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EXTERNAL INSTITUTIONS

Comune di Milano
AMAT
Cefriel
a2a Smart City

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SMART CITY DIVA

Executive summary

Smart City DiVA is the project that led to the design and implementation of a dashboard for the city of Milan. City dashboards are among the digital tools that try to handle the complexity of smart cities, by displaying indicators about the urban performance and aiding people that are accountable for it, namely the Municipality and its cooperators, making the most profitable choices for the city's wellbeing. In order to answer to the needs of our target (made by decision-makers and citizens) we developed two different platforms cooperating together: the first one is the actual dashboard that, together with visualizing the datasets, could also set up a forecast based on the available data, in order to provide support both for short term and long term decisions. The second platform is a mobile app, designed specially for citizens, that makes them create their "personal" dashboard, setting which kind of real time updates they want to receive about Milan's transportations, services, events and so forth.
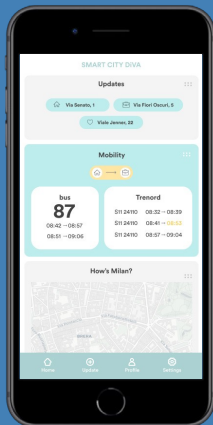
Key Words

dashboard, prediction, visualization, e-government, communication
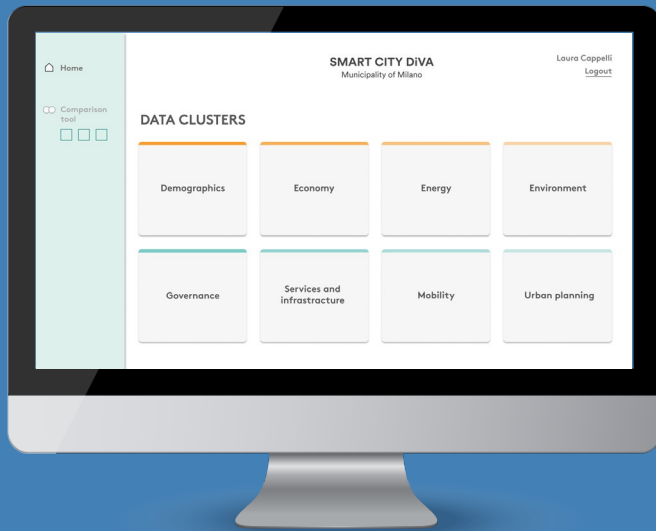
Smart City DiVA website allowing decision makers to monitor meaningful indi- cators and visual models describing the city perfor- mance, in order to act accordingly.

Smart City DiVA app allowing citizens to receive useful information about the city in real time, and get updates about the topics they care more about.

Project description written by the Principal Academic Tutor

The development of user interfaces in form of dashboards is becoming an emerging topic all around the world with the spreading of Smar City initiatives that promote pervasive data collection activities but did not show, yet, to be able to contribute to structured decision making processes, either top-down or bottom-up.The design of dashboards is a complex task due the cross-sectional skills required and to the heterogeneity of data sources. Competencies in data analytics, data visualization and communication, and web user interface design need to be integrated and applied for specific objectives including energy, environment, economics, transportation, buildings, etc. Smart City DiVA tried to face this contemporary and interesting challenge, developing a prototype of dashboard/platform built around the characteristics and the needs of Milano, one of the European cities at the forefront of the smart city initiatives. Data availability, privacy, quality and management issues have been encountered and overcome, as well as communication obstacle with public authorities and citizens about topics that are crucial for the city management but that imply many issues. The project required a high level of multi- and interdisciplinarity and forced the team members to continuously challenge themselves to interpret, understand, and propose innovative solutions for a nascent field of investigation and development.

Team description by skills

The team was made up by:
-Tommaso Bianchi (Computer Science Engineering)
-Laura Cappelli (Digital & Interaction Design)
-Paolo Colusso (Mathematical Engineering)
-Andrea Guzzetti (Architecture Built Environment Interiors)
-Valerio Volpe (Mathematical Engineering)

On the basis of the critical review and of the background of the people involved in the project, the team was organized in distinct groups in order to examine in depth the topic and to find innovative and better ways to deal with data analytics methodologies, API process and reuse, user interface design, KPIs definition, etc. Basically, two groups were created one for the data analytics part and one for the data visualization and user interface design part.

Goal

The ultimate purpouse of the project is providing Milan with a city dashboard, a platform aiding data visualization and analysis to monitor the city's current situation, analyse its past performance, and predict what could be the possible consequences of the Municipality's actions. Moreover, this tool could become an effective channel bridging the gap between the Municipality and citizens that, given the changes the city is undergoing, must be kept informed and always questioned about their needs.

Understanding the problem

The first step we took was trying to understand how other cities approached a dashboard design process. We started by analysing other dashboards, both from Italian and foreign cities, in order to map which categories of information they displayed in the first place. We then compared these clusters of information with the current categories displayed on Open Data Milano, the main dataset source we had at hand. From this comparison, we built the first draft of the website structure, dividing the information in eight categories (Demographics, Economy, Energy, Environment, Governance, Services and Infrastructure, Mobility, and Urban planning). Afterwards, we carried out a usability analysis of three examples (Amsterdam, Florence, and Dublin). We focussed on these three dashboards because many of their characteristics are reflected in the majority of the other examples. That's why we go as far as to say that most of the dashboards we saw have usability issues of some sort: they basically focus on technical efficiency, and on including as much data sources as possible, without verifying the actual usefulness of such information. Moreover, the dashboards we analysed were developed by teams with a single set of skills (computer scientists, geographers, architects...) and, given the complexity of such a platform, a multidisciplinary approach, like the one proposed by ASP, could be more effective. Therefore we agreed upon opposing the top-down approach proposed by other dashboards and embrace a bottom-up approach, with greater attention to users' needs, the only force that must shape the dashboard.
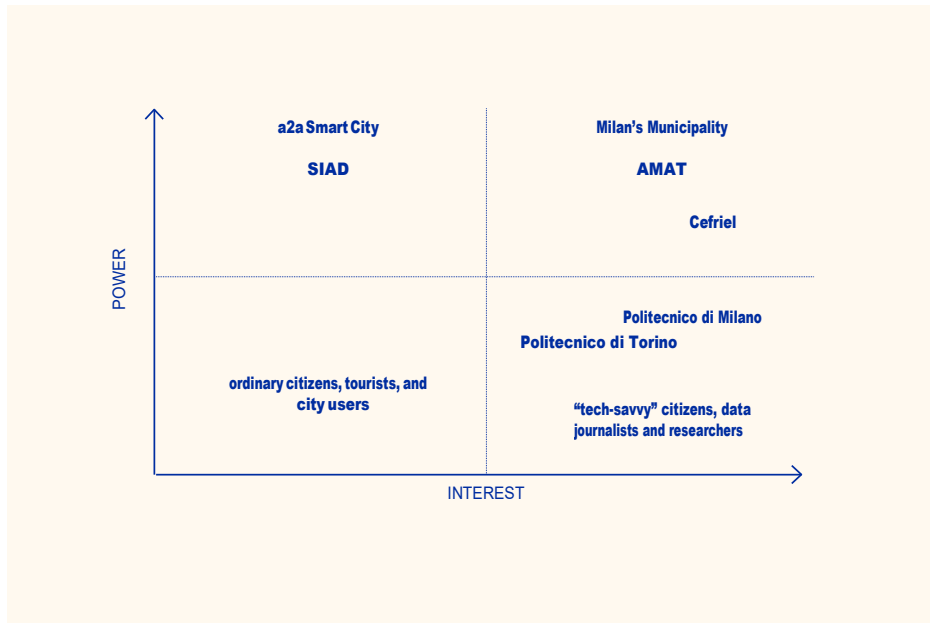
The project's stakeholders map
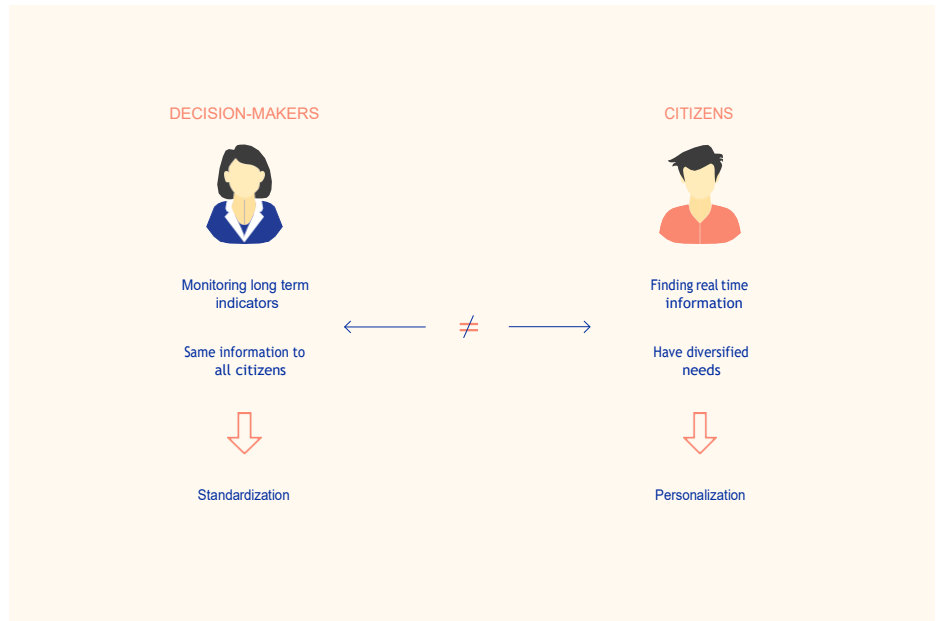
A summary of the users' needs

Exploring Opportunities

Before going any further into the project development, we really needed to have a clear idea about the target's needs. The user analysis was possibly the most insightful phase of the whole process, since nothing compares to the confrontation with users when in need of ideas and inputs. We carried out interviews with the decision-makers while we involved citizens through interviews and an online survey.
In this way, we understood that the decision-makers' needs were far removed from the citizens': the Municipality needs to look at performance indicators, based on a long-time perspective, and that's what they want to communicate to citizens, in order to show the improvements they worked on. On the other hand, citizens are more drawn towards real time information, that they look for in order to live the city in the current moment.

Generating a solution

At this point, we started shaping the solution based on the users' needs: we gradually understood that one platform was not enough to answer to all the requirements we set up to respect. We opted for an integrated solution made by two platforms (a web app and a mobile app) working together and connecting the two ends of the target, decision-makers and citizens.-The web platform is mainly targeted at decision-makers, that here can visualize the datasets they dispose of and use them to support decision making;-On the other hand, the app will provide citizens with real time information, displayed on a customized dashboard based on E015 APIs.

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