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SMART CITIES:

THE DECISIVE ROLE OF BIG DATA

IN NEW URBAN TRANSFORMATIONS

EXPERT OPINION

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The keen interest in the concept of the "Smart City", as well as the diversity of the cities that have taken it up, bear witness to something that is more than a passing fad and marks a resurgence of the debate on the future of cities. What is it that drives this resurgence and explains the emergence of the Smart City as a new urban ideal? It is the co-occurrence and coming together of two global phenomena.

The first phenomenon is the tremendous acceleration in the worldwide urban transition that is due to see the proportion of the population living in cities rise from 54% in 2014 to 66% in 2050[1]. In the space of 35 years, the world's cities are going to have to absorb 2.5 billion extra people, one of the consequences being a proliferation in megacities with more than 10 million inhabitants. While there were only 3 of them in 1970 and 10 in 1990, they number 28 in the world today, and that figure looks set to exceed forty in 2030. Just because this dynamic is 90% due to emerging countries, that does not mean that there are no urban challenges in developed or previously urbanized countries: on the contrary, issues of mobility, energy efficiency, urban sprawl, social cohesion, and quality of life are pressing ones in such countries, if not on the same scale as in the giant cities of Asia and Africa.

The second phenomenon is the increasingly widespread use and pervasiveness of digital technologies. Far beyond the computerization of cities that started decades ago, information and communication technology (ICT) is offering the city's traditional operators, but also, and perhaps above all, companies from the digital sector, entirely new possibilities for automating and interconnecting systems, modernizing infrastructures, and optimizing flows, but also mobilizing citizens and developing methods of governance. The democratization of ICT is indeed the driving force behind the digital transformation of our societies which manifests itself notably through:

- the dramatic incursion of the smartphone into everyday uses,
- the even more rapid development of social networks and, more recently, of collaborative consumption,
- the explosion in the consumption of digital services and its corollary, the exponential production of data.

The central idea behind the concept of the Smart City, and all the initiatives undertaken by the cities that claim to be one, is the following: digital will, in one way or another, provide more intelligent – more ingenious, less costly, more coordinated... – solutions to the new urban challenges that all the world's cities are going to have to meet in the coming decades.

FROM THE CONCEPT TO ITS MATERIALIZATION IN EUROPE

The way in which Europe's cities are taking up the concept of the "Smart City" and putting it into practice is far removed from what is being shown by highly publicized projects like Masdar[2] or Songdo[3], presented by their developers as architypal Smart Cities. Build from scratch, they are, in truth, more life-size experiments with the most advanced technologies, than places to live. Being at the same time laboratories and technological showcases, these state-of-the-art operations are, however, struggling to acquire city status. As efficient and rationalized as they may be, they lack, notably in the eyes of us Europeans, the cultural depth and the human complexity and diversity of cities with a past.

[1] United Nations, World Urbanization Prospects – 2014 Revision. http://esa.un.org/unpd/wup/FinalReport/WUP2014-Report.pdf
[2] New town in the Emirate of Abu Dhabi. Under construction since 2008, Masdar will extend over 6.5 hectares and is set to accommodate 50,000 inhabitants by 2030.
[3] New district in the city of Incheon (South Korea) under construction since 2003, Songdo extends over 610 hectares and will eventually host 65,000 inhabitants.

So it is not surprising that the cities of the old continent are choosing other, far less spectacular paths: since they have a history, they must transform and reinvent themselves by building on the existing spatial, social, political and economic set up that constitutes their identity. So it is that, beyond publicity on the theme of the Smart City, we see a project-based approach characterizing the 240 European "smart" cities identified in the study published in 2014 by the EU Parliament[4]. These cities have in common the fact that they are implementing a portfolio of projects integrating a strong ICT component and aiming to meet one or more of the following challenges:

• Citizenship – providing information to citizens and access to the city's data and services.

• Quality of life – local life, neighbourhood life, social cohesion, ethnic and cultural diversity.

• Mobility and transport – traffic management, eco-friendly modes of transport, shared cars and bicycles, pollution control, management of multimodality and parking...

• Economy – business incubators, co-working spaces, competitiveness hubs, development of ICT...

• Environment and energy – energy-positive buildings, waste management and recycling, controlled consumption of water and energy, development of renewable energies, short channels...

• Governance – participatory/collaborative democracy, electronic voting, open data.

TWO PHILOSOPHIES TO BE RECONCILED

Two visions polarize current "Smart City" initiatives. The first is the techno-centric vision of a city covered with sensors enabling all the data to be collected and all urban services managed. This "quantified city", by analogy with the "quantified self" movement, relies on the continuous monitoring of information transmitted by sensors. This is the model in place in Rio de Janeiro, where all data relating to civil security, the weather, traffic etc... are transmitted to a very spectacular "control room". Honolulu, Malta and, closer to home, Nice, with its experimental connected boulevard, are moving towards this model which aims for real-time management of the city's effective functioning and security.

The second vision is collaborative and participatory. Addressing the citizens more directly, it makes available to them data, services and applications enabling them to implicate themselves in the daily management of the city, contribute to its projects, develop new practices, etc.

Paris is probably one of the cities that has done the most work in this direction. Although it was not long ago that Paris started claiming to be a "Smart City", this work has led it to be recognized as a laboratory for urban space uses and an ecosystem that is particularly conducive to start-ups and the development of new collaborative practices. The Austrian capital is also close to this model, with a vision based on innovation promoting social inclusion, the maintaining of a heterogenous society, and the narrowing of socio-economic divides.

In our opinion, the Smart City does not have to choose one or the other of these models. It has to make them converge and learn to combine them in an approach in which digital is a tool for transformation and reinvention and not an end in itself. As Antoine Picon recalls "*the Smart City appears [...] as the fruit of a dynamic that is only partially technological*". He nevertheless emphasizes that, "*inexorably, cities are transforming themselves into information systems, often with real-time information. Within these systems, the relationships between physical infrastructures, service offerings and users are reconfigured to achieve improved responsiveness and greater flexibility of use.*"[5]

WHAT ROLE AND STRATEGY FOR BIG DATA IN THE SMART CITY?

In order for this reconfiguration to occur and be virtuous, one needs to collect the gigantic masses of data generated continuously by sensors, the city's internal services, urban operators, local businesses and citizens. One also needs to be able to centralize them, model them, mutualize them, and make them available to all those – citizens, companies, city services – who can utilize them to create value in the broad sense.

Given the multiple sources and types of data, the number of actors, and the volumes involved, a Big Data strategy, managed by the city itself, is an essential prerequisite for a sustainably Smart City. This strategy involves not only equipping the area with a technical platform for collecting and processing large volumes of data, but also assessing the potential of existing data with regard to the city's projects, and defining the conditions for achieving interoperability between them, making them available, and enabling them to be used by third parties.

In other words, it involves defining data policy and governance in a context in which, whilst data abounds, their owners are reluctant to share them spontaneously. Yet, fundamentally it is this pooling of data, typically within an open data rationale, that determines the ability of public, private, and individual actors to:

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[4] European Parliament, Mapping Smart Cities in the EU, January 2014. The study takes into account only cities with more than 100,000 inhabitants. http://www.europarl.europa.eu/RegData/etudes/etudes/join/2014/507480/IPOL-ITRE_ET%282014%29507480_EN.pdf
[5] Antoine Picon, Smart Cities, Theory and criticism of a self-fulfilling ideal, Éditions B2, 20 3.

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- better understand the city, its functioning, its consumption and its dysfunctions;

- use this knowledge to identify new needs and invent new services and uses;

- decompartmentalize each actor's scope of action to provide responses that are coherent and coordinated in space and time.

Today, two Big Data strategies seem possible for Smart Cities: total control over data or interdependence. In the first case, the city, owner of the infrastructures, requires that it receive the data from them and pushes local actors in this direction through an "open data" approach that becomes an additional lever for (re)gaining control over its data. In the second case, the city and the urban operators create a partnership based on the data collected by the latter.

One clearly senses that these are strategy choices essentially determined by the means available: total control over data for large cities and interdependence for the others. There is a great temptation for municipalities to rely on Big Data covering every movement of each of the citizens so as to better manage energy and transport flows, prevent and deal with all incidents however small, and ensure optimal quality of life for the citizen, etc. However, as in many areas, total control over data is not a panacea:

- it deprives the city of competition between operators, and in the process inhibits their investments and ability to innovate in areas that are their core business,

- it transforms the city into a multi-domain data operator with substantial investments that go beyond the effective functioning of the city,

- it centralizes the data-driven innovation function at the level of the city, whereas this is not – and will not be – the city's role.

A wise strategy for the city with regard to Big Data must take into account three key principles so as to ensure an optimal result for the city:

- Big Data must serve the citizens, and it must therefore be based on simple principles shared by all; it must notably be participatory, bring people together and not be intrusive, whilst at the same time ensuring transparency via open data. In concrete terms, this means that Big Data must confine itself to themes that are of direct interest to citizens, or give them the means to satisfy their requirements, rather than analyzing their every move.

- There is not one Smart City Big Data but several. Most urban operators (utilities, transport...) have already launched, or are going to launch, Big Data projects – the city does not need to collect the flow data from scratch but should rely on these urban operators. However, before getting to that, it is essential to master the information mesh required to establish successful working arrangements with these actors and demand an improvement in services when necessary. The city can also itself organize these operators within a data-sharing rationale and must, above all, put in place a strategy that benefits its citizens without the risk of intruding into their private lives.

- Big Data must take into account the temporality of data and the actions associated with them: improving traffic flow or preventing incidents does not rely on the same data as anticipating the city's development or the quality of life of the citizens; moreover, it is unlikely that the correlations between these data conceal invaluable secrets.

A "Data Hall" strategy for a local authority must therefore above all include criteria for the city's economic development and for the quality of life of the citizens – areas in which the progress made by Data Science[6] is substantial – and should constitute the heart of urban policy. Beyond these issues, and notably with regard to more operational and immediate concerns, it will be necessary to rely on traditional and technological actors, but also on citizens. This seems the best way for a local authority to ensure, on the one hand, the emergence of new services, and on the other hand, the responsiveness of existing community services.

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[6] Michael Batty, The New Science of Cities MIT Press 2013

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ABOUT THE AUTHORS

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ABOUT KEYRUS

An international player in consulting and technologies and a specialist in Data and Digital, **Keyrus** is dedicated to helping enterprises take advantage of the Data and Digital paradigm to enhance their performance, facilitating and accelerating their transformation, and generating new drivers of growth, competitiveness, and sustainability.

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