Methodologies for publication of Open Government Data

Research report

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Abstract

Public sector bodies hold significant amount of valuable data than can be reused in new and innovative applications and services. Open Government Data (OGD) is a machine-readable data owned by the public sector bodies and made available on the web for free reuse. OGD promises significant benefits to citizens, business and the public sector bodies as well. However the public sector bodies are currently facing a number of problems and issues when publishing OGD. In order to facilitate OGD publication various methodologies for its publication is being developed. The goal of this paper is to discuss problems and issues related to publication of OGD, introduce some of the existing OGD publishing methodologies and discuss how these methodologies address the identified problems.

Key words

Open Data, Open Government Data, OGD, data publication, methodology, OGD publication methodology, assessment, OGD publication problems

History

Version	Date	Description	Revised by
0.1	15. 7. 2014	Results of the initial assessment (May 2014) translated into English.	Jan Kučera
0.5	28. 7. 2014	Previous assessment revised. Assessment of the following methodologies added: • MEtric for reLeasing Open Data (v3.10) • Methodological Guidelines for Publishing Linked Data • Best Practices for Publishing Linked Data	Jan Kučera
1.0	29. 7. 2014	Version 1.0 finalized.	Jan Kučera

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1   Introduction

Public sector bodies hold significant amount of valuable data than can be reused in new and innovative applications and services. Open Government Data (OGD) is a machine-readable data owned by the public sector bodies and made available on the web for free reuse (see for example (Open Knowledge Foundation, 2012)). Open Government Data can help increase transparency, improve government performance and it can stimulate economic growth (Ubaldi, 2013). OGD promises significant benefits to citizens, business and the public sector bodies as well. However the public sector bodies are currently facing a number of problems and issues when publishing OGD. These problems and issues are discussed in more detail in the following section.

In order to facilitate OGD publication various methodologies for its publication is being developed. According to Buchalcevová (2009) a methodology is "*a set of methods and procedures for performing a certain task.*" In this paper OGD publication methodology is defined as a set of methods, procedures or practices for publication of Open Government Data. I.e. the OGD publication methodology provides recommendations or guidelines how Open Government Data should be published and how to perform the steps of the OGD publication process.

The goal of this paper is to presents some of the existing OGD publishing methodologies and discuss how these methodologies address identified problems and issues related to the publication of OGD. OGD publication problems introduced in this paper were identified during the literature review.

In this report is structured as follows. In the next section identified problems and issues of the OGD publication are described. Next based on these problems and issues a set of requirements for the OGD publication methodology are defined. In the following section some of the existing OGD methodologies are briefly described. Next section contains evaluation of the existing methodologies. Concluding remarks are presented at the end of this paper.

2   Problems and Issues of the OGD Publication

In this section problems and issues related to publication of OGD are described. These issues and problems were identified by review and analysis of the literature, especially studies and papers focusing on analysis of the current state of the OGD phenomena.

Ubaldi (2013) discusses challenges of the OGD initiatives related to policy, technology, financing, organisation, culture, and legal frameworks. Both and Schieferdecker (2012) in their study grouped the recommendations into political, organisational, legal and technical recommendations. This shows that there might be issues or problems related to different aspect of OGD publication and initiatives. Therefore the problems of the OGD publication discussed in this section classified into the following domain:

- Political and social (*SOC*) – problems related to the political support, decision making and social problems;
- Economic (*ECO*) – problems related to benefits and costs of OGD and to identification and measurement as well as problems related to the financing of the OGD initiatives;
- Process and organizational (*ORG*) – problems related to the organizational structures and process through which the OGD are delivered;
- Legal (*LEG*) – problems related to the legal openness of OGD as well as the legislative issues;
- Technical (*TCH*) – problems related to the technology, data formats and infrastructure needed to publish OGD.

Identified problems and issues of the OGD publication are summarized in the following table 1. Description of the problems represents an interpretation author's interpretation of the analysed literature.

Table 1: Problems and issues of the OGD publication, source: author

ID	Problem/issue	Description	Domain	References
PR7	Too many OGD initiatives	According to (Janssen et al., 2012) open data users in Netherland feel confused by too many OGD initiatives.	SOC	(Janssen et al., 2012)
PR9	Misinterpretation of the data or contradictory conclusions	Published open data might be misinterpreted. Different users might draw different conclusions out of the data.	SOC	(Kučera and Chlapek, 2014), (Janssen et al., 2012)
PR11	Arguable value of the user feedback	Feedback provided by the users does not always have the necessary level of quality to be used for improvements.	SOC	(Janssen et al., 2012)
PR3	Low value or unclear re-use potential of the datasets	Some of the published datasets have little value for the users or they use is not always obvious.	ECO	(Janssen et al., 2012)
PR4	Public sector bodies seek benefits for themselves over benefits to the society	In some cases the public sector bodies prefer benefits for themselves over the benefits for citizens and society. This might hinder re-use.	ECO	(Janssen et al., 2012)
PR6	Some public sector bodies must sell data but fees hinder OGD re-use	Fees and payment for data represent a barrier to the re-use. However there are public sector bodies that must sell data to cover their costs.	ECO	(Ubaldi, 2013), (Janssen et al., 2012)
PR22	Not enough resources, especially in case of the small public sector bodies	Financial and other resources are needed for publication of OGD. However the small public sector bodies might not have the required resources.	ECO	(Janssen et al., 2012)
PR24	No systematic OGD cost measurement	Costs of OGD publication are not systematically measured. Although some of the sector bodies are aware of the related costs, cost side has not received enough attention.	ECO	(Ubaldi, 2013), (National Audit Office, 2012)
PR27	No systematic OGD benefits assessment	There are many studies discussing the OGD benefits. However the public sector bodies not always systematically track and manage the benefits.	ECO	(National Audit Office, 2012)
PR1	No standard process of the OGD publication	Standards or guidelines for OGD publication are not always defined, therefore the persons responsible for OGD publication might not always know how to proceed with the OGD publication.	ORG	(Ubaldi, 2013), (Janssen and Zuiderwijk, 2012), (Janssen et al., 2012)
PR10	Lack of interaction between OGD users and publishers	OGD providers do no always assess the provided feedback or interact with the OGD users. Publishers do not provide support to the users (e.g. it is not always possible to ask for help when problems with some dataset arise).	ORG	(Ubaldi, 2013), (Janssen et al., 2012), (Tinholt, 2013)
PR20	No centralised OGD portal	Sometimes there is no central OGD portal available to the publishers.	ORG	(Janssen et al., 2012)
PR25	Processes and responsibilities not always in place	Publication of OGD requires appropriate structure of processes, roles and their responsibilities. However these are not always in place and setting up the right organizational structure requires significant effort.	ORG	(Ubaldi, 2013)
PR26	Published open datasets are seldom regularly updated	According to (Tinholt, 2013) in 96% of the assess countries datasets are published only once and they are seldom regularly updated.	ORG	(Tinholt, 2013)

ID	Problem/issue	Description	Domain	References
PR2	Legal risks and concerns about possible violations of legislation	There is a risk of violation of protection of the personal information or other protected information when publishing OGD. Concerns about the possible violation of legislation acts as a barrier to the OGD publication.	LEG	(Janssen et al., 2012), (National Audit Office, 2012)
PR15	Unclear, missing or restrictive terms of use	Published datasets have missing, unclear or restrictive terms of use. This results in legal uncertainty of the potential users. Some of potential users consider re-use of unclearly licenced datasets too risky.	LEG	(Ubaldi, 2013), (Janssen et al., 2012)
PR13	Same or similar datasets do not always share the same format or schema	Same or similar datasets are published on multiple places. Related datasets are not interlinked enough. Same or similar datasets are published in different formats or schemas.	TCH	(Ubaldi, 2013), (Janssen et al., 2012)
PR14	Users need to register to access data	Some of the public sector bodies require users to register in order to access the data. According to (Sunlight Foundation, 2010) such practice is viewed as discriminating.	TCH	(Janssen et al., 2012)
PR16	Published data is not primary	According to (Janssen et al., 2012) some of the users pointed out that the published datasets are not always primary, i.e. only aggregated data is published. However due to the personal data protection it might not always be possible to publish the primary data.	TCH	(Janssen et al., 2012)
PR17	Low quality of the published data	Quality of the published open datasets is not always sufficient.	TCH	(Janssen et al., 2012), (Tinholt, 2013)
PR18	It is difficult to find required data	Sometimes it is difficult to find the required open data. This is often caused by the missing or insufficient metadata. Metadata of poor quality also makes the reuse problematic. Especially if the information needed to correctly interpret the data is missing.	TCH	(Ubaldi, 2013), (Janssen et al., 2012), (Tinholt, 2013)
PR19	Missing description of the data formats and schemas	Schema of some of the datasets is complex. However schema definition is not always provided which makes the reuse difficult.	TCH	(Janssen et al., 2012)
PR21	In some cases it might be difficult to publish OGD due to the underlying ICT infrastructure (e.g. in case of the "legacy" applications)	ICT environment within the public sector bodies is heterogeneous and made of different applications. Some of these applications are legacy. In such cases the underlying infrastructure might make the OGD publication challenging.	TCH	(Ubaldi, 2013), (Janssen et al., 2012)
PR23	Lack of suitable software tools for OGD publication	Available software tools have not reached the state of industry standards yet.	TCH	(Janssen et al., 2012)

List of problems and issues related to the OGD publication presented in the table 1 is by no means comprehensive. Other problems are mentioned in the literature as well. For example Ubaldi (2013) as well as Janssen et al. (2012) point out that not every person has the necessary skills and knowledge to use the published open datasets and thus there are concerns that OGD might contribute to the digital divide. Janssen at al. (2012) also report that some of the potential users have no time to use the data. However there are issues not only on user side but on the government (publisher) side as well. For instance Ubaldi (2013) points out that many countries do not have a dedicated OGD strategy. According to Ubaldi (2013 str. 41) OGD strategy "*can help establish what data to open, for what purpose and how the government is planning to stimulate a market for its use.*"

Although the abovementioned problems might seriously affect the OGD initiatives and their success they will not be further discussed in this paper, because solution of these problems probably lies

beyond the scope of the OGD publication methodologies. Development of the dedicated OGD strategy falls into the domain of the national OGD governance. Digital divide is a problem that is related not only to the Open Government Data (see for example (Aqili and Alireza, 2008)).

3   OGD Publication Methodology Requirements

One of the current issues of the OGD publication is a fact that the OGD publication process and practices are not always standardized (see *PR1* in the table 1). OGD publication methodology might be a way how to achieve the desired standardization in this area. In order to be able to help the OGD publisher to deal with problems and issues described in the table 1, such methodology should meet a set of requirements. These requirements are explained in the table 2.

Table 2: OGD publication methodology requirements, source: author

ID	Requirement	Description	Related problems
RQ1	Definition of roles	The OGD publication methodology should specify roles and their responsibilities for activities and tasks related to OGD publication. This should ensure that it is clearly described who is responsible for what when publishing Open Government Data.	PR25
RQ2	Assessment of demand for OGD	In order to focus the effort on datasets that are in demand by the potential users, the OGD publication methodology should provide guidelines how to assess the demand for OGD.	PR3, PR4, PR10
RQ3	Selection and prioritization of datasets	Public sector bodies own various datasets. Therefore the OGD publication methodology should provide guidelines how to identify and select suitable datasets for opening up. Because it might not be always feasible to publish all the selected datasets at once, recommendations on prioritization of datasets for publication should be provide as well.	PR3
RQ4	OGD benefits assessment	Because the OGD benefits are not always systematically assessed, the OGD publication methodology should provide explanation of the typical OGD benefits and recommendations for their assessment.	PR27
RQ5	Effort and costs estimation	In order to support financial and resource management of the OGD publication, recommendations on effort and cost estimation should be provided by the OGD publication methodology.	PR21, PR24
RQ6	Recommendation about fees	In order to align the OGD publication with the applicable charging principles the OGD publication methodology should discuss the issues of collecting fees for data vs. providing data for free.	PR6
RQ7	Ensuring compliance with the legislation	The OGD publication methodology should provide guidelines or recommendations about analysis of the applicable legislation and the possible limitations to publication of particular datasets. The goal of this analysis is to ensure that publication of the selected datasets complies with the applicable legislation. In case that it is not possible to publish the primary data (e.g. due to the personal data protection), the methodology should provide recommendations about anonymization of the data.	PR16
RQ8	Risk analysis	In order to properly manage the possible risks associated with the OGD publication, the methodology should discuss the risk management issues and it should provide recommendations how to deal with common risks.	PR2
RQ9	Licencing	In order to ensure that the published data are legally open, the methodology should provide recommendation about licencing Open Data and how to inform users about the terms of use of the datasets.	PR15
RQ10	Reuse of already published datasets	In order to avoid unnecessary duplicate publication of datasets on different web sites, the methodology should provide recommendations how the OGD publishers should reuse existing datasets and inform them about existence of the data portals.	PR13
RQ11	Recommended data formats	In order to ensure that the published data is technically open, the methodology should provide a set of recommended data formats together with guidelines for their application.	PR13

ID	Requirement	Description	Related problems
RQ12	Interlinking of related datasets	Datasets might relate to each other. In order to increase value of the provided datasets, the methodology should provide recommendations or guidelines how to interlink datasets and how and when to publish Linked Open Data.	PR13
RQ13	ICT impact assessment	Publication of OGD might require changes to the underlying ICT infrastructure and systems. Therefore ICT impact assessment should be taken into consideration by the OGD publication methodology.	PR21
RQ14	OGD publication process	OGD publication process and recommendations for its execution should be included in the methodology. This should ensure that every involved party know what steps should be taken to publish OGD.	PR1, PR25
RQ15	Data cataloguing	In order to ensure that the published data are easily located by their potential users and that the information needed to understand the data schema, semantics and possible limitations are available to the users, guidelines on data cataloguing should be provided by the methodology together with the recommended metadata schema. Metadata quality assurance should be discussed as well.	PR9, PR18, PR19
RQ16	Data quality assurance	In order to ensure that the published open datasets meet the quality requirements, the methodology should provide guidelines for data quality assurance.	PR17
RQ17	Ensuring easy access to datasets	The methodology should discuss the common barriers to access to the datasets including a possible pitfall of required user registration at data portals. This should ensure that the access to the published datasets is as easy as possible.	PR14
RQ18	Dataset maintenance	Dataset maintenance should be addressed by the OGD publication methodology in order to ensure that the datasets are regularly updated.	PR26
RQ19	Communication strategy	Recommendation how to develop OGD communication strategy should be provided by the methodology. This strategy should define how the feedback from the users will be processed, how the OGD will be promoted and how the OGD activities of the publisher will be aligned with other relevant OGD initiatives.	PR7, PR10, PR11
RQ20	Independence on the central data portal	Even though many countries have launched their national OGD portal there might be other countries where the central data portal is not available. Therefore the recommendations and practices described in the OGD publication methodology should de independent on the central (national) data portal.	PR20
RQ21	Recommended software	In order to ease selection of the suitable software tools for publication of OGD, the methodology could provide a list of recommended software tools.	PR23
RQ22	Public sector bodies of different size should be taken into consideration	Public sector consists of different public sector bodies. The small ones might have a very limited resources for publication of OGD. Therefore size of the public sector bodies should be taken into consideration when formulating recommendations of the OGD publication methodology.	PR22

4 Existing Methodologies

In this section some of the existing OGD publication methodologies are briefly introduced. List of methodologies described in this section is by no means comprehensive and it may be extended or updated in the future versions of this report. Methodologies that are available in English language are primarily included in this the report. Table 3 provides an overview of the methodologies analysed in this paper.

Table 3: Overview of the OGD publication methodologies analysed in this paper, source: author

ID	Name	Author/publisher	References
ODH	Open Data Handbook	Open Knowledge Foundation	(Open Knowledge Foundation, 2012)
OGDUN	Guidelines on Open Government Data for Citizen Engagement (2nd edition)	United Nations	(United Nations, 2013)
OGDTK	Open Government Data Toolkit	World Bank	(World Bank, 2014)
POD	Project Open Data	Office of Management and Budget, Office of Science and Technology Policy	(Office of Management and Budget; Office of Science and Technology Policy, 201?)
SODFG	Open Data Field Guide	Socrata	(Socrata, 2014)
ODIG	Open Data Institute Guides	The Open Data Institute	(The Open Data Institute, 201?a), (The Open Data Institute, 201?b), (The Open Data Institute, 201?c), (The Open Data Institute, 201?d), (The Open Data Institute, 201?e), (The Open Data Institute, 201?f), (The Open Data Institute, 201?g), (The Open Data Institute, 201?h), (The Open Data Institute, 201?i), (The Open Data Institute, 201?j), (The Open Data Institute, 2014)
ODVSCR	Czech Open Government Data Publication Methodology	D. Chlapek, J. Kučera, M. Nečaský	(Chlapek et al., 2012)
MELODA	MEtric for reLeasing Open Data (v3.10)	University Rey Juan Carlos	(University Rey Juan Carlos, 2014)
MGPLD	Methodological Guidelines for Publishing Linked Data	B. Villazón-Terrazas, O. Corcho	(Villazón-Terrazas and Corcho, 2011)
BPPLD	Best Practices for Publishing Linked Data	B. Hyland, G. Atemezing, B. Villazón-Terrazas	(Hyland et al., 2014)

4.1 Open Data Handbook

Open Data Handbook (ODH) is a methodology developed by the Open Knowledge Foundation (2012). It provides definition of Open Data and it discusses the possible Open Data benefits. Basic process of Open Data publication is outlined together with a set of recommendations for tasks like selection of datasets for opening up, licencing, making the published datasets discoverable or communication with the potential users. Suitable data formats are discussed in the methodology as well.

4.2 Guidelines on Open Government Data for Citizen Engagement

Guidelines on Open Government Data for Citizen Engagement (OGDUN) 2nd edition is a methodology developed by the Department of Economic and Social Affairs of the United Nations. This methodology is aimed strengthening citizen engagement through OGD and it is intended mainly for policy-makers and technologist (United Nations, 2013). The concept of Open Government Data is explained as well as the process for developing OGD strategy. Practical recommendations how to open up government data and how asses their impact are provided. The methodology also provides recommendations about interaction between OGD publishers, citizens and users.

4.3 Open Government Data Toolkit

Open Government Data Toolkit (OGDTK) is a methodology developed by the World Bank (2014). It provides definition of OGD and introduction to this concept. This methodology often references other methodologies and literature. Topics discussed by the methodology include, but are not limited to, recommended technologies, building demand for OGD and the user engagement. Data quality is also

discussed. Provided recommendations and references to other sources are accompanied with OGD readiness assessment questionnaire[1].

4.4 Project Open Data

Project Open Data (POD) is a project initiated by the US government, however it is open to public for participation (Office of Management and Budget; Office of Science and Technology Policy, 201?). Its goal is to develop an OGD methodology which would support the public sector bodies in publishing data in line with the Open Data Policy (Executive Office of the President, 2013). This methodology provides basic definition of Open Data, recommendations for implementation of the Open Data Policy, overview of the suitable software tools and recommended readings and resources. A set of case studies is also available at project website.

4.5 Open Data Field Guide

Goal of the **Open Data Field Guide (SODFG)** by Socrata is to provide a comprehensive set of recommendations for implementation of the Open Data initiatives (Socrata, 2014). The concept of Open Data is explained in this methodology as well as the benefits of Open Data. This methodology provides recommendations for example for setting up the goals of the Open Data initiative, forming the Open Data team, development of the policy, planning and implementation of the initiative and interacting with the users. Alongside the publication of data in machine-readable formats this methodology emphasizes presentation of the data through applications.

4.6 Open Data Institute Guides

Open Data Institute on its website provides a set of guidelines for publication and consumption of Open Data[2]. As of July 2014 the **Open Data Institute Guides (ODIG)** cover the following topics:

- Definition of Open Data (The Open Data Institute, 201?j);
- Potential use of Open Data (The Open Data Institute, 201?d);
- Engaging with re-users (The Open Data Institute, 201?a);
- Open Data Rights Statement Vocabulary (The Open Data Institute, 201?f), (The Open Data Institute, 201?h);
- Open Data Licencing (The Open Data Institute, 201?e), (The Open Data Institute, 201?g);
- Open Data Business Case (The Open Data Institute, 201?c);
- The Open Data Consumers Checklist (The Open Data Institute, 201?i);
- Anonymization (The Open Data Institute, 2014);
- FAQs (The Open Data Institute, 201?b).

4.7 Czech Open Government Data Publication Methodology

Czech Open Government Data Publication Methodology (ODVSCR) (Chlapek et al., 2012) defines Open Government Data, it outlines the OGD publication process and a set of roles participating on the publication of OGD. Recommendations for the individual steps of the OGD publication process are provided. These recommendations cover, but are not limited to, the following topics: selection of the datasets for opening up, licencing, selection of the suitable machine-readable formats or data cataloguing.

4.8 MEtric for reLeasing Open Data (v3.10)

MEtric for reLeasing Open Data (MELODA) is rather a method than a methodology. It was developed by the University Rey Juan Carlos and other contributors (MELODA, 2014). MELODA is a method for

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[1] http://data.worldbank.org/about/open-government-data-toolkit/readiness-assessment-tool
[2] http://theodi.org/guides

evaluation of datasets and their readiness for re-use. Based on the evaluation of the legal framework, technical standards, accessibility to the information and the semantic data model dataset are being scored. However criteria for evaluation of these four dimensions might be used as a lightweight recommendations for data publishers how to publish datasets that are reusable.

4.9 Methodological Guidelines for Publishing Linked Data

Methodological Guidelines for Publishing Linked Data (MGPLD) represent a methodology specifically aimed at publication of data according to the Linked Data principles (Berners-Lee, 2006). Guidelines and recommendations of this methodology are organized according to a life cycle with the following phases (Villazón-Terrazas et al., 2011): specification, modelling, generation, publication and exploitation.

4.10 Best Practices for Publishing Linked Data

Best Practices for Publishing Linked Data (BPPLD) is a methodology for publishing Linked Data developed by W3C (Hyland et al., 2014). This methodology consists of the following best practices (Hyland et al., 2014):

1. Prepare Stakeholders,
2. Select a Dataset,
3. Model the Data,
4. Specify an Appropriate License,
5. The Role of "Good URIs" for Linked Data,
6. Standard Vocabularies
7. Convert Data to Linked Data
8. Provide Machine Access to Data
9. Announce to the Public and
10. Social Contract of a Linked Data Publisher.

5 Evaluation of the Existing Methodologies

OGD publication methodology requirements were described in the section 3. Evaluation how the methodologies introduced in the previous section satisfy these requirements is summarized in the table 4. Every requirement is either satisfied (**S**), partially satisfied (**P**) or not satisfied (**N**) in the particular methodology. The following general guidelines were applied during assessment of the methodologies:

- A requirement is considered to be *satisfied* (**S**) if the methodology contains description of the problem area as well as specific guidelines or practical recommendations how to deal with the particular problem.
- A requirement is considered to be *partially satisfied* (**P**) if the problem area is only described in the methodology but there are no specific guidelines or practical recommendations how to deal with the particular problem.
- A requirement is considered to be *not satisfied* (**N**) if the problem area is not covered by the methodology or if it is discussed only briefly.

Table 4: Evaluation of the OGD publication methodologies, source: author

ID	Requirement	ODH	OGDUN	OGDTK	POD	SODFG	ODIG	ODVSCR	MELODA	MGPLD	BPPLD
RQ1	Definition of roles	N	N	N	S	S	N	S	N	N	P
RQ2	Assessment of demand for OGD	S	S	N	S	S	P	N	N	N	N
RQ3	Selection and prioritization of datasets	S	S	N	S	S	S	P	N	P	P
RQ4	OGD benefits assessment	P	P	P	P	S	P	N	N	N	N
RQ5	Effort and costs estimation	N	P	N	P	N	P	N	N	N	N
RQ6	Recommendation about fees	P	S	N	N	N	S	N	N	N	N
RQ7	Ensuring compliance with the legislation	N	P	N	S	N	P	P	N	N	N
RQ8	Risk analysis	P	S	N	S	N	P	N	N	N	N
RQ9	Licencing	S	S	P	S	P	S	S	S	S	P
RQ10	Reuse of already published datasets	N	N	N	N	P	N	N	N	S	P
RQ11	Recommended data formats	S	P	P	P	S	P	S	S	P	P
RQ12	Interlinking of related datasets	N	P	N	N	P	N	P	N	S	S
RQ13	ICT impact assessment	N	N	N	S	N	N	N	N	N	N
RQ14	OGD publication process	S	S	N	P	N	N	S	N	S	S
RQ15	Data cataloguing	P	P	P	S	N	S	N	N	P	P
RQ16	Data quality assurance	N	N	P	P	N	N	N	P	P	N
RQ17	Ensuring easy access to datasets	P	P	N	N	P	N	N	S	N	N
RQ18	Dataset maintenance	N	N	N	P	N	N	N	N	N	P
RQ19	Communication strategy	S	S	S	P	S	S	P	N	N	P
RQ20	Independence on the central data portal	S	S	S	S	S	S	S	S	S	S
RQ21	Recommended software	P	P	P	S	N	N	N	N	S	N
RQ22	Public sector bodies of different size should be taken into consideration	N	N	P	N	N	N	N	N	N	N

Assessment of the methodologies summarized in the table 4 shows that none of the analysed methodologies meets all the requirements described in the section 3. However due to the different scope and focus of each of the analysed methodologies the results should not be taken as a critique of any of the methodologies. The results should be rather viewed as a comparison what topic or problem domains are addressed in the analysed methodologies.

Most of the analysed methodologies discusses what Open Data is, how to ensure legal openness of the datasets by appropriate licencing and the technical openness by publications of data in machine-readable formats. Recommendations for selecting datasets for opening up and at least some basic recommendation for user engagement or promotion of the published open datasets are often provide as well. Recommendations provided by the analysed methodologies in most cases do not assume use of the features provided by the central data portal.

Open Government Data Toolkit (*OGDTK*) by the World Bank often references to other sources instead of providing its own recommendations. Open Data Handbook (*ODH*), Guidelines on Open Government Data for Citizen Engagement (*OGDUN*) and the Open Data Field Guide (*SODFG*) are among the referenced sources. Many of the requirements are assessed as not satisfied by the *OGDTK* because of *OGDTK* does not address them directly. However users of the *OGDTK* might find recommendations for the non-addressed topics in other referenced methodologies.

MELODA covers only a limited number of the requirements. It is necessary to mention that *MELODA* is focused just on assessment of some basic attributes of datasets concerning ease of their reuse. Therefore many of the requirements are out of the *MELODA's* scope. It is also not a process oriented

methodology and thus it does not describe the OGD publication process. However *MELODA* might complement some of the process oriented methodologies with measurement dimension.

Although *MELODA* does not cover the data quality of open datasets thoroughly, it provides measures for assessment of the data schema and datasets reusing global data standards are scored better than those not utilizing these standards (University Rey Juan Carlos, 2014). Adopting a common model might be a way how to implement data and schema integration as a data quality improvement technique (Batini et al., 2009). Therefore data quality is assessed as partially satisfied in *MELODA*.

6   Conclusion

Open Government Data is on the agenda of many governments nowadays. Although opening up data is sometimes view as something that is easily achieved, according to (Janssen and Zuiderwijk, 2012) public servants in charge of the opening up process "*experience that opening might be more difficult than initially advocated*". OGD publishers face many political and social, economic, process and organizational, legal and technical issues and problems when publishing OGD. Some of the current problems and issues related to OGD publication ware summarized in this paper.

In order to support OGD publisher in their tasks various OGD publication methodologies are being developed. Ten of the existing methodologies were briefly introduced in this papers. Based on the identified OGD publication problems and issues a set of requirements for the OGD publication methodology was formulated. Assessment what of the formulated requirements are satisfied in the analysed methodologies was performed.

Assessment provided in this paper shows what topics or problem areas are covered in the analysed methodologies. Most of the analysed methodologies provide definition of Open Data and recommendations for achieving legal openness of the datasets by appropriate licencing and the technical openness by publication of data in machine-readable formats. Recommendations for selecting datasets for opening up and at least some basic recommendation for user engagement or promotion of the published open datasets are often provide as well. Recommendations provided by the analysed methodologies in most cases do not assume use of the features provided by the central data portal.

However none of the analysed methodologies satisfy all of the formulated requirements. This is partially due to the different scope and focus of the analysed methodologies. Therefore results provided in this report should not be interpreted as a critique of the analysed methodologies, as for example *MELODA* is focused only on some aspects related to the OGD publication and many of the assessed requirements are out of the scope of this methodology. Results of the assessment presented in this report might be used by the OGD publisher when looking for guidelines or recommendations how to deal with one of the issues or problems identified in this paper.

7   References

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