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Academic Perspectives on Open Government Data: A Study of Quality, Trust and Intention to Use

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Abstract: Open Government Data (OGD) is a highly effective method for governments in many countries to share data with citizens. Many governments have taken the initiative to create their platform for sharing freely accessible data. Even though the platform is ready for use, the level of OGD usage remains to be discovered. It is critical to investigate the behavioral intention to use OGD to ensure transparency, accountability and trust in the government. This research aimed to fill the gap in the literature on the quality factors of OGD that influence the intention to use from the academic staff perspective. As 389 data was analyzed using Structural Equation Modeling (SEM) – SmartPLS the purposive sampling technique was applied. The results determined that information quality plays a big role in indicating trust in the OGD website as compared to service quality and system quality. For the mediating results, it is proven that trust in the OGD website mediates the relationship between trust in government and behavioral intention and trust in technology and behavioral intention to use OGD. The government can determine the extent of OGD usage in the nation by looking at characteristics including quality, and trust. The results of this empirical study may therefore be useful in helping the federal, state and municipal governments get ready for the release of their various open data sets. According to the National Agenda for a Digital Malaysia, this study may guarantee that Malaysia's accessible government data serves its residents in several ways.

Keywords: *Open government data, information success model, trust, OGD, intention to use*

1. Introduction and Background

The paradigm of governance is changing dramatically in the digital age to embrace accountability, transparency, and citizen participation. The idea of Open Government Data (OGD), a system that gives the public access to information produced by the government, is at the forefront of this evolution. It is crucial to comprehend the elements influencing people's intentions to utilize such data as more and more governments across the globe implement Open Government Data (OGD) projects. The intention to use Open Government Data is a complex phenomenon that is impacted by a wide range of organizational, individual, and technological factors. To create policies that encourage the adoption of OGD and optimize its societal impact, policymakers, researchers, and practitioners must first unravel these critical elements. The evolution of OGD research should also take place in the area to ensure that the implementation of it benefits the citizen (Gao et al., 2023).

One of the government's initiatives to accelerate big data analytics in Malaysia is through the development of the Open Government Data (OGD) portal. The Public Sector Open Data Portal (data.gov.my) was developed in-house by the Malaysian Administrative Modernization and Management Planning Unit (MAMPU) launched by YB. Datuk Joseph Entulu, Minister in the Prime Minister Department at the Conference of the ASEAN CIO 2014. The portal serves as an online one-stop-center to access and download open government data.

According to Talukder et al. (2019), the synthetization of the two strong models, namely the Unified Theory of Acceptance and Use of Technology (UTAUT) and the Information System Success Model (ISSM), is important to identify the factors that influence the intention to use open government data. Therefore, there is a need to study the factors that originated from both theories that influenced the intention to use open government data. However, this study focuses on using the ISSM to determine the factors influencing the behavioral intention to use OGD. Though a study conducted by Matheus et al. (2024) highlighted that information system infusion negatively impacts the relationship between information quality and behavioral intention to use OGD, the results may differ due to a different context and research focus. Furthermore, Rizun et al. (2023) mentioned that quality factors play a big role in identifying the adoption and usage of OGD. Adding to the literature, service quality and trust are significant to the adoption of OGD among students (Lněnička et al., 2022).

Trust in government and trust in technology have been proven to be key success factors in an e-government (Teo et al., 2008). However, the roles of trust in an open data context were still unanswered extensively as initial trust was needed in a relationship where people do not have reliable and meaningful information related to the service provider (Fitriani et al., 2017), but then has been proven as significant to the usage intention of OGD recently (Chen et al., 2023). Some studies considered trust as an important factor in determining behavioral intention (Al-Hujran et al., 2015). As mentioned previously, not much research has identified the intention to use OGD by inflating the theory of ISSM and trust. Therefore, this research attempted to fill the gap in the literature in the open data context.

2. Literature Review

Information Quality, System Quality, Service Quality and Trust

In their study, Nulhusna, Sandhyaduhita, Hidayanto, and Phusavat (2017) found a strong relationship between information quality and trust in the setting of e-government. According to recent research, there is a considerable relationship between system and information quality and trust in mobile banking (Damabi et al., 2018). Wang et al. (2010) previously claimed in their article that the accuracy and completeness of the e-government system is the basis for the public's assessment of the quality of information pertaining to government activities. Accordingly, Nulhusna et al. (2017) claimed that higher-quality information could increase public confidence in the e-government system. Additionally, trust should be influenced by positive information quality, as noted by Nicolaou & Mcknight (2006). Nevertheless, Fitriani et al. (2017) showed a direct correlation in their study between information quality and trust in open data websites.
H1: There is a relationship between information quality and trust in the OGD website.

Cui et al., (2018) proposed that there exists a positive correlation between the seller's trust in the e-marketplace and the quality of the system and services provided. In the context of e-commerce, system and service quality are critical determinants of consumer trust, as previously noted by Wang et al. (2010). Teo, Srivastava, and Jiang (2008), on the other hand, emphasized that trust allowed citizens to think that e-government could offer the finest services to the residents. However, Wang et al. (2010) noted that from the users' point of view, the presence of system quality attributes like speed of access and dependability could enhance their faith in e-government. Similarly, Nulhusna et al. (2017) also mentioned that system quality and service quality could likely improve confidence towards trust from the users' perspectives. Recently, Lněnička et al., (2022) highlighted that service quality plays an important role in the adoption of OGD. Therefore, this study formulated that:
H2: There is a relationship between system quality and trust in the OGD website.
H3: There is a relationship between service quality and trust in the OGD website.

Trust to Government, Trust to Technology, and Trust to OGD Website

Fitriani et al. (2017) distinguish between two categories of trust: trust in service providers and trust in the technology utilized to deliver services. According to McKnight et al. (2016), individuals' evaluations of the competence, integrity, and generosity of the government agency providing the service constitute their trust in the government. Additionally, it has been demonstrated that building public trust in the government requires a strong and meaningful interaction between the two (Wang et al., 2010). In general, people are more inclined to trust the government's open data website if they think it can fulfill its duties and promise to provide reliable data (Fitriani et al., 2017). Similarly, users are more inclined to trust an open data website if they believe that accessing open data over the internet is safe and dependable. According to Carter and Bélanger (2005) and Fitriani et al. (2017), trust in open data can be defined as the conventional perspective of trust in a particular organization (government) and trust in the dependability of technology as the access medium. Additionally, Pritchard (2017) noted that trust in e-government websites is a function of both faith in the government and trust in technology.

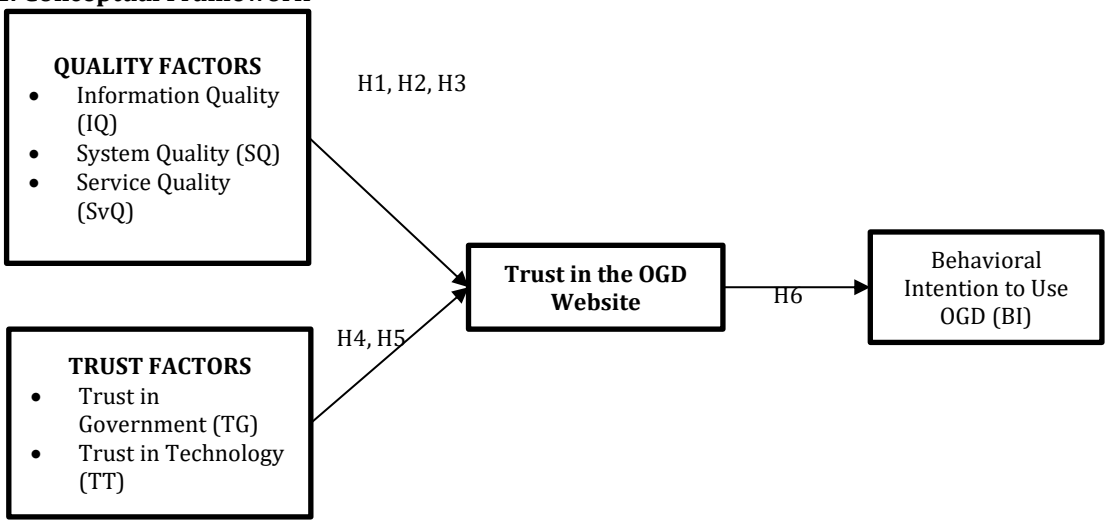
Based on the literature, this study formulates these hypotheses:
H4: There is a relationship between trust in government and trust in the OGD website.
H5: There is a relationship between trust in technology and trust in the OGD website.

Trust and Behavioral Intention

The relationship between trust and the intention to use technology has been studied in many areas such as e-

government (Abu-Shanab & Al-Azzam, 2012; Carter & Bélanger, 2005; Chen et al., 2023; Lean et al., 2009; Lee & Song, 2013), e-commerce (Belanger et al., 2002) and internet banking (Esmaili et al., 2011; Sok Foon & Chan Yin Fah, 2011). Nevertheless, trust can also be related to continuance intention to use technology (Nulhusna et al., 2017). On the contrary, in the mobile financial services context, trust did not influence the intention to use (Chemingui & Lallouna, 2013). This is due to the traditional way that is preferred by the customers when it comes to financial matters. In the open-data context, trust has had a significant relationship with open-data websites (Fitriani et al., 2017; Jurisch et al., 2015). Therefore, in this study, this hypothesis was constructed:
H6: There is a relationship between trust in the OGD website and behavioral intention to use OGD.

Figure 1: Conceptual Framework



3. Research Methodology

The full set of cases from which a sample is taken is called the population. In sampling, the term population is not necessarily used in its normal sense as the fullest of cases need not be people. According to J. Hair et al., (2007), a target population is the entire set of individuals, items, or components that are pertinent to the study because they have the data that the study is intended to gather. It is necessary to clearly emphasize the theoretical population before moving further with the sampling technique. Academic staff members at universities make up the study's population since it attempts to determine the behavioral intention to use open government data from the stakeholders' point of view.

20 public universities in Malaysia fall under three categories namely: 1) research university, 2) comprehensive university, and 3) focused university. A research University focuses on the field of research while a Comprehensive University offers a variety of courses and fields of study. Meanwhile, Focus University focuses on specific areas related to its establishment (Kementerian Pendidikan Malaysia, n.d.). The total population of academic staff in public universities in Malaysia is 31,586 (in 2020). From the above numbers, the possibility of the target population being chosen for the sample is very minimal. With nonprobability sampling, the inclusion or exclusion of elements in a sample depends on the researcher Hair, Jr, (2015). Therefore, purposive sampling is applied in this research.

According to Faul, Erdfelder, Bucher and Lang (2009), G*Power 2 is a second-generation power analysis program designed as a stand-alone application to handle several types of statistical tests commonly used in social and behavioral research. Since this study measured the behavioral intention to use OGD, this study referred to the sample size calculated using the G-Power Statistical Analysis. Generally, the larger the sample size, the higher the statistical power of the analysis. However, having a very large sample size was not considered because it involves costs in terms of time, effort, and other resources. Based on G*Power statistical analysis, with the effect size f2 equals 0.15, α err prob equals 0.05, Power (1 – β err prob) equals 0.8 and the number of predictors equals 6, the minimum sample size was calculated as 146.

4. Results

Internal Consistency Reliability

In the past, Cronbach's Alpha (α) was predominantly used to measure the internal consistency of the data. Cronbach's alpha, one of the most often used metrics for assessing reliability, is based on average correlation and expresses the internal consistency of a test or scale as a value between 0 and 1. The study's findings are based on a rule of thumb (Salkind, 2014). All of the variables' Cronbach's Alpha values are more than 0.6, which indicates that they are deemed reliable based on the data in Table 1. The values showed that every respondent had a thorough understanding of the questions. Thus, it can be sure that the internal consistency of each latent variable was sufficient and this can also be as evidence of the unidimensionality of each latent variable (Chin, 1998; Sarstedt et al., 2017).

Table 1: Result of Reliability Test

CONSTRUCT	NO. OF ITEMS	CRONBACH ALPHA (N = 389)
Information Quality	6	.885
System Quality	5	.913
Service Quality	5	.853
Trust to Government	6	.927
Trust to Technology	4	.928
Trust to Open Data Website	5	.937
Behavioral Intention	4	.955

Despite the fact many methodological studies have shown that Cronbach's Alpha is riddled with problems stemming from unrealistic assumptions, many studies continue to use Cronbach's Alpha regardless of its assumptions (Ramayah et al., 2018). Furthermore, Gefen et al. (2000) highlighted that it is more appropriate to apply a different measure of internal consistency reliability, which is known as composite reliability (CR).

Descriptive analyses were used to describe targeted variables in this study which comprised mean and standard deviation as well as minimum, maximum, Skewness, and Kurtosis statistics. As shown in Table 2 below, based on the analysis, all the items have a mean score in a range between 3.5 to 4.0 (Information Quality: M = 3.728, SD = 0.667; System Quality: M = 3.685, SD = 0.761; Service Quality: M = 3.724, SD = 0.644; Trust to Government: M = 3.857, SD = 0.742; Trust to Technology: M = 3.692, SD = 0.779; Trust to OGD Website: M = 3.781, SD = 0.748; Behavioural Intention: M = 4.269, SD = 0.734). Hence, it can be concluded that all these factor structures have agreement levels. In addition, the distribution of these agreements was normally distributed since the Skewness and Kurtosis statistics were in the range of ±2.0 (Frederick J Gravetter et al., 2018).

In terms of the behavioral intention to use OGD, the descriptive analysis also indicated that the average of the intention to use OGD variable was at an agreed level (M = 4.269, SD = 0.734) and the distribution was also normally distributed (Skewness = -0.902, Kurtosis = 0.621).

Table 2: Descriptive Analysis of the Variables

Variables	MEAN	SD	SKEWNESS	KURTOSIS
Information Quality	3.728	.667	-.684	.670
System Quality	3.685	.761	-.645	.496
Service Quality	3.724	.644	-.551	.681
Trust to Government	3.857	.742	-1.123	1.549
Trust to Technology	3.692	.779	-.865	.807
Trust in OGD Website	3.781	.748	-.938	.953
Behavioral Intention	4.269	.734	-.902	.621

Measurement Model

Table 3 provides the results of outer loadings, composite reliability (CR), and Average Variance Extracted (AVE). From the table, the CR value for behavioral intention is 0.967, the CR value for Information Quality is 0.914, the CR value for System Quality is 0.935, the CR value for Service Quality is 0.895, the CR value for Trust to Government is 0.943, CR value for Trust to Technology is 0.949 and CR value for Trust to OGD Website is

0.953. Based on the guidelines from Joe F. Hair et al. (2011), all CR values for all constructs exceeded 0.7 and confirmed a satisfying result of reliability.

Table 3: Loadings, Composite Reliability, and Average Variance Extracted

CONSTRUCT	ITEMS	LOADINGS	AVE	CR
Behavioral Intention	BI1	0.912	0.881	0.967
	BI2	0.934		
	BI3	0.961		
	BI4	0.948		
Information Quality	IQ1	0.817	0.639	0.914
	IQ2	0.821		
	IQ3	0.819		
	IQ4	0.732		
	IQ5	0.799		
	IQ6	0.805		
System Quality	SQ1	0.865	0.742	0.935
	SQ2	0.889		
	SQ3	0.874		
	SQ4	0.852		
	SQ5	0.825		
Service Quality	SV1	0.718	0.630	0.895
	SV2	0.804		
	SV3	0.818		
	SV4	0.806		
	SV5	0.819		
Trust To Government	TG1	0.882	0.733	0.943
	TG2	0.893		
	TG3	0.884		
	TG4	0.854		
	TG5	0.780		
	TG6	0.839		
Trust To Technology	TT1	0.904	0.822	0.949
	TT2	0.914		
	TT3	0.909		
	TT4	0.901		
Trust To OGD Website	TW1	0.897	0.801	0.953
	TW2	0.856		
	TW3	0.895		
	TW4	0.920		
	TW5	0.906		

In this study, to assess discriminant validity, the HTMT criterion was used. This is due to criticism of the usage of Fornell and Larcker's criterion to detect discriminant validity in common research situations. The result indicated that all the respective correlations of the latent constructs were below 0.90 and also highly significant as shown in Table 4. Thus, it confirmed that each latent construct's measurement was discriminating to each

order (Gold et al., 2001; Henseler et al., 2015). The result shows neither lower nor upper confidence interval includes a value of 1. Thus, discriminant validity was achieved based on HTMT inference.

Table 4: HTMT

Items	BI	IQ	SV	SQ	TG	TW	TT
BI							
IQ	0.555 CI (0.469, 0.626)						
SV	0.654 CI (0.586, 0.714)	0.849 CI (0.807, 0.887)					
SQ	0.504 CI (0.410, 0.582)	0.890 CI (0.861, 0.915)	0.837 CI (0.787, 0.879)				
TG	0.628 CI (0.550, 0.688)	0.634 CI (0.552, 0.705)	0.771 CI (0.711, 0.825)	0.603 CI (0.513, 0.674)			
TW	0.675 CI (0.618, 0.725)	0.596 CI (0.514, 0.674)	0.695 CI (0.617, 0.762)	0.602 CI (0.512, 0.679)	0.752 CI (0.679, 0.806)		
TT	0.557 CI (0.481, 0.631)	0.515 CI (0.419, 0.604)	0.685 CI (0.611, 0.750)	0.556 CI (0.457, 0.641)	0.698 CI (0.633, 0.756)	0.866 CI (0.801, 0.907)	

Structural Model Assessment

The path coefficient results in the structural model are displayed in Table 5. As a result of each path coefficient's observed t-value being less than the 95% critical value of t-statistics (i.e., observed t-value < 1.96), the results showed that four path coefficients were not significant for at least a 95% level of confidence interval. In contrast, other paths were found to be statistically significant because their observed t-values exceeded the 95% critical value of t-statistics (i.e., observed t-value > 1.96). The two path coefficients that are not significant are SQ → TW (t-value = 1.038) and SV → TW (t-value = 0.230).

Table 5: Hypotheses Testing

Hypotheses/ Relationship		Std Beta	Std Error	t-value	p-value	BCI-LL	BCI-UL	f2	Q2	Decision
H1	IQ -> TW	0.092	0.050	1.838*	0.033	0.006	0.177	0.009		Supported
H2	SQ-> TW	0.058	0.056	1.038	0.150	-0.036	0.153	0.004		Not Supported
H3	SV -> TW	-0.012	0.052	0.230	0.409	-0.101	0.073	0.000		Not Supported
H4	TG-> TW	0.247	0.056	4.401*	0.000	0.163	0.347	0.096		Supported
H5	TT-> TW	0.582	0.043	13.673*	0.000	0.511	0.644	0.628		Supported
H6	TW -> BI	0.357	0.057	6.308*	0.000	0.276	0.463	0.126	0.568	Supported

Note: IQ = Information Quality; SQ = System Quality; SV = Service Quality; TG = Trust to Government; TT = Trust to Technology; TW = Trust to OGD Website; BI = Behavioural Intention; [a]the path coefficients were significant at 95% confidence level (*) if t-statistic > 1.96 (p <.05).

Moreover, the results of the 95% bootstrap confidence interval for each path coefficient were also consistent with the results of the observed t-value assessment. The bootstrap confidence interval approach pointed out that, the two path coefficients that were found not significant (SQ → TW and SV → TW) were also not significant since the confidence interval for both types of bootstrap confidence interval analysis (i.e. BCI-LL and BCI-UL) does include zero.

Table 6: R2 Results

	R Square	R Square Adjusted

Behavioral Intention	0.530	0.524
Trust in OGD Website	0.720	0.716

Next, the value of the coefficient of determination (R2) as represented in Table 6, the value of 0.530 suggested that 53.0% of variances influenced the behavioral intention to use OGD and the value of 0.720 suggested that 72% of variances influenced the trust to OGD website. Hair, Hult, Ringle, Sarstedt, and Kai (2017) considered this value as moderate.

In addition, the f2 values that represent the effect size of a specific exogenous construct on the endogenous construct were also assessed. As asserted by Sullivan and Feinn (2013), both effect size and p-value are essential results to be reported because the p-value can inform the reader whether an effect exists but does not reveal the size of the effect. According to Cohen (1988), the f2 value of 0.35 has a substantial effect on R2, the f2 value of 0.15 has a medium effect on R2, and the f2 value of 0.02 has a small effect size on R2. Referring to Table 6, the results indicated that all the variables have a small effect in producing the R2 for behavioral intention, except for trust towards the OGD website, which has a substantial effect size on R2.

Next, the predictive relevance of the model was examined using the blindfolding procedure. If the Q2 value is larger than 0, the model has predictive relevance for a certain endogenous construct (Hair et al., 2017). In this study, both the Q2 values for behavioral intention (Q2 = 0.461) and trust in the OGD website (Q2 = 0.568) were more than 0, indicating that the model has sufficient predictive relevance.

Discussion: The findings revealed that information quality has a significant relationship with trust in the OGD website. This finding is consistent with previous studies that were conducted by Fitriani et al. (2017), which mentioned that information quality has a significant relationship with trust in the OGD website. According to Fitriani et al. (2017), information quality in open data technologies is associated with the data openness level that is assessed by many indicators, which leads to the reuse, process, and distribution of data freely by anybody. This finding also accords with earlier observations by Nulhusna et al. (2017), which showed that information quality has a significant relationship with trust in the OGD website. Contrary to expectations, this study did not find a significant relationship between system quality and trust in the OGD website. This finding contradicted previous studies by (Lněnička et al., 2022), Teo et al. (2008) and Nulhusna et al. (2017). According to Teo et al. (2008), trust in e-government websites is positively associated with the system quality of the website. According to Nulhusna et al. (2017), system quality has a positive correlation with institutional trust. Good system quality is certainly required to increase trust. Even though both studies were related to e-government websites, this finding is relevant to the context of open data technologies.

5. Managerial Implications and Recommendations

The study on the characteristics that influence the utilization of Open Government Data (OGD) provides vital findings with significant management consequences for both government agencies and organizations interested in OGD projects. One significant managerial aspect is the need to invest in technical infrastructure. The report emphasizes the need for user-friendly and advanced OGD platforms, which require strategic investments to assure data accessibility, interoperability, and ongoing technological adaptation. Robust technological underpinnings are essential for attracting people and ensuring long-term involvement. Furthermore, the report emphasizes the importance of explicit data governance standards. For managers, this means proactively establishing and communicating clear frameworks that address data integrity, security, and privacy concerns. To keep up with technological changes and developing difficulties, managers should evaluate and update these rules regularly. Managers may build confidence in users by prioritizing clear and secure data governance, resulting in a trustworthy environment for OGD adoption.

Conclusion: The goal of the current study is to investigate and comprehend the connection between behavioral intention to use OGD and determinant factors. The determining criteria were modified from two information system theories the trust theory in the information system and the success model of the information system. This study has looked at three quality factors: system, service, and information quality. Furthermore, trust elements namely, trust in technology and government were taken into consideration as determinant factors to

assess the desire to adopt OGD.

The application of the underpinning theories adopted in this study namely as Information Systems Success Model (ISSM) and trust factors led to a new understanding of the factors that influence the intention to use OGD, according to the findings. Information quality from the ISSM was shown to be related to the desire to use OGD and it has been demonstrated that the intention to use the same technology is influenced by both trust in the government and trust in technology.

In conclusion, the use of accessible government data offers societies around the world a transformative opportunity, especially when considered in the context of the ISSM and the trust factor. The ISSM helps us understand how important it is to have data that is easily accessible, relevant, accurate, and timely to maximize its impact and efficacy. Moreover, the trust factor emerges as a crucial determinant in the adoption and utilization of open government data. Trust, both in the source of data and in the institutions governing its release and management, is fundamental. Governments must prioritize transparency, accountability, and data integrity to cultivate trust among stakeholders.

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