

Smart Cities

Are "smart" cities the future? The introduction of ICTs (information and communication technologies) into urban spaces paves the way for new functionalities and new ways of managing, governing and experiencing cities. Today, projects are emerging in France and abroad which demonstrates the interest cities have in these new systems but also the inherent industrial issues. Although ICTs can contribute to making cities more sustainable, their development has given rise to questions in relation to both social acceptability as well the method of financing or modifications which impacts upon the nature of services offered and the rapport between citizens/users and the city.

From a smart city to a sustainable city

Faced with the need to reduce their CO2 emissions, preserve raw materials, optimize resource management, but also to adapt to the evolution of needs, cities have had to devise new solutions, to innovate technologically, socially or organizationally. The concept of the smart city must be viewed in this context and seen as one solution among others to the challenges posed by sustainable development. It's key characteristics are:

- Responding to a goal of restraint in the use of resources. Saving water, capping electricity consumption at peak times, monitoring energy consumption thanks to real-time measurement devices, minimising losses due to an aging network, etc., these are all consistent with the idea of resource management optimisation, which is one of the main objectives of smart cities. Its technical implementation mainly depends on the use of "smart grids" ¹.

- Enabling a systematic approach to the city. This is about looking beyond sector-specific approaches that separate transport, energy, water treatment, building, etc., in favour of interactions between these different components, as is made possible through the

¹ Smart grids. These are networks enhanced with information systems (information and communication technologies) which aim to optimise the production, use and distribution of resources.

development of ICTs. However, this systematic approach to cities, which everyone now recognises as a necessity, faces many obstacles relating to the dominance of traditional "silo" approaches, a compartmentalised government and specialised professional cultures.

- Putting the user at the center of strategies. In addition to having access to a more diverse range of services, the citizen/user will also become a generator of information, for example in relation to traffic conditions or by providing feedback on the operational status of services. Using internet based information systems and means of communications, the inhabitant will be able to alert the local authorities to any malfunction, thus creating a feedback loop between the users and the providers of the services.

From a governance perspective, facilitated access to open data information (thus fulfilling the requirement for transparency of public activities) and, thanks to ICTs, the possibility of greater interaction between the citizen and the political components are also consistent with the idea of greater stakeholder participation. A smart city is a city that will develop a digital public space where communication between the government and the governed will be accelerated.

However, beyond its functionalities, in order for the



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smart city to be sustainable, it must also integrate lifestyle elements to make it attractive, whether these are conditions impacting on health (air quality, noise, greenery) or the quality of urban projects.

The city 2.0: opportunities offered by ICTs

As already mentioned, a smart city must be understood as an urban system where the different "silos" (energy, transport, public lighting, buildings, etc.), until now considered autonomous and unconnected, are united by a network bringing together this scattered data to then process it as a whole. Even if today these interactions are still rather limited, the trend is towards integrative approaches that will give added value to smart cities.

Some examples of use:

Smart grids: several projects have been launched in France² within the context of optimizing energy management by better regulating supply and demand and integrating the local production of renewable energies into the distribution network. Eventually, charging stations for electric vehicles, public lighting, as well as other urban infrastructures (water networks, street furniture) may be connected to the network, thus creating synergies and optimizing the management of urban services.

Issygrid: the first district-level smart grid in Issy-les-Moulineaux

Launched in 2012, in the business district of Seine Ouest on the initiative of a private consortium of companies in ³ partnership with the city, Issygrid will gradually be implemented in other districts (Fort d'Issy residential ecodistrict). The aim of the project is to implement new tools for optimizing the piloting of energy consumption at a district level (offices, housing, businesses, public facilities), to better manage public lighting or vehicle charging infrastructures, but also to facilitate the production and storage of new renewable energies (with photovoltaic panels, cogeneration systems, etc.), which will be linked to the network. Issy Grid will be a pilot installation in Grand Paris.

² Particularly in Lyon and Grenoble (Green Lys), Nice (Nice Grid et Reflexe), PACA region (Premio) and Issy les Moulineaux (Issy Grid).

³ Consortium comprising Alstom, Bouygues Immobilier, Bouygues Telecom, EDF, ERDF, ETDE, Microsoft, Schneider Electric, Steria, Total and 4 start-up (EMBIX, IJENKO, NAVIDIS, SEVIL).

Smart water networks: This concept relates to smart sensors and meters managing information on the status of the water network, consumption and available resources.

With the support of IBM and based on remote reading technology developed by Suez Environnement, Malta is currently building a smart network which will integrate water and electricity distribution. This system will be capable of identifying water leaks and energy losses and will help public management companies plan their investments in the network more effectively and therefore improve performance. 250,000 interactive meters will enable users to control their consumption more efficiently and benefit from a variable tariff. Eventually, this network will help the country to replace fossil fuels with sustainable energy sources.

The integration of the electricity and water networks is a promising market and today we are seeing new stakeholders like M2ocity get involved. As an operator of remote meter reading devices, M2ocity combines the competencies of Veolia Eau, who holds a 40% share of the water market in France, and Orange's telecommunications expertise. M2ocity's aim is to implement and manage a telecommunications network enabling the exchange of data and the remote reading of water meters.

More generally, the integrator of solutions is becoming key to the construction of a smart city and the evolution of businesses' activities is moving towards the integration of solutions which will bring about diverse competencies. We are thus witnessing the emergence of new partnerships, of which M2ocity is an example, along with UrbanEra created by Bouygues Immobilier. Urban Era seeks to provide a comprehensive and tailored response for local authorities, in creating a new generation of sustainable districts favouring positive energy.

Multimodal information systems: The implementation of an information system connecting both public and private transport services across a territory has become key to ensuring access to sustainable mobility.

Driven by future investments as part of programs for vehicles of the future, several projects are currently underway on the initiative of local authorities.

Optimod'Lyon: a project to facilitate day-to-day mobility

As the agglomeration of Lyon has many transport and service infrastructures, all this data is fragmented between the different organizations that manage various metropolitan transport services. The solution? Gather this information together and exploit it through a single platform. This is the aim of the Optimod'Lyon project.

Over a period of 36 months, with the help of partners like IBM, Orange, Renault Trucks and Autoroutes Trafic, the project will develop a "data warehouse", which will be supplemented by data from new fixed and mobile sensors.

The aim is to offer innovative services across Grand Lyon by 2014 at the latest:

- Hourly traffic forecasts, which will optimize the system responsible for the management of the 1500 signal operated interchanges across the city and which assures the prioritisation of public transport and the fluidity of road traffic.

- The development of a real-time multimodal navigator using mobile telephony. This service will develop a multimodal calculator giving all transport options for travelling from a point A to B within the territory, according to different criteria. It will integrate real-time alerts in the event of unexpected circumstances and all the functions associated with GPS, and will provide users with an effective urban navigational tool in real-time.

In addition, the project includes a section on goods transport. It provides for the testing of a delivery round optimisation tool for operators of urban freight and a mobile navigational tool for freight drivers, integrating the freight topology of networks (height of bridges, the radii of curvatures, green waves, etc.), recorded traffic data, in real-time and 1 hour forecasts, as well as the availability of delivery areas that will be used.

The B Pass in Nice (on mobile NFC) provides information, optimizes transport, enables the acquisition and payment of transport fares via mobile phones and thus gives access to all modes of urban transport: public transport, bicycles, car sharing, park and ride, etc. Beyond transport, many applications are

currently being developed by other partners (banks, shops, leisure and tourist facilities, etc) which make transform mobile NFC into a multi-service platform.

Interactive urban furniture: The installation of new kinds of interactive urban furniture in public spaces institutes a new kind of relationship between city-dwellers and public spaces. Our roads, until now a hardware infrastructure are becoming part of a digital and informational infrastructure.

A new generation of parking meters in Nice

Implemented in the city from March 2012 thanks to information systems deployed by sensors and measurement systems installed in the pavement, the new parking meters will allow drivers to use their Smartphones to discover on which streets there are available parking spaces, thus reducing traffic jams and time spent searching. Once parked, drivers will be warned if they exceed the allotted time, leading to a reduction in parking tickets...and a significant loss of earnings for the city's coffers. The information will be relayed by the Semiacs information centre (a public/private company manager of parking on public roads and in car parks) which will know, in real-time, the parking status of each of its 10,000 spaces on public roads. Fitted with touch screens and Wi-Fi, the patented parking meters will eventually become actual kiosks, capable of providing a wide range of information to users such as programmes of events and bus timetables, as well as applications like bicycle hire.

Open data

The necessary provision of public information constitutes a means of revitalising democratic life through a greater transparency of public activity. It is also acts as a means of improving it as everyone can contribute to the resolution of shared problems by channelling information and expertise which is then circulated throughout the society. For example, the online directory of 360,000 bus stops in the United Kingdom has enabled users to highlight and correct 18,000 errors. The local authorities are also opening up their data for others to use in the hope of giving rise to useful applications.

Rennes, the pioneer of open data

After opening up its public data, in 2011 Rennes Métropole launched a services and application development competition. Among the 43 applications that were received, one of them - handi.map.org - concerned a route calculation tool for the disabled. From the data issued by the city in relation to dropped pavements together with other travel data from pedestrians' journeys, the developers have been able to create an application that tells people in wheelchairs which routes to take to be sure of meeting dropped pavements or working lifts, or that tells the blind where there are beeping traffic lights.

The smart city: an ideal to aspire to?

Although the smart city offers a range of solutions to problems, particularly in relation to preserving the environment or adapting to climate change, the development of ICTs also gives rise to a number of questions. These include:

- The fear of a loss of personal freedom and the question of preserving privacy and confidentiality in a city where all information is logged and saved. With the development of smart grids, how much autonomy will users have in regulating their energy consumption? Who will this collective data belong to? How can the individual be sure that such data won't be used for commercial or other purposes?
- The risk of the emergence of new forms of exclusion linked to not having access to ICTs: exclusion based on economic, but also (age) demographic or cultural criteria.

- A failure by users to adopt these new systems due to the pre-eminence of the supply logic, without sufficiently taking into account beforehand the needs and the social acceptability of new systems.

- Who will pay what? Although in France, funding relating to "investments of the Future" have made it possible to cover some of the investments for certain pilot schemes, the question of how these new services or devices will be financed in the future remains unanswered. The economic model of the smart city has yet to be established.

The smart city model, which is often promoted by the media through the example of Masdar (United Arab Emirates) and Songdo (Korea), must therefore be considered with a certain level of prudence. It presents a vision of a very instrumentalized city where ICTs are intended to be carriers of community intelligence, environmental and social sustainability initiatives, and a way of guaranteeing a good quality of urban life. This vision is driven mainly by engineers or investors whose knowledge of the urban environment is often limited. In effect, the city is not only a collection of materialities, of technical features: there are people, culture and resources that give it its dynamism and allow it to adapt and renew itself. From now on, although ICTs are a strong component, the future of smart cities relies on the ability of the city to become smart by implementing new forms of governance, by favouring the adoption of new systems by users, by identifying viable economic models which will support its development and make it a pleasant place to live. As we were reminded by the American sociologist Saskia Sassen during the Lift conference that took place in July 2011 in Marseille, "the key is to urbanize technologies rather than to use technologies that deurbanize the city".

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