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Determinants of Continuance Intention to Use Open Data Website: An Insight from Indonesia

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Abstract

Open data is a flagship initiative in open government program to increase transparency, social and commercial value, and participatory governance. Open data is a relatively new field and the factors affecting its continuance use by citizen has not been widely studied. A better understanding of these factors can help government to formulate policies and strategies that can improve the acceptance and use of open data website. The research model is based on the Theory of Planned Behavior and integrated with the technology quality and trust factors. Data collection was conducted using questionnaire. Structural Equation Modeling (SEM) was used to test the research model. The results show that attitude, subjective norm, perceived behavioral control and trust directly affect continuance intention to use open data website. Systems quality affects perceived ease of use, while information quality positively affects perceived usefulness, perceived ease of use, and trust. Both perceived usefulness and perceived ease of use affect user's attitude. The analysis of this study suggests that each influencing factor provides implications for government to stimulate the continuance use of open data website.

Keywords: continuance intention, open data, Theory of Planned Behavior, Technology Acceptance Model, trust, Indonesia

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Introduction

In recent years, the idea of open government has emerged in many countries around the world. Since President Obama announced a Memorandum of Transparency and Open Government in 2009, open government has been one of the most important public policy (Chu & Chiang, 2013). Some countries set official regulations related to open government, such as Open Government Partnership in 2011, open data Australia in 2011, and G8 Open Data Charter in 2013 (Attard, Orlandi, Scerri, & Auer, 2015). Open government initiative has brought a revolutionary change to the traditional model of e-government. It forces the transition from a service-oriented to a data-oriented government. However, it does not discard e-services but expands the traditional concept of e-government with open data (Bogdanovic-Dinic, Veljkovic, & Stoimenov, 2014).

Open data can be simply interpreted as data that is open to the public. Open data is largely implemented by building an open data portal or website. According to United Nations' survey in 2016, 128 out of 193 UN member countries provided government spending related data in an open format (United Nations, 2016). The Asia Pacific region is one of the regions with the highest percentage of countries that provide datasets in open standards along with Europe and the Americas (United Nations, 2016). Among countries in Asia Pacific, there are countries that have even provided datasets in open standards in 5 or more sectors, including Bahrain, India, Japan, Mongolia, Pakistan, Philippines, Republic of Korea, Singapore, and Uzbekistan. This indicates that open data initiative has been widely adopted around the world, including Indonesia. In Indonesia, open data initiative is supported by the Information Disclosure Law (Law No. 14 of 2008). Although the law does not specifically regulate the provision of data on online portals, various open data initiatives have appeared, both from government and citizen side. The Indonesian Government established the Open Government Indonesia to

accommodate various open data initiatives, such as citizen online grievances, one map policy and open data portal. Up to December 2016, open data portal has provided 1,242 datasets from 32 organizations. On the other hand, open data initiatives also come from the citizens, in the form of e.g. election databases, data-driven application, data-driven journalism, and other initiatives from the open data organizations and communities.

According to the Open Data Barometer, Indonesia's ranking had dropped from 36th position in 2014 to 40th position in 2015, among the 92 countries surveyed. The result stated that the readiness and implementation of open data initiative in Indonesia scores 46 and 36, while the impact of open data only scores 14 out of 100. Public engagement to open data initiative is still low and the impact of open data to political, social and economic is not significant.

Encouraging the government agencies to publish their data is important in open data initiative but encouraging the data use is a key for open data. Technology such as website or portal acts as medium to use open data. Therefore, the acceptance and use of open data technologies need to be further investigated (Zuiderwijk, Janssen, & Dwivedi, 2015). Open data is a relatively new field. Recently, open data related research is mostly about how to design an open data program from a data provider side (Arman, 2014; Dawes, Vidiyasa, & Parkhimovich, 2016; Gurin, 2014; Ivanov, Varga, & Bach, 2014; O'Hara, 2012; Ohemeng & Ofosu-Adarkwa, 2015) and how to assess an open data portal (Bogdanovic-Dinic et al., 2014; Lourenço, 2013, 2015; Veljković, Bogdanović-Dinić, & Stoimenov, 2014). Factors affecting user's continuance intention to use open data has not been widely studied. One of studies that specifically assessed the acceptance of open data open technology from users' side is the study by Zuiderwijk et al. (2015). The study used a research model based on the Unified Theory of Acceptance and the Use of Technology

(UTAUT) (Zuiderwijk et al., 2015). Although the study focused on the use of open data technology, it has not included important factors related to technology quality in its research model. In addition, the previous study only focuses on acceptance and initial use of open data technology, while this study focusses on continuance intention to use open data technology.

To provide a broader understanding of the predictors that influence the continuance use of the open data technology, this study aims to investigate the determinants of users' continuance intention to use open data website in Indonesia. The Theory of Planned Behavior (TPB), which is widely recognized in predicting behavioral intention, will be used as the basis to develop the research model. In TPB, behavioral intention is influenced by attitude, subjective norm, and perceived behavioral control. Attitude is influenced by external factors. Based on the Technology Acceptance Model (TAM), attitude in using technology is influenced by perceived usefulness and perceived ease of use. Therefore, these two factors are proposed to be determinants of attitude in the research model. As a technology, the quality of an open data website can be assessed by the quality of the support system, the quality of the data and information provided and the quality of its services. These three aspects are in accordance with the quality indicators of DeLone & McLean IS Success Model (DeLone & Mclean, 2003). Furthermore, the use of an e-government system is closely related to the trust factor. Thus, the trust factor will also be considered as a predictor in the research model in this study.

An understanding of factors that influence user's continuance intention to use the open data website can help various parties to exploit the full potential of open data (Zuiderwijk et al., 2015). For data provider, understanding these factors can encourage them to build an open data website with better quality. Furthermore, these factors can also help the government to formulate policies that can

improve the acceptance and use of open data website. This paper is organized as follows: Section 2 provides a literature reviews related to open government, open data, and various theory in technology acceptance. Section 3 discusses the research model and hypotheses. Section 4 explains the research methodology. In section 5, we report the findings based on the questionnaires that were used to investigate the extent to which the research model can explain the continuance intention to use open data website. Based on the findings, we then discuss some recommendations for the policymakers in order to increase the use of the open data website in section 6. Finally, the conclusions of this study are provided in section 7.

Literature Review

The open data website is a technology that provides open data services to the public and is a leading initiative in the open government program. Consequently, the definitions and characteristics of open government and open data are reviewed in this section. In addition, the definition and related research about TPB, TAM, DeLone and McLean's IS success model and trust, which provide the basis for this research framework, are also reviewed in this section.

Open Government

Open government is defined as the provision of public information in an interoperable and standard format to improve data access by the public (Abu-Shanab, 2015). In an open government, citizens can monitor and influence the processes of government through access to government information and access to decision-making arena (Meijer, Curtin, & Hillebrandt, 2012). According to Obama administration, open government is a three-dimensional concept, which covers transparency, participation, and collaboration (Obama, 2009). In line with Obama's open government, open government conceptual model states five elements of open government, namely

open data, data transparency, government transparency, participation and

collaboration (Veljković et al., 2014). The conceptual model is shown in Figure 1.

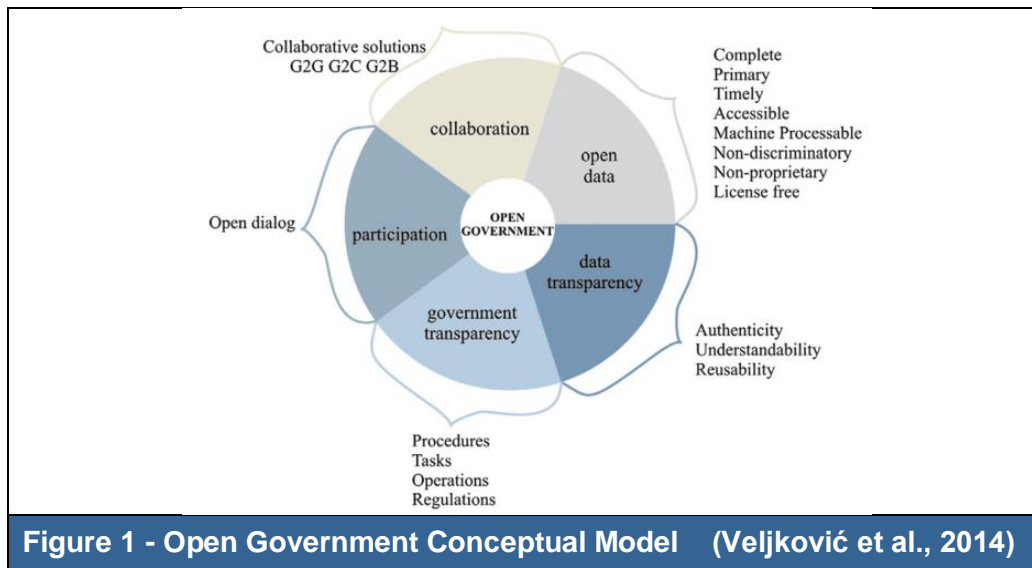


Figure 1 - Open Government Conceptual Model (Veljković et al., 2014)

The first element of open government is open data. Open data is public related data which is available to the public without any restriction that it can be found and accessed easily. Transparency can be divided into government transparency and data transparency. Government transparency aims to create responsible governments by publishing their operational and procedural implementation as well as achievement of their program to the public. On the other hand, data transparency aims to ensure that the data is known, complete, accessible and open to everyone. Participation aims to engage citizens in the democratic process of a country. In this case, the government can use social media and interactive communication (G. Lee & Kwak, 2011; Veljković et al., 2014). Last, the collaboration aims to create a more responsive decision-making by implementing collaborative work and feedback involving all stakeholders. There are three types of collaboration, namely internal collaboration within government (G2G - government to government), a collaboration between the government and non-profit companies or the private sector (G2B - government to businesses) as well as external collaboration between government and the public (government G2C- to citizens).

Open Data

Open data is data that open to the public (Attard et al., 2015). It is created or commissioned by the government or an entity controlled by a government to be freely used, reused and redistributed by anyone. An open data should be available without copyright restrictions, licensing, patents, or other restrictions mechanism (Ohemeng & Ofosu-Adarkwa, 2015). According to Open Government Working Group (2007), government data shall be considered open if it is made public in a way that complies with 8 principles, including complete, primary, timely, accessible, machine-processable, non-discriminatory, non-proprietary and license-free.

In a democratic environment, all the information related to the public interest can be classified as open data because it allows the public to know what is being done by the government (Ohemeng & Ofosu-Adarkwa, 2015). It can be a business-related information, register, patent, trademark information, public tender databases, geographic information, legal information, meteorological information, social data, and transportation (Ubaldi, 2013).

Collectively, there are three main reasons of why the government needs to open their data. The first reason is transparency, where citizens and stakeholders can monitor the initiative and the legitimacy of the government through the access, use, reuse and dissemination of data. Second, open data can open the social and commercial value. By opening public data, governments can encourage the creation of businesses and creative services that provide greater social and commercial value. Third, open data stimulates participatory governance, where people get a chance to participate actively in the decision-making process of government.

Open data is largely implemented by collecting the appropriate database along with the necessary metadata and then publish it on an open data website or portal. Open data portal can be operated by the government as well as citizens initiatives and may include state or city area (Attard et al., 2015). Various countries around the Asia Pacific region have made an open data portal both locally and nationally, for example, Korea (www.data.go.kr), Uzbekistan (<http://data.gov.uz/>), Thailand (<http://data.pm.go.th/>), Taiwan (www.data.gov.tw), Singapore (data.gov.sg), Philippines (<http://data.gov.ph/>) and Indonesia (<http://data.go.id/>).

Acceptance Theory

Previous researches have utilized and employed several theories to explain or predict users' adoption and continuance use of technologies. The continuance use of a technology or an information system (IS) can be more important, compared to the initial acceptance, to its long-term viability and success (Chan, Cheung, Lee, & Lee, 2016). In e-government field, several theories such as Theory of Planned Behavior (TPB), Technology Acceptance Model (TAM), DeLone & McLean IS Success Model and trust are commonly used to predict user acceptance of e-government system.

Technology Acceptance Model (TAM)

TAM (Davis, 1989) explains that technology usage behavior can be predicted from individual intention to use the technology, while the intention can be assessed from the attitude in using the technology. Furthermore, the attitude is influenced by personal beliefs consisting of the perceived usefulness and perceived ease of use. In other words, users decided to use the technology when they found it useful and easy to use at the first sight (Hou & Gao, 2018). TAM has been widely used and considered as one of the best frameworks to understand the adoption of e-government (Belanche, Casalo, & Flavian, 2012). Previous studies employed TAM in various aspects of e-government, including e-government service, e-tax, e-filing, EDMS, and open government (Belanche et al., 2012; Jurisch, Kautz, Wolf, & Krcmar, 2015; Lin, Fofanah, & Liang, 2011; Ozkan & Kanat, 2011; Susanto & Aljoza, 2015). The main goal of TAM is to predict IT adoption from an IT perspective because it focuses on system design characteristics and does not involve the human and social factors (Al-Hujran, Al-Debei, Chatfield, & Migdadi, 2015). Therefore, social and human factors might be integrated with TAM to improve its predictive power (Al-Hujran et al., 2015; Legris, Ingham, & Collette, 2003).

Theory of Planned Behavior

In TPB, technology usage behavior is affected by individual intention to use technology, while the individual intention is determined not only by attitude but also by the subjective norm and perceived behavioral control (Ajzen, 1991). Attitude is an individual evaluation of the use of a technology. Subjective norm is a person's perception that most people who are important to him think he should or should not perform a behavior (Susanto & Goodwin, 2013). Perceived behavior control is the extent to which a person feels that the opportunities and resources necessary to use a technology available to him/her (Susanto & Goodwin, 2013). TPB has been widely applied in a variety of research, including in evaluating public acceptance of e-government (Fu, Farn, &

Chao, 2006; Ozkan & Kanat, 2011; Shareef, Kumar, Kumar, & Dwivedi, 2011; Susanto & Goodwin, 2013).

DeLone & McLean IS Success Model

DeLone & McLean IS Success Model was first introduced in 1992. The latest version of the IS Success Model released in 2003 consisting seven dimensions, namely information quality, system quality, service quality, intention to use, use, user satisfaction and net benefits (DeLone & Mclean, 2003). System quality represents the technical quality of information system in data processing. It is measured by several indicators including ease of use, functionality, reliability, quality of data, flexibility, and integration (DeLone & Mclean, 2003; Gorla, Somers, & Wong, 2010). Information quality refers to the quality of output produced, that consists of four dimensions, namely accuracy, completeness, consistency, and currency (DeLone & Mclean, 2003; Gorla et al., 2010). On the other hand, the service quality refers to the extent of differences between consumers' expectations of a service and their perceptions of the actual performance of the service (DeLone & Mclean, 2003; Gorla et al., 2010). It is evaluated by five indicators, namely tangibles, reliability, responsiveness, assurance, and empathy (Jiang, Klein, & Carr, 2002). Over the past decades, the DeLone and McLean IS Success Model has been applied to assess various types of information systems, and has been tested and validated in different contexts, including e-commerce website, e-government system, m-banking system, e-learning system, digital library, and nursing information system (Dang, Zhang, & Chen, 2018). The most current application of this theory is to analyze the adoption of social media search system (Dang et al., 2018).

Trust

In the dynamic online environment, filled with uncertainties, risks, lack of users' sophistication and lack of face to face interaction, trust is considered as an important factor that determines the behavioral intentions (Al-Hujran et al., 2015; Belanche et al., 2012). Therefore,

several studies related to e-government highlighted the importance of the trust factor as the main factors that determine the adoption and continuance use of the public towards e-government services (Al-Hujran et al., 2015; Belanche et al., 2012; S.-Y. Hung, Chang, & Kuo, 2013; Jurisch et al., 2015; Lean, Zailani, Ramayah, & Fernando, 2009; Susanto & Aljoza, 2015; Susanto & Goodwin, 2013).

Some studies used initial trust as a predictor of behavior (Al-Hujran et al., 2015; Belanger & Carter, 2008; Lean et al., 2009). Initial trust is needed in a relationship where people do not have a reliable and meaningful information related to the service provider. At the beginning of a relationship, people will use any information that he has, for example, the perception of the website or government agency, to assess the trust of the service provider (Belanger & Carter, 2008). Traditionally, the trust can be grouped into two categories, namely the belief in entities that provide services (party trust) and trust in the technology used to provide services (institutional-based trust) (Al-Hujran et al., 2015; Belanger & Carter, 2008; Lean et al., 2009). Both types of trust are necessary to encourage citizens to participate in e-government services.

Research Model and Hypotheses Development

The main key in open data initiatives is an effort to encourage the acceptance and use of open data technology by the public (Zuiderwijk et al., 2015). After the technology is implemented, the next step is to ensure that the technology continues to be used. Open data is a relatively new concept, so the factors driving the continued use of open data technology by the public are still rarely investigated. Therefore, research related to any factors that can encourage people to continue to use open data technology, especially open data website, is important to do.

The theory of TAM, TPB and DeLone & McLean IS Success Model are three models that have been used extensively to

evaluate the acceptance of technology, including e-government. However, the three models have not been used to evaluate the continuance use open data website.

TAM explained that the intention of individuals to use technology can be judged by their attitude, while that attitude is influenced by individual beliefs consisting of perceived usefulness and perceived ease of use. One of the weaknesses of TAM is the limitations and simplicity of the model so that it does not adequately reflect the various environments and user boundaries completely (Belanche et al., 2012; Fu et al., 2006). Therefore, Legris et al. (2014) suggested that TAM be integrated into a broader model by adding variables related to human and social factors.

TPB has a broader view, where the intention of individuals to use technology is not only determined by attitude, but also by subjective norms related to social factors, and perceived behavioral control. Thus, TPB and TAM can be integrated into a model that is more complete and broader in scope. The integration of the TAM and TPB models has been supported by several previous studies in the field of e-government (Fu et al., 2006; Ozkan & Kanat, 2011; Shareef et al., 2011; Susanto & Goodwin, 2013).

In addition, the open data website also needs to be understood in terms of system quality, information quality and service quality as mentioned in the DeLone & McLean IS Success Model. Open data is usually displayed in the form of websites or portals of government institutions. The website or portal allows people to access available data and submit data requests that are not yet available on the website. We need to understand the relationship between system quality, information quality and service quality with the continuance intention to use open data website. In addition, the quality dimensions in the DeLone & McLean IS Success Model can also be associated with perceived usefulness in TAM (Chang et al., 2005; Lin et al., 2011; Sang & Lee, 2009)

The trust factor is also one dimension that can encourage the public's intention to adopt e-government. Therefore, the trust factor will also be integrated into the research model as one of the predictors for perceived benefits and continuance intention to use the open data website. Integration between trust factors and TAM models has been supported theoretically and empirically (Al-Hujran et al., 2015; Belanche et al., 2012; Jurisch et al., 2015; Lean et al., 2009; Susanto & Aljoza, 2015).

By using TPB as a basic framework, integrated with TAM, DeLone & McLean IS Success Model and trust factor, this study aims to investigate the factors that influence continuance intention to use open data website in Indonesia. The proposed research model can be seen in Figure 2.

Relations between dimensions in the proposed research model are explained in detail in the following subsections.

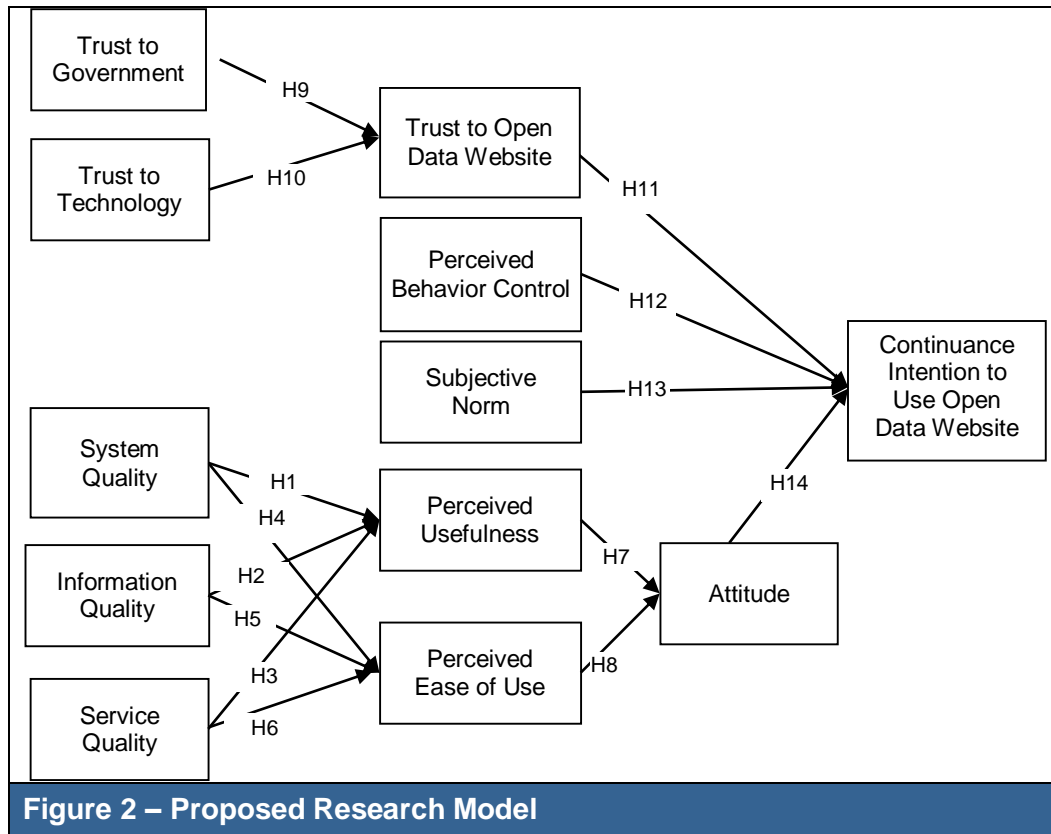
Relationship between System Quality, Information Quality, Service Quality and Perceived Usefulness

According to TAM, the perceived usefulness are subjective judgments from users that using a particular system can improve their performance (Davis, 1989). System quality, information quality, and service quality are the important factors that have consistently influenced the perceived usefulness of e-government systems (Chang, Li, Hung, & Hwang, 2005; Lin et al., 2011; Sang & Lee, 2009). In open data context, users use internet-based applications to search for and access public data or information. Open data websites that provide good system quality, which is free of errors, fast response and user-friendly, can improve user performance in finding and accessing data.

Besides being seen from the quality of the system, open data websites must also have good quality information. An open data website that provides accurate, complete, consistent and up to date data will help users find information quickly and accurately. In addition, open data websites

can also be assessed from reliability and responsiveness in providing data requested by users. In this case, the government needs to provide various services on the open data website, including updating information, answering

questions, responding to aspirations / criticisms / suggestions / complaints, or providing feedback (Teo, Srivastava, & Jiang, 2009). The higher the quality of service, the higher the level of benefits felt by the community.



Taking all these into account, the following hypotheses are proposed:

H1: System quality positively affects perceived usefulness

H2: Information quality positively affects perceived usefulness

H3: Service quality positively affects perceived usefulness

Relationship between System Quality, Information Quality, Service Quality and Perceived Ease of Use

Perception of ease of use is the level at which users expect a system that is free of effort (Davis, 1989). The relationship between ease of use and quality of the system, information quality and service quality has been proven in several literature (Chang et al., 2005; Sang & Lee,

2009). Related to this research, an open data website is an e-government service that aims to provide free access to public data. Open data websites with good quality systems will make it easier for users to learn and use the system. The appearance of a user-friendly system, easy menu access and speed of data search can reduce the effort of users while using the system. Likewise, the quality of information provided on the open data website will reduce the effort required by users to find and obtain the information expected. For example, an open data website can provide data completeness and novelty, availability of meta data, categorization of data, open data formats, etc. In addition, service quality will make it easier for users to interact and get help when facing difficulties in using open data websites. Based on these explanations, the following hypotheses can be formulated.

H4: System quality positively affects perceived ease of use

H5: Information quality positively affects perceived ease of use

H6: Service quality positively affects perceived ease of use

Relationship between Perceived Usefulness, Perceived Ease of Use and Attitude

Attitude is an individual evaluation towards the usage of technology. According to TAM, attitude is influenced by perceived usefulness and perceived ease of use (Davis, 1989). In e-government research, the relationship between these three factors has been demonstrated in various literatures (Belanche et al., 2012; Jurisch et al., 2015; Lin et al., 2011; Ozkan & Kanat, 2011; Susanto & Aljoza, 2015). Open data website can provide various benefit to citizens in terms of data transparency and citizen participation. Citizens can access a complete, primary, and timely government open data that can help them to understand how government governs the country. They can also monitor what the targets and achievements in various governmental fields. Many open data websites also provide features where citizens can participate in discussion or request some other data. Moreover, open data website can make it easier and faster for citizens to get the data compared with traditional approaches. Those benefits will facilitate citizens' attitude toward that open data website usage is positive. In other words, they will have a positive attitude towards the use of open data website. Based on these explanations, we formulated the following hypotheses.

H7: Perceived usefulness positively affects attitude

H8: Perceived ease of use positively affects attitude

Relationship between Trust to Government, Trust to Technology and Trust to Open Data Website

Trust can be classified into two categories: trust to entities that provide services (party trust) and trust to technology used to provide services (institutional-based trust). Both types of trust are necessary to encourage citizens to participate in e-government services (Al-Hujran et al., 2015; Carter & Belanger, 2005). Open data is a new technology that is currently not widely known, especially in Indonesia, so that trust in open data websites is rather difficult to measure directly. To make it easier for people to assess their trust to open data websites, we provide two initial trust indicators, namely trust to government and trust to technology.

The Indonesian government has previously provided various sites to facilitate communication and transactions between the government and the public, such as e-passport, e-billing, LAPOR, e-tax, and so on. The government's success in providing these services can encourage people to trust open data websites as other services from the government. In other words, users who believe that government can perform its obligations and commit to providing open data will likely trust the government's open data website.

In addition, open data provided through internet technology also provides many benefits. In addition to being able to provide complete and up to date data, internet technology is also safe and reliable, making it easier for people to find government open data. Accordingly, they will trust the reliability of open data website. Based on these explanations, we formulated the following hypotheses.

H9: Trust to government positively affects trust to open data website

H10: Trust to technology positively affects trust to open data website

Relationship between Trust, Subjective Norm, Perceived Behavioral Control, Attitude and Continuance Intention to Use Open Data Website

Trust allows an individual to create a positive atmosphere that stimulates the use of technology (Belanche et al., 2012). The relationship between trust and intention to perform a behavior has been supported by many studies in e-government field (E. Abu-Shanab, 2014; Belanger & Carter, 2008; Carter & Belanger, 2005; Jurisch et al., 2015; Lean et al., 2009; Sang & Lee, 2009; Susanto & Aljoza, 2015; Wu, Zhao, Zhu, Tan, & Zheng, 2011). According to TPB, subjective norm, perceived behavioral control, and attitude are factors that stimulate individual intention to perform a behavior. Social factors are influential in encouraging the continuance use of open data website. When social environment (e.g. Colleague, friends, supervisor) encourages users to use open data website, users will likely continue to use the website. The continuance intention to use the website is also influenced by the availability of opportunity and resources (e.g. skill, computer, and network) to access the website. Moreover, users who have positive evaluation towards the use of open data website will likely have the intention to continue using the website. Taking all these into account, the following hypotheses are proposed:

H11: Trust to open data website positively affects the continuance intention to use open data website

H12: Subjective norm positively affects the continuance intention to use open data website

H13: Perceived behavioral control positively affects the continuance intention to use open data website

H14: Attitude positively affects the continuance intention to use open data website.

Methodology

Data Collection and Sample

This study adopted a quantitative research approach, using a questionnaire as the primary means of data collection. The population is all users who have been using government's open data websites, including search, download or request public data through the open data websites. We employed a purposive-random sampling method to determine samples for this study. This method is a type of non-probability sampling technique which researcher relies on specific consideration when choosing members of the population to participate in the study. To obtain the relevant respondents, the questionnaires were distributed to followers of any open data-associated accounts in a variety of social media, including Twitter, Facebook, and Line.

The data collection process lasted for approximately two months, starting on September 15th, 2016 until November 14th, 2016. We obtained 531 respondents who filled out the questionnaires, but only 513 (96.6%) valid respondents who become samples and basis for analysis. Among 513 respondents, 48.5% respondents were male, and 51.5% respondents were female. Most of the respondents (66%) were students followed by private sector worker of 19%. A half of respondents (50%) were in the age of 21-30 years. Regarding education, 47% respondents were high school grads followed by undergraduates of 35%. The demographics are presented in Table 1.

Table 1 - Demographics of Respondents			
Demographic	Category	Frequency	Percentage
Age	<21	223	44%
	21-30	258	50%
	31-40	25	5%
	>40	7	1%
Gender	Male	248	48.5%
	Female	265	51.5%
Occupation	Student	341	66%
	Civil worker	29	6%
	Private worker	97	19%
	Other	46	9%
Education	High School	238	47%
	Three-year college	26	5%
	Bachelor	179	35%
	Postgraduate	70	13%
Number of Open Data Website Access	1-3 times	239	47%
	4-7 times	109	21%
	7-10 times	44	9%
	>10 times	121	23%

Instrument Development

All items in the questionnaire were adapted from pre-validated studies in e-government field. Question items sought to identify the relative contribution of all factors in the research model towards continuance intention to use open data website.

The final questionnaire consisted of total 47 questions on twelve difference constructs of the proposed research model, including system quality (3 items), information quality (4 item), service quality (3 items), trust to technology (4 items), trust to government (6 items), trust to open data website (6 items), perceived usefulness (4 items), perceived ease of use (5 items), attitude (3 items), subjective norm (3 items), perceived behavioral control (3 items) and continuance intention to use open data website (3 items).

As the questionnaire was distributed in Indonesia, hence the items were translated to Indonesians with several adjustments related to the case study. Validation and readability test of the questionnaire were conducted among researchers and experts. All items in the questionnaire were measured using a 5-point Likert-type scale ranged from 1=strongly disagree to

5=strongly agree. Likert scale is a psychometric scale commonly used in the questionnaire and is the most widely used scale in the form of a survey research.

The questionnaire was developed using Google Forms (online questionnaire Services provided by Google), so the distribution of questionnaires was conducted online. The online survey is quite efficient in terms of time, effort, and cost. The questionnaire link was then distributed through a variety of social media, including Twitter, Facebook, and Line.

Data Analysis

Covariance-based structural equation model (CB-SEM) was used for data analysis. CB-SEM is a multivariate statistic that combines factor analysis and regression analysis (correlation). The intended use of CB-SEM is to examine the relationship between variables in a model, both among indicators to construct as well as the relationship between the constructs. In addition, CB-SEM is suitable to test a theory, confirm the theory or compare several alternative theories (Astrachan, Patel, & Wanzneried, 2014; Hair, Ringle, & Sarstedt, 2011). CB-SEM requires 5-10

samples for each indicator. This study has 47 indicators, hence the ideal number of samples needed to test the research model is 235-470 samples. There are 513 valid samples in this study that complies with the recommended amounts. SEM also requires normally-distributed data, so it is necessary to assess the normality of data and to check the existence of outliers (Hair, Gabriel, & Patel, 2014). The result showed that there were 54 outliers that need to be eliminated. After deletion of outlier data, the data is still not normally distributed. This process leaves 459 data to be analyzed further. Hence, we employed bootstrapping process by resampling the data to 1,000 data with confidence level of 95%.

IBM SPSS AMOS 24 was used to perform the data analysis. There are two main parts of the SEM analysis: testing measurement model and testing structural model. The measurement model testing was done using confirmatory factor analysis (CFA). CFA is a way to check how well the variables representing the constructs that have been determined based on a particular theory (Joseph F Hair, Black, Babin, & Anderson, 2010). If the measurement model was valid, then the test was continued on the structural model.

Result

Assessment of Measurement Model

Assessment of measurement model aimed to evaluate how well manifest variables can explain latent variables in the research model. It consists of determining convergent validity and determinant validity. Assessment of convergent validity aimed to determine whether an indicator describes a construct. It is measured by calculating loading factor and average

variance extracted (AVE). Loading factor should be greater than 0.5 (Bagozzi & Yi, 1988; Hair et al., 2010) or greater than 0.6 to ensure significant level (Kline, 2005). AVE is used to measure the amount of variance in a latent variable as contributed by its indicators. Convergent validity is acceptable if the AVE for the latent variables is greater than 0.5 (Chin, 2010; Hair et al., 2011).

Another indicator to assess the convergent validity is construct reliability that measured using two coefficients, Composite Reliability (CR) and Cronbach's Alpha. The construct is reliable if it has CR value greater than 0.6 (Bagozzi & Yi, 1988) and Cronbach's alpha greater than 0.7 (Hair et al., 2010). Table 2 shows all revised indicators.

Indicator PU4 and SvQ3 were deleted due to low factor loading. Based on the revised indicators in Table 2, all indicators have factor loading greater than 0.6 and all constructs have met the minimum threshold of AVE, CR, and Cronbach's Alpha. Therefore, the measurement model has passed the convergent validity assessment.

Discriminant validity describes whether each construct can be differentiated from other constructs in the model (Chin, 2010). There are two measures that must be assessed to ensure discriminant validity. In AMOS, discriminant validity can be assessed from cross loading values between a construct and its indicators, where the value of indicator loading must be higher than the value of its cross loading. The result showed that each indicator had a higher correlation with its related construct compared to the other constructs. Therefore, the discriminant validity of the measurement model was acceptable.

Table 2 - Value of Factor Loadings, AVE, CR, and Cronbach's Alpha					
Variables	Indicators	Factor Loadings	AVE	CA	CR
System Quality (SQ)	SQ1	0.762	0.596	0.806	0.725
	SQ2	0.839			
	SQ3	0.709			
Information Quality (IQ)	IQ1	0.749	0.516	0.794	0.687
	IQ2	0.81			
	IQ3	0.606			
	IQ4	0.692			
Service Quality (SvQ)	SvQ1	0.732	0.556	0.710	0.606
	SvQ2	0.759			
Perceived Usefulness (PU)	PU1	0.757	0.569	0.802	0.692
	PU2	0.687			
	PU3	0.813			
Perceived Ease of Use (PEOU)	PEOU1	0.726	0.651	0.901	0.859
	PEOU2	0.782			
	PEOU3	0.842			
	PEOU4	0.814			
	PEOU5	0.863			
Trust to Government (TG)	TG1	0.769	0.583	0.893	0.830
	TG2	0.781			
	TG3	0.757			
	TG4	0.713			
	TG5	0.736			
	TG6	0.822			
Trust to Technology (TT)	TT1	0.702	0.552	0.830	0.731
	TT2	0.732			
	TT3	0.776			
	TT4	0.759			
Trust to Open Data Website (TR)	TR1	0.824	0.615	0.902	0.855
	TR2	0.781			
	TR3	0.683			
	TR4	0.707			
	TR5	0.871			
	TR6	0.822			
Attitude (ATT)	ATT1	0.848	0.624	0.831	0.757
	ATT2	0.7			
	ATT3	0.815			
Subjective Norm (SN)	SN1	0.724	0.514	0.761	0.619
	SN2	0.711			
	SN3	0.715			
Perceived Behavioral Control (PBC)	PBC1	0.708	0.509	0.768	0.613
	PBC2	0.741			
	PBC3	0.692			
Continuance Intention to Use Open Data Website (ITU)	ITU1	0.827	0.759	0.903	0.878
	ITU2	0.889			
	ITU3	0.896			

Assessment of Structural Model

Assessment of the structural model begins by checking overall model fit or goodness of fit (GOF). The initial result showed that some GOF indicators still have poor values. To obtain good fit values, we

performed a modification of the structural model by checking the output of modification indices (Hair et al., 2010). The modification indices suggested adding connection from IQ to TR. Besides recommended from the modification indices, previous studies also supported

the correlation between IQ and TR (Abu-Shanab, 2014; Lee & Kwak, 2011). In open data context, if open data website provides good quality information (accurate, complete, consistent, and present), users will likely trust the website. In other words, information quality will positively affect users' trust to open data website. Accordingly, we proposed another hypothesis, H15: information quality positively affects trust to open data website.

After the structural model modification, all GOF indicators showed marginal and good fit values. Several commonly used GOF indices that were employed in this study are the goodness of fit index (GFI>0,80), root mean square error of approximation (RMSEA<0.08), comparative fit index (CFI>0.90), normed fit index (NFI>0.80), and adjusted goodness of fit index (AGFI>0.80). This indicated that the GOF testing results had met the criteria and were considered fit with the sample data.

The next steps in the structural model assessment are testing the hypothesis,

significance level, and coefficient of determination (R²). In the hypothesis testing, $p < 0.05$ (t value 1.66) was used as a threshold value. Accordingly, if a hypothesis had $p < 0.05$, then the hypothesis is accepted, otherwise, the hypothesis is rejected if $p > 0.05$. In the significance level testing, the relationship between two variables can be measured from the correlation value. If the correlation value > 0.5 , the two variables have a strong relationship, otherwise if the correlation value < 0.5 , then both variables have a weak relationship.

Table 3 depicted the summary of hypothesis and significance level testing. Among 15 hypotheses proposed in this study, 12 hypotheses were supported and 3 hypotheses (H1, H3, and H6) were not supported. Moreover, among 12 hypotheses that were supported, 4 hypotheses had strong relationships and 8 hypotheses had weak relationships. Furthermore, the R² value was used to assess the coefficient of determination. In this study, the R² of endogenous constructs is showed in Figure 3.

Table 3 - Hypothesis and Significance Level Testing

Hypothesis	Parameter	P Value	Decision	Correlation Value	Significance Level
H1	SQ → PU	0.082	Not supported	0.118	Not significant
H2	IQ → PU	0.002	Supported	0.587	Strong
H3	SvQ → PU	0.06	Not supported	0.086	Not significant
H4	SQ → PEOU	0.001	Supported	0.506	Strong
H5	IQ → PEOU	0.005	Supported	0.177	Weak
H6	SvQ → PEOU	0.826	Not supported	-0.007	Not significant
H7	PU → ATT	0.001	Supported	0.352	Weak
H8	PEOU → ATT	0.002	Supported	0.262	Weak
H9	TG → TR	0.002	Supported	0.256	Weak
H10	TT → TR	0.002	Supported	0.198	Weak
H11	TR → ITU	0.002	Supported	0.188	Weak
H12	SN → ITU	0.006	Supported	0.153	Weak
H13	PBC → ITU	0.003	Supported	0.2	Weak
H14	ATT → ITU	0.002	Supported	0.512	Strong
H15	IQ → TR	0.002	Supported	0.616	Strong

R² for constructs perceived usefulness, perceived ease of use, attitude, trust to open data website and continuance intention to use open data website are,

respectively, 0.366, 0.287, 0.272, 0.484 and 0.438. R² value for continuance intention to use open data website is 0.438 suggesting that 43.8% of the variance in

continuance intention to use open data website can be explained by factors in the research model. According to this result, the R² value for each variable was considered weak.

Discussion and Implication

This study has identified determinants of user continuance intention to use open data websites in Indonesia. The result shows that the continuance intention to use the open data website is influenced by attitude, subjective norms, behavioral control, and trust. User's trust to open data website is significantly affected by user's trust to government and user's trust to technology. Moreover, the attitude factor is influenced by perceived usefulness and perceived ease of use which is in accordance with the TAM model (Davis, 1989).

The perceived usefulness and perceived ease of use are linked to system quality, information quality, and service quality in the proposed model. However, the result shows that information quality positively

affects both perceived usefulness and perceived ease of use; and system quality only affects perceived ease of use. On the other hand, service quality does not have a significant effect both to perceived usefulness and perceived ease of use.

The reason is because service quality measures the respond of administrators in answering request to data, questions, or comments from citizen. Citizen always wants a fast and reliable response, but the availability of administrator is very limited. Sometimes, the administrators of open data website are not only responsible for handling requests and questions from citizens, but also doing other jobs. Therefore, they often have no time to handle mass requests from citizens.

Among these factors, there are four relationships that have strong significance level, specifically user's attitude on continuance intention to use open data website, information quality on trust to open data website, information quality on perceived usefulness, and system quality on perceived ease of use. The following sections will discuss the finding and implication of the study.

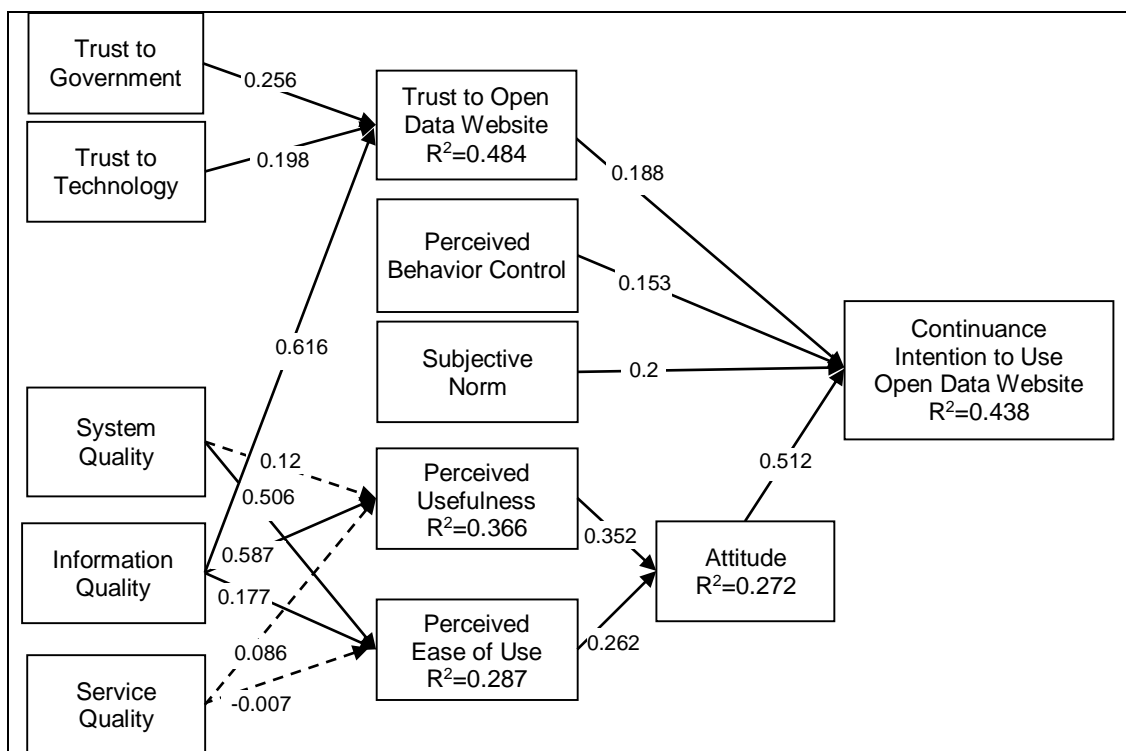


Figure 3 - Result Estimated by AMOS

Perceived Usefulness, Perceived Ease of Use and Attitude

In this study, we find that the attitude of open data users had the highest influence on the continuance intention to use open data website. This indicates that expectation and evaluation of users towards the use of open data website strongly determine their continuance intention to use open data website. Therefore, factors affecting the user's attitude need to be optimized. This study finds that attitude is affected by perceived usefulness and perceived ease of use. Users decided to use the technology when they found it useful and easy to use at the first sight (Hou & Gao, 2018). The positive relationships between these three factors are consistent with TAM (Davis, 1989). The open data website provides a valid and accurate source of data from official government agencies. In Indonesia, open data is not widely known and used. Therefore, the results of this study indicate that governments should raise citizen awareness of the benefit of open data and what can be done with open data website. The citizens need to be properly informed that open data website is beneficial for them in providing easy and free access to the government data without having to visit government office for hardcopy documents. The government shall inform what can be done with open data, for example through a workshop, training, advertisement or another form of education programs.

System Quality

The positive relationship between system quality and perceived ease of use is consistent with Chang et al. (2005) and Sang & Lee (2009). This indicates that if open data website has a good system quality, the user will feel ease to learn and use the website. However, the system quality aspects of open data websites in Indonesia still have many shortcomings, which are related to reliability and usability of the websites. The reliability of the website is related to the provision of adequate network and infrastructure. Based on the assessment of Networked

Readiness Index (NRI) 2014, Indonesia ranked 65th in the world and ranked 4th in ASEAN (Nababan & Darwanto, 2015). Moreover, the digital divide is still occurring, causing rural areas to have poor access to internet technology. In Indonesia, the digital divide that takes place is not the difference in devices used in urban and rural areas. More than that, the digital divide is related to the availability of devices that can access internet and the availability of the internet itself. In the rural area, most people do not have an internet device and even if one has a PC, notebook, or smart phone to access the internet, the availability of internet networks in that area is very limited. To overcome this problem, we recommend that the government improve and distribute infrastructure development in all regions to increase the accessibility of open data website.

Other aspect of the system quality is related to the usability of website. Open data in Indonesia is mostly provided in government agencies' official website. Sometimes, it is difficult to find the menu to access the data. It gives the impression that government is not highlighting the provision of data. In terms of feature availability, standard features to search and download data are available although their reliability and ease of use still need to be improved. The results of this study indicate that governments should provide good quality open data websites that facilitate user to search and access the data easily. It can be done by providing complete features to search and analyze the data, user-friendly interface and simple website navigation.

Information Quality

The positive relationships between information quality and perceived usefulness and perceived ease of use are consistent with Chang et al. (2005), Lin et al. (2011), and Sang & Lee (2009). In this study, information quality also positively affects trust. The information quality refers to the accuracy, completeness, consistency, and timely of data and information provided (DeLone & Mclean, 2003; Gorla et al., 2010). In open data

context, the information quality is also associated with the data openness level that is assessed by eight indicators, including complete, primary, timely, accessible, machine-processable, non-discriminatory, non-proprietary and license-free. These indicators show the extent to which data can be reused, processed and distributed freely by anyone.

In Indonesia, the completeness and public data presence have been addressed in the Information Disclosure Law (Law No. 14 of 2008). Evaluation of the implementation of the law has also been conducted annually. Unfortunately, there is no clear mechanism of sanctions if institutions do not provide complete and updated data. Moreover, the law does not specifically regulates the provision of data on online portals, such as data type, format, licensing or other requirements related to open data (Nugroho, 2013). Currently, the available data are still largely in PDF format and have a very limited metadata. The above assessment applies to the data provided in government official website. For Indonesia's open data portal (data.go.id) the assessment of system quality and information quality has better results because the portal has been using CKAN platform.

Information quality is an important factor that strongly significant to encourage the use of open data website. Therefore, the government needs to ensure the provision of quality data on their websites. Specifically, in Indonesia, the government need to establish policies related to open data by creating a legal framework to regulate the quality of open data and to ensure the continuous data release process.

Subjective Norm

Subjective norm is also found to be the determinant of user continuance intention which is consistent with Emad (2014), Hung et al. (2009), Hung et al. (2006) and Ajzen (1991). This indicates that the influence of other people that are considered important (friends, co-workers,

supervisor, etc.) plays a role in encouraging the use of open data website. Specifically, in a new form of online social interactions, social factors are essential in influencing continuance intention to use a technology (Chan et al., 2016). In an academic environment, where open data website has been widely known and used, the social community served as a medium to introduce the website, exchange information and discuss the published data. In the non-academic environment, the government needs to build the communities. The government does not necessarily have to build a physical community, but it may provide a virtual community on their official website or social media. Such communities can stimulate the continuance use of open data website by providing data visualization, discussion, and knowledge sharing about open data implementation. Thus, this result implies that, in the decision-making process with respect to continuance use of open data website, there may exist social network effects that are attributable to peer influence (D. Lee, Son, Yoo, & Lee, 2012).

Perceived Behavioral Control

Perceived behavioral control explains that user's skill and the availability of supporting facilities (computers and networks) are important factors that encourage a behavior (Fu et al., 2006; S.-Y. Hung, Chang, & Yu, 2006; S. Y. Hung, Tang, Chang, & Ke, 2009; Ozkan & Kanat, 2011). This study also finds that perceived behavioral control positively affects continuance intention to use open data website. Accessing and using the website requires the user to understand computer literacy. Moreover, the user also needs an adequate equipment and reliable network to be able to use the website. According to a survey conducted by Indonesia Ministry of Communications and Information in 2015, the number of individuals using the internet in urban areas (40.9%) is two times more than individuals in rural areas (20.3%). It shows that supporting facilities need to be improved, especially in rural area.

Related to perceived behavioral control factor, it is important to minimize the barrier

of open data website use. It can be done by providing easy to use website, performing socialization and training on how to use the website, and most importantly providing a reliable network for everyone in all regions. The last part requires the government to accelerate access to the internet continuously, especially in rural areas that have limited internet access.

Trust

The next factor that directly and positively encourages the continuance intention to use open data website is trust. Open data initiative is a relatively new field and not widely known by the public, so this study used the concept of initial trust. The initial trust consists of two categories, namely trust to the government as the data provider and trust to technology (Al-Hujran et al., 2015; Belanger & Carter, 2008; Lean et al., 2009). Consistent with the previous studies, the two categories of trust are significant to encourage user's trust to open data website. These findings can give new insight to the government to enhance the public trust to open data services. For example, the government should provide information about data providers, data collection methods and guarantees of the data accuracy in the open data website. Moreover, increasing the completeness, relevance, and present of the data also necessary to improve user's trust to open data website.

Implication to Public Section Practices

This section summarizes the implication of each factors of the study to public section practices in Indonesia. In Indonesia, open data initiative is supported by the Information Disclosure Law (Law No. 14 of 2008). However, from an open data perspective, the law is considered not too strong because it only encourages the publication of data but does not force. Currently, Indonesia does not have a policy that specifically regulates data disclosure on online portals. Therefore, several recommendations for improving the open data policy and implementation in Indonesia are as follows. First, government

need to create a stronger legal framework to guarantee the continuous release of data from data publishers, including the minimum number of datasets that must be published regularly and regulations related to privacy (Nugroho, 2013). Second, government need to create operational policies that cover more aspects of the open data process, such as data quality, data reading machines and data accessibility on open data platforms without registration (Nugroho, 2013). This is done to reduce confusion, ensure data quality and increase participation in open data publication. Third, government need to create an ecosystem to manage relationship between data publishers and data users. It also includes making initiatives at the regional government level to encourage more data requests (Nugroho, 2013). Fourth, the success of open data policy and implementation need to be supported by adequate and reliable infrastructures and good governance. Finally, government need to design open data website according to some guidelines to improve system quality and increase perceived ease of use which in turn can facilitate citizen's trust and continuance intention to use the website.

Conclusion

As a new initiative in e-government field, the acceptance and adoption of open data website need to be evaluated. This study aims to identify determinants of user continuance intentions to use open data website. The research model is adopted from the Theory of Planned Behavior and integrated with the technology quality and trust factors. The direct predictors of the research model account for 43,8% of the variability of the continuance intention to use open data website. The results of the analysis showed that the continuance intention to use open data website is directly influenced by four factors, namely the attitude, subjective norm, perceived behavior control and trust. The attitude is indirectly affected by system quality and information quality through moderator factors of perceived usefulness and perceived ease of use. Trust to open data

website is influenced by the trust to government, trust to technology, and information quality. We found that one variable in our model did not significantly influence the continuance intention to use open data website, namely the service quality.

The contributions of this study are both theoretical and practical. The practical contributions of this study lie in the analysis of predictors of the continuance intention use of open data website. The results imply that in order to enhance user's continuance intention to use open data website, the government needs to consider strategies to optimize each of the affecting factors. Moreover, this study contributed to a broader knowledge about determinants of open data website use from multiple dimensions, including technology quality, individual perception and trust factor. The finding of this study extended the finding from previous research by Zuidervijk et al. (2015) by adding trust and technology quality factors as significant determinants to use open data website.

This study also has some limitations. The model only describes 43.8% variance explained on behavioral continuance intention, so the future research can explore other factors on user continuance intention to use open data website. Moreover, the future research can enhance the analysis of specific demographics characteristic on continuance intention.

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Appendix

Appendix 1 – List of Model Construct and Items			
Indicator	Code	Statements	Reference
<i>System Quality (ISQ)</i>	ISQ1	Open data website is easy to use	Chang et al. (2005)
	ISQ2	Open data website has an easy and clear navigation structure	
	ISQ3	Open data website is user friendly	
<i>Information Quality (IQ)</i>	IQ1	The data information available on open data website is trustworthy	Lin et al. (2011)
	IQ2	The data information provided on open data website is from a trusted source	
	IQ3	Open data website provides up to date data	
	IQ4	Open data website provides accurate data	
<i>Service Quality (SQ)</i>	SQ1	Open data website responds quickly when I request data, ask questions or give comments	Teo et al. (2009)
	SQ2	Administrators of open data website are always willing to respond to my request	
<i>Trust to Technology (TT)</i>	TT1	I believe that the internet has enough security	Belanger & Carter (2008)
	TT2	I believe that the legal and technological structures are able to protect me from problems in the internet	
	TT3	I believe that encryption and other technologies in the internet keep me safe in accessing the website of an open data provider	
	TT4	In general, I believe that today the internet is a safe and reliable environment for data access	
<i>Trust to Government (TG)</i>	TG1	When interacting with the Government, I believe that the Government is reliable	Belanger & Carter (2008)
	TG2	I believe that the Government has done its job effectively, so I feel comfortable interacting with the Government	
	TG3	I believe that the Government acts in the interests of the people	
	TG4	I believe that the Government will provide full assistance if I have problems related to accessing open data	
	TG5	I believe the Government is serious about providing open data services	
	TG6	I believe that the Government is reliable in fulfilling its commitment to provide open data services	
<i>Trust to Open Data Website (TR)</i>	TR1	I believe that an open data website provides data from authorized and credible government agencies	Al-Hujran et al. (2015)
	TR2	I believe that open data website provides quality assured data	
	TR3	I believe that there is a validation and control process for each of the data published in open data website	
	TR4	I believe that open data website is a reliable and secure environment for accessing public data	
	TR5	Open data website is trustworthy	
	TR6	In general, I trust open data website	

<i>Perceived Usefulness (PU)</i>	PU1	Open data website can meet my needs to access public data	Hung et al. (2006)
	PU2	Through open data website, I can get data easily and quickly	
	PU3	Through open data website, I can get valid and accurate data	
<i>Perceived Ease of Use (PEOU)</i>	PEOU1	I can easily learn to use an open data provider website	Hung et al. (2006)
	PEOU2	I can easily search and download public data in an open data website	
	PEOU3	I can easily become skilled in using an open data website	
	PEOU4	I can clearly understand every menu and feature available on the open data website	
	PEOU5	In general, I think open data website is easy to use	
<i>Attitude (ATT)</i>	ATT1	In my opinion, accessing public data using open data website is a good idea	Belanche et al. (2012)
	ATT2	In my opinion, using open data website will be a fun experience	
	ATT3	I like the idea of using an open data website to access public data	
<i>Subjective Norm (SN)</i>	SN1	The people who influenced my behavior thought that I should use an open data website	Hung et al. (2006)
	SN2	People who matter to me (eg. family, friends) suggest that I use an open data website	
	SN3	People whose opinions I appreciate (eg colleagues, bosses, lecturers) think that I should use an open data website	
<i>Perceived Behavioral Control (PBC)</i>	PBC1	I feel comfortable using an open data website alone	Fu et al. (2006)
	PBC2	I will be able to use the open data website easily without the help of others	
	PBC3	I have enough resources (computers and networks) to use an open data website	
<i>Continuance Intention to Use Open data (ITU)</i>	ITU1	I intend to continue using an open data website to access public data	Zuiderwijk et al. (2015)
	ITU2	I predict that I will continue to use an open data website to access public data in the future	
	ITU3	I plan to continue using an open data website to access public data	

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