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**Developing a Framework of Citizen's Engagement in Open Government
Data's Website**

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Abstract

Website is one of the OGD initiatives that provide input and spread information to the public. This research's objective is to develop a framework for citizen engagement in using OGD's website, i.e. Ministry's websites. This research proposes a few combinations of determinants from the Theory of Human Behavior, Technology Acceptance Model (TAM), Theory of Planned Behaviour (TPB), Theory of Reasoned Action (TRA), and Information System Success Model (ISSM). This research will provide input and information on how the implementation of OGD in Malaysia can become a sustainable innovation in developing a user-friendly website to attract engagement from the public.

Keywords: Open government data, Open data, Citizen engagement, Information Quality, Research Framework

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1.0 Introduction

Today's data-driven businesses have emerged and become important to our daily life. The demand to have reliable, comprehensive, and transparent data shows the importance of having a set of data that can be fully utilized by anyone without any restrictions. For instance, when COVID-19 started to hit the whole world, the importance of having accurate and transparent data became more visible. From the context of the public sector, providing a set of data through public funds that can be shared, used, and reused is considered Open Government Data (Attard et al., 2015). Open Government Data (OGD) is regarded as an organization-level innovation that works ideally in a data openness ecosystem where a government publishes data for free use and re-use by anyone without any restrictions (Mustapa et al., 2017). Many countries implementing OGD are focusing on sharing public data through portals and websites. OGD offers many benefits if it is successfully implemented (Kim et al. 2014). In Malaysia, the Malaysian Administrative Modernisation and Management Planning Unit (MAMPU) is one of the central government agencies that was tasked to implement OGD within the public sector by the Malaysian Government. MAMPU has developed an open data platform accessible through the portal <https://www.data.gov.my> to guarantee the success of the OGD initiative. The Malaysian government has developed a circular concerning global best practices on open data (Daud & Zulhuda, 2019).

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Based on the interviews in New York, London, and Berlin, public agencies are willing to share with only a small number of groups or organizations instead of participating in OGD initiatives (Heimstädt, 2017). Public agencies as public data providers should be aware of and realize the benefits of the implementation of OGD in many aspects. This is crucial to ensure the OGD is in growing progress. Many countries and governments realized the benefits of Open government data (OGD) that give value to political, economic, and social benefits (Zhao & Fan, 2018). Starting with the US Government introducing the "data.gov" portal in 2009, 94 countries have at least one OGD initiative run by their government. As outlined in the 11th Malaysian Plan (RMK-11), greater cooperation is needed among ministries and agencies in the public sector. This is to ensure Malaysia's ranking in the global rating index Online Service Index (OSI) is improving. In 2020, Malaysia targeted to be in the top 15 in OSI. Unfortunately, Malaysia only managed to rank at 24th place. Open Government Data is one of the focus areas in the United Nations e-Government (UNEG) survey for OSI.

It is not deniable that OGD plays a vital role in contributing to the democratic value and citizen participation, especially in monitoring for transparency and measuring government services as well as discussing public matters (Ruijter et al., 2017). From this perspective, data publishing is limited, and it is only a part of a bigger effort to supply digital government services. To enhance and unleash the OGD potential, government agencies, corporate leaders, civic society, academia, and the community must collaborate (Mustapa et al., 2019). Data providers attempt to include users in promoting OGD technology and creating cutting-edge open data practices through workshops, conferences, and hackathons to address this issue. Unfortunately, these strategies led to technological solutions but did not have the desired effect on end users (Carr & Lassiter, 2017). Thus, to make this OGD initiative successful, investigations on citizen engagement using OGD initiatives are essential.

In this research, the researchers use ministries' websites as one of the OGD initiatives that have been widely used by citizens to search for information. The researchers employ a few theories to evaluate from the perspectives of citizens concerning information quality, system quality, satisfaction, trust, perceived usefulness, and perceived ease of use. The framework is drawn from a few combinations of determinants from the Theory of Human Behavior, Technology Acceptance Model (TAM), Theory of Planned Behaviour (TPB), Theory of Reasoned Action (TRA), and Information System Success Model (ISSM). To the best of researchers' knowledge, limited studies have been done in this area of OGD especially citizen engagement through the ministry's website in Malaysia using the combination of theories mentioned earlier. Motivated by the little attention to the factors that may influence citizens in Malaysia to participate in OGD initiatives, this research is primarily intended to fill the research gap. Adopting these theoretical theories has three advantages. First, it specifies how the ministries as the owners of the OGD digital platform can strategize to stimulate innovation. Second, it simplifies explanations of evolution aimed at the development, improvement, and expansion of the websites as an OGD platform. Lastly, it allows for the identification of the factors that influence citizen engagement on the OGD website. This conceptual paper signifies providing literature for academicians and researchers, especially in OGD. The researchers aim to develop a framework for citizen engagement in using OGD's website as an outcome of this research. The result is believed will give input and information on how the implementation of OGD in Malaysia can become a sustainable innovation in developing a user-friendly website to attract more participation and engagement from the public.

2.0 Literature Review

It is seen that OGD initiatives offer multiple benefits if successfully implemented. Sharing public agency data through OGD efforts can improve government operations' transparency and accountability by allowing the public to monitor government activities more effectively (Kim et al., 2014). Furthermore, distributing free, reusable public-sector data is projected to boost public-sector innovation by decreasing the barrier to entry for individual developers and firms looking to establish new services using the data (Ubaldi, 2013). OGD has become a crucial action for government administrations worldwide. Nonetheless, mostly especially government agencies choose not to share their datasets and act reluctantly to embed the concept of data publication in their daily operations (Yang & Wu, 2016).

2.1 Open Government Data

Particularly, OGD is aimed to help the government become more transparent and accountable. Civilians, policymakers, journalists, scientists, and businesses can utilize, manipulate, and analyze government datasets to generate new uses and economic growth by gaining access to them (Attard et al., 2015; Dawes & Helbig, 2010; Zuiderwijk & Janssen, 2012). OGD is widely regarded as a catalyst for efficiency and a means of enhancing transparency, citizen participation, and innovation in society. It is hoped that OGD will eventually result in significant value creation (Jetzek, Avital, & Bjorn-Andersen, 2014).

Open data is data that is publicly accessible online, available for re-use without technical restrictions, and released under an open access license that permits the data to be reused without restriction, including across different 'fields of endeavour' (Jetzek et al., 2014).

A fascinating subset of free data is government data sets. In many different fields, public agencies are among the major creators and collectors of data (Janssen, 2011). These fields include anything from traffic, weather, and geography data to business statistics and data, as well as government budgeting (Janssen, Charalabidis & Zuiderwijk, 2012). OGD added value to the data creation and information, not only to help the government in decision-making but also to the citizens and investors. By disseminating and publishing data, the government indirectly encourages stakeholders to innovate and establish new services (Attard et al., 2015). Citizens are given the chance to actively participate in governance processes such as decision-making and policymaking through the publication of government data, rather than just occasionally participating in elections every few years (Attard et al., 2015).

In a way, open data is a tool to bridge the gap between government and users, by assisting public organizations to become more transparent when interacting with their surroundings (M. Janssen et al., 2012). Many countries that participate in the open government data movement provide official platforms to ensure the accessibility of the data is reachable. In Malaysia, open data portal led by MAMPU

provides open data for citizens where they can easily access information from official sources, save time and cost, and as well as to encourage creativity and innovation of new ideas and products.

2.2 Open Government Data in Malaysia

Malaysia officially implemented OGD in 2014 and was resolved by MAMPU. Based on the decision made in the meeting of the Steering Committee NKEA (National Key Economic Area) CCI (Communications Content and Infrastructure) which was chaired by YB Minister of Communications and Multimedia on 29 May 2014 a Public Sector Open Data Platform was developed.

Ministers Cabinet Meeting on 20 August 2014 agreed that the public sector agency would carry out the open data initiative to realize the Government's aspiration. It is hoped that by providing a platform for OGD, it will indirectly improve the transparency of government's services by providing and sharing accurate, fast, and relevant data promptly. Besides, it will increase the nation's digital economy productivity by promoting innovation and attracting involvement from businesses and the digital community. There are many benefits to implementing OGD in Malaysia such as in political and social, economic, operational, and technical (Janssen et al., 2012), improve transparency, and encourage collaboration and innovation (Harrison, Pardo & Cook, 2012). In ensuring the implementation stage is smooth and at a growing pace, the government should do more promotion and advertisement regarding the implementation and as well as provide training and awareness programs to all ministries, agencies, and as well as to end users such as citizens.

2.3 Website as OGD's Initiative

Nowadays, governments all around the world are progressively developing OGD projects or initiatives to share data from public agencies via websites or OGD portals as platforms (Zhenbin, Kankanhalli, Ha & Tayi, 2019). In the government context, open data refers to data created with public funds and made freely available for use or distribution (Attard et al., 2015). If OGD projects are successfully executed, they provide numerous benefits. For example, sharing public agency data through OGD efforts can increase openness and accountability of government operations by allowing the public to effectively monitor their activities (Kim et al., 2014).

Furthermore, providing free, reusable public agency data is intended to spur public service innovation by decreasing the barrier to entry for individual developers and enterprises looking to create new services with the data (Ubaldi, 2013). The creation of OGD portals or sites is used to implement an OGD. Tang & Jiang (2021) define OGDs in their research as sites or portals that allow the public to access government information or public data. Little attention has been given to the usage of OGD platforms and there is limited understanding of how these platforms for open data service innovation are controlled, where the nurturing of an installed base of diversified service innovators can lead to higher OGD usage (Bonina & Eaton, 2020). In this research, the researchers attempt to explore the factors that may influence citizens' use of data offered by OGD platform owners which are the government ministries. It is hoped that the exploration will provide benefits to the ministries by improving the information and system quality published on the website.

2.4 Citizen's Engagement

From the perspective of website usage, user engagement is defined by Attfield et al. (2011) as an emotional, cognitive, and behavioral connection between users and a website at a specific time or over a specific period. In this research, user engagement refers to user involvement in the ministry's website as one of the OGD initiatives. User engagement is regarded as an intentional decision made by data users following the use of an open data portal or OGD's websites (Krismawati & Hidayanto, 2021). The accessibility of this information and solutions can better meet end-user information needs. To date, the projected degree of open data persistence use has not been met due to a lack of user engagement and participation in long-term OGD activities (Safarov et al. 2017). Local governments are utilizing this opportunity to increase citizen engagement in political and social concerns as social media becomes a major conduit of online interactive participation (Haro-de-rosario, Sáez-martín & Caba-pérez, 2016). The ways in which citizens participate in the life of a community to improve conditions for others or to help determine the community's future are referred to as citizen engagement. The use of information and communication technology (ICT) to enhance public engagement is a recurring theme in local governments (Cegarra-navarro et. al. 2014).

2.5 The Importance of OGD and Citizen's Engagement

There are many benefits to be gained if OGD is widely used and fully utilized by the end users. It provides useful and valuable information and data and may create innovations. OGD also became essential during the outbreak of COVID-19, where citizens rely on the data released by the government. Open data sharing can give complete information to enhance all stakeholders' efforts to successfully manage the COVID-19 epidemic (Cosgriff, Ebner & Celi, 2020). Although the benefits of using available government data are numerous, the impact of open data efforts has yet to be felt (Krismawati & Hidayanto, 2021). OGD publication promotes government innovation and strengthens the link between individuals, societies, citizens, and governments. When data is made available, the public becomes an active participant in data analysis, which leads to more effective and well-informed societies (Ahmad & Warriach, 2020).

Citizens participate in public affairs to help determine the community's future. The greatest way to assure healthy and result-oriented Citizen Engagement is to employ OGD effectively (Ahmad & Warriach, 2020). Engagement is seen as the best approach for technologically advanced and empowered citizens where it is supposed to work by restoring an equal relationship between citizens and public organizations, in a way where two-way communication is established (Piqueiras, Canel & Luoma-aho, 2020). So far, empirical research on the use of OGD, particularly among Malaysian citizens, is sparse (Zainal et. al., 2019). Understanding the mentioned variables and characteristics in this research may aid all parties in optimizing the potential of open data efforts. The findings of this research may persuade the government to establish better open government data websites and portals.

3.0 Methodology

The variables and dimensions in this research were adopted from previous literature and research. Most of the variables and dimensions are well-known and widely used in the field of IS. The theoretical concept and items were adopted from previous research that had already been tested, measured, and evaluated. This research used a literature review of past research as the methodology to sort out the variables, and following that, mapped the research variables and dimensions with the literature. Online databases such as IEEE, Scopus, Emerald Insight, Web of Science, Google Scholar, Science Direct, and Springer Link were used to find relevant papers and publications from the year 2012 until 2022.

4.0 Findings

The dimensions for the independent variable (IV) and dependent variable (DV) were chosen primarily based on the findings of the literature review. The literature review provided researchers with a clearer picture of the evolution of each variable, allowing them to adapt and adopt the concept. The findings are discussed in items 4.1 and 4.2.

4.1 Construction of Variables/ Dimensions

In this research, a combination of a few theories is used to develop the theoretical framework. There are three stages based on the Theory of Human Behavior which are cognitive, affective, and conative. The three-dimensional stage of human behaviour theory is frequently used as the foundation for developing human psychological models. Human behaviour can be categorized into three parts which are mental, emotional, and behavioural responses (Hilgard, 1980). Thus, according to Rosenberg & Hovland (1961), three components of the mental and emotional elements are cognitive (cognition), affective (affection), and conative (conation). The cognitive component of attitude is related to the person's thoughts, judgments, or opinions about the object of the attitude (Abun, Magallanes & Incarnacion, 2019). In this research, the cognitive phase is represented by the citizen's experience in using the ministry's websites as an OGD platform. Information quality and system quality are selected as the components under the cognitive phase. These variables are adopted from the ISSM theory by DeLone and McLean (2003). Meanwhile, the affective component is associated with the person's emotional reaction or feeling toward the object of the attitude, such as liking or dislike (Abun et al., 2019). Thus, under the affective phase, it represents the citizen's feelings towards the usage of the ministry's websites. As referred to in Figure 1, the elements under the affective stage are satisfaction, perceived usefulness, perceived ease of use, and trust adopted by Krismawati & Hidayanto (2021). Abun et al. (2019) defines the behavioural or conative component of attitudes as the behavioural reaction to the object of the attitude. It means that the conative phase denotes the user's actions or behaviour in relation to an object. Since the purpose of this research is to assess citizens' engagement on the ministry's websites as one of the initiatives of OGD, the conative phase is to determine the citizen's engagement behaviour towards the usage of the ministry's websites. Each stage, variable, and dimension are adopting and adapts from the Technology Acceptance Model (TAM), Theory of Planned Behaviour (TPB), Theory of Reasoned Action (TRA), and Information System Success Model (ISSM). Thirty-three articles have been selected as the references and a cross-tabulation method has been adopted to match and select the dimensions for Information Quality and System Quality. The most frequent dimensions are selected, and the categorization is made based on the suggestions and findings of the previous authors in each article. Table 1 represents the construction and development of the dimensions in each variable with the references of sources:

Table 1: Variables, dimensions, references, and theory

VARIABLES	DIMENSION	DEFINITION	REFERENCES	THEORY
Information quality		The standard of the outputs that the information system generates, may take the form of reports or online screens (DeLone & Mclean, 1992).		ISSM TAM
	Completeness	The degree to which data is needed for the task at hand in terms of breadth, depth, and scope (Wang & Strong, 1996).	(Montesdioca & Macada, 2015) (Sari, Yanuartha, Yani, & Dewa, 2021) (Nugraheni & Bayastura, 2021) (Urbach & Müller, 2012) (Zaied, 2012) (Nelson, Todd, & Wixom, 2005)(Zheng, Zhao, & Stylianou, 2013) (Al-Mamary, Shamsuddin, & Abdul Hamid, 2014) (Fitriani, Hidayanto, Sandhyaduhita, & Purwandari, 2017) (Fitriati, Pratama, Tubastuvi, & Anggoro, 2020) (Zhu, Yan, & Song, 2022) (Lin & Lee, 2005) (Lee, Strong, Kahn, & Wang, 2002)	ISSM TAM
	Accuracy	The extent to which information is correct, unambiguous, meaningful, believable, and consistent (Nelson et al., 2005).	(Hudin et al., 2019) (Sari et al., 2021) (Salim, Alfansi, Anggarawati, Saputra, & Afandy, 2021) (Urbach & Müller, 2012) (Zaied, 2012) (Nelson et al., 2005) (Benmoussa, Laaziri, Khouliji, Kerkeb, & Yamami, 2018) (Al-Mamary et al., 2014) (Fitriati et al., 2020) (Zhang, Fan, Zhang, & Zhang, 2019) (Umukoro & Tiamiyu, 2022)	ISSM TAM
	Relevance	Information must be relevant and appropriate for the purpose for which it is sought (Al-Mamary et al., 2014).	(Hudin et al., 2019) (Sari et al., 2021) (Salim et al., 2021) (Nugraheni & Bayastura, 2021) (Al-Mamary et al.,	ISSM TAM

		2014) (Fitriati et al., 2020) (Umukoro & Tiamiyu, 2022) (Zhu et al., 2022) (Lee et al., 2002)	
System quality	Represents the quality of the information system processing itself, which comprises software and data components, and it is a measure of the extent to which the system is technically sound (Gorla, Somers, & Wong, 2010).		ISSM TAM
Responsiveness	The extent to which a system's specialized capability provides quick (or timely) responses to requests for information or action (Nelson et al., 2005)	(Hudin et al., 2019) (Montesdioca & Macada, 2015) (Sari et al., 2021) (Wulan Sari et al, 2021) (Nugraheni & Bayastura, 2021) (Urbach and Muller, 2012) (Nelson et al., 2014) (Umukuro & Tiamiyu 2020)	ISSM TAM
Flexibility	The ability of a system to adapt to a variety of user needs and changing conditions (Nelson et al., 2005).	(Montesdioca & Macada, 2015) (Salim et al., 2021) (Urbach & Müller, 2012) (Nelson et al., 2005) (Benmoussa et al., 2018) (Fitriati et al., 2020)	ISSM TAM
Reliability	The degree to which information is accepted as true, believable, and credible (Zheng et al., 2013)	(Krismawati & Hidayanto, 2021) (Montesdioca & Macada, 2015) (Salim et al., 2021) (Urbach & Müller, 2012) (Zaied, 2012) (Nelson et al., 2005)	ISSM TAM TRA TPB
Satisfaction	A psychological process encompassing beliefs, feelings, and attitudes concerning user experience while using the website (Delone & Mclean, 1992)	(Krismawati & Hidayanto, 2021) (Islam & Khayer, 2021) (Islam & Khayer, 2021) (Hudin et al., 2019) (Montesdioca & Macada, 2015) (Sari et al., 2021)	TAM TRA TPB ISSM UTAUT
		(Aldholay, Isaac, Abdullah, Abdulsalam, & Al-Shibami, 2018) (Salim et al., 2021) (Nugraheni & Bayastura, 2021) (Hidayah et al., 2020) (Pardiñan, Pardiñan, & Loremia, 2019) (Urbach & Müller, 2012) (Lwoga, 2014) (Zaied, 2012)	
Perceived usefulness	The extent to which a person believes that using a specific system will increase his or her job performance (Davis, 1989).	(Buabeng-andoh, 2018) (Fitriani et al., 2017) (Cegarra-navarro et al., 2014) (Yang & Wu, 2016) (Salim et al., 2021) (Pardiñan et al., 2019) (Lwoga, 2014)	TAM TRA TPB ISSM
Perceived ease of use	The degree to which a person believes that using technology would be effortless (Davis, 1989).	(Krismawati & Hidayanto, 2021) (Buabeng-andoh, 2018) (Fitriani et al., 2017) (Cegarra-navarro et al., 2014) (Nugraheni & Bayastura, 2021) (Hidayah et al., 2020) (Pardiñan et al., 2019) (Zaied, 2012)	TAM TRA TPB ISSM
Trust	A level of trust in good intentions, benevolence, competence, and reliability of members who share data and information on the website (Chen & Hung, 2010).	(Krismawati & Hidayanto, 2021) (Purwanto & Janssen, 2020) (Lnenicka, Nikiforova, Saxena, & Singh, 2022) (Fitriani et al., 2017) (Cegarra-navarro et al., 2014)	TAM TRA TPB ISSM UTAUT
Citizen's Engagement	A long-term emotional, cognitive, and behavioural relationship that develops between users and a website (Attfield et al., 2011).	(Krismawati & Hidayanto, 2021) (Purwanto & Janssen, 2020) (Cegarra-navarro et al., 2014) (Andrei, Zait, Stoian, Tugulea, & Manolica, 2020) (Siebers, Gradus, & Grotens, 2018) (Piqueiras et al., 2020) (Ahmad & Warriach, 2020)	TAM TRA TPB ISSM

4.2 Research Framework

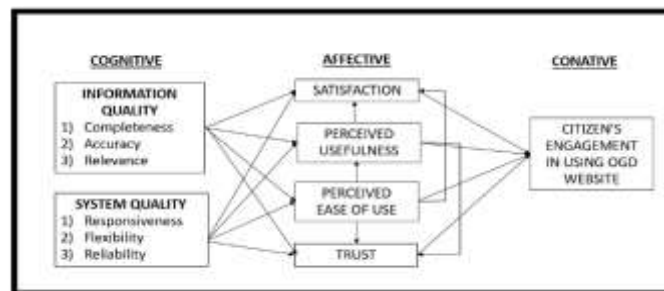


Figure 1: Proposed Theoretical Framework

A framework is proposed for Citizen Engagement in using OGD 's website and identified the relationships of all the variables and dimensions.

5.0 Discussion and Conclusion

This research focuses on OGD from the perspective of end users. In developing the questionnaires, each variable and dimension is constructed with five items each. The questionnaire development is based on previous studies and is verified by six Expert Panelists in related fields. Based on previous research, the Theory of Planned Behaviour is widely used and known as a theory to measure behaviours. This theory will serve as the foundation for developing the research model besides the Theory of Human Behaviour. According to the TAM, satisfaction, perceived usefulness, perceived ease of use and trust can impact technology acceptance. Thus, in this research, the researchers adapt those dimensions in the proposed framework. The quality of an open data website as a technology can be measured by the quality of the system and information which is consistent with DeLone and McLean's IS Success Model (DeLone & McLean, 2003). This research also focuses on OGD as a process of knowledge sharing, particularly in the public sector, and limited research has been done in the public sector, particularly on OGD's website. Besides, it is aimed to contribute to the body of knowledge by providing a framework that combines a few theories and fills the research gap in the OGD field. However, this research has some limitations in that it only covers citizens in Klang Valley. Future research can explore a wider range of respondents and explore other determinants in citizens' engagement in using OGD's website. Finally, this research suggests a snapshot of how particular behaviours, information, and technology relationships can lead and guide Citizen Engagement.

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References

- Abun, D., Magallanes, T., & Incarnacion, M. J. (2019). College Students' Cognitive and Affective Attitude toward Higher Education and Their Academic Engagement. *International Journal of English Literature and Social Sciences*, 4(5), 1494–1507. <https://doi.org/10.22161/ijels.45.38>
- Ahmad, Z., & Warriach, N. F. (2020). Civic Engagement through Open Government Data : Challenges and the Way Forward Civic Engagement through Open Government Data : Challenges and the. *Library Philosophy and Practice (e-Journal)*.
- Al-Mamary, Y. H., Shamsuddin, A., & Abdul Hamid, N. A. (2014). The relationship between system quality, information quality, and organizational performance. *International Journal of Knowledge and Research in Management & E-Commerce*, 4(3), 7–10.
- Aldholay, A., Isaac, O., Abdullah, Z., Abdulsalam, R., & Al-Shibami, A. H. (2018). An extension of Delone and McLean IS success model with self-efficacy: Online learning usage in Yemen. *International Journal of Information and Learning Technology*, 35(4), 285–304. <https://doi.org/10.1108/IJILT-11-2017-0116>
- Andrei, A. G., Zait, A., Stoian, C., Tugulea, O., & Manolica, A. (2020). *Citizen engagement in the " post-truth era " A knowledge management inquiry into the online spread of information*. 49(5), 1429–1443. <https://doi.org/10.1108/K-03-2019-0178>
- Attard, J., Orlandi, F., Scerri, S., & Auer, S. (2015). A systematic review of open government data initiatives. *Government Information Quarterly*, 32(4), 399–418. <https://doi.org/10.1016/j.giq.2015.07.006>
- Attfield, S., Piwowski, B., & Kazai, G. (2011). *Towards a science of user engagement*.
- Benmoussa, K., Laaziri, M., Khoulji, S., Kerkeb, M. L., & Yamami, A. El. (2018). Impact of system quality, information quality, and service quality on the efficiency of information systems. *ACM International Conference Proceeding Series*. <https://doi.org/10.1145/3286606.3286818>
- Bonina, C., & Eaton, B. (2020). Cultivating open government data platform ecosystems through governance: Lessons from Buenos Aires, Mexico City, and Montevideo. *Government Information Quarterly*, 37(3), 101479. <https://doi.org/10.1016/j.giq.2020.101479>
- Buabeng-andoh, C. (2018). of reasoned action and technology acceptance model Predicting students ' intention to adopt mobile learning A combination of theory of reasoned action and technology acceptance model. *Journal of Research in Innovative Teaching & Learning*. <https://doi.org/10.1108/JRIT-03-2017-0004>
- Carr, S. J., & Lassiter, A. (2017). Big Data , Small Apps : Premises and Products of the Civic Hackathon. *Springer Geography*, 543–559. <https://doi.org/10.1007/978-3-319-40902-3>
- Cegarra-navarro, J., Garcia-perez, A., & Moreno-cegarra, J. L. (2014). Technology knowledge and governance : Empowering citizen engagement and participation. *Government Information Quarterly*, 1–9. <https://doi.org/10.1016/j.giq.2014.07.001>
- Chen, C., & Hung, S. (2010). Information & Management To give or to receive ? Factors influencing members ' knowledge sharing and community promotion in professional virtual communities. *Information & Management*, 47(4), 226–236. <https://doi.org/10.1016/j.im.2010.03.001>
- Cosgriff, C. V, Ebner, D. K., & Celi, L. A. (2020). Data sharing in the era of COVID-19. *The Lancet Digital Health*, 2(5). [https://doi.org/10.1016/S2589-7500\(20\)30082-0](https://doi.org/10.1016/S2589-7500(20)30082-0)
- Daud, M., & Zulhuda, S. (2019). Open Data and Right to Information in Malaysia: A Comparative Analysis. *2018 6th International Conference on Cyber and IT Service Management, CITSM 2018*, (Citsm), 1–5. <https://doi.org/10.1109/CITSM.2018.8674259>
- Davis, F. D. (1989). Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. *Management Information Systems Research Center, University of Minnesota*, 13(3), 319–340. <https://doi.org/10.5962/bhl.title.33621>
- Dawes, S., & Helbig, N. (2010). Dawes & Helbig_Information Strategies for Open Govt.(2010).pdf. *IFIP International Federation for Information Processing*, 50–60.

- Delone, W. H., & Mclean, E. R. (1992). *Information Systems Success: The Quest for the Dependent Variable*. (4).
- DeLone, W. H., & McLean, E. R. (2003). The DeLone and McLean model of information systems success: A ten-year update. *Journal of Management Information Systems*, 19(4), 9–30. <https://doi.org/10.1080/07421222.2003.11045748>
- Fitriani, W. R., Hidayanto, A. N., Sandhyaduhita, P. I., & Purwandari, B. (2017). Determinants of Intention to Use Open Data Website : An Insight from Indonesia. *Pacific Asia Conference on Information Systems (PACIS)*.
- Fitriati, A., Pratama, B. C., Tubastuvi, N., & Anggoro, S. (2020). Study Of Delone-Mclean Information System Success Model : The Study Of Delone-Mclean Information System Success Model : The Relationship Between. *Journal of Theoretical and Applied Information Technology*, 98(3), 477–487.
- Gorla, N., Somers, T. M., & Wong, B. (2010). Organizational impact of system quality, information quality, and service quality. *Journal of Strategic Information Systems*, 19(3), 207–228. <https://doi.org/10.1016/j.jsis.2010.05.001>
- Haro-de-rosario, A., Sáez-martín, A., & Caba-pérez, M. C. (2016). *Using social media to enhance citizen engagement with local government : Twitter or Facebook ?* <https://doi.org/10.1177/1461444816645652>
- Harrison, T. M., Pardo, T. A., & Cook, M. (2012). *Creating Open Government Ecosystems: A Research and Development Agenda*. 900–928. <https://doi.org/10.3390/fi4040900>
- Heimstädt, M. (2017). Openwashing: A decoupling perspective on organizational transparency. *Technological Forecasting and Social Change*, 125, 77–86. <https://doi.org/10.1016/j.techfore.2017.03.037>
- Hidayah, N. A., Hasanati, N., Putri, R. N., Musa, K. F., Nihayah, Z., & Muin, A. (2020). Analysis Using the Technology Acceptance Model (TAM) and DeLone McLean Information System (DM IS) Success Model of AIS Mobile User Acceptance. *2020 8th International Conference on Cyber and IT Service Management, CITSM 2020*. <https://doi.org/10.1109/CITSM50537.2020.9268859>
- Hilgard, E. R. (1980). THE TRILOGY OF MIND: COGNITION, AFFECTION, AND CONATION. *Journal of the History of the Behavioral Sciences*, 16, 107–117.
- Hudin, J. M., Farlina, Y., Saputra, R. A., Gunawan, A., Pribadi, D., & Riana, D. (2019). Measuring Quality of Information System Through Delone Mclean Model in Online Information System of New Student Registration (SISFO PPDB). *2018 6th International Conference on Cyber and IT Service Management, CITSM 2018, (Citsm)*, 1–6. <https://doi.org/10.1109/CITSM.2018.8674310>
- Islam, M. T., & Khayer, A. (2021). *Exploring continuance usage intention toward open government data technologies : an integrated approach*. <https://doi.org/10.1108/VJIKMS-10-2020-0195>
- Janssen, K. (2011). The influence of the PSI directive on open government data: An overview of recent developments. *Government Information Quarterly*, 28(4), 446–456. <https://doi.org/10.1016/j.giq.2011.01.004>
- Janssen, M., Charalabidis, Y., & Zuiderwijk, A. (2012). Benefits, Adoption Barriers and Myths of Open Data and Open Government. *Information Systems Management*, 29(4), 258–268. <https://doi.org/10.1080/10580530.2012.716740>
- Jetzek, T., Avital, M., & Bjorn-Andersen, N. (2014). Data-driven innovation through open government data. *Journal of Theoretical and Applied Electronic Commerce Research*, 9(2), 100–120. <https://doi.org/10.4067/S0718-18762014000200008>
- Kim, G. H., Trimi, S., & Chung, J. H. (2014). Big-data applications in the government sector. *Communications of the ACM*, 57(3), 78–85. <https://doi.org/10.1145/2500873>
- Krismawati, D., & Hidayanto, A. N. (2021). The User Engagement of Open Data Portal. *2021 International Conference Advanced Computer Science and Information Systems (ICACIS)*.
- Lee, Y. W., Strong, D. M., Kahn, B. K., & Wang, R. Y. (2002). AIMQ : a methodology for information quality assessment. *Information & Management*, 40, 133–146.
- Lin, H., & Lee, G. (2005). *Effects of socio-technical factors on organizational intention to encourage knowledge sharing*. (2000). <https://doi.org/10.1108/00251740610641472>
- Lnenicka, M., Nikiforova, A., Saxena, S., & Singh, P. (2022). *Investigation into the adoption of open government data among students : the behavioural intention-based comparative analysis of three countries*. 74(3), 549–567. <https://doi.org/10.1108/AJIM-08-2021-0249>
- Lwoga, E. (2014). Critical success factors for adoption of web-based learning management systems in Tanzania. *International Journal of Education and Development Using Information and Communication Technology (IJEDICT)*, 10(1), 4–21. Retrieved from <http://ijedict.dec.uwi.edu/viewarticle.php?id=1669>
- Montesdioca, G. P. Z., & Macada, A. C. G. (2015). Quality dimensions of the DeLone-McLean model to measure user satisfaction: An empirical test on the information security context. *Proceedings of the Annual Hawaii International Conference on System Sciences, 2015-March*, 5010–5019. <https://doi.org/10.1109/HICSS.2015.593>
- Mustapa, M. N., Hamid, S., & Nasaruddin, F. H. (2019). *Exploring the Issues of Open Government Data Implementation in Malaysian Public Sectors*. (August). <https://doi.org/10.18517/ijaseit.9.4.8850>
- Mustapa, M. N., Md Nasaruddin, F. H., & Hamid, S. (2017). Post-adoption of Open Government Data Initiatives in Public Sectors. *Pacific Asia Conference on Information Systems (PACIS)*, (Ubaldi 2013), 274.
- Nelson, R. R., Todd, P. A., & Wixom, B. H. (2005). Antecedents of Information and System Quality : An Empirical Examination Within the Context of Data Warehousing Antecedents of Information and System Quality : An Empirical Examination. *Management of Information Systems*, 21(4), 199–235. <https://doi.org/10.1080/07421222.2005.11045823>
- Nugraheni, D. M. K., & Bayastura, S. F. (2021). Analysis of factors that influence satisfaction and usefulness for attendance system with the Delone & McLean model

- (case study: Attendance system at Diponegoro University). *Journal of Physics: Conference Series*, 1943(1). <https://doi.org/10.1088/1742-6596/1943/1/012108>
- Pardiñan, E. G., Pardiñan, P., & Loremia, R. A. (2019). Simulation-Based Learning in Electronics: Modified TAM and DeLone & McLean IS Success Model. *Journal of Science, Engineering, and Technology*, 7, 77–93. Retrieved from <http://www.academia.edu/download/63476623/JSET57420200530-76347-13yppt6.pdf>
- Piqueiras, P., Canel, M.-J., & Luoma-aho, V. (2020). Citizen Engagement and Public Sector Communication. *The Handbook of Public Sector Communication*, (First Edition), 278–287.
- Purwanto, A., & Janssen, M. (2020). Citizens' Trust in Open Government Data A Quantitative Study about the Effects of Data Quality, System Quality, and Service Quality. *The 21st Annual International Conference on Digital Government Research*, 310–318.
- Rosenberg, M. J., & Hovland, C. I. (1960). Attitude Organization and Change: An Analysis of Consistency Among Attitude Component. In *American Sociological Review* (Vol. 26, pp. 644–645). Yale University Press.
- Ruijter, E., Grimmelikhuijsen, S., & Meijer, A. (2017). Open data for democracy: Developing a theoretical framework for open data use. *Government Information Quarterly*, 34(1), 45–52. <https://doi.org/10.1016/j.giq.2017.01.001>
- Safarov, I., Meijer, A., & Grimmelikhuijsen, S. (2017). Utilization of open government data: A systematic literature review of types, conditions, effects, and users. *Information Polity*, 22(1), 1–24. <https://doi.org/10.3233/IP-160012>
- Salim, M., Alfansi, L., Anggarawati, S., Saputra, F. E., & Afandy, C. (2021). The role of perceived usefulness in moderating the relationship between the DeLone and mclean model and user satisfaction. *Uncertain Supply Chain Management*, 9(3), 755–766. <https://doi.org/10.5267/j.uscm.2021.4.002>
- Sari, N. W. W., Yanuartha, W., Yani, M., & Dewa, S. R. (2021). Evaluation of E-Learning Implementation During the Covid-19 with the DeLone and McLean Models. *IJISTECH (International Journal of Information System & Technology)*, 4(2), 637. <https://doi.org/10.30645/ijistech.v4i2.104>
- Siebers, V., Gradus, R., & Grotens, R. (2018). Citizen engagement and trust : A study among citizen panel members in three Dutch municipalities. *The Social Science Journal*, (2017). <https://doi.org/10.1016/j.sosci.2018.09.010>
- Tang, R., & Jiang, J. (2021). Characteristics of Open Government Data (OGD) Around the World : A Country-based Comparative. *2020 ASIS&T Asia-Pacific Regional Conference (Virtual Conference)*, 5(1), 11–26.
- Ubaldi, B. (2013). Open Government Data: Towards Empirical Analysis of Open Government Data Initiatives. *OECD Working Papers on Public Governance*, NO.22(22), 61. <https://doi.org/10.1787/5k46bj4f03s7-en>
- Umukoro, I. O., & Tihamiyu, M. A. (2022). Modeling the predictors of e-service use among information systems users. *Library Hi Tech*, 40(1), 222–238. <https://doi.org/10.1108/LHT-01-2020-0018>
- Urbach, N., & Müller, B. (2012). Chapter 1 The Updated DeLone and McLean Model of Information Systems Success. In *Information Systems Theory: Explaining and Predicting* (Vol. 1). <https://doi.org/10.1007/978-1-4419-6108-2>
- Wang, R. Y., & Strong, D. M. (1996). Preparation and properties of a carbon-free precast block for ladle lining. *Journal of Management Information Systems*, 12(4), 5–33.
- Yang, T. M., & Wu, Y. J. (2016). Examining the socio-technical determinants influencing government agencies' open data publication: A study in Taiwan. *Government Information Quarterly*, 33(3), 378–392. <https://doi.org/10.1016/j.giq.2016.05.003>
- Zaid, A. N. H. (2012). An Integrated Success Model for Evaluating Information Systems in Public Sectors. ... of *Emerging Trends in Computing and Information ...*, 3(6), 814–825. Retrieved from <http://www.doaj.org/doi/func=fulltext&aid=1093381>
- Zainal, N. Z., Hussin, H., Abd Rahim, N. H., Mior Nazri, M. N., & Suhaimi, M. A. (2019). Open Government Data Use by Malaysians. *IEEE 2019 6th International Conference on Research and Innovation in Information Systems (ICRIIS)*, 1–6.
- Zhang, L., Fan, Y., Zhang, W., & Zhang, S. (2019). *Extending the Theory of Planned Behavior to Explain the Effects of Cognitive Factors across different Kinds of Green Products*. 1–17.
- Zhao, Y., & Fan, B. (2018). Exploring open government data capacity of government agency: Based on the resource-based theory. *Government Information Quarterly*, 35(1), 1–12. <https://doi.org/10.1016/j.giq.2018.01.002>
- Zhenbin, Y., Kankanhalli, A., Ha, S., & Tayi, G. K. (2019). What drives public agencies to participate in open government data initiatives? an innovation resource perspective. *Information & Management*, (October 2018), 103179. <https://doi.org/10.1016/j.im.2019.103179>
- Zheng, Y., Zhao, K., & Stylianou, A. (2013). The impacts of information quality and system quality on users' continuance intention in information-exchange virtual communities: An empirical investigation. *Decision Support Systems*, 56(1), 513–524. <https://doi.org/10.1016/j.dss.2012.11.008>
- Zhu, W., Yan, R., & Song, Y. (2022). Analyzing the impact of smart city service quality on citizen engagement in a public emergency. *Cities*, 120(1), 103439. <https://doi.org/10.1016/j.cities.2021.103439>
- Zuiderwijk, A., & Janssen, M. (2012). Impediments, challenges, and recommendations for using open government data. *12th European Conference on eGovernment – ECEG 2012*, 3–5.