Post-adoption of Open Government Data Initiatives in Public Sectors

Research-in-Progress

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Abstract

Most of the innovation adoption framework in an organization ends at the adoption stage. For an innovation to be acculturated by the organization, there should be an on-going effort of assimilation to further create the impact and value of the innovation usage. Being the most important organization entity in Open Government Data (OGD) innovation, continuous adoption of OGD in public sector is crucial. OGD innovation must be incorporated into the public sectors to fully secure the benefits. Therefore, the aim of this article is to examines the important issues and challenges of OGD adoption in public sectors and identified factors that could contribute to post-adoption stage. Drawing from Technology-Organization-Environment framework and unified framework of post-adoption activities, this paper also intended to find gaps in OGD implementation in public sector to design and propose solutions.

Keywords: Open government data, post-adoption, organization, innovation diffusion

Introduction

Since the inception of the open data initiative by U.S. President’s Obama in 2009, government from around the world have started to adopt the idea of disclosing the public data for reuse and distributed by anyone without any restrictions. This innovation is intended among others to increase transparency and accountability in government, empower the citizen participation to government service and to stimulate the economic growth by allowing the third party to create products and services (Janssen et al. 2012; Kalampokis et al. 2011; Kucera et al. 2014; Ubaldi 2013). Among the most popular endeavor done by the participating governments is by introducing their own open data portal. Through this web portal, citizens and stakeholders can obtain government information in a form of datasets and they may transform it into whatever format or applications as they like. This will particularly help the citizens make better decision and improve their quality of live out of the open government data. As the main data publisher, governments without a doubt plays an important role to realize such value as the governments has been collecting and keeping an enormous amount of public data underutilized for long. This has led the term “Open Government Data” (OGD) become a prominence recently among researchers.

In most developing countries, open government data initiatives are still at its infancy resulting many challenges at the implementation level (Hossain et al. 2016; Wang et al. 2016). For some countries, releasing public data may incurred some potential costs associated with the production and presentation of open data that need to be considered and accounted for (Ubaldi 2013). This may be
true as tasks like data collection, data cleaning and data management need certain skills for the human resources. The more complex the task the user wish to accomplish, the more barriers will appear thus forcing the organization to equip their human resources with such technical skills (Janssen et al. 2012). Furthermore, by opening government data, government agency may require preparing proper infrastructures such as purchasing new server or upgrading the network infrastructures. These factors involving cost may be the major impediments for government to keep on running open government data initiatives.

Data quality is another issue in open government data implementation. Lack of accuracy, lack of meta standards, obsolete and non-valid data are among the issues found in existing data in the government open data portal. The quality of open data differs from the traditional data quality, since it is not in a controlled environment as if it would be classically when dealing with private data of an organization, favoring the existence of quality criteria such as the accessibility or reputation of their sources. In fact, the definition of open data itself is influenced by data quality criteria related to such openness. In December 2007, during an Open Government Data Working Group meeting held in Sebastopol, California defined Eight Open Government Data Principles to be put forward as a guideline to open government data movement. The principles are completeness, primacy, timeliness, ease of physical and electronic access, machine readability, non-discrimination, use of commonly owned standards, licensing, permanence, and usage costs (Ubaldi 2013). Even so, not all of these principles were being practiced by governments in their open government data initiatives.

To date the most used quality criteria are those established in 5-stars open data scheme proposed by Tim Berners-Lee in May 2010 during the Gov 2.0 Expo 2010 (Hausenblas et al. 2012). According to this scheme, the most quality dataset is when the data can be link to other people’s data to provide context. Government data is part of this ongoing evolution of the Web and thus it should be combined and integrated with other open data on the Web to allow for added value services (Kalampokis et al. 2011). But what can be observed in most government’s datasets today is still far from reaching 4 stars which is using the URLs to identify things so that people can point at our stuff. Most of the datasets manage to reach 3 stars’ scheme which is to publish in non-proprietary format. This is clearly seen lack of systematic monitoring in government structure after data has been published as there is no initiative to update the published data in a timely manner. The effort seems only at the initial stage of the open government data adoption but not on the post-adoptions phase.

Government agency also face data privacy issue when some of the data sets contains personal identities when combining with different data sets (Conradie et al. 2014). In particular, government tend to release data that is easier to collect, incomplete and unstructured. A study by Janssen et al. (2012) called the said action as risk-averse culture where institutions only revealed data that is relatively safe while at the same time hoping that the data will not be discovered by the public. Sieber et al. (2015) highlight the data privacy as critical issue that may led government agency to retrench the open government data initiatives if individual privacy is being compromised. Therefore, there is a need to study whether privacy concern is the determining factor in post-adoptions of the open government data initiatives.

Level of understanding of what is open government data among government agency also plays an important role in determining the adoption of open government data initiatives. It is afraid that some government agency just jumped into the bandwagon for the sake of supporting the central agency’s or top-management decision but not on voluntarily reasons. Due to this matter, agencies may be releasing data only once and no further actions to release more data sets. These agencies might have not seen the explicit benefits they can get by open their data and concerns are raised upon this rather than what citizens can benefit from it. Furthermore, agencies felt that collecting, converting and publishing data are not part of the daily task to be prioritize (Conradie et al. 2014). These burdensome trade-offs may help explain why governments around the world still have a long way to go in terms of fulfilling what many see to be the great promise of open data (Michener et al. 2016).

Technical barriers are not the only factor in open government data adoption, on the other hand, government may face the pressure from public to release more usable data as citizens, civic hackers, civil society organizations, non-government organization to name a few are getting more aware of valuable datasets such as from the government spending, health data, transport data and crime data. These are among datasets that are highly demanded and may not previously disclosed in any form from the government that the intermediaries such as civic hackers, civil society organizations, private company among other, see as opportunities as they have the knowledge to transform the data into citizen centric applications. Coping with this demand require a strong policy in place to prevent data from being misused at the same time protecting the privacy and security of the data. Without uniform
policy of publicizing government data, there is a possibility of lawsuit threat or other violations (Attard et al. 2015; Janssen et al. 2012). The question is how much has the government do to prevent such dispute? Are they any license impose in reusing government data? These are the questions that need to be dig deeper in the post-adoption of open government data initiatives.

This paper is organized as follows. In the following sections, the motivation of the study is presented. The next section described the theory background for this study. Following section comprises expected contribution and future goals of the study. Finally, we provide our concluding remark in the last section.

**Motivation of Study**

Research concerning beyond adoption of OGD remain an uncharted area until today. The urge to see OGD initiatives as one of the sustainable innovation is undeniable due to the high insistence for government transparency. Hence, this study is sought to answer the main research question of how to ensure the OGD in public sectors reach post-adoption stage in order to sustain the initiatives in the future. Together with the research question, we aim to develop a framework of OGD post-adoption in public sectors as an outcome of this study. Guided by a well-known organization theory together with a reliable post-adoption theory, the mission will be supported by gathering the data from current OGD adopters in public sectors. From here we should be able to identify the factors influencing the adopters in implementing OGD initiatives and determine the factors towards OGD incorporated in public sectors.

**Statement of Problems**

Malaysia is currently in at the implementation phase of OGD initiatives (MAMPU, personal communication, March 23, 2017). This is due to various effort have been taken place since 2014 by government agencies and significant progress have been shared to public regularly. Malaysian government is investing heavily in OGD initiatives with the intentions to create citizen's wellbeing. As of today, almost all government agencies in Malaysian government have been equipped with open data knowledge and awareness. However, despite the on-going endeavor, OGD initiatives shows no significant progress of data publication among public sectors (MAMPU, personal communication, March 23, 2017). This is due to fragmented and low visibility of policy to allow data publication among public sectors (Janssen et al. 2012). Consequently, it affected the number of datasets release in government's data portal and data demand from public increase. With the aim to release almost 7000 datasets in 2020, Malaysian government has a lot of works to do to achieve the said target. Thus, investigating the existing impediments of OGD implementation in public sectors is crucial to understand and lessen the unbearable burdensome by public sectors.

Malaysia’s ranking in Open Data Barometer (ODB) report continue to drop from number 41 in 2014 to 51 in 2015 and recently dropped to 53 in 2016 among 115 participant countries (Open Data Barometer 2017). While the number of new countries participating in the movement increases every year, efforts from existing participating countries were showing significant improvement making their ranking getting better every year. The ODB measures readiness, implementation, and impact of open data initiatives from government of participating countries. This tell us that challenges and barriers are not just exist in local context, challenges from global context must not be ignored. While other countries are progressing well, it is important for the government to double the effort and finding a way of how OGD can be a sustainable innovation. Without proper implementation strategy, OGD initiatives may later found in the decommission stage. Following from this issue, it is important to study the on-going effort of OGD initiatives implementations in public sectors to ensure OGD not just being a daily task but rather reach the acculturation state.

For OGD innovation to reach the end state on diffusion process, it must come to complete incorporated among public sectors (Hazen et al. 2012). This include stages such acceptance, routinization and assimilation as defined by Saga et al. (1993) to fill the gap between adoption and incorporation. Furthermore, Hazen et al. (2012) added that adoption is just one of the initial stage of innovation diffusion which denied the assumption that adoption is the end-state of diffusion. Previous research only focused on adoption stage with various factors has been identified in OGD adoption among organization and individual (Hossain et al. 2016; Wang et al. 2016; Yang et al. 2016; Zuiderwijk et al. 2015). However, there has been a limited research towards understanding post-adoption at organization level (Jaspersen et al. 2005) especially in OGD among public sectors literature.
Theoretical Background

Pre-adoptions, Adoption & Post-Adoption

Studies on adoption perspective evaluate the characteristics of a user’s or organization’s response to innovation. Drawing from innovation diffusion theory, adoption is a process rather than an event and various studies have define the stages to three general phases consist of pre-adoptions, adoption and post-adoptions (Rogers 1983; Zmud 1982). Pre-adoptions also referred as the initiation phase consists of activities that recognize the need to find for a solution, awareness of the technology and making decisions to adopt the suitable solutions (Hinnant et al. 2003; Karahanna et al. 1999). Adoption phase consist of activities that reflect the decisions to adopt the innovation, allocating resources and implement the innovation in the organization (Damanpour et al. 2006). There are however various and overlapping terms of post-adoptions being used by many researchers. For the purpose of this study, we define post-adoptions stage as what Hazen et al. (2012) drawn from myriad literature where he tried to uncover the ambiguity after the innovation or technology has been accepted in organization. The stage was then called incorporated. This incorporated stage may include three post-adoptions activities where it includes acceptance, routinization, and assimilation (Rashid et al. 2011; Saga et al. 1993).

Technology-Organization-Environment (TOE) Framework

Oliveira et al. (2011) observed the different kind of Information System (IS) adoption studies at firm level and has found two prominent models; Diffusion of Innovation by Rogers (1983) and the Technology-Organization-Environment (TOE) framework by Tornatzky et al. (1990). TOE was originally delineated by Tornatzky and Fleischer’s in their book called The Processes of Technological Innovation (1990). The book described the process of innovation from the development, adoption phase until the implementation of an innovation within the context of a firm. Three elements were found to influence firm’s decision towards adopting an innovation namely technological context, organization context and environment context. TOE framework is being chosen for this study because there is not much evolvement since its inception making TOE as one of the consistent framework for study about innovation adoption in organization context (Baker 2012).

Unified Framework of Post-Adoption Activities

Based on study by and Hazen et al. (2012), a proposed conceptual framework for post-adoptions OGD in public sectors is developed and depicted in Figure 1. The framework for this study is a combination model from Technology-Organization-Environment (TOE) by Tornatzky et al. (1990) and Hazen et al. (2012) because of the concept that both researchers portrayed is aligned to the objective of this study. Hazen et al. (2012) focused on beyond adoption of supply chain innovation at organization level. He also highlighted the important for an innovation to reach the end-state of incorporated to ensure maximum value and benefits from it. Hazen et al. (2012) framework also consistent with previous research by Rogers (1983) where Hazen try to portray a process of adopting an innovation or technology right from realizing the benefits towards embracing the innovation in governance structure and work forms.

Several studies have proven that TOE framework has been shown to be useful in the investigation of a wide range of IT innovations in an organization. Furthermore, up to this point, no new construct has been added to the framework. Although, some studies have found new factors or measures to influence technology adoption, the factors will still fall in either one of the three construct of TOE. This shows that the three antecedents (technology, organization, environment) are dynamic and can be manipulated with various factors that influence organization to adopt innovation or technology. With the said reasons, it motivates us to further extend Tornatzky antecedents to Hazen et al. (2012) stages of post-adoptions which consist of assimilation, routinization, and acceptance stage. The actual factors in technology, organization and environment context will be mapped with the data gathered during phase 1 of this research. Each of Tornatzky antecedents is assumed to have influence on post-adoptions stages. Therefore, a set of hypotheses will be construct to test the relationship. Additionally, Hazen et al. (2012) stressed on validating one unified framework to generalizes the supply chain innovation post-adoptions and further personalized to various disciplines rather than grounded another new theory. At the end of this research, we will have a firm model that will help us understand what are the factors contributing to the OGD post-adoptions in public sectors.
In this conceptual framework as depicted in Figure 1, there are two states before reaching the end state of adoption that is incorporated. The first state is adapted from Tornatzky et al. (1990) where it consists of technology, organization and environment context. The state towards incorporated is adapted from Hazen et al. (2012) which delineates three dimensions namely assimilation, routinization, and infusion.

### Table 1. Definition of constructs

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<thead>
<tr>
<th>Construct</th>
<th>Definition</th>
<th>References</th>
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<tr>
<td>Technology</td>
<td>Relates to all technologies that are significant to the organization.</td>
<td>Tornatzky et al. (1990)</td>
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<tr>
<td>Organization</td>
<td>The attributes and assets of the firm, including connecting structure between representatives and firm size.</td>
<td>Tornatzky et al. (1990)</td>
</tr>
<tr>
<td>Environment</td>
<td>Incorporates the structure of the business, technology provider and administrative environment.</td>
<td>Tornatzky et al. (1990)</td>
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<td>Assimilation</td>
<td>The extent to which use of the innovation has diffused across organizational processes</td>
<td>Hazen et al. (2012)</td>
</tr>
<tr>
<td>Routinization</td>
<td>Degree to which an organization’s governance systems are adjusted to accommodate the innovation</td>
<td>Hazen et al. (2012)</td>
</tr>
<tr>
<td>Acceptance</td>
<td>Degree to which an organization’s constituents receive the innovation</td>
<td>Hazen et al. (2012)</td>
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**Research Method**

This selection methodology in the perspective of this research is to understand how government embrace innovation and what are the efforts towards extending the usage in other public sectors. The methodology is broken to five difference phases in Figure 2, in which every phase has its own activities and expected outcome. The approach for this research is more to mixed method as we will be using various data collection techniques and analysis such as observation, semi-structured interview, and questionnaire survey.

Phase 1 is all about problem identification where some of the activities involves setting semi-structured interview session with key-person of open government data initiatives in government. Objective of this semi-structured interview is to understand current OGD implementation and to find what are the current impediments of OGD implementation in public sectors. Information from the interview session will be transcribe and coded for data classification. This will not just help us to understand the real situations of OGD implementation, but to further strengthen and validate our
problem statements. Another activity in this phase is to analyze secondary data which will be obtain from Open Data Barometer website and Malaysian Open Data Readiness Assessment (ODRA) report by the World Bank. As mention earlier, ODB measure the open data initiatives for participating countries including Malaysia and they offer the raw data to be downloaded for reuse. With these datasets, we can make descriptive analysis to show how much has Malaysia contribute in terms of readiness, implementation, and impact of open data initiatives. This analysis will help also us clarify the benchmarks that OGD initiatives should reach in order to be fully incorporated in public sectors. Thus, the outcome of this phase 1 would be research problems and research questions.

Based on the information gathered in phase 1, the problems or challenges identified will be investigated in phase 2. Other activities include building the literature review and formulated hypotheses of the study. These hypotheses will help on establishing factors of the OGD post-adoption model. The expected outcome of this phase is a set of hypotheses. The primary data gathering of this research will commence in phase 3 where we construct research instrument in the form of questionnaire. The questionnaire will undergo reliability test using Rasch modelling. This survey will later be disseminated at government agency whom has already adopted OGD initiatives as the objective of the survey is to get information on OGD implementation at the organization. Data collection activity may involve more than one cycle. Stratified sampling will be using as the sampling process with the advice of the central agency. Outcome of this phase is to get the primary data from the target sample and design the desired solution. In phase 4, the data gathered will be analyze after a series of data cleaning to remove any incorrect, incomplete, or duplicated data. Structural equation modelling (SEM) is currently the data analysis techniques chosen for construct validity analysis as SEM allow for hypothesis testing and evaluate. At the end of the validation phase, an OGD post-adoption in public sectors model is hope to be established.

Expected Contribution & Future Works

The selection methodology in the perspective of this research is to understand how government embrace innovation and what are the efforts towards extending the usage in other public sectors. The methodology is broken to five difference phases, in which every phase has its own activities and expected outcome. The approach for this research is more to mixed method as we will be using various data collection techniques and analysis such as observation, semi-structured interview, and questionnaire survey. Thus, this on-going study is aim to be able to engage as many OGD adopters from public sectors as possible to understand their current implementation of OGD. Within the government, the move towards opening government information has driven both social and cultural change across agency. This research will help to foster OGD ecosystem in government’s body where data is open by default. Additionally, it will challenge existing policies and workflows as well as pushing the current technical skills and capabilities of civil servants to a better degree. In terms of IS body of knowledge, this research will contribute towards exploration on innovation or technology post-adoption theory at organization level. Apart from that, this research will further validate the theory in the field of open government data. In the perspective of open government data initiatives, to the best of our knowledge this is the first ever research to go beyond the adoption. While many people rather wait for the impact of open data to be tangible and visible, we believe the source of impact comes by learning from the source of the data. Open data offers endless possibility for the citizen, thus the initiatives need to sustain in government. With this study, it is hope to help the government survive the challenges and barriers mentioned in previous section.

References


