Towards data driven cities?

Meet up with Chief Data Officers

New York, Chicago, Boston, Los Angeles and Pittsburgh in perspective

Paris Seminar

Monday, March 23rd

LA FABRIQUE DE LA **CITÉ**

CONTENTS

Welcome address

Welcome to all of you, and especially to our guests from the United States.
Let me tell you a few words about La Fabrique de la Cité.
La Fabrique de la Cité is a think tank on urban innovations which has been set up as an endowment fund by VINCI. Our purpose is to identify and analyse the major trends that are likely to change our cities.

We believe that the best way to do this is to take a broad view that includes cities from abroad. Our focus encompasses primarily the Americas and Europe. This international perspective is instrumental in understanding what challenges our cities – be they big or small – will have to face in the near future.
Our ambition is to foster discussion, exchange of views and experiences amongst all the stakeholders of cities: elected officials, senior civil servants, citizens and communities, academics and urban experts, start ups and the private sector. You are today representative of this mix and I assume you will be more
than willing to contribute to this debate on the potential of data for urban transformation.

As you may know, La Fabrique de la Cité has been working intensively these last few months on the breakthroughs allowed by the explosion of urban data. This seminar is a major cornerstone in this ongoing discussion. We have a rare opportunity to debate with five brilliant speakers whose invaluable expertise has allowed their appointment as Chief Data Officers in big American cities: New York, Chicago, Boston, Pittsburgh, and Los Angeles.

I now give the floor to Nathalie Martin-Sorvillo. As director of La Fabrique de la Cité she has led our team's work on urban data. She will give you some key insights and she will highlight what we call the "data-philosophy" for cities.

Remi Dorval, Chairman of La Fabrique de la Cité - The City Factory

Find all the **videos of the keynotes and the interviews of our speakers** online by scanning the QR code or directly on our website www.thecityfactory.com

**Nathalie MARTIN-SORVILLO,
Director of La Fabrique de la Cité**

As a think-tank, we have been working on urban data, the data produced by citizens, those provided by the private sector when providing public services, and the private data handled by the local administrations. My team, which includes Guillaume Malochet, Alexandre Grassigny and Camille Waintrop-Boyon, has been looking specifically at how data management has been impacting cities.

HOW TO COLLECT URBAN DATA

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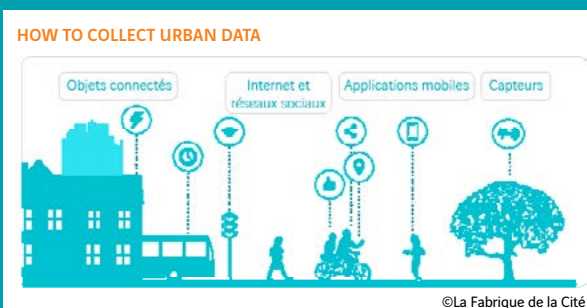
Data has become a buzzword, automatically stirring visions of an abundant "value production". McKinsey in fact predicted that it will trigger $3.5 trillion[1]. We will see whether this is indeed the case, together today, with the special guests from the United States that we have invited for this purpose. Every day new data sets are produced, offering ever-greater coverage. We will hear how the cities of Boston, New York, Pittsburgh, Chicago and Los Angeles are making these data work for them.

GENERAL SITUATION OF THE 5 CITIES

©La Fabrique de la Cité
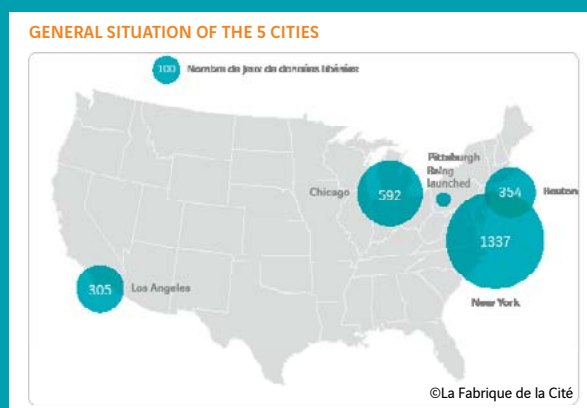
The Open Data Movement is naturally also underway in Europe. Amsterdam has used data to monitor and improve services to individuals. Some cities in France are involved in it, for instance Rennes. Lyon is also involved in work on mobility through the Optimod' project (http://www.optimodlyon.com/en/), with the aim of providing urban services to citizens and improve their quality of living.

Particularly striking to us in the United States was the fact that mayors of major cities are appointing Chief Data Officers. In other words, they find this movement sufficiently important to have a single person or a whole new team dedicated to it full-time. Furthermore, and as the documents provided at this meeting show it, we noted a common philosophy between the five cities:

◗ a smart data approach,
◗ the importance of using and building on data for the purpose of predictive analytics,
◗ accountability,
◗ partnerships between the public and private sector,
◗ the provision of data through collective intelligence and crowdsourcing.

URBAN DATA PHILOSOPHY

#Smart Data Approach   #Accountability   #Collective Intelligence

#Predictive Data Analytics   #Partnerships

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I look forward to hearing the data you will "produce" today. I hope that, after having heard you, we will all be able to explain the role of the CDO, the impact of Open Data and how much value it creates[2].

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1. Reference: "*Big data: The next frontier for innovation, competition, and productivity*", McKinsey, 2011.
2. See also the study of La Fabrique de la Cité *"The impact on Urban Data on daily mobility"*, October 2014.
http://www.thecityfactory.com - Works - Events - *The impact on Urban Data on daily mobility.*

How to Use Data As a Driver for Urban Transformation?

Brett GOLDSTEIN
Former Chief Data and Information Officer, City of Chicago
Senior Fellow of Urban Science, University of Chicago

Having arrived in Paris over the weekend, I went to visit one of my favourite places here: the Louvre. During my last visit, I was with my wife, who likes to move quickly through the museum, while I enjoy using the map to wind my way through every single room. As I stood in an obscure corner of the second floor, worlds away from the Mona Lisa or any other popular attraction, I looked to my left and recognised a woman. I wondered for a moment how that could be, before realising that she had been seated next to me on my flight from Chicago. Far from being a "random incident", as many may think, this is a perfect illustration of a multi-variant quantitative equation of a predictable event. That is reality: there is no such thing as a random event. As we advance in data science, we realise that these sorts of events have become predictable. Similarly, as France debates whether it "should" do certain things, it needs to realise that some of these are already being done. I am sorry that Open Table - the Silicon Valley start-up at which I spent the majority of my career - is not common in France, as it is in the rest of the world. It is I grew up in jeans and a t-shirt, as a computer scientist, building objects in San Francisco. My background is that tiny company which we managed to turn into a multinational.

I then decided that I wanted to "give back" to the community and, in a decision that appeared incomprehensible to much of my family, I joined the Chicago Police Department. I spent five years as Commander and, just as I was preparing to return to the private sector in another start-up, Mayor Rahm Emanuel, Former Chief of Staff to President Obama, recruited me to be the first Chief Data Officer of the City of Chicago. He wanted to turn the techniques I had developed for predicting violence into tools for managing a city. I worked for him for two years, as Chief Data Officer, then as CIO to the City. I am now in my "after-life" as Senior Fellow of Urban Science, at the University of Chicago.

1. The Availability of Data in the Ecosystem

It is fundamental to understand that Open Data is a reality. It exists in the present, and should not be likened to the magical moving sidewalks of the future, about which much is said and little experienced. The data available within any city is copious. City service data, specifically, is abundant in Chicago. Whether potholes*, graffiti or the minutiæ of the everyday, all of it is reported to our "311 System" and forms a pool of very rich data. Many people may describe potholes as annoyances; I see them as a reflection of a city's ecosystem.
I travel frequently for my work: in the past six weeks, I have been to China, Japan, France, England and India. During these visits, I enjoy taking public transport and watching how people use their telephones. I also observe the streets. Areas with specific climates often have potholes, which in turn cause changes to the traffic system: a diversion occurs from the pothole and traffic backs up, drivers understandably preferring not to head their new cars directly into potholes, here they will damage them. This also impacts the rest of the system. In collecting this type of data, cities learn not only about where their potholes are located, but are informed as to how a broader part of their system actually works.

Watch online the keynote **HERE** and the interview **HERE**

* Nids de poule.

Also of significant importance to the City of Chicago is its data on crime and, around that, violence, property, etc. Data on crime is particularly robust: Chicago posts 450 000 to 550 000 reported crimes per year; 911 and emergency hotline interactions number 7 million. Both of these categories can be defined as incident-level data. Both inform as to what happens in cities.

I consider cities to be ecosystems. They are intertwined in ways we did not consider only a few decades ago. Cities are, furthermore, ecosystems within ecosystems, and operate in their own way. In order to understand how those pieces work, it is necessary to take all of the underlying data into account.

Coupled with the more traditional data are the rising media of the day, such as Twitter. Increasingly popular in the United States, it accommodates hundreds of millions of posts per day. It is also the story of each city, told by its citizens: a slow train, graffiti on a wall, garbage lying on the ground – all of this is fascinating information about what happens in cities. Data on weather is also of remarkable relevance; I am currently researching the topic of weather and crime, insufficiently explored over the past decade. These simple lessons are very important and should not be cast aside for the thrill of multi-variant machine-learning.

2. A New World of Applications

The City of Chicago is currently involved in a project known as the Array of Things (AoT), on which I work with my close research partner, Charlie Catlett at the University of Chicago and Argonne National Laboratory. Charlie Catlett is focused on building AoT sensors, sensors placed on the street to collect data and intended to be part of the new built environment. It can collect simple information, for instance on the weather, humidity, or traffic flows, or more complex information, like Bluetooth data. When handed off to a different array, the latter type of data indicates a path and, as such, is extremely rich in insight.

Schema of the Array of Things
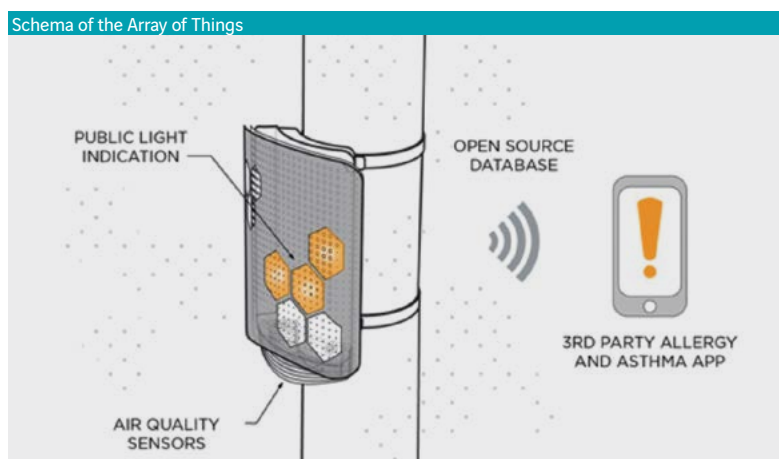
AoT is becoming commonplace and it is very important that it be structured: while potentially very valuable in facilitating city functioning, it can also be frightening. I wrote a piece in the New York Time's Opinions section about how to propagate sensors without them becoming scary.

There exist many types of data and it is important to understand the distinctions between them:
◗ structured data, e.g., Excel charts;
◗ aggregated data, which helps understand topology and underlying structures, which is more interesting.

Mayor Emanuel took care to ensure from the start that a robust data programme was in place. I worked for him from the start, in 2011, and can attest to his very strong personality: it is difficult for anyone to respond with less than immediate compliance to his slightest request. We created data.cityofchicago.org (https://data.cityofchicago.org/), a very powerful tool very much reflective of a new phenomenon, which I would term "spreadsheets on the Web": the mass outpouring of data from individuals that remains without meaning until effectively tied together.

We, at the University of Chicago, have built Plenario (http://plenar.io) specifically for that purpose. The tool reaches out to data portals and draws in their data; it becomes a one-stop shop for spatially-enabled data. Whether researchers, government officials or private companies, the aim is the same: to know the "total story" of a specific place, from the licenses and permits connected with it, to the Tweets it generates and onward. Plenario users can write code using our data, but most importantly, use it to deriving meaning about a place.

Screenshot of Plenario
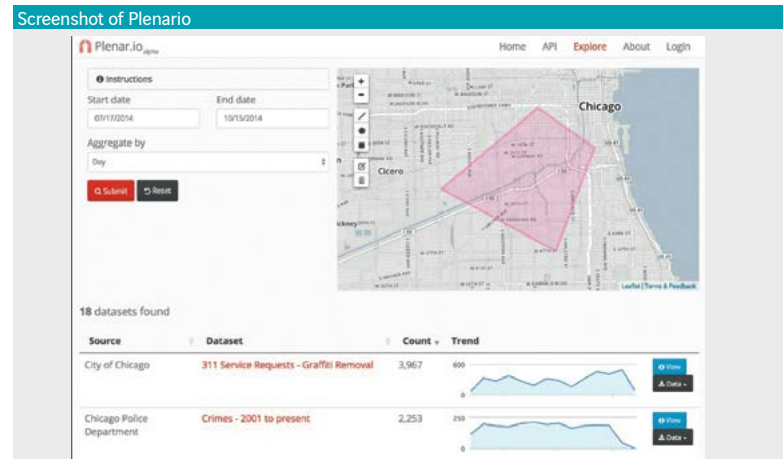
3. How Should Data Be Used?

I was Commander of the Predictive Analytics Group at the Chicago Police Department. My job was the somewhat dark task of predicting where individuals would die. Traditionally, public safety authorities single out specific areas as potentially "bad areas of town". I was responsible, in contrast, for determining the micro-geographic targets within the city with the highest likelihood of being the site of a homicide within zero to 48 hours, so that the appropriate teams could be sent there. In other words, I worked on the basis of signals, heard from within vast amounts of data. This was an entirely new approach to preventing violence. It was by no means creative work; we simply applied the data-mining lessons learned from other companies, such as Amazon, Google, LinkedIn, Facebook, to find the small signals of disruption.

With 450 to 550 homicides per year across 200 square miles, Chicago offered a wealth of information. The task was all the more important in that the police force numbers only 13 000 and is by far underequipped to cover its terrain. It is critical to pick the right target at the right time. The system's first year also became the one during which the City of Chicago posted the lowest number of homicides in forty years. As we were not afraid to capture signals and use the data, we prevented individuals from dying. That is a clear, measurable result. Anomaly detection is another possible avenue: distinguishing the normal from the abnormal, by effectively using algorithmic detection techniques on the data available. The decision-maker is able to keep normal events out of his focus and focus concern on the potential disturbances, managing for the system's co-variants. This will be critical as more and more connected systems come onto the scene, joining the already mammoth-like Twitter, GPS and AoT data. Sometimes, individuals do not realise the value of normalcy, when it is a critical area of computer and data science.

I am very proud of the WindyGrid project, in Chicago, originally built for the NATO Summit in 2012. It was our first major event under the new administration and my responsibility was to ensure that we could determine what went on at any given place and at any given time during NATO. With a new mayor, large-scale event, "Black Block" expected and various threats coming in, this was very important. The traditional response for cities consists of handing 20 or 30 million dollars to a large vendor, so that it builds a turnkey system. Not having such funds on hand, we developed and coded our own – using an open-source stack. WindyGrid consumes all of the spatial data available, lifting information from the base and creating a so-called "large spatial index". In any given area, it became possible to find responses to queries as diverse as the number of police cars active, the sources

of the Tweets being sent out, the identities of those using 911, etc. and making the needed predictions, for instance, on where rats would likely to be seen or where an outbreak might occur. All of this was achieved using open resources and entailed extraordinarily low costs. It is a system in which we take great pride.

Screenshot of WindyGrid
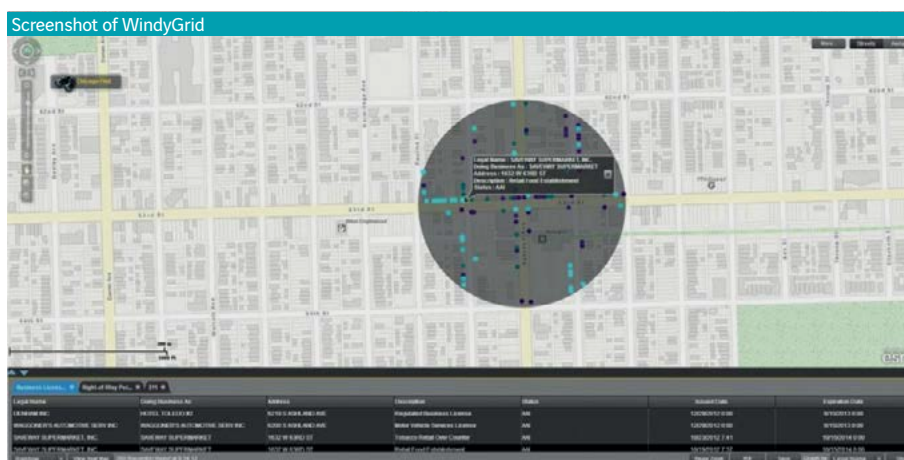
Maps can be outstanding enablers. My speciality is spatio-temporal prediction. In this field, individuals walking down a street are also understood as points operating over time within a polygon. They can also be portrayed as predictable events, once mathematics and computation are effectively applied to them. The resulting decisions are thus data-informed. Given that the technology exists and the computational power has changed greatly over the past five or ten years, governments have all of the tools in hand to make the smartest decisions. To believe that "the old way is the only way" is to fundamentally err. Governments can indeed be as ambitious and efficient as companies from Silicon Valley.

One way to do this is by "recalculating city geometry". Chicago is divided into districts, precincts, wards, etc., each a different political unit of analysis. In contrast, we at the University of Chicago are working on a project dedicated to understanding "homogenous areas of commonality". I can best explain this by drawing an analogy. Fifteen years ago, oncologists would treat extensive areas of the body, taking a blanket approach; over the past five years, treatment has become more and more pinpointed and tailored. The algorithms we are developing today enable the same precision-focused approach – the only effective one – to urban strategies.
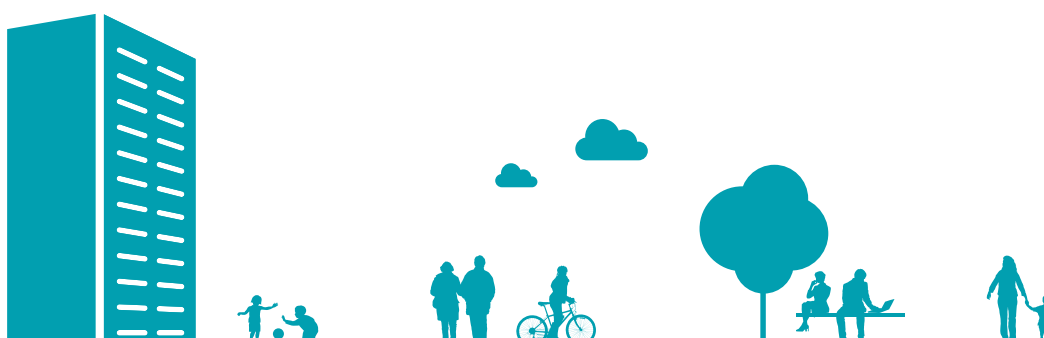
❝ Questions & Answers

Alex TAYLOR

Data on traffic, for instance, must be up-to-date. How do you ensure that your information is always robust, recent and reliable?

Brett GOLDSTEIN

It is not possible to ensure that. I contributed one chapter to a book entitled "The Bad Data Handbook". In it, I called for an end to the quest for data perfection. While entirely appropriate in the context of an academic journal, in day-to-day operations of cities and governments, such precision is not necessary. There are enough data to drive sound decisions; if we were to get bogged down in fine-tuning, we could lose the benefits of the undertaking entirely.

Jean-Bernard AUBY, Professeur de droit, Directeur de la Chaire Mutations de l'action publique et du droit public/Professor of Public Law, Director of the Governance and public law Chair, Sciences Po Paris

Thank you for your thrilling presentation. My first question may be somewhat silly: what has changed fundamentally since the open data movement came into being? How have our lives changed over the last twenty years?

Brett GOLDSTEIN

The major change in Chicago was rooted in the fact that the new mayor, Rahm Emanuel, had been "exposed" to Silicon Valley and the technologies from there. This made him want to recruit an unusual profile like mine, having seen the benefits to those businesses. He felt that, after decades of working in the same way, the City of Chicago could learn to operate more effectively and more efficiently.

Jean-Bernard AUBY

Where are the sensors that make up your "Array of Things" located? On which kinds of networks are they placed? I imagine there is competition between the networks, each wanting to be recognised as "the best" place for sensors.

Brett GOLDSTEIN

The test sensors are currently located on city lightpoles in downtown Chicago, having been placed there in partnership with the City. In test mode, they traverse back into the University of Chicago's network. Note that the data collected by the AOT will, as it comes online, be publicly posted, as transparency is one of our main tenets. As a result, individuals will see the information being collected about them.

Joël RODE, Général de Division aérienne, Inspecteur adjoint, Armée de l'Air/General, Air Division, Deputy Inspector, French Air Force

You mentioned that this information grid is becoming "scary": is it so because of the huge amount of information now available, or because you have information about specific individuals?

Brett GOLDSTEIN

To clarify, the grid has the potential to be scary, but is indeed not so, in my view. I see it as a valuable, powerful tool for efficiency and intelligence, and I am extremely frustrated when governments make decisions for the benefit of the citizens on the basis of naive data. We need to be aware that it has the potential to be scary and make this part of our debate. As a data scientist or computer scientist, this is a problem about which I would by definition not have to worry. With age, I realise that I should add this to the discussion in order to prevent it from being a problem.

Berent DAAN, Manager of Research, Information and Statistics, City of Amsterdam

You spoke about predicting the chance of homicide in a certain area. Could you explain which datasets you were using to generate effective results? Secondly, in reference to the "open" manner in which you will be communicating about the sensors, I wanted to ask whether you will also allow open access to the data.

Brett GOLDSTEIN

The intent is to provide the data from the sensors openly. I worried for a long time about how to ensure that individuals would both accept this and be able to reap the benefits from it. When starting such a programme, as I wrote in the New York Times, the data should be posted in a data portal. The public can better understand when there is full transparency about what is being collected and open access to the said collection.
As to your first question, traditional approaches to predicting violent and other types of crime are based on reported crime histories. As a sworn officer, I found the assumption that a crime would take place in the same location as in the past to be flawed. Instead, I relied on 911 signals. I mentioned the difference between the number of reported crimes and the number of 911 interactions. Once one defines the micro-geographies and sub-sets of neighbourhoods, it becomes possible to detect the predictable behaviour in them. The neighbourhood "tells" its own story, through its people. There are wonderful people calling 911 for the slightest twitches in their environment. Using that data, we were able to identify the leading indicators that a disruption was imminent. I was able to conclude, from an emerging cluster of a given type of activity, that a team should be sent out. Homicide was very challenging, being one of the sparsest types of crime sets.

Nicolas COLIN, Co-fondateur/Co-founder, TheFamily

I work in venture capital but I am also a member of the French Personal Data Protection Authority (http://www.cnil.fr/english/). To what extent did you interact with the American data protection authorities when you were Chief Data Officer for Chicago? Had you been working in France, you would typically have had to submit a complete plan for approval, wait months before receiving a permit, then even after securing it, agree to certain limits and restrictions even at the expense of responsiveness and agility.

Brett GOLDSTEIN

I did not want to wait for months. I had received a mandate from Mayor Emanuel and wanted to work at my former "start-up" pace. Consequently, I held parallel discussions from the very start. In the US, we have multiple regulatory areas, from CGS (CUSIP Global Services) to FERPA (Family Educational Rights and Privacy Act), EPA (Environmental Protection Agency), etc. At the same time, re-identification algorithms, a fascinating area of computer science, remains well beyond the boundaries of any regulatory scope and needs to receive due attention. Alongside this, though not active on Twitter up to that point, I embarked on a four-way conversation with different audiences: the public, the media, the regulatory authorities and the city legal offices. The latter, interestingly, dealt with the Freedom of Information Act, in a way not analogous to some of the central regulatory areas but still valuable. Taking a collaborative rather than adversarial stance from the start, I was able to move forward at a very fast pace.

Claudio VANDI, Responsable des programmes d'expérimentation et recherche utilisateur/ Head of Experimentation and User Research programmes, NUMA

I appreciated your comparison between cities and companies. If Amazon were a city, it would certainly make use of the data it has to offer a better service. At the same time, it would not publish the said data, as this would not be to its competitive advantage. How do you address concerns that competitors might use the data you publish? Who are your competitors? Terrorists are just one of the groups that could make inappropriate use of that data. How do you reconcile concern about mis-use of data with your fight for transparency?

Brett GOLDSTEIN

Though known to many for Open Data, I believe in striking the right balance and also advocate for "closed data". Some of our data about homicides is, in fact, closed data. I do not believe that all data should be open.
I was very worried after the publication of each new data set, as my wife and children can confirm. I tried to have a mindful eye to all concerns, whether public safety, re-identification, or other parts. I was able to leverage my prior experience for this purpose. That being said, some data should remain closed and can be very powerful in analytics. Much of that which can be done for cities is not complicated, dœs not require multi-variant data, and is "low-hanging fruit" that can make cities much smarter.

City-Dwellers, Public and Private: How to Take Advantage of Urban Data?

Amen Ra MASHARIKI
Chief Analytics Officer, City of New York

Many thanks to La Fabrique de la Cité for having invited us. The one day and a half spent with you have been wonderful. I am new to this circle, having entered my position in November. This is my first time meeting counterparts and colleagues from other cities. Through our very compelling conversations, I have noticed that, just as our profiles and complexities differ, our city governments have organized differently and taken different angles to urban data, as reflected in our titles (Chief Analytics Officer, Chief Data Officer, etc.) and reporting structures. In other words, there is no single path to using data to help cities. It has been enlightening to have conversations with our colleagues to understand this.

1. About the Metropolitan Office of Data Analytics

My predecessor in New York City created the title and office of Chief Analytics Officer by simply doing it. He did not sit in meetings, conferences and events, wringing his hands as to whether or how he should take up this issue, and instead simply went out, engaged individuals, gained an understanding of how the city was working, and solving the problems. The title and office followed. This is a strategy I would recommend for any city just starting on this path.

MODA, or the Metropolitan Office of Data Analytics, uses aggregate data from across the city to solve its toughest challenges, specializing in those cases where a government agency has realized that the data to which it has access will not be enough to overcome the problem at hand. Indeed, just as a doctor cannot cure a patient only by having diagnosed his disease, but needs to take into account contextual factors such as the patient's education or environment, they need data from other agencies, as aggregated by our offices.

This, in turn, enables more strategically-prioritised risks, more effectively-delivered services and increased transparency. Our core functions include: collaborating with agencies, building a city-wide data platform, and supervising city-wide data projects. While my title is Chief Analytics Officer, I am also the Chief Data Officer, in that we need data to conduct strong analytics and thus oversee that realm. I am also Chief Platform Officer, giving me supervisory powers over New York's Open Data law. New York City and Palo Alto California are the only two cities in the United States with Open Data Laws. Our City Council has adopted a law stating that city agencies must open their data by 2018 and place it on the platform (https://nycopendata.socrata.com/). While this may not result in prison sentences in the near future, the fact of the law remains and we use it to drive the situation effectively.

▶ Watch online the keynote **HERE** and the interview **HERE**

2. Guiding Principles

It was important to me, upon arriving, to ensure that MODA was governed by core principles:

◗ **build sustainable capacities and solutions**

Rather than one-off solutions, we build projects that can be applied to multiple places across the city, as agencies experience the same needs.

◗ **privacy and security**

As an office, MODA prides itself on being the best possible steward of data possible. This implies understanding concerns about both privacy and security, and taking a strong stance on both. The entire team has been sent to security and privacy training, we manage the data in such a way that agencies feel comfortable sharing their data with us, and deal with New Yorkers' data as though it were our own.

◗ **user-centered analytics**

We do not perform analytics for the sake of analytics or technology. We engage agencies to understand a particular problem and solve that problem. The Offices of Community Affairs established by the Mayor are amongst my favourite with which to work, as their information and approach are precisely the wide-spanning ones we need. We conduct analytics to have an impact and can be trusted with the data and information provided to us. It is of the highest importance to us to be the trusted partners to the mayor and agencies both.

◗ **quality and excellence**

As we employ high-quality analysts, we fully stand behind their work. The information found on our website is of high-quality and is subject to thorough vetting and improvement, on a daily or weekly basis.

◗ **opportunities for analytics**

We diagnose problems, inspire creative thinking and methods and develop solutions through quantitative models. The core difference between a Chief Analytics Officer and a Chief Data Officer lies in the fact that the former dœs not consider data first. We engage and understand our clients' processes, problems and solutions before even touching upon the topic of data. Only once we have gained the necessary perspective do we offer solutions. In some cases, we have turned down projects, seeing that we are not aligned in our approaches.

3. Sample Projects

FDOC, the New York City Fire Department (FDNY) Operations Centre Intelligence tool, is dedicated to situational awareness. For instance, it informs the fireman heading to a fire not only of the address, but also of the type of neighbourhood, urban environment, presence of abandoned buildings, etc. It is a multi-source tool that aggregates information from varied sources and informs users thoroughly, immediately and automatically.

Time to Open Metro is New York's new business acceleration team. It is also a single solution that can be used across agencies. MODA has perfected the concept of end-to-end processing, understanding processes from their starting time to their ending time, tracking:

◗ 911 calls from the time the individual dials the last number to the emergency vehicle's arrival at its destination;
◗ the time elapsed between a new entrepreneur's arrival at a government building to seek a license or permit to their business' opening day, etc.

Our aim is to identify the duration of processes and, if possible, shorten it. It is often believed that the Government holds up processes, when we use the information found to make better policy decisions in the future.
Founded prior to my arrival, the Illegal Conversions Task Force has since been modernised by my team and is now an excellent example of MODA's impact in the city. A landlord with a building that should only house four apartments may have converted the structure to house up to ten apartments, not only causing a bevy of issues

to the city, but also creating a fire hazard. This Task Force sends teams out to find out who is illegally converting the buildings. There is only a small number of investigators, however, while there are a tremendous number of apartment buildings in New York City. Our challenge was to keep the conversion rate down. Thanks to analytics, we were able to boost the illegal conversion vacate rate, wherein law enforcement officers order over-crowded buildings to be vacated, from 13% to 70%. This quantitatively shows the impact which data services can have on a City's capability to solve tough issues in the city.

New York City's Business Atlas (http://maps.nyc.gov/businessatlas/) is one tool which I also particularly appreciate. Large businesses such as Target, Starbuck's, IKEA or Best Buy have a wide range of tools at their disposal with which to perform market research. Small entrepreneurs, in contrast, have very little funding to conduct the same research before determining where they wish to open their businesses. We once again used cross-agency data to produce fuzzy-matching algorithms to inform individuals of exactly which trends were shaping specific blocks in the town: traffic patterns, businesses in existence in the area, businesses about to be created, businesses closing, etc.

Screenshot of NYC Business Atlas

Screenshot of Databridge

DataBridge, a project which some specifically asked to hear about today, is an array of automatic feeds which we have built into agencies' databases. It is thus a warehouse that we have created, storing city agency data. It consists of a master data repository, in which data is matched (based on property, building, 311, MMR Collision), stored and then either shared with other agencies or used for analytics. We also have the capacity, in New York City, by which agencies can share data with one another, point-to-point, while also entering the data into DataBridge.

Our data can thus never be "stale". We receive our feeds on an hourly, weekly or daily basis, depending on our needs. DataBridge offers sharing and sending to multiple agencies, storage and matching, and tools for insight. We collect data from the agencies through their usual course of operations, use high-priority tables and fields to transform this into universal data, put it through storage and matching, and lastly, make it available to other agencies through data visualisation in the data repository.

OpenData has been governed by law since November 2012. MODA recognises Open Data as extremely important and is dedicated to ensuring that agencies are aware of how they can open up their data to their own advantage. The Department of Education, for instance, was able to have one of its problems solved by an entrepreneur by opening up. We use this to illustrate to agencies how they can better drive their projects, improve their Key Performance Indicators (KPIs) and achieve their goals more efficiently.

❝ Questions & Answers

Alex TAYLOR

In what ways do you see the data you are collecting might help a city's economic development?
How can it foster or increase economic development through the use of data?

Amen Ra MASHARIKI

The Business Atlas allows for market research to be done by small entrepreneurs. I discussed providing a solution that can be re-used in many ways. We have "flipped" the Business Atlas, added algorithms and data, so that it is an all-around resource. Now, an entrepreneur approaching a bank for a loan can enter the negotiation with a full array of information. City agencies can also use Business Atlas to address large businesses and show them that there is good reason for them to open locations in neighbourhoods which they may have otherwise avoided.

Valentine AGID-DURUDAUD, Directrice déléguée Ville, Territoire et mobilité/Director Cities, Regions and Mobility, GDF SUEZ

You discussed your work in cooperation with agencies to develop solutions. How do you work with other cities? Are your data open to other cities or, on the contrary, do you see them as the private property of New York and thus a means of differentiating the city?

Amen Ra MASHARIKI

That is an excellent question. In order for cities to work together, they must be connected by a project. Chicago has been a great friend to New York City in starting up and sharing business solutions. New York City has done the same for other cities. I have conversations with people from various smaller cities just starting up in this area. When it comes to engaging each other to solve some of the challenges that we share, whether homelessness, education, garbage, etc., we need to do so in a more collaborative, deliberate manner. Our joint efforts must go beyond conversations and become a true framework. New York City is entirely open to this.

Alexandre GRASSIGNY, Project Officer, La Fabrique de la Cité

I read that the new urban project, Hudson Yards, is boasting that it is the first self-quantified community to be built. How will you measure the data you have gathered and the impact it has?
Secondly, could you give us insight into MODA's budget? We know that data is a cost-effective solution, but I would like to understand exactly to what extent that holds true.

Amen Ra MASHARIKI

Our budget is small. I was awake at 4 AM responding to e-mails today, because one of our most significant challenges is hiring: we need to hire extremely smart and competent individuals, but can offer only bizarrely-low salaries. I am very concerned about my analysts and their ability to live in New York City, a bizarrely-expensive city. MODA is powered by the creativity and energy of the analysts it hires. Any solution we have offered to the city has far outweighed any costs it has incurred to keep our organisation running.
As to your first question, the Quantified Neighbourhood is a very interesting concept, based on what companies such as Nike or Apple have already done for individuals wishing to better understand their sleep patterns, physical condition, etc., in order to better manage their health. Cities, meanwhile, quantify certain areas.
In New York, we have come to see that there is truly a "tale of two cities" underway: those who work and earn a great deal; and those who are challenged when it comes to growing within the community. Quantified Neighbourhoods are those that understand how they are faring and where they stand: their environmental practices, available hospital and medical facilities, proximity to schools and parks, the number of libraries with Internet access, etc. The neighbourhoods that have quantified these aspects are better able to attract and secure the services that will help them grow.

Jean-Philippe CLEMENT, Chargé de la mission Smart City, Ville de Paris/Project Officer Smart City, Paris Town Hall

I work as a project officer for sustainable development and would like to share a vision with you. Every city working with a smart city approach is asking itself the same data question. However solutions will also come from data generated by city partners and citizens?
What platform could aggregate these muli-source data? In France, an Open Data platform is already put into place. What about a norm to spread it to other cities?

Amen Ra MASHARIKI

That is a great question. MODA's vision will certainly be very different from that of my colleagues and I suggest you ask them individually. We are working to bring closer together DataBridge, our closed platform, and Open Data so as to bring even more information to the public. The idea that some data is good enough to be released to the public, while other is "non-premium", will not function. Data seeks to be separated and put in silos. We must therefore work to bring these pieces of data together. There is currently entirely separate systems for Open Data, for Data Bridge and another separate system for Data Share. Agencies, meanwhile, have their own separate systems, within which data naturally falls into categories based on what they describe. We, at MODA, wish to actively and determinedly bring data together and it is those platforms which we can share with the public.

Gert-Joost PEEK, Professor, Urban Area Development and Transition Management, Hogeschool Rotterdam

One of the greatest tests for any city and its management strategies is disaster. What did you learn from the experience of Hurricane Sandy (October 2012), specifically regarding the use of data and resource management?

Amen Ra MASHARIKI

Thank you for that question. A Sandy Aftermath Emergency Management Data Working Group operates within MODA and we have learned a great deal from it. MODA was brought in to help facilitate the use of incoming data and performing algorithm-matching and spatial analysis on it. MODA played a prolific role during Sandy, in that sense. I chaired the Emergency Management Data group responsible for reviewing the suggestions that were submitted following the hurricane, including easier data sharing and easier data storage. DataBridge will be the medium by which agencies share their Emergency Management Data. We will integrate that data, then channel them to the task forces assembled during emergency situations in New York. We are engaging them in conversation today in order to better understand the challenges they face.
The United States operates a National Information Exchange Model (NIEM), through which federal, state, local and even tribal communities can communicate and share data in an interoperable way. New York State is preparing to become part of that so that we can share and receive data with the Red Cross, Department of Homeland Security, other states and other cities. We will thus be fully-interoperable when an emergency situation strikes. We are building our standard now, taking into account some of the changes that have recently come about. For instance, for emergency vehicles attempting to reach a location, we can manage and model data on different streets to make their journey easier.

Transparency, Crowd-Sourcing, Citizen Services: How are Data Changing the Picture?

Abhi NEMANI
Chief Data Officer, City of Los Angeles

I would first like to thank the organisers for having invited me to come to such an inspiring city and event. After the bike tour of yesterday, the memories of which are still acute in my every muscle, I discussed with Remi Dorval during dinner, exploring the goals of the conference. As both he and Nathalie Martin-Sorvillo mentioned in their introductions, he described it as defining the value of data. Indeed, while we know the quantities of data now available, we do not yet understand how, by giving it meaning, we make it into something valuable. I have adapted my presentation slightly to address this specifically, shifting my focus from data science, analytics and modelling, to how the various players in an ecosystem can be stirred to use data as a driver of meaning and become in effect a community. Today's audience includes a broad range of attendees, from government, to the private, high-technology and NGOs sectors, and it is very interesting to me to imagine how you might work together to use Open Data effectively.

1. Four Key Principles

▶ Focus on the user

Los Angeles launched its first city portal in June 2014, seven months ago (https://data.lacity.org/). From the 200 data sets it then contained, we have now grown to 305. When I arrived, in September 2014, I immediately went out in search of user feedback, literally knocking on doors and asking people whether they found the data they needed on the website. Surprisingly enough, after an initial positive yet vague response, individuals would admit to not knowing exactly what data is. Even some of people working in my office did not have a clear understanding of this!

We should think of an action around open data that visualizes it compellingly, to let people know what data is and how it affects them. We redesigned the portal one month ago (February 2014), with a basic design. The points on the map show for instance building permits, and there are many other discovery and search functionalities. The key feature is that people can find the data that is important to them. We adapt our platform to the current context: we currently feature statistical points around the bike festival to be held in Los Angeles this weekend (28-29/03/2015), which individuals can explore immediately and mine for their own planning purposes.

▶ Watch online the keynote **HERE** and the interview **HERE**

Screenshot of Los Angeles Open Data portal
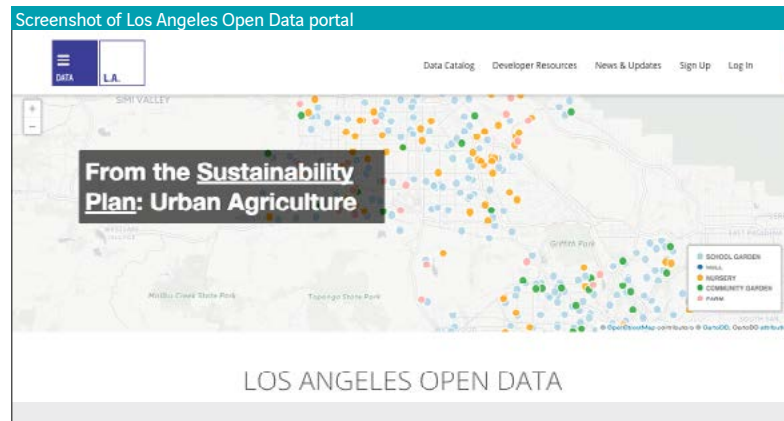
We made our website relevant and visual, and overall, we are pleased to announce that our bounce rate, i.e., the percentage of people leaving the site immediately upon arrival probably due to lack of understanding, has decreased from 50% prior to overhaul to 5% today. In other words, through discussion and by taking into account users' opinions and the problems they had with the interface, we were able to bring about a dramatic improvement in less than one month. As we think about building open data experiences and programs, we should keep in mind the user. In the near future, we plan to make every dataset visualized, open to interaction and exploration in a more meaningful way.

◗ Change the citizens' experience

We tend to think of Open Data as something that is on a portal, or on an application built by someone, online or possibly downloaded to a personal computer. In my opinion, it is just a start. The Open Data we are providing can be really meaningful to private businesses, along with the interactions created everyday among citizens. There is no reason this data should not work for the benefit of companies. This is precisely what happened in Los Angeles when the restaurant inspection authorities paired with user review site Yelp to share with consumers the often obscured hygiene and safety ratings of each restaurant reviewed online. This enables consumers to make easily an informed choice in advance. Yelp did this because they wanted to provide a better customer experience.

Trulia, a popular apartment search website has similarly made city's building inspection results visible to prospective tenants, sharing with them appreciation levels on landlords, compliance with building code regulations, termite or rat presence, etc. The information that used to be hidden away is now made available outright. I encourage all those in the private sector to consider how they might use open data to improve their business operations and the experience of their customer. Instead of building more civic applications, we should think of how to make all apps a bit more civic.

◗ Enable a community

In essence, I personally am stirred to work every morning by the opportunity to build more engaged, thriving civic technology community in Los Angeles. When I came to my position in LA, I started out by studying how other cities do this, based on my experience at Code for America working with municipal authorities in Chicago, New York and Boston on their Open Data and Open Government applications.

- Put good people to work on good problems

As simple as this idea may sound, it is also extremely powerful. Currently, capable and avid citizens are more likely to stow away in their basements to work alone on code, or at best, will work at a coffee shop with a handful of friends. However, when given the opportunity to come together at a specific place and work as a community, they are able to multiply both their output and enjoyment. Chicago, for instance, has a popular location open every Wednesday from 6 PM only to those interesting in working on city technology. This is a shift from the one-time hackathon spirit to that of an ongoing, constructive effort.

- Create a sense of identity

Individuals enjoy being part of a group. They can be given a greater feeling of belonging using logos, stickers, message boards, etc. This makes for a common group and cohesion.

- Challenge them to accomplish something

Too often, we see challenges and problems remain unfixed. We create mechanisms by which we can give ideas and opportunities to citizens who want to contribute and shine. Chicago's Large Lots programme is one example of this: a group of volunteer hackers turned the previously tedious and trying process of applying to buy land into an attractive and convenient tool for the city's authorities. The number of applications has increased by a factor of 1 000. When Los Angeles organised a hacking competition to improve the way it addresses the issue of homelessness, the winning group was quick to specify that all of its members are still in high school. We have applied the same model to other areas, each time putting forth the challenge and offering resources, city contracts, star participation, etc. as motivation.

◗ Build and engage institutions

One of the topics on which we touched during dinner yesterday was that of sustainability. A culture needs to be built within City Hall and into the surrounding community. When we were recently asked to produce a performance dashboard by the Mayor, in just a few days' time, we made the decision to base it on Google Docs. In so doing, we recognised the fact that individuals interested in contributing often lack the technical familiarity needed. Our reasoning was proven correct when other city agencies interviewed requested exactly the same interface for their own undertakings.

We have created a culture, in that even if the population of the offices changes, the capacity to work in a given manner will still be present. Smart Chicago Collaborative is a non-profit, civically-focused platform that makes it possible to use technology for the good of the community, by turning one-time projects into sustainable solutions. It offers high-quality project teams the opportunity to be served by fellows, spend time in other venues, etc. and in so doing, lowers the barrier to entry, creating a model which I love and became intent on creating in Los Angeles. Today, we have such a structure, Compiler.LA (http://compiler.la/) which works with non-profit organisations and government to solve problems directly, but even more importantly commits 10% of its resources to community-building, in other words, to funding innovation through non-government means, over the long-term. One recent initiative could be summed up in a crowdsourced-planning effort: Citygrowth.LA, which invites citizens to comment freely on land planning data made open to them.

Screenshot of Compiler.la, a new civic tech organization

Compiler.LA: New Civic Tech Organization

In order to sustain the broader civic technology movement, we need real investments. I was advised to talk with some of the start-ups present in the room. Their funding will help prototype-builders turn into full-fledged start-ups. In addition to the more widely-known foundations in Los Angeles, such as Goldhirsch, I would like to call attention to the GovTech fund (http://govtechfund.com), which resulted from our work with Code for America. We built an accelerator for government-focused for-profit technology companies to help them scale. Thus far, results have been extremely encouraging, with one partner business expanding from 100 clients to 650 in the last two years. One of the people involved in launching the accelerator has built a 20 million dollar venture capital fund focused on gov-tech start-ups. It is only the first round but has already attracted support from the likes of Jeff Bezos (Amazon) to Steve Case (AOL). This is a very serious undertaking indeed and one in fact open to international investments.

A map of all the 500 start-ups and civic technology companies using open data in the Los Angeles area is available online, at http://www.govlab.com/opendata500.

2. Create friction with data

Technology is often thought of as an area in which seamlessness, speed and ease are the main aims.
In Open Data, we should take the opposite approach, understanding that it is important to create friction, have individuals meet and challenge one another, and – rather than waiting to know the value of data before taking action – using the beauty of Open Data's ever-emerging nature to our advantage.
Alexis de Tocqueville, one of my favourite authors, wrote in *"Democracy in America":* «as soon as they have found one another out, they combine. From that moment they are no longer isolated men, but a power seen from afar, whose actions serve for an example and whose language is listened to». In this quotation, he describes the power, value and potential of community. Beyond what we can see together today, I challenge you to build a broader community within Paris, France and around the world, to make our lives be seen from afar.

" Questions & Answers

Alex TAYLOR

This can appear very far-off and futuristic, though it is indeed quite real. To what extent have you touched all sections of the community? How do you make sure that they are all involved, including for instance the elderly? My step-mother, for instance, has never touched a Smartphone. She is afraid of it.

Abhi NEMANI

My parents still do not understand what I do for a living, if that is any indication; they have not understood for approximately six years. The Smart Chicago Collaborative runs a fantastic programme known as the CUTGroup Programme, which has civic applications tested at a user testing night, for instance at a local laboratory, a local library, in South Chicago, etc., paying local citizens to use the applications and give their opinions. They claim that the value to them comes from the user feedback provided to them, when the material benefit lies in the fact that these testers have now adopted the applications themselves, playing with them, installing them on their telephones, etc. We are working to do the same in Los Angeles.
Further value comes from the marketing that naturally occurs, and which is of great assistance in that cities do not have Chief Marketing Officers (CMOs) specially dedicated to understanding how to better reach their constituencies. The start-ups or non-profit organisations using the services and with the vision of their CMOs can indirectly spread the word about these applications and services.

François-Xavier FRINGANT, Co-fondateur/Co-founder, Dataveyes

Could you tell us about how you divide up the various responsibilities within your team? Do you have designers? Who are your team members?

Abhi NEMANI

The team is very talented and experienced: it consists of only me. As such, I too am sometimes up at 4 AM in my apartment, working. The intention is to hire capable and responsible individuals to bolster a central, more multi-skilled team, working on visualisation, technology, etc. Unlike my counterparts from other cities, I do not work in the IT Department; I am the "data person" seated next to the said department. My approach consists of bringing people on board not by control, but by influence and newly-built understanding. I want to build a "tiger team" capable of shaping its future.

Jean-Bernard AUBY, Professeur de droit, Directeur de la Chaire Mutations de l'action publique et du droit public/Professor of Public Law, Director of the Governance and public law Chair, Sciences Po Paris

My question is directed to all of the morning's speakers. You, as leading American cities, appear to naturally consider that you should be the centre of the entire data system. This has enabled the appointment of Data Officers, etc. I wonder whether French cities will feel the same.
Secondly, as you increasingly interconnect data and make use of it in this form, you will inevitably run into privacy issues. How do you intend to tackle this problem, as you transpose this system in Europe, which is much more reluctant to expose data?
Lastly, as to the reuse of data, will it always be able to remain open and cost-free? How will you make sure that information is still protected and maintains value?

Alex TAYLOR

We are unfortunately already ten minutes behind schedule. Perhaps you could touch only on the French issue.

Abhi NEMANI

I will answer very briefly. On the first issue, you might also want to talk with Debra Lam, whose emerging open data movement has used the university as the central component, to better understand and identify trends. As to privacy, we are working with lawyers, advisory boards, etc. I tend to favour asking for forgiveness over asking for permission, in other words, doing as much as can be done and making changes if necessary. Lastly, as the system develops, we will be able to determine whether there is a need to charge for the data currently available free of charge.

Pierre MESSULAM, Directeur général de Transilien/Chief Executive Officer, Transilien, SNCF

My question relates to your fascinating focus on maps and iconographics. It would imply that language will be less relevant. Do you have any plans to include Spanish-language data, in this context?

Abhi NEMANI

Los Angeles is the most diverse city in the country. It is said that any foreign national can fly into the city and feel at home once again, within a very short amount of time. We have residents from almost every country in the world, and diversity is always a priority focus topic. Your point is excellent. As soon as I reach home, I intend to check whether there is a Spanish version of our data portal. I do not know whether other CDOs here have considered the issue. I would recommend making the entire portal multi-lingual and having specific datasets translated as necessary, leaving the choice up to individuals as to how they make use of that data.

A Different Story: The Early Efforts of the City of Pittsburgh

Debra LAM
Chief of Innovation and Performance, City of Pittsburgh

Thank you for inviting me, it is a real honour to address you. I will tell a different story: that of a smaller city, with a population of only 305 000 and a number of datasets totalling zero. We are, in that sense, only at the beginning of our data story and path. I feel it is important to tell about how we are approaching this and share some of the challenges we are facing in an honest and critical manner. While many of you do not work for cities, we all live in cities and are thus affected in the way we approach data and information in our day-to-day lives.

1. Laying the Foundations

The Department of Innovation and Performance officially became part of the City Government and policy in 2014. It is now embedded into the City Code and is taken into account in the management decisions made by the City Council, legitimising our action. As a previous speaker stated, this institutionalisation is very important for, while Mayors, Chief Officers, Innovation Officers and teams may change, the structure for innovation and performance is now part and parcel of city operations.

Data and innovation are, in fact, nothing new. They should be part of city government of the same right as any other component of citizens' lives. When we approach other departments to have them work with us, we state very clearly and simply that data should not be considered new, additional or unfamiliar work, it is an approach that will help and improve city operations overall. The team and the culture are now in place.
Like all of the cities present today – Boston, Chicago, New York, Los Angeles – we were all relatively fortunate in that we have relatively new mayors, elected on progressive platforms. That progressiveness implies a focus on equity and improved quality of living for residents, which in turn makes our jobs much easier and enables success. We just celebrated our one-year anniversary and, on that occasion, held a mini-birthday party.

Looking back on our work, we were able to see that strides had indeed been made.
In particular, we saw that our focus on changing internal day-to-day operations had progressed. Working for a city consists, in large part, of "fire-fighting" – addressing issues that arise everyday, fixing problems that come up internally. We had to make a conscious shift, given our end-vision, to the external world. We had to understand who we serve and which audiences we address. In the end, indeed, my boss is not the Mayor, but the people. I report to them on the commitments I have made and obligations I have accepted. On this point, I would like to give all due credit to our Analytics and Strategy Manager, Laura Meixell, who contributed invaluably to raising data to the place it deserves in Pittsburgh.

▶ Watch online the keynote **HERE** and the interview **HERE**

2. Building the Frame

I see data as a very important tool heading into the future, much in the same way as steam engines transformed cities in the past. Like other cities, we plan to release data and consider that as a very important step. However, even though it involves thousands of datasets, I feel it is only the first step. We must ensure that the public can find the data and knows how to use them. Otherwise, they will be meaningless. For this reason, we are also dedicated to enabling the second stage, preparing the applications and related release strategies. We are very lucky to have become a Code for America city this year, and through our membership, we are working on the issue of how to facilitate doing business in the City of Pittsburgh. This entails understanding the kind of information required, identifying the most effective triggers for action, recognising and addressing different groups (local-level, minorities, women), etc.

We are also building Regional Data Centres, applying the concept we believe is most effective, namely the multi-stakeholder partnership involving the City, County and universities. Hosted in large part by the latter, it will not be part of the city government itself, but still retain the possibility of extending there. It will include data from community groups, local municipalities, private sector, etc.

Under consideration is data digitisation for use in our historic archives. Our History Television channel, for instance, owns thirty years of video cassettes – all of which are subject to explode if played only once. In other words, we have a very rich archive of previous mayoral inaugurations, key City Council speeches, etc., which stands to be lost. If digitised, this could be restored to life, made useable and searchable, and applied.

We are very fortunate to have a very strong academic community around us, dedicated to education and research. We work with that community at two levels: with the University of Pittsburgh, for the regional data centres that are at the highest level; and with Carnegie-Mellon University, which has allowed us to in essence funnel R&D research into city operations. The latter will be extremely beneficial, as the city by definition must run a large number of operations concurrently, without necessarily having the time to complete the critical research before it implements its policy decisions. Consequently, a great deal of quality information gœs to waste. The partnership with Carnegie-Mellon can, in this sense, be likened to "match-making": when the city has to make decisions on such issues as pavement analytics, snow-plough trackers, sustainability, energy-building, the elderly population, etc. it is able to benefit from the correlating research data. Today, twenty-four projects worth a total of USD 1.1 million are making use of this, effectively aligning the city's real-time needs with the longer-term efforts of researchers, in a very powerful engagement. The first set will be completed at the end of this year.

We also wanted to share our Innovation Book with you. It is often believed that, with the latest developments, sensors, gadgets, etc. in hand, anything could be solved. I wish that were the case. In reality, tools become effective and beneficial when incorporated into a clear strategy and vision. Our Innovation Book is a living document with a list of recommendations as to how to utilise technology, but also achieve a certain goal around digital infrastructures, education and training, transportation, etc. We have been very proactive in this process, holding Round Tables, plotting out the innovative communities on a map. We have understood that innovation data is not owned by the city, but is the collective property of all citizens. We appreciate the work going on all around us.

3. Structures for the Future

Our challenge today lies in taking this innovation to the next level and making innovation more acceptable so that it is applied beyond the "elite" (data scientists, city decision-makers, etc.).

Various illustrations on web-based civic actions in Pittsburgh
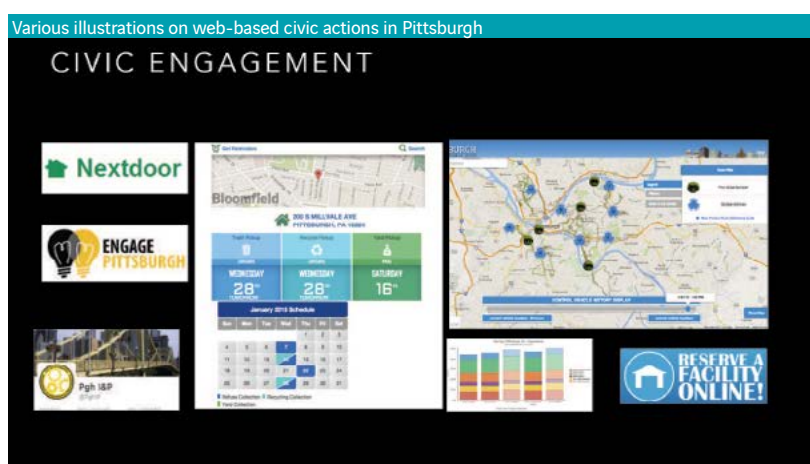
Next Door, a social interface that breaks down communication to the neighbourhood block level, is one response. When the city has to make a decision, for instance on public works, trash collection, recycling, etc. in a certain neighbourhood, it can use the tool to send the related news to only that area, rather than extraneously channelling it to the whole city. The system can also operate in an organically-driven manner, enabling individuals to issue messages (announcing a yard sale, sending out a call about a missing dog, requesting recommendations for child-care). The result is a virtual community, on the very real scale of each neighbourhood. The City can also use the tool as a "social medium" of sorts, to ask its own questions, for instance, most recently surveying citizens as to the kinds of datasets they wish to see, and seeking their opinion about those which they already see.

At the same time, it is very important to understand that not everyone uses social media. *(A show-of-hands survey taken on the spot shows that less than 20% of the audience present at the event uses social media).* For this reason, we keep watch over communications technology as well, knowing that those who use social media are not the same as those who use the Safe People channel; the latter are an older, sedentary population. Essential, then, are consistency and regularity across all of the city's communication media: when I post to Twitter, I also ensure that the same is relayed via our cable channel, the website and in print.

PGH.ST (http://pgh.st/) is a further application serving the public. By entering their home address, users can view the schedules for trash pick-up, recycling pick-up and yard care, all of which had been flagged by citizens as unclear. This past winter, we launched a snow-plough tracker as well, providing data on a key service to one of the coldest cities, where schools are regularly closed for days due precisely to inclement cold weather. The application includes information about "snow angels" (volunteers willing to help the elderly clear snow from their doorsteps and sidewalks), warming centres for the homeless, and other snow-related services.

Lastly, we have released an application that raises the curtain on the city's budget, including the mayor's salary, the cost of its real estate, etc. Previously available in PDF-form, it was bulky and time-consuming to consult. Today, it is possible to target specific departments, view trends, and see how taxpayers' contributions are put to work, in a useable, searchable and visually-compelling format that makes the government more accountable to the citizens. Indeed, if we are unable to report to our ultimate fund-providers as to how we are spending their money, we are fundamentally in trouble.

While we are yet to release our first datasets, we are already releasing data in operable, beneficial fashion. Similarly, though without a data officer or team, we are bringing out "champions" in various segments all around the city. In line with the City's mandate, we have representatives in all city agencies working with us and helping us to gain access to the valuable information which, still today, is hidden away in closets, filing cabinets or an individual mind.

4. Conclusion

In closing I will say a few words about Pittsburgh's Hackathons, which extend beyond the traditional weekend format to give rise to powerful and fruitful public-private partnerships. PGH.ST came into being as a result of one such hackathon, and involves not only the City authorities, but also Google, American Eagle Outfitters, non-profit groups, etc. It also engages students of all ages, from elementary school on, thus building from the very start a new mind-set about citizen engagement.

Screenshot of Steel CIty Codefest's webpage in 2015

We hope to create a world-class data management system, with a focus on sustainability, technology and performance, but also want to foster a culture of innovation and accountability for society. We cannot do this on our own; we rely on a strong network, partnerships and long-term interaction. We have learned a great deal from our fellow cities present today. There is excellent experience on which to draw. There is no need to be a large city or have officers dedicated only to data; it is enough to have "champions" and work from the right spirit.

Questions & Answers

Alex TAYLOR

You mentioned also a programme dedicated to land distribution.

Debra LAM

The population of Pittsburgh is declining, as the city's industrial heritage fades and a new era begins. The land bank gives communities the opportunity to voice their opinion on those properties in their neighbourhoods that are facing tax foreclosure, so that vacant parcels do not fall into the hands of speculators and so that citizens can, from their grassroots level, choose which assets they wish to build around them, from education to medicine and onward.

Joël RODE, Général de Division aérienne, Inspecteur adjoint, Armée de l'Air/General, Air Division, Deputy Inspector, French Air Force

Are you rather proud or resentful of the fact that you have not yet released any datasets? Is the city of Pittsburgh below a threshold that would allow that, or are you content with the "champions" approach?

Debra LAM

Perhaps I was not clear. We are just at the start of our work, having launched Open Data only last year. Ours is a story of reaching a goal, from zero, and working with different departments to do so. Our message is for the many cities out there in the same position. They need not be discouraged, or deterred, seeing other cities with 2000 datasets released. I am here to tell them that there is no inherent disadvantage in being at Point Zero.

Valentine AGID-DURUDAUD, Directrice déléguée Ville, Territoire et mobilité/Director Cities, Regions and Mobility, GDF SUEZ

I was wondering, listening to you and your colleagues, about the frontier between cities and their traditional prerogatives on the one hand, and citizens and the public domain on the other. Do you see a new partnership dynamic developing, in planning, financing, innovation, etc., and management overall?

Debra LAM

I am very pleased with the new partnerships we have developed. The traditional idea that the city is the sole expert, decision-maker and executor, is declining and rightfully so. The city's resources, capacity and expertise are limited, after all. Engagement with the public sector, private sector, non-profit organisations, and community groups is a vital necessity. We have been very fortunate that the public in Pittsburgh has been willing to help.

Berent DAAN, Manager of Research, Information and Statistics, City of Amsterdam

There are all kinds of initiatives and technologies, some surely better-suited than others, given the many different ways in which the public communicates. Do you risk investing in some technologies which individuals will not use? How do you position Next Door solution, positioned at the neighbourhood level, to your citizens?

Debra LAM

Next Door is a partnership, developed not by the city, but by an outside company. It approached us with their technology and tool, offering us the chance to use it. We see it as a great example of partnership. My Department dœs not actually have coders or developers working for the city and, instead, depends on the community to develop and expand the tools. This is wonderful in that I do not know what will result from the release of data. The presence of an active and willing community of citizens creates an exciting dynamic, while also giving us the assurance needed when developing into an unknown environment. It makes for a very exciting dynamic.

# Building a "Thriving, Innovative and Healthy" Boston through Data

Jascha FRANKLIN–HODGE
Chief Information Officer, City of Boston

When Mayor Martin Walsh was elected last year, the local newspaper asked him about his vision for the City of Boston. He described it as that of a "thriving, innovative and healthy" city, but also laid out his plans for reaching that goal, most importantly through the use of data in a way that has a real positive impact. The concepts of user-centricity and focus on outcomes are central to the data-driven city which we are working to build. The number of datasets a city owns or the volume of those is less important than their being used to shape individuals' lives in a positive manner. Throughout my presentation, I will also try to restore some justice to over-used and under-served terms such as "data-driven".

1. Data as a Tool for Accountability

In his office, the Mayor has a dashboard showing key statistics on the entire city, thanks to which he can constantly maintain a view of how the city is working from hour to hour, in areas ranging from public safety to education, crime, public services, road conditions, etc. He views it, internalises it, then uses it to ask questions to departments when he sees figures that have gone off balance, or to congratulate and encourage when agencies post figures that show that his vision is becoming reality. The public, too, can view this tool on our website (www.cityofboston.gov/mayorsdashboard/), such that we become accountable to them on our announced goals.

Screenshot of the Boston dashboard
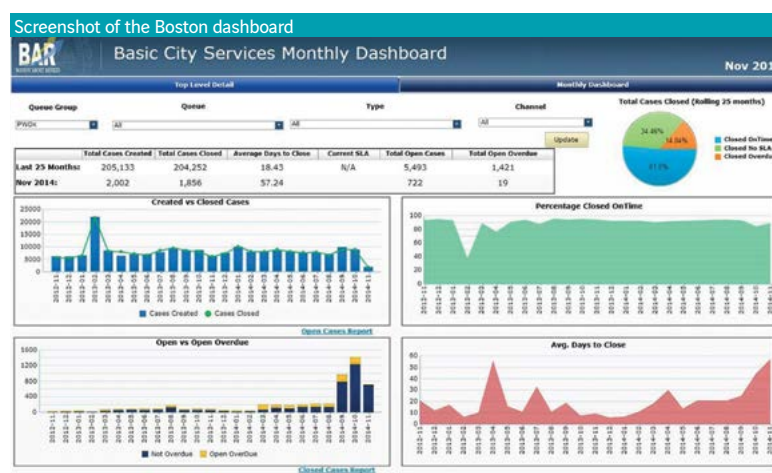
Watch online the keynote **HERE** and the interview **HERE**

In order for this to be truly useful, it cannot only be at the executive level. The Mayor's Dashboard is the tip of the pyramid. At the next level below that, we have thus built a management dashboard, enabling figures such as the Commissioner of Public Works to track and be ready with a response when the Mayor calls him to ask why pothole repair is taking so long (e.g., problems in a given district, problematic type of pothole, etc.). In other words, it is not enough to establish accountability; there must be knowledge and a data structure that allow specialists and decision-makers to understand and respond to their worlds.

2. Working through Partnership

Waze is a traffic application developed by Google and used by the City of Boston for a number of purposes. The first is traffic management: ensuring traffic flow, controlling traffic signals from a central location, responding to situations identified via the city's traffic cameras, etc. However, with only 300 cameras for 850 intersections and 800 miles of roadway, not all incidents can be seen. With Waze, we are able to ensure situational awareness on the roads of Boston, pointing up situations that impede traffic, camera locations, traffic jams, trucks blocking lanes, etc., and offering a much more detailed picture of the city's developments on the road, from minute to minute. Waze also offers data about events that are to happen in the future: when roads are to be closed for public events or construction, users can be alerted in advance and re-plan their journeys accordingly.
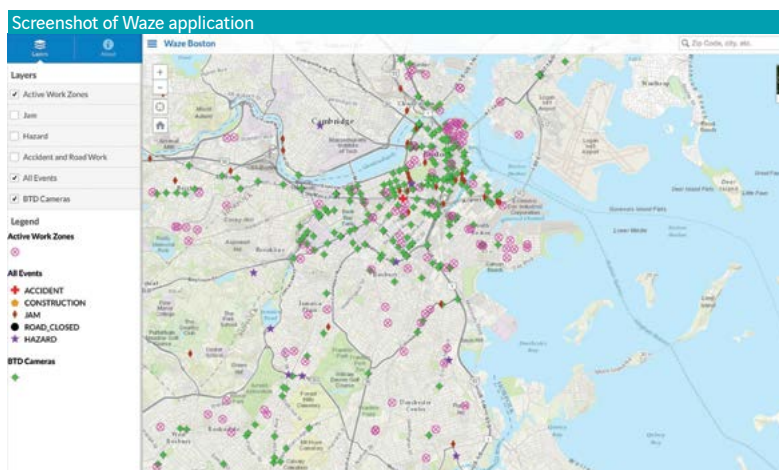
The data which we are gaining through our partnership with the company Uber, meanwhile, are allowing us to approach the city as a laboratory, conducting experiments that would have been slow and expensive in the past. One example is that of transit signal priority, a principle by which a traffic controller can extend or enable a green light for a public transit vehicle (bus, train, trolley) approaching an intersection. Usually, such projects require major, multi-year traffic studies, costing hundreds of thousands of dollars. We are running a much simpler experiment, turning on traffic signal priority every other day for one month. On Monday, buses are always given the green light, on Tuesday treated like any other vehicle, etc. It is now very easy for us to measure the impact of these changes on other traffic (i.e., cross-traffic) and determine whether the buses' facilitated travel is causing gridlock for others, based on the detailed speed information picked up about traffic in surrounding streets.

The past winter was the snowiest in the history of Boston, with over eleven feet piling up, over eight feet of which came in the first month. In a city overwhelmed with snow, our responsibility is to try to improve citizens' lives. SnowCop is an internal tool used by the city to track ploughs, identify areas that have not been adequately served and ensure that snow is removed more quickly and more efficiently. The same data is also useful in informing the public as to the City's response. We do this with the application SnowStats, which paints a picture neighbourhood by neighbourhood and over time. It is as much a tool for communication as for information. Users can view their own location, find out what percentage of the surrounding streets have been ploughed,

how many miles have been covered, learn the names of the drivers operating the ploughs, etc. This illustrates a further benefit of this type of application, namely: humanising services and enabling individuals to feel a stronger connection with the city's management strategies and the people who make them reality. Individuals then feel better served.

We also see data as a "conversation-starter". Last week, the City of Boston held its second event in this respect. The first, dedicated to the topic of permits, though perhaps not as universally appealing, gave rise to three applications that now facilitate the permit-seeking process for users. The second event focused on data visualisation. We have 350 datasets on our own data portal and opened up a further thirty specifically for this event, consisting of both unreleased city data (911 calls, parking tickets, information about liquor and business licenses), and data contributed by partners (about traffic conditions on the roads of Boston, car-sharing services, fitness and the use of parks for recreation). The conversation was engaged not only with the city, but with all of the players in our ecosystem as represented at the event, with the aim not of zooming in on a single data set, but by relating multiple sets up with each other. The results will be available next weekend (end of March 2015). As a "data-driven" city, we look forward to this new information about how we are performing on public engagement and citizen involvement.

3. A Cultural Change in Government

Data has become the common language of City Hall in a very new way. So much of the government in the City of Boston operates in silos, with each authority (on transport, schools, etc.) focusing only on its own issues. Yet the problems society encounters are, by nature, cross-departmental. Educational achievement depends not only on schools, but also on health, economic equality, criminal justice in some cases, etc. Data has enabled us to convene different departments to essential conversations, on topics such as citizen engagement, which help us not only learn others' perspectives, but also build our strategies for working together as a team.

❝ Questions & Answers

Alex TAYLOR

As you may know, some cities in Europe have banned Uber. How do you deal with it and the competitive issues it raises?

Jascha FRANKLIN–HODGE

It is true that cities are struggling to address and rein in the Uber phenomenon. When we signed the data-sharing agreement, one of the first questions I was asked had to do with whether Uber was now approved. Indeed, it is not and that conversation is ongoing. It nonetheless remains that the detailed trip-level data Uber can provide is invaluable to us, specifying the time required to reach any given address from another, highlighting demand patterns, showing where public transit is effective and where it is less so. The regulatory process is continuing, but should not impede us from recognizing a useful tool.

Gert-Joost PEEK, Professor, Urban Area Development and Transition Management, Hogeschool Rotterdam

All of the data presented thus far have related to cities. What are you doing at the level of Metropolitan Councils?

Jascha FRANKLIN–HODGE

The answer will vary considerably from city to city. Massachusetts is home to 351 different cities and towns, of very different sizes and structures, and all very independent. While they do cooperate to some extent, there is no single governance organization legally binding them. Thus, most of our work together is run informally. That being said, some agencies have a metropolitan scope and constitute a vehicle for opening up the conversation. In other places, there is stronger regional governance. We are still learning and hope to start an open data portal that covers many of our cities and towns so that all of the data can be accessed from a single point. The challenge at present is to bring together the disparate collections of datasets each provide (350 from Boston, 200 from Cambridge, 500 from the State), and make them into organised, searchable units. We have a great deal of work to accomplish before we can all speak a common language, in the state and across the country.

Emilie FORSTER, Responsable des offres Smart / Head of Smart offers, COFELY INEO

Thank you for your presentation. You discussed the fact that individuals' names are used on your city portals in order to humanize policy. How do you help those individuals see the value of transparency, when such exposure could also be seen as an open door to surveillance?

Jascha FRANKLIN–HODGE

It is true that while we do want to bring governmental action to life, we also do not want the data we provide to be exploited. While we did show which snow-plough drivers were active and when, we did not publicly display any comparisons between them, not seeing this as helpful or necessary. Thus individuals had the sense that they were being portrayed fairly and accurately.
We are now working to develop applications through which individuals can provide feedback to city workers. One of our applications makes it possible for individuals to report cases needing attention, then for city workers to post pictures of successfully-completed jobs; we now want to enable digital thank you notes for citizens, with the overall aim of building positive reinforcement. We believe that individuals should work not only to complete tasks, but to genuinely improve lives.

Sandrine MATHON, Responsable du service Administration,
Direction des Systèmes d'information, Toulouse Métropole / Head of Administration,
Information Systems Department, Toulouse Urban Area

We have just set up a forty local authority organisation and would be delighted if you could associate yourself with our work, given the fact that we share the same issues and vision.

Jean-Luc POMMIER, Directeur du développement / Vice-President,
Business Development, VINCI

My question is for all of the speakers, relating to your connection with data companies. I imagine that they have been storing data for a tremendous amount of time and have huge amounts of private data – in greater quantities and detail than you ever will. Do you work with them, and regardless, how do you select your partners and determine the extent of your partnerships?

Jascha FRANKLIN–HODGE

We generally do not associate with parties dedicated to collecting and selling data. The most fruitful partnerships are those in which interests overlap, as is the case of Uber or Waze. They do not sell data, but in the process of their operations, collect information that is helpful to us and, if we use it effectively, can be helpful to them as well. For instance, if we are able to speed up traffic, Uber will be able to make more journeys. It is important to further distinguish between privacy and comfort. Individuals are often haunted by the spectre of a "Big Brother" government that collects too much data about them.

Using data for more liveable European cities

Gilles BABINET
Digital champion for France at the European Commission

I am very pleased to see that a discussion on this topic becomes more central at the European level as well. It is difficult to provide a clear benchmark as to the use of data overall. There is a clear uptake in society and strong involvement, in particular on the part of the European Commission in facilitating this, fostered by our centralised legislative framework. Standardisation is more easily done and our statistical surveys have shown that many countries are already faring very well.

I will not focus on comparing data points across Europe, but rather on the fact that the success of policy to date has come from the room for manœuvre left by the national and European governments to city-level initiatives. As to which concepts will be essential to achieving success, the first is standardisation. On this note, I would add that it is not enough to have the same type of dataset; it is also important to have the same type of API. We will, in my opinion, see API become the law. We will use the concept to normalise many aspects of our common lives and it is time that we think about this. When I recently contributed to preparing the bill on terrorism, I realised how difficult it is to clarify certain concepts and reconcile reality with policy intentions, because the "code" or "API" is not visible. It is precisely that code that will determine how stakeholders exist. This is an area in which we need to work together, and engage with the regulators at the same time. I hope that these comments do not disrupt too much of what was said this morning. If we want to be a modern country, we must start to think about API and regulation.

Jascha FRANKLIN–HODGE

Thank you for those very insightful remarks. It is exciting, at events such as these, to realise that we are part of a global community working on similar problems and seeing similar opportunities. While we each have our own political environment and technological approach, we are ultimately solving a problem together. It is galvanizing to see how much we have in common and I hope to see good sharing of ideas, approaches and perhaps even law that help us develop solutions that work around the globe.

The Urban Data-based innovation policy of Paris

Jean-Louis MISSIKA

Adjoint chargé de l'urbanisme, de l'architecture, des projets du Grand Paris,
du développement économique et de l'attractivité, Mairie de Paris

Deputy Mayor of Paris in charge of Planning, Architecture, Greater Paris projects, Economic
Development and Attractiveness, Paris Town Hall

Thank you very much for your invitation. I will be saying a few words about the policy of the City of Paris, its progress on this issue and its ambitions for the next few years. Then, if you like, we can exchange some ideas around the topic.

We launched the Open Data policy at the City of Paris back in 2008. Today, it is largely deployed on the opendata.paris.fr website (http://opendata.paris.fr/page/home/). It hosts all our data sets since 2009 and is regularly enriched. For instance we will be announcing two important data releases before the end of 2015, one being all the deliberations of the Paris City Council (votes, attendance, the actual deliberations), and the other being financial and budget data, publication of which is a major milestone for any city or State.
Important data about urban planning is already available on the website. The creator of a start-up recently told me that his teams cheered when they found out we had released high-volume geographical data. They specialise in modernising collection of micropollution data street-by-street and the availability of this data has led to a quite spectacular improvement in their work.
It is important to distinguish between visible use of data (by citizens, journalists and researchers) and less visible use (by companies, who by integrating it into their knowledge bases improve the quality of their services) – the latter is no doubt the most important.

In addition, as Gilles Babinet pointed out, it's not enough just to make the data available; it must be provided in a form that matches real conditions of use. The City of Paris processed the data released to make it easier for developers, researchers and companies to use it, which means providing both conventional file formats and all the tools that allow interoperable use of the data.

Coordinating the work of the developers community is another essential element, since it enriches provision of data from meet-ups. For instance, the City of Paris has organised meet-ups on the crucial issue of transport. In 2013 and then again in 2015, we organised a competition around construction of multimodal services through applications – it was a great success, attracting several hundreds of developers, and the various multimodal services offered on smartphones in the Paris region today emerged directly from these hackathons. We are convinced that organisation of this type of challenge and community coordination is the best way of bringing about a fundamental improvement in service quality.

We also devote a lot of effort to persuading our partners to release their data. For transport, this means the STIF, the RATP and the SNCF, and we have approached them in a very active even proactive manner.
The reasons for their reluctance are always the same. First, there's the so-called «All-Google» danger, and yet transport operators are more likely to benefit from releasing their data and developing multimodal services thanks to the data made available. It's a simple calculation: organising a multimodal information service available

Watch this keynote online **HERE**

to all Paris region inhabitants costs a few hundreds of thousand of euros, whereas adding a new metro station on Line 10 or Line 14, for example, costs tens of millions of euros for infrastructure that will be used by only a few tens of thousands of people a day. Investment in data and multimodal services is extremely profitable and bears no comparison with the cost of physically upgrading transport networks.

The quality and supposed deterioration of data is the second argument. Here, the experience of the City of Paris shows the contrary – data quality actually improves thanks to the sharp and expert eye of the people involved in the project. For instance, it was the developers who noted that the system of using Roman numerals to identify the different districts (arrondissements) led to some absurd results, with the I, V and X being read as Latin letters and interpreted as such by the computer system.

There are uses that the City of Paris hadn't thought of. Publication of our data on parks and gardens indicating all the species raised awareness and renewed interest in rare plants in Paris. Walking trails are now being organised to let people discover these rare species. Groups supporting asthma sufferers have even been able to advise their members to avoid certain spots during the spring because of the species likely to be found there.

The last source of concern is loss of power or control. But in fact it's by not publishing data that you risk losing control of the situation. The users community will join forces to set up alternative information networks, which genuinely escape control. The big issue we have with transport operators is theoretical time schedules compared to real schedules. The City of Paris is fighting for publication of real schedules – if we only publish theoretical schedules, the digital users community will very quickly post comparisons of theoretical / real schedules. Ultimately, the City of Paris will publish all its data on an Open Data basis, except for personal data or data protected for security reasons. We sought to develop a data analytics policy to improve the performance of the City of Paris in line with the Smart City approach, with a particular focus on energy performance in social housing and identifying buildings at risk of fire (by cross-referencing fire brigade and social housing authority data). I would also like to launch a study of accident rates: we could identify accident hotspots by analysing data in this field and in many others. Today, it is crucial for big cities to set up genuinely cooperative policies with the public and private sectors and the world of research to cross-reference all this data.

For instance, the City of Paris has inserted an Open Data clause in all contracts with subcontractors, indicating that the data produced through these contracts will be published and made available free of charge. Without this clause, the data would belong to the operator – today an operator can no longer invoke business law to prevent release of data. It is particularly important in the transport sector, where there's a mix of public and private data. This will become increasingly common with the growth of carpooling, car-sharing and self-service bicycle and car rental services (Vélib and Autolib'), whose data we will be able to cross-reference with data from the SNCF, RATP etc.

This is how we will be able to formulate a genuine intermodal policy in the field of mobility combining cross-referenced public and private data. The report submitted to Mr. Vidalies* defines the very interesting concept of «general interest data»: I hope that French legislation will validate this concept and substantiate the need to release data, both public and private.

* Rapport sur l'ouverture des données de transport, présidé par F. Jutand, remis le 12 mars 2015

❝ Questions & Answers

Alex TAYLOR

La Fabrique de la Cité travels all over Europe. What information-sharing arrangements have you set up with other cities? How do they work?

Jean-Louis MISSIKA

We work a lot with the City of New York in the field of data-mining and we are keen to take inspiration from its initiatives. For multimodal applications for calculating itineraries, we looked at the work done by the cities of Amsterdam and Boston. Today, exchanges between cities on these themes would benefit from being better organised – for the moment they are limited to discussions during more broadly based meetings with these cities. Lastly, we are working on the possibility of integrating Big Data start-ups in our incubators.

I was recently involved in launching the Starburst start-up in the æronautics sector, which brought several companies together in our premises. France has a real competitive advantage here and should be capable of encouraging French, American and European start-ups to work together on data analytics.

Alain KERGOAT, Directeur du marketing stratégique / Director of Strategic Marketing Toshiba Systèmes France

You talked about collaboration related to energy performance in buildings. This is a sizeable challenge since buildings account for 40% of the City's energy consumption. However, it can be difficult to access some data in this field. How do you plan to collect it?

Jean-Louis MISSIKA

To begin with, we will collect data that falls within our own remit. Social housing accounts for 20% of residential units in Paris, and here we generally establish agreements with the housing authorities. I have also fought for a smart, open meter as opposed to a proprietary meter and I think we are winning this particular battle.

As Gilles Babinet indicated, the European and national regulators should support this concept of general-interest data, particularly as concerns energy consumption alongside mobility-related data.

Mounia TRAIKIA, Conseillère communautaire déléguée au Développement numérique du territoire, Communauté d'agglomération de Plaine Commune/Community Councillor in charge of Digital Development, Plaine Commune Greater Urban Area

Plaine Commune is an area covering nine towns and 500 000 inhabitants. We should work together more given that we recently launched an Open Data approach ourselves. We want to use data sharing to respond to citizen-related issues on the ground, such as mobility, particularly around the Stade de France or in the framework of the «Grand Paris» project. So, I would be very interested in any work involving collaboration and information sharing with you.

A second approach, closely linked to the first one, involves the Smart City: we have set up a digital data sharing centre and are encouraging participation by the different economic players – our region has a rich array of start-ups and big digital sector players. We will therefore be organising wide-ranging public and citizen consultation, plus consultation with elected officials, to build together the Smart City of the future in a way more specifically tailored to our situation than an approach inspired by the example of major world capitals. I hope we will continue to exchange ideas around these issues.

Jean-Louis MISSIKA

You're right: Open Data and the Smart City are at the heart of urban policy. The different services really need to work together.

Pierre MESSULAM, Directeur général de Transilien/Chief Executive Officer, Transilien, SNCF

I would also like to stress the importance of this work carried out in common with Plaine Commune, particularly the part aimed at citizens. The issue of theoretical and real schedules surfaces very often. I believe our cities will work better when we manage to persuade commuters to avoid everyone taking public transport in the same half-hour period: conditions of travel would be less stressful and we could guarantee better management of flows.

Jean-Louis MISSIKA

Your comment echœs what I called for in my presentation: we must recognise and welcome release of data as being beneficial to users and operators of public services. A building known to be an energy «sieve» can be given priority treatment, likewise a building that is particularly vulnerable to fire. The operators themselves, whether cities or transport operators, have realised that that they were not making full use of data. The City of Paris can deliver the promises of the Smart City by effectively cross-referencing the information systems of the different networks. But to do this, data has to be free and interoperable – this will be indeed the main focus of the work we need to do over the next five years.

Key take-aways

First of all, thank you for this wonderful meeting.
Your contributions made it very fruitful and interesting. I will keep it short with a few comments. First of all, having listened to you, I believe that we are at the beginning of a process, even though some cities have been at work for years already. We are perhaps not yet aware of all the opportunities and complexities that lie ahead for us.

Secondly, beyond the key issues that immediately come to mind when contemplating data-based urban management, such as energy and traffic, the range of applications is wide, as is the potential impact for communities, municipalities, governments and stakeholders in general. The third central issue lies in successfully making the shift from silo-based operations to a widespread willingness to share, then transforming the data received so that it can be transparently yet securely used by outside stakeholders.

Lastly, while thanking Abhi Nemani for attempting to answer our question about value creation, I must also apologise: my question was not the right one. So much of the value created by the Open Data movement will depend on the creativity of the stakeholders. Thus, for the time being, we cannot pinpoint it and it may well be better that way. This is not a very comfortable position for those of you who would like to set up a clear business model but I fear this is emblematic of the world ahead of us.

At La Fabrique de la Cité we will continue our work on urban data and do hope to share it with you all in the next future.

Remi DORVAL, Chairman of La Fabrique de la Cité - The City Factory

Want to know more? Read the study
"Optimising the city using data"
 www.thecityfactory.com

Get to know the Chief Data Officers

Debra Lam was appointed Chief Innovation & Performance Officer of Pittsburgh by Mayor Bill Peduto end of 2013. Prior to joining the Executive Team, Debra worked as a project manager and policy consultant at Arup, a global consulting and design firm. Debra Lam has over ten years of international experience in governance, sustainable and strategic development, policy analysis, and project management. She specialized in advising cities around the world on policy, sustainability, climate change, and low carbon issues. Her projects have included strategy work with the She was amongst the 35 high achievers awarded a place on Management Today's "35 Women Under 35" list, and a finalist for Women of the Future, Science and Technology.

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 oversaw Barack Obama's digital campaigns in 2008 and 2012. He has worked as advisor for Code for America, a nonprofit that seeks to solve the challenges facing society by encouraging technological innovation. He was previously director of software development for AOL's Digital Music Division. He has an MIT diploma in computer science.

Chicago

Boston

Los Angeles

Pittsburgh

New York

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 to serve citizens. He was previously a core member and one of the drivers behind the creation of Code for America. Abhi Nemani has a PhD in philosophy, politics and economics (PPE) from Claremont McKenna College and studied political philosophy and rhetoric at the University of Oxford.

Brett Goldstein served as Chief Data and Information Officer for Chicago between 2011 and 2014 after being appointed by Mayor Emanuel Rahm. Today he has joined the University of Chicago (Harris School of Public Policy) where he works as a researcher and developer of strategic tools revolving around urban data. Before becoming Chicago's Chief Data Officer, he worked for the start-up OpenTable, an online restaurant reservations platform. He also founded the predictive analytics unit for the Chicago Police Department. He has a master in computer science from the University of Chicago and a master in criminal justice from Suffolk University.
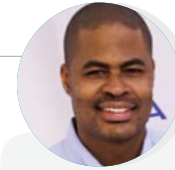
Amen Ra Mashariki was appointed Chief Analytics Officer for the New York Office of Data Analytics by Mayor Bill De Blasio in October 2014. Before taking up his current post, he was chief technology officer at the U.S. Federal Office of Personnel Management, where he developed innovative analytics tools. He started his career as a developer at Motorola. He has also directed bio-informatics research and was deputy IT director for the University of Chicago's cancer research unit. He holds a PhD in engineering from Morgan State University and a computer science master from Howard and Lincoln Universities.

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