The Metropolitan Mobility Observatory of Spain

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Objectives:

- Show the PT contribution to the urban environment
- Role of PTA in achieving an attractive and high quality PT
- Analyze changes on mobility supply and demand
- Investigate PT funding and management
- Highlight PT innovations and results
- Impacts of PT policies on urban sustainability

Policy Context:


- **Action Plan on Urban Mobility** (2009): create an Urban Mobility Observatory to share information, data and statistics. To assess changes in mobility and to facilitate exchange of best practises.
Members of OMM

22 PTA (25.6 millions inhabitants, 54.8%)

plus: .......
Ministry of the Environment
Ministry of Transport
Spanish Energy Agency
Traffic General Direction
Rail and Buses Operators
Cities Association
Trade Unions
Metropolitan areas characteristics

- 6 → > 1 million inhabitants (Madrid, Barcelona, Valencia, Murcia, Sevilla & Asturias)
- 8 → 500 - 1.000.000 inhabitants (Málaga, Mallorca, Gran Canaria, Zaragoza, Gipuzkoa, Bahía Cádiz, Camp de Tarragona & Granada)
- 7 → < 500.000 inhabitants (Almería, Alicante, Lleida, Pamplona, Vigo, Campo de Gibraltar & A Coruña)

- Different number of municipalities:
  - A Coruña, Vigo – 1
  - Zaragoza – 30
  - Barcelona – 164
  - Madrid – 179

- Different GDP per capita:
  - A Coruña, Vigo – 20.000 €
  - Zaragoza – 26.000 €
  - Barcelona – 27.600 €
  - Madrid – 29.600 €
Population distribution according to metropolitan area size (2009)

- Big: 17 mill (69%)
- Medium: 6 mill (24%)
- Small: 1.8 mill (7%)

- > 1 millón
- > 1/2 millón < 1 millón
- < 1/2 millón
Population change (2002-2009)

- Overall population growth
- Bigger in metropolitan ring than in main city: 3.4% vs 0.8%
Modal split for work-related trips
(source: mobility surveys)

Majority use of the car for worked related trips
Modal split for non work-related trips
(source: mobility surveys)

walking trips dominant
Modal split for **ALL** trips
(source: mobility surveys)
Mobility surveys

- Bigger use of public transport in largest cities
- Car use > 40%, except Madrid, Barcelona, Valencia & Zaragoza. Used in work-related trips
- Non work-related trips → public transport and on foot
- Madrid (1996-2004):
  - Growth of public transport use in work-related trips
  - Growth of car use in leisure trips
Changes in public transport demand (2002-2009)


- bus trips (4.5%)
- rail trips (5.7%)

Public transport demand ▼ 3.8%
Change in bus demand (2006-2009)

Bus trips per year (millions)

<table>
<thead>
<tr>
<th>Year</th>
<th>&gt; 1 million inhabitants</th>
<th>&gt; 1/2 &amp; &lt;1 million inhabitants</th>
<th>&lt; 1/2 million inhabitants</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>1.316</td>
<td>169</td>
<td>70</td>
</tr>
<tr>
<td>2007</td>
<td>1.296</td>
<td>172</td>
<td>71</td>
</tr>
<tr>
<td>2008</td>
<td>1.243</td>
<td>170</td>
<td>71</td>
</tr>
<tr>
<td>2009</td>
<td>1.208</td>
<td>163</td>
<td>67</td>
</tr>
</tbody>
</table>
Changes in rail demand (2006-2009)

**Rail trips per year (millions)**

- **2006**: 1.583,6 (14,1) > 1 million inhabitants, 1.598 (14,4) < 1 million inhabitants
- **2007**: 1.530,7 (14,1) > 1 million inhabitants, 1.545 (14,4) < 1 million inhabitants
- **2008**: 1.647,5 (14,6) > 1 million inhabitants
- **2009**: 1.575,5 (13,8) > 1 million inhabitants, 1.589 (14,4) < 1 million inhabitants
Crisis effects: changes in PT demand (2006-2009)

Bus trips per year (millions)

2006: 1,555
2009: 1,437

7% decrease

Rail trips per year (millions)

2006: 1,584
2009: 1,576

7% decrease
Public transport trips/year per inhab. (2008)

Small cities: 90
Medium cities: 78
Big cities: 163
Modal split of PT trips (2009)

- Rail modes: 1,630 million trips
  - Capital urban bus: 35.9%
  - Other urban buses: 11.0%
  - Metropolitan buses: 11.5%
  - Tram/Light rail: 5.3%
  - Other rail modes: 1.4%
  - Renfe: 2.9%

- Buses: 1,783 million trips
Modal split of PT trips (2009)

Rail is dominant in big cities

- > 1 million: 38.0%
  - Capital urban bus: 28.8%
  - Other urban buses: 9.4%
  - Metropolitan buses: 2.9%
  - Other rail: 1.6%

- > 1/2 million < 1 million: 20.4%
  - Capital urban bus: 70.8%
  - Other urban buses: 9.4%
  - Metropolitan buses: 4.3%
  - Other rail: 1.6%

Buses rule medium-small cities

- < 1/2 million: 82.2%
  - Capital urban bus: 15.5%
  - Other urban buses: 6.2%
  - Metropolitan buses: 3.6%
  - Other rail: 2.3%
Supply-demand balance (2008)

The diagram shows the relationship between car-km/inhabitant and pax-km/1,000 inhabitants for various cities in Spain. The cities included are Madrid, Barcelona, Mallorca, Valencia, Sevilla, Asturias, and G. Canaria. The data points are plotted on a graph, with car-km/inhabitant on the x-axis and pax-km/1,000 inhabitants on the y-axis. The cities are marked on the graph, and a trend line indicates the general pattern of supply-demand balance across these cities.
Changes in bus supply (2006-2009)

Bus car-km per year (millions)

- 2006:
  - > 1 million inhabitants: 418.3
  - 1 / 2 & <1 million inhabitants: 14.8
  - < 1 / 2 million inhabitants: 72.2

- 2007:
  - > 1 million inhabitants: 416.6
  - 1 / 2 & <1 million inhabitants: 15.2
  - < 1 / 2 million inhabitants: 75.6

- 2008:
  - > 1 million inhabitants: 422.8
  - 1 / 2 & <1 million inhabitants: 16.2
  - < 1 / 2 million inhabitants: 73.9

- 2009:
  - > 1 million inhabitants: 479.6
  - 1 / 2 & <1 million inhabitants: 16.1
  - < 1 / 2 million inhabitants: 75.8

Total:
- 2006: 505.3
- 2007: 507.4
- 2008: 512.9
- 2009: 571.5

Legend:
- Light blue: > 1 million inhabitants
- Red: > 1 / 2 & <1 million inhabitants
- Green: < 1 / 2 million inhabitants
Public transport supply (2008)

Networks

- 78,000 km of bus routes (urban & metropolitan)
- 3,300 km of rail modes networks (metro, tram/light rail, suburban rail modes)

Services supply

- 1,180 millions of car-km:
  - 576 millions busxkm
  - 604 millions rail coachesxkm
Bus network densities (2008)

- **Bus routes km / million inhab.**
- **Bus route km / 1,000 km²**
Relationship between bus routes and bus trips (2009)

Without Madrid and Barcelona
Rail network densities (2008)

- Madrid: 107 km/million inhabitants, 84 km red/1,000 km²
- Barcelona: 142 km/million inhabitants, 216 km red/1,000 km²
- Valencia: 280 km/million inhabitants, 351 km red/1,000 km²
- Murcia: 144 km/million inhabitants, 18 km red/1,000 km²
- Sevilla: 125 km/million inhabitants, 81 km red/1,000 km²
- Asturias: 56 km/million inhabitants, 70 km red/1,000 km²
- Málaga: 54 km/million inhabitants, 32 km red/1,000 km²
- Mallorca: 134 km/million inhabitants, 239 km red/1,000 km²
- Gipuzkoa: 85 km/million inhabitants, 73 km red/1,000 km²
- B. Cádiz: 18 km/million inhabitants, 41 km red/1,000 km²
- Alicante: 52 km/million inhabitants, 27 km red/1,000 km²
- A Coruña: 27 km/million inhabitants, 14 km red/1,000 km²
Relationship between rail network and rail trips (2009)

Without Madrid and Barcelona
In urban areas, more than 80% of pop. lives near a PT stop (< 300 m.)

Bus commercial speed 12-18 km/h & metro 28-55 km/h

Park and ride:
- Madrid (22,256 spaces)
- Barcelona (13,400 spaces)
- Valencia (1,672 spaces)
- Sevilla (2,859 spaces)
- Camp de Tarragona (spaces)
- Pamplona (7,971 spaces)

Hours of service: 15-20 hours/day

Public bycicle rental services in 13 cities
Bus lanes percentage (2008)

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

- A Coruña: 2.0
- Vigo: 1.3
- Granada: 0.4
- Gipuzkoa: 5.3
- Mallorca: 0.6
- Málaga: 4.0
- Asturias: 1.2
- Sevilla: 4.6
- Valencia: 19.7
- Barcelona: 12.1
- Madrid: 6.0
There are public bicycle rental services in 13 of the metropolitan areas.
Modal choice depends on the ratio between modes travel time
Change in financial balance (2002-2008)

Financial imbalance has increased

Valencia, Asturias, Mallorca, Zaragoza, B. Cádiz, Vigo & A Coruña, until 2007
Establish long-term integrated strategies
Measures: coordination oriented towards achieving sustainable objectives

integration
complementarity
Compensate
**New PT modes: Tram**

- **BILBAO, 2002**  
  - Today 18.4 km

- **VÉLEZ-MÁLAGA, 2006**  
  - Today 4.7 km

- **ALICANTE, 2003**  
  - Today 4.5 km

- **MADRID, 2007**  
  - Today 36.0 km & 4 lines

- **BARCELONA, 2004**  
  - Today 28.4 km & 6 lines
New PT mode: Tram

SEVILLA, 2007
• today 1.317 m

MURCIA, 2007
• today 2,2 km

BAHÍA DE CÁDIZ, 2006
• 21 km
• 2 lines
Rail network extensions
Improvement of bus services

New Bus lane at Granada

New stops in Pamplona and Andalucía
Transport interchanges
Fleet renewal

Full Accessibility
Consulta de tiempo de espera del autobús ........................................

Mediante WEB NUEVO (Consulta inmediata en tiempo real)
Elige la línea que quieres consultar y sigue las instrucciones:
Línea: Seleccione la Línea...

Mediante SMS
Envía un mensaje desde tu móvil para saber el tiempo de llegada del próximo autobús de cada una de las líneas correspondientes a la parada donde te encuentres.

Es tan sencillo como marcar: ESPERA espacio nº de parada y enviar a el nº 7998

eBus, Valencia

Nueva tarjeta sin contacto
Green carburants

Natural Gas

Bioetanol

Biodiesel

Electric
Integrated fare systems
Intelligent integrated ticketing systems

Interoperability in Andalucía Metropolitana areas

EMT Valencia: T1, T2 y T3
Marketing campaigns

nightbus

beachbus

olébus

en bicicleta TAMBién AL Trabajo

22 de septiembre de 2008
Día sin coche, puedes probar una bicicleta eléctrica o plegable.
Conclusions

• Population and mobility changes threat the modal balance in medium and long-term.
• Mobility demand stagnation because the economic crises
• Promotion of the PT: improving service quality, commercial speed, frequency and accessibility
• High cost coverage: operators good management
• Great investments (rail modes) & fleets renewal
• Sustainable transport policies: parking management, alternative modes, etc.
Goodwin (1997): focus of mobility analysis must shift from the state of behaviour to changes in behaviour.

Brög (1996): behaviour actually begins in the mind

Skip to analyze the behavior of mobility to study how to change the behavior of mobility
Orfeil (2000):

In urban transport, the long-run elasticities are worth twice the short-run elasticities.

The effects of the measures implementation become evident in 5-8 years, causing changes in the mobility behaviour.
Thank you for your attention!

Andrés Monzón

www.observatoriomovilidad.es