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Editorial correspondence
Laboratory of Land Use Mobility and Environment
DICEA - Department of Civil, Architectural and Environmental Engineering
University of Naples "Federico II"
Piazzale Tecchio, 80
80125 Naples
web: www.tema.unina.it
e-mail: redazione.tema@unina.it

The cover image shows a sea glacier ice that melts away.

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REVIEW NOTES – Urban practices

Planning for sustainable urban mobility in Southern Europe: insights from Rome and Madrid

Gennaro Angiello

Department of Civil, Architectural an Environmental Engineering
University of Naples Federico II, Naples, Italy
e-mail: gennaro.angiello@unina.it

Abstract
Starting from the relationship between urban planning and mobility management, TeMA has gradually expanded the view of the covered topics, always following a rigorous scientific in-depth analysis. This section of the Journal, Review Notes, is the expression of a continuous updating of emerging topics concerning relationships among urban planning, mobility and environment, through a collection of short scientific papers. The Review Notes are made of four parts. Each section examines a specific aspect of the broader information storage within the main interests of TeMA Journal. In particular, the *Urban Practices* section aims at producing, analyzing and reporting data on recent and relevant policies in the urban domain.
The present note in particular reports on the recent initiatives undertaken by two major Southern European capitals to foster sustainable mobility: Rome (IT) and Madrid (ES). To this aim, the note briefly introduces the legal background and current developments of the Sustainable Urban Mobility Plan (SUMP), a framework developed by the European Commission to support local administrations in developing holistic urban mobility strategies. This is followed by (i) an overview of the mobility situations in Rome and Madrid and by (ii) an analysis of the objectives, the strategies and the measures set in their respective SUMPs. A comparative analysis of the two SUMPs is proposed in the last paragraph as summary factsheet of the contribution.

Keywords
Sustainable Mobility; SUMP; Rome; Madrid.

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1. Introduction

Urban mobility — the movement of people and goods in urban areas — has a significant impact on sustainability and quality of life in cities. Mobility indeed generates significant externalities such as air pollution, noise, congestion, occupation of public space, and increased morbidity and mortality caused by traffic accidents and pollution (Chatziioannou et al., 2021; Gargiulo and Russo 2017). Furthermore, mobility externalities are unequally distributed on society, since they particularly burden the most disadvantaged communities (Lucans and Jones, 2012). Additionally, the impacts of urban mobility — and in particular that of motorized mobility — extend far beyond the cities' boundaries where they are generated. Indeed, the use of fossil fuel combustion engines in urban areas greatly contribute to the global climate change crisis and to the human perturbation of the global environment (IPCC, 2014).

Due to these negatives externalities, promoting sustainable mobility in urban areas has become an issue of main concern for policy makers and, as such, one of the most widespread objectives in transportation planning worldwide: nowadays, no plan, project, or policy direction concerning the transport sector does not (at least) mention the concept of sustainable mobility (Gallo and Marinelli, 2020). Yet, sustainable mobility — as a complex socio-technical phenomenon — remains quite challenging to operationalize (Geels, 2012) while different frameworks have been proposed by researchers and practitioners to foster its implementation in planning practices (Gallo and Marinelli, 2020).

This short note focuses on one particular implementation framework: the "Sustainable Urban Mobility Plan" (SUMP), a concept/framework developed by the European Commission to support local level authorities in exploring new urban mobility strategies. Within this context, this note reports on the recent initiatives undertaken by two major Southern European capitals to foster sustainable mobility: Rome (IT) and Madrid (ES). To this aim, the note briefly introduces the legal background and current developments of the SUMP framework in Europe. This is followed by (i) an overview of the mobility situations in Rome and Madrid and by (ii) an analysis of the objectives, the strategies and the measures set in their respective SUMPs. A comparative analysis is proposed in the last paragraph as summary factsheet of the contribution.

2. What is a Sustainable Urban Mobility Plan?

In recent years, the European Commission has been increasingly focused on the development of sustainable urban transport and has introduced legislation and formal directives in this domain. In its 2013 Communication on competitive and resource-efficient urban mobility, the Commission has acknowledged the importance of supporting local authorities "so that all cities across the Union can achieve a step-change in their efforts for more competitive and resource-efficient urban mobility" (EC, 2013a). Still, the impact assessment accompanying the 2013 Urban Mobility Directive (EC, 2013b) found that most European cities have not solved their urban mobility challenges, and that deficient planning practices on the local level endangered key European objectives, including a competitive and resource-efficient transport system, the EU's future prosperity and its international competitiveness. In an attempt to address these shortcomings, the Commission introduced the concept of Sustainable Urban Mobility Planning (SUMP) in Annex I of its 2013 Urban Mobility Package (EC, 2013c). The package advocates "a step-change in the approach to urban mobility" (…)"to ensure that Europe's urban areas develop along a more sustainable path and that EU goals for a competitive and resource-efficient European transport system are met.". It sketches out the guiding principles of the planning process and the topics to be addressed in a SUMP.

Within this legal background, a SUMP can be regarded as "a strategic and integrated approach for dealing effectively with the complexities of urban transport" (EC, 2013c). Its core goal is to improve accessibility and quality of life by achieving a shift towards sustainable mobility. SUMP advocates fact-based decision making guided by a long-term vision for sustainable mobility. As key components, this requires (i) a thorough assessment of the current mobility situation, (ii) a widely supported vision with strategic objectives, and (iii)

an integrated set of infrastructure, regulatory and financial measures to deliver the objectives – whose implementation should be accompanied by systematic monitoring and evaluation. In contrast to traditional planning approaches, SUMP places particular emphasis on the involvement of citizens and stakeholders, the coordination of policies between sectors and broad cooperation across different layers of government and with private actors. The concept also emphasises the need to cover all aspects of mobility (both people and goods), and all modes and services in an integrated manner, and to plan for the entire "functional urban area", as opposed to planning for a single municipality within its administrative boundaries.

Implementation of SUMPs across Europe has been supported by numerous and diverse EU initiatives aimed at funding SUMPs adoption, providing strategic guidance, and foster network opportunities for cities and functional areas. As result, more than 1,200 SUMP initiatives are reported on the Eltis City Database (Elstis, 2022), as of June 2022, while the SUMP — as a planning instrument— has taken over the role of the main strategic transportation planning document in most EU cities (Gallo and Marinelli, 2020). The two paragraphs below, reported on the case studies of Rome (3.1) and Madrid (3.2), two Southern European capitals that have recently developed their respective Sustainable Urban Mobility Plans.

3.1 Rome SUMP

SUMP legislation in Italy

In 2017, the Italian law *D.M. 4 agosto 2017* was approved, which provides national guidelines for the development of SUMPs in Italian municipalities. The law establishes the approval of the SUMP as a compulsory step for local authorities to get State-level public funding for public transport projects.

Rome and its metropolitan area

With over 2.75 million inhabitants, Rome is the capital and the largest city of Italy. Spreading over a 1,287 km² surface, it is also the EU largest city by area. Rome is the capital of the homonym metropolitan city that counts 4.2 million inhabitants.

City's challenges

Most of the mobility challenges currently faced by the Italian capital are the results of decades of poorly regulated urban development, inadequate provision of public transport services and infrastructures in peripheral areas, and dominant urban sprawl patterns in the so called "Extra GRA" area i.e., the area outside the ring-shaped motorway that encircles the city center (Coppola et al., 2014). These circumstances have resulted in the dominance of car as the preferred mode of transport which accounts for the 52% of daily trips in the city, a significant share of trips by motorbike (15%) – — whose fleet has more than doubled in the past 10 years — and a modest use of public transport (28%) and low rates of active mobility (6%). Furthermore, the dominance of cars has resulted in high rates of morbidity and mortality caused by traffic accidents, with an estimated yearly cost per person of 360 euro, against a national average cost of 100 euro per inhabitant. For the same reason, more than the 65% of the city's population is exposed to traffic noise levels that are above the OMS recommended levels. Finally, according to the most recent data from the Global Traffic Scorecard (IRIX, 2021), Rome is the 5th most congested city of the world. In terms of logistics, one of the main issues that the city is facing is related with the pressure imposed by logistics vehicles to the overall street circulation, especially in the city center. Furthermore, a generalized "logistic sprawl" has brought an emerging set of issues such as congestion nearby major distribution facilities in peripheral areas.

SUMP objectives

In order to cope with these challenges, on February 2022, the City Council of Rome approved the city' SUMP. The aim of the plan is to promote accessibility for all, safety and the use of 'smart' technologies that enable communication between infrastructure, vehicles and people. The plan's objectives are hierarchically articulated on two levels. At the top level, the followings represent the overall objectives of the plan:

- Provide transportation options to access key destinations and services.
- Improves safety and security.
- Reduces air and noise pollution, greenhouse gas emissions, and energy consumption.
- Increases the efficiency and cost-effectiveness of passenger and freight transport.
- Contribute to the attractiveness of the territory and the quality of the urban environment.

These five main objectives are further articulated in 17 second-level objectives. The latter are grouped in three groups according to the expected implementation timeframe, as short-, mid-, and long-term objectives.

Measures

The 17 second level objectives are further articulated in 42 measures that covers different aspects of urban mobility including technical and infrastructure measures, as well as regulatory, promotional and financial measures. For instance, in order to support the modal shift from car to public transport and reduce the longstanding city's car dependency, the plan envisions the extension of the city's subway system (line A, B1, C and new developments) toward the peripherical areas, the construction of new urban rail corridors and the introduction of a congestion charge zone in the city center. Beside building new lines and new stations, the plan also envisions the redevelopment of most of the existing stations to improve station access and create multimodal hubs with new parking and extended facilities. Furthermore, in order to reduce the high levels of morbidity and mortality caused by traffic accidents, the plan identifies a number of interventions on the city's most critical car axes. These measures are coupled with interventions aimed at promoting active mobility by (i) improving the safety condition of pedestrians, (ii) expanding the city's bike network with 91,4 km of additional bike lanes and (iii) establishing 77 new "car free islands" in all the city's neighborhoods, following the successful example of the Barcelona's superblock initiative (Mueller et al., 2020). To address the city's logistics problems, the plan introduces a number of measures, including the construction of 9 new urban distribution centers, the extension of the number of dedicated loading and unloading facilities, as well as incentives for private companies willing to switch to environmentally friendly vehicles. A central role in the implementation of the city' s plan is devoted to the uptake of smart technologies, such as adaptive traffic signals, smart public transport solutions, bike and pedestrian solutions, smart parking, logistics solutions, and vehicle to infrastructure technologies.

3.2 Madrid SUMP

SUMP legislation in Spain

In 2011, the Spanish Law for a Sustainable Economy (*Law 2/2011*) was approved, which encouraged local administrations to create a SUMP. As for Italy, also the Spanish law establishes the approval of a SUMP as a compulsory step for local authorities to get public funding for transportation projects.

Madrid and its metropolitan area

Madrid is the capital and most populous city of Spain. The city has almost 3.4 million inhabitants and a metropolitan area population of approximately 6.7 million inhabitants. It is the second-largest city in the European Union, and its monocentric metropolitan area is the second largest in the EU.

City's challenges

Despite a generalized positive trend started in 2014 with the great expansion of its rail transportation network, the city of Madrid is still facing important mobility challenges, especially in its periphery areas where 2,25 million inhabitants and 750,000 employees are located. These areas, especially those of recent development, are characterized by a car-centric street layout that— tougher with a lack of proper transit infrastructures— favors the extended use of private cars. Most important challenges in the public transport sector concerns the lack of dedicated pathways for bus and for (some) tram services that undermine the competitiveness of these services as alternative to individual transportation. In terms of soft mobility, the city has recently extended its network of dedicated bike line, yet the use of bikes remains relatively modest, with women substantially less likely to ride a bike due to safety concerns. Furthermore BiciMAD — the municipal bike sharing system — is limited only to the central part of the city. Walkability also result problematic in some areas of the city due to poor street design and the presence of 4 and 6-lanes streets that constitute a physical impediment to walking. In terms of personalized smart mobility, both public and private companies are operating in the city; yet the supply of these services remain limited in most peripherical areas. Furthermore, lack of clear regulation generates conflict between pedestrians and users of shared vehicles. In terms of logistics, the plans notices that as of today the monitoring of logistic activities is very limited, and as such, the lack of reliable data hampers evidence-based decisions.

SUMP objectives

Over the last few years, the Spanish capital has made huge strides in its sustainable mobility planning and deployment. The city's new SUMP – named Madrid 360 – is the next step in this journey. It has been approved in July 2022 and identifies four main objectives that the city intends to reach by 2030:

- Safe mobility, aimed at reducing to the maximum extent the probability of severe car accidents.
- Healthy mobility, aimed at promoting active transportation modes while reducing traffic pollution and noise, with the overall objective to improve public health conditions through transport planning.
- Sustainable mobility, further articulated in three sub-objectives: environmental, energetic, and social sustainability.
- Smart mobility, aimed at improving the overall transportation system performances thought the adoption of smart technologies.

Measures

More and better public transport is a key component of the plan. Madrid plans to expand its network of bus lanes to 250 kilometres by 2030, while implementing green corridors which will enable similar speeds to those of the Metro and contain a segregated platform for buses. The aim is to have 60 kilometres of green corridors by 2025. Improving transport

infrastructure is also an important pillar of the SUMP. To do this, the city will be promoting the extension of the metro network (lines 3, 5, 7 and 11 and new developments) and implementing high occupancy vehicle lanes at all major road entrances to the city. Active mobility also benefits from increased visibility in the Plan, as 35 kilometres of new bike lanes are planned by 2050, supported by 20,000 parking spaces for bicycles and personal mobility vehicles. At the same time, the city's electric bike sharing system, BiciMAD, will be expanded to 10,000 bicycles. Micromobility and intermodality will also be enhanced to facilitate modal integration. This will see the implementation of 300 micromobility hubs, as well as 700 places for shared cars in the city by 2025. The SUMP also takes a more sustainable approach to parking management. The Regulated Parking Service will be expanded to new neighbourhoods to prioritise parking for residents. The SUMP also stimulates the uptake of less polluting vehicles - starting with the city's own public transport fleet operated by EMT. One third of the EMT fleet will be zero emission by 2027. Simultaneously, measures to change the technology used in private vehicles and taxis, as well as providing the necessary recharging infrastructure, will also be promoted. Logistics receives a lot of attention in the SUMP. The document foresees the implementation of five micro-platforms in car parks near restricted access areas, with all loading and unloading places being smart by 2030.

Discussion and conclusions

Promoting sustainable urban mobility has become an issue of major concerns for researchers and policy makers. Yet, operationalizing this concept in planning practices remain a challenging task, while different planning framework has been proposed in recent years. Within this context, the EU "Sustainable Urban Mobility Plan" represents an interesting example, as it offers an EU-wide standardized process for urban mobility planning, allowing — within a certain extent — the comparison of SUMP initiatives across different EU cities. This short note focused on this framework and reported on the initiatives undertaken by two major Southern European capitals that have recently adopted a SUMP: Rome (IT) and Madrid (ES).

In terms of national legislation both Spain (in 2011) and Italy (later in 2017) have developed national guidelines to support public authorities in developing SUMPs. Furthermore, both national legislations establish the adoption of the SUMP as a compulsory step to access to public funds for transportation investments. In terms of geographical features, both cities present a strongly radial and monocentric urban form characterized by a high-density mixed-use city core, and a significantly extended peripheral areas. The latter it is characterized by unregulated and disperse urban development in Rome and by a car-centric layout in Madrid. In both cases, these areas are poorly served by public transport, making car the most used mode of transport. Car dependency however is much more severe in Rome that, overall, present higher level of traffic congestion and very high traffic-related morbidity and mortality rates compared to the Spanish capital. Both cities are struggling to promote active transportation and both plans recognize a lack of proper dedicated infrastructures and services as the main barriers to walking and cycling. Logistic issues are reported in both plans although more acute in the city of Rome where 'sprawl logistics' is considered the main issue hampering the sustainable movement of goods across the city. The two cities report similar high-level planning objectives. This is not surprising as EU-level guidelines set common EU-wide, high-level objectives for cities intending to implement SUMPs. Yet the 'weight' assigned to each objective is slightly different. Rome's plan poses more emphasis on reducing car dependency and car-related externalities, while Madrid plans provide a much richer set of objectives that address sustainability more holistically. Several measures to support these objectives are established in their respective SUMPs, with the city of Rome focusing more on infrastructure and technological measures, while Madrid providing strong emphasis also on services and regulation. The two cities have both undertaken a participatory process to SUMP development, involving citizens, NGOs, the academia and the private sector. Both have relied on simulation models to evaluate the impacts of policy interventions, and both have set monitoring and reporting mechanisms to track plan's progress and objective achievement. Finally, both plans strictly follow the recommendations established at the EU level and provide coordinated mix of measures to foster sustainable mobility, thus setting the necessary conditions for a more sustainable urban future. Yet, the implementation of these impressive set of measures is not granted, and only monitoring and ex-post evaluations will truthfully tell whether the two cities have been able to achieve their sustainable mobility goals.

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Author's profile

Gennaro Angiello

Gennaro Angiello is a Senior IT Consultant, currently auditing for the European Commission, where he leads the analysis and design of information technologies aimed at supporting data-driven policymaking in the domain of environment, public health and food safety. Prior to moving to the private sector, Gennaro has worked as researcher at the Department of Civil, Architectural and Environmental Engineering of the University of Naples Federico II and has been Visiting Fellow at the Department of Human Geography of the Complutense University of Madrid.