



SMART CITY WORLD CONGRESS

SKETCHING WITH URBAN DATA

FABIEN GIRARDIN, 29.11.2011, BARCELONA

**Near Future**  
LABORATORY

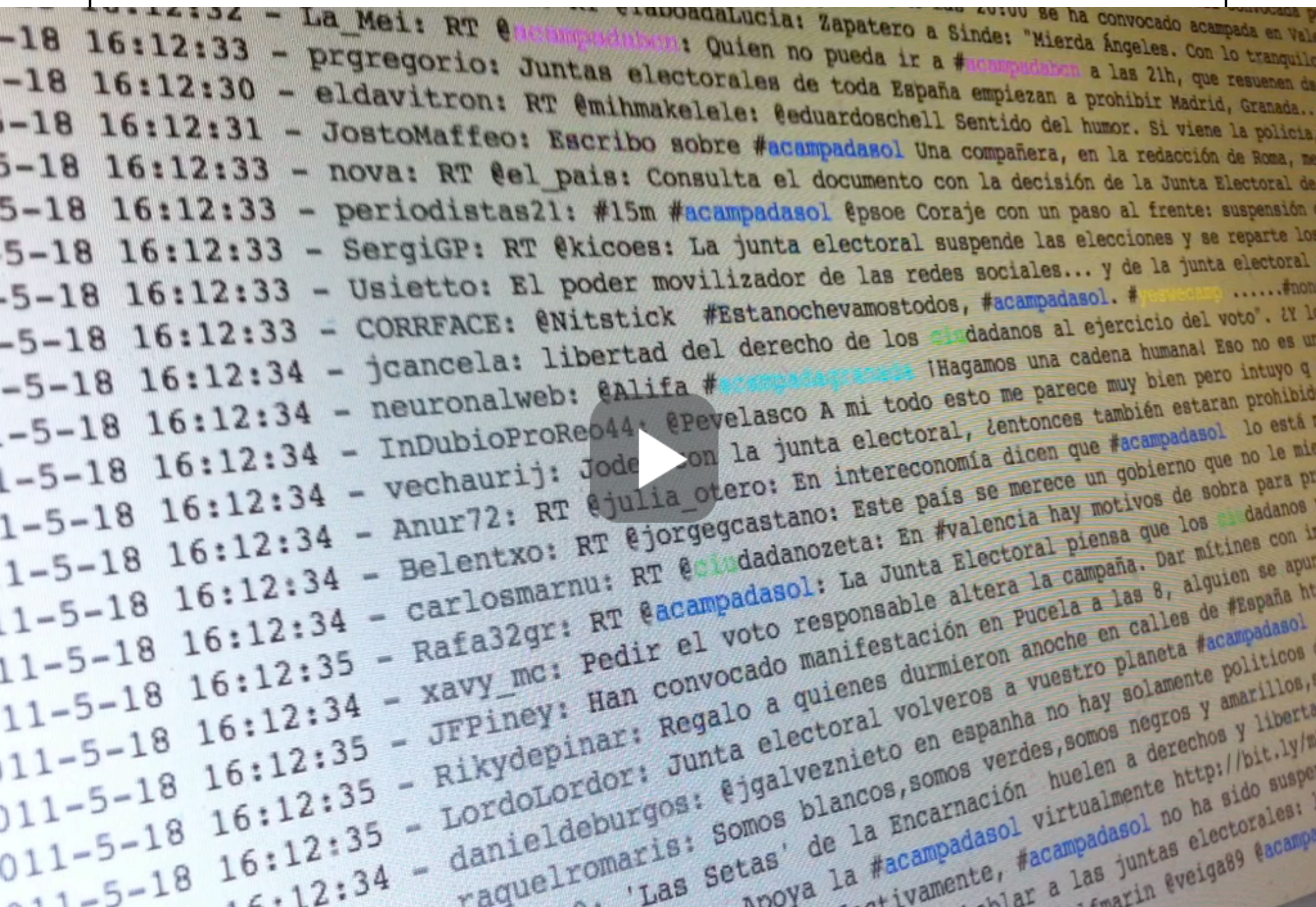
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Hello, thanks to the organizers for inviting me to this Smart City World Congress (<http://www.smartcityexpo.com/>). My name is Fabien Girardin. I am a researcher and engineer active in the domains of user experience and data science.

I practice my passion as a Partner at the Near Future Laboratory (ex Lift Lab) a think/make-tank strategically located in Geneva, Barcelona and Los Angeles. We combine insight and analysis with design and research with rapid prototyping to create potent provocative sometimes preposterous ideas into material form. We split our agenda between client projects and self-supported initiatives. Among many other lines of investigations, we are fascinated by the interplay between people, technology and the urban life.

In this short presentation I will describe you how we approach our work with our clients to materialize value form the data the \*smart\* city produces and consumes.





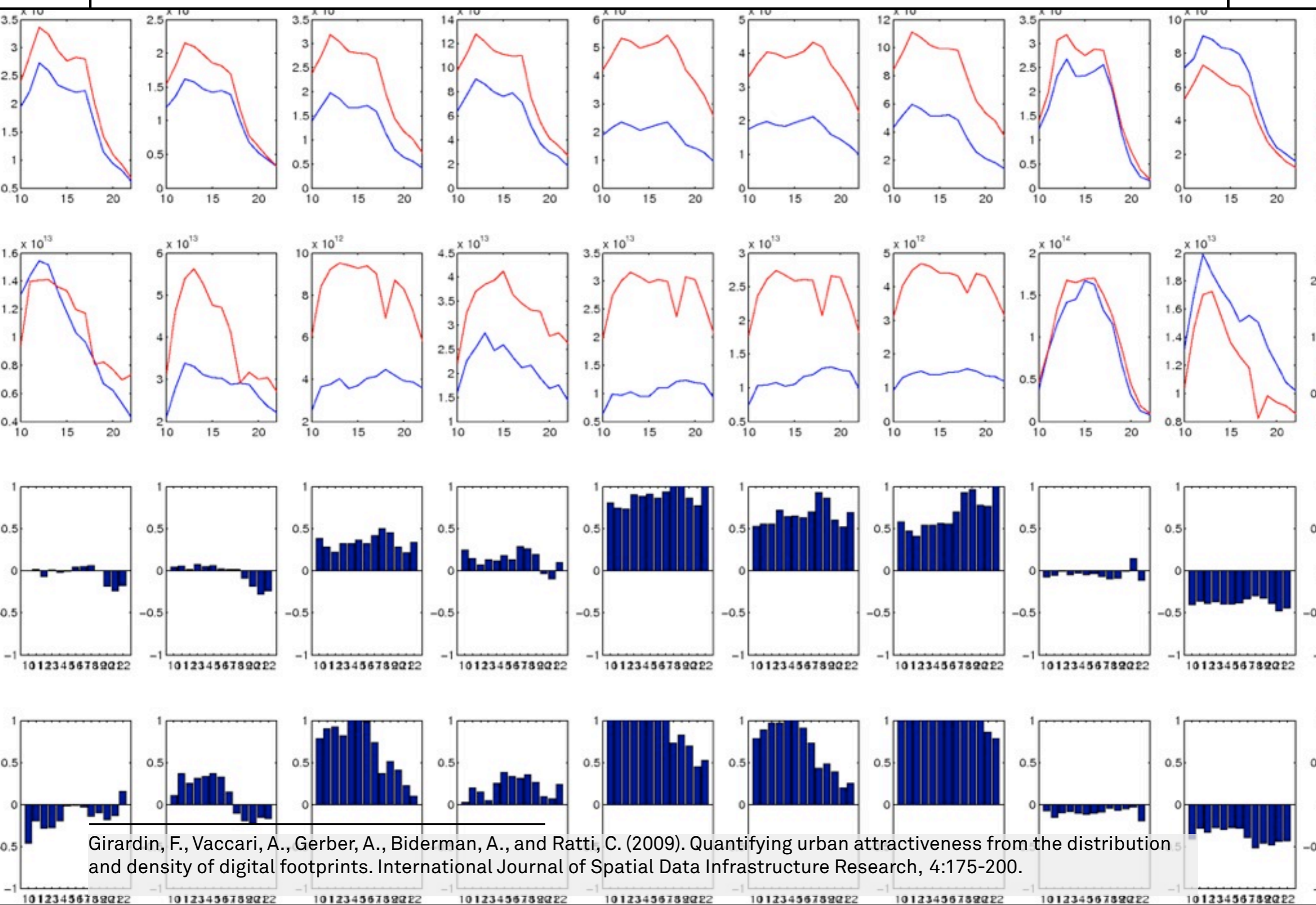
We have been active observers and contributors since the dawn of the data deluge: working on “making data work” and materializing information from pretty much anything that is networked in our cities: cellphones, cars, shared bikes, digital cameras, credit cards, ...





This materialization took the form of public installations that reveals how the city lives through its data. Here the World'Eyes project exhibited at the Design Museum in Barcelona in 2008 (<http://senseable.mit.edu/worldseyes/>). In this piece produced with the MIT SENSEable City Lab, we collected a year of photos georeferenced in Spain and publicly shared on Flickr.

This piece reveals the evolutions of the presence and flows of photographers. As photos pill up to reflect the intensity of the tourist activity, they uncover where photographers are, where they come from and what they are interested in capturing and sharing from their visit.

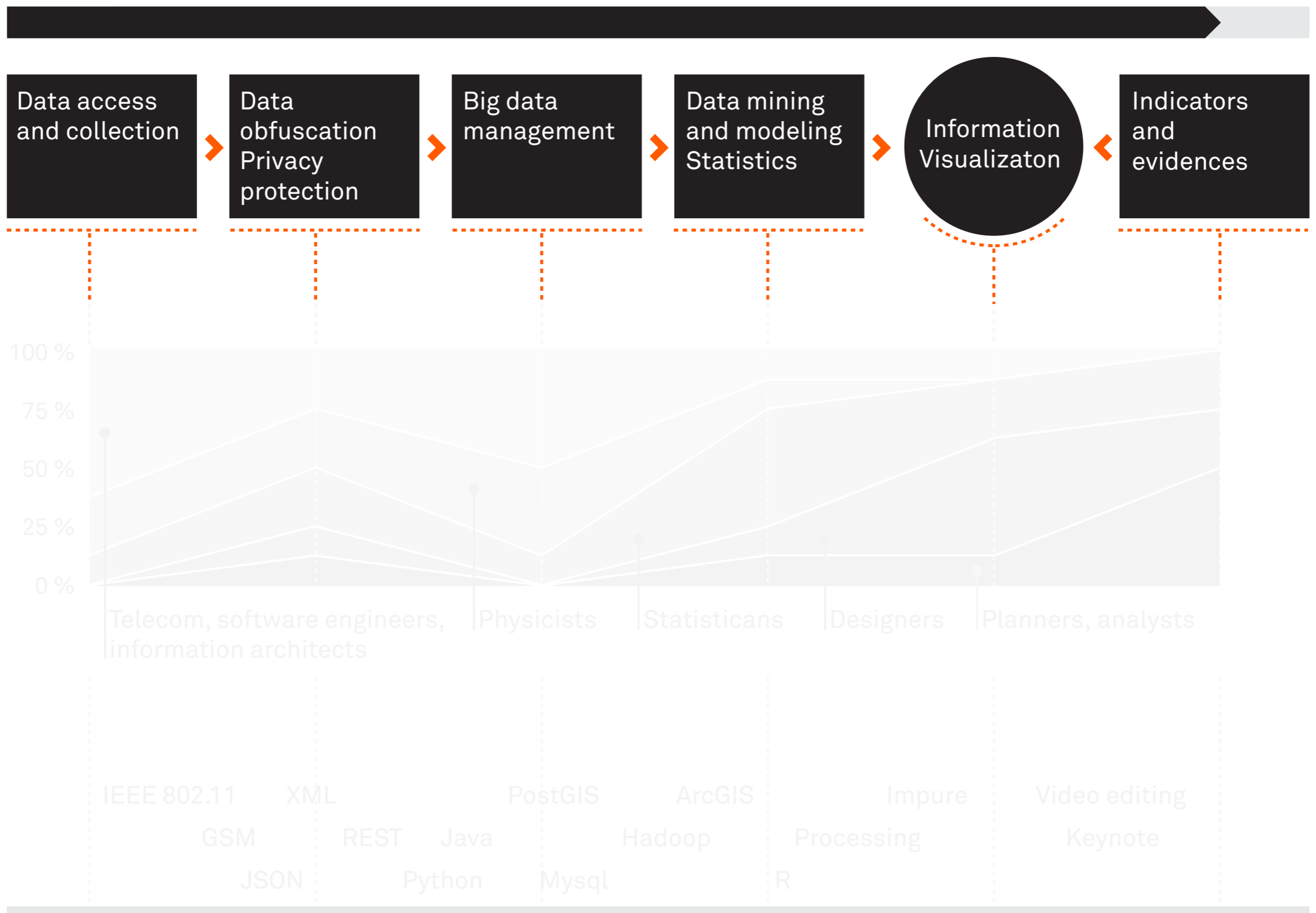


Girardin, F., Vaccari, A., Gerber, A., Biderman, A., and Ratti, C. (2009). Quantifying urban attractiveness from the distribution and density of digital footprints. *International Journal of Spatial Data Infrastructure Research*, 4:175-200.

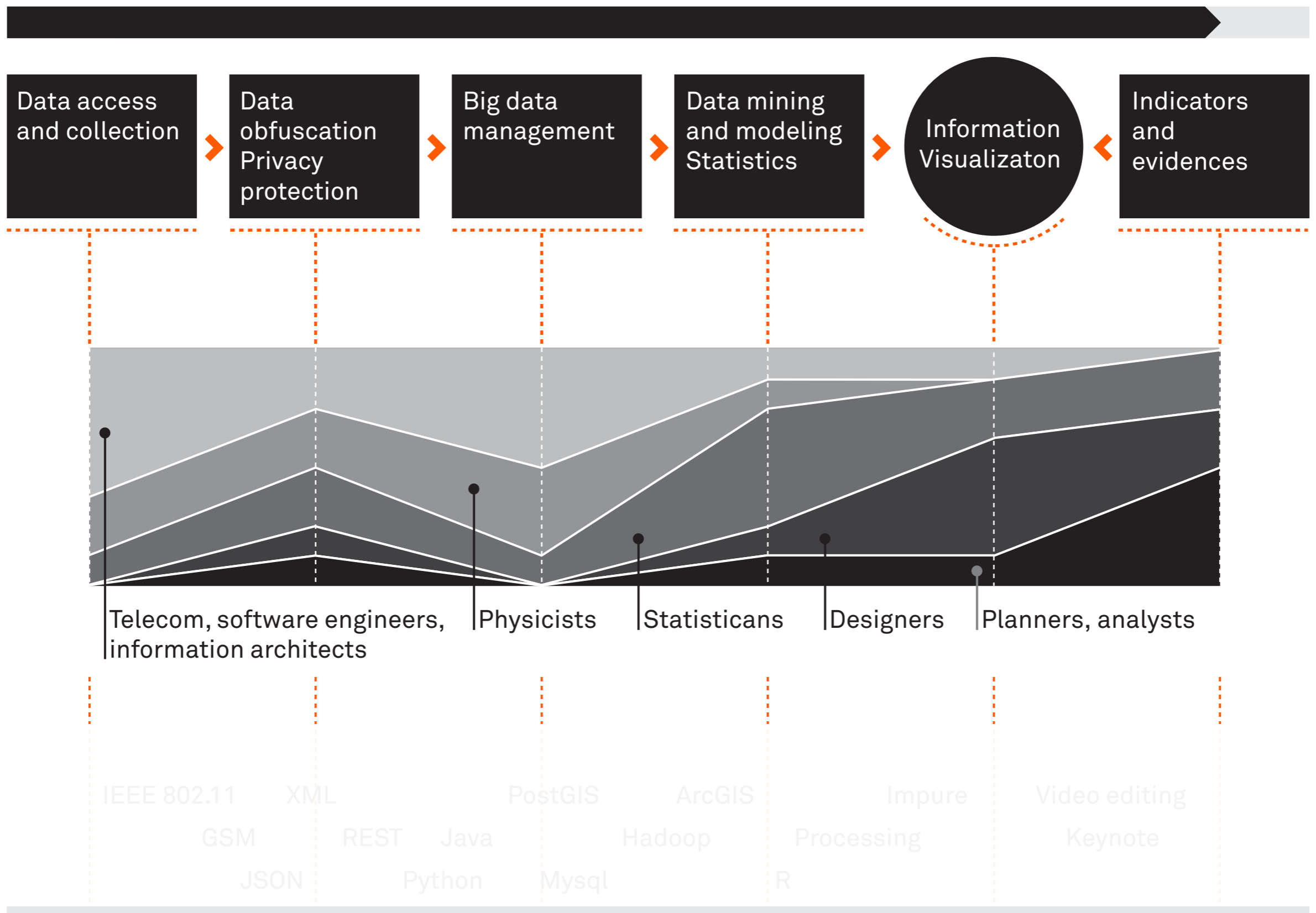
These kind of public exhibits have been very effective ways to collect feedback on some results and engage the different stakeholders of the city to participate. It is from this type of work that we could later investigate on the field in \*real-world\* settings. For instance we studied the evolution of people digital footprints as an indicators of attractiveness of urban areas (Here some raw results form the study of the attractiveness of the New York City Waterfalls pubic exhibit in 2008 - Also worked performed with the MIT SENSEable City Lab).

Girardin, F., Vaccari, A., Gerber, A., Biderman, A., and Ratti, C. (2009). Quantifying urban attractiveness from the distribution and density of digital footprints. *International Journal of Spatial Data Infrastructure Research*, 4:175-200.  
<http://ijmdir.jrc.ec.europa.eu/index.php/ijmdir/article/view/147>

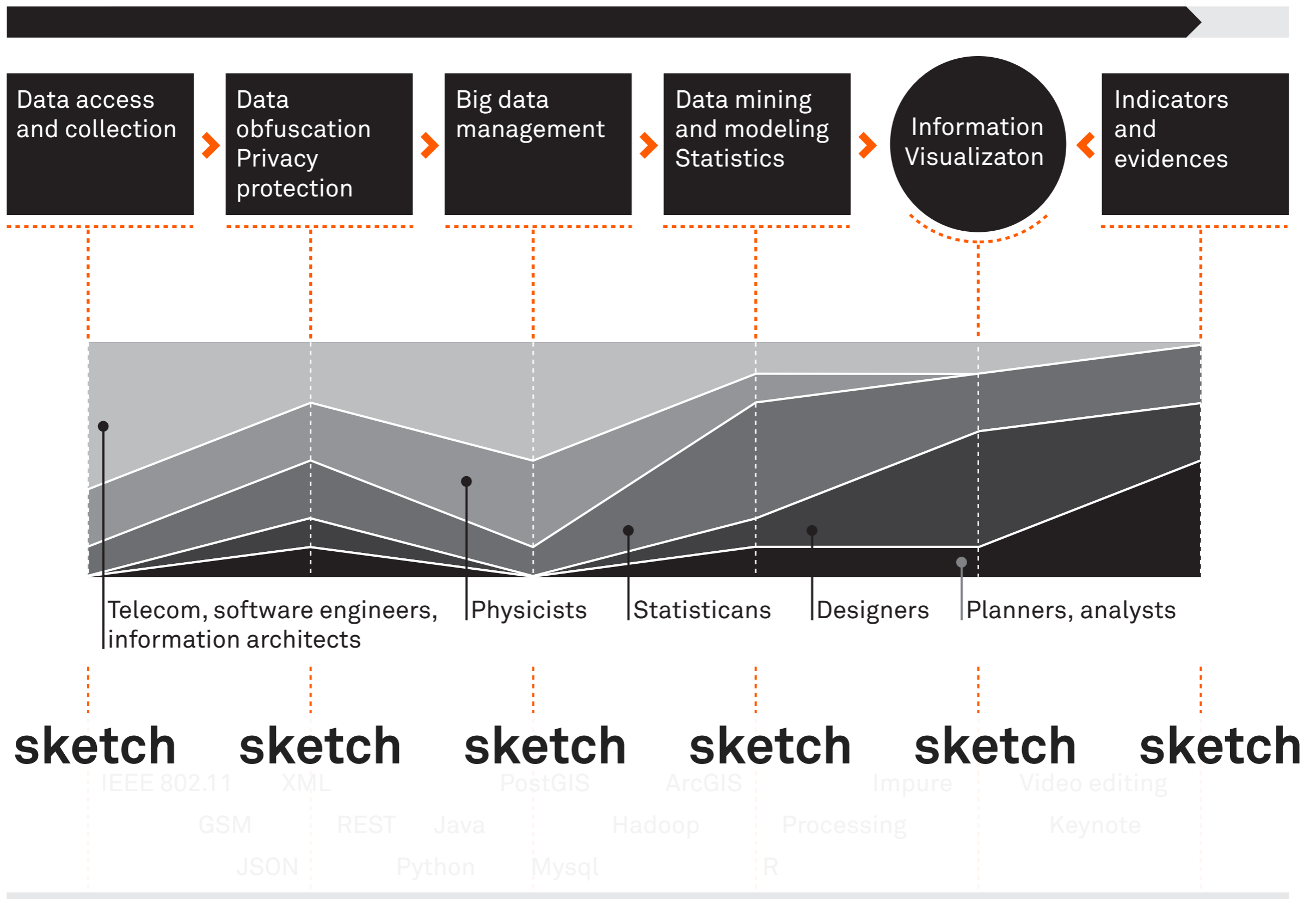




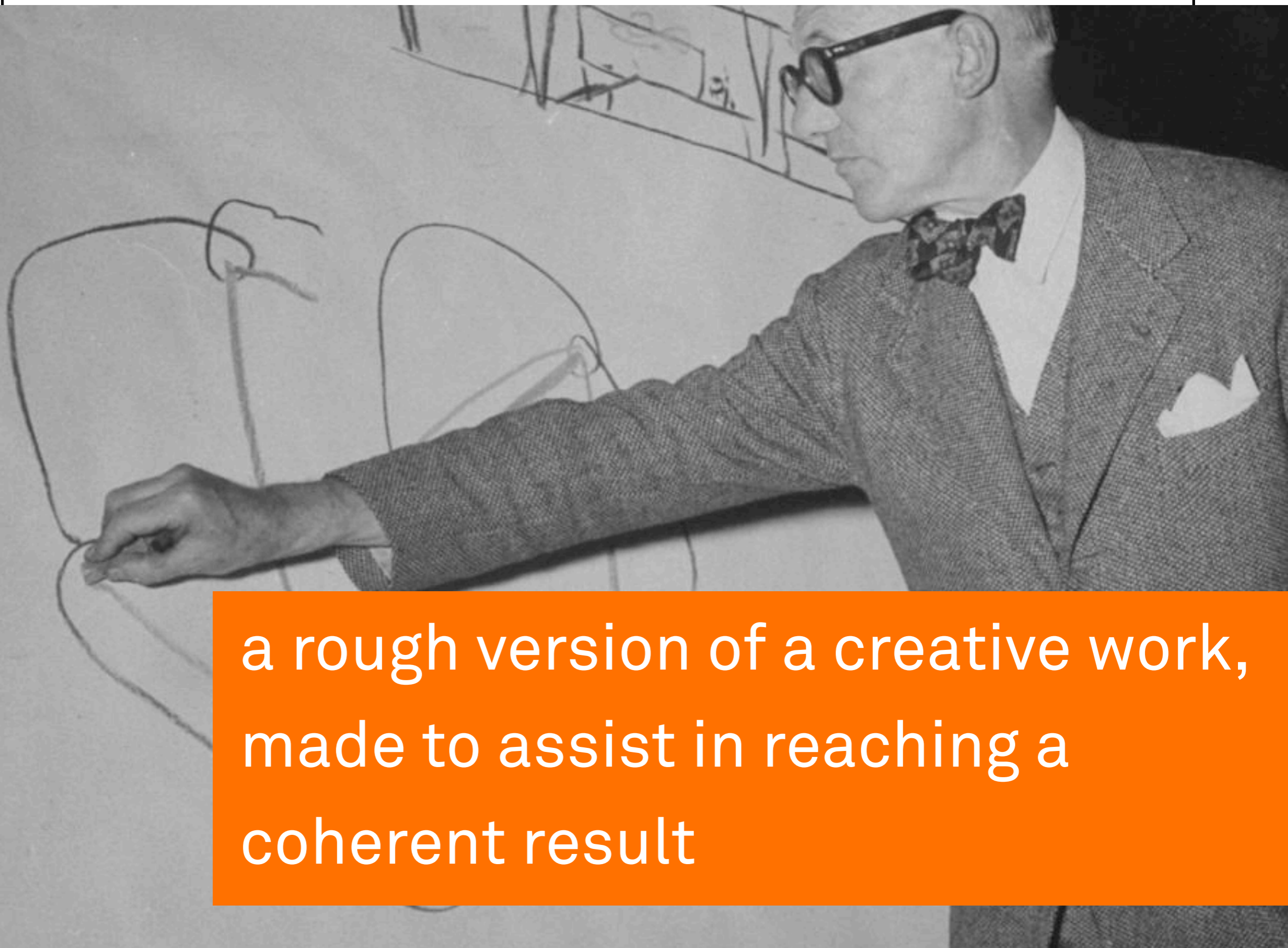
The process of innovating with urban data demands several clear steps, each with their own set of questions and answers: From the data access and collection techniques, that feed data to obfuscations algorithms and big data management systems that are interrogated by basic data mining operation or advanced statistical inquiries. Information visualization techniques are then used to build evidences and indicators used to interrogate further the data.



The process involves multiple practices and skills from engineering, to statistics, design, strategy planning, product management and law.



We have accompanied clients (and ourselves) along that often uncertain innovation process. Our experience has led us to use sketches with the data at hand at each steps. We use this sketches to answered some questions that generate new interrogations for the next phase.



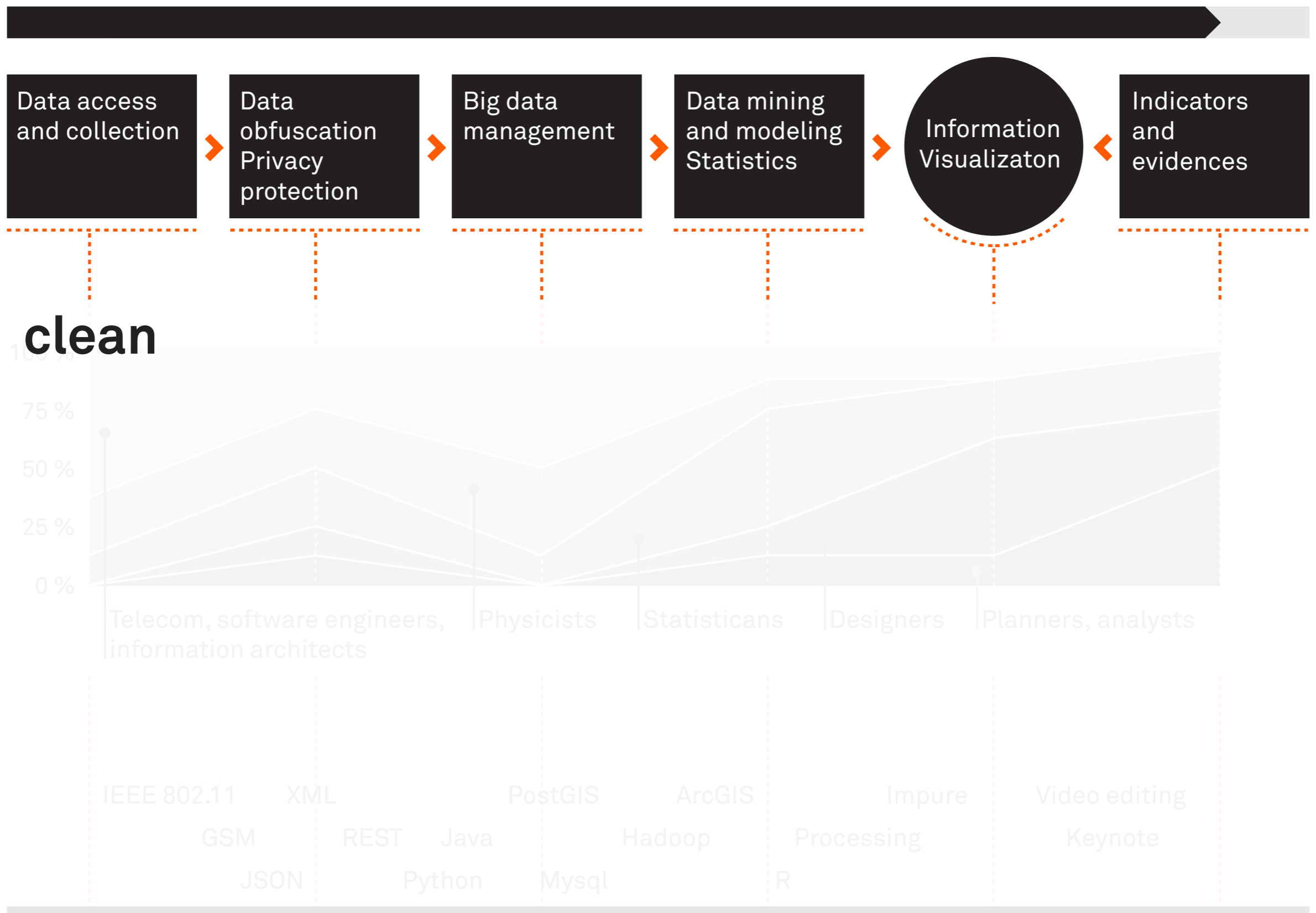
a rough version of a creative work,  
made to assist in reaching a  
coherent result

Sketching is not an odd practice as part of a creative activity, for instance in drawing, painting and architecture (here Le Corbusier) all related to visualization and communication.

“Through visual artifacts, architects can transform, manipulate, and develop architectural concepts in anticipation of future construction. It may, in fact, be through this alteration that architectural ideas find form”

Reference: Architect's Drawings: A selection of sketches by world famous architects through history by Kendra Schank.





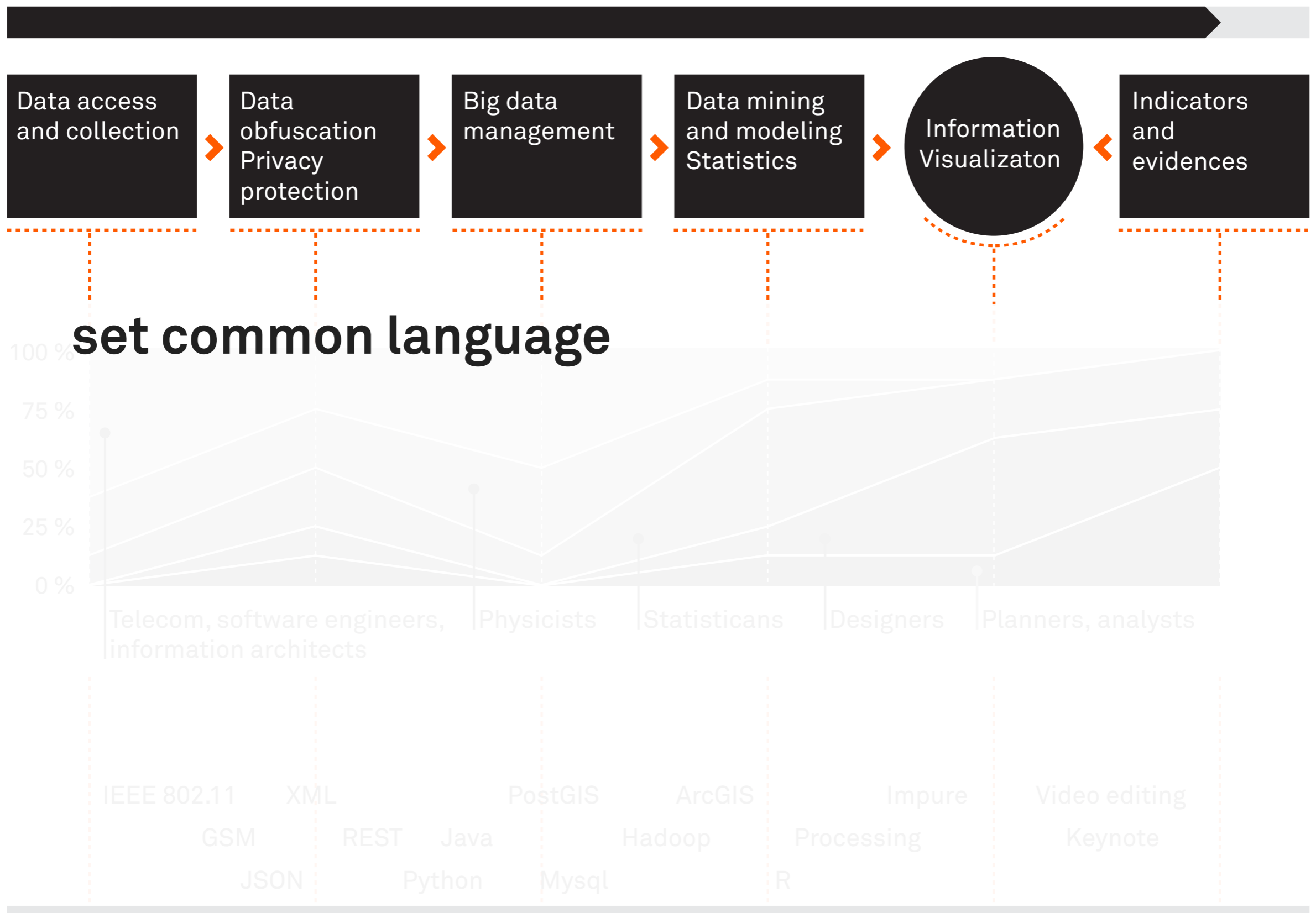
And here are some application of sketches. First to help clean the data as part of the data collection process.



## Data scientists and amateurs

Currently particularly relevant to \*data scientists\* and the amateurs who for instance develop with open data with uneven quality. Here the example of the plot of raw social media activity in Barcelona with the indication of issues on the collected material.





Sketching a visualization is helpful to set a common language among the different actors of the project on what the data really is and how it can be used





Mobile operator product managers and engineers

City of Geneva 2011

This is an example of a sketch used in a project for a mobile phone operator that involved a mix product managers and engineers. This map was used to explain the structure of the data (here related to the infrastructure of a network) and the type of information that could be extracted (here mobility and density of the a sample)



## City political and administrative authorities

City of Geneva 2011

Within the same project, we use the same technique to engage political and administrative authorities in the project by revealing the city (here Geneva) through the angle of its digital activity.



Sketches are key to qualify first results when measures and patterns are emerging.

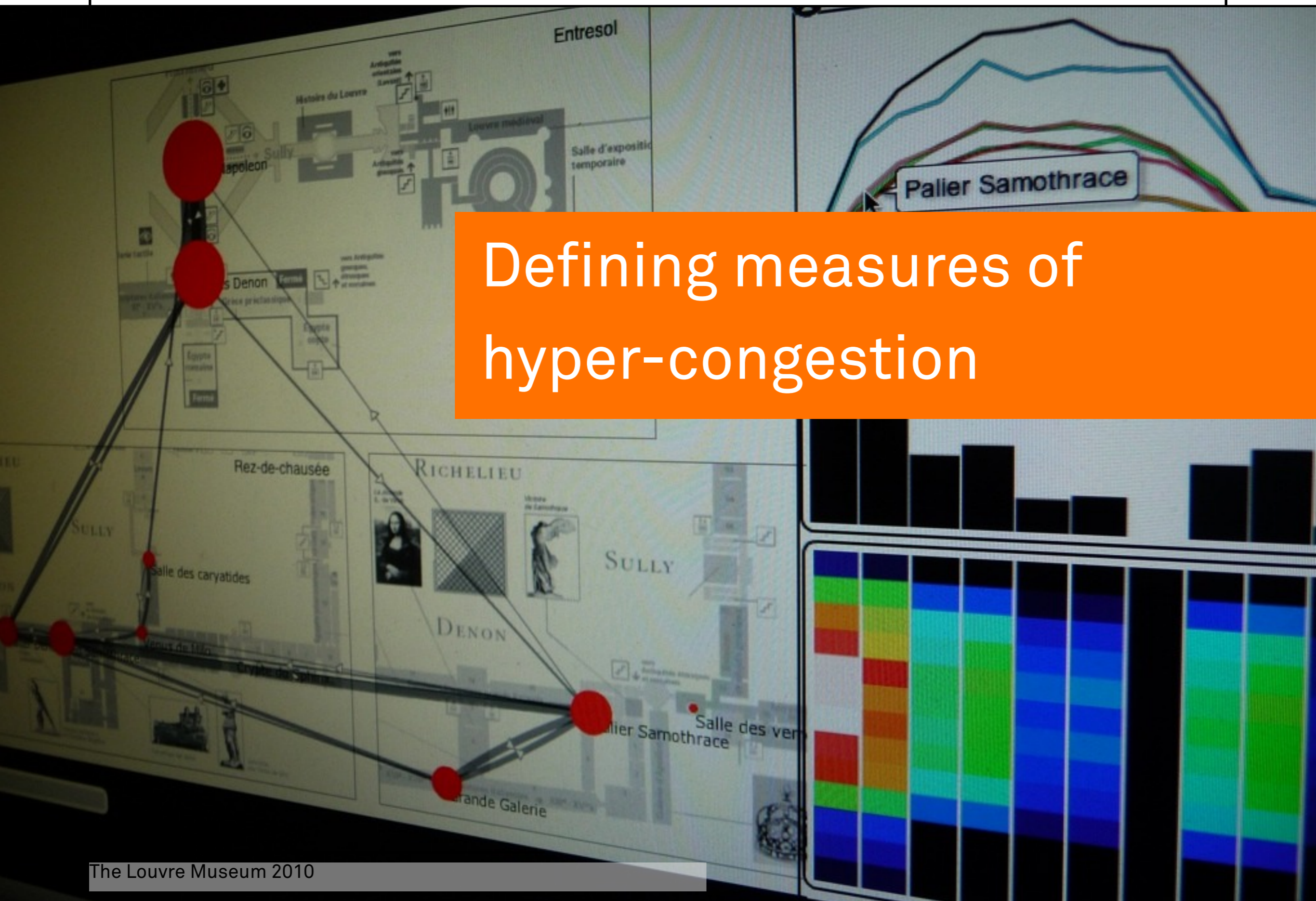


## Post-occupancy evaluations of the built environment

The Louvre Museum 2010 (in collaboration with BitCarrier)

In this example we were asked by the Louvre Museum to help them understand how, where and when hyper-congestion of the space affected the experience of the visitors. Our investigation was based on audits of key areas of the museum with sensors that measured that presence of visitors.





Defining measures of hyper-congestion

The Louvre Museum 2010

Based on the sensor data we extracted information on the visiting sequences, travel times and staying times of visitors to rapidly sketch indicators that helped us detected areas suffering from recurrent symptoms of hyper-congestion.

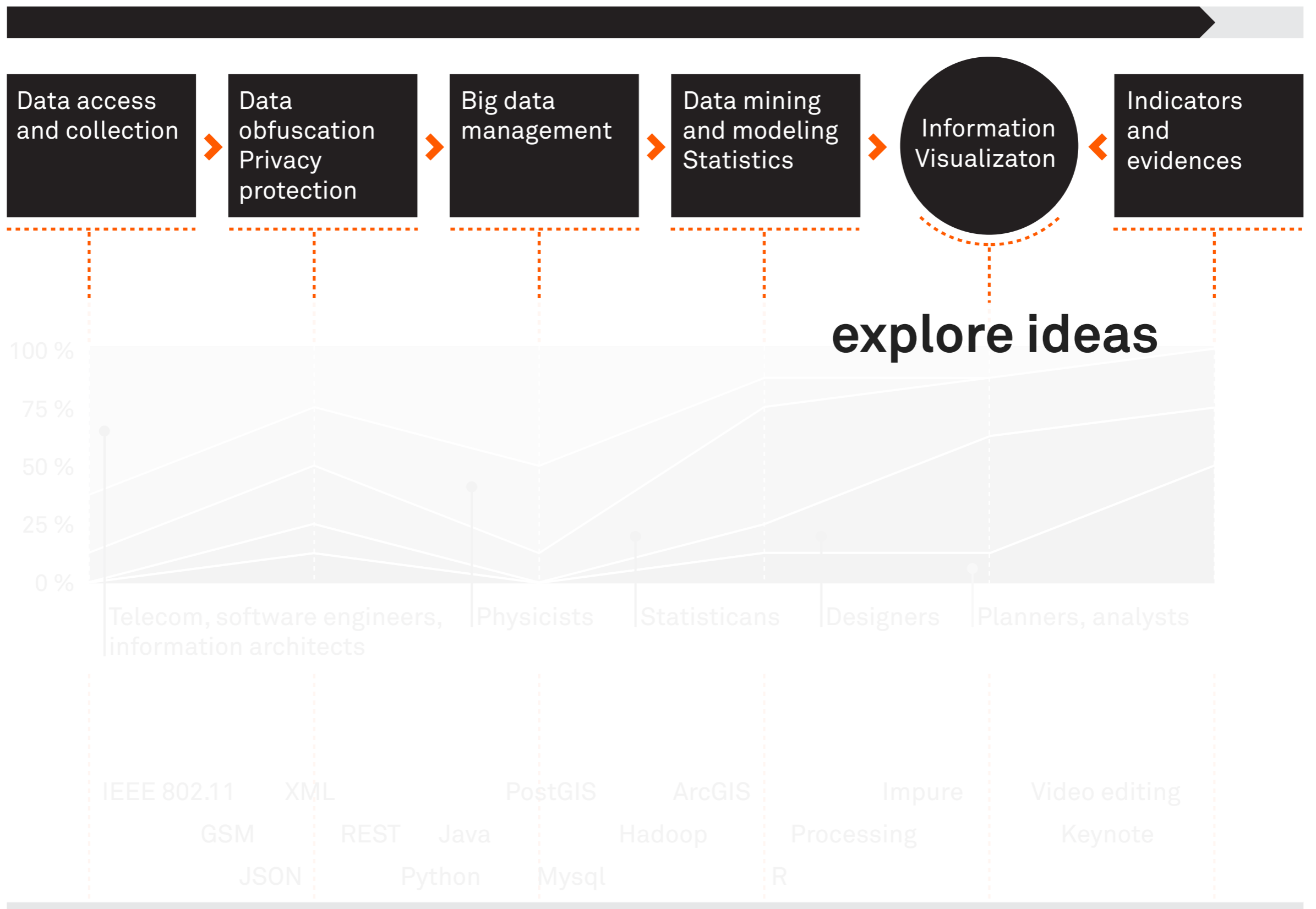




People on the field have the experience to help contextualize the data and early results

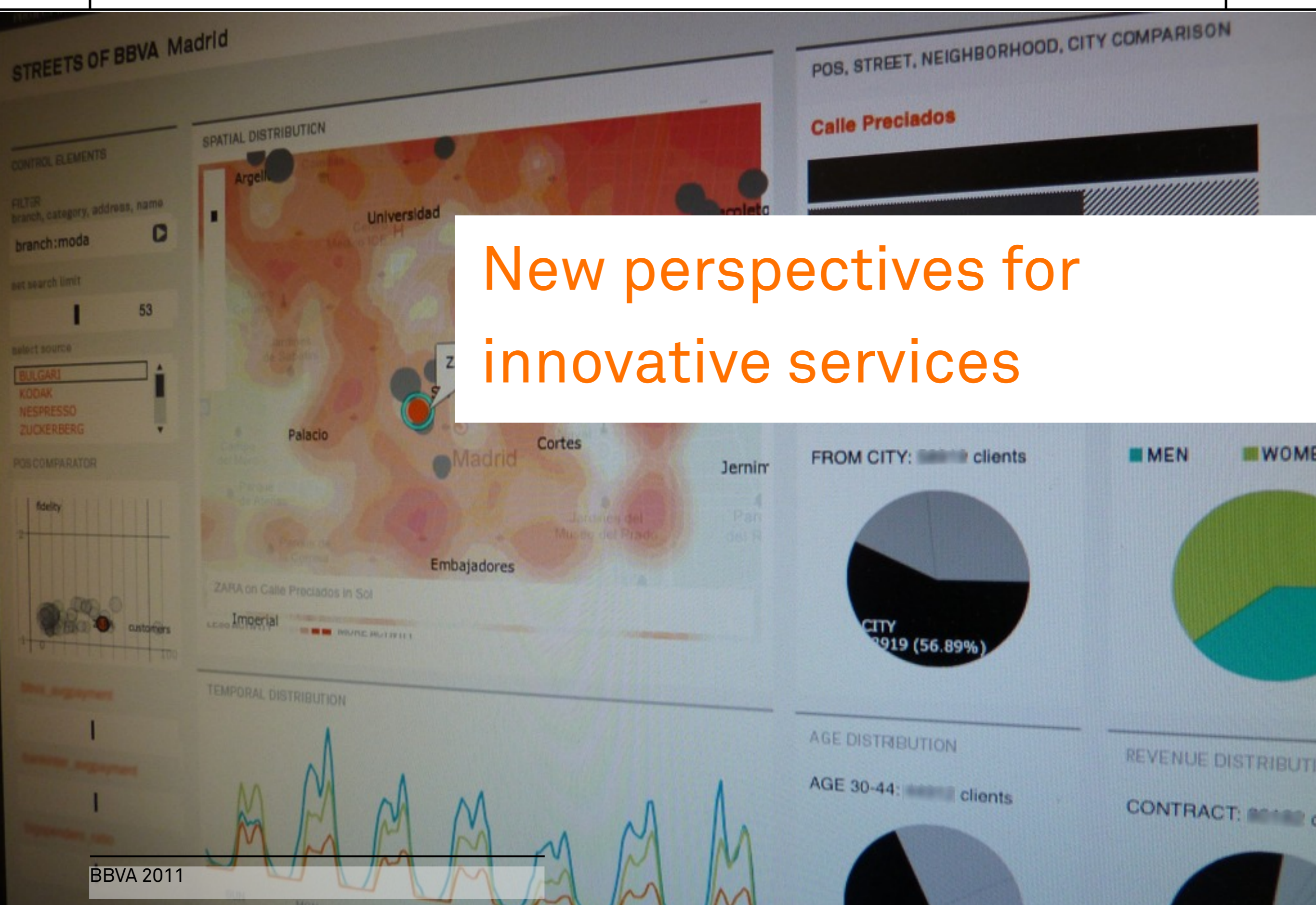
The Louvre Museum 2010

We confronted our measures and indicators to people on the field. Their \*qualitative evidences\* they helped contextualize and qualify the early results as well as explain the detected irregularities.



As in painting and drawing, sketching is used to explore ideas



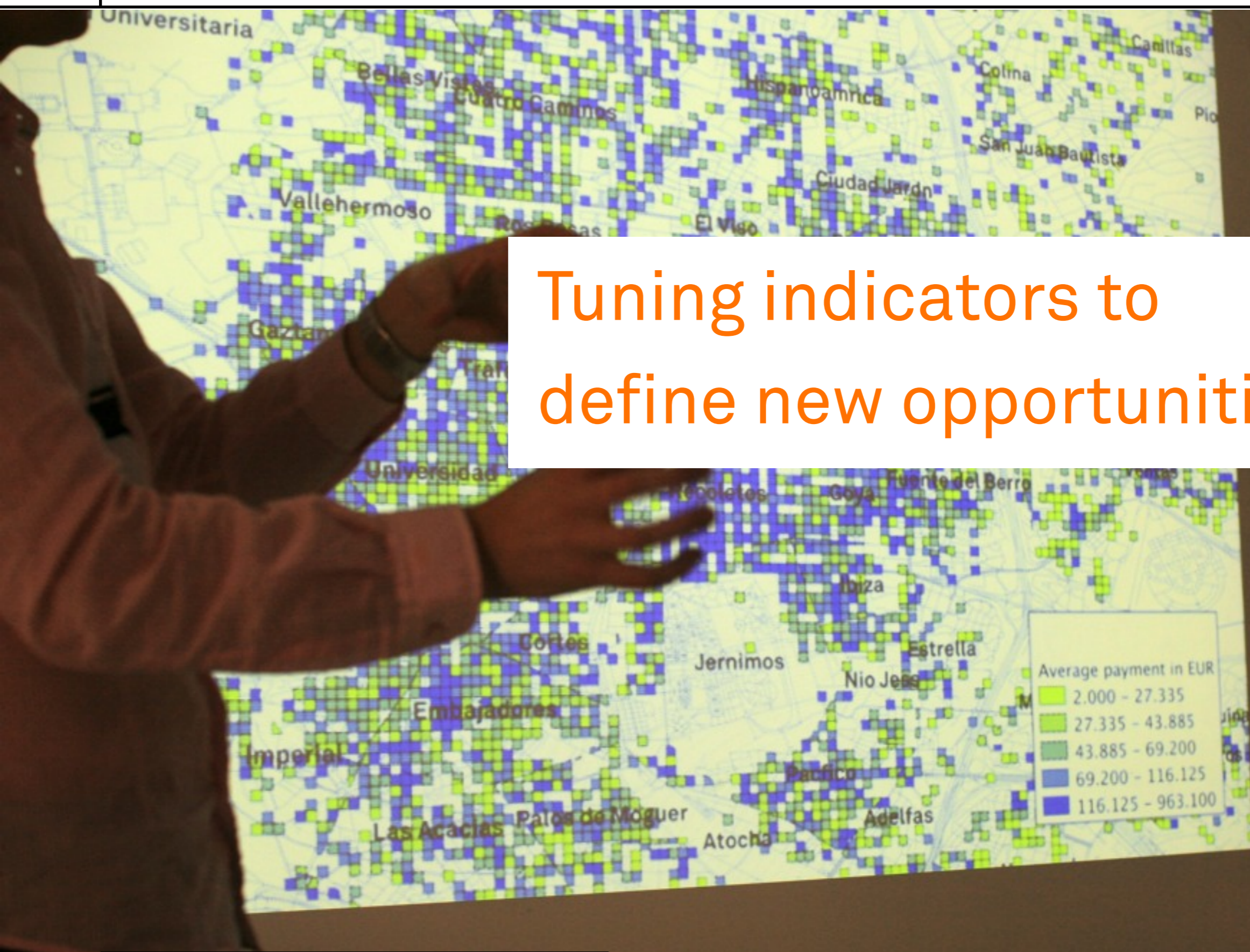


New perspectives for innovative services

BBVA 2011

For instance we have been exploring of the new roles of a retail bank in the smart city. Our contribution took the form of a fairly advanced sketched dashboard for members of the working group to explore and interrogate their data with fresh perspectives. (here aggregated credit card activity in Madrid)





Tuning indicators to define new opportunities

The use of the dashboard helped the participants craft and tune indicators that qualify the space (e.g. the streets of a city) based on its business activity. This experience was used to develop scenarios of exploitation of the data.

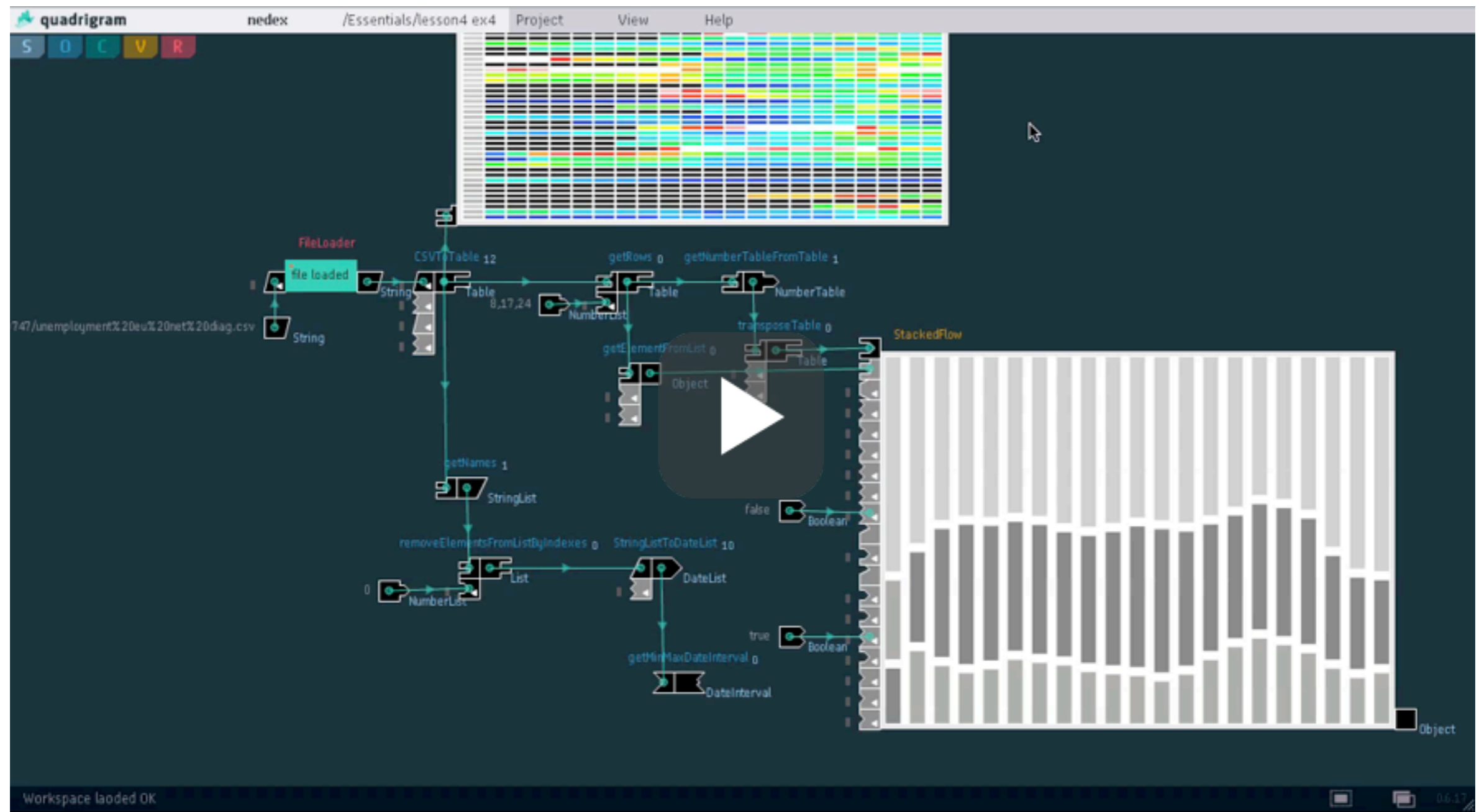




Tools built to find the questions  
that find the answers

The practice of sketching comes with a proper set of tools. The types of tools built to find the questions that find the answers. The types of tools with the same approach that led to the production of “Photo 51”, the 1953 X-ray diffraction photograph of a DNA molecule. This photo by researcher Rosalind Franklin, is the critical data which directly informed the first chemical model of DNA by James D. Watson and Francis Crick.





At our more humble level, the investigation I presented today has been developed using a unique tools to access, analyze and visualize information called Quadrigram developed here in Barcelona by Bestiario. It is based on a visual programming language that support the development of *live* data flows. We started using it as alpha testers. Our experience with Quadrigram has changed our practice of *making data work* to the point that we are now acting as strategic advisors.





**info@quadrigram.com**

Quadrigram is currently in private beta but do not hesitate in contacting [info@quadrigram.com](mailto:info@quadrigram.com) if you have big data... that means big questions and big answers.



**Cities are major sources and exploiters of big data.**

**We need better ideas of what this living material means.**

**Multiple actors and objectives along the innovation process.**

**New tools to embrace this evolution - try Quadrigram!**



MERCI GRACIAS **THANK YOU** DANKE GRAZIE



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