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Exploring the Issues of Open Government Data Implementation in Malaysian Public Sectors

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Abstract— **The paper presents a preliminary study of current progress and the issues of OGD implementation in Malaysia. With this objective, the authors attempt to identify initial factors that influence OGD implementation in the public sectors and discern how far the OGD initiative in Malaysia has grown since its inception. The authors make the highlight of the OGD implementation phase rather than adoption phase due to the research aim is to look at the OGD activities beyond adoption. Adoption phase is where the organization is in the state of deciding whether to adopt an innovation or not, while the implementation phase is the extent where the innovation is taking into actual use. Taking from the perspective of the central agency who is leading the OGD initiative, by using interview, observation, and desk research as the research approaches, the issues pertaining to OGD implementation is consolidated into the technology-organization-environment framework. The findings have indicated that data granularity, culture, policy, resources, skills, incentives, use and participation, and external pressure are the current issues transpired in the OGD implementation. These findings are contributing to the conceptual framework of authors' future works in determining the factors influencing OGD post-adoption in the public sectors.**

Keywords— **open data; open government data; post-adoption; innovation implementation; public sectors innovation.**

I. INTRODUCTION

The Malaysian government has started to embark on the open data journey since 2014. A central agency under the Prime Minister Department called Malaysia Administrative Modernization and Management Planning Unit (MAMPU), is responsible for the management of the initiatives in the country, and leads the agenda in the global context. The government data portal is accessible through www.data.gov.my. The decision to embark on the open data journey was made, through authoritative level management of the federal government. This mandate later makes a clear pathway for the government agency to adopt open government data (OGD) initiatives. During the infancy phase, few datasets were published, and some of it was not in a readable and processable format by computer system. Subsequently, the number of datasets increases every year, due to various engagement endeavor that has been established with the data owning agencies. Every year, MAMPU organized the hackathon competition, to encourage data usage among various groups of data users, such as the academia, civil society organization, private business, school, digital start-up entrepreneur, among others. The encouraging responses from the hackathon competition have shown that the public has gradually realized the value of OGD. There

are about over 200 data suppliers from 18 different clusters that have published their datasets in the open data portal and this number is steadily increasing. By the end of the year 2018, the Malaysian government is targeting to publish around 10,000 datasets in 100 percent machine-readable format. In line with the Eleventh Malaysia Plan 2016-2020, open data is expected to empower the data-driven government by enhancing the value of the data and strengthen the inter-agency data sharing in the public sector.

Apart from the national plan, the government is striving to achieve a better ranking in the United Nations E-Government Survey. As Malaysia venture into new frontiers of information and communication technology (ICT), stepping up in the global benchmark, will by any means, reflect the country's achievement. Every country in this world will put their best effort to get the best ranking, as this will also portray the capability of the country to harness upcoming challenges and realities of the digital revolution. As open data innovation grows, many evaluation bodies emerge with different vital indicators to determine the ranking of country achievements in OGD. In this regard, currently, the Malaysian government is giving full attention to the E-Government Development Index (EGDI) in the United Nation E-Government Survey. There are three main dimensions of e-government index; 1) Online Service Index

(OSI) 2) Human Capacity Index (HCI) and 3) Telecommunication Infrastructure Index (TII) [1]. Open government data initiatives happen to be under the OSI in which it contributes to one of the online services, provided by the government to its people. Currently, Malaysia is ranked at 25th place in OSI out of 193 United Nation Member State [1]. By 2020, the government targeted to achieve the top 15 of the OSI ranking. In this regard, data publication merely is insufficient; in fact, it is just a part of the larger digital government services delivery effort. It takes a tremendous commitment from government agencies, business leaders, civil society, academia, and the community to strengthen and unleash the OGD potential.

The study sought to answer the question of what the issues of the OGD implementation in the public sectors that are needed to be scrutinized. Most of the innovation adoption studies keen to investigate the factor that influence the intention of innovation adoption, however, what happen after this adoption remains unexplored. To keep an innovation running in the organization, every implementation issue related to the innovation must be tackled with much detail. Prolong and unresolved implementation issue will lead the innovation to an unfavorable position such as decommissioning of the innovation. In this regard, this preliminary study takes the effort to explore the OGD implementation issues from the perspective of the policy makers of the OGD governance structure in the public sectors. Hence, the perspective from the data users' side is excluded in this study.

OGD adoption study recently has gained attention among scholars. Like any other innovation or technology, the OGD adoption study can be explored using various approach and theories. Reference [2],[3],[4] take the setting of factors influencing OGD adoption from the government perspective while a study from [5] look from the view of private organization perspective. From the data user perspective, the study by [6] and [7] managed to identify factors influenced the data users to adopt OGD. However, while these studies focused on the adoption phase, the study on the OGD post-adoption phase is still lacking.

In the early part of this paper, the term implementation is emphasized instead of the adoption of OGD in the government. To understand the relation of post-adoption and implementation, it is essential to look at the fundamentality of innovation adoption. OGD is regarded as an innovation in which according to [8], innovation is refers to as a new idea, practice, product, program that is perceived new to the adopting unit. Taking from the previous study by [9], innovation adoption can be categorized into three general phases; 1) pre-adoption 2) adoption (decision) and 3) post-adoption. Pre-adoption or some call it initiation phase, refers to activities of the potential adopters to get an early exposure of the innovation, identified the need of the innovation and putting the intention to adopt the innovation. The second phase, which called the 'adoption', as explained by [9] and [10], indicates the activities that led to deciding whether to adopt the innovation or not. While in the last phase which is the post-adoption, is the phase in which the innovation is getting through a process of collective events, actions and decisions involved in establishing an innovation into actual use which constitute implementation, routinized, institutionalized and towards assimilated in the regular activities of the organization [8],[9]. Fig. 1 illustrates a simplified adoption process.
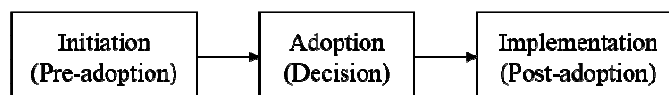

Fig. 1: Innovation adoption phase (Adapted from [9])

Taking the experience from the OGD adoption in Malaysia, the initiation phase of OGD in Malaysia occurred before 2014, in which the government was aware of the need for the government to share data publicly. The government has been sharing data with the public for years but in the form of information through the various platform. However, data request was considered on a case-by-case basis and subject to certain restrictions. Through a series of highly top management meeting, in Mac 2014, the government decide that all agencies are ready and act to identify dataset for the implementation of OGD initiatives in each agency service area. The year 2016 and beyond have seen the government has set up a lot of OGD events and actions. From time to time, the government amplified the aim of OGD implementation to be more robust and sustainable in order to adapt with the latest global technology trend. In short, OGD in Malaysia is moving beyond the adoption phase, which is the post-adoption phase.

Having a sound comprehension of the phases of innovation adoption allows the author to justify the position of the implementation issues rather than just adoption issues. We define OGD implementation as an event that comprises a series of activities of putting the OGD into effect until regarded as a routine in the organization business norm. The theme brought in this study is consistent with previous study by [11], where the author take the effort to evaluate the OGD initiatives in the city of Vienna, Austria to find the implementation success factors. Whereas the study by [12] focused on the other side of the success factor of OGD, which is the negative consequences of OGD implementation by applying in-depth interviews with the government personnel. These studies reinforce the purpose of this paper by adding to the OGD knowledge in presenting the progress and identifying the general issues of OGD implementation from the viewpoint of the policymakers.

This paper will be organized as follows; the next section will discuss the material and method taken to undertake this study. In section III, the results of this study are discussed and elaborated. Thereafter, the conclusion of the study can be found in section IV.

II. MATERIAL AND METHOD

As the first step in this study, a series of semi-structured interview has been performed with eminent person who is responsible for Open Government Data (OGD) implementation in the Malaysian government to get a firm viewpoint of current OGD progress in Malaysia. The semi-structured interview runs into two session with three different personnel from Digital Government Division, Malaysia Administration Modernization, and Management Planning Unit (MAMPU). The first session was held with

the head of the division, while the latter session was held with the two officers from the same division. A set of interview question was emailed to the interviewees prior to the interview session so that the interviewees could have an overview of the questions and to make the interview session smoother. The semi-structured interview questions set has been simplified as the question context and the objective as seen in Table I.

TABLE I
THE INTERVIEW QUESTIONS CONTEXT AND THE OBJECTIVES EACH CONTEXT.

Context	Objective
Organization	
Governance	To perceive the important of the OGD governance structure in managing the OGD implementation is sufficient.
Financial	To perceive whether the financial resources allocated for OGD implementation.
Culture	To notice whether the government agency has an adequate understanding of the OGD initiatives and would shift their work tradition to implement OGD.
Resources	To discern whether the government agency has adequate infrastructure and dedicated manpower to carry out the OGD initiatives.
Policy	To perceive the extent of whether government data policy such as data sharing and data secrecy play a role in the OGD implementation in the government agency.
Skills	To notice where the government agency has obtained the necessary technical skills to operate OGD initiatives.
Top management commitment	To perceive whether the top management in the government agency is giving their commitment to help facilitate OGD implementation in the organization.
Technology	
Data granularity	To notice whether the data granularity is emphasized in the OGD publication.
Complexity	To perceive whether OGD is too complex for the government agency to be implemented.
Compatibility	To perceive whether OGD is compatible with the existing practices of data publication in the government.
Environment	
External pressure	To notice whether external pressure such as from competitors, latest technology phenomenon, or external evaluation has significant role in the OGD implementation.
Use and participation	To discern whether data use and participation from the OGD target users is important.
Incentives	To observe whether incentives such as reward or recognition for implementing OGD is important to the government agency.
Image	To perceive whether the government would like to retain a good image from the public's view by implementing OGD.

Besides the government data portal as our source of information, we also seek from the published reports that have mentioned anything about OGD in Malaysia for our desk research approach. We managed to analyze several published reports about open data in Malaysia including i) Malaysia Open Data Readiness Assessment 2017, ii) OECD eGovernment Survey 2018, and iii) Eleventh Malaysia Plan 2016-2020. As for observation method, we participated in several open data events held by the government including Malaysia Open Data User Group workshop. During the

events, we captured the feedbacks from the participants towards OGD implementation through notes taking and recording. At the end of the approach, we consolidated and triangulated all the information obtained from the three different data collection methods mentioned.

Often the successful adoption of an innovation is measured at the implementation phase and beyond. Recent years has seen several studies tried to prove that the OGD initiatives has created a value and impact whether from the economic, social or the political perspective. The study by [13], [14] seek to measure the OGD implementation successfulness through public value perspective. While, [15], [16] explore the OGD implementation from business perspective. The tangible results of OGD usage only visible when it is being used and this normally happens in the later stage of OGD implementation. Hence, the implementation phase of OGD is the focus of this study as we attempt to identify the issues that influence the OGD to be routinized in the public sectors. The following sub-headings are the aspects of OGD implementation progress that we have observed upon.

A. OGD Governance

OGD initiative in Malaysian is led by a central agency at the federal government level called Malaysia Administrative Modernization and Management Planning Unit (MAMPU) under the Prime Minister Department. From each ministry, MAMPU has appointed the Chief Information Officer (CIO) as the focal point of the OGD initiatives in their respective ministry. Besides having the responsibility to be an advisor and spearhead their ministry OGD initiatives implementation, the CIO is expected to ensure the key performance indicator of OGD in their ministry can be achieved. Among other task includes identifying the datasets that can be published in the data portal and retrieve proper permission from the head of the department or unit before publishing the datasets. Together with these ministries, the states government and statutory bodies also have been invited to join the OGD initiatives. State Secretary is given the responsibility to lead the OGD initiatives in their state's government including the local authorities or municipality in the state, while their CIO leads the statutory body. Under this ministry and state government, there are agencies or department in which selected government personnel are appointed as open data agent to manage the OGD activities in their respective agency or department. Figure 2 implied the governance structure of OGD initiatives in Malaysia.
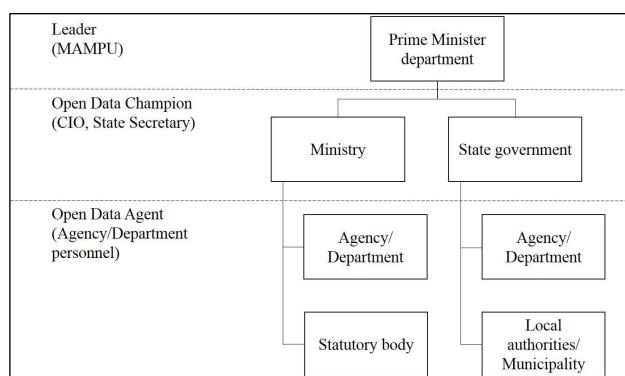

Fig. 2 OGD governance structure

B. OGD Ecosystem

The OGD implementation has come to its maturity when it has been created as an ecosystem in government [17]. In order to foster the OGD ecosystem, government has delineated three principles namely 1) to publish quality datasets by following the key performance indicators that have been set in the data portal, 2) increase the data usage particularly the datasets that are impactful and 3) to provide circular on data usage and stabilize the existing open data policy. Regarding action, every year MAMPU has organized a hackathon competition to encourage OGD use among communities, private business, startup, academia, schools, or any individual. With this endeavor, it is targeted to save government resources on developing data product and perhaps generating the economy through digital services for the citizen. Nevertheless, the data products from the hackathon have less attention from the public. Some of the data products use static data in which has no continuity to be use in a longer term.

In this OGD ecosystem, a public demand of a new dataset is also catered in the data portal, and each of the requests is vetted through whether the data can be released to public or not. From the data supplier side, currently there is an automated process for data supplier to upload their datasets in the data portal. Upon approval from the central agency, the datasets will be available in the data portal. The OGD demand and supply flow is not relatively new concept, as the government before has practiced it. Data user has long requested data from government, but the bureaucracy's procedure hinders the usage, but having such data portal create some awareness among government agency on the important to publish their datasets. However, much of the data usage is visible through news reporting rather than innovation that can benefit the public.

C. Data Openness

Although the effort to increase the number of datasets published is essential, the data quality is not neglected. Presently, the 'Eight Open Government Principles' is used to determine the degree of reusability of the datasets. At the early stage, the datasets published were in various data format. However, to date, the datasets in data portal is almost 100 percent in machine-readable format compared to only 30% machine-readable format back in 2014 and some of it achieved five stars of the openness benchmark. In early 2018, the central agency who leads to OGD initiative has committed a series of engagements with the data-owning agency from state government and statutory body. This effort manages creating awareness of OGD among these agencies and have swelled the number of datasets published in the data portal after that. Besides that, the government is also planning to publish real-time data or more Application Programming Interface (API) in the data portal to achieve higher quality datasets and promote better usability.

Figure 3 presents the number of datasets by data openness score. 0 stars means that the datasets resource URL is found to be broken or producing errors. One star's openness means the datasets only appear in non-machine-processable format such as word processing (.doc), Hypertext Markup Language (HTML) or Portable Document Format (PDF). More than 70 percent of the datasets score two stars openness as most of

the datasets is in the form proprietary spreadsheet format. Datasets scored three stars openness if it is ready in a non-proprietary format such as the Comma Separated Value (CSV). At four stars openness, data is set to have a Uniform Resource Identifier (URI), which represents a unique meaning of things to allow others to denote to this data. Five stars openness indicates that the datasets are ready with API integration together with highly processable format such as Resource Description Framework (RDF), Operational Data Store (ODS), Keyhole Markup Language (KML), or JavaScript Object Notation (JSON).
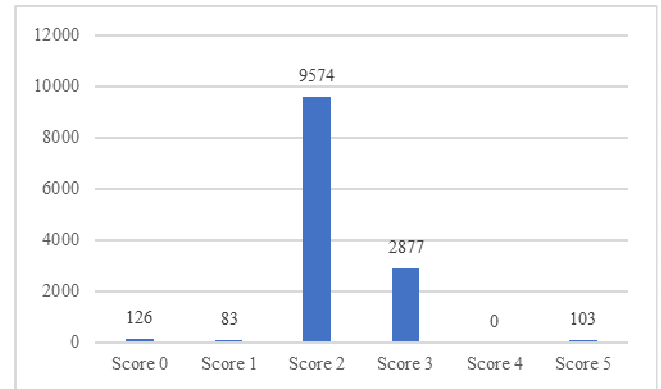

Fig. 3: Number of Datasets by Data Openness (*Retrieved on 25th December 2018*)

However, the star's classification of these datasets is not in line with the method by Tim Berners-Lee's Five Star scheme although the portal claimed to be following the scheme. For example, when looking closely at the five stars level datasets, many of the datasets does not have a link to other data using in the web semantic. This is contrary to the definition of five stars level by Tim Berners-Lee [18]. Clearly, a higher understanding of the dataset's deployment scheme amongst data publishing agency is required.

D. Data usage

Study on the actual use of the open data is scarce and remain as unchartered territory especially in most developing countries [7], [6]. Table II present the top ten most downloaded datasets from the government data portal at the time this paper was written.

TABLE II
MOST DOWNLOADED DATASETS

	Most downloaded data	Cluster	Number of downloads	Openness
1.	Population and Demographic Statistics	Census	865	3 stars
2.	Unemployment Rate by State	National Statistics	578	3 stars
3.	Malaysian Economic Indicators: Leading, Coincident & Lagging Indexes	National Statistics	509	3 stars
4.	Labor force by state	National Statistics	464	3 stars
5.	Population Data for Federal Territory of Kuala Lumpur, Putrajaya And Labuan	Census	986	5 stars
6.	Number of Vehicles on The Road by State	Transport	632	5 stars
7.	Consumer Price Index	National	400	3 stars

		Statistics		
8.	Life Expectancy, Malaysia	National Statistics, Health	389	3 stars
9.	Number of Deaths Due to Road Accidents by Year and State	Transport, National Statistics	380	2 stars
10.	Vital Statistics, Malaysia	Census, Health	377	3 stars

However, the number of downloads alone does not help to indicate that the datasets are valuable and reusable enough. There should be a shred of tangible evidence to demonstrate that the datasets have been put to a good cause. Reference [19] suggest for the government to provide a feedback mechanism for the data users to share on how they have used the data.

E. License type

Having a license-free data is one of the crucial elements in the Open Government Data Principle. Reference [20] has identified that standardizing the license for public use is among the critical success factor for OGD publication. One of the benefits of having a proper license type for each dataset is to facilitate data-driven innovation among the data users as well as protecting the right of the data owner. For that reason, almost 99 percent of the datasets in the data portal are subject to a Creative Common Attribution license. This will allow users to freely copy reuse and redistribute the datasets commercially without having any restrictions provided credit is given to the original data source. Table III summarizes the number of datasets by license type.

TABLE III
NUMBER OF DATASETS BY LICENSE TYPE

License type	Number of datasets
Creative Commons Attribution	12531
Other (Open)	46
Other (Non-Commercial)	30
Open Data Commons Attribution License	27
Other (Attribution)	13
Creative Common Attribution Share-alike	8
Other (Public Domain)	3
Creative Common Non-Commercial (Any)	2
Creative Commons CCZero	1
Open Data Commons Open Database License (ODbL)	1
GNU Free Documentation License	1
Unspecified	1

The organization is a complex unit of analysis of information technology adoption in the environment which it operates [21]. Tornaztky and Fleischer made one of the renowned attempts at discerning and categorizing the determinants of IT adoption in an organization in their book; 'The process of technology innovation' [22] which introduces the Technology-Organization-Environment (TOE) framework.

The TOE framework is deemed as an organizational level model, which clarify three disparate contextual attributes of an organization that influence the adoption decision to any innovation. The technology context depicts the technologies that are pertinent to the organization whether the technology is presently used or the technology that is accessible in the market but have not been utilized by the organization yet. Whilst the organizational context refers to the characteristics and resources of the organization, such as the organization size, slack resources and intra-organization communication capability. Finally, the environmental context explains the composition of the organization's structure and the regulatory encompassing the organization's operations [22].

The extant literature, which employed TOE framework in their studies, has normally regarded factors from the technological, organizational, and environmental as direct antecedents of innovation adoption and implementation. Thus, prescribing the nature of this study, which regards OGD as the innovation, government agencies as the organizational unit of analysis, and implementation as the adoption phase, we employed TOE as the lens theory in consolidating the OGD implementation issues.

III. RESULTS AND DISCUSSION

The findings from the semi-structured interview were triangulated with the findings from the desk-research and observation methods. The issues were consolidated and transformed into factors according to TOE framework as summarized in Table IV. Issues that are not listed as from the Table I contexts, has found to give little to no issue at all in the OGD implementation. In acquiescence with the TOE framework, issues are presented according to their related context. The TOE framework [22] has been adopted as the foundation of the theoretical framework because there is not much evolvement since its inception, making TOE as one of the consistent frameworks for a study about innovation implementation in organization context [23].

TABLE IV
SUMMARY OF ISSUES IN OGD IMPLEMENTATION IN PUBLIC SECTORS

Context	Issue	Interview	Desk Research	Observation
Technology	Data granularity	+	+	
Organization	Culture	+		+
	Policy	+	+	+
	Resources	+	+	+
	Skills		+	+
Environment	Incentives	+		
	Use and participation	+		
	External pressure	+	+	

*+ marked as the issue identified in the method applied.

A. Data Granularity

Having OGD initiatives running in the country does not merely means putting the data on the online platform. Instead, there are many things to consider including the quality of the data to be published. Although, much of the current OGD practices follow the Eight Open Government Data Principles, the technicality quality aspects are still lacking. Reference [24] stated that, the quality of the data should be stemming from the information system that produce the datasets. Unfortunately, some of the software-based system failed to enforce quality data input which caused poor datasets in the database. This issue can hardly be solved because it requires many resources to rectify from data input to a more structured database. Aggregated data is

another data granularity issue in OGD initiative, where some of the datasets published are in the form of reporting summary. This might give difficulty for data users who wish to analyse the raw data further as they have a restriction to full datasets.

B. Culture

Furthermore, referring to the data portal, there are more than 200 government agencies involved in data publication since the OGD was initiated in the Malaysian government. However, as stated by one of the interviewees, there are still a small number of government agencies, which felt sceptical about the benefits of OGD. These agencies also perceived that committing to OGD initiative is an added burden to their existing tasks, as they need to allocate resources to identify, collect, clean, and publish a dataset. This finding is consistent with [25] in which the research mentioned about provisioning raw data is a demotivating factor and [26] in which the researchers mentioned on lack of resources especially in small agency, hinder the operation of open data. Furthermore, other initiatives at the national level require the government agency focus too.

C. Policy

Existing policy about data and information imposed by government consists of the Official Secrecy Act (OSA) and Personal Data Protection Act (PDPA). The PDPA only applies to private company in commercial transactions, yet some agency uses this reason for not to release most of the essential data in the data portal. PDPA is meant to prevent the privacy infringement in private company who might misuse their client data. Unlike data sharing requests between government agencies, it is decided formally on a case-by-case basis, and usually data security and privacy are being taken cautiously by both government agencies [27]. In the case of OSA, many government agencies still unclear on the type of data that can be shared to the public due to the stigma that all government data is tied under OSA.

While most of the OGD is free, some data incurred fees structure for data release. This policy has been imposed by certain agency quite long before OGD initiative emerge especially for high demand datasets such as geoscience and healthcare data. Removing this fees structure will involve a series of legal procedure and a considerable amount of time.

D. Resources

Resource allocation in term of manpower is a little bit of issue as the government agency has claimed that they have too many initiatives from the central agency running in tandem. As much as the government agency insisted that they have inadequate of resources to commit to OGD initiatives fully, the central agency also has limited capacity to do an outreach program to help develop the change management and capabilities among data owning agency. Infrastructures do not seem to be much hindrance for OGD implementation as the platform is being leveraged on the government's available open source platform. However, workforce allocation is an issue, where most of the personnel currently have to multitask between their daily task and managing OGD publication.

At the global open data ecosystem, many developed countries have started venture into more advanced of OGD concepts such as open contracting and open spending. OGD is only a part of the completely open government movement, in the future; the government is considering embarking on the Open Government movement. Therefore, more resources regarding staff and knowledge are needed.

E. Skills

Managing OGD initiatives is not just about releasing datasets, prior to that, publishing datasets involved steps from data creation, selection, harmonization, and cataloguing. Each of these steps requires the government personnel with the necessary information technology (IT) skills. Reference [17] stressed that, future government workforce in OGD not just need to have basic IT skills but more advanced and high demand skills in data science, predictive analytics, and web 2.0 technologies to name a few. Reference [28] has outlined six essential core skills area for public servants to be apply in relation to managing open government data. Although these core skills are not required to be applied in their daily job, the public servants are expected to achieve a certain level of awareness in order to prepare them with the latest trend of public service delivery [28].

Therefore, knowing this limitation, the central agency has invested in competency development in which selected government agencies have participated in technical capability coaching by Open Data Institute. With this coaching approach, agencies were encouraged to build their own data product such as business case and use cases using real data at the same time develop their open data skills. The selected government personnel who have gained the skills is hoping to transfer the knowledge to other personnel in their respective agency. Although it is far from the demanded skills mentioned before, some foundation must be laid first before moving on to the next.

F. Incentives

During the initial stage of OGD implementation, the government agencies raise the concern of unclear benefits of the open data to the public and government itself. While there is no tangible evidence that OGD has brought about change in the society, the government agencies find dearth of motivation in giving continuous support to OGD initiatives. This finding is consistent with [19] which summarize the need for strategy and support for government agencies in data publication, as one of the OGD critical success factors. As a start, government agencies were given rewards and recognitions such as certificates, gifts, and token of appreciation to acknowledge their participation in OGD initiatives. With these acknowledgements, it is hoped that more government agencies are willing to participate in OGD initiatives and the existing adopters felt appreciated.

G. Use and Participation

Publishing OGD is already a huge challenge in government, now another challenge of OGD implementation is to get the people to use the OGD. The value of OGD lies when it is put to any tangible product that could benefits the public. Having a data hackathon event annually is

encouraging, but this alone is insufficient, as the participant of the competition may have created innovation that suits the purpose of the competition rather than making a long-term useable data innovation. Some of the applications have no further updates, and almost no usage is recorded. This situation is a bit worrying, as the organizer has no clue if the participant intention were to get the prize money or to build an application that really has an impact on the society. In the future, a mechanism to ensure the continuity of the application built during the competition should be in place rather than just a one-off event

H. External Pressure

External pressure is found to be one of the interesting findings during the semi-structured interview method performed. The rapid growth of the digital revolution has made the government feel pressure from the peer government. Leaving one initiative behind from the big pile of ICT trend will leave a gap and later become a big hole that is arduous to cover. The same phenomena happen for OGD initiative as OGD is suggested to be developed in parallel with other data initiatives such as Big Data. Newly emerging technology such as the Internet of Things or Blockchain may create convergence technology with OGD that is highly data-driven. In time, OGD size will grow and requires advance machine learning technique to analyze. OGD also is a foundation to enable Smart Cities initiatives implementation that will improve the citizen's well-being. Furthermore, OGD is the first step before any government want to advance to Open Government directive in which will open more opportunities to engage with the public [29].

Given the vast potential of OGD and ongoing promotion from the media, the effort to sustain the OGD implementation is ostensible. In addition, global recognition body has produced an annual report that shows an accomplishment comparison between country and this report indirectly will give an impact to a participating country's reputation and capability in the ICT sector.

This study is part of the preliminary step before the actual empirical study is conducted. As for the future works, we aim to study on the factors that influence OGD initiatives to be routinized in the government agency level. The initial factors found in this study help us to design the questionnaire survey in the next phase. Having this preliminary study before the actual study gives us an overview of what are the expected factors to be explored further. We perceived more new factors would be discovered, particularly in the technological context, as the government agency is the final actor of the data publication process. The result will help to build OGD post-adoption model for a sustainable OGD implementation in the public sectors.

IV. CONCLUSION

This paper presented an overview of recent OGD initiatives and its implementation issues in the Malaysian government. Generally, Malaysia has performed at a relatively well in its commitments to OGD initiatives. Malaysia has a very firm governance structure; high-income nation; and possesses a high IT literate society; new information technology such as OGD can be penetrated in the public sectors within a short period. This is due to most

of the government data are already stored in digital format, produce by the legacy information system that processes the data input. Despite the shortcomings such as data granularity, government culture, and so on, the country has made considerable progress in terms of expanding OGD adoption from the top to the bottom unit of the government structure. The effort has made not just the number of datasets increases in the data portal, but in 100 percent machine-readable format. In time, more quality and significant datasets will be visible in data portal. Alongside with these efforts will encourage more usage of the OGD among data innovators and eventually creating political, social, and economic impacts.

This study takes a different setting in terms of exploring the OGD implementation from the top viewpoint of the OGD governance structure. Findings from this study contribute to peer OGD adopters on some insights on what to expect during the implementation phase and prepare with a better planning, as there is a room for improvement. The factors explored in this study can be applied to shape for the conceptual framework of OGD post-adoption empirical study.

Although the central agency is responsible to manage the OGD initiatives, but the data owners experience the real hassle of data publication process, which in this case refer to the government agency at the bottom of the OGD governance structure as, mentioned in the section four. The TOE framework is utilized as the theoretical framework to amalgamate the OGD implementation issues so that the sources of the factors can be defined in the later phase of the study. Therefore, further empirical study is needed to determine whether the factors explored in this study influenced the government agency as the data owners to continue to adopt OGD.

REFERENCES

[1] U. Nations, "United Nations E-Government Survey 2018." New York: United Nations. 2018.

[2] H.-J. Wang and J. Lo, "Adoption of open government data among government agencies." Government Information Quarterly, 33(1): p. 80-88.2016

[3] T. M. Yang and Y. J. Wu. "Exploring the information behaviors of government officials in open data initiatives". in ACM International Conference Proceeding Series. 2016. p. 511-512.

[4] M. Hossain and C. Chan, "Open data adoption in Australian government agencies: an exploratory study." arXiv preprint arXiv:1606.02500.2016

[5] M. Kaasenbrood, et al., Exploring the factors influencing the adoption of open government data by private organisations, in Standards and Standardization: Concepts, Methodologies, Tools, and Applications. 2015, IGI Global.2015

[6] A. Zuiderwijk, M. Janssen, and Y. K. Dwivedi, "Acceptance and use predictors of open data technologies: Drawing upon the unified theory of acceptance and use of technology." Government Information Quarterly, 32(4): p. 429-440.2015

[7] S. Saxena and M. Janssen, "Examining open government data (OGD) usage in India through UTAUT framework." Foresight, 19(4): p. 421-436.2017

[8] E. M. Rogers, Diffusion of Innovations. Vol. 12. New York: The Free Press.1995.

[9] F. Damanpour and J. D. Wischnevsky, "Research on innovation in organizations: Distinguishing innovation-generating from innovation-adopting organizations." Journal of Engineering and Technology Management, 23(4): p. 269-291.2006

[10] A. D. Meyer and J. B. Goes, "Organizational assimilation of innovations: A multilevel contextual analysis." Academy of Management Journal, 31(4): p. 897-923.1988

[11] P. H. Parycek, Johann; Ginner, Michael, "Open government data implementation evaluation." Journal of theoretical and applied electronic commerce research, 9(2): p. 80-99.2014

[12] A. Zuiderwijk and M. Janssen. "The negative effects of open government data-investigating the dark side of open data". in Proceedings of the 15th Annual International Conference on Digital Government Research. 2014. p. 147-152.

[13] A. Purwanto, M. Janssen, and A. Zuiderwijk. "Towards an Open Government Data Success Model: A case study from Indonesia". 2017.

[14] J. O. Attard, Fabrizio; Auer, Sören. "Value Creation on Open Government Data". in System Sciences (HICSS), 2016 49th Hawaii International Conference on. 2016. p. 2605-2614.

[15] F. O. Ahmadi Zeleti, Adegboyega; Curry, Edward, "Exploring the economic value of open government data." Government Information Quarterly, 33(3): p. 535-551.2016

[16] V. M. J. W. Omenogo, Towards a Model of Sustainability for Open Data Motivated Start-Ups, in 2016 Open Data Research Symposium. 2016: Madrid, Spain.

[17] B. Ubaldi, "Open government data: Towards empirical analysis of open government data initiatives." OECD Working Papers on Public Governance, No. 22, OECD Publishing.2013

[18] M. Hausenblas; and J. G. Kim. 5-star Open Data. 31 August 2015 [cited 28 December 2018]; Available from: https://5stardata.info/en/.

[19] A. Zuiderwijk, et al. "Open data disclosure and use: Critical factors from a case study". in CeDEM15: Conference for E-Democracy and Open Government. 2015. p. 197.

[20] I. Susha, et al., "Critical factors for open data publication and use: A comparison of city-level, regional, and transnational cases." JeDEM-eJournal of eDemocracy and Open Government, 7(2): p. 94-115.2015

[21] G. Zaltman, R. Duncan, and J. Holbek, Innovations and Organizations. Vol. 1973. Wiley New York.1973.

[22] L. G. Tornatzky, M. Fleischer, and A. K. Chakrabarti, Processes of Technological Innovation. Lexington Books.1990.

[23] J. Baker, The technology–organization–environment framework, in Information Systems Theory. 2012, Springer.2012

[24] I. Schieferdecker. "(Open) Data Quality". in 2012 IEEE 36th Annual Computer Software and Applications Conference. 2012. p. 83-84.

[25] J. O. Attard, Fabrizio; Scerri, Simon; Auer, Sören, "A systematic review of open government data initiatives." Government Information Quarterly, 32(4): p. 399-418.2015

[26] M. Janssen, Y. Charalabidis, and A. Zuiderwijk, "Benefits, adoption barriers and myths of open data and open government." Information Systems Management, 29(4): p. 258-268.2012

[27] T. W. Bank, "Open Data Readiness Assessment: Malaysia." The Malaysian Development Experience Series. Malaysia: Global Knowledge & Research Hub in Malaysia. 2017.

[28] OECD, "Open Government Data Report: Enhancing Policy Maturity for Sustainable Impact." Digital Government Studies. Paris. 2018.

[29] G. K. Lee, Young Hoon. "Open government implementation model: a stage model for achieving increased public engagement". in Proceedings of the 12th Annual International Digital Government Research Conference: Digital Government Innovation in Challenging Times. 2011. p. 254-261.