A LITERATURE REVIEW ON OPEN GOVERNMENT DATA

SEBUAH TINJAUAN LITERATUR TENTANG DATA PEMERINTAH TERBUKA

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Abstract

The development of information, communication, and technology (ICT) today has benefits value for each element, includes for government institutions. One form of ICT utilization that is currently being implemented in government institutions is Open Government Data (OGD). OGD is proven to be able to improve the government’s transparencies and accountabilities; increase public participations; create a bigger opportunities of data use to boost economy and support new inventions whether in public or private sector. Although, the failure of OGD implementation is found sometimes, the initiation of OGD implementation remains as an interesting topic to discuss. Currently, the initiation of OGD in Indonesia continues to increase. In line with bigger interest in the initiation of Open Government Data in Indonesia, supports from research that addresses the issue of OGD initiation is needed. Thus, the optimum benefits from the initiation of OGD can be obtained. Therefore, this study conducted a literature review to understand how the development of OGD research in the world, especially related to research focus area, research methods and data sources used. From the 18 papers obtained through the Kitchenham stage, it was concluded that, there were three focus areas of the OGD research, namely the assessment for adopting OGD, implementation of OGD, and studies comparison. In term of research methods, generally, OGD-related studies use quantitative, qualitative, mix and descriptive methods with data sources were gained from observations, surveys, analysis documents and interviews. The findings in this study can provide an overview of OGD research which contribute to the implementation of OGD research in Indonesia.

Keywords: open data, open government data, study literature review.

Abstrak


Kata Kunci: data terbuka, data pemerintah terbuka, tinjauan literatur.

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INTRODUCTION

The high intention of public demand on information has forced the government to provide the best information services (Gagliardi et al., 2017). The evolution of information, communication, and technology (ICT) was the key of government initiation to be transparent, responsive, inclusive, accountable, and efficient (Mishra et al., 2017). This situation has led many countries to attempt the implementation of open data concept (Putri Nugroho, 2014).

By utilizing advanced technologies, there are a plethora of advantages for governments by implementing the open data concept. Open data will increase government’s transparencies and accountabilities, increase public participations and empowerments, increase economy growth and stimulate new innovations from data used (Janssen et al., 2012).

The Open data itself is the data provided by the public entity that could be used or utilized by everyone (Ayre & Craner, 2017). Open data had several characters, such as completeness, availability, usability, non-proprietary, non-discriminatory, variety, timely processed and updated, also summary (Dong et al., 2017).

The implementation of Open Data in government sectors is called Open Government Data (OGD). OGD is the data from government institutions which is collected, saved, and shared to the public to be used by people or private institutions (Sayogo et al., 2014). OGD has a lot of benefits, there are to increase the government transparencies, to increase people participations, to create new innovations, and the economy benefits (Okamoto, 2017). OGD is also expected to create a good relation between people and government (Qureshi et al., 2017).

In order to improve the understanding of Open Government Data importance, Openovdata (2016) defined some basic principles of Open Government Data. By applying these principles, it is expected to increase the value of effectiveness, transparencies and also relevancies of utilizing Open Government Data. These principles are listed below:
1. Completed: The data must be available in full, and there are no restrictions on privacy, security or privileges in its use;
2. Primary: The data are collected directly from the source, not in aggregated or transformed way;
3. Timely: The data are available when needed;
4. Accessible: The data can be easily accessed by people for many diversified possible purposes;
5. Machine-processable: To support automatic processing, forms of data must be structured;
6. Non-discriminatory access: The data are available to all; data can be obtained without registering;
7. Non-proprietary format: the data are formatted in general form, which no entity will have exclusive control; and
8. License Free: The data are not subject to copyright, brands or trademarks. Rules in accessing data can be regulated through laws that contain privacy, security and control access to data.

Research by Attard, Orlandi, Scerri, & Auer (2015) explained that corruption is a primary problem that lead the initiation of Open Government Data. The implementation of Open Data in government institutions focus to openness information value. The government is asked to be more transparent with their data by providing those data openly for public (Weerakkody et al., 2017).

Another study said that a main reason to implement open government data in various developing countries is to increase transparencies. But, as a matter of fact, the data released through the website is still not structured systematically. It makes data users feel difficult to use it. (Idowu et al., 2018).

Besides that, to increase government’s transparencies and accountabilities, the Open Data concept is also used by the government to share information to public. The data which was mostly used by the public are public transportation’s schedules, weather information, whistle blowing system,
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education’s feedback (Okamoto, 2017). That information is provided through government’s website to ease people to access the information.

Open Government Data can also help citizens to oversee administration in government. From the government side, the use of Open Government Data will provide data needed by the public, thus data published must be easily accessible and complete (El-Ebiary, 2018).

Especially in Indonesia, OGD initiation has started since 2008 by the launch of Law No 14 Year 2008 about Public Information Openness. The development of OGD initiatives in Indonesia is rapidly grown since Indonesia participated in Open Government Partnership (OGP) in 2011. OGP is a commitment prove of Indonesia government to support information openness, therefore, it could be used by public (Retnowati et al., 2018).

In addition, one of concrete step to implement OGD in Indonesia signed by the launch of One Data Indonesia through http://data.go.id (Gunawan & Amalia, 2017). One Data Indonesia is the government’s initiatives to repair and improve data management in Indonesia. One Data Indonesia’s initiation aims to upgrade data use which is not merely used as decision’s evidence based only, but also for various purposes by public used.

The upgrade of data management and data use which are the brief focus of OGD initiation in Indonesia, should be supported by researches on OGD. These researches are conducted to solve problems related to the implementation / adoption of OGD. Thus, the benefits of OGD initiation could be gained maximum. However, OGD researches in Indonesia is very limited. Here are some OGD researches in Indonesia, research by Husein, Sunindyo, Bahawares, Nainggolan, & Akbar (2015) carried out strategic formulation to improve productivities and competencies of SMEs Fishery; research by Purwanto, Zuiderwijk, & Janssen (2019) related to public participation in OGD; research by Resti Fitriani, Hidayanto, Sandhyaduhita, & Purwandari (2017) about motivation factor of OGD portal used; and research by Retnowati et al. (2018) about OGD principles.

Based on those literatures, it needs to do literature study systematically to understand how the development of the research on Open Government Data implementation. The main purpose of the literature study is to understand how far the research on OGD in the world, included the focus areas research, research methods, and research data sources. The result of literature review is expected to contribute in OGD research in Indonesia.

Based on that purpose, the research question was the following:

RQ1: What is the focus area research on Open Government Data research?
RQ2: What is the method used to do the Open Government Data Research?
RQ3: Where is the data source in the Open Government Data research?

This literature study is made based on Kitchenham stages (2004). Namely: planning, conducting, and reporting.

This method is in accordance with the needs of systematic literature in the domain of software engineering. This method provides assessments and results of studies to obtain balanced and objective research results.

![Kitchenham Stages](image)

Figure. 1. Kitchenham Stages

On the planning stage, writer decides the research questions, database sources, search criteria, selection of primary studies implementation, quality assessments, and data extraction. Those processes should be done systematically. The search is applied specifically to get a good quality of literature to answer all the research questions.
Furthermore, the papers on Open Government Data research which is used in this literature study are found in the database of popular papers as following:

**Table 1. Database Sources**

<table>
<thead>
<tr>
<th>No</th>
<th>Source</th>
<th>Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ACM Digital</td>
<td><a href="https://dl.acm.org/">https://dl.acm.org/</a></td>
</tr>
<tr>
<td>2</td>
<td>IEEE Xplore</td>
<td><a href="https://ieeexplore.ieee.org">https://ieeexplore.ieee.org</a></td>
</tr>
<tr>
<td>3</td>
<td>Science Direct</td>
<td><a href="https://www.sciencedirect.com">https://www.sciencedirect.com</a></td>
</tr>
<tr>
<td>4</td>
<td>Springer Link</td>
<td><a href="https://link.springer.com">https://link.springer.com</a></td>
</tr>
</tbody>
</table>

Based on the research questions, here are the criteria used to search the papers:

**Table 2. Search Criteria**

<table>
<thead>
<tr>
<th>No</th>
<th>Criteria</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Keyword</td>
<td>“Open Government” “Open Government Data”</td>
</tr>
<tr>
<td>2</td>
<td>Year</td>
<td>2015-2019</td>
</tr>
<tr>
<td>3</td>
<td>Document Type</td>
<td>Journal, proceeding</td>
</tr>
<tr>
<td>4</td>
<td>Availability</td>
<td>Available in full text</td>
</tr>
<tr>
<td>5</td>
<td>Writing</td>
<td>In English</td>
</tr>
<tr>
<td>6</td>
<td>Subject</td>
<td>Computer Science</td>
</tr>
</tbody>
</table>

In an attempt to choose good quality papers to be reviewed, it needs a quality assessment. The quality assessment is done by some screening question to each paper, the screening question are:

1. Question: Is the focus area research about Open Government Data?
2. Question: Is there a clear discovery in each paper?

Papers which qualified the screening question would be reviewed next through data extraction process.

It found 1.179 papers in searching. Furthermore, in order to decide the research focus is done within 4 steps, there are step 1 limited the search by title, step 2 checked the availability of full text, step 3 duplication checked, and the last one answers the research question.

**RESULT**

Based on the search result in the previous step, writer found 18 papers from 4 databases that would be extracted. The Extraction aims to gain the information and answer the research questions in this paper. Here are the following extraction’s results.

Table 4 shows the author’s name and title of 18 papers which answered the research questions.

**Table 4. Finding**

<table>
<thead>
<tr>
<th>Authors/Year</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Zheng &amp; Gao, 2016)</td>
<td>Assessment on China’s open government data platforms: Framework, status and problems</td>
</tr>
<tr>
<td>(Mutimukwe et al.,</td>
<td>Trusting and Adopting E-</td>
</tr>
</tbody>
</table>
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2017) Government Services in Developing Countries? Privacy Concerns and Practices in Rwanda
(Idowu et al., 2018) A model and architecture for building a sustainable national Open Government Data (OGD) Portal
(D. Wang et al., 2018) A prioritization-based analysis of local open government data portals: A case study of Chinese province-level governments
(Mishra et al., 2017) Assessment of Open Government Data Initiative - A Perception Driven Approach
(Li et al., 2018) Quality assessment for open government data in China
(Sanabria et al., 2018) Colombian case study for the analysis of open data government: A data quality approach
(Alromaih et al., 2016) A proposed checklist for the technical maturity of open government data: An application on GCC countries
(H. J. Wang & Lo, 2016) Adoption of open government data among government agencies
(Srimuang, Cooharojananone, Tanlamai, & Chandrachai, 2017) Open government data assessment model: An indicator development in Thailand
(Ruijer et al., 2017) Open data for democracy: Developing a theoretical framework for open data use
(Torchiano et al., 2017) Preserving the Benefits of Open Government Data by Measuring and Improving Their Quality: An Empirical Study
(Craveiro et al., 2016)(Wieczorkowski, 2019) Barriers to Using Open Government Data
(Styrin et al., 2016) Open data and open government: From Abstract principles to institutionalized practices
(Köster & Suárez, 2016) Open data for development: Experience of Uruguay
(Hu et al., 2016) Readiness assessment of open government data

(Talukder et al., 2019) Determinants of user acceptance and use of open government data (OGD): An empirical investigation in Bangladesh
(Srimuang, Cooharojananone, Tanlamai, Chandrachai et al., 2017) The Study of Public Organization’s Intention to Use an Open Government Data Assessment Application: Testing with an applicable TAM

A. Article Selection and study characteristics
Based on Database
The following are the 18 papers answered the research questions based on the database sources.

<table>
<thead>
<tr>
<th>Database</th>
<th>Papers Found</th>
<th>Candidate Number of publications that relevant to the research questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACM Digital Library</td>
<td>98</td>
<td>87</td>
</tr>
<tr>
<td>IEEE Xplore Digital Library</td>
<td>152</td>
<td>40</td>
</tr>
<tr>
<td>Science Direct</td>
<td>683</td>
<td>69</td>
</tr>
<tr>
<td>Springer Link</td>
<td>246</td>
<td>27</td>
</tr>
<tr>
<td>Total</td>
<td>1,179</td>
<td>223</td>
</tr>
</tbody>
</table>

From 1,179 papers found in the first step, only 18 papers left after the selection processed which answered the research questions of this literature review.

Most of the paper is found from ACM Digital Library (9) database and few papers is found from Springer Link (2) database.

Based on Research Location
On Figure 3. the distribution of papers based on country is described below.
Based on the previous data, the research on Open Government Data (OGD) mostly took place in Asian countries.

**Based on Year**

On Figure 4 the distribution of research based on year is described below.

![Figure 4. Papers based on year](image)

From 18 papers reviewed, most of it talked about the assessment of Open Government Data implementation. Specifically, the assessment is designed to measure how big the users acceptance rate of the Open Government Data implementation, as previous researches by Talukder et al. (2019), Srimuang, Cooharojananon, Tanlamai, Chandrachai, et al. (2017), D. Wang et al. (2018), H. J. Wang & Lo (2016), Srimuang, Cooharojananon, Tanlamai, & Chandrachai (2017), Ruijer et al. (2017), Mishra et al. (2017), Mutimukwe et al. (2017), and Zheng & Gao (2016). Besides that, the assessment is also applied to measure data quality, as previous researches by Li et al. (2018), Sanabria et al. (2018), Torchiano et al. (2017), measure the maturity as previous research by Wieczorkowski (2019), Alromaih et al. (2016), and also to measure the readiness as previous research by Hu et al. (2016).

Other topics had focus in the implementation of Open Government Data, as a researches by Idowu et al. (2018) and Köster & Suárez (2016) and also comparison between Open Government Data implementation in different countries, as a research by Styrin et al. (2016).

Here is the framework used in the research focus on Open Government Data assessment.
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RQ2: What is the method used to do the Open Government Research?

To answer RQ2, writer analyses the papers based on the methodology in each paper.

RQ3: Where is the data source in the Open Government Data research?

Here is the distribution of the research based on data collection methods.

DISCUSSION

After the characteristic analysis and individual studies through 18 papers done, writer concludes the research on Open Government Data is classified into implementation aspect, assessment aspect, and comparison. But the research on Open Government Data focused on measurement/assessment of Open Government Data adoption/implementation at the most. This conclusion comes from 18 papers reviewed, as many as 15 papers is talked about the implementation of Open Government Data assessment.

A plethora of the researches related to evaluating the adoption of Open Government Data may due to the large number of Open Government Data initiatives that are still having difficulties in its application.

For example, research by Talukder et al. (2019) conducted an assessment due to a desire to find out the cause of open government data use that is still far behind the expectation. Therefore, it is expected that the results of assessment results can be used as a guide to improve the quality of open government data services. Another example is research by Sriruang, Cooharojananone, Tanlamai, & Chandrachai (2017), in that study the researcher wanted to do an assessment of the level of acceptance of Open Government Data. This is driven by the desire to know in
what extend the success of Open Government Data implementation, especially dealing with issues such as data privacy and data protection.

Research by Li et al. (2018), Sanabria et al. (2018), and Torchiano et al. (2017) even specifically addresses issues related to data quality in the application of Open Government Data. Data quality becomes a serious problem in the application of Open Government Data, some of the obstacles that cause poor data quality are decentralized data, duplicated data, expired data, thus reducing benefit values of the data itself (Sanabria et al., 2018).

From methodological aspect, mostly methodology in OGD researches is quantitative methods (12 out of 18 papers). However, from data collection method, observation method (9 researches) and survey (6 researches) are primary data collection’s method in term of OGD researches.

Research methodology selection and data collection method closely relates to research’s topic or issues which consider to be solved. Other researches relates to OGD utilization applied quantitative methods by collecting primary data through questioners from OGD users in each case, as previous researches by Talukder et al. (2019), H. J. Wang & Lo (2016), Srimuang, Cooharojananone, Tanlamai, Chandrachai, et al. (2017) and Mutimukwe et al. (2017).

Quantitative method is also used in many researches related to quality issue in OGD implementation. In this case, data primary collector method is observation, in which it could be done by OGD portal/website pages searching and collecting dataset to assessment process or problem analysis. This researches are conducted by Torchiano et al. (2017), Wieczorkowski (2019), Li et al. (2018), Sanabria et al. (2018), and Zheng & Gao (2016).

On the other hand, qualitative methods which chiefly used in explorative research, usually it is a research related to model development, which ever done by Srimuang, Cooharojananone, Tanlamai, & Chandrachai (2017) and Idowu et al. (2018).

OGD initiations are new phenomena in our world todays (Talukder et al., 2019). If we take a look in Indonesia, based on Open Data Barometer in 2016, Indonesia was ranked at 36th out of 86 countries regarding preparation level, implementation, and impact of open data initiative. By that rank, Indonesia categorized in Capacity constrain cluster in which countries group who have limitations in sustainable open data implementation. It is caused by governments limitation, civil societies, or private sectors, internet access limitation, also digital data management and collections (Open Data Barometer, 2016).

Other indicators, such as Global Open Data Index showed Indonesia ranked 61st in term of OGD adoption (Global Open Data Index, 2016). Those two indicators show how the OGD initiation’s development in Indonesia is still far behind to ideal condition which is expected.

Challenges in OGD implementation should be resolved in order to gain OGD implementation benefit’s value. As the adoption of OGD implementation is emerging in Indonesia, it should be followed by researches development which carry out OGD’s issues. Therefore, OGD researches could be utilized to overcome OGD initiation’s problems in Indonesia. By that, it can give maximum benefit’s value to each institution/organization who implement it.

Although in a limited numbers, several studies related to the issue of OGD initiation in Indonesia have been carried out, such as the research by Husein, Sunindyo, Bahawares, Nainggolan, & Akbar (2015), Purwanto, Zuiderwijk, & Janssen (2019), Resti Fitriani, Hidayanto, Sandhyaduhita, & Purwandari (2017) and Retnowati et al. (2018). These studies have successfully examined the problems of initiating OGD, in order to improve the quality and benefits value of initiating OGD in their respective case studies.

More researches related to OGD is needed to support the successful initiation of OGD in Indonesia. The findings in this literature review has shown practical description of OGD’s researches development. If it is linked to OGD initiation in Indonesia recently, the finding can be a consideration and evidence based in order to choose research...
focus area, research methodology on OGD’s adoption, and also data source.

CONCLUSION AND RECOMMENDATION

Conclusion

Technology implementation recently has significant benefit values in every element, included government institutions. In government sector, the initiation of technology implementation in form of OGD has been started in the worldwide. The initiation of OGD provides benefits in increasing government transparency, increasing public participation, increasing innovation and other economic benefits. Even though there are still some failures in its implementation processes.

Especially in Indonesia, the initiation of open data aims to encourage the use of data by the public for various purposes. The initiation of OGD in Indonesia certainly needs support from studies that discuss issues related to the initiation of OGD in Indonesia. These studies are expected to be able to solve the problems of OGD initiation so that the objectives of OGD initiation can be achieved. Thus, this research has succeeded in conducting a literature study on the development of research related to OGD in the world, which aims to contribute to knowledge in Indonesia’s OGD research.

This research found that research focus on Open Government Data are on 3 areas, it is the assessment on Open Government Data adoption, the implementation of Open Government Data, and comparison study. From 18 papers reviewed in this research, 15 papers discussed about the assessment of Open Government Data by government. The assessment stage is measured user’s acceptance rate, data quality, maturity and readiness of Open Government Data implementation.

In terms of research methodology, most of the OGD research uses quantitative approaches (12 out of 18 papers) and qualitative methods (3 out of 12 papers). Quantitative methods are used for research related to OGD adoption issues and data quality problems. While the qualitative methodology is used for exploratory research.

From the data sources which used in OGD’s research, there are two main data sources, namely observation (9 out of 18 papers) and survey (6 out of 18 papers). Both data sources closely relate to two popular topic issues in OGD researches, it is OGD adoption by users and data quality.

The result of this literature review may become the reference to choose which research focus, methodology, and data sources to take. As there is a plethora of researches on Open Government Data, hopefully it might be good theory and practice foundation of Open Government Data implementation in the future.

Recommendation

To support the implementation of OGD in Indonesia, further research should discuss the challenges related to the initiation of OGD in Indonesia or the factors related to the success of OGD implementation in Indonesia. These two topics can become knowledge for anyone who will implement OGD or anyone who has problems related to OGD, especially in Indonesia.

REFERENCES


