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Open Government Data Implementation Evaluation

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Abstract

This paper analyses the implementation of the Open Government Data strategy and portal of the City of Vienna. This evaluation is based on qualitative interviews and online polls after the strategy was implemented. Two groups of users were involved in the evaluation: internal target groups (employees and heads of department in the City of Vienna's public administration departments) and external stakeholders (citizens, business representatives, science and research, journalists). Analyzed aspects included the present organizational processes, the benefits (to business and society), and requirements for future Open Government Data initiatives. This evaluation reveals success factors which accompanied the implementation: the clear definition of responsibilities and the implementation along a process model, the integration of the Open Government Data platform into existing Content Management Systems, the evaluation of the Open Government Data initiative very shortly after its inception. Based on the theoretical and empirical findings, recommendations for future Open Government Data strategies are made which target the local authority and would require action on the federal level such as Creative Commons Attribution License as the default for subsidy funds or public relation measures carried out directly by the data providing departments.

Keywords: Open government data, Open government, Open data, Evaluation, Strategy implementation

1 Introduction

The Open Government Data (OGD) movement is a worldwide phenomenon. Governments and local authorities in countries such as the United States, Australia, New Zealand, the Netherlands, Sweden, Spain, Denmark and Austria make their data accessible to the public by publishing it on the web [33]. The main reasons for implementing OGD are increasing democratic accountability, enhancing transparency, delivering citizen self-designed public services, and stimulating economic growth [17]. The portal (Site 1) is providing data and information about population, labor, education and research, finance, health, environment or traffic. OGD has become central to our information technology-based society. However, the benefits cited by [17] all rely on the assumption of hard to measure, long term indirect benefits. City administrations, typically fulfilling political will within a four, five or six year perspective between elections, have to rely on tangible results instead of inspiring visions. Therefore the City of Vienna called for an evaluation of its OGD strategy implementation with a focus on value for money. Vienna is a quite decentralized administrative body, headed by the city directorate; regulations issued by the directorate are nonetheless very much dependent on the support by heads of departments. While a governing regulative document exists which is effectively demanding the cooperation of departments, departments retain control over what data they release and in what granularity. Thus, heads of departments have to be persuaded person by person about the benefits of OGD with tangible and relevant arguments.

This paper provides an insight into the practical implementation of an OGD strategy from a research perspective, with a particular focus on the organizational implementation, the public value and recommendations based on surveys including city departments and external OGD stakeholders. Analyzing the City of Vienna's implementation of OGD provides general insights into the implementation of OGD in a strongly decentralized administrative system.

The remaining parts of this paper are structured as follows: Section 2 will give insight into the current foundations of OGD by providing a working definition used throughout this paper, describe the current implementation of OGD in Austria and the effective supporting organizational setting at the federal level. Section 3 presents the guiding research questions, the involved stakeholders of the study and the methodologies used to answer the research questions. Section 4 answers those research questions which can be answered by a survey carried out within the city administration and OGD stakeholders as well as follow-up interviews. Section 5 tries to formulate recommendations concerning further steps of the Viennese OGD strategy, partly derived from survey results and literature review. Section 6 gives a short summary of key findings and a prospect for further research.

2 The State of OGD in Austria

This chapter provides a working definition of OGD, its importance expressed by European policy making and the current state of implementation of OGD in the city of Vienna including the backing organizational framework.

2.1 Definition

Open data as the underlying principle of OGD is defined as "...non-privacy-restricted and non-confidential data which is produced with public money and is made available without any restrictions on its usage and or distribution" [20]. Assuming that the government itself is an open system that interacts and cooperates with its environment, then open data leads to OGD. OGD changes not only the access to data and information but also the boundaries between the public and its governmental institutions [20]. OGD in itself is not only the publication of data, but also include users' feedback so as to improve governmental performance and mechanisms for monitoring.

OGD are non-personal data sets that the general public can access [27]. On this basis, new intermediate services for a wider audience are created. The principles of OGD have been elaborated by open data activists (Site 11 & [35]), who claim that publishing open data alone is not enough. A crucial aspect is the provision of metadata (data about data) and advanced descriptions of data acquisition processes [36]. OGD is repeatedly mentioned in the European Commission and European Union agenda setting. The eGovernment Action Plan [13] aims *...to make public services more efficient and more modern and to target the needs of the general population more precisely*. To achieve this, the plan proposes *a series of priorities and a roadmap to accelerate the deployment of eGovernment in Europe*. The five priorities in the plan are: access for all, increased efficiency, high-impact eGovernment services, putting key enablers in place and increasing participation in decision-making [13]. Challenges that go along with this action plan are modernizing public services to make them more effective and providing better service. Davies argues that OGD promises to meet these goals [10].

According to the cited sources, OGD will play an important future role to make administration more open and accountable, reducing costs while increasing efficiency, fuel the economic system while equalizing social imbalances. High aims backed by little empirical data. For the city of Vienna it was important to justify their expenses by tangible results. Thus goals and consequences of OGD publication are required to be validated in respect to value-for money under the premise that OGD itself relies on indirect benefits involving many ties.

2.2 OGD Strategy and its Development in Austria

Austria can prove a successful tradition of federal cooperation in the field of E-Government [24]. Existing E-Government achievements are the result of collaborations between the national level, the provinces, cities and communities beyond legal obligations]. An element of Austria's E-Government plan is the strategic coordination of activities by the platform Digitales Österreich (*Digital Austria*, Site 2).

During the inception phase of OGD Austria concerns were raised whether existing governance structures of E-Government will be effective for the implementation of OGD, especially the vivid and fast changing nature of OGD that would have been challenging for the existing governance and approval processes. Therefore a sleek governance structure Cooperation Open Government Data Austria (in short: Cooperation OGD Austria, Site 5) was designed. Cooperation OGD Austria is by federal representatives, provinces, cities and municipalities. This body is not a formal entity but consists of so called *ambitious and knowing* persons who decide on the future of Open Government Data. The core assumption is framed by OGD principles, effective organizational and technical frameworks. The Open Knowledge Forum Austria (Site 3), the Danube University Krems, Department for E-Governance (Site 4) and the *Open3.at* society (Site 6) act as advisors to the Cooperation OGD Austria. In this context, the choice of license, the description of data sets (metadata), the procedure regarding publication of open administration data and content cooperation (integration of metadata and data on other platforms) are discussed. The Cooperation OGD Austria also focuses on identifying data resources and elaborating a simple Uniform Resource Identifier (URI) concept.

The three central aspects (metadata, legal standardization – *Creative Commons Attribution License* (CC-BY) and the identification of resources – URI) are met by all OGD projects in Austria, ensuring a basis for a common metadata platform. The Cooperation OGD Austria defines the specifications. Sub-working groups that include experts from science, research and business deal with different OGD issues. These working groups report their findings and recommendations back to the steering committee, thus supporting a fast and effective collaboration in a quickly evolving field.

In Austria, OGD is a much newer concept and barely covered by the term E-Government. In 2011, the City of Vienna's *data.wien.gv.at* was one of the first OGD platforms in the German-speaking countries. On a national level, *data.gv.at* was launched in April 2013 and is an integrator of all OG data in Austria. As of December 2013, 1047 data sets from 21 different organizations are available at this platform.

3 Methodological Approach

This section gives an overview on which methods and tools were used to obtain answers to guiding research questions, how these methodologies cooperate and, and in particular who was interviewed and why.

In order to prove assumptions laid out in literature as presented in the preceding section and to justify further expenses in the field of OGD, a number of goals were set: to evaluate the social value of the OGD strategy for different target groups (employees, citizens, stakeholders from business, science and research, application developers, journalists), the internal and external perception of the OGD strategy and implementation, the financial aspects, sustainability and gender aspects. Only the subset fulfilling the following research questions will be presented in this paper.

Survey questions were partly influenced by results presented by the Comptroller and Auditor General about the implementation of the UK OGD portal [8]. However, at the time of the survey inception (spring, summer 2012), no framework satisfactorily addressed OGD impact assessment, as is also identified by Davies [9].

3.1 Guiding Research Questions

The central research questions guiding the evaluation are:

1. What organizational processes support the City of Vienna's publication of OGD? The first research question addresses the Status Quo of Vienna's OGD strategy which is required to get assessed in order to identify requirements for future OGD measures (question two).

This research question was answered by inspecting the strategic papers of the city of Vienna describing organizational setting and by validating the actual implementation in interviews with heads of departments and those responsible for OGD. Interviews are carried out both written and face-to-face. All of the Viennese municipal departments should get evaluated, contributing to the statistic validity of the findings.

2. What are the requirements for future OGD measures in the City of Vienna? Discussion and contextualization with literature in combination with the results of the qualitative interviews with employees

from the public administration departments and external stakeholders assist to develop recommendations for improvement of further stages of the Viennese OGD implementation.

3. What are organizational, economic or societal benefits of an OGD implementation?

Question three is used to generate tangible and communicable benefits of the OGD strategy implementation. These benefits help convince those persons in charge (especially department heads) that the publication of OGD has both internal and external (i.e. organizational, economic and societal) benefits. These benefits are a stimulus for the City of Vienna to continue OGD initiatives and activities. The findings of this study help improve the data publication processes and the OGD strategy as a whole.

The detailed questions of the survey map to the guiding research questions as can be seen in table 1:

Table 1: Assignment of survey questions to guiding research questions

Research topic	Survey questions
1. What organizational processes support the City of Vienna's publication of OGD?	<ul style="list-style-type: none"> Which policies are in effect to deal with reported mistakes or recommendations Which advertisement measures accompanying the release of OGD have been undertaken by your department From which other administrative departments does your department use data Is your department able to propose wishes/ideas to the OGD competence centre and how do your reports affect future expansion steps How was the OGD strategy mediated to you Is your department offering data for sale
2. What are the requirements for future OGD measures in the City of Vienna?	<p>Questions targeting the Viennese departments:</p> <ul style="list-style-type: none"> Which data sets do you recommend for further publication at the data platform of the City of Vienna Do you consider the implementation of the OGD strategy as an important aspect of your work? Is it planned to intensify the current OGD engagement of your department Which suggestions for improvement would you recommend for future data set release phases <p>Questions targeting external stakeholders:</p> <ul style="list-style-type: none"> What were your positive and/or negative experiences with the platform <i>data.wien.gv.at</i> How do you plan to use OGD Are there additional abilities or skills that you need to have in order to make better use of OGD What are the areas of data that you are interested in or where you wish to have more data available concerning your field of activity Which data format is the most convenient to work with OGD in your field of activity
3. What are organizational, economic or societal benefits of an OGD implementation?	<p>Questions targeting the Viennese departments:</p> <ul style="list-style-type: none"> Was there an increase of external requests concerning data sets via telephone after the implementation of the OGD strategy Was there an increase of external requests concerning data sets via email after the implementation of the OGD strategy The expenses for the implementation of the OGD strategy at my department per month can be numbered with (approximately days of work per person) Was there an increase of internal requests from other departments concerning data sets after the implementation of the OGD strategy What are your department expenses to release OG data sets [data set] [hours]. Has the expense of work in your department concerning the provision of data been reduced since the implementation of the OGD strategy Is there an additional value for your department by the implementation of the OGD strategy <p>Questions targeting external stakeholders:</p> <ul style="list-style-type: none"> Since you are making use of OGD in your products and services, to what extend [percent] did your revenues increase because of OGD. How do you estimate the proportional revenue because of OGD in ten years How do you perceive the potential of OGD for internal utilization for example in business intelligence?

The survey questions target the departments of Vienna as well as external OGD stakeholders and are included in the Appendix.

3.2 Study Design

The evaluation was conducted ex-post the implementation of the Viennese OGD strategy [28]. The following methods were used:

- Analysis of secondary literature: international publications on OGD were analyzed, with a particular focus on the historical, international and European perspective and the socio-political and organizational challenges. In particular, the paper by Dawes & Helbig who describe stakeholder interests in respect to public value [11]; Eight Business Model Archetypes for PSI re-Use by Ferro and Osella to better understand the business perspective of OGD when preparing the surveys [14]; Benefits, Adoption Barriers and Myths of Open Data and Open Government by Janssen et al. who provide a list of political and social, economic, operational and technical benefits which show OGD potentials in relation to frequent wild expectations about the impact of OGD [20]; A paper by Chun who describes the sphere of Citizens, Data and Government [6]; and the EU eGovernment action plan, which consolidates many benefits mentioned in the preceding literature and creates a vision of harnessing ICT to promote smart, sustainable and innovative government [13].
- Document analysis: Political documents: the Viennese red-green coalition agreement which includes the intention to open government data on the city level [34]; Internal strategic documents by the City of Vienna, these documents were: Executive order of the implementation of open government and open data including a virtual department responsible to execute the order [28]; Executive order concerning the appointment of a central data responsible at the department of statistics and his duties; Executive order concerning the procedure and cooperation of departments with the department of statistics and the central data responsible [31]; Communication by the City directorate to the heads of departments to self-assess their available datasets according to the Centre for Research in Administrations OGD procedure model [22], [30]; Operative document: download statistics of data sets and APIs and their origin
- Empirical qualitative and quantitative analysis: two different online questionnaires were developed: one for the employees and one for external OGD users. The City of Vienna's directorate actively supported the internal survey process, so that every department was asked to take part in the questionnaire, leading to a high number of valid responses. Both questionnaires are included in the appendix.
- Empirical qualitative analysis: The qualitative analysis consisted of semi-structured, question-based interviews with members of internal departments and external users.

See figure 1 for an overview on the research stages:

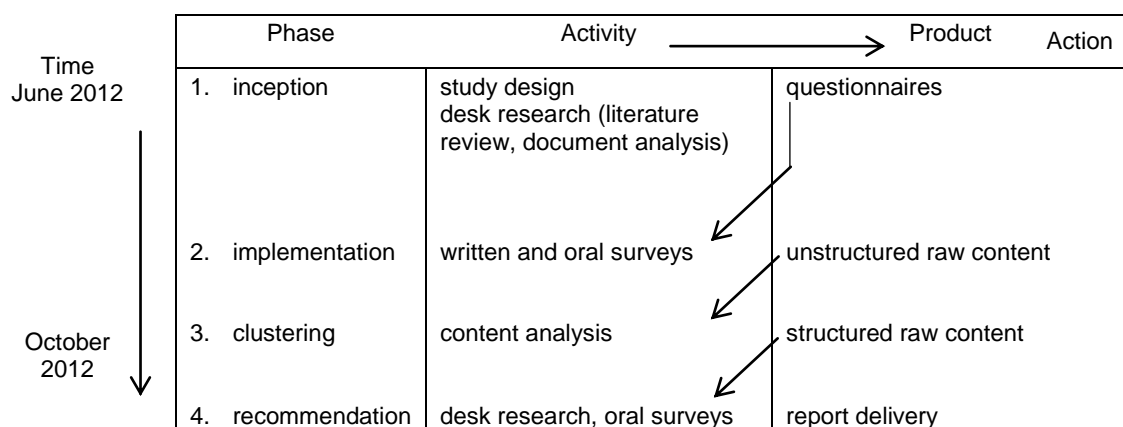


Figure 1: Research phases, activities taken and (intermediate) research products which give input to subsequent research activities

During the survey inception phase, representatives from the City's directorate were involved in the design of the questionnaires. The questionnaire used for the employees was mainly used to determine the Status Quo of the City of Vienna's OGD strategy. The aim of the questionnaire for external users was to generate new insights for improving the current implementation and developing further OGD initiatives. Completed online questionnaires were content analyzed to identify re-occurring topics and issues. The clusters that were generated refer to positive and negative peculiarities and common issues. The cluster formation is a discussion outcome of content analysis, desk

research and the persons responsible for the study. In a further step, the findings from the online questionnaire were used to derive a guide for the interviews: the issues obtained from the questionnaires were discussed with the interviewees. Table 2 provides an overview on the characteristics of the used research method, and the number of participants of the surveys.

Table 2: Overview of the questionnaires used in the research, as well as the type and number of involved interview participants

Method	Characteristics	Interviewees	Nr. Participants
Questionnaires: Empirical qualitative and quantitative analysis (online questionnaires)	Questionnaire for internal users	Members of the municipal administration departments (city and districts)	121 people from 83 administration units
	Questionnaire for external users	Convenience sample of users interested in OGD. These interview partners were selected participants from the ADV E-Government conference and the Gov 2.0 camp, so there clearly was a bias to be expected.	48
Empirical qualitative analysis (oral interviews)	guide that addresses the findings from online survey with target group specific adoptions	Members from the internal departments	11
		External stakeholders (science and research, business, journalists, application designers)	21

4 Research Results

The purpose of this section is to give answers to the research questions using the methodologies described in the previous section. Research questions 1 (What specific organizational processes support the City of Vienna's publication of OGD) and 3 (What are organizational, economic or societal benefits of an OGD implementation?) are answered in this section. Research question 2 (What are the requirements for future OGD measures in the City of Vienna?) is answered in the following section as it requires discussion and contextualization with relevant literature. As previously stated, a method mix seemed feasible to provide the necessary inputs. Results of this section (survey clustering) remain largely un-interpreted and are set into context in the interpretation and recommendation section.

4.1 Survey Participation

The online questionnaires were implemented using Google Forms and were accessible starting June 2012 until 8 August 2012.

4.2 Internal Poll and Interviews

The questionnaire for the City's employees contained 16 closed and 10 open questions. The City of Vienna sent the online questionnaire to all its employees. 121 employee's responses were received. All 83 administrative departments (city and district administration departments) took part in the survey. Hence, at least one employee in each department took part in the survey.

ViennaGIS contact persons are employees working with the Vienna geospatial information system (GIS). This is a centrally located IT-system operated by the ICT-department providing GIS services to a multitude of departments. At present, this ICT-system is the only large-scale shared system within the city of Vienna.

As can be seen from table 3, about one third of the respondents are affiliated to IT. Especially people with an IT background (16%) and data protection officials (9%) responded. This reflects the assumption that the topic of OGD within the City of Vienna is related to IT and neglects associated social aspects. 33% of the participants hold directive or executive positions. The remaining 33% are employed in a department that actively contributes to the City of Vienna's OGD strategy.

Table 3: Participation by city employees by field of work

Field of work	# respondents	%
Other	84	52%
ViennaGIS contact persons	5	3%
Public relations workers	11	7%
ICT consultant	16	10%
Person in charge for gender questions	1	1%
data protection officer	11	7%
IT contact person	19	12%
budget consultant	8	5%
heads of departments	7	4%

Face-to-face, semi-structured interviews based on the results obtained from online questionnaires were used as online questionnaires alone do not always provide the required in-depth insights [1]. p. 157ff. The interview guide was designed on the basis of the answers obtained from the online questionnaire and adapted to the specific target group or department. 11 participants from 9 departments participated and Interviews took between 30 to 45 minutes.

4.3 External Polls and Interviews

48 people responded to the questionnaire and 21 people were interviewed. The questionnaire for external users was based on 8 closed and 13 open questions. As only 48 people took part in the survey targeting external data stakeholders, the quantitative aspect of the results are insignificant, but the responses yield interesting and important insights. Social media tools were used to call for participation during a time frame of eight weeks to participate. The respondents are self-selected, and obtaining insights from people outside the internet user community was not an explicit goal. To guarantee the competence of the participant, the first question asked is about the familiarity with the term *Open Government Data*. The vast majority (96%) of the external participants are familiar with OGD, yielding to relevant qualitative results.

A common problem with online questionnaires is a declining level of responses, even when the request to respond is made by e-mail [13]. Thus personal invitations and requests made in social networks (relevant newsgroups, forums for discussions and websites) were used to urge external users to respond to the questionnaire. Mainly users with an interest in OGD were addressed. A further goal of these requests was to call the attention of people who are randomly in touch with the OGD topic or community, but do have specific expertise in the OGD domain.

The results also show that three-fourths of the external users use OGD actively. Their hands-on experience with OGD is a pre-condition to answer the questionnaire in a meaningful way. As online participation of external stakeholders proved challenging, 21 oral interviews were conducted with different stakeholders: 4 citizens; 3 from the business category, 4 from category science & research; 4 application developers, and 6 journalists.

4.4 Status Quo of OGD in the City of Vienna

The present organizational Viennese OGD publication setting was answered by analyzing the strategic documents and validating the therein laid out structures by the written survey and oral interviews with employees of city departments. Some decisions made upfront are unique to the City of Vienna and are likely to contribute to the publication success attained that far.

Although the publication of OGD in Vienna is legally undefined, the Vienna OGD initiative is backed by political commitment and agreement on publication of administration data at the policy level. At the moment, disclosure of information is influenced by several specific laws, such as the national *Bundesstatistikgesetz* or Vienna's *Landesstatistikgesetz* (BGBl. I Nr. 163/1999; Wiener Statistikgesetz, LGBl 2001/50; federal resp. provincial law concerning the aggregation of statistical data). However, the *Landesstatistikgesetz* demands the publication of data in an aggregated manner, to prevent drawing any conclusions about *singular persons, events, processes or business contacts*. The federal law for *Dokumentation im Gesundheitswesen* (BGBl. Nr. 745/1996; documentation about health-care related data) requires publication about costs and expenses of healthcare facilities. Austria does not have a pro-active freedom of information law as is the case in the US or the UK, instead, according to the *Auskunftspflichtgesetz* (BGBl. Nr. 287/1987) officials are required to give information upon citizens request, but only in the case that the regular work of the administration will not be adversely influenced. However, the efficacy of this regulation is heavily undermined by the principle of *Verschwiegenheitspflicht* (Art 20 Abs 4 B-VG; obligation of secrecy), within the Austrian constitution. This makes (at least in legal theory) Austria the most secretive administration in Europe. Further legal fundaments are the implementation of EUs PSI and INSPIRE directive into

national law (BGBl. I Nr. 135/2005, Informationsweiterverwendungsgesetz and LGBL 2006/48, Wiener Umweltinformationsgesetzes; BGBl. I Nr. 14/2010, Geodateninfrastrukturgesetz and WGeoDIG: Wiener Geodateninfrastrukturgesetz). The implementation of INSPIRE sparked the establishment of the ViennaGIS-coordinator and the implementation of the geospatial information infrastructure, spanning multiple departments.

In Vienna, the Chief Information Officer fulfils this political agenda and every department has to nominate a person responsible for the OGD implementation at the department level. The OGD platform *data.wien.gv.at* serves as the central data portal and the OGD implementation, provision of assistive services and establishment of good practice has been delegated to an expert group, comprising of permanent and strategic departments (IT department, statistics department, Geographical Information System (GIS) department, directorate). However, results from the online questionnaire reveal departments' limited influence on the OGD strategy: 67% of the departments have no direct influence on the implementation of the OGD strategy. The clear definition of responsibilities and process steps supports an unambiguous control of the OGD process which focuses on coordination, prioritization and evaluation.

The Viennese administration (and administrations of German-speaking countries in general) is heavily influenced by the delegation principle with strong department leaders and a comparatively weak central steering group, so the publication of data sets has to be discussed case by case, department by department. This enables the integration of political discussion processes preceding data publication. At the City of Vienna, this process is called *OGD – data examination and production*. This internal procedure includes data monitoring where data sets for publication or non-publication are identified. This was enabled along the implementation of an OGD process model, developed in cooperation with the Centre for Administration Research (Zentrum für Verwaltungsforschung - KDZ, Site 7) [22], which is in turn based on the work of [25]. The identification is carried out in respect to possible economic potential, value, security and potential improvement. A range from 0 (no publication) to 5 (no limits) guarantees these guidelines which incorporates the aspect of data protection as a coherent component of the Viennese OGD strategy.

4.5 Efforts and Expenses

Another interesting aspect was the influence of the OGD strategy on department's efforts. The survey tried to assess that correlation by measuring the number of received phone calls (31 responses) and emails (30 responses) concerning the department's information provision. Given that the majority of information provided as OGD at the point of the study was also available on the departments websites (albeit spread over different areas in a mostly unorganized way), an ex-ante compared to ex-post relationship can be derived.

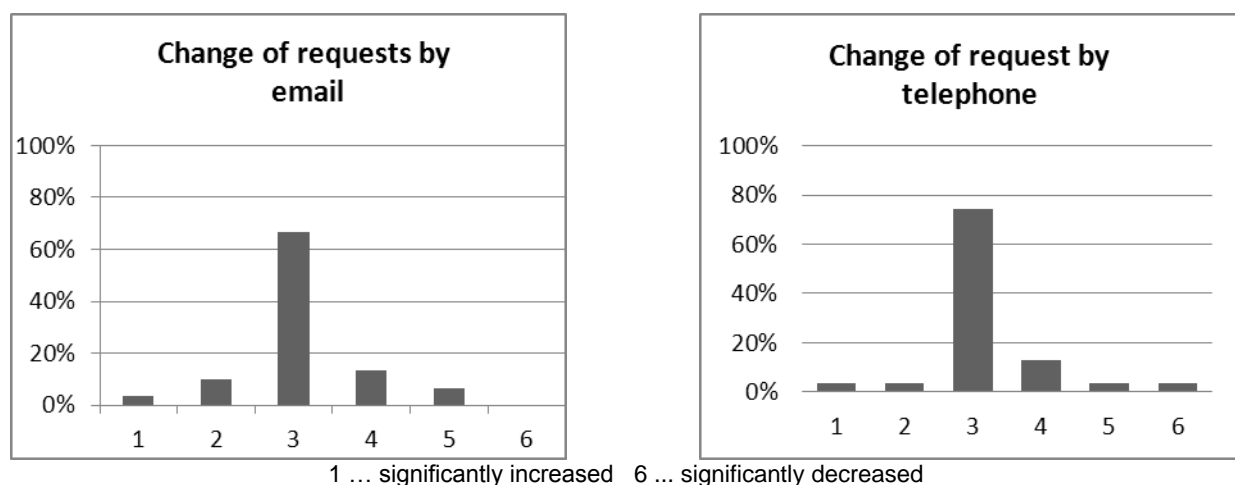


Figure 2: Change of requests since the release of OGD

As can be seen in Figure 2, the release of OGD has no significant influence on the rate of requests from external stakeholders. Neither the requests by email nor those by telephone have clearly changed after the release of open government data.

Another question assessed the amount of time City of Vienna's staff requires to prepare (formats and meta-data descriptions) and quality-proof data devoted as OGD, measured in person days per month. Respondents claimed that OGD created additional labor costs, although in Vienna these additional expenses are not measurable as OGD is not set up as a cost center, thus expenses cannot be attributed towards those efforts. Most of the respondents see OGD as an activity related to infrastructure anyway, which would make activity related expenses futile to project on a cost center basis. 33 persons answered that question: the majority of respondents (12 in total, i.e. 36%) state that 1-2 person days were spent on this activity.

The interviewed employees of the administrative departments agreed that OGD should be free of charge as the benefits of publication are difficult to measure but are expected to exceed the possible loss of income (by no longer

selling data). Nevertheless, the models of (re-)financing should be adapted: Giving away data free of charge leads to some decline in earnings and OGD release support by the ICT department is additionally billed on a per data set basis, punishing those who are willing to disclose more data sets than those who follow a more restrictive data liberation policy.

4.6 Organizational Implementation

The decision to host the OGD platform at the beginning of the strategy implementation on the existing Content Management System (CMS) proved to be advantageous, as knowledge of Comprehensive Knowledge Archive Network (CKAN) or other data providing platforms was scarce. This allowed Vienna to kick-start OGD without in-depth technical knowledge of a new system.

The traditionally heterogeneous administrative structure required Vienna to establish an informal, ad-hoc working group to decide on publication details. This so-called competence center of Open Government of Vienna is a virtual department and consists of five core departments, including the ICT-department, and the department for city planning. Other entities become part of this virtual structure on demand. One survey result was that Departments which are not directly involved in the strategic agenda setting, showed considerably less or missing knowledge about the Open Government strategy itself or the implementation of the strategies.

Marketing and Public Relations are central aspects of OGD publication, supported by a strong cooperation between the organizational units and the OGD competence center. Both coordinate OGD activities, run projects, surveys, or competitions, develop strategies for data publication and can be contacted for matters related to OGD. However the survey results and interviews show that at present, the actual carrying out of marketing activities is still considered to be the duty of the central PR-department. The survey revealed that data providing departments do not see in their duty to carry out stakeholder management.

Evaluating the data sets is a further aspect of the organizational implementation. A central component of Vienna's strategy development was the cooperation with the Centre for Research in Administration (KDZ, Site 7)] which designed a detailed process model of OGD [22] which was subsequently extended by [23]. The implementation of OGD measures is executed in line with this process model. The difference to other international implementation processes is that in Vienna an early prioritization and evaluation of the measures and a selection of the data sets in relation to public activities was performed. For example, the US and UK OGD platforms, while operative in 2009 or 2010 respectively, were evaluated in regard to expenses and efficiency not before 2012 [8].

4.7 Technical Implementation

Results for this section were obtained from the aforementioned 11 oral interviews with city department representatives, namely the ICT-department, the OGD competence center, and departments affiliated with geographical information processing.

The hub of Vienna's OGD is the *GEO-server*, an integrated information system which stores GIS data, ranging from historic data up to city planning level. The GEO-Server is commodity GIS software that has been heavily customized to fit specific needs and extensively extended in the last 10 years of usage. Many departments access or actively contribute to the GEO-server. By using the GEO-server, the departments can independently decide on the data to be released as OGD. The data sets are declared as OGD within the GEO-server, however declaring data as *open data* within the GEO-server does not automatically result in the publication of that data on the OGD portal. The data still has to be enriched with metadata and designed according to the guidelines of OGD. CMS advisors finally, still, have to establish the link from OGD metadata to the actual data set. Further survey results in this domain are summarized in table 4:

Table 4: Summary of the main organizational findings

Research Question	Key Findings
What are the specific organizational processes that support the publication of OGD of the City of Vienna?	Clear definition of responsibilities and process steps
	Process model for OGD publication developed in cooperation with the Centre for Administration Research based on academic field work by [25]
	Evaluation as an integral part of the OGD initiative
	Integration of OGD platform into existing CMS systems to kick-start the progress
	Homogeneity of external-facing implementation

4.8 Benefits of an OGD Implementation

This section provides an overview of findings concerning the perception of Vienna's OGD implementation in terms of its benefits (economic, democratic and societal), potentials, and costs. Unlike the previous section, where the Status Quo was gathered by analyzing documents of the City of Vienna and surveys held with the City departments, results of this section were primarily obtained by the external stakeholders.

While the release of data certainly has challenging consequences such as loss of income due to releasing data for free (as it is the unconditional case in Austria), long term and net positive effects prevail [20]. As the city departments of Vienna have a strong autonomy in their decisions and doings, tangible and understandable benefits beyond large scale yet hard to measure societal benefits are necessary to persuade heads of departments to increase OGD efforts or to release data at all. That is why this section concentrates on benefits. Threats and challenges of OGD with a focus on Austria were assessed for example in [21].

The Viennese government agreement on OGD [34] named the following beneficial aspects of their strategy. These claims were used to formulate survey questions as seen in the Appendix:

1. Easier access to increase the number of users, which will stimulate and improve the value of the services provided;
2. Increased transparency of public administration and its processes. Citizens are seen as partners that are able to interpret and adapt the provided data;
3. Reduced administrative efforts. The bulk of administration processes will be automated.
4. Administrative procedures will be simplified because user specific terms of service or invoices are no longer necessary

4.9 Benefits Drawn from the Department Survey

The majority of the participants (32 out of 40) perceive the implementation of the OGD strategy as beneficial, especially heads of department agree on this. The heads of department believe that OGD provides a number of advantages, e.g. higher efficiency and availability of the data sets on the official OGD platform (instead of responding to demands for data). This helps improve customer friendliness and customer focus, and in turn also improves the image of public administration. Given the common data basis, OGD allows for the comparison of data as well as an understanding of content and structure. Interpretation errors could be avoided, and the departments would be able to focus on improving the administrative processes. The quality of data can also be improved as citizens report errors they identify.

At the time of the survey, the city of Vienna provided a forum which was used to collect citizen reports concerning identified mistakes. This forum, after half a year of operation, contained only 17 entries and as of October 2013, this forum has been shut down without providing another alternative to report mistakes.

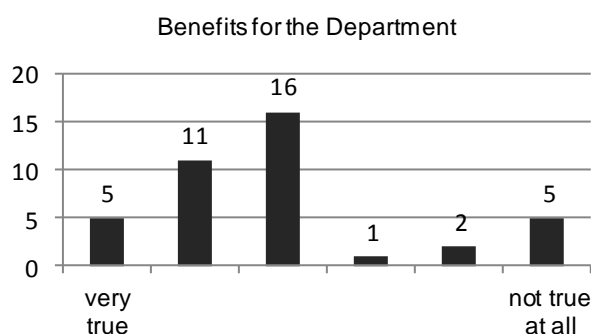


Figure 3: Benefits for the department

The results of figure 3 reveal an interesting distribution. While a majority is on the positive side on OGD, there is core of pessimists, who believe that OGD is not beneficial at all. A benefit mentioned by department employees is the rapid and readily availability of data as some departments used the OGD platform as a replacement for a missing enterprise information system. Departments use this platform to gain information about the data of other departments, or to use the data of other departments for their own activities. Some respondents also mentioned that they used the platform as a form of *data bulletin*: By inspecting other department's data, they gain a notion of what they are actually doing. This effect of a *poor man's information management system* was not foreseen at all.

Negative voices mentioned concerns about erroneous data and legal liability consequences.

4.10 Benefits Mentioned by External Stakeholders

External OGD stakeholders assign good grades to Vienna's OGD platform implementation. Public administration itself is seen as the main beneficiary of OGD, particularly in regard to improved error reporting and, in order to efficiently supply OGD, by administrations need to invest in new and improved automated data services. Additional value is created by the improved perception of the public administration's reputation. The interviewees stated that OGD had a positive effect on the public image as well, where the public image is related to higher conformability, government activities, higher transparency, better quality, efficiency and effectiveness [16]. 18 out of 27 external stakeholder survey participants perceive OGD as beneficial for their work activities, especially scientists and researchers. None of the external stakeholders evaluated OGD as *non-relevant*. According to this survey, OGD is more relevant.

Concerning the question about public value (cf. Appendix), higher efficiency in governmental self-administration leads to economic savings. In the medium and long term, OGD will be implemented by a more intensive coordination of the administration departments, enabled by a stronger connection between departments and units via ICT-based information management [5]. The combination of heterogeneous data sources would lead to new insights if the organizational maturity and the quality of the information management in the agencies could be increased. This will cause a better administration performance with simultaneous cost savings in the medium term.

Addressing the question on economic benefits (cf. Appendix), the survey participants and interviewees see OGDs potential as a factor for innovation: The publication of OGD is regarded as a mean towards new enterprises and business models. However, for new business models to emerge, standards (e.g. metadata), which future-proof financial investments, would be required. The biggest benefits are expected for start-ups and business niches. One interviewee mentioned that the use of OGD has led to a 5% increase in sales. Other possible benefits will emerge from outsourcing present government procedures, as a business network and for business cycles.

OGD was mentioned as an additional resource for existing business models in the area of data analysis, data handling, data visualization and data integration [14]. Additional indirect value is created through the increased coordination of the target groups, as the public sphere tends to realize only those projects that generate either direct economic market value or fulfill an actual need. For successful OGD implementation an active, a solution orientated attitude, both the economic OGD stakeholders and the administrative entities will be necessary.

Participants and interviewees also addressed the risks of implementing OGD. The risks mainly affect the purchasing power of the consumers. Existing imbalances in regard to assets, knowledge and income will not be balanced but increased. The underlying reason is that the handling of data requires additional skills and competences.

Concerning questions targeting advantages for democracy and society, increased transparency is seen as a major benefit of releasing OGD. Government, citizens, civil society, NGOs are seen as the major beneficiaries of OGD. In the context of Open Government it is often predicted that more transparent processes will lead to a greater interest in politics. Respondents mentioned that the publication of relevant data in combination with administration structures enables citizens to gain more insights into activities of the authority and, as a result, more possibilities to control administration and politics. A crucial factor in this context is citizens' ability to verify or access sources. The OGD could also contribute to the acceptance, stabilization and legitimization of policy decisions. Transparent processes and greater citizen control may be able to hinder corruption and the irresponsible use of public money [11]. Increasing the power of intermediates would thus lead to increased democratized processes [6]. Several participants and interviewees expressed their concerns that essential core data sets will still remain closed. Existing business models around high value data sets like the company register cannot be torn down over night. People behind these businesses might express a shammed interest in OGD while concentrating to preserve a closed status. Another interview partner was worried that OGD only offers an illusion of transparency in that the administration is still under full control of what data they intend to publish. This would only change by a free information law with a *the default is open* attitude. Another interviewee raised concerns over highly emotional topics such as migration or expenses in health care. These topics would be complicated, involve many stakeholders and require deep insight. Open data and the current possibilities or the lack of cross-related datasets by the authorities themselves, combined with missing easy to use visualizing tools, would make such data sets inappropriate for public consumption.

4.11 Summarizing OGD Benefits

The main benefits of OGD are seen as improving internal processes, error reporting by users and the community, and an automated data service (instead of individual requests). Internal benefits are the increase of employee motivation due to more interaction with stakeholders emphasizing the external importance of their work. Another advantage is more customer friendliness, more customer focus and efficiency, leading to an improved public image of public administrations. More efficiency and better quality of OGD also offers financial savings. The usage of OGD as a simple system for information management and the rapid availability of data are further benefits of OGD implementation.

Societal benefits are: more information for voting, diversity in opinions and debate, and increased citizen participation. Increased political participation can contribute to stabilization and legitimization of policies. Corruption and other forms of irresponsible practice may also be prevented or at least minimized [5].

In the field of economy, new business models making use of OGD are expected to emerge. Participants suggested that they could be based on data analysis, data handling, data integration and visualization. Thus, public value is likely to be created by higher tax revenues. OGD may be able to contribute to economic growth, job preservation or job creation.

The following table 5 summarizes some of the mentioned core benefits, expressed either by city representatives of external OGD stakeholders.

Table 5: Summarizing OGD implementation benefits

Research Question	Key Findings	Mentioned by
What benefits (internal, economic or societal) does the implementation of the OGD-strategy offer?	Improving data and processes through error reporting	City representatives
	Automated data service to reduce human intervention	
	Increased employee motivation	
	Improved public image	
	Limited but useful information management system	
	Customer friendliness and focus	
	Increased economic efficiency	External OGD stakeholders
	New business models	
	Rapid availability of data	
	Increased citizen participation	
	Stabilization and legitimization of policies	
	High qualitative data for research	
	Insights into government mechanism	

5 Recommendations and Discussion

While research questions 1 and 3 could be answered to a large extent by using documents provided by the administration of the city of Vienna and the results obtained by the survey and follow-up interviews, question 2 (What are the requirements for future OGD measures in the City of Vienna?) required contextualization to existing literature. In addition, this section looks at the current OGD strategy, expectations and wishes for future OGD initiatives.

5.1 Expectations

The user group *citizens* shows a high interest in the legal entrenchment of OGD initiatives by a freedom of information law. Increased publication of political data would be required and more homogenous data standards and better metadata to allow for the easier comparison of data. Further activities such as specific applications for target groups, supportive measures and OGD workshops (to curate data, how to design a mobile app) were also mentioned. Such activities would help to increase awareness of OGD in the population and lower entrance barriers. Additionally, more meetings to link the target groups to the City of Vienna should be supported in the future. Like the citizens, the journalists emphasize the socio-political dimension of OGD and are interested in particularly polarizing and newsworthy data.

Economic stakeholders agreed that data sets are *interesting* however they are not usable in a cohesive way: access to more comparable and complementary data would be necessary. The economic benefit of OGD is mentioned, however the interviewees revealed no novel business models. Wishes and requests mentioned the release of data currently stored in federal registers like the commercial register and land register. However, these requested data items cannot be provided by the City of Vienna as they are not in charge of these registers.

A few participants from the target groups *science and research* and *application developers* see no primary reason to deal with OGD due to lack of financial incentives. The survey participants requested better integration of the chambers of commerce, special interest groups and of education institutes and universities.

Most of the application developers appreciate the data and services currently offered and see potential areas of improvement such as the ability to provide direct feedback instead of the existing forum. (As of October 2013 and in conjunction with the move towards using CKAN after building up enough knowledge my OGD operators, this forum is now defunct altogether.) Further requests were made regarding additional data (geographic, localization, traffic, mobility, population, demographic, housing), application programming interfaces, research data, and to facilitate ties to universities and educational institutions. Interviewees from science and research emphasized the potential of OGD in education and research, however concerns were raised as educational concepts would have to be rethought and redefined, as such education and research programs needs to emphasize on creativity instead on memorizing facts. Table 6 summarizes key findings for future stages of OGD expansion.

Table 6: Summary of the main requirements

Research Question	Key Findings
What are the requirements concerning further stages of OGD expansion?	OGD backed by legal framework
	Publication of political data
	Homogenous data standards
	Stakeholder specific target group management
	Networking between different target groups

5.2 Recommendations for OGD Implementation

On the basis of the survey findings, deficiencies mentioned and wishes expressed by OGD stakeholders, recommendations in three areas could be derived. These recommendations have a level of generality, thus are applicable beyond the city of Vienna departments, but may not be suitable for all kinds of government departments. Cities with a comparable stakeholder constituency and power structures as the described one of the city of Vienna will certainly identify areas of action which will help to improve an on-going OGD implementation.

Recommendations have been separated into technical, operative and strategic measures, targeting either the local authorities or the federal layer.

5.3 Technical and Operative Measures

As was witnessed during the interviews, departments with modern and integrated ICT-systems have a higher willingness to publicize data as OGD. For example, data stored in the GEO-server can be transferred to the OGD-portal in a semi-automated manner, while other data sets on the OGD platform of the City of Vienna are provided in a manual and thus error-prone way. Ideally, all data should be stored in an integrated IT-system with automatic transferal to the OGD platform. This would also facilitate the provision of standardized application program interfaces (APIs) for external stakeholders [29]. Therefore, these recommendations foster the implementation of modern, data-specific tools:

- Implementation of a cross-department information management system via a common data bus. Such an data / information sharing bus was described in [32], and while this paper primarily targets E-Government on a federal layer it incorporates necessary elements as authorization and authentication.
- The harmonization of data and comparability of OGD through code lists and thesauri. Although the public appearance of the Viennese OGD portal is visually homogeneous, the different departments are autonomous in their decision making. This is reflected in formats, structures and extent of the provided data which is different between the particular departments. However, the sheer amount of data within the organization, combined with the promise of OGD to be a valuable resource for business intelligence, requires data to be organized in a computer system understandable manner. This measure helps to fulfill requests made by interview partners belonging to the external stakeholders and is a first step towards more sophisticated automated reasoning possibilities to leveraging the potential of business intelligence [2].
- Providing tools on the OGD platform such as described in objective C1-RES of the ENGAGE project (Site 8) which help to visualize core data sets such as points of interest or time series related data in a user driven fashion [3]. Currently there are no data visualizations provided by data.wien.gv.at. Besides visualizations, tools which facilitate data curation, collaboration, and code sharing would be advisable.

As expressed by interviewed city of Vienna employees, OGD has the characteristics of an infrastructure measure, with certain departments abandoning income by no longer selling data while being forced to appoint and pay the ICT department to publish the data. This requires

- The development of appropriate OGD re-financing models. While it has been argued, that keeping PSI in secrecy or effectively restricted in usage by availability burdens [15], direct financial losses by OGD contributing departments have to be compensated in a way, that releasing more data is encouraged rather than punished by requiring departments to pay assistive data release services on a per-dataset basis. However, [4] call it an “interesting problem”, suggesting that questions of re-financing require structural changes.

OGD uptake could be further improved by lowering the participation barrier and by showcasing potential usage. This requires

- Public relation activities and stakeholder-oriented initiatives carried out by the departments themselves. Those activities focus on specific user groups as is the case of the open government engagement team OG Ontario [26] and laid out in Guidelines on Open Government Data for Citizen Engagement by the United Nations [12].

The value of OGD increases by releasing valuable and mashable data sets. However, this requires first and foremost to

- Publish more data.

5.4 Strategic Measures

Austria's administrative system is a thoroughly federal system with a clear distinction between administration and politics. While OGD has barely reached the political layer, certain actions require measures to be taken at that level as they clearly escape the scope of administrative actions.

One observation and an effect of the imperative separation of powers between politics and administration is the relatively detached OGD portal (perceived as an administrative action) from open government measures (perceived as a political action), which are initiated from the policy level. Seen from an end-user perspective it would be advisable to integrate open data as an authoritative information resource on open government portals and develop both into a true platform. This requires:

- Merge the relatively isolated OGD portal into an open government platform as laid out by Cindio in [7]; and
- Integrate it with other government Open Government projects.

While the focus of the survey clearly laid on assessing the OGD implementation of Vienna and thus recommendations have been drafted with that goal in mind, fields of actions could be identified which would require measures at the federal level. These recommendations address the local authorities as well as government policy making. They focus on the legal perspective, educational guidelines, and encouragement of political participation.

While the threads of discussion on public sector information (PSI) and OGD can be separated as laid out by [18] in that PSI subject to OGD principles yields open government data, many goals are shared and the European Commission. The European Commission itself is imprecise using both terms as can be seen on the entry portal to the digital agenda 2020 (Site 9). While the PSI discussion has a head-start of 20 years compared to that of OGD, attained results apply to a large extent to OGD as well (PSI to be accessible, in standard and re-useable formats), which suggests that

- For the long-term discussion, threads of OGD and PSI should be unified [32].

From a geo-political perspective, democratic, transparent countries with an open culture are more attractive for migration, increasing diversity and the potential for creativity [37]. OGD is a stimulus to the creative potential of people. In this context the substandard innovation willingness of the European economic sphere as a result of missing creativity is a core criticism of the head office of *Enterprise and Industry* of the European commission [37]. Thus, concluding from literature, in order to fully leverage these envisioned economic benefits, existing business strategies and subsidy models will have to change as well as educational programs, starting at the primary school level with a focus on data literacy. Therefore it seems feasible to suggest that

- Education and training programs will have to increasingly account for creative methodologies as well as analytical competences [1]. UKs department for education has already reacted to concerns of diminishing IT-literacy skills of teachers which in turn adversely affects pupils' initial exposure to the topic of algorithms,

statistics and information design. As a reaction, the UK national curriculum in the field of computer science has been re-designed from the ground up to foster creativity in what to do with computer systems instead of how to perfectly make use of existing programs and implementations [38].

The more information and data available, the easier it is to get an undertaking started. This is suggested by common sense and is verified by the interviews with business stakeholders who considered OGD primarily as an additional resource which will be evaluated on actual business needs. To increase the pool of data as business facilitating resource,

- CC-BY or a comparatively permissive license should be used as the default according to which beneficiaries of public subsidies have to release their results. Open Access is already the default publication scheme of Horizon 2020 results (site 10), which would make this adoption a reasonable step for national regulation of funding schemes.

The interviews with citizens revealed their concerns about a missing legal backup of OGD. While the reshaped EU PSI-directive is a fuel of OGD, it does not express a fundamental attitude of openness. As a reminder, the initial drivers for OGD have been arguments relating to transparency, accountability and public participation, which are closely related to the drivers for the right to access government information (RTI) instead to that of PSI. OGD in Austria is a good-will undertaking of administration, lacking formal legal regulation. To make OGD stakeholders investments future proof it would be required

- To promote a legal framework that makes OGD an integral part of government actions. This legal regulation must be grounded in the rights to information (RTI) movement, enacted as a pro-active freedom of information law [19].

6 Conclusion and Suggestions for Further Research

The last years have witnessed increased publication of data on the internet, data that has been provided by public organizations and is (re-)used by researchers, citizens, journalists or other users. Particularly the re-use of data by public stakeholders is expected to generate the benefits described in literature and which were verified by this survey and stakeholder interviews. This study focused on a.) the current state of OGD at the city of Vienna; b.) the benefits perceived by city representatives as well as OGD external stakeholders and c.) out of the mentioned drawbacks obtained by surveys and interviews from the mentioned stakeholder groups recommendations for further improvement of the Vienna city OGD portal.

The current state of the organizational set-up of Vienna OGD city portal, assessed by document review and expert interview is as following:

- Clear definition of responsibilities and process steps: To support OGD in Vienna, a virtual department has been founded, comprising of the ICT-department, PR-department, GIS-department, Economy and Statistics-Department, E-Government and Data protection department. This department is directly reporting to the Chief Information Officer of Vienna, who is fully responsible to implement the OGD strategy, as laid out by political government agreement.
- Open data is released according to an OGD process model. This model facilitates to prioritize data sets, assess them according to privacy regulations, ICT-requirements, public utility, data quality, and possible synergies.
- Evaluation has been considered an integral part of the implementation measuring download and API usage, generated applications and visualizations as well as value for money.
- As of the time of the study, the platform has been integrated into the existing CMS system instead of using the pervasive CKAN software. This helped to kick-start the project while building up the required knowledge to operate CKAN.

The Viennese administration (and administrations of German-speaking countries in general) is heavily influenced by the delegation principle with strong department leaders and a comparatively weak central steering group, so the publication of data sets has to be discussed case by case, department by department. Therefore, tangible and communicable benefits of OGD strategy implementation had to be elaborated to convince heads of department to either start to release data or for those who already provided data, to intensify their data supply. These benefits have been mostly aggregated through surveys and interviews. Vienna city employees and heads of department mentioned the following benefits of OGD:

Increased employee motivation: As city employees see the data they work with being taken up and used in applications, they perceive appreciation for their work. Some city workers even mentioned that their work now makes sense as they see what it is used for.

The ability to improve data and processes through error reporting by external stakeholders will help to sanitize the data basis. In the long run this will require coordination between departments which as of now work too autonomously to agree on common data standards.

Currently, OGD is manually provided and requires human interaction. As OGD is not a fad but has come to stay, higher levels of Information, Communication and Technological (ICT) support will be required to support automated and sustainable processes. Processes changed through the application of ICT are likely to cross-fertilize other administrative fields of work.

There has been an improved public image by getting into contact with external stakeholders and reacting to their requests beyond formal administrative processes.

OGD is (ab-)used as a limited but useful information management system. One department picks up data from another department and integrates that data into their own work. Getting that data in the traditional way would have required signatures, explanations and would have been tedious.

Among others, external OGD stakeholders mentioned the following benefits of implementing OGD at the city level:

- The rapid availability of authoritative data as a valuable resource to establish business models. Missing liability declarations by the issuer has only been a minor concern.
- OGD provides indirect insights into government mechanisms and is likely to increase citizen participation. Overall OGD will stabilize and legitimize policies
- Researchers mentioned the value of OGD for research; however unpublished data prior to the date of the establishment of the OGD portal would be of high value to generate time series oriented analysis.

The surveys and interviews combined with literature review were used to generate recommendations for the Vienna OGD portal operators to define next steps. While the recommendations clearly have the Vienna administration in mind, many of the recommendations can be generalized and be useful for other administrations.

1. OGD has to be backed by a legal framework. Currently, OGD is largely a good will action. While public uproar would be high, effectively hindering a shutdown of the OGD portal, there is no legal guarantee that data, once released, will be available for a longer period.
2. Comparability of data sets through the harmonization of the representation of e.g. addresses will have to be gradually improved. This is likely to happen with the implementation of a cross-department information management system via a common data bus and using code lists and thesauri.
3. Although overall OGD uptake of Viennese data sets is very satisfactory, more stakeholder specific target group management is required. Such public relation activities and stakeholder-oriented initiatives have to be carried out by the data releasing departments themselves as they know best their stakeholders. Networking between different target groups is very likely to be beneficial yet difficult to achieve, as current department structures do not foster cooperation. Possible organizational-technical measures are to provide tools on the OGD platform which help to visualize core data sets such as points of interest or time series related data in a user driven fashion.
4. Education and training programs will have to increasingly account for creative methodologies as well as analytical competences. This would require curricula which leverage creativity in what to do with data and computer systems instead of learning how to perfectly use existing implementations.
5. To fuel academia and business, CC-BY or a comparatively permissive license should be used as the default according to which beneficiaries of public subsidies have to release their results. This would enlarge the data and information sphere and help others to build better and derived products, services, and research out of existing building blocks.

In terms of future research, the permanent evaluation of the activities associated with the implementation of an OGD strategy need take place to justify further administrative expenses. Additionally, a generalized OGD implementation assessment model could be created out of existing evaluation building blocks. This facilitates to assess what OGD measures has proven successful and more evaluations of authorities around the world could help to derive more information on OGD implementation as well as help to anticipate the pitfalls in OGD implementation.

Another interesting result warranting research is the use of data of the external oriented data portal by the departments themselves. Departments use site 1 as an information broker substitute to easily access information entities instead of making official internal requests for data which are tedious, have to be approved, take much longer and are fulfilled at a lower data quality or granularity.

Website List

Site 1: Open Government Data Portal of the City of Vienna

<http://data.wien.gv.at>

Site 2: Digitales Österreich

<http://www.digitales.oesterreich.gv.at/site/6497/Default.aspx>

Site 3: Open Knowledge Forum Austria

<http://gov.opendata.at/okfo/>

Site 4: Danube University Krems, Centre for E-Governance

<http://www.donau-uni.ac.at/en/departement/gpa/telematik/index.php>

Site 5: Cooperation Open Government Data Austria

<http://www.data.gv.at/hintergrund-infos/cooperation-ogd-austria/>

Site 6: Open3.at: Netzwerk zur Förderung von OpenSociety, OpenGov und OpenData in Österreich

<http://www.open3.at/>

Site 7: Centre for Administration Research (Zentrum für Verwaltungsforschung – KDZ)

<http://www.kdz.eu>

Site 8: Engage Project

<http://www.engage-project.eu> and <http://www.engagedata.eu>

Site 9: European Commission Digital Agenda for Europe 2020

<http://ec.europa.eu/digital-agenda/en/open-data-0>

Site 10: OpenAIRE portal, Open Access Infrastructure for Research in Europe

<http://www.openaire.eu>

Site 11: Open Government Standards

<http://www.opengovstandards.org/>

References

- [1] Ausschuss für Bildungsfragen, Gemeinsamer Fortschrittsbericht des Rates und der Kommission über die Umsetzung des Arbeitsprogramms Allgemeine und berufliche Bildung 2010, Brüssel, Technical Report 15897/09 EDUC 180 SOC 687 - KOM(2009) 640, 2010.
- [2] R. B'Far, Scalable reasoning techniques for semantic enterprise data, in Linking Enterprise Data (D. Wood, Ed.). New York: Springer US, 2010, pp. 127–147.
- [3] P. Bak, A. Yaeli, G. Saadoun, and H. Ship, Data visualization methods and components, Brussels, Deliverable D7.7.4, 2012.
- [4] E. Barry and F. Bannister, Barriers to open data release: A view from the top, presented at the European Group for Public Administration, Edinburgh, September 9, 2013.
- [5] J. C. Bertot, P. T. Jaeger and J. M. Grimes, Using ICTs to create a culture of transparency: E-government and social media as openness and anti-corruption tools for societies, Government Information Quarterly, vol. 27, no. 3, pp. 264–271, 2010.
- [6] S. A. Chun, S. Shulman, R. Sandoval and E. Hovy, Government 2.0: Making connections between citizens, data and government, Inf. Polity, vol. 15, no. 1, pp. 1–9, 2010.
- [7] F. Cindio, Guidelines for Designing Deliberative Digital Habitats: Learning from e-Participation for Open Data Initiatives, The Journal of Community Informatics, vol. 8, no. 2, Apr. 2012
- [8] Comptroller and Auditor General, Cross-government review: Implementing transparency, National Audit Office, London, April 2012.
- [9] T. G. Davies. (2013, December) Notes on open government data evaluation and assessment frameworks. Open Data Impacts. [Online]. Available: <http://www.opendataimpacts.net/2013/02/506/>
- [10] T. G. Davies and Z. A. Bawa, The promises and perils of open Government data (OGD), Journal of Community Informatics, vol. 8, no. 2, 2012.

- [11] S. S. Dawes and N. Helbig, Information strategies for open government: Challenges and prospects for deriving public value from government transparency, in *Lecture Notes in Computer Science* (D. Hutchison, T. Kanade, J. Kittler, J.M. Kleinberg, F. Mattern, J. C. Mitchell, M. Naor, O. Nierstrasz, C. P. Rangan, B. Steffen, M. Sudan, D. Terzopoulos, D. Tygar, M. Y. Vardi, G. Weikum, Eds.). Lausanne, Switzerland: Springer, 2010, pp. 50–60.
- [12] Department of Economic and Social Affairs, Guidelines on Open Government Data for Citizen Engagement, Division for Public Administration and Development Management, 2013.
- [13] European Commission. (2010, December) The european eGovernment action plan 2011-2015 - harnessing ICT to promote smart, sustainable & innovative Government. European Commission. [Online]. Available: <http://ec.europa.eu/digital-agenda/en/european-egovernment-action-plan-2011-2015>
- [14] E. Ferro and M. Osella, Eight Business Model Archetypes for PSI Re-Use, presented at the Open Data on the Web Workshop, Google Campus, Shoreditch, London, 2013.
- [15] M. Fioretti, Open data: Emerging trends, issues and best practices - a research project about openness of public data in EU local administration, in *Open Data, Open Society* (G. Bottazi, Ed.). Pisa: Laboratory of Economics and Management, 2012.
- [16] J. Fox, The uncertain relationship between transparency and accountability, *Development in Practice*, vol. 17, no. 4–5, pp. 663–671, 2007.
- [17] M. B. Gurstein, Open data: Empowering the empowered or effective data use for everyone?, *First Monday*, vol. 16, no. 2, 2011.
- [18] B. Huber, A. Kurnikowski, S. Müller, and S. Pozar, Die wirtschaftliche und politische dimension von open government data in Österreich, Institut für Entrepreneurship & Innovation WU Wirtschaftsuniversität Wien, Wien, 2013.
- [19] K. Janssen, Open government data and the right to information: Opportunities and obstacles, *Journal of Community Informatics*, vol. 8, no. 2, 2012.
- [20] M. Janssen, Y. Charalabidis and A. Zuiderwijk, Benefits, adoption barriers and myths of open data and open government, *Information Systems Management*, vol. 29, no. 4, pp. 258-268, 2012.
- [21] M. Kaltenböck and T. Thurner, *Open Government Data Weißbuch*. Krems: Donau-Universität Krems, 2011.
- [22] B. Krabina and T. Prorok, *Open Government Vorgehensmodell*, KDZ, Wien, Vorgehensmodell, V1.0, 2011.
- [23] B. Krabina, T. Prorok and B. Lutz, *Open Government Vorgehensmodell*, KDZ, Vienna, Vorgehensmodell, V2.0, 2012.
- [24] R. Ledinger, E-Government in Austria, presented at the 15th Porvoo Conference, Vienna, May 27, 2009.
- [25] G. Lee and Y. H. Kwak, An Open Government Implementation Model: Moving to Increased Public Engagement, IBM Center for The Business of Government, Jan. 2011.
- [26] D. G. Lenihan, L. Church, D. Eaves, P. MacLeod, D. Newman, R. Sharma, N. Sterling, E. Todres, and H. Zafari, Open by default: Moving ontario forward, The Open Government Engagement Team, Toronto, Ontario, Technical Report 2428, 2014.
- [27] J. Lucke, J. and C. P. Geiger, Open Government Data - Frei verfügbare Daten des öffentlichen Sektors, Zeppelin University, Friedrichshafen, Technical Report TICC-101203, 2010.
- [28] B. Lutz, Open government - IKT-Strategische richtlinie, MD-OS/IKT, Version 1.1 - 17.02.2012. 2012.
- [29] A. J. Meijer and M. Thaens, Public information strategies: making government information available to citizens, *Inf. Polity*, vol. 14, no. 1-2, pp. 31-45, 2009.
- [30] J. Mittheisz, Open Government – Ausbau 2012. MD-OS, 26-Apr-2012.
- [31] R. Neidinger, Hinsichtlich der Zusammenarbeit der städtischen Dienststellen mit der MA 23 im Bereich der Statistik und der Registerzählung. 2012.
- [32] I. I. NEMEDI, Advanced eGovernment information service bus (eGov-Bus), *Informática Económica*, vol. XI, no. 1, pp. 67-73, 2007.
- [33] T. Sheridan and J. Tennison, Linking UK government data, in *Proceedings of the WWW Workshop on Linked Data on the Web*, Raleigh, North Carolina, 2010, pp.1-4.
- [34] SPÖ und Grüne Wien, Gemeinsame Wege für Wien Das rot-grüne Regierungsübereinkommen. SPÖ und Grüne Wien, Nov-2010.
- [35] Sunlight Foundation. (2011, November) Ten principles for opening up government information - policy center. Sunlight Foundation. [Online]. Available: <http://sunlightfoundation.com/policy/documents/ten-open-data-principles/>.
- [36] The Gallup Organization, Entrepreneurship in the EU and beyond, European Commission, Brussels, Flash EB Technical Report Series #283, 2009.
- [37] TED Conferences, Tim Berners-Lee: The next web, Long Beach, USA, 2009.
- [38] UK Department for Education, The national curriculum in England, England, 2013.

Appendix A: Internal Questionnaire

General information/department/function
Contact details
What is your function at the department
Is it a leading position
Is your department actively working on the Open Government presence of the City of Vienna
Offer and expenses
Was there an increase of external requests concerning data sets via telephone after the implementation of the OGD strategy
Was there an increase of external requests concerning data sets via email after the implementation of the OGD strategy
The expenses for the implementation of the OGD strategy at my department per month can be numbered with (approximately days of work per person)
Was there an increase of internal requests from other departments concerning data sets after the implementation of the OGD strategy
What are your department expenses to release OG data sets [data set] [hours].
Has the expense of work in your department concerning the provision of data been reduced since the implementation of the OGD strategy
Is there an additional value for your department by the implementation of the OGD strategy
Publicity and advertisement
Which advertisement measures accompanying the release of OGD have been undertaken by your department
From which other administrative departments does your department use data
Would it make sense for your department to recommend the provided data at the platform to external users with advertising measures?
Operative internal process
Does your department deliberately publish not entirely correct data sets
Are the provided OG data sets in your opinion complete and representative
What is the time frame of internal availability of data up to their publication (hours/days/weeks/months)
How do you feel about the utilization statistics concerning the usage of your data at the data platform
Communication with target groups
Are you familiar with the negative effects of data abusing / misinterpreting your data sets
Which policies are in effect to deal with reported mistakes or recommendations
Communication with the departments
Is your department able to propose wishes/ideas to the OGD competence centre and how do your reports affect future expansion steps
How was the OGD strategy mediated to you
Future data and possibilities of improvement
Do you basically have an overview about the data sets that are generated or enriched in your department
Is your department offering data for sale
Which data sets do you recommend for further publication at the data platform of the City of Vienna
Are the ICT-strategic guidelines of OGD in Vienna an effective instrument for the implementation of the OGD initiative
Which suggestions for improvement would you recommend for future data set release phases
Is it planned to intensify the current OGD engagement of your department
Do you consider the implementation of the OGD strategy as an important aspect of your work?
Our department is actively participating at the OGD performance of the City of Vienna
Is the term OGD familiar to you and are you able to explain the main features of Vienna's OGD strategy to a colleague
Do you see possibilities to make data sets from your department publicly available for interested external stakeholders
Have you found relevant data sets for your work at the OGD platform

Appendix B: External Questionnaire

General information/field of activity/function
How old are you
Gender
What is the name of your organization, institution or enterprise
What is your function
Are you familiar with the term <i>Open Government Data</i>
General Open Government Data questions
Which of the following stakeholder groups describes best your involvement with OGD?
How did you get notice of Open Government Data
Did you actively use Open Government Data
Did you already attend conferences, meet-ups, meetings with an OGD focus
Are you a member of Facebook, LinkedIn, a mailing list or another random social network which has Open Data as a subject focus
Which political consequence does Open Government Data have
Which societal consequences does Open Government Data have
Which economic consequences does Open Government Data have
What kind of data sets are you interested in or which kind of data sets would you like to have more available of
Which recommendations do you have for future OGD initiatives
Which institutions will benefit the most as a result of OGD
Detailed questions
Have you already used OGD of the City of Vienna for your field of activity
Detailed questions journalism
Have you already used OGD of the City of Vienna for your journalistic field of activity
Detailed questions economy
Have you already used OGD of the City of Vienna for your economic field of activity
Detailed questions science & research
Have you already used OGD of the City of Vienna for your scientific field of activity
General utilization of the OGD platform
Describe the use-case you made use of open data
What is your personal main interest concerning the open data area
What were your positive and/or negative experiences with the platform data.wien.gv.at
Possible fields of application for OGD
Is OGD relevant for your field of activity
How do you plan to use OGD
Are there additional abilities or skills that you need to have in order to make better use of OGD
Which measure might help to bridge the gender imbalances concerning open data use in general and especially at application competitions
What are the areas of data that you are interested in or where you wish to have more data available concerning your field of activity
Which data format is the most convenient to work with OGD in your field of activity
The utilization of OGD in the business area
What is your predominant field of activity
Where is your enterprise located
Since you are making use of OGD in your products and services, to what extent [percent] did increase your revenues because of OGD
How do you estimate the proportional revenue because of OGD in ten years
How do you perceive the potential of OGD for internal utilization for example in business intelligence?