Madrid Public Transport Authority: a bet on a future viable urban environment

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Abstract

Madrid metropolitan area, with more than 5 million inhabitants, relatively high car ownership, high public transport modal split and high traffic congestion, is involved in an ongoing maturity process, pointed up during the last years.

The complex metropolitan structure requires an efficient transport system with the capability to manage the different flows derived from its intense socio-economic activities. With such an objective, a competitive public transport system, able to satisfy the citizens mobility needs in a proper way, is demanded. Networks and operators diversity should be faced with a comprehensive and efficiently managed organisation, playing the transport authority a key role in the co-ordination of public transport services, both from public and private companies.

Underlying this scenario is the Madrid Regional Transport Consortium, created sixteen years ago as a public transport authority aimed to promote an environmentally friendly mix of transport services, with a strategy based on three fundamental features: administrative, fare and modal integration. It firmly contributes to the sustainable development goal at the same time than users can take advantage of a large transport network that facilitates 1,486 million trips annually with very suitable high-quality and seamless journey conditions.

1 Background information

In the beginning of the 80s, the Madrid region, like the rest of the country, was subject to several different tensions created by the following events:

- The energy crisis that broke out at the end of the 70s and the beginning of the 80s increased unemployment rates to levels above 20%.
The Sustainable City II

- The political model changed and the country began its transition to a democratic system by dividing its territorial structure into autonomous regions.

- In the beginning of the 70s, the social structure changed as women began to play a more important role in the labour force. This fact also changed certain mobility patterns and triggered a drop in birth rates.

In addition, Madrid was going through other specific changes in regards to public transport:

- Madrid’s population began to decrease, the maximum of 3,228,057 inhabitants was reached in 1975, as people moved to the outskirts. The metropolitan ring did not have a railway network that was capable of handling the public transportation necessities required by the new metropolitan mobility structure.

- There were two large public operators in the city of Madrid, one in charge of the underground network and the other the urban bus network. These operators were competitors, a fact that decreased the number of people who used the underground network for travelling owing to the transport network’s lack of service and fare co-ordination.

- Metro became a public company governed by the State and, unlike the private company, was able to implement an ambitious Enlargement Plan that would extend the underground to outlying neighbourhoods created in the 60s. At the same time, however, no investments were made in the old network or the rolling stock, which resulted in a clear deterioration of the service quality of the existing network.

- The lack of a co-ordinating organisation of public transport was evident. Until 1983, COPLACO was the metropolitan planning body for transportation infrastructures and urban development, but after that there was no co-ordination between the different public and private operating companies.

As a consequence, the public transport demand steadily declined. In particular, the underground recorded daily losses in terms of passengers, despite the enlargement effort made between 1975 and 1983. The length of the Metro network doubled from 50 km to 102km, while the number of passengers dropped 20% (Figure 1).

![Figure 1. Evolution of public transport demand, period 1973–1986](image-url)
2 Creation of the Public Transport Authority

The Consorcio Regional de Transportes de Madrid, CRTM (Madrid Public Transport Authority) was set up in 1985 by Madrid Region Law and began operating at the beginning of 1986. The following are the authority’s basic functions as outlined in the law:

- To plan public transport infrastructure projects, such as the underground network and interchanges.
- To plan transportation services, defining co-ordinated exploitation programs for all modes of transportation as well as controlling and surveying services rendered.
- To establish an integrated fare system for the entire public transport system.
- To define the economic and financing framework of the transport system as well as the management of the derived economic activities.
- To create a global image by acting as an intermediary between the user and the public transport system.

The Consorcio Regional de Transportes de Madrid (CRTM) has a 20-member Administration Council composed as follows:

- Madrid Region: 5 members, including the President of the CRTM
- Madrid Municipality: 5 members, including the Vice-president
- Other municipalities in the Madrid region: 3 members
- The National Government: 2 members
- Transportation Business Associations: 2 members
- Transportation Worker Associations: 2 members
- User and Consumer Associations: 1 member

Nowadays, similar to other great Western European capitals, Madrid’s metropolitan area has been undergoing a transformation process for the last ten years. This transformation has been fuelled by economic growth and the resulting sociodemographic changes and increased car ownership.

The population of the large city centre continues dropping given that families are moving to the outskirts in search of a better quality of life. Over the last twenty years, the city of Madrid has lost more than 10% of its population (Table 1). As a result, the metropolitan ring has experienced a high growth rate and this area of almost 2 million inhabitants has taken in former city-dwellers as well as people from other regions.
Table 1. Population according functional divisions of the Community of Madrid

<table>
<thead>
<tr>
<th>Ring</th>
<th>Area (km²)</th>
<th>Municipalities</th>
<th>1975</th>
<th>1996</th>
</tr>
</thead>
<tbody>
<tr>
<td>Madrid City</td>
<td>606.4</td>
<td>1</td>
<td>3,228,057</td>
<td>2,866,850</td>
</tr>
<tr>
<td>Metropolitan Ring</td>
<td>2280.7</td>
<td>49</td>
<td>929,099</td>
<td>1,913,804</td>
</tr>
<tr>
<td>Regional Ring</td>
<td>5141.4</td>
<td>129</td>
<td>162,748</td>
<td>241,636</td>
</tr>
<tr>
<td>Total</td>
<td>8028.5</td>
<td>179</td>
<td>4,319,904</td>
<td>5,022,290</td>
</tr>
</tbody>
</table>

Even though the territorial development structure of the metropolitan area has been based on a multiple-centre scheme, the municipality of Madrid still accounts for the most of the economic activity of the Region of Madrid and for more than two-thirds of the tertiary employment sector. Thus, the surrounding regions still heavily depend on the capital’s economic strength.

Based on the functions established in its Law of Creation, the strategy of the CRTM over the last 15 years has been supported by three fundamental pillars: administrative integration, fare integration and modal integration.

3 Administrative integration

Transport authorities have developed an interconnected operating structure in regard to the mobility policies and strategies set out in their framework of competence. The transport authority’s relationship with users, operators and different public administrations is the key for carrying out tasks such as planning networks and services.

Since the CRTM has representatives from the Region of Madrid, Madrid Municipality, State Administration, other adhered municipalities, unions and the business sector as well as sufficient technical representation and capacity it is regarded as the sole transport authority in charge of the public transport operations.

Madrid Region granted the CRTM public transport competencies corresponding to the suburban bus lines that channel mobility between Madrid and its metropolitan ring. 33 private companies that operate under a grant system composed of 41 concessions cover the 280 bus lines. In addition, the Region of Madrid transferred 23% of the shares of Metro it had received from the State to the CRTM. The other 77% remains in the hands of Madrid Municipality.

The CRTM’s Law of Creation allows municipalities to adhere to CRTM, if they so wish. In this case, the municipalities would transfer their legally granted competencies of service planning functions to the CRTM in exchange for a stable framework for financing their urban transport. For example, Madrid Municipality would have to finance 100% of the deficit generated by the municipal bus compa-
ny and the Metro’s corresponding share, but it only has to finance 50% of this deficit since it is part of the CRTM (the rest is financed by Madrid Regional Government).

Currently, all important municipalities of Madrid Region are integrated in the CRTM. Out of a total of 179 municipalities, only 3 with a population of less than 1,000 inhabitants have not yet been integrated.

The CRTM’s strong relations with local and regional public administrations, users and operating companies are fundamental for developing their strategic role and the tactical aspects associated with the public transport networks.

In addition, the CRTM plays a fundamental communication role in areas related to location of activities and land use with different public administrations that are responsible for urban planning. Its goal is to ensure that city planning developments take the public transportation system into account. This way, they will be able to encourage compact residential areas where a high-quality and environmentally balanced public transportation system can be created.

4 Modal integration

Mobility in large metropolitan areas responds to patterns of growing complexity, while operating relations and the supply of existing modes of transportation continue evolving.

Comprehensive knowledge about this mobility is key to promoting public transport. This should not be a static process. Continuous observations on mobility must be made so that any changes produced could be explained and acted upon beforehand.

In order to implement this dynamic observation and reaction process, the transport authority must have the human and technical means required. The CRTM plays a fundamental role in aspects relating to mobility and its modelling. Underground enlargement proposals and new public transport infrastructure projects are simulated and evaluated by their own technical teams.

Therefore, the effects that certain land uses and location of activities have on mobility can be investigated since the growth of the city and, consequently, the increased distances travelled by private vehicles imply non-existent land needs, non-permissible environmental impacts and increased consumption of travel time.

Intermodality is the key to efficiently serving the user’s changing needs given the continual enlargement of public transport networks and its characteristics. The intermodality concept refers to the entire modal chain of door-to-door journeys. This fact must be taken into account in all aspects, not only in co-ordinating the different modes and operators, but also in the interchange points and the system information available for users.

The existence of different operators, the need for co-ordinating timetables and the creation of physical spaces used for interchanges requires the presence of the
transport authority from the start. This transport authority plays an important role in both the promotion and the design of the interchange since the very first moment.

The CRTM has greatly contributed to the development of an interchange policy aimed at mobility from the metropolitan ring to the city centre. Throughout the years, CRTM’s conception of themselves has evolved. Currently, they bet on multi-modal interchange stations whose success greatly depends on private financing (Figure 2).

Figure 2. Section of the interchange at Avda. de América between underground (4 lines), buses (urban, metropolitan and long-distance) and parking lot.

According to the operator’s point of view, the transport authority must play a dual role. On the one hand, they must try to harmonise public transport by searching for service level improvements and optimising the use of existing resources.

On the other, they must be dynamic because the authorities, along with the operators, have to make a huge innovating effort in order to improve both the public transport network and the quality of the rolling stock by vying for the latest technologies and more accessible and less contaminating vehicles.

The quality of transport services should be incorporated in business contracts, not only at the management level of the operating company, but also in regard to vehicles, stops/stations, information as well as service, punctuality, timetable fulfillment and cleanliness.

The image of an integrated public transport system must be given to users, regardless of the companies operating it. And again the transport authority is the body that works closely with operators in order to compile and disseminate timely information on the various networks.

The CRTM produces information to be posted at the stops of the public transport network as well as maps, brochures and guides that facilitate information to different types of public transport users. These transport authority functions must be established in a single framework of multiple transport operators that provide the user with consistent and thorough information. Without the presence of the transport authority, it is difficult to tackle an information plan when there are multiple operators using the same stops.
5 Fare integration

The achievement of an integrated fare system for the operator and service group is a priority for CRTM since the presence of a consistent fare system in their structure and typology projects an unified and integrated image of the transport system.

The Travel Card stands out among the different transport tickets. It can be used unlimitedly for different transportation modes within a valid period of either one month or one year. The Travel Card was created in 1987 with two basic aims: rationalise the price of collective public transport services and encourage its use by offering access to all modes. Since then, the Travel Card has been diversifying and extending its spatial coverage according to user needs with the objective of making it more attractive. The results of improvements show a continual growth of the Travel Card’s market share since its creation. It reached 65% in 2001, which means that two out of three public transport passengers use this integrated card provided by the CRTM.

![Figure 3. Fare evolution compared with the CPI of the Region of Madrid (year 1987 = base 100)](image_url)

Therefore, the CRTM’s fare policy for the different tickets available is extremely important. The evolution shows that ticket prices have been kept below the CPI curve of the Region of Madrid, although they were levelled off last year. The “A zone” Travel Card for the municipality of Madrid and the “B3 zone” Travel Card for the outer metropolitan ring represent 79.2% and 78.0% respectively, compared with the 10-trip ticket and the clearly penalised single-trip ticket represent 131.1% and 216.0% respectively (Figure 3).
Revenues obtained from fares in the public transport system of the region of Madrid allowed the CRTM to reach a coverage ratio of 53% in 2000. It must be noted that the transport system does not receive any type of external compensation for the reduced-fare Travel Cards offered to young people and senior citizens.

There is no doubt that the CRTM's performance as transport authority should be backed up by a stable financial source that assumes the task of seeking economic resources to finance the public transport system. For this purpose, the CRTM obtains agreements and makes commitments with economic administrations and negotiates with different political classes so as to cover the subsidies needed by the system. In 2000, the figure for subsidies reached 449.2 million Euro and was allocated as follows: 42% came from the Region of Madrid, 36% from the State Administration, 20% of Madrid Municipality and the remaining 2% from other local corporations.

Taking into account financial needs, the CRTM must fundamentally cover operation expenses, and eventually investments, that are incurred by its integrated public companies. They must also cover compensations for private suburban bus companies and suburban railways, Cercanías Renfe (State governed), for the use of Travel Cards.

The convenience of the integrated Travel Card has lead to greater understanding of the public transport network and specially to certain user groups, such as young people. This group can now satisfy their mobility needs by taking advantage of the extensive network that is available everyday and especially at weekends.

In a normal month, more than one million people carry an integrated transport card in their pocket, that is, one out of every four citizens of the Region of Madrid owns a travel card.

6 Conclusions

The challenges being created in regard to metropolitan areas mobility, require public transport support measures to be taken in the context of sustainable mobility. These measures should bring together the fields related to mobility, intermodality, service quality, financing and information. Transport authorities play a crucial role in the development and implementation of these measures, which are closely worked on with the rest of the parties involved.

Since being founded, the fundamental aim of the CRTM has been to promote public transport use by co-ordinating services, networks and fares and to create a transport system that offers citizens greater capacity and better quality of service.

This mission, implied in the conception of the CRTM, is composed of a triple integration structure: modal, fare and administrative. Efforts made have been rewarded by the public transport's demand evolution that has recorded a growth of 56% from 1986 to 2000 (Figure 4).
All this was accomplished while attending to the population’s growing mobility needs with efficient and high-quality transport services. These achievements are proven by the spectacular supply growth experienced during these years.

However, there is still a long road to travel, especially for aspects related to the global idea of the transport system and its co-ordination by means of strategies and territorial policies. For example, a city’s political decisions on traffic and private vehicle parking frequently do not coincide with public transport policies. The best solution would be to assign certain functions to the transport authority. This would allow for a global idea of mobility and for the optimisation of available resources used to achieve the objective of sustainable mobility in our metropolitan areas.

**References**

- American Public Transit Association and Institute for Alternatives Futures, 1997. “Strategic goals for 21”.

**Figure 4. Evolution of public transport demand in Madrid Region, 1974–2000**