

# Digital technology at the service of urban mobility: The stakes for metropolitan areas?

Chloé Perreau & H  l  ne Roussel,  
Montpellier M  diterran  e M  tropole (3M)

## Abstract:

Local authorities must adapt to digital technology while being “proactive” to rapid technological, environmental and societal trends. The “smart city” approach, adopted by Montpellier, seeks to make the social, environmental and economic spheres converge toward a global, systemic solution. Montpellier Mediterranean M  tropole (3M) has adopted a roadmap for the digital transition in this metropolitan area in France. This roadmap includes information and ticketing services for multimodal transit, an open data policy and public-private partnerships for handling changes in mobility (“intermodality”, the reduction of emissions, driverless vehicles, connected mobility...). Given the scope of the changes in both mobility and digital technology, local authorities are faced with challenges that are considerable but exciting (e.g., digital sovereignty or organizational changes).

Policies of mobility must deal with two major issues: on the one hand, social cohesion and, on the other, the environment- and climate-related emergency (and thus public health). Solutions proposed for transportation must take into consideration publics of all sorts, enable people to be autonomous, foster the return to employment... and should also reduce pollution from emissions. Motorized transportation, the leading source (40%) of greenhouse gas emissions in France, contributes to global warming. Motor vehicles emit significant quantities of nitrogen dioxide and particulates, which affect air quality. In the greater Montpellier metropolitan area (3M: Montpellier M  diterran  e M  tropole), road transportation is the major source of nitrogen dioxide emissions.<sup>1</sup>

**3M: Montpellier M  diterran  e M  tropole,**  
the Montpellier metropolitan area

3M is a public establishment (with its own tax sources) for cooperation among communes in the metropolitan area of Montpellier in southern France. It groups 31 communes in a single, homogenous geographical unit (without enclaves), this group forming a space of solidarity for jointly drafting and conducting a program of urban planning and of economic, environmental, educational, cultural and social development so as to improve cohesion and competitiveness and contribute to sustainable development with solidarity. In a spirit of regional and interregional cooperation and for the sake of a balanced territorial development, emphasis is placed on economic functions in the metropolitan area — its transportation networks and resources in higher education, research and innovation.

Source: [data.montpellier3m.fr](http://data.montpellier3m.fr)

Recent trends in digital technology bear opportunities for dealing with these problems, in particular for better coordinating various modes of transportation for users and reducing the number of single-passenger cars on highways. This technology can also help “debunkerize” policies compartmentalized by sector of activity. For instance, the digitization of sporting and cultural events (locations and schedules) enables us to more clearly foresee the demand for transportation.

<sup>1</sup> This article, including any quotations from French sources, has been translated from French by Noal Mellott (Omaha Beach, France). The translation into English has, with the editor’s approval, completed a few bibliographical references. All websites have been consulted in October 2019.

Local authorities have the tasks of defining and steering a global, multisectoral digital strategy (transportation, environment, urbanism, culture, etc.) in a context of quick technical and societal changes. The Smart City Program (*Cité intelligente*) seeks to consolidate the social, environmental and economic pillars through a global, systemic approach. It provides 3M with a roadmap for the digital transition. This roadmap foresees information and ticketing services for multimodal transit, open data, and public-private partnerships for following up on the changes now under way in mobility: intermodality, transportation with low emissions, driverless vehicles, connected mobility, etc.

## The Smart City roadmap: The founding principles of public interventions

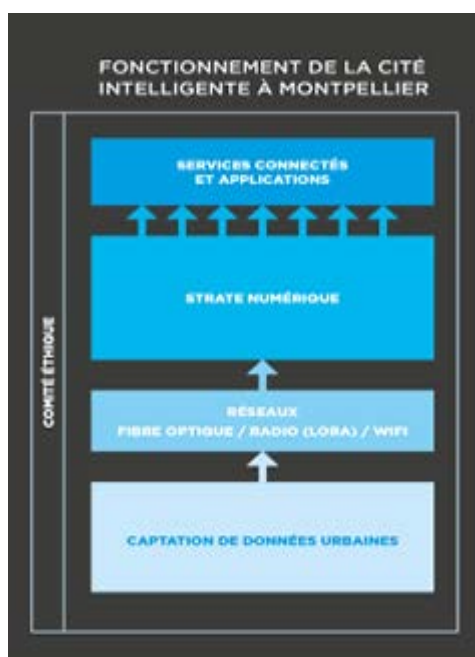
Digital technology is a springboard for giving thought to public interventions since it is based on citizens' new practices. It leads us to reconsider the question of how to control uses and forces us to restate the role and fields of interventions by public authorities in a highly competitive, potentially disruptive environment, where private services are being offered. This context is laden with opportunities.

Since 2011, 3M has adopted an approach to research and development that resulted, in 2015, in the Smart City roadmap (*Cité intelligente*) with the following three dimensions:

- CITIZENSHIP: improve citizen participation and reinforce social bonds.
- ECONOMY: make data available to attract and retain firms in the metropolitan area through "industrial collaborations".
- ENVIRONMENT: respond to the climate emergency, engage in the energy transition and economically manage resources.

Via this City roadmap, 3M has asserted its role as a "trusted third party", as a manager and integrator in a complex context (governance, forms of technology, business models, etc.). A pillar of this approach is a global, structured data policy with the objectives of assisting decision-making by local authorities, providing services for citizens and making data available to third parties (private or academic).

**Figure 1:** The Smart City Program in Montpellier



The governance of this Smart City Program calls for a deep organizational change at 3M. Various skills and aptitudes will be put to use: citizens, elected officials, departments in local administrations, private parties and the scientific community. For local authorities and the urban area, the digital transformation implies an organizational process, multisectoral and agile, so that various departments (the water supply, mobility, risk-management, urban planning, information systems, economic development, culture...) can appropriate and design interventions. This calls for a multidisciplinary organization within the public administration for supporting municipal service departments, firms and academics in the metropolitan area. A project steering group oversees the implementation of the Smart City roadmap, the piloting of new digital services (users and communes) and the support for digital innovations in business processes. It relies on specifications for processes within operational departments. The governance of the Smart City Program is still taking shape: from 2013 to 2015, a steering committee for multipartner R&D contracts; and since 2016, a committee of strategy attached to the board of directors and an ethics committee.

The Smart City Program relies on a platform for centralizing, optimizing and making available urban data. The issue of “digital sovereignty” soon became crucial. Faced with the hegemony of a few multinational firms that carry more weight than public authorities, 3M chose to construct a smart city that is not technologically dependent. The urban platform is nonproprietary, open and interoperable.<sup>2</sup> The Smart City Program involves partnerships and collaboration in association with research centers, big groups, small and medium-sized companies, and start-ups.

The architecture of the Smart City Program has four layers for: capturing data; passing the data up through publicly managed networks; storing and processing the data; and making the data available. 3M defines and develops a public data policy for the following operations:

- developing interfaces, a single centralized base of data management;
- federating data producers;
- applying conventions and contracts (under the French legal formula of a “delegation of public services”) in order to retrieve the data;
- incorporating clauses about open data in public markets;
- creating data benchmarks; and
- posting bids to tender for experimental programs, etc.

## **Digital technology for new solutions: Open data**

Since 2012, 3M been making data available with the intent to be transparent, modernize public interventions and have leverage for economic development. Through a website ([data.montpellier3m.fr](http://data.montpellier3m.fr)), 3M and its partners make anonymous data on the metropolitan area public. The goal is to enable the public to know, understand and ameliorate these data and to imagine and propose services that make the city more efficient, dynamic, attractive, pleasant and environmentally friendly. These data are reliable, having been structured and organized by major fields (transportation, culture, administration, urban planning).

The metropolitan area has positioned itself as a trusted third party for upholding privacy and independence. To implement this independence and sovereignty over data, it provides nonpreferential, undiscriminatory access to its data through a single channel for diffusing open data.<sup>3</sup>

---

<sup>2</sup> On open (public) data in France, cf. <https://www.etalab.gouv.fr/> and decree n°2017-638 of 27 April 2017 “relatif aux licences de réutilisation à titre gratuit des informations publiques et aux modalités de leur homologation” available at <https://www.legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000034502557&categorieLien=id>.

<sup>3</sup> <https://www.mobiliteinclusive.com/>

The portal is interoperable with other open-data portals, both local and national. A particularity: the local OpenStreetMap community and 3M's services work closely together. To obtain data on the 31 communes in the metropolitan area, 3M is officially involved in improving OpenStreetMap's free database. This collaboration fits in with the free movement in digital technology, which advocates using open-source software. The aim is to take part in building a digital commons.

More than 50,000 up/downloads per year are made on the open data website. Among the most frequent are the data available in real time on self-service bicycles and parking places. This stems from the interest of firms in promoting their offers. For instance, the SNCF posts the schedules of tramways at the Montpellier train station; and Vigilo, a collaborative citizen application, draws a map of the difficulties encountered by cyclists.

## **Digital technology for virtuous mobility: EMMA**

EMMA — 3M's multimodal space (Espace Multimodal de Montpellier Méditerranée) — combines multimodal information and ticketing services.<sup>4</sup> EMMA fully integrates services for all trips, whether involving buses, trams, shared bikes, parking places. EMMA's strategic objectives are:

- foster a global policy for overseeing mobility through the integrated development of modes of transit as an alternative to private vehicles;
- reinforce the presence of public transit services in neighborhoods (through agencies, branch offices of city hall, etc.); and
- make the offer of transportation more accessible via digital tools and apps for everyone.

Through a website ([tam-voyages.com](http://tam-voyages.com)) and a mobile app (TAM), a user can search for a multimodal itinerary and obtain information in real time, reserve a transportation service, order a ticket, renew the subscription to transit services, etc.

To propose the same service to everyone, the metropolitan area has, via its transit authority (TAM), installed electronic terminals in so-called "priority" neighborhoods and in places with heavy traffic. TAM's sales offices have literally become "mobility spaces" that propose a range of multimodal transit offers.

EMMA's subscription-based traveler's card is a single, all-purpose ticket for using tramways, busses, car parks, self-service bicycles and carpools. The new parking meters installed on streets are multimodal kiosks where it will soon be possible to make a bundled purchase of parking time and public transit. Subscribers to transit services may benefit from an annual subscription for residential parking at a preferential rate.

EMMA meets up to citizens' high expectations. The mobile app has been downloaded more than 300,000 times; and 60,000 transactions have taken place. For improving intermodality, what Europeans demand most is a single transportation ticket along with multimodal information services.<sup>5</sup>

A multimodal calculator like EMMA, at a time when services like Google Maps exist, is noteworthy. For cities, this is a democratic choice, a matter of sovereignty. For sure, the applications developed by high tech firms (GAFAM) render service to users; but they might orient people toward choices contrary to the general interest, by making suggestions that, for example, increase traffic near schools or lead drivers to take small roads instead of major highways. They might orient users toward cars for hire instead of suggesting other solutions, such as walking or biking. Advice of this sort runs counter to the objectives of the mobility policies defined in the urban trip plans (PDU: *plans*

---

<sup>4</sup> As part of the Eco-Cités program, this project is cofinanced by the state, the Caisse des Dépôts et Consignations, Europe, the metropolis and city of Montpellier, the Languedoc-Roussillon Region, TAM and TRANSDEV.

<sup>5</sup> According to IPSOS & the Boston Consulting Group (2017) "Première édition: Les attentes des Européens en matière de mobilité", *Observatoire Européen des Mobilités*, 1, April, 29p., available via [https://www.ipsos.com/sites/default/files/files-fr-fr/doc\\_associe/powerpoint\\_etude\\_ipsos\\_bcg\\_en\\_francais.pdf](https://www.ipsos.com/sites/default/files/files-fr-fr/doc_associe/powerpoint_etude_ipsos_bcg_en_francais.pdf).

*de déplacements urbains*), the keystone for planing and programming mobility on the metropolitan scale. For this reason, PDUs in the future will have to reckon with digital players. Local authorities should boost cooperation between big groups, start-ups and research institutes; and cities should take a leading role as a trusted third party and guardian of the general interest.

The objective is for local authorities to set up and administer a multimodal service platform where firms may add their offers. Citizens' could thus be accompanied on their trips.

Thanks to a national platform ([transport.data.gouv.fr](http://transport.data.gouv.fr)), the geographical bounds of the proposed services will be enlarged. Consequent to a new EU regulation, "*transport authorities, transport operators, infrastructure managers or transport on demand service providers shall provide the static travel and traffic data through the national access point.*"<sup>6</sup>

The purpose is to make it easier to reuse the data. A framework bill of law on the "orientation of mobilities" will set the terms of application of this regulation.

Local authorities also have tools such as the PDMs (*plans de déplacements mobilité*) for firms. By moving beyond mobility alone, digital tools can make these plans more attractive for persuading firms to adopt "telework", stagger trips over time, reduce the psychological distance of walking.... *CivicTechs*, which seek to reinforce the relations between citizens and public administrations, offer a potential of action for increasing the efficiency of PDMs.

## **Preparedness for technological trends, in particular driverless vehicles**

To make things simple, there used to be, on the one side, urban transit and, on the other, the automobile. Technological and societal trends are making the role of transit authorities evolve. The bounds between public transit and individual mobility are fading. It is of utmost importance to form partnerships with industries and research centers for the purpose of being prepared for the coming of driverless vehicles. In a partnership with La Poste, STEF and Cara (a pole of expertise on passenger and freight transportation), the metropolitan area has, with TwinswHeel, started experimenting with deliveries by robot. This program is financially supported by the state (under the program Investissements d'Avenir managed by ADEME).

The function of these robots is to help with handling and carrying heavy loads. The TwinswHeel robots are of various sizes and shapes. The smallest can carry loads up to 40 kg; and the biggest, up to 500 kg. They are 100% electric and can move at a speed up to 6 km/h in a crowded environment and 12.5 km/h in open spaces. Experiments in a pedestrian zone in Montpellier will be carried out to test different use cases: delivery to post office pickup points, the collection of packages in stores, etc. This experiment will assess the interest of an automated urban supply chain, measure its social, societal and economic impact, and evaluate its acceptance by users. It will be worthwhile to measure the technical help provided, the adoption by users, and the contribution to the autonomy of dependent persons. In general, this project will help prepare for the coming of connected self-driving devices and improve our understanding of digital trends: the Internet of things, big data, data analytics, artificial intelligence, etc.

---

<sup>6</sup> Article 4 of the Commission delegated regulation (EU) 2017/1926 of 31 May 2017 supplementing Directive 2010/40/EU of the European Parliament and of the Council with regard to the provision of EU-wide multimodal travel information services available at <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32017R1926&from=FR>.

## **Conclusion**

Local authorities must not only adapt to digital trends but, above all, be more forward-looking in a very fast changing context. While seeing to the general interest, offers of mobility should be taken under consideration that respond to citizens' needs and to the urgency of the environmental and energy transitions. The ambit of the issues and challenges with which local authorities must cope is considerable: a major worksite for authorities. Responses must be found to several issues:

- the digital sovereignty of cities;
- local digital governance;
- the organizational transformation necessary for pursuing the implementation of a policy for pooling data that involves citizens and firms;
- cybersecurity;
- the training of employees in these new processes on the interface between digital technology and urban management;
- the development of green technology;
- the development of a local culture by fostering cooperation among geographical subdivisions (short channel distribution, proximity).