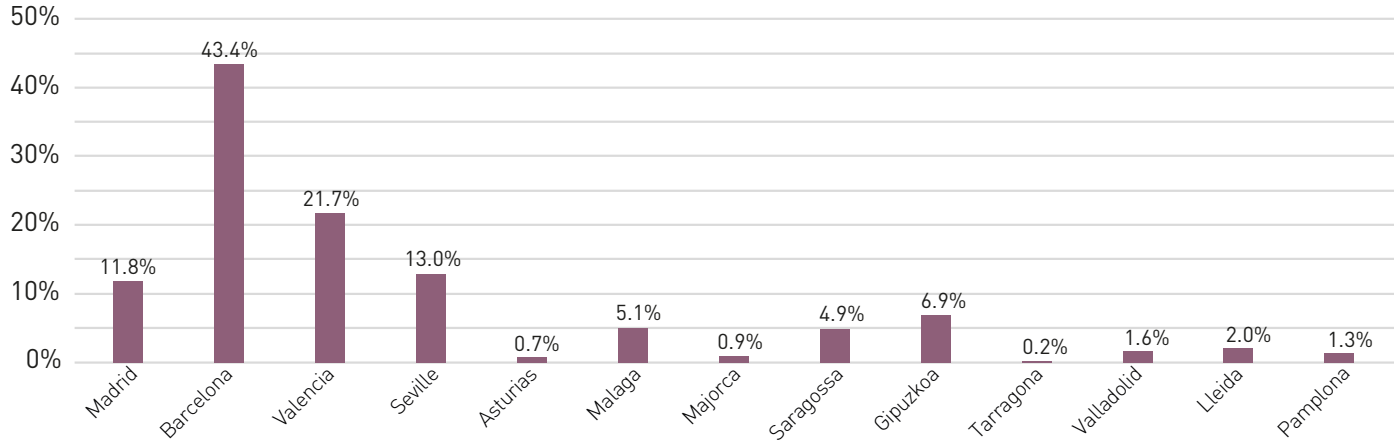
Exclusive or preferential lanes for public transport are essential for it to be competitive with private transport. These lanes are more effective if they have some form of protection. In 2020, Barcelona had the longest length of bus lanes in its network (212 km), as well as the highest percentage of bus network with bus lanes in the capital city (43.4%), followed by Valencia (21.7%) and Seville (13%)..

Length of bus lanes in main city (2020)



Source: compiled by authors based on data provided by the PTA

Percentage of bus network with bus lanes in main city (2020)

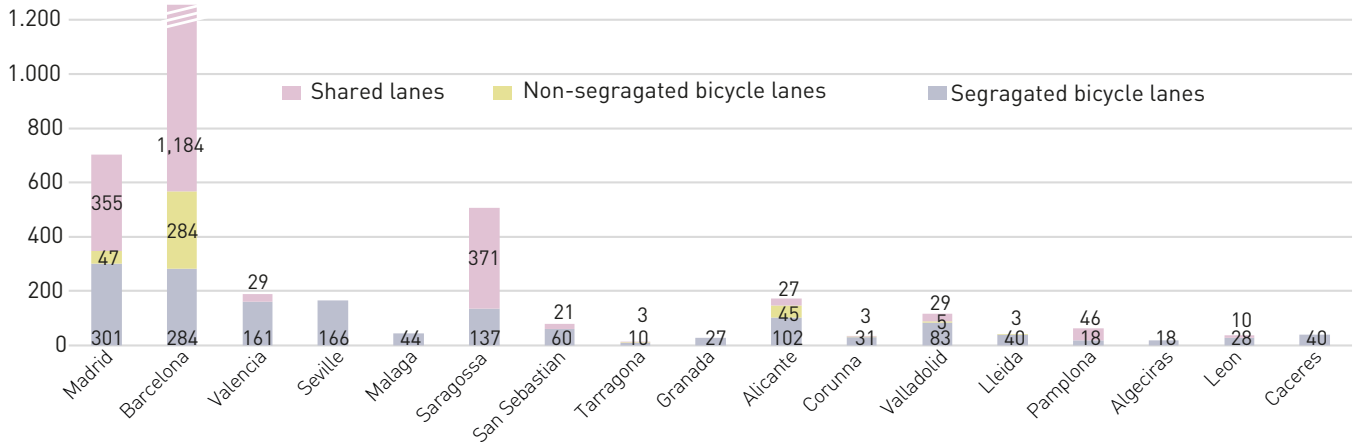


Source: compiled by authors based on data provided by the PTA

Dedicated cycling lanes

In Spanish cities, bicycle use is still negligible compared to other European cities. The interest of local authorities in this type of transport is growing, given the multiple benefits of cycling both at user level (improved quality of life and health, lower economic cost) and social level (less road occupation, elimination of air and noise pollution). To promote cycling in cities, an adequate, safe and efficient space for cyclists to circulate must be provided. The figure below shows the length of three different types of cycle lanes in Spanish cities: segregated (or protected) cycle lanes, non-segregated cycle lanes, and shared lanes (one-way streets with preference for cyclists). **Cycling lanes continue to increase,** mainly due to the development of public bicycle-sharing systems. Barcelona and Madrid are the cities with the greatest length of lanes.

Length of bicycle lanes in the main city in 2020 (km)

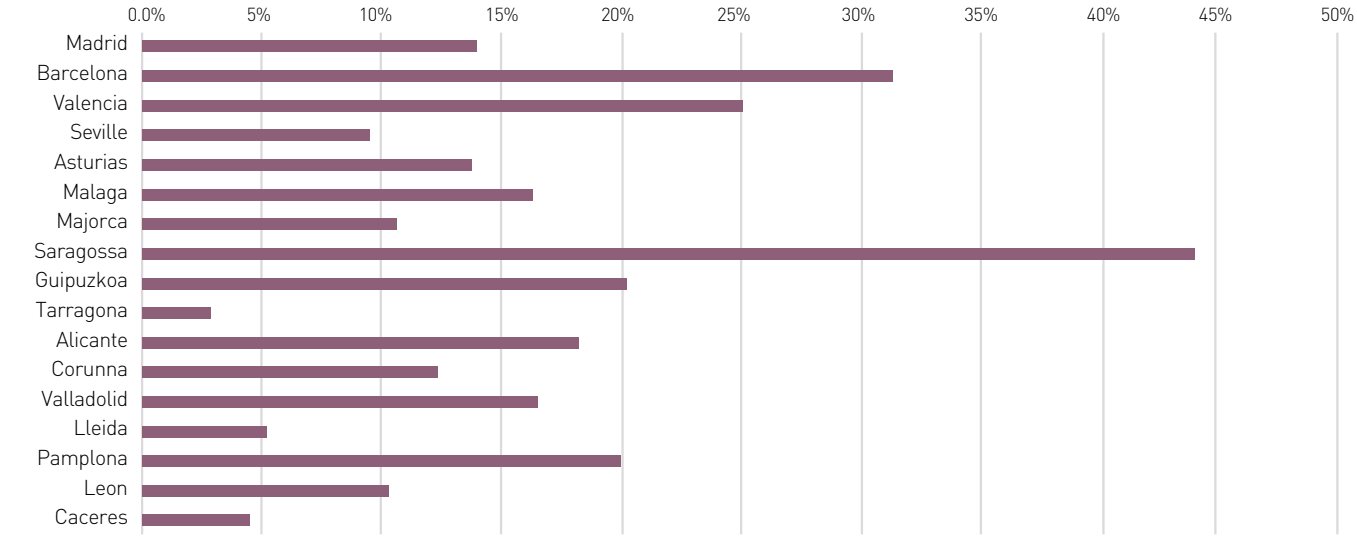


Source: compiled by authors based on data provided by PTA

ITS and information

Intelligent Transport Systems (ITS) have made it possible to **increase the quality, efficiency, sustainability and safety of public transport** in recent years. One example is the OSS (Operational Support Systems), which facilitate the daily operation of public transport services, or the use of intelligent ticketing, which makes the implementation of tickets and fares more flexible. Another key aspect for improving user satisfaction with PT services is the real-time information provided on vehicles, stops´ or stations´ screens or through the various mobile applications (apps) that have recently emerged and which are available in all areas and for most modes of transport. These apps have different functionalities: display of maps and routes, trip planning, information on waiting time, interruptions in real time etc.

% bus stops with real-time information screens (2020)

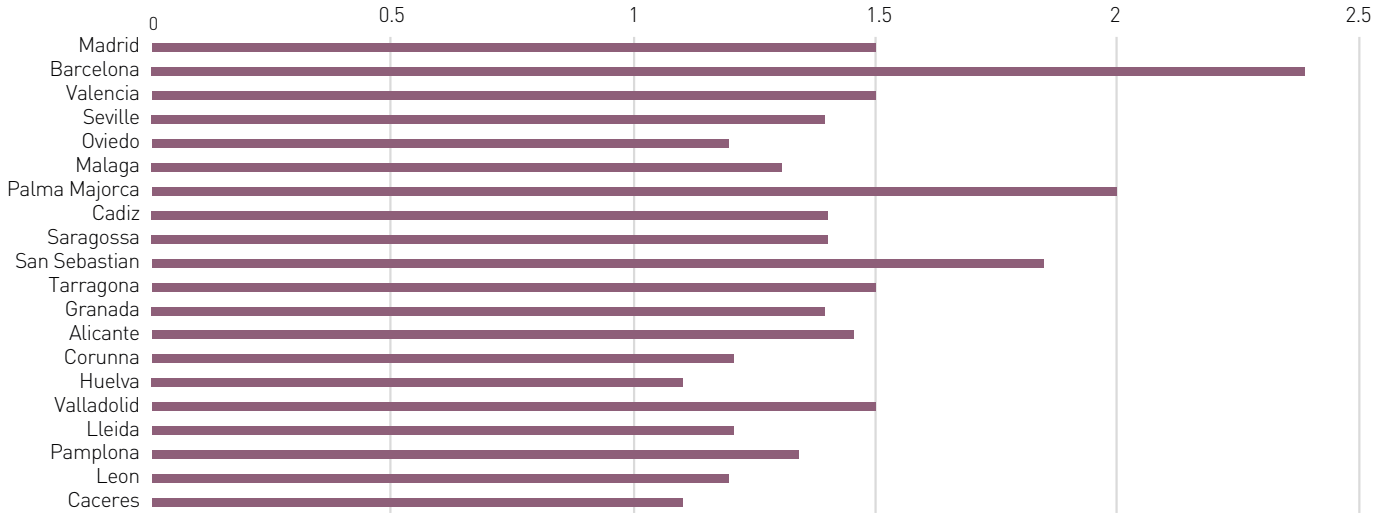


Source: compiled by authors based on data provided by PTA

Types of tickets and fares

There is **great heterogeneity in the fare systems of the different metropolitan areas,** which means that there is an infinite number of transport tickets adapted to the different territorial and demographic contexts. The only common ticket in all areas is the **single ticket in the main city,** although the coexistence of different modes of transport means that fares differ within the same city. In Madrid, the monthly pass is the most widely used ticket (71% of users). In Bizkaia, Corunna, Jaen and Gipuzkoa, the wallet cards are the preferred transport pass, used by more than 70% of users. Barcelona is the city with the highest fare for a single ticket (€2.40).

Single ticket price in the main city (Euro, 2020)

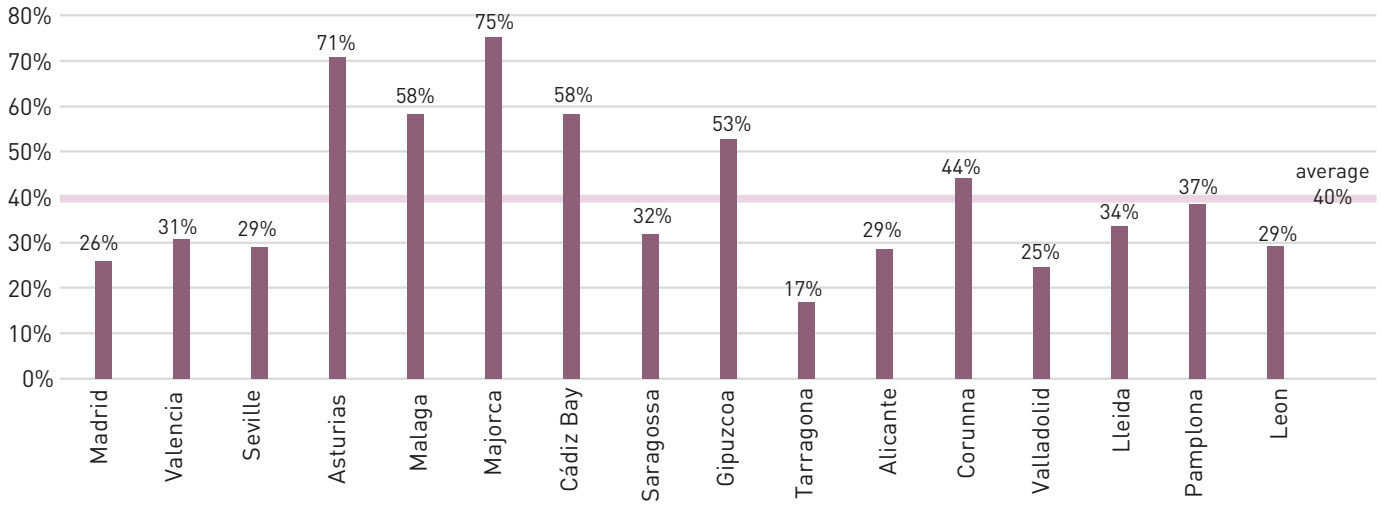


Source: compiled by authors based on data provided by PTA

Coverage ratio

The percentage of operating costs covered by fare revenues (**coverage ratio**) averaged **40%** in 2020. In general, metropolitan areas with rail mode have lower coverage ratios than those without. Outstanding cases are, on one hand, Majorca and Asturias, with ratios of 75% and 71% respectively, and, on the other hand, Camp de Tarragona, with a ratio of 17%. The Spanish results are better than those in Europe, where the average coverage rate is 50%, according to the EMTA Barometer.

Coverage ratio for PT systems in the metropolitan area (2020)



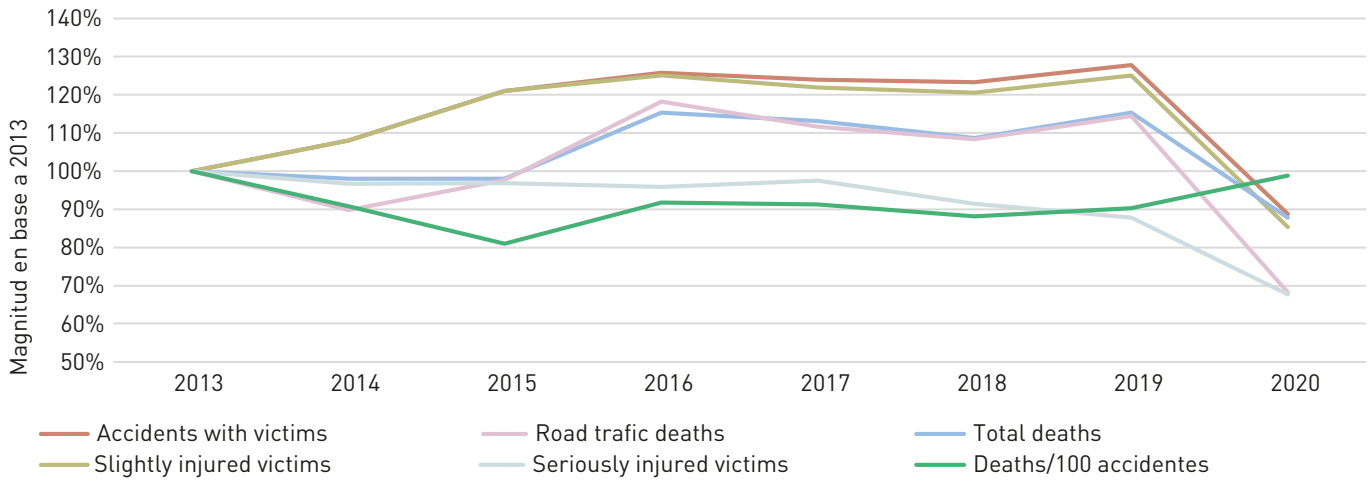
Not included data from Renfe services. Seville does not include tram or metropolitan bus, just metro. Cadiz bay does not include urban bus..
Source: compiled by authors based on data provided by PTA.

Urban accident rate

The **urban accident rate** followed a **downward trend from 2000 until 2013**, when there was a significant increase in the number of accidents with victims. At the writing time of this report, the latest data published by the DGT is from 2020, a year in which, as a result of the pandemic, the urban accident rate has fallen considerably, reaching 2010 figures.

The following graph shows a negative evolution of urban accident indicators from 2013 to 2019. In 2020, all indicators (except the number of deaths per 100 accidents) decrease by more than 10% compared to 2013 and by more than 20% compared to 2019. This large variation is not the result of specific measures but of the huge reduction of trips in the months of March, April and May.

Traffic accidents data evolution (2013-2020)



Source: "Main Figures of Road Accidents. Spain 2019." General Directorate of Traffic, 2020

Shared mobility services

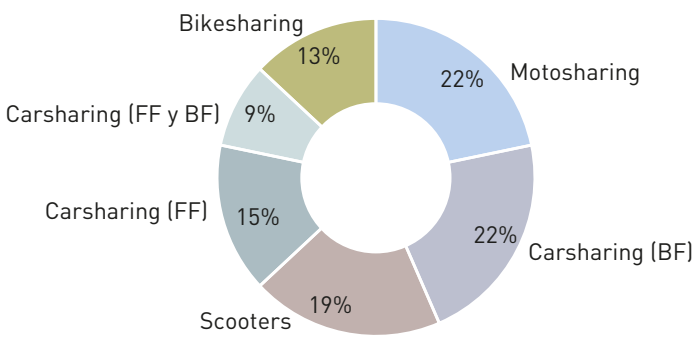
Shared mobility is one of the essential vectors of the new mobility. The integration of different modes of transport poses new challenges and provides an alternative where conventional public transport does not reach, or as a complement in cases where distances or time make mobility by foot impossible. This new form of mobility, based on technology, appeared in urban mobility around 2014 and since then, these services have contributed to very significant changes.

"Sharing" mobility consists of the provision of a fleet of vehicles for individual use shared for rent. Certain mobile applications allow the customer to locate, rent and pay for the vehicle. There are four different types of sharing depending on the vehicle they offer: car-sharing, moto-sharing (motorcycles), bike-sharing and electric scooter sharing. These new forms of sharing are becoming increasingly popular for many reasons, the main one being the accessibility of the vehicles: these vehicles are electric, so they are not affected by the restrictions that affect combustion vehicles.

In Spain, larger cities have a greater variety of these services, while medium and small cities lack some of them. In 2021, car-sharing and moto-sharing companies have increased, whilst scooter companies have decreased. Out of the 4 types of sharing, private bicycle companies are still the fewest. This is due, on one hand, to the volatility of the sector, and, on the other hand, to the large presence of public companies offering similar services, which means that the business is not profitable for many companies.

The following graph shows the percentage of companies that are present in each type of shared mobility.

Number of companies providing new mobility services (2020)



Source: compiled by authors based on data provided by the PTA

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Metropolitan Mobility Observatory of Spain (MMO)

Public Transport Authorities

Autoritat de Transport Metropolità de València

Autoritat del Transport Metropolità de Barcelona

Autoritat Territorial de la Mobilitat Àrea de Lleida

Autoridad Territorial del Transporte de Gipuzkoa

Autoritat Territorial de la Mobilitat Camp de Tarragona

Ayuntamiento de A Coruña

Ayuntamiento de Cáceres

Ayuntamiento de León

Ayuntamiento de Valladolid

Consorci de Transports de Mallorca

Consorcios de Transporte de Andalucía

Consorcio de Transportes de Asturias

Consorcio de Transportes de Bizkaia

Consorcio de Transportes del Área de Zaragoza

Consorcio Regional de Transportes de Madrid

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Asociación de Transportes Públicos Urbanos y Metropolitanos

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Instituto para la Diversificación y Ahorro de la Energía

Ingeniería y Economía del Transporte

Sindicato de Comisiones Obreras

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