Towards data-driven cities?

Spotlight on Boston, Los Angeles, New York, Pittsburgh and Chicago

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La Fabrique de la Cité is a think tank promoting discussion and leadership on urban innovation. Its interdisciplinary approach brings together leaders and international players to uncover good urban development practices and put forward new ways of building and rebuilding cities.

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TOWARDS DATA-DRIVEN CITIES*?

La Fabrique de la Cité is highlighting five North American cities with projects in place to gather and exploit urban data. Naturally though, these cities – Boston, Chicago, Los Angeles, New York and Pittsburgh – are not all at the same stage. But two facts are immediately clear to the outside observer: political impetus at the highest level with the personal commitment of city mayors, and the existence of close contact with the private sector and the wider society. This study illustrates the strategies implemented, and a number of recent and promising projects.

The exponential growth of data gives cities an opportunity to address the challenges they face, not the least of which doing better with less. Many cities have now embarked upon an open data approach, which constitutes an important step towards democratic transparency and reflects their openness to usage-based innovation.

Governance apart, all areas of municipal activity are also radically transformed by the optimisation opportunities afforded by data. The data in question concerns the various areas in which cities operate, such as mobility, energy consumption, management of infrastructure and public spaces, public health, education, recreation and community participation. The aim is always to provide more efficient services by involving as many stakeholders as possible: city dwellers, developers, start-ups and major companies, etc.

Some pioneering North American cities have appointed Chief Data Officers and data teams tasked with collecting, standardising and cross-referencing data that could be helpful for urban development.

How can we use the city's historical data to promote the predictive maintenance of urban infrastructure? How can we use accurate, real-time mapping of people's movements to improve their wellbeing and respond to their needs? How can we use an analysis of individual and collective consumption data and weather forecasts to adjust the energy supply of the city in real time? These are just some of the questions that Chief Data Officers advising U.S. mayors ask themselves on a daily basis.

These Chief Data Officers provide concrete examples of how data can be harnessed and show how this effort contributes to the sustainable economic development of cities. Their work involves building on existing data and cross-referencing all sources of urban data. They are establishing innovative partnerships with start-ups and major industrial groups to meet people's needs and expectations. In addition, conurbation Chief Data Officers are developing projects that underline the need to cross-reference data in order to exploit it for economic and social purposes.

* See glossary at the end of this document.
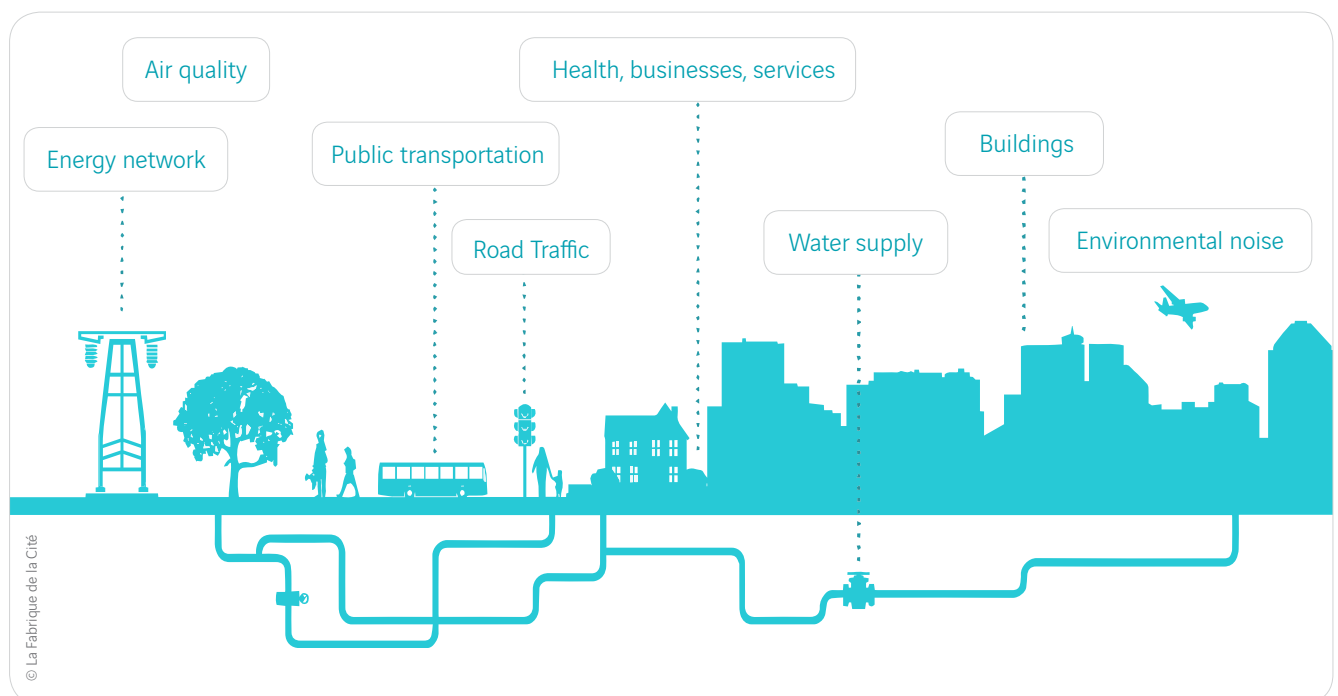
1 THE POTENTIAL OF URBAN DATA

New opportunities to create value

The big data revolution is at work everywhere, radically transforming the world as we know it. With the huge exchanges of unstructured data (text, images, sound, video) on Web 2.0 sites, the reduction in storage costs (cloud computing*), the arrival of powerful software for structuring and processing disparate data (NoSQL* and Hadoop*), and in light of recent developments in data visualisation, businesses and governments are faced with the same problem: how to create value from the prodigious amounts of data we now produce, store and analyse in record time?

Whether held by the municipality, produced by businesses or generated by individuals themselves, urban data covers a wide range of fields:

◗ mobility
◗ energy consumption
◗ management of infrastructure and public spaces
◗ public health
◗ education
◗ crime prevention, etc.

Various optimisation opportunities for cities

Air quality

Health, businesses, services

Energy network

Public transportation

Buildings

Road Traffic

Water supply

Environmental noise

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Multiple data sources

Internet of Things

Internet and social networks

Mobile apps

Sensors

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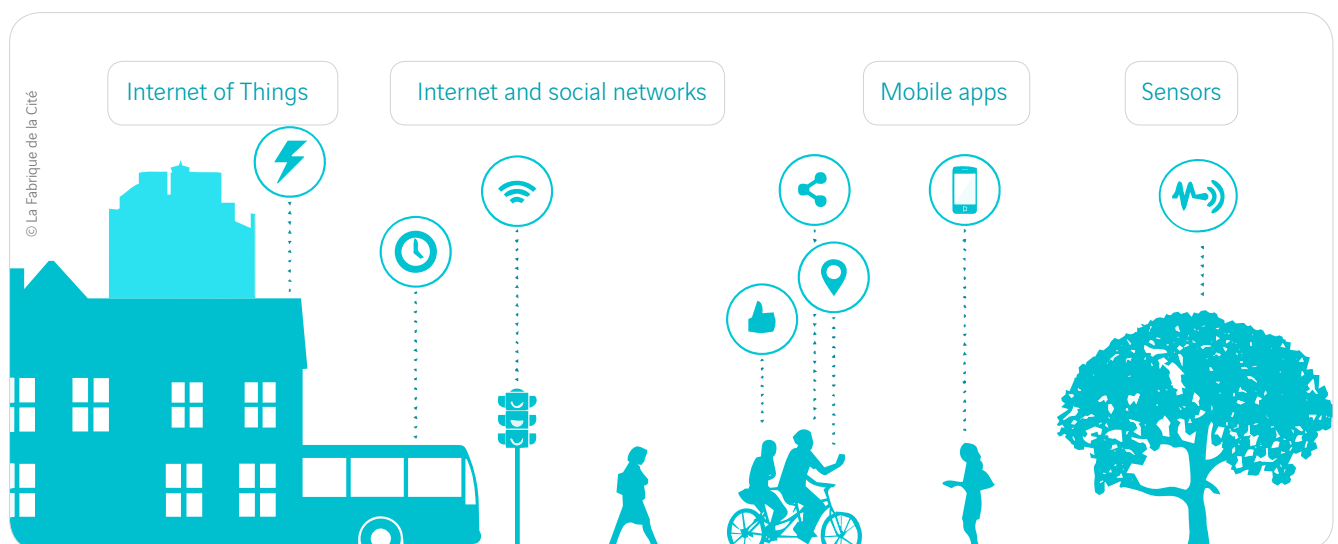
* See glossary at the end of this document.

Urban data policies

An increasing number of cities are recognising the potential for exploiting urban data, leading to initiatives that the adoption of open data policies is helping to energise in many ways. Indeed, the release of public data sets* that were hitherto classified produces new correlations with existing data, thus highlighting usage patterns and behaviours that were previously impossible to detect. In addition, cities that take the open data approach apply a transparency principle in order to create an unprecedented democratic dynamic that involves encouraging the public authorities, private companies and individual citizens to take part in the co-construction of new services with high economic and social value added. It is around this concept of an agile, resilient city that the exploitation of urban data genuinely makes sense.

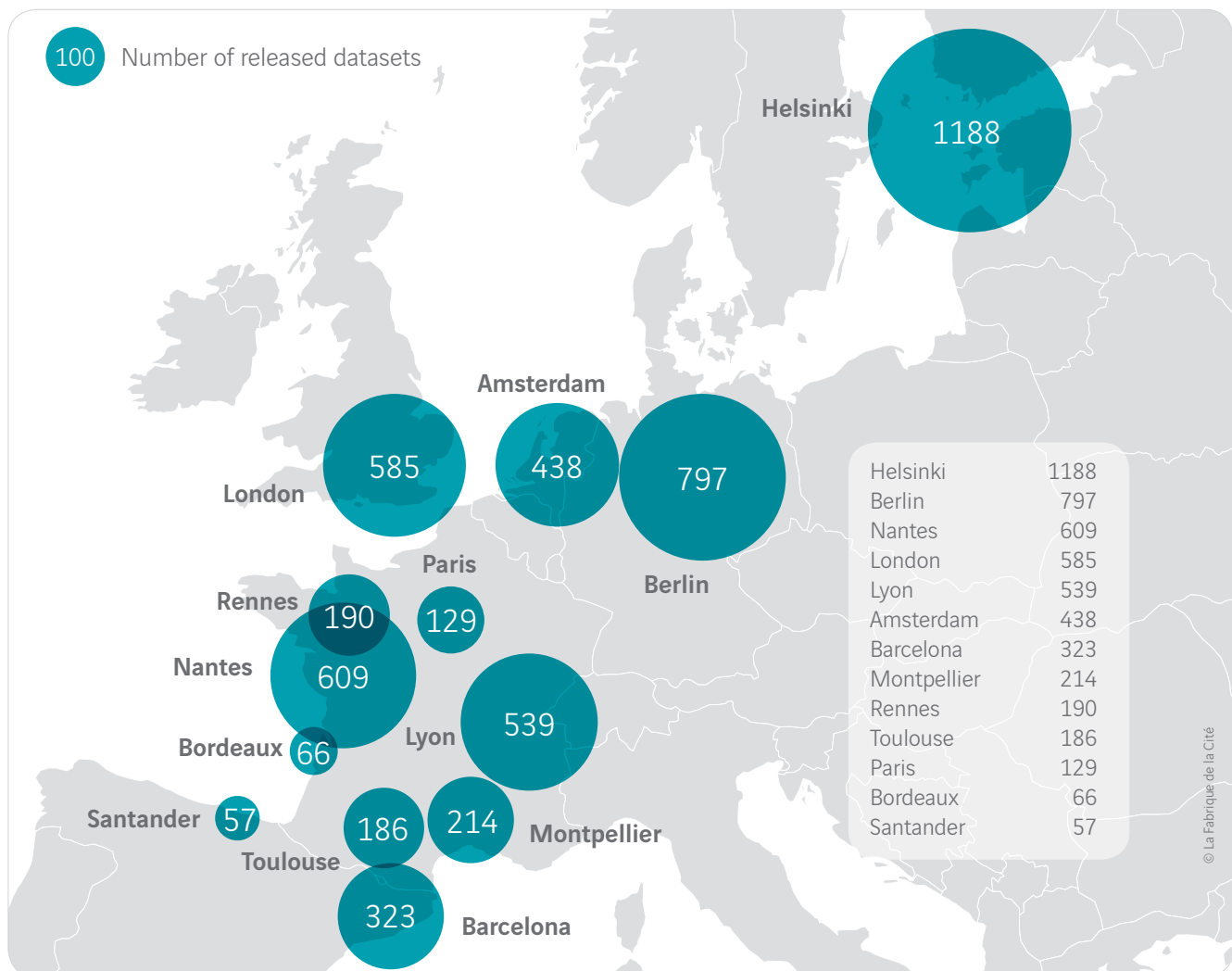Current urban data approaches show the wide range of optimisation opportunities:

▶ **Predictive maintenance systems** for infrastructure and energy consumption systems for buildings; applications that reprocess data to match up supply and demand in an emerging sector, in order to develop new economic levers in the city;

▶ **Interactive maps** that use geolocation data and social networks to provide, in real-time, more intelligent – perhaps even automated – management of transport flows.

▶ **Statistical calculation tools** that optimise risk prediction and prevention in relation to climate and public health.

The potential of urban data is still to be discovered but it exists in every field. This is why adopting a collaborative approach to build our cities remains crucial.

A movement spread around all European cities

| 100 | Number of released datasets |

Helsinki	1188
Berlin	797
Nantes	609
London	585
Lyon	539
Amsterdam	438
Barcelona	323
Montpellier	214
Rennes	190
Toulouse	186
Paris	129
Bordeaux	66
Santander	57

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* See glossary at the end of this document.

2 THE UNITED STATES: A PLAYGROUND FOR DATA-DRIVEN CITIES

A regulatory framework that is conducive to urban optimisation and innovation

Since 2009, under the leadership of President Obama, the United States federal government has been rolling out a nationwide open data policy. Of all the strong measures deployed by the U.S. administration in this area, the most important involves providing businesses and citizens with hundreds of thousands of data sets on the data.gov website[1] .
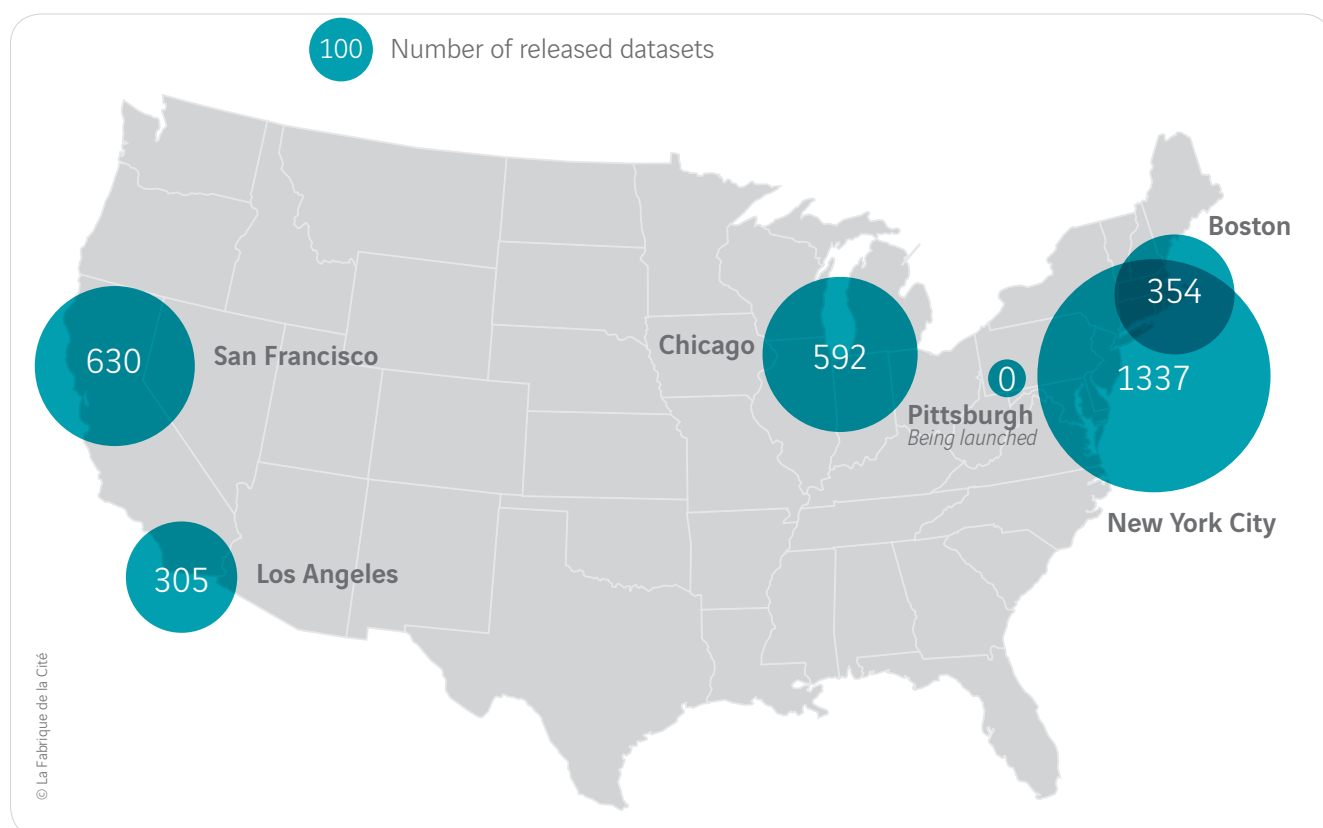
In the wake of this first federal initiative, several U.S. cities including San Francisco (2010), New York (2012) and Chicago (2013) signed an "Executive Order" requiring their administrations and other public agencies to demonstrate greater transparency and accountability towards taxpayers, including by providing free, open access to their data on a web portal. In ratifying the Order, the cities concerned also agreed to make available to developers – whether they be

1 The site currently lists almost 400,000 data sets, and more than 1,000 applications have been produced by re-harnessing the data.

employees of the municipality or ordinary citizens – open source* tools (platforms, software, interactive maps, etc.), in order to encourage them to create, for example, innovative data visualisation* devices or applications for city dwellers such as the digitalisation of the city's 311* complaints system.

In this respect it is important to note the crucial role played for several years now by Code for America* – a citizen group that works to ensure that technological innovation, progress in computer coding education and entrepreneurial dynamism can benefit municipalities that are dealing with open data issues. Being at once a start-up incubator, a matchmaking network and a "Civic Hacking" organisation, Code For America is a cornerstone of urban data in the U.S. inasmuch as it has organised conferences and hackathons* that have enabled computer scientists, designers, urban planners

Open data in few pioneering American cities

100 Number of released datasets

630 San Francisco

305 Los Angeles

Chicago 592

0 Pittsburgh
Being launched

Boston 354

1337 New York City

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and sociologists of all stripes to work in concert with the municipalities to develop tools to visualise and analyse readily transferable data.

City administrations dedicated to analysing urban data

These regulatory and civic measures have been accompanied by organisational changes such as the establishment – in a world first for cities – of departments and units tasked with analysing, reprocessing and cross-referencing data in order to produce a new type of urban mechanics. The creation of the very first "Chief Data Officer" posts is the most exemplary of the provisions demonstrating the distinctive nature of urban data policies in American cities.

The time has now come to learn from these early data organisation initiatives. What can the American experience teach us? How do American cities get hold of the data that is available? How do they organise the production of new data in order to create economic and social value, improve public services and, more generally, optimise their internal operations? To reflect on these crucial issues relating to the future of our cities and their inhabitants, this study will explore the initiatives implemented by New York, Chicago, Boston, Los Angeles and Pittsburgh, five cities whose actions have shown that a specific urban data policy applies to each urban context.

A Chief Data Officer's (CDO) job:

A City CDO's job is somewhat akin to an orchestra conductor's, and s/he has three main duties:

❱ **Ensuring open data policy unfurls smoothly** and thus enables the city's administration to showcase its initiatives more transparently and legibly for city-dwellers, using clear, intelligible data visualisation tools

❱ **Develop KPIs** to measure municipal service performance

❱ **Cross-reference data** and use it for predictive analytics purposes: Urban data policies need more than city data storage and packaging capabilities to work. As Chicago's former CDO Brett Goldstein puts it, *"We want to be able to prevent the citizen complaint before it happens rather than just react efficiently."*
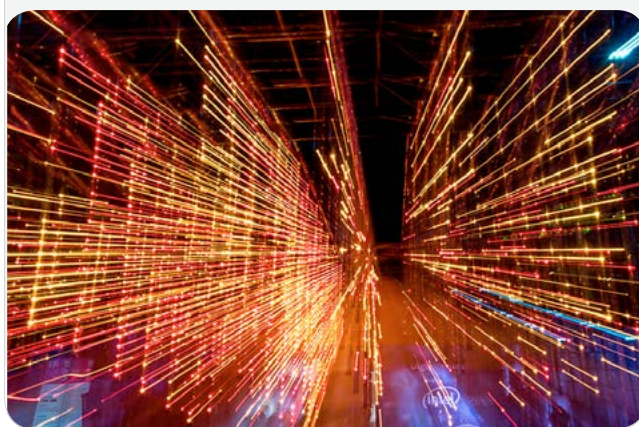

Photo credits: FlickR - Sacha Fernandez - No changes were made

Chief Data Officer portraits

Debra Lam

Debra Lam was appointed as Pittsburgh's Chief Innovation & Performance Officer by Mayor Bill Peduto following his election at the end of 2013. Previously, Debra was a project manager at international consulting and design engineers Arup. She has more than ten years' international experience in governance, sustainable and strategic development, policy analysis and project management. She has advised a diverse range of cities around the world on public policy, sustainability and climate change issues. She featured in the Management Today '35 Women Under 35' list, and has been a finalist in the Women of the Future: Science and Technology Awards.

Jascha Franklin-Hodge

Jascha Franklin-Hodge was appointed Chief Information Officer* for Boston by Mayor Martin J. Walsch in June 2014. In 2004, he co-founded the digital strategy agency Blue State Digital (BSD), which supervised Barack Obama's digital campaigns in 2008 and 2012.
He has worked as an adviser for Code for America, a non-profit organisation that seeks to use technology to solve society's challenges and encourage innovation. He was previously head of software development for AOL's Digital Music Division. He is an MIT graduate in computer science.

Chicago **Boston**

Los Angeles **Pittsburgh** **New York City**
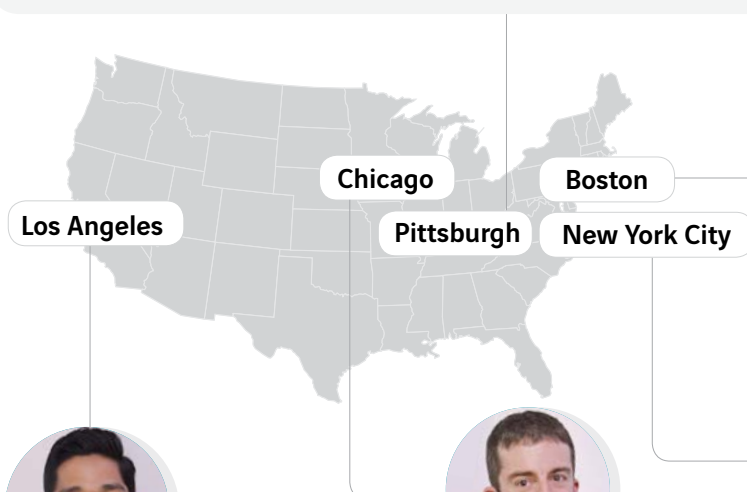
Abhi Nemani

Abhi Nemani is currently Chief Data Officer for the City of Los Angeles, where he leads the city's efforts to build open data and data analytics for the benefit of citizens.
He was previously a core member and one of the drivers behind the creation of
Code for America, a non-profit organisation that seeks to use technology to solve society's challenges and encourage innovation. Abhi Nemani has a PhD in philosophy, politics & economics from Claremont McKenna College, and studied political philosophy and rhetoric at Oxford University.

Brett Goldstein

Brett Goldstein served as Chief Data and Information Officer for Chicago from 2011 to 2014 following his appointment by Mayor Emanuel Rahm. He now works in the Harris School of Public Policy at the University of Chicago, where he researches and develops strategic tools for urban data processing.
Before his appointment as Chicago's Chief Data Officer, he worked for the start-up OpenTable, an online restaurant reservations platform.
He also founded the Chicago Police Department's predictive analytics unit. He is a computer science master's graduate from the University of Chicago, and holds a master's degree in criminal justice from Suffolk University, Boston.

Amen Ra Mashariki

Amen Ra Mashariki was appointed as Chief Analytics Officer for the New York Office of Data Analytics by Mayor Bill De Blasio in October 2014. He was previously Chief Technology Officer in the U.S.. Federal Office of Personnel Management, where he developed a series of innovative analytics tools.
He began his career as a developer with Motorola. He has also directed research in bioinformatics and was Deputy Head of IT of the University of Chicago's cancer research unit.
He holds a PhD in engineering from Morgan State University and a computer science master's from Howard and Lincoln Universities.

3 DATA PHILOSOPHY: FOUNDING PRINCIPLES

#SmartDataApproach #OpenGovernance

These conurbations have tasked their Chief Data Officer (or equivalent) and municipal agencies in charge of information and new technologies with organising the recovery and optimal processing of public data, and transforming it into "smart data"*. The aim is to predict and resolve as many urban problems as possible while improving city dwellers' quality of life.
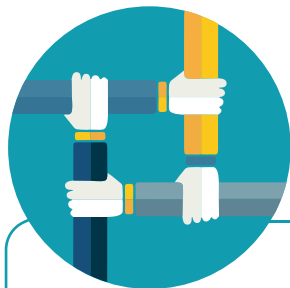
#Partnerships #CorporateFriendly #BusinessOriented

One of the common features of the cities studied is the way they are able to persuade private companies, start-ups and academic clusters in the city or region to come together to build tools or services for their citizens. This mobilisation is underpinned by partnerships that eventually produce new data, statistical analyses or even trials of innovative projects with high economic value added.

#PredictiveDataAnalytics

To varying degrees, the five cities have increased the frequency with which the data collected by existing devices is updated, in order to generate more specific, reliable and personalised recommendations (particularly regarding traffic, in order to reduce traffic jams); this enables the municipality to take greater account of residents' needs and even anticipate these needs through predictive analysis. This type of approach helps to establish correlations that provide a better understanding of the ins and outs of an underlying problem (e.g. in the case of crime, the link between the presence of abandoned cars and broken windows in a neighbourhood and its prevailing illiteracy and unemployment rates).

#CollectiveIntelligence #Crowdsourcing

In addition to the provision of open-source tools (API*, software) on "Open Portals" for all developers, the five cities also organise consultation events and more proactive ways (contests, hackathons) of mobilising city dwellers and/or the civil society-based IT community, to establish the actual needs of the city and try to respond with solutions that re-harness the available data (by creating an application, a website, etc.).

#Accountability #Transparency

The administrations of these cities intend to use public data to ensure they are accountable to taxpayers by giving them the opportunity to assess, in real time or over time, the way the city is managed by its leaders. This approach involves creating comparative tools (statistical tables, data visualisation) that enable citizens to judge the efficiency of their municipal administration's work (effective redistribution of taxes in various sectors, progress of public works, etc.).

* See glossary at the end of this document.

4 A TALE OF 5 DATA-DRIVEN CITIES
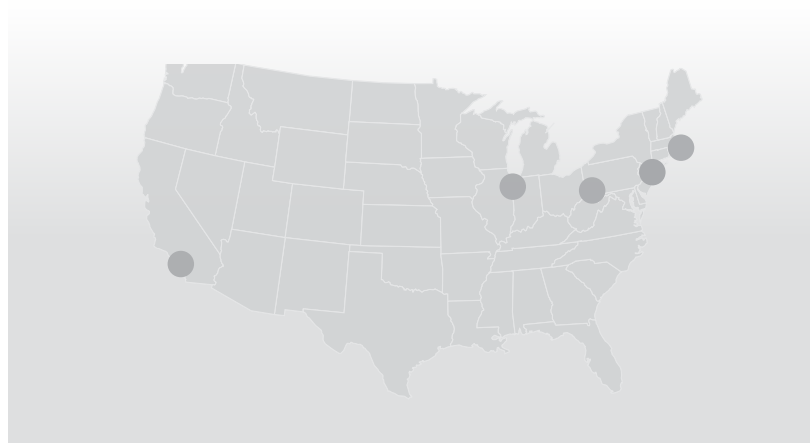
Boston

STATE: **MASSACHUSETTS**

MAYOR: **MARTY WALSH SINCE 2014**

POPULATION: **CIRCA 659,000**

AREA: **232.14 KM², OF WHICH 46% IS WATER**

DENSITY: **5,151 / KM²**

Specifics of the city in terms of urban data

▶ **Unique systems providing a chart for evaluation and in-depth analysis of the city's performance.**

▶ **Original crowdsourcing methods to encourage residents to become regular producers of key data for the city.**

▶ **Data re-use that leads to the creation of local services tailored specifically to residents' everyday needs.**

Structures and key players

The city of Boston has continued its urban data drive with the arrival of the new Mayor, Marty Walsh, in 2014 (opening of an open data portal and signature of an Executive Order requiring municipal agencies to release their data). The city's Chief Information Officer at the Department of Innovation and Technology (DoIT), Jascha Franklin-Hodge, is currently in charge of running and coordinating the city's open data policy. The wider remit of the CIO and the DoIT in Boston includes optimisation of the city's infrastructure and technical machinery and developing innovative services for residents. In addition, their work also involves reflecting on the use of technology to boost citizen engagement.

" Data create a common language, drive a stronger transparency and change the city into a real urban laboratory "

· Jascha Franklin-Hodge

Another municipal body also deserves a mention here: the Mayor's Office of New Urban Mechanics (MONUM), established in 2010, whose work is divided up into four units:

◗ **The Streetscape Lab** focuses on using technology to optimise the Boston urban landscape and environment.
◗ **The Transparency & Engagement Lab** aims to deepen and strengthen the relationship of trust between residents and the municipality.
◗ **The Education Lab** is exploring the creation of new programmes and technology for parents, teachers and students.
◗ And **the New Economy Lab** focuses on supporting the city's economic development.

Thanks to these four specialist units and rapid prototyping methodology, MONUM has trialled more than 50 pilot projects (see below) in partnership with universities, start-ups, non-profit associations and other municipal agencies.

Data-Driven Boston

Jascha Franklin-Hodge
Chief Information Officer

Made in Boston

Overhaul of the city maintenance model: the success of Citizen's Connect

Launched in 2009 by MONUM and the DoIT, Citizen's Connect (CC) is Boston's flagship initiative and one of the most successful data crowdsourcing projects in the United States. Citizen's Connect is an application that complements the 311 call system – the number used to report a wide number of problems or damage in several U.S. cities. The first version of CC enabled users to take pictures of a problem, geotag, comment and forward it in real-time to the relevant municipal department for resolution.
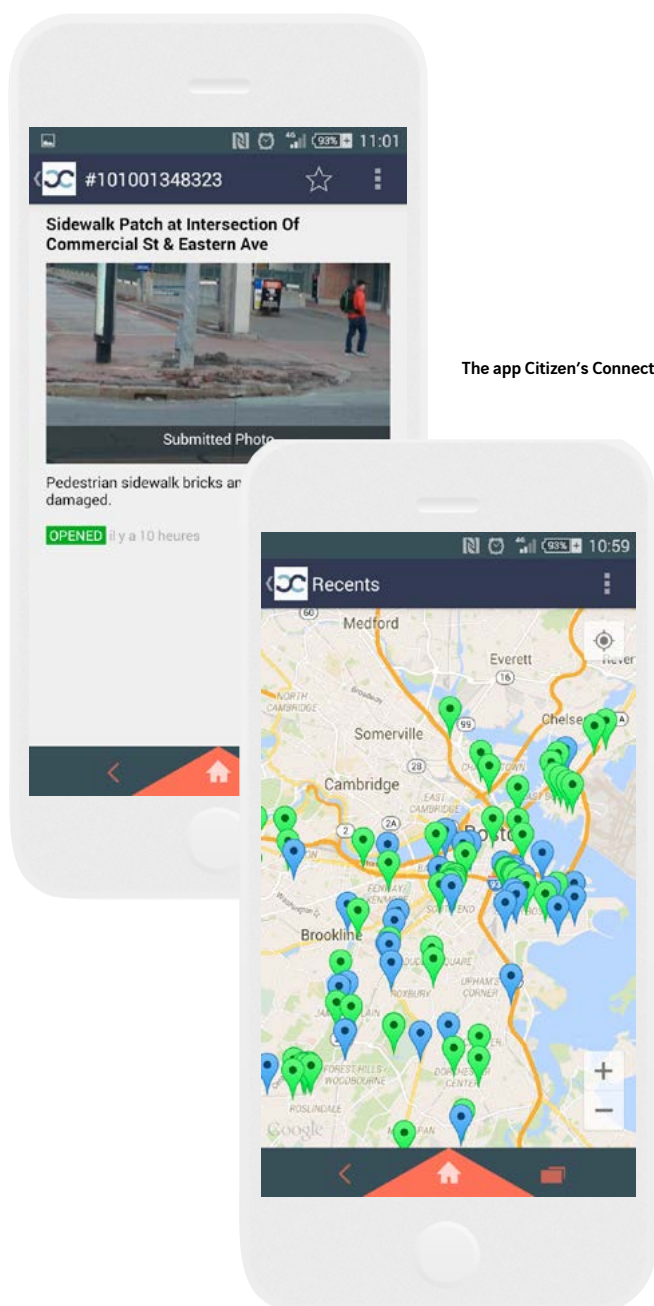
The app Citizen's Connect

Additional features were added later, such as the ability to track progress in addressing the issue, identify which employees were on the case and congratulate them, but also the ability to send an alert by SMS or Twitter and access the "best city residents" ranking. Some 20% of reports now go through the app and although the number of reports has almost doubled since the app was launched, the city's departments have nevertheless managed to deal with at least 80% of them.

The app proved to be particularly useful after Hurricane Sandy, when road links and severed cables had to be repaired as soon as possible. CC was also twinned with the City Worker App, which enables the relevant municipal departments to receive an alert in real-time and to plan their responses better. Similarly, CC is currently being rolled out in 65 municipalities as part of a project entitled CommonWealth Connect.

Furthermore, the City of Boston is combining CC data with the information available on open data portals in an attempt to gain a better understanding of the sociology of its spaces and to fight against the spread of insecurity and violence in some areas of the city, using a process similar to predictive analysis. The much publicised "broken window" theory, which establishes a strong correlation between the quality of the urban environment and social problems (violence, traffic, disease, academic failure, etc.), has given Boston an opportunity to use CC as a way of combating these issues in real time and preventing their spread through predictive analysis.

Involving citizens in co-managing the city

The DoIT's discussions of the levers for involving citizens through technology have thus far resulted in the launch of the Boston About Results (BAR) online portal. This tool provides citizens with an accurate progress report for a number of departments and an update of the socio-economic statistics for the city (unemployment, investment, business openings, an individual department's position in relation to targets, etc.). In addition, the city has just celebrated the second edition of HubHacks, a semi-professional hackathon that invites members of the IT community to come up with public data re-use projects, thus confirming the municipality's commitment to the concepts of accountability and civic hacking in the implementation of its urban data policy.

In partnership with MONUM, the DoIT has also developed participatory and collaborative mobile applications that have enabled specific everyday problems to be solved in Boston. Here are some examples:

◗ **Where's My School Bus?** displays in real-time the location of the school bus for concerned parents, but also for children who do not want to wait for the bus in the cold, especially if it is 20 minutes late because of the snow.

◗ **Street Bump** aims to get residents involved in reporting potholes in the city. Developed in partnership with the Public Work Department, this app – which city residents can download for free – uses motion sensors built into smartphones (accelerometer, tilt, geolocation, etc.) that store valuable data to automatically detect a pothole when a vehicle drives over it. This is a reliable, economical way of informing the relevant municipal department.
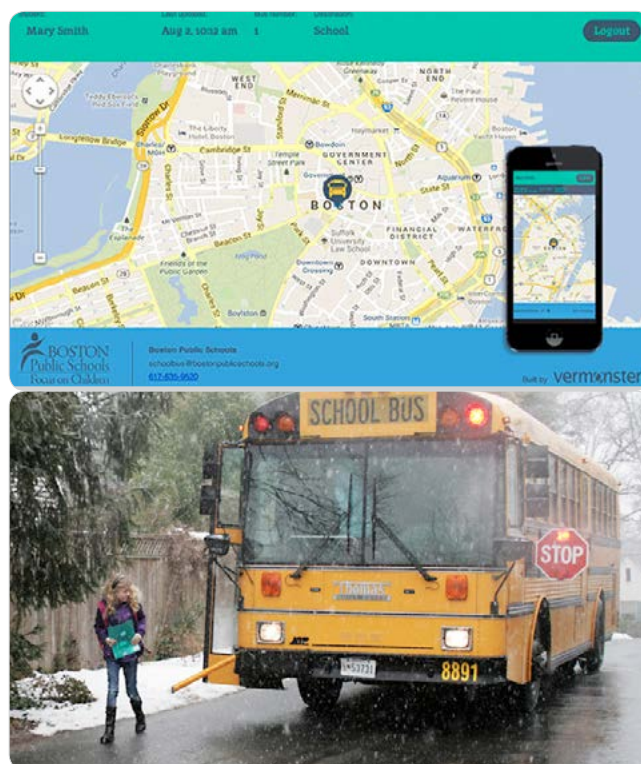
The app Where's My School Bus?
Source : https://schoolbus.bostonpublicschools.org/

Photo credits: FlickR - Woodleywonderworks - No changes were made

The partnership between Waze (Google) and Boston

The partnership between Waze (Google) and Boston now provides drivers, cyclists and pedestrians with city traffic status updates via a mobile app that drivers, riders and pedestrians can use to post real-time updates on city traffic conditions and receive alerts on an interactive map to plan ahead when they need to go somewhere. Through a partnership it set up in February 2015, the city of Boston is now supplying Waze with updates on emergency road and motorway closures, so the app's roughly 400,000 users can reroute if they need to. Likewise, the engineers at Boston's Traffic Management Center can now use the data that this app gathers and aggregates to promptly reset the city's 550 traffic lights and thereby unjam automobile traffic as much as possible.
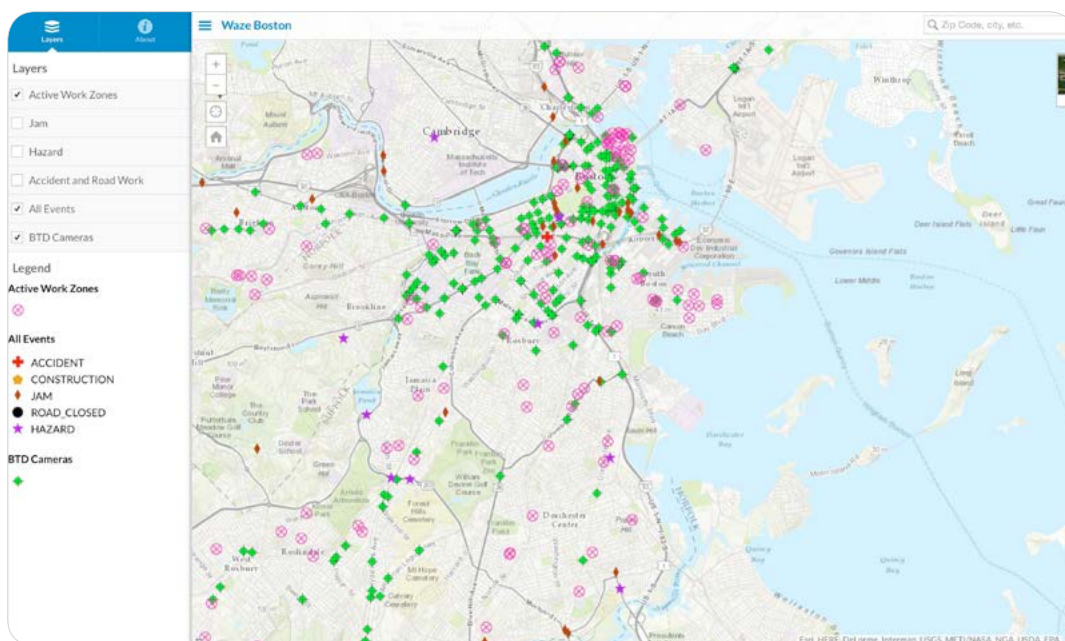
Waze alerts map of the city of Boston

Source : Jascha Franklin-Hodge's slideshow for La Fabrique de la Cité (www.thecityfactory.com)

And tomorrow?

Collaboration between Uber and the City of Boston

Thanks to the on-board systems in their taxis, Uber possesses accurate information about thousands of journeys across the city. The City of Boston and Uber are launching a partnership to harness the full potential of this data. By sharing the date and time of a journey, departure and arrival ZIP codes, distance and journey time, as well as technical support for using this data and assistance with implementing road safety measures, Uber will enable the city to make great progress.

Boston will be able to have a better overview of population flows in the city, improve road traffic flows, plan new public transport for under-developed routes, and improve management of parking lots.
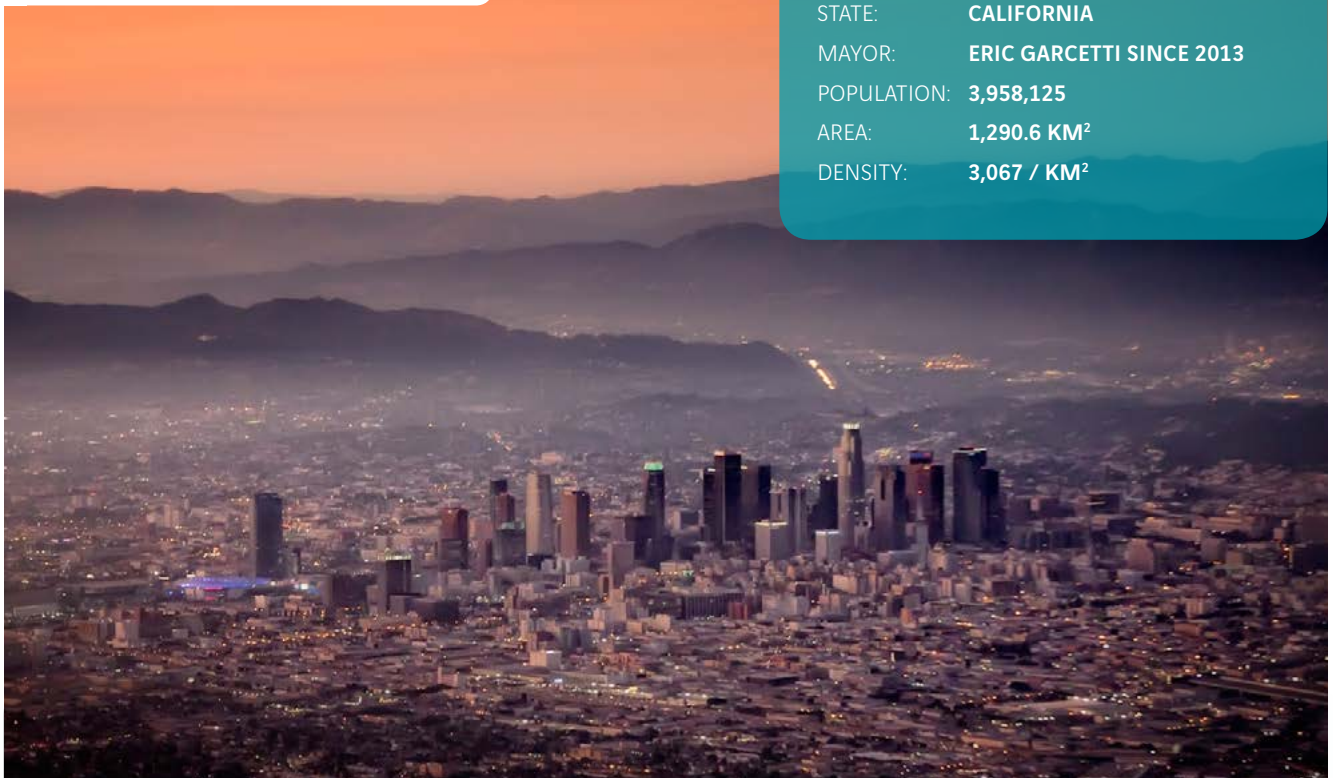
Los Angeles

STATE:	**CALIFORNIA**
MAYOR:	**ERIC GARCETTI SINCE 2013**
POPULATION:	**3,958,125**
AREA:	**1,290.6 KM²**
DENSITY:	**3,067 / KM²**

Specifics of the city in terms of Urban data

For some ten years now, the city has been carrying out sporadic trials and implementing original entrepreneurial initiatives involving urban data around three main strands:

◗ **The creation of new service companies.**

◗ **The need to be accountable to taxpayers via assessment tools of public policies.**

◗ **The need to make Los Angeles a more sustainable, greener city.**

Structures and key players

In making its data available via a universally accessible open data portal in 2014, the city of Los Angeles embarked upon a new founding step in its urban development policy. This decision, which is key to the principles of transparency and accountability in the field of public data, led to the appointment of the first Chief Data Officer of the City of Los Angeles. A former co-director of Code For America, the dynamic civic hacking organisation, Abhi Nemani reflects Mayor Eric Garcetti's intention to make Los Angeles a spearhead city in urban data exploitation. Since he was appointed to Los Angeles City Council, this young CDO has not stopped striving to enhance users' experiences. In September 2014, he kicked off an open data portal revamp aimed at

providing city-dwellers with information that they can instantly understand and, more importantly, use. CicLAvia, an annual cyclist gathering, is Abhi Nemani's favourite example for this user-centric approach. When CicLAvia came to Los Angeles in March 2015, the City Council on-lined an interactive map on its open data portal to provide live updates on the event, locate the closed roads and plan car journeys to circumvent the congestion. This portal revamp is an unqualified success: its bounce rate[1] has dropped from 50% to 5%.

1 The percentage of internet users who reach a web page and leave it ("bounce") only seconds later instead of browsing other pages on the website. High bounce rates denote low user satisfaction rates: they mean users are unable to understand the available information or do not find what they are looking for.

Abhi Nemani has now set out to gather a community of new-technology experts and enthusiasts resembling existing Civic Hacking communities such as Beta NY or Code for Boston. The goal is to involve Angelenos as much as possible in efforts to solve their day-to-day problems using data. So far, this CDO is delighted to see the TechLAcompetitions hackathon's popularity soar: high-schoolers have used it to build solutions to house the homeless, avoid wasting water and trigger debate on immigration reform.

In another initiative to gather a creative community around data and unleash the resources it needs to have a real impact on the city, Abhi Nemani is supporting the launch of Compiler. LA. This cross-cutting civic organisation is aiming to follow in Smart Chicago Collaborative's footsteps, improving city life by leveraging data and developing apps, programmes and a variety of other tools.

Supporting Abhi Nemani in this task is Peter Marx, the Chief Innovation Technology Officer, responsible for developing the application of new technologies in the city's infrastructure and integrating them in municipal service delivery. His role also involves boosting the economic dynamism of the city and promoting job creation in the ICT sector. Peter Marx and Abhi Nemani will be working with the **Los Angeles Information Technology Agency**, which is tasked with maintaining and developing all the city's information and communication networks.

Made in Los Angeles

Reducing traffic congestion in the city of Los Angeles

When studies revealed that the search for a parking space was one of the most important factors in traffic congestion in the city, Los Angeles decided to embark on a partnership with XeroxLabs. In 2010, this led to the installation of sensors in the road surface of the heavily congested Hollywood district, followed by an intelligent system that adjusts the cost of a parking space according to drivers' demand and availability. The Parker app was then developed to complete the system and extend it to the rest of the city by offering to guide motorists towards an available parking space. By combining the two platforms, car traffic in the city has been reduced by almost 10%, to which can be added the positive impact on air pollution and improved operation of public transport.

The fight against crime using a predictive policing system

Using an algorithm that compiles spatio-temporal data and the type/recurrence rate of offences committed in a given place, in the mid 2000s the private company Predpol developed a software to identify areas of a city where the probability of a crime being committed is highest depending on the time of day. Los Angeles is the first city in the world to use Predpol. In 2013 and 2014, the municipal police tested the system on targeted crimes such as car theft, burglary and assault. By pinpointing risk areas within a range of 50 metres, the software tells the police where to turn up and make their presence felt in order to deter crime. The Foothill neighbourhood, which has trialled the system, saw the number of offences fall by 20% between January 2013 and January 2014. It even had a previously unheard of one day with no recorded crime at all. This crime mapping and predictive policing tool has since been rolled out to numerous other U.S. cities.
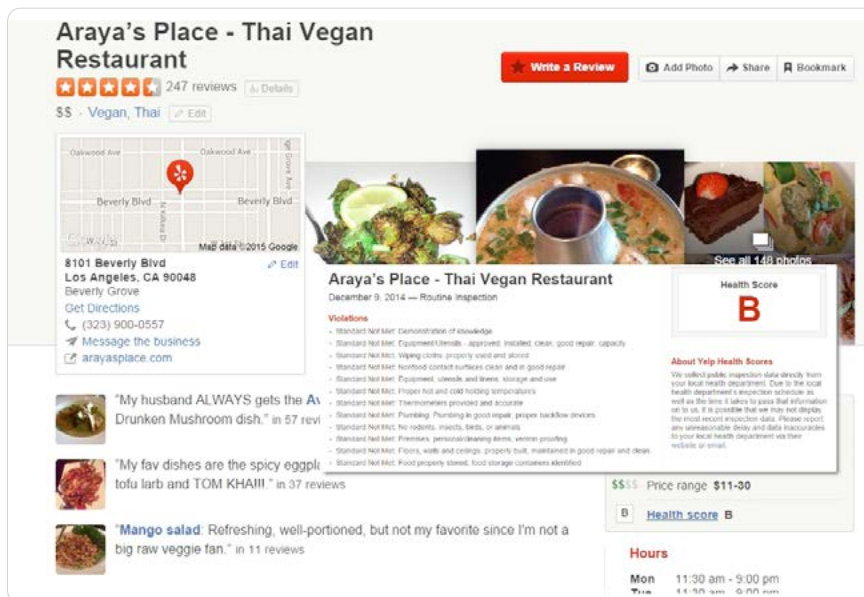
Making public data meaningful: reusing data to support business creation and boost citizen satisfaction

Some of the data that the city's agencies are providing is already being reused to support entrepreneurs and to make city-dwellers' lives easier:

◗ One company, Trulia, has developed a system to generate **advice on buying and renting property** by mapping public information such as new building permits and rent prices in a given neighbourhood, landlords' reputations on social media, etc.

◗ Adding a **Health Code Rating** to the scores of Los Angeles restaurants on Yelp, based on those restaurants' scores during Department of Health inspections.

◗ **The City's Performance Dashboard**
The Performance Dashboard is a database that keeps track of a large amount of city indicators relating to four different categories: sustainable develoment, security and performance of municipal services.
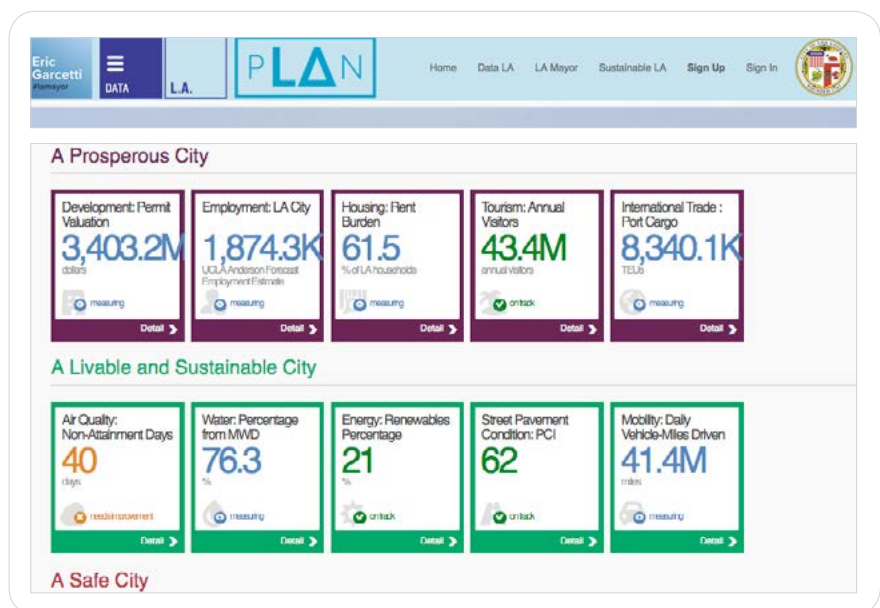
The platform includes comparative tables tracking various curve changes in areas such as unemployment, the number of jobs created, the proportion of electricity produced from renewable energy sources and the status of the city's roads and pavements. This information is usually accompanied by a performance marker (e.g. "on track" or "needs improvement") to provide a better picture of the efficiency of the city administration's work compared to previously declared objectives.

▶ ControlPanelLA

This display tool for municipal expenditure was developed in the interest of transparency and accountability. Residents can keep track of (anonymised) employee salaries and all expenditure incurred by municipal administrations and councils of various districts by visualising the information using the traditional data visualisation tools provided by Socrata on its portals.

▶ HistoricPlaces LA

Supported by the city's Office of Historic Resources, HistoricPlaces LA is a digital map that can geotag all the historic buildings in the city (theme filtering is possible: LA before 1900, Modernism in LA, the entertainment industry), and includes huge amounts of information about them (year of construction, architectural style, current use, owner, etc.). This quite unique initiative aggregates data from multiple sources: the national register of historic monuments, data from the City of Los Angeles, the State of California, etc., as well as data from a major city survey conducted by the Office of Historic Resources and SurveyLA to identify all the historic buildings in the city. The platform is set to become a key resource for the heritage preservation strategy of the city of Los Angeles.

And tomorrow ?

The redesign of the 311 system

Peter Marx, the city's Chief Innovation Technology Officer is preparing to unveil his plans for optimising the MyLA311 mobile app, which currently allows city residents to submit a geolocalised request. It seems that the redesign will involve innovative use of urban data analysis. The notion of "user feedback" is at the core of this project, along with the idea that citizens can be at the core of efforts to improve the city's digital services.

" Get creative about making apps more civic, not just building new apps ". Abhi Nemani

Using data to raise awareness of global warming and develop solar energy

In 2014, a study by EDF (Environmental Defense Fund) in partnership with the University of California (UCLA) on the use of GIS (Geographical Information Systems) and various global warming data, highlighted the areas likely to be the most severely affected by rising temperatures – a phenomenon considered hazardous for cities – and pollution. The project also showed that almost 98% of the solar potential of the city remains untapped and that development of the photovoltaic industry could create thousands of jobs and deliver a more sustainable energy policy. Having been used to identify new risks and opportunities for urban areas, will environmental data be reused to create new tools for a greener city[2] ?

2 See article by La Fabrique de la Cité, *Adapting cities to a +4℃ climate change: the Los Angeles case*, study available only in fench and produced in April 2013 by the Department of Geography at the Ecole normale supérieure : www.thecityfactory.com
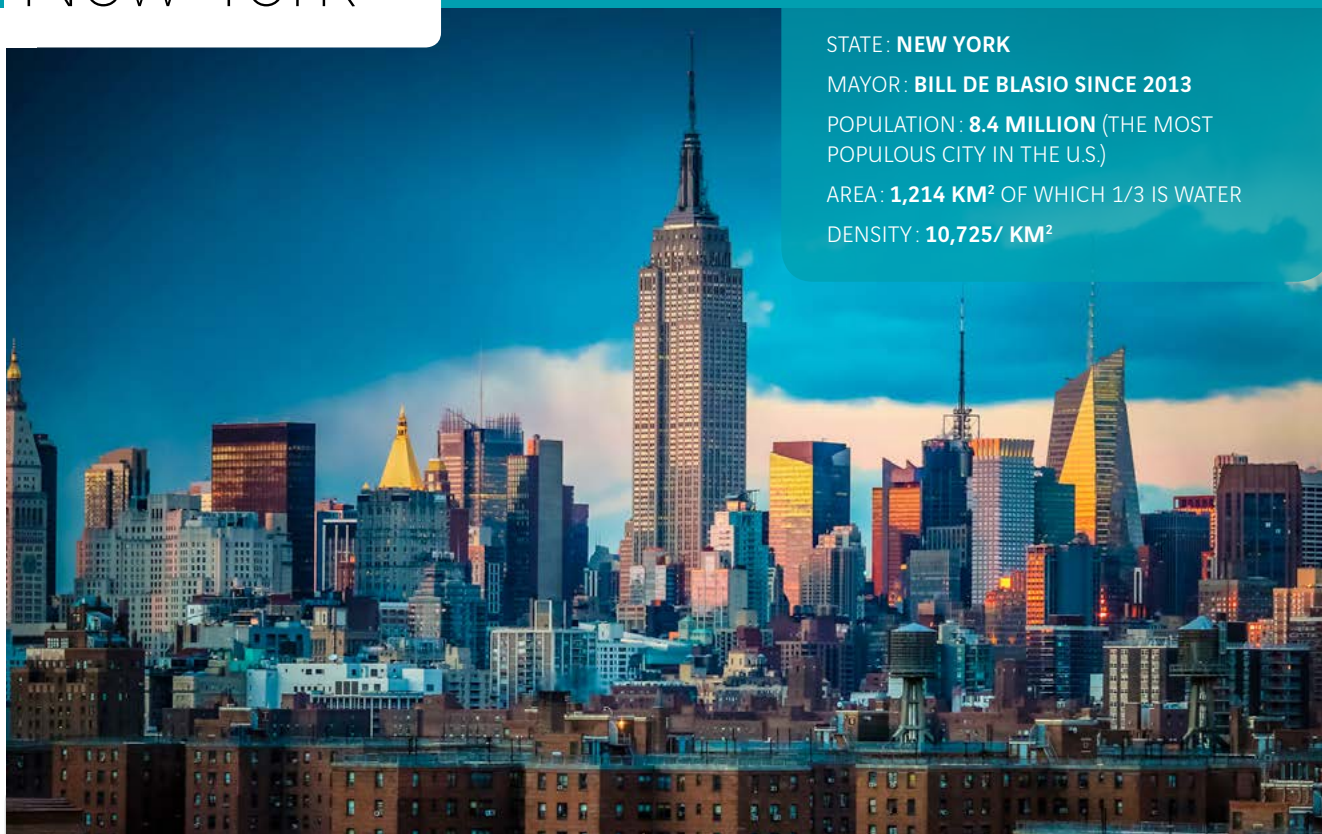
New York

STATE : **NEW YORK**

MAYOR : **BILL DE BLASIO SINCE 2013**

POPULATION : **8.4 MILLION** (THE MOST POPULOUS CITY IN THE U.S.)

AREA : **1,214 KM²** OF WHICH 1/3 IS WATER

DENSITY : **10,725/ KM²**

Specifics of the city in terms of urban data:

❱ **Use of public data to boost entrepreneurship through continued cooperation between City Hall and the ecosystem of young high-tech companies, leading to the production of new urban services.**

❱ **Emphasis on the reappropriation of public data by citizens through the provision of numerous open-source tools, reflecting the great importance of the developer community for City Hall.**

Structures and key players

Since Michael Bloomberg signed in 2012 an Executive Order on the application of the Federal Open Data Law, the city's administrative agencies have been required to sort and release their data free of charge to their citizens. He is assisted by two bodies in this endeavour: the **Mayor's Office of Data Analytics** (MODA) and the **Department of Information Technology and Telecommunications** (DoITT).

Created in April 2013, the **Mayor's Office of Data Analytics** (MODA) is defined as a civic intelligence centre supported by a "Geek Squad" whose task it is to aggregate data from city agencies and cross-reference them with those made available by their partners in Silicon Alley*, including the academic research hubs and incubators of NYU (New York University),

Cornell-Technion, Columbia, CUNY (City University of New York), and Carnegie Mellon. This organisation, which Amen Ra Mashariki has been leading since October 2014, is intent on developing customised solutions to address the problems that the city's departments are facing. "*Urban data is useful to provide us with a greater wealth of knowledge about New York, to measure the success of our programs and to encourage everyone in this city to get involved,*" Amen Ra Mashariki sums up.

The DoITT, meanwhile, ensures City Hall technologies are kept up-to-date by creating partnerships with leading IT companies in order to improve urban infrastructures, get New Yorkers involved and facilitate Open Governance.

* See glossary at the end of this document.

Made in New York

As a pioneering urban data city, New York has rolled out several projects that are now regarded as benchmarks. Those one include the New York City Big Apps contests organised by the DoITT since summer 2009. This event boosts the NYC Developer Portal, which provides a platform and tools (API, open-source software) for urban development, bringing together local entrepreneurs and developers. This annual challenge involves designing apps for the public good in various fields (learn, work, play, live…) using the data provided by City Hall and its partners. Since its launch, the event has produced hundreds of digital tools for NYC residents. The most notable winning projects include:

◗ **Heat Seek**, an app that monitors central heating in New York buildings. Thanks to a thermal sensor system installed by tenants in their apartments, the app can help homeowners save money when energy is wasted, including through poor insulation, and provide reports of violations to the "heating code", i.e. when tenants are forced to live in a cold apartment in winter because the owners refuse to pay hefty bills.

◗ **NYCFacets,** an app that simplifies access to data on the NYC Open data Portal for civil society developers. On the strength of a 10,000 dollar prize, the designers of the app have created **Ontodia**, the company behind **PediaCities** – an urban encyclopædia project in partnership with the City of New York, which lists the practical data (education, security, real estate, etc.) associated with each neighbourhood of the metropolis. This app is emblematic of the value creation made possible by the launch of urban data policies. Indeed, without access to previously aggregated data, the creation of Ontodia would have required hundreds of thousands of dollars.

◗ **HealthyOut,** an app that can geotag restaurants that have been given a top-rating by the city's hygiene department, based on data from inspections conducted by the Public Health Department.

> *"DataBridge is a citywide platform that facilitates data sharing, storage and use for operations, analytics and reporting."*
>
> · Amen Ra Mashariki

Another benchmark for the city of New York is the **Open data Portal (NYC.gov),** launched in September 2013 by the DoITT in partnership with MODA. This open access portal – which has since become the largest municipal open data platform in the world – currently hosts 1,333 data sets from almost 60 municipal agencies (public security data, storage of 311 environment complaints, results of restaurant inspections, real-time road traffic information, etc.), organised in folders representing more than 600 million data rows. These datasets had been viewed over 2.8 million times by the end of their first year online.

Designed by Socrata, the Open data Portal offers powerful data visualisation tools and aims to be the interface with the "general public" for **NYC DataBridge**, an in-house data sharing service for the city's various departments, which brings together more than 50 data sources from some 20 administrations and external organisations (National Weather Service, Federal Emergency Management Administration, Con Edison [the electricity supplier for almost the whole city], Long Island Power Authority) as well as academic centres (University Center for Urban Science and Progress and the Columbia University Institute for Data Sciences and Engineering).

Databridge provides a gateway for City Council offices to access all the available urban data and thereby build a more shared vision of the city, develop collaborative approaches, create steering tools to react promptly and accurately, and analyse and predict the way in which the city works and will work.

Graphic representation of the number of heat-related complains in New York City per neighbourhood and per month with HeatSeek.
Source : http://heatseeknyc.com/
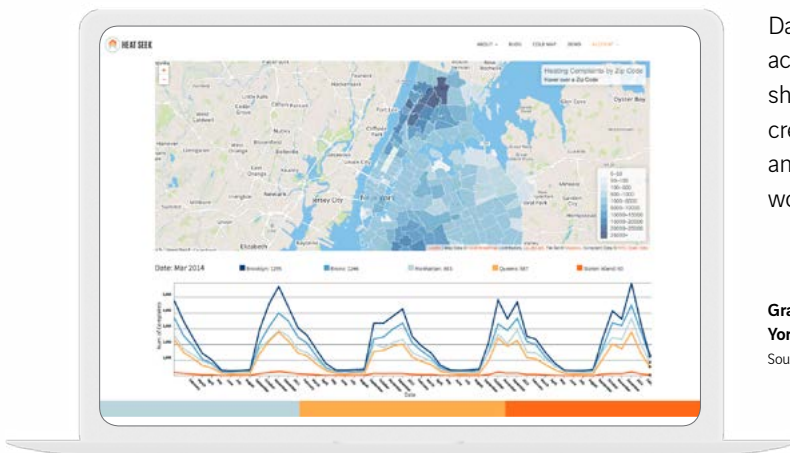
Key example related to use of NYC DataBridge:

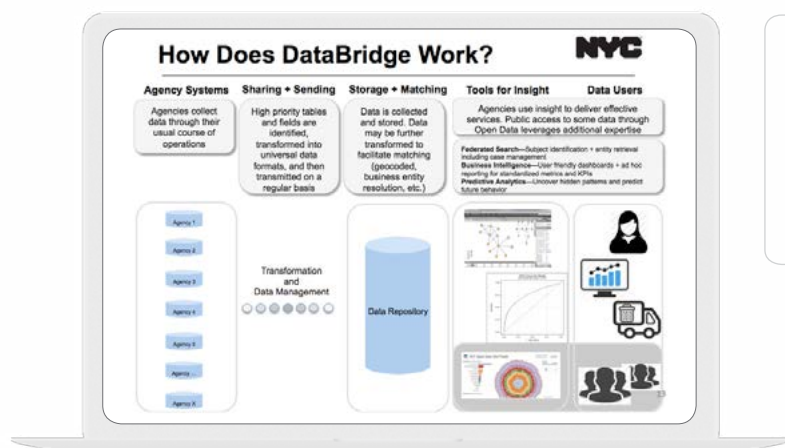## Prevention of domestic fires

One of the DataBridge platform's finest success stories involves averting domestic fires due to illegal apartment conversions. As housing demand outweighs supply in New York, certain landlords and/or tenants reuse business premises as residential ones or split their homes in two to take in other residents. As the installations do not comply with safety standards and these dwellings are dangerously crammed, these illegal conversions entail considerable fire hazards. The 311 complaints system has proven extremely efficient to direct inspections. However, the amount of data and inaccurate complaints sometimes make it difficult to accurately assess how serious a situation really is.

Also on the DataBridge platform, data modelling of illegal alterations to apartments with a high fire risk (due to being carried out in breach of safety standards), cross-referenced with 311 complaints data and with other types of information (non-payment of rent, foreclosures for non-payment of mortgage, service connections, crime) has enabled the city of New York to develop an algorithm to pinpoint priority inspections. This has been a successful application, with the detection rate for major infractions rising from 8% to 70% of inspections.

But Databridge has also:

▶ Improved success rates when city authorities conduct searches to find retail outlets that sell smuggled cigarettes (from 30% to 82%).

▶ Helped to identify the city's drugstores that smuggle prescriptions for Oxycodon, a medical drug commonly used for recreational purposes.

▶ Considerably improved mortgage fraud detection.

Finally, we must also remember the recent initiative championed by New York Mayor Bill de Blasio, who unveiled the **Digital platform.NYC** in October 2014. This tool provides citizens with all the information they need about new technologies and entrepreneurship in the city's five boroughs: events, job offers, creation of incubators and start-ups, new workspaces, etc. The result of a unique public-private partnership between, on the one hand, the New York City Economic Development Corporation and, on the other, companies such as IBM and Gust, online course platforms (MOOC) and the NY Venture Capital Association, this platform is the latest urban data policy milestone in New York.
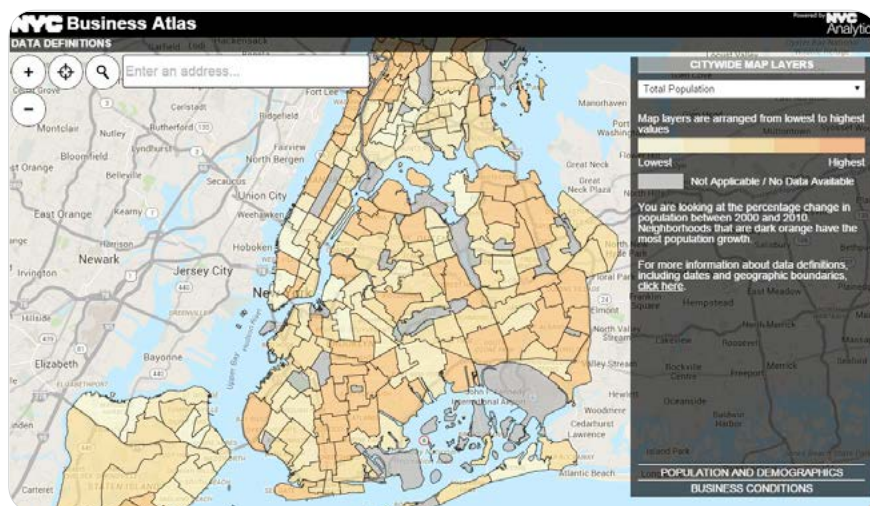

The structure of the DataBridge database and its usages.
Source : Amen Ra Mashariki's slideshow for La Fabrique de la Cité (www.thecityfactory.com)

" Any projects that we worked on should be able to be applied in multiple places across the city "

· Amen Ra Mashariki

The population per neighbourhood on NYC Business Atlas.
Source : http://maps.nyc.gov/businessatlas/

In order to support the economy, including small shops and businesses, MODA teamed up with NYC Digital, the New Business Acceleration Team and the Economic Development Corporation to develop the **NYC Business Atlas** in 2014. This user-friendly visualisation platform enables entrepreneurs (tradesmen, convenience storeowners, human services providers, etc.) to understand the economic environment in the New York neighbourhood where they are thinking about opening a business. The information they receive helps them to fine-tune their decisions. The NYC Business Atlas is a map that provides neighbourhood-by-neighbourhood information including demographics from the latest census, automobile and pedestrian traffic flow, taxes, average wages and the number of businesses that are currently active, applying for licences or filing for bankruptcy. For example, this map shows that, in Midtown East, near Bryant Park, 21% of the population is 25 to 29 years old, 51% of the people living there moved in over the past 8 years, and that 34% of the businesses there are restaurants.

And tomorrow?

Hudson Yards – the first "quantified" community

The Hudson Yards neighbourhood is currently the largest private construction site in the history of the U.S. since the Rockefeller Center. This area will soon be the scene of an unprecedented experiment, involving the systematic collection and analysis of quantitative data relating to its inhabitants. Thanks to a huge system of sensors, satellites and a number of applications made available to residents, Hudson Yards will become one of the first connected neighbourhoods to convert entirely to the principles of the Smart City, with a view to achieving energy self-sufficiency and total predictive maintenance of its infrastructure. Projects currently being developed include fitting apartments with intelligent lighting systems that can switch off the lights as soon as the occupant leaves the room, or adjust the degree of brightness in living spaces according to the availability of natural light. Similarly, engineers working on the project are busy designing elevators that can recover braking energy and re-inject it into the grid in order to make energy savings. In setting itself the goal of becoming the "first quantified urban community", Hudson Yards aims to recreate urban comfort and social connections via a unique urban data system.

Pittsburgh

STATE: **PENNSYLVANIA**

MAYOR: **BILL PEDUTO SINCE 2014**

POPULATION: **305,841 IN 2013**

AREA: **151 KM²**

DENSITY: **2,140 / KM²**

Photo credits: FlickR - Brian Donovan - No changes were made

Specifics of the city in terms of urban data

◗ **An urban data policy based on a strategy that aims to gradually raise public awareness of big data/open data issues.**

◗ **A genuine ambition to develop a regional urban data policy to address specific challenges such as the economic revitalization of the area and the fight against poverty in disadvantaged neighbourhoods.**

◗ **One of the only cities in the United States to have drafted legislation covering re-use of the city's open data.**

Structures and key players

Since March 2014 (when an Executive Order was signed on the application of the principles of transparency and data release in city agencies), Mayor Bill Peduto's teams have been looking into the development of an open data platform. In a fully collaborative approach, Pittsburgh City Council and especially Debra Lam, the **City's Chief of Innovation and Performance**, have consulted universities, companies, associations and citizens in order to accurately determine the aims of the platform, the types of data sets to be opened up first and to secure optimum re-use of the data. The conclusions of this informal think-tank have led to the **Pgh Data Forum**, an open data portal that is still being developed.

Pittsburgh's open data policy is characterised by a desire to extend public data collection and cross-referencing to neighbouring towns and cities through partnerships – a decision that appears perfectly consistent with the region's shared history and common infrastructure.

This regional approach to urban data was recently demonstrated with the creation of the **Regional Data Resource** Center by the University of Pittsburgh, in partnership with the City Hall, the Allegheny County or Carnegie Mellon University, which aims to develop a portal for gathering and cross-referencing local (associations, universities), municipal and regional data. The 131 municipalities in the county will be invited to take part in this major initiative. The platform has just published its first data sets, but it is sure to expand as the community consolidates and the recovery processes are standardised.

In addition, the **Regional Data Resource Cente**r has been awarded a 1.8 million dollar grant by the Richard King Mellon Foundation. Part of the grant must be used to implement two major decisions. The first concerns the official participation of 3 members of Code for America in developing the first technological tools to improve services to citizens throughout the county. The second is the creation of a **Government Solutions Engineering Team** – a team of data experts who will be tasked with developing data-driven systems to improve data collection and exploitation, as well as monitoring internal performance.

Finally, one of the key urban data players in Pittsburgh is **Pittsburgh Dataworks,** an association created in 2013 by the Universities of Pittsburgh and Carnegie-Mellon in partnership with major local and international companies such as Google, IBM, Draper Triangle Ventures and Innovation Works. It has launched a myriad of initiatives (partnerships, experiments, training, promotion) that aim to place Pittsburgh at the heart of the American big data scene. It is also sponsored by IBM and Avere, a data storage company.

Made in Pittsburgh

Data education efforts

The development of open data and the definition of Pittsburgh's urban data policy have also led to a Data Dictionary, which aims to provide an exhaustive description of the data produced by the city and to shed light on the public data measurement and recovery process. This urban data encyclopaedia is regularly updated after the **open data Public** Hearings that City Hall holds in order to better identify city residents' information needs. This prime example of taxpayer-accountability is in line with the principles behind **Open Book Pittsburgh** which, since 2009, has made all government contracts and campaign finance reports available online, in order to provide transparency with regard to how the city administration spends taxpayers' money.

Involving citizens early in the development of urban data

In Pittsburgh every year, the Urban Redevelopment Authority (URA) and city education representatives organise the **Steel City Codefest** and the **Pittsburgh Highschool Data Challenge,** which are hackathons for professionals and students, be they high-school or even middle-school students. The purpose of these events is to encourage the development of mobile applications and digital devices that will be useful for Pittsburgh residents every day, by aggregating and analysing information about the city. In addition, at every Steel City Codefest the participating teams are presented with challenges, all of which require them to use a data set provided by the competition partners. One of the first editions of the hackathon asked the contestants to develop a data visualisation tool that could exploit data from the regional food bank (Greater Pittsburgh Community Food Bank) and to harness information such as the type of programme run by the organisation, its budget, performance indices, beneficiaries, etc.

Towards a better understanding of territorial dynamics

One of the first projects run by the Regional Data Resource Center and its associated research teams is Regional Land Banking. This comprehensive database is currently being developed to provide users with all available information – in real-time – about plots of land. It is intended to be an optimised monitoring tool for fraud, vacant lots, risks, etc., but also for dealing more thoroughly with property deterioration issues that lead to a loss in value for surrounding properties. In addition, the next step might involve formulating predictive analytics to anticipate and prevent any deterioration of the economic and social situation in the Pittsburgh area. The goal, in due course, is also to stretch this policy to share and leverage urban data into every city council department.

" We want data champions in each and every single city department "
· Debra Lam
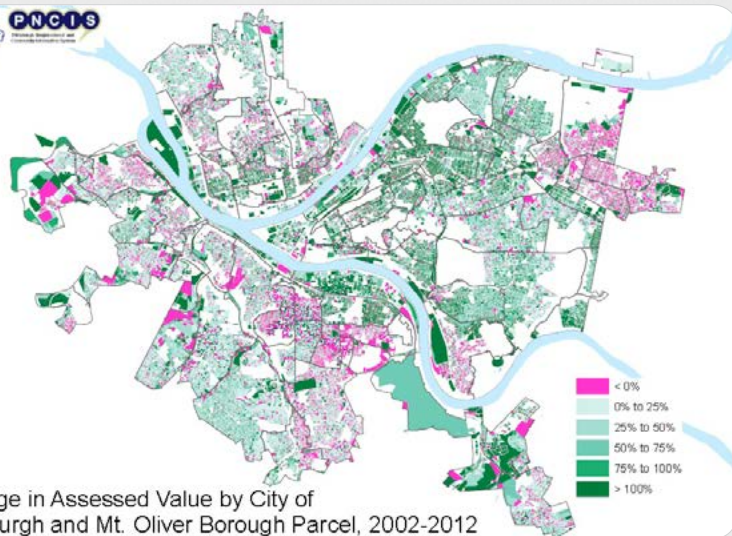
Study of change in assessed value by parcel in Pittsburgh based on the PNCIS.
Source : http://ucsur.pitt.edu/pittsburgh-urban-blog/

Using data to combat poverty: the Pittsburgh Neighbourhood and Community Information System

A result of the partnership between the City of Pittsburgh, the University of Pittsburgh and Allegheny County, this database aims to aggregate as much local information as possible about the various neighbourhoods of the city, with particular focus on the most disadvantaged areas. It includes indicators such as payment of taxes, mortality and birth rates, the proportion of unused land, crime rates, etc. This project is part of the major NNIP (National Neighbourhood Indicators Partnership) programme, which is run by the Urban Institute and aims to create a national map of living conditions by neighbourhood in 35 major cities.

And tomorrow?

Pittsburgh's urban data policy teams are exploring several avenues for optimising existing services. Here are some of the most significant ones:

▶ **Work with Bike Pgh!** to improve road safety by using data on the state of the roads and accident statistics to identify hazardous routes and discourage risky behaviour.

▶ **Address the issue of empty homes** (a synonym for neighbourhoods affected by poverty and/or delinquency) in partnership with Operation Better Block and GTech, using cross-referenced data regarding residents, potential tenants, the socio-economic history of the neighbourhood, etc.)

But these teams have a much broader agenda. As Debra Lam says, there is no point in buying the latest gadget or developing apps merely because they are fashionable. The overarching goal is to serve an all-round strategy to **foster innovation and enhance efficiency.** In particular by harnessing the momentum from Code for America, this city is intent on leveraging the data-management tools it is developing to change real people's lives in Pittsburgh.

Chicago

Photo credits: FlickR – Wally Argus – No changes were made

Specifics of the city in terms of urban data:

◗ **Large-scale, long-term projects that correspond to local issues.**

◗ **A pioneering city in terms of predictive analytics.**

◗ **Various procedures (platforms, applications, events) for involving citizens in discussing the use of urban data and its specific opportunities.**

Structures and key players

Given its proud status as a technology and innovation hub since 2000 – enhanced by the attraction of its Lakeside Data Centre – the City of Chicago soon developed an urban data policy, which was given a boost in 2012 when Mayor Rahm Emanuel signed an Executive Order requiring all city agencies to transfer their data to a single Open Data portal. Following this Order, every agency was required to appoint an Open Data coordinator, which reflects the importance the Mayor of Chicago places on collaboration.

Furthermore, the role of Chief Data Officer of Chicago involves coordinating the network of data produced by the city agencies and their partners (civic, private, academic) by launching new projects and providing development guidelines. Finally, two of the urban data benchmarks in Chicago – the Smart Chicago Collaborative and the Urban Center for Computation and Data (CCD Urban) – are not from the municipality. The Smart Chicago Collaborative is a non-profit organisation of computer technology experts, and aims to develop new services and solutions to improve everyday life in the city. It is financed primarily by philanthropic funds (mainly the McArthur Foundation and the Chicago Community Trust). The Urban CCD is a research centre set up by the University of Chicago and the Argonne National Laboratory.

Its latest projects are a data-based sociological study of the evolution of urban planning in the Lakeside neighbourhood, and a data-driven city monitoring programme known as **The Array of Things**.

Made in Chicago

In 2010, Rahm Emanuel launched the **Chicago Open data Portal**, a public data aggregation platform designed by the Socrata development agency. With 592 datasets currently available, giving access to millions of data rows, this is one of the largest open data initiatives in the United States. Indeed, the city officials behind the Chicago Open Data Portal pride themselves on having developed a unique portal in terms of the reliability of its data recovery machinery, but also in terms of its data update frequency. For example, the platform's city traffic information is now updated every 10 minutes – a decision that has greatly enhanced existing datasets and allowed for more detailed analysis.

In addition, all those concerned about the reuse of public data in the city can get together every week for **Open Gov Hack Night**, an event conceived and organised in partnership with the municipality. By devoting so much time and attention to the city's IT community, Chicago is helping to create one of the largest, most dynamic Civic Hacking communities in the world.

One of the city's flagship urban data projects was initiated by the **Department of Innovation and Technology**. In 2013, the Chicago DoIT entered a competition organised by Bloomberg Philanthropies to reward ambitious data use programmes in the city. It was one of the five winners and won one million dollars for its **Smart Data Platform**, a project that had been in the making since 2011. The aim of the programme was to harness the seven million rows of data produced every day in Chicago (traffic, weather, emergency calls, etc.) and set up a team of experts to develop predictive algorithms based on the problems identified and the data available on the Open Data portal.

The **WindyGrid** platform is the first stage in Smart Data Chicago's development. Brett Goldstein designed it with a view to providing a proper tool to enhance situational awareness. This mapping application enables users to visualise, on a single graphical interface, the operational situation of the city in real time or over time, thanks to location-based information such as accident history at a crossroads and the ensuing list of emergency calls, CCTV camera video flows, tweets by the public, etc. The city officials who use WindyGrid can use the platform to send requests and receive alerts/automatic updates. With its unified GIS, Windygrid is particularly useful for events such as the NATO summit (2012), when it was used to assist Chicago's Office of Emergency Management and Communications.

WindyGrid is also particularly useful for organising predictive maintenance of the city, as witness the part it played in the Automated Preventive Rodent Baiting Program, launched in October 2013. By facilitating the development of an algorithm that could identify and analyse the 31 types of 311 calls that corresponded to signs of an infestation (broken water pipes, problems with garbage collection, etc.), the WindyGrid platform enabled the municipality to predict rodent activity seven days in advance and to intervene effectively upstream.

WindyGrid allows aggregation of all available data on a specific geographical location.
Source : Brett Goldstein's slideshow for La Fabrique de la Cité (www.thecityfactory.com)

Improving health and access to health care

In 2011, under the aegis of the Chicago Department of Public Health (CDPH) and its Office of Strategy and Innovation (OSI), the city launched the Healthy Chicago project, which aims to help improve public health through an ingenious use of the data made available to the city. Some of the noteworthy initiatives created by the project include:

▸ **The Chicago Foodborne system**, which analyses tweets and 311 calls relating to food poisoning and triggers health department intervention.

▸ **The Flu Shots application**, which tells people where they can get vaccinated for free.

▸ **The Chicago Health Atlas**, a location-based platform developed by the Smart Chicago Collaborative in partnership with the CDPH and five city hospitals, which brings together all public health data for the people of Chicago. This mapping system makes it possible to see how a disease is spreading by neighbourhood, to report statistics relating to uninsured people or locate health services in the city. More broadly, the project aims to aggregate as much existing data (public and private) as possible, create new data and, ultimately, to develop predictive analytics solutions for residents' health.

The work carried out by OSI and the CDPH is done in collaboration with the public authorities (DoIT, the Department

> *"The people, by producing data, tell you the real-time story of their city"*
> · Brett Goldstein

of Business Affairs and Consumer Protection, the Local County Government and the Illinois Public Health Department) and academic research laboratories (the University of Chicago's Data Science for the Social Good). But without private companies such as Allstate Insurance and the Civic Consulting group of private leaders – which we know invested almost 115 million dollars to improve access to education, health and employment in Chicago in 2014 alone – these projects could not be completed. Worse still, they would not benefit from the rich data resources that these private contributors make available for the occasion.

And tomorrow?

The Array of Things or a new data-driven urban planning

Launched in September 2014 by a group of researchers and architects from Urban CCD, the Array of Things is a network of 40 sensor boxes (initially) that have been installed on traffic signs and street lights in the city to collect environmental data (temperature, humidity, light, noise, air pressure, air quality) and dissect urban activity (including estimating pedestrian traffic by counting the number of smartphones switched on at the terminals). The aim of the system is to use the new data to optimise the real-time operation of the city and understand the impact the urban environment has on residents' quality of life. In time, the Array of Things will be able to reconfigure traffic signals automatically to address road congestion or pedestrian traffic flows, or, for example, provide suggestions for targeted road gritting in winter.


A sensor of the Array of Things network in the city.
Source : https://arrayofthings.github.io/

Plenario, the project to build a single platform to host the country's open data

Plenario's beta version was introduced in September 2014. It was developed by lecturers, researchers and students from the Computation Institute and Harris School of Public Policy at the University of Chicago. This platform is aiming higher than tools such as WindyGrid: the goal, here, is to provide the single interface containing and categorising all the information available to American citizens form public administrations, universities, private businesses and non-profits. Plenario enables its users to aggregate different types of data sets from different sources over a given period of time, via a mapping data-visualisation tool. As its open-source software architecture is compatible with most of the tools and portals developed by American cities, this platform will in due course enable public officials and academic researchers to study regions, cities and neighbourhoods over specific timeframes and to cross-reference all the data they find relevant regardless of its origin.
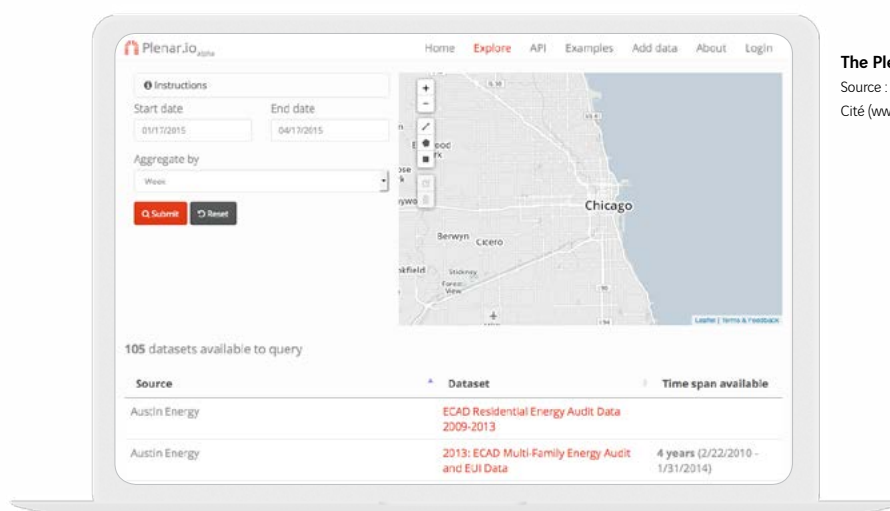
The Plenario project
Source : Brett Goldstein's slideshow for La Fabrique de la Cité (www.thecityfactory.com)

5

URBAN DATA INITIATIVES IN SOME EUROPEAN CITIES

Paris

The clause on open data and general-interest data

The discussions about opening up access to public data that Paris' former Mayor Bertrand Delanoë kicked off in the spring of 2010 led to opendata.paris.fr in January 2011. This digital platform today centralises all the data sets that the city has opened up under a free license, to put citizens in touch with information that only experts could retrieve in the past.

Boosting Paris City Council's open data policy also involves inciting the city's developer community. These past few years, the city has organised several meetups, barcamps and other hackathons, in particular during festivals focusing on digital innovation such as *Futurs en Seine.* In the summer of 2013, Paris city authorities also teamed up with several private-sector companies (RATP, SNCF, JC Decaux, etc.) to organise *Moovin'thecity*, an app-creation contest revolving around multimodal transport services that has spawned around 100 new digital services. *"Organising contests such as these is what can really take the quality of a city's services to the next level,"* says Jean-Louis Missika, Paris' deputy mayor in charge of urban development. Paris city officials have also teamed up with the Paris Région Lab to spur its developer community by kicking off the "*Hacker la ville*" program, which enables students, designers and start-uppers to invent or tweak street furniture and test it in public areas.

Developing Paris' open data community also involves creating forums dedicated to digital innovation. During Bertrand Delanoë's term in office, almost 100,000 sq. m. of premises were redeveloped to house start-up incubators. The next step in this direction is due in a few months' time when Halle Freyssinet opens in 2016-2017, in Paris' 13th arrondissement. This immense 30,000 sq. m. complex will host around 1,000 pioneering start-ups and is financed by entrepreneur Xavier Niel and the Caisse des Dépôts et Consignations. Halle Freyssinet will be one of the French capital's digital technology hotspots and become a compelling example of the public-private teamwork that this city is intent on developing over the coming months.

> *" We are working hard to ensure that our partners - especially in the areas of transportation and energy - release their data and put aside their reservations, particularly with regard to concerns over loss of control and possible damage to the quality of the data "*
>
> - Jean-Louis Missika
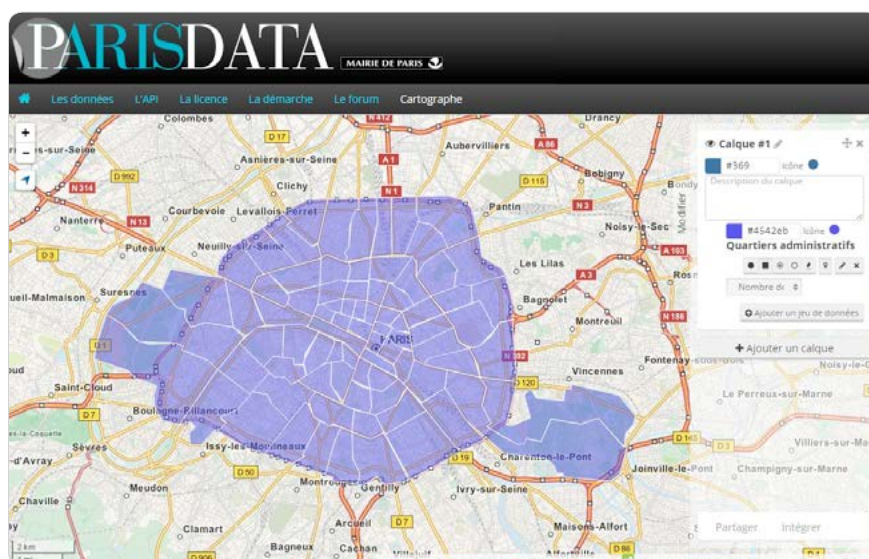
A data visualisation example on the parisian open data portal.
Source : http://opendata.paris.fr/page/home/

Future public-private partnerships will necessarily include an open data component. This is why Paris city authorities decided in 2014 to systematically include an open data clause in its calls for tenders. The goal is to reuse data that suppliers and providers originally retained.

In due course, Jean-Louis Missika hopes to see the notion of "general interest data" emerge to require public and private organisations to release certain information that is clearly valuable to society as a whole.

Paris has two other open data projects on the agenda:

◗ Opening up data on Paris City Council meetings (votes, elected official attendance, etc.)

◗ Along with the city's budget. As all other open data, this information will need to be available to citizens in a clear and intelligible format, "*to be simple to use and interoperable for developers, citizens and businesses,*" Jean-Louis Missika adds. He insists on the role that APIs (application programming interfaces) will need to play in this clarification process and hopes, over time, to deliver "*a single range of services, providing unified access for each and every Parisian, gathering applications created by Paris authorities or private players.*"

Nice

Hackathon in Nice, 29 teams and 130 participants to imagine new innovative services.

The data strategy of Nice

The City of Nice has been engaged for some years in developing an innovation strategy for urban data. Its flagship achievements include the city's open data portal with 139 datasets, a public data reuse website, the connected Boulevard Victor-Hugo fitted with 200 sensors monitoring everything from street lighting to waste bins, and the development of a digital parking guidance and payment system designed to reduce congestion in the city centre. The latest development is the hackathon organised by the Nice Urban Authority in partnership with VINCI. As one of France's largest hackathons, it attracted 130 participants in 29 teams with a challenge to develop innovative services to improve the customer experience of travellers and spectators using stadiums, motorways and airports. Using the city's open data sets and open data provided by VINCI and the Allianz Riviera Stadium (motorway network maps, details of existing services, historic traffic data, the stadium seating plan and even sports statistics from the latest match), the services developed by contestants point the way towards new ways in which to use the city. Examples include BabbleCar, a registration number-based social network for drivers that allows interaction with any car, Wever, which takes a new look at commuter car sharing by creating a dynamic system that uses geolocation to simplify contact between users, and Share!t, which brings together a range of different collaborative asset sharing platforms (airbnb, BlaBlaCar, Koolicar, etc.) and provides an interface for reselling time-limited items, such as concert and sports event tickets. Based on the judging panel's final verdict, winners receive not only financial prizes, but also support from VINCI Autoroutes to accelerate the development of their service and conduct full-scale testing of it.

Lyon

Optimod'

Greater Lyon is developing this tool with a wide network of partners including IBM, Orange and Parkeon. Optimod' aggregates data from multiple sources (public transport, city traffic, bike sharing, car sharing, airplanes, etc.) to offer a complete solution for urban mobility.

The service is currently testing a multimodal urban browser for smartphone, which would be a world first, the aim being to show users the optimal route in real-time, including all the information they need about delays, accidents, availability etc.

An urban freight logistics browser is also being tested, which intends to provide drivers with real-time updates on traffic status, road geometry and availability of loading bays.

Both services will eventually include a one-hour traffic prediction function, a first in Europe, in order to build on the real-time function and provide an urban and suburban mobility experience that is as smooth as possible.

From the cable car to the tramway including the bike sharing system or Rhône Express, the Optimod' app will gather all the means of transport.

Amsterdam

© La Fabrique de la Cité
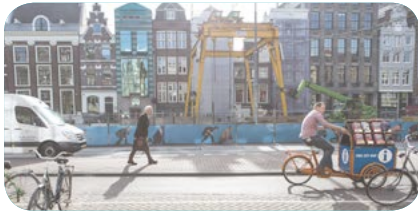
Energy Atlas

An experiment in the Zuidoost district of Amsterdam, near the Ajax ArenA, to aggregate the energy consumption data of the 800,000 inhabitants concerned. This atlas is being produced as part of a collaboration between the city of Amsterdam, companies such as Liander and Waternet and the Federation of Private Landlords. The data is incorporated into an interactive map. The ability to visualise energy production and consumption across an area covering 22 km^2 has made it possible to identify potential for local energy exchange.
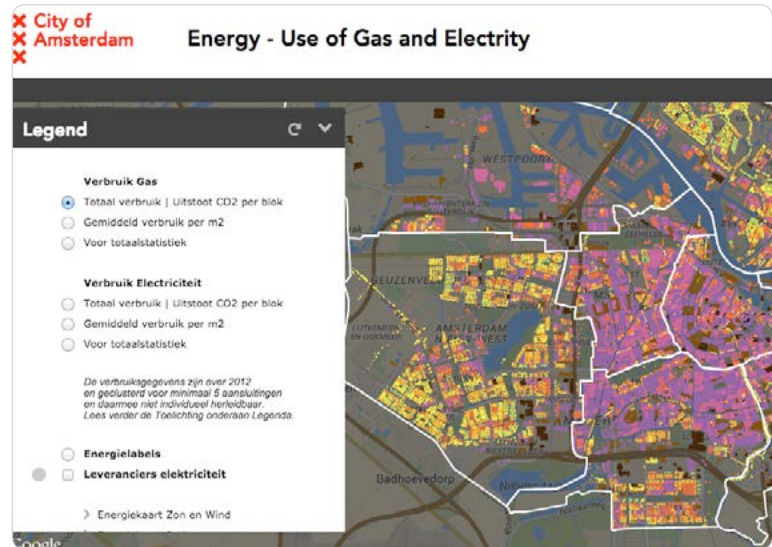
The interactive map enables the users to visualise many datasets including electricity or gas consumption in the city.
Source : http://maps.amsterdam.nl/

Hamburg

© Metro Centric
No changes were made

Leerstandsmelder

An open-source geolocation tool for derelict land and buildings, enriched by the data provided by the inhabitants themselves. Community member alerts can be updated continually (owner of the land/building and status, photo, how long it has been derelict). The aim is to encourage re-use of these places for temporary events and to assist the municipality, which can use this free tool to identify potential development sites. In addition to Hamburg, some 30 other German cities use this tool, including Berlin, Frankfurt and Bremen.
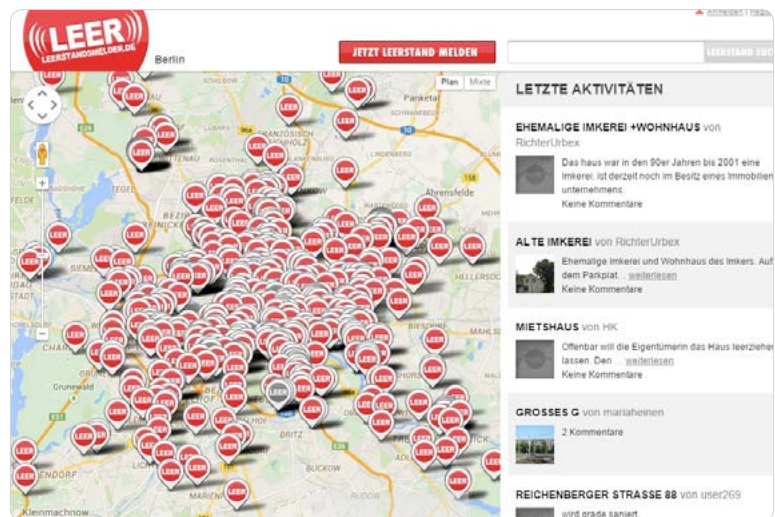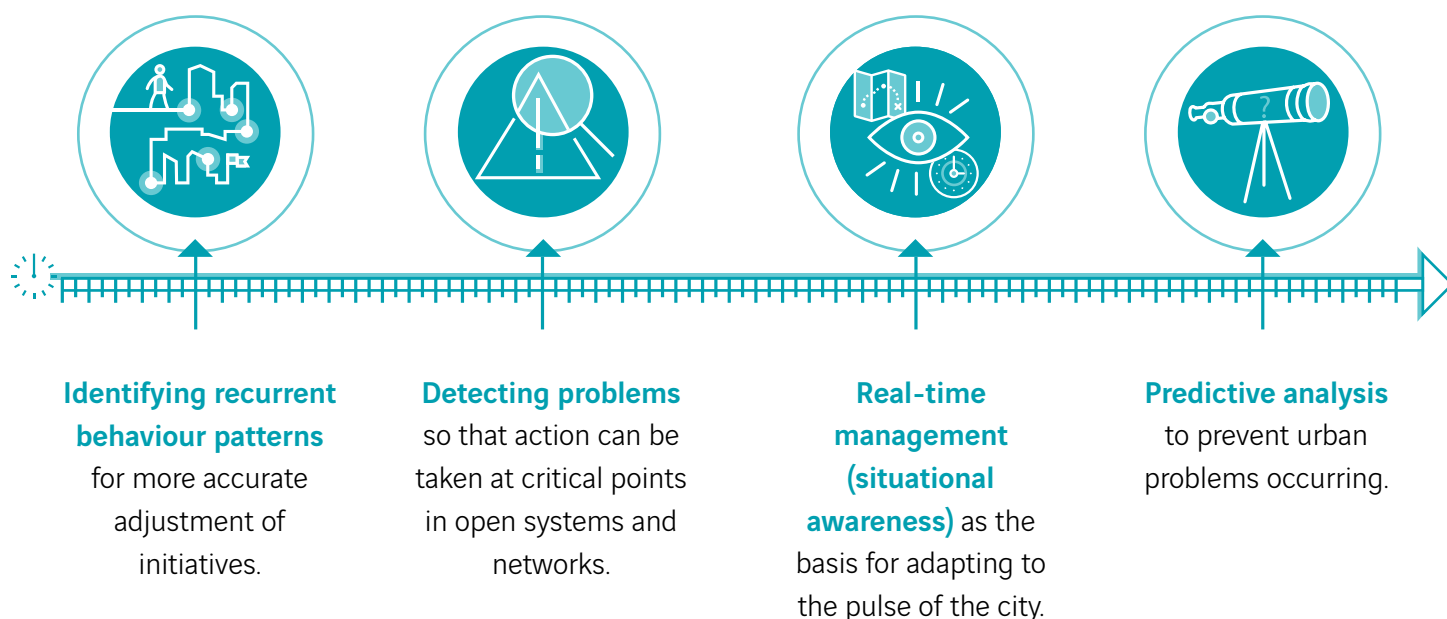

Geo tagging vacant buildings in Berlin on Leerstandsmelder website.
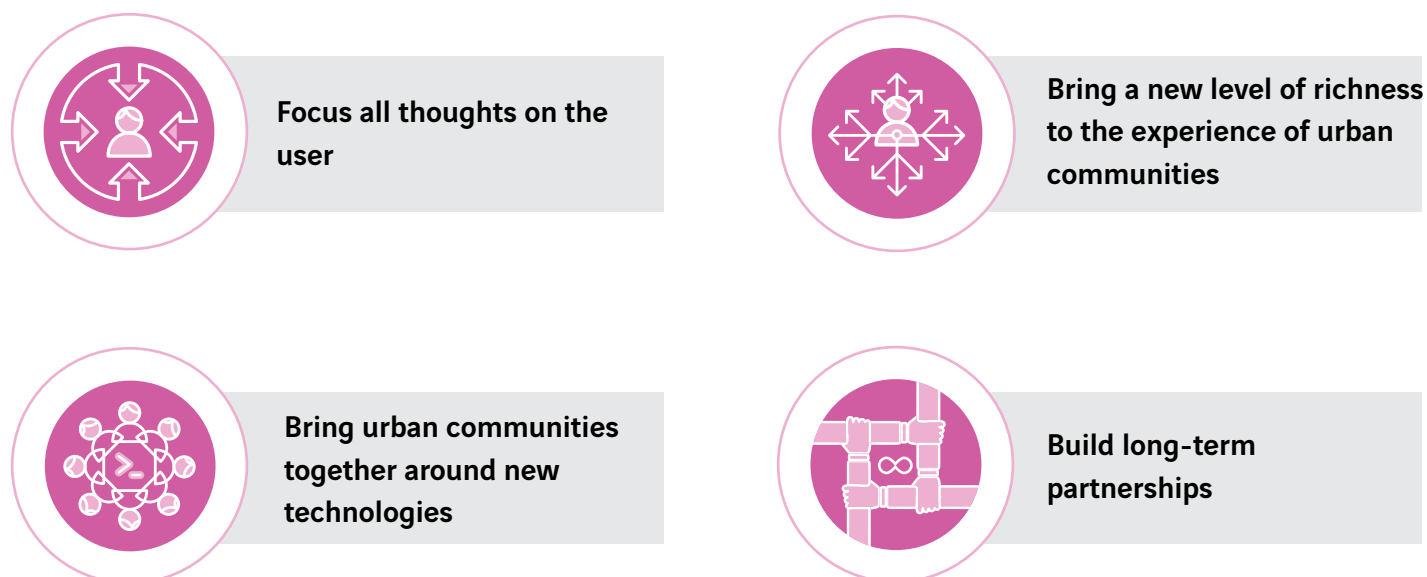Source : http://www.leerstandsmelder.de/

KEY TAKEAWAYS

Thinking of cities as a collection of data ecosystems that shape the regional geography is a good way of grasping the crucial importance of urban data policies.

OPPORTUNITIES FOR USING URBAN DATA

Identifying recurrent behaviour patterns for more accurate adjustment of initiatives.

Detecting problems so that action can be taken at critical points in open systems and networks.

Real-time management (situational awareness) as the basis for adapting to the pulse of the city.

Predictive analysis to prevent urban problems occurring.

ACTION PRINCIPLES

Focus all thoughts on the user

Bring a new level of richness to the experience of urban communities

Bring urban communities together around new technologies

Build long-term partnerships

Contributors

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Journalists at Usbek & Rica. Founded in 2010, Usbek & Rica publishes a quarterly magazine of the same name mapping future trends. But Usbek & Rica is also a futurology app (Futur !), a collection of books (Le monde expliqué aux vieux - The world explained to old folks), a quarterly courtroom-format conference (Tribunal pour les générations futures - Court for future generations), and the creation, coordination and promotion of media for companies and public authorities.

Alexandre Grassigny

City Factory Project Manager Alexandre is a specialist on technology issues generally, and data and energy in particular. A graphic designer in his spare time, Alexandre is also a keen traveller, whether for business or for pleasure. In a previous life, he worked for the City of Paris authority on preparing the Paris Literacy Campaign. Alexandre holds a master's degree in Regional and Urban Strategy from Sciences Po Paris, and is an ENSTA ParisTech graduate engineer.

Guillaume Malochet

Research & Partnerships Manager Guillaume guides and manages City Factory research projects and coordinates our network of academic partners in France and around the world. He has worked in the public sector for around 10 years, first at the University, and then in the Prime Minister's office. Permanently on the lookout to identify the trends that will shape tomorrow's world, Guillaume then analyses and interprets them with the expert eye of an economist and sociologist. A passionate writer, he is also the author of many social science essays.
Guillaume holds an agrégation advanced level qualification in economic science, is a doctor of sociology and a former student of the Ecole normale supérieure de Cachan. He was previously Academic Visiting Fellow at Nuffield College, Oxford University.

APPENDICES

Urban data Glossary

311: the number for non-emergency calls in the United States (noise, congestion, urban infrastructure problems, potholes, vehicle theft). It enables users to contact city services without over-loading the emergency call line. The 311 number works in most major North American cities.

API (Application Programming Interface): interface including one or more data sets accessible to a program or an application (platform allowing access to very high-volume or volatile data sets). Other data sets can be downloaded.
"APIs are very useful for application and web services developers. They allow selective access (programmers access the information they need rather than downloading everything) and are well suited to frequently updated data"
(Simon Chignard, Data Editor – data. gouv.fr platform/Etalab project).

For further information:
◗ Chignard S. (2012), «*Open data : comprendre l'ouverture des données publiques*», Fyp Éditions.

Big Data: volumes of data (structured or unstructured) so massive that they cannot be processed or stored using conventional means. It is estimated that 90% of the data currently available has been produced in the last two years. This mass of data comes from Open data and other sources and is mostly generated in real time (e.g. when tickets are scanned on public transport). There are many challenges associated with the development of Big Data, including improving services provided based on the use of data, guaranteeing confidentiality and respect for privacy. The sector offers economic potential due to the capacity to analyse data according to four criteria: velocity, variety, veracity and value. However,

risks need to be addressed in relation to cross-referencing and protection of personal data (e.g. the Prism scandal, a US electronic surveillance program involving the collection of information from internet communications and other electronic service providers). This data requires new storage solutions.

For further information:
◗ Brasseur C. (2013), «*Enjeux et usages du big data. Technologies, méthodes et mises en oeuvre*», Éditions Lavoisier
◗ France's General Commission for Strategy and Economic Foresight (2013),
«*Note d'analyse : Analyse des bigdata, quels usages, quels défis ?*»

Chief Data Officer: the main task of a Chief Data Officer is to facilitate the decision-making process of a structure - whether public or private - by aggregating, processing and analysing the data made available.

Chief Information Officer: in charge of information and communication technology in a company or a public authority.

Civic Hacking: expression referring to the collaboration between officials, designers, engineers, entrepreneurs and IT experts to develop and support projects that meet the needs of civil society. These projects are based on the reappropriation of existing data to produce new responses and/or new urban services ("hacking").

Cloud Computing: the use of remote servers to store information.

Commercially available public data: in principle, public data is free but there is a certain amount of commercially available public data whose reuse is subject to a fee: the deliberations of the

CNIL, for example.

Code for America: non-profit organisation behind the innovative Civic Technologies concept. It aims to harness the creativity of Silicon Valley developers and entrepreneurs to improve the accessibility and quality of public services and to address the challenges municipalities are and will be facing. This involves creating mobile applications and web platforms that can make citizens' lives easier and developing tools for managing and analysing public data.

Crowdsourcing: gathering or creation of data by a group of volunteers, resulting in the development of a collaborative database. Crowdsourcing can be applied to numerous business sectors (urban planning, artistic creativity, design, etc.).

Data : distinct piece of information in various forms (e.g. numbers, text or bits). «Brute fact», «Material in its raw state, which we can manipulate, process and analyse ourselves» (Simon Chignard). Data is not information since information is data which has already been processed and/or contextualised, about which a judgement has been made.

Datajournalism: interpretation of data. Datajournalists' investigation methods rely on research and cross-referencing of data collected.

Source :
◗ Data Publica, «*Petit lexique de l'open data et du big data*» (http://www. data-publica.com/content/lexique-de-lopen-data)

Data visualisation: the main purpose of data visualisation is to enable information to be communicated in a clear and effective visual form, rather

than to give an overly scientific representation: data visualisation should be both attractive and functional.

For further information:
- Friendly M. (2009), «Milestones in the history of thematic cartography, statistical graphics and data visualization» (http://www.math. yorku. ca/SCS/Gallery/milestone/ milestone.pdf)
- Friendly M. (2007), «A Brief History of Data Visualization» in Chen, C.-H., Härdle W., Unwin A., «Handbook of Computational Statistics: Data Visualization», Springer.

Data Mining (or Knowledge Discovery in Databases – KDD):
Data Mining aims to explore and extract information from a mass of data. Some authors describe Data Mining as a stage in the updating of information using data:
1. Data scrubbing – removal of irrelevant and incoherent data.
2. Data integration – combining different data.
3. Data selection – selective extraction of coherent data.
4. Data transformation – consolidation of data.
5. Data Mining – extraction of a model or a data repetition pattern to allow the data to be used and read.
6. Evaluation of the model – identification of what the information will do within the model.
7. Presentation of the information by means of visualisation.

Process of understanding databases by means of algorithms. For example, this involves finding data repetition patterns to allow the data to be used and read.

For further information:
- Han J., Kamber M. (2006), «Data Mining, Concepts and Techniques», 2nd edition, Morgan Kaufmann (http://akademik.maltepe.edu. tr/~kadirerdem/772s_Data.Mining. Concepts.and.Techniques.2nd.Ed.pdf)

Data set: data aggregation around a single theme (e.g. the list of primary schools in a municipality; transport timetables, etc.)

Hackathon: portmanteau of the words "hacking" and "marathon". A hackathon is an event in which developers, designers, entrepreneurs etc. come together to model services using existing datasets (application development and programming within a limited timeframe).

Hadoop: designed in 2004 by Doug Cutting, who was looking to increase the size of the index component of the open source engine Nutch. Hadoop is an Open Source software framework developed under the auspices of the Apache Foundation, written in Java, and designed to process huge petabytes-sized volumes of data. As an area of Cloud Computing, Hadoop is typical of Big Data.

Interface: point of contact between two elements (computer, software, human etc.) enabling them to interact and exchange ideas.

Interoperability: ability of an organisation or a device whose interfaces are open and fully known to operate with other organisations or devices without restriction.

Licences: contract model that enables the creator of an application to define with the user or the other party the terms for the dissemination, modification and use of an IT product.

NoSQL: NoSQL brings together a number of databases, mostly recent ones, which differ from the SQL (Structured Query Language) model thanks to their non-relational representation of data. Their main advantages are their performance and their ability to handle very large volumes of data.

Open data: before data can be truly qualified as "open", it must meet certain technical, legal and economic criteria:
- provision in an open technical format;
- use of open legal licences with no constraints on data re-use;
- limited fees, which can be an economic disincentive for the people re-using the data.

For further information:
Declaration published under the title «The 8 Principles of Open Government Data», 2007, http://opengovdata.org/

Open data Movement: a movement campaigning for universal access to all the data held by the public authorities. This approach was initiated by the Obama administration's "Open Government Initiative" (2009). Open data involves three main challenges:
- a democratic challenge, since transparency, encourages citizens to be more vigilant;
- an economic challenge, since value is created by processing and cross-referencing data (creation of new services, especially in the urban environment);
- a creative challenge, in terms of data processing and use.

For further information :
- http://democratieouverte.org/open-blog/ les-3-piliers-de-la-democratie-ouverte-1-latransparence

Open Government: this initiative aims to create an unprecedented level of government transparency and openness. It is part of the emerging trend towards Open Source Governance, which recommends adopting an open source and open content (Open data) approach in politics and political governance so that any citizen who so wishes can get involved in policy, and to enable governments to benefit more from local expertise and know-how.

For further information:
▌ Lathrop D., Ruma L.(2010), «Open government: collaboration, transparency and participation in practice», O'Reilly Media

Open Source: system for distributing open access code software that complies with the principles established by the open source initiative.

Silicon Alley: located in the heart of Manhattan, Silicon Alley is a technology park that focuses on companies specialising in digital technologies, media, publishing and advertising.

Smart City: a smart city would use ICTs and exploit all the data at its disposal to implement an infrastructure management system (water, energy, information and telecommunications, transport, emergency services, public facilities, buildings, waste management and sorting, etc.) that is communicative, adaptable, sustainable, more efficient and automated, in order to improve citizens' quality of life, while respecting the environment.

Public data: data produced, issued and updated by public agencies.

Smart Data: the huge quantities of data that citizens and the economic world have to deal with will lead to the development of new services with high value-added. In addition, if it is to be relevant and usable, this "raw" data must be processed and enhanced before it can become Smart Data.

Socrata: a cloud-based software company in Seattle that focuses exclusively on democratising access to government data via data portals.

Urban Coproduction: process of cooperation between various urban stakeholders (e.g. politicians, government agencies, the private sector or inhabitants) to develop the city.

Urban data: subset of large-scale data relating to urban centres. Urban data brings together data that can be held by the public authorities, urban infrastructure operators, businesses or citizens (in which case we refer to personal data).

Publications

Overviews

· **What tools can we use to optimize the city?**
Lisbon Seminar Overview
July 2014

· **How to create value for cities?**
Stockholm Seminar Overview
July 2013

· **Building the shared city: how can we engage citizens?**
Amsterdam Seminar Overview
August 2012

· **Looking for Legacy: for a sustainable impact of major sports infrastructure**
London Seminar Overview
January 2012

· **What is the place for public spaces in the city of the future?**
Barcelona Seminar Overview
May 2011

Studies

· **A roadmap to develop institutional investment in infrastructure**
by Frédéric Blanc-Brude, EDHEC-Risk Institute - October 2013

· **Recovering cities: how to create value for cities? Experience of seven «Phœnix Cities»**
by Anne Power, London School of Economics - July 2013

· **What is the role for cities in the energy transition?**
August 2013

· **Which financial mechanisms for urban railway stations?**
by Richard Abadie, PwC - March 2013

· **Financing Green Urban Infrastructure**
by Olaf Merk, OECD - October 2012

· **Citizens' expectations regarding urban transformation**
by Michel Ladet, Sociovision - September 2012

· **Governance of public spaces: international key facts - presentation of 8 case studies**
by Marcus Zepf,
Grenoble Urban Planning Institute - September 2011

Notes

- **«Phœnix cities» and city value creation**
September 2014 (Lille)

- **What are the economic models for the optimisation of the management of urban networks?** by Dominique Bureau (Economic council for sustainable development) - July 2014

- **Urban optimisation strategies in seven cities around the world** by David Albrecht (ENSA-PB) - June 2014

- **The impact of urban data on daily mobility** in partnership with Sciences Po Paris - June 2014

- **What is the role for cities in the energy transition?**
January 2014

- **How to build 70 000 housing in the Greater Paris**
June 2013

- **When culture transforms the city**
April 2013 (Marseille)

- **Adapting cities to a +4°C climate change: the Los Angeles case study** in partnership with the École normale supérieure - April 2013

- **Note towards citizen engagement in major urban projects**
in partnership with Sciences Po Paris - October 2012

- **«Serious Game»**
Play the City Amsterdam north - August 2012

- **Financing Green Growth**
in partnership with OECD
May 2012

- **The reversible city?**
in partnership with the École nationale des ponts et chaussées
December 2011

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