From Data to Decisions

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ABSTRACT
A revolution over the open data approach has gained importance over the last decade. This revolution is based on the information and communication technology and has been catalyzed by open government directives that have emerged. In this paper we present preliminary results of our approach based on dashboards showing selected open government data as a key element for trends visualization, prediction evaluation and decision support.

CCS Concepts
• Applied computing~E-government

Keywords
Democracy 2.0; Transparency; Open Data; Dashboards

1. INTRODUCTION
One can observe a shifting in the position of public administrations. Kaschesy et al. pointed out that data consumption may face several gaps if useful data is not made available and usable [1]. Haering has developed a process to identify global challenges Switzerland will face in this context. These challenges impact decision makers who are expected to take right actions at the right time [2]. There is a need for new forms of cooperation between science, civil society and policy makers to address these challenges and move from silos to inter-institutions reflections. Decisions based on participation tend to be more durable. Thus given its position as the connector between politics and the citizen, the government is supposed to serve with a participatory approach. Nowadays, Swiss public administrations do not make full use of data power in order to enhance their communication services and their strategy of transparency towards the citizens. Our project aims at making the public administration's data available and easily accessible and reusable. This paper addresses two issues: the data transparency and openness on one hand and the data visualization and valorization on the other hand.

2. RELATED WORK
The concept of transparency has emerged in recent decades as a necessity to counter the organizational and individual aberrations. In their paper [3], Pasquier et al. established a typology of behavior of organizations with respect to transparency requirements. It concludes that to achieve transparency a profound cultural change is to operate within government. To support this vision of transparency, the measures taken by governments worldwide is to create an "Open Data" policy. Open Data is a concept in which information can be freely used, reused and distributed by anyone, provided the source is acknowledged and information rebroadcast under the same license. According to [4] the issues of re-use of public data are various: political (transparency, modernization), economic (value estimated at 140 million Euro per year) and legal (copyright, personal data). Another challenge for the Swiss municipalities is the cost of open data: search and identification of reusable data, cleaning and processing, as well as the cost of developing a portal of publications, human resources and financial resources to get there. Several types of data can be reused and published in a public administration such as administrative documents (minutes of meetings, permits, discussions, etc.) the geographical data (maps, land registers, etc.), financial information (budgets, statistics, subsidies etc.) or even the analyzes that have been made to these common (e.g. Energetic dashboards). The main players in the Open Data are data producers, re-users and consumers. In addition, for an open data set to be useful and reusable it should be as exhaustive as possible, basic (raw with minimal aggregation), up-to-date, accessible, usable, non-discriminatory, non-proprietary and free for usage. Among other open data platform we can list: CKAN, free platform to make accessible the data by providing tools to organize the publication, sharing, research or reuse of data; DataHub, based on CKAN, it is used to share the Linked Open Data datasets. Examples of open government data platforms are cited: United States, United Kingdom, and Switzerland.

A successful case of use for decision-making at Procter & Gamble was presented in [5]. "Decision Cockpit" is "the only source of truth" at P&G. As described in [6], a dashboard is information visualization consolidated on a single screen, to monitor information and make instant and informed decisions.

3. PRELIMINARY RESULT
We propose to make use of dashboards allowing different stakeholders to share the same picture of the situation. This sharing will facilitate the dialogue between the different political parties and it will help the convergence of objectives. In a first phase these dashboards will be available at public administration to target only the efficiency of internal operations. The actors of these public bodies could then decide to include, for example, these dashboards in the reports presented to legislative bodies. In a third step, data and dashboards could be offered to citizens before meetings so that they can take full knowledge and better prepare their questions. In a later stage, the citizens would have the means to contribute to the political implementation by taking advantage of the open data in order to propose open innovation services. In our project we work with a set of public administration, which play the role of pilot administrations, and we adopted a methodology consisting of the following phases: Context Analysis, Data Cleaning and Aggregation, Data Validation and Analysis, Data Visualization and Interaction and Global Validation.

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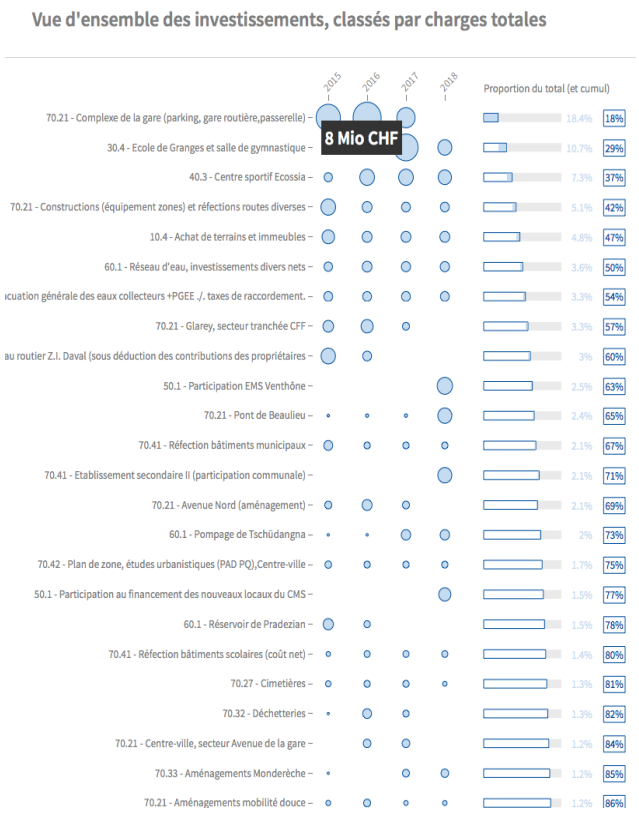

Figure 1. Example of an interactive investment dashboard

A first study has been conducted over public administrations in the domains of finance and energy. A set of different questions was addressed to the public administration and data was collected from different public administration. A first set of dashboards was designed by combining energetic and financial data revealing hence an overview of the energetic status of the administration. In a glance, the dashboards allowed the identification of the large consumers, the most expensive resources and their evolution over time. Another set of interactive dashboards was dedicated to offer an insight over the planned investments of the administration. Each bubble in the Figure 1 shows the estimated annual investment for the heading concerned. The surface of the bubbles is proportional to the amount of charges. To the right of each section is shown the proportion of total investment expenses that form this section (light blue rectangle and figure), and the combination thereof with the proportions of the above headings (box figure and dark blue). For example, the sixth line of the table in Fig. 1 shows that the investment '60 .1 Réseau d'eau' represents 3.6% of the total investment. However, combining it with previous (above) investments, they represent together 50% of the planned investments. Investments are sorted in descending order, we can identify at a glance the parts of the total represented by the largest investments.

From a technical point of view, the dashboards have been realized either with Knime/Birt or with D3.js. It has been realized over two steps: Automatic Data Analysis and Data Mashup and Rendering. In the case of the energetic dashboard, data involving water or energy (electricity, gas and fuel) were extracted from the annual account (given in xls and csv formats) with KNIME and given as input to render the dashboards.

The dashboards were presented to stakeholders and decision makers in the administrations. They reported informally that the dashboards helped enhancing their comprehension of critical issues. Therefore, they have the potential of positively influencing the decision making process.

4. CONCLUSION

Our project promotes the use of public administration's data in order to show the benefits of making it available and easily accessible and reusable. Informal evidence collected during interviews with stakeholders hint at the utility of dashboards based on mined data in the public decisions making process. However, we also noticed clear political and technical difficulties to access and use relevant data. This also prevents the widespread use of operational tools that public administrations could use everyday for monitoring and driving their decisions.

5. REFERENCES

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