

# Intention to Use Open Government Data among Academics – Empirical Findings

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## **Abstract**

**Purpose:** The purpose of this paper is to present the findings of an empirical study conducted to determine the factors influencing the intention to use OGD, among the academicians in public universities in Malaysia.

**Design/methodology/approach:** By using purposive sampling, with 389 respondents, the study adapted the UTAUT model as an underpinning theory, and use PLS-SEM as the tool to analyse the data.

**Findings:** The findings highlighted that performance expectancy has positive influence to the intention to use the OGD among academics from 20 public universities in Malaysia.

**Research limitations/implications:** This research feasibly proposes a suitable model in identifying factors of intention to use OGD and this perhaps can provide the best guidelines to the government to implement OGD more extensively.

**Practical implications:** The finding is ideally significant to the academic area especially in research because the intention to use the OGD may lead to the next level of the publishing of data by the data owner among government agencies.

**Originality/value:** Perchance this study could make a noble contribution as it proposes a suitable model which measures technology usage in open government data context, from the perspective of the researchers. The study is confident that eventually with widespread OGD implementation the Malaysian government will achieve its policy of an effective and transparent administration system.

**Keywords:** open government data, intention to use, academics, UTAUT, OGD, Trust

## **Introduction**

The Public Sector Government Open Data (OGD) portal in Malaysia was developed in 2014 to support the aspiration of implementing open data. The OGD portal enables the government open data to be easily accessed centrally from an official source. Essentially, the implementation of open data by government helps to improve the transparency of government services delivery through sharing of data. Data that is accurate, fast and relevant aid to increase the nation's digital economy productivity through new innovations. In Malaysia context, Malaysia had become the country that falls under "one-sided country" category or supply-side driven approach which refers to the "government had initiatives to publish data, but lack of citizens engagement" (The World Wide Web Foundation, 2015). According to Priyanka Bhunia (2017), citizens might not be using the open data even it is available in the portal. This is due to lack of awareness, or maybe absence of a culture of openness. As highlighted in Malaysia OGD portal, academics and researchers has been identified as one of the stakeholders in OGD context, as the data shared by the government agencies can be used in many research areas. Though, the level of usage of the data in OGD is still doubtful. Therefore, by using a quantitative research methodology this study attempts to identify the factors influence the intention to use OGD among academics in Malaysia.

## **Literature Review**

The adaption of technology acceptance is very popular to identify the factors that influence the intention to use many technologies. Despite many researches that related to intention to use are adapting theories such as Technology Acceptance Model (TAM) and Theory of Planned Behavior (TPB), this study focus on the Unified Theory of Acceptance and Use of Technology (UTAUT) by Venkatesh et al. (2003). UTAUT is the most suitable theoretical model to be applied in certain IT applications such as OGD even though some extension, modification and revision is needed to suits with the technology (Venkatesh et al., 2011).

### ***Performance Expectancy, Effort Expectancy, Social Influence and Facilitating Conditions***

Performance expectancy is defined as the degree to which an individual believes that using the system will help the person to achieve improvements in job performance (Venkatesh et al., 2003). According to Zuiderwijk et al. (2015) performance expectancy could mean people are more likely to use conventional ways of working if they assume that open data technologies are not helping them much in performing their job tasks. Prior research has proved that performance expectancy is the strongest predictors towards behavioural intention (Lu & Nguyen, 2016; Thomas, 2006). To be specific, few empirical studies that have been conducted in the area of OGD also support that performance expectancy is the most influenced factors that relates to intention the use OGD (Saxena & Janssen, 2017; Zuiderwijk et al., 2015).

Effort expectancy can be related to the degree of ease associated with the use of the technology (Venkatesh et al., 2003). Yet, Davis (1989) highlighted that even though the potential users believe that given application is useful, they may believe that the system is so difficult to use and therefore the performance benefits of usage are compensated by the effort of using the system. Zuiderwijk et al. (2015) defined effort expectancy as the extent to which organization or a person believe that using open data will be free of effort. In other words, the authors also believed that this perceived ease of use influences their intention to use open data technologies regardless either the open data systems are easy to use or vice versa. Furthermore, Saxena & Janssen (2017) mentioned that effort expectancy linked with ease of locating OGD and the skills needed to extract and analyze the required data sets. Therefore, the perception of individual towards the easily accessible datasets, may lead to their less effort in utilizing them.

Based on the few studies mentioned earlier, it is clear that ease of use is one of the most important reasons for users' inclination to use the OGD data sets.

Social influence is defined as the degree to which an individual perceives that it is important for the others to believe that the person should use the new system or technology (Venkatesh et al., 2003). The person may show different levels of commitment and satisfaction of using the technology when it is being praised and recommended by their social circle (Albashrawi & Motiwalla, 2017). In the open data context, social influence may come from the colleagues, supervisors, management, friends, family and people who are important to the user (Zuiderwijk et al., 2015). This study hypothesizes that social influence has an effect to the intention to use open data, especially from the colleagues, peers, teammates (also known as co-researchers) and supervisors of the researchers.

Facilitating conditions can be defined as "the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system" (Venkatesh et al., 2003). Zuiderwijk et al. (2015) and Saxena & Janssen (2017) in their study identified that facilitating conditions influence the behavioural intention to use open data, even though Rana, Williams, Dwivedi, & Williams (2011) mentioned that facilitating conditions is not the best predictor in intention to use e-government services. Based on the literature discussed in this paragraph, these hypotheses were formulated:

***H1: Performance Expectancy positively influence the behavioural intention to use OGD.***

***H2: Effort Expectancy negatively influence the intention to use OGD.***

***H3: Social influence positively influence the intention to use OGD.***

***H4: Facilitating Conditions positively influence the intention to use OGD.***

## **Methodology**

### ***Population, sample and item measurement***

According to J. Hair, Money, Page, & Samouel (2007), target population is the complete group of people or objects or elements that relevant to the research, as they possess the information the research is designed to collect. Before proceeding with the sampling procedure, the theoretical population needs to be clearly highlighted. As this study aims to identify the behavioural intention to use open government data from the stakeholders' perspective, the population for this study involves the academic staff from 20 public universities in Malaysia. In determining the sample size, it was done by utilizing the G Power software to estimate the minimum sample size. An estimation of at least 131 samples was suggested by G Power. Prior to the actual data collection, a pilot test was conducted to determine the respondents' understanding based on the items and the estimated time to complete answering the questions. It also serves as a function of helping to detect possible errors in the measurement instrument. The items to measure acceptance factors were adopted from Zuiderwijk et al. (2015). The results of the internal consistency score showed high internal consistency with Cronbach's alpha > 0.7. Based on the result of the acceptable Cronbach's alpha > 0.7, all the measures demonstrated good internal consistency of the items in the scale. Thus, these items are maintained for the actual survey execution.

### ***Data Collection and Demographic Profile***

The survey was done via Google Form. The invitation to participate in the study was send through emails. A total of 389 responses were received and used for the analysis. From the 389 respondents, 59.1% of the respondents are female, while another 40.9% are male. For the age

range, the table portrayed 44.5% of the respondents are ranging from 31-40 years old, 37% among 41-50 years old. The least range of age is between 51-60 years (8.2%) whilst the rest of the percentage (10.3%) are from 21-30 years old of respondents.

In terms of the educational background, most of the respondents (66.8%) are postgraduate degree holder, and 32.1% are master’s degree graduates. Furthermore, only 0.8% graduated with bachelor’s degree, and 0.3% graduated from diploma. For the career, most of the respondents (86.6%) are lecturers, whilst 13.4% are researchers. From the empirical results, majority of 33.4% of the respondents are in Social Sciences and Humanity research area. This is followed by 26.2% from Science and Technology and 20.6% are from Business and Management area. Whilst, eight research area depicts only 0.3% of the respondents which are Art and Design, Counselling, Emergency Management, ICT, IT in Business, Law, Operation Research and Tourism Management.

### ***Reliability Test***

Reliability test was used to measure the degree to which measurement instrument produces stable and consistent results. The reliability was done when a test measures the same thing more than once and the results will become the outcomes and there are several different reliability coefficients. One of the most commonly used is Cronbach’s alpha which it was based on the average correlation provide a measure of the internal consistency of a test or scale it is expressed as a number between 0 and 1 and the study results were based on the rules of thumb (Salkind, 2014). Based on the results in Table 1, the Cronbach’s Alpha values of all variables are more than 0.7 and they were assumed to be reliable. the values indicate that all the respondents understand the questions well.

Table 1 Result for Reliability Test

<b>Construct</b>	<b>No. of Items</b>	<b>Cronbach Alpha (n = 389)</b>
Performance Expectancy	5	.919
Effort Expectancy	6	.928
Social Influence	4	.882
Facilitating Condition	4	.833
Behavioral Intention	4	.955

### ***Descriptive Analysis***

A descriptive analysis was used to measure the mean score and standard deviation of each item. Table below shows the range of evaluation interval for mean values.

Table 2 Descriptive Analysis

<b>Item</b>	<b>Min</b>	<b>Max</b>	<b>Mean</b>	<b>Std. Dev.</b>
Performance Expectancy	1.80	5.00	3.9578	.71556
Effort Expectancy	1.50	5.00	3.8693	.71835
Social Influence	1.00	5.00	3.2391	.72268
Facilitating Condition	1.00	5.00	3.5668	.67948
Behavioral Intention	1.25	5.00	4.2686	.73381

Based on the table 2, it can be concluded that the respondents believe that using OGD is useful for them in their academic career. The value of the mean score for performance expectancy with 3.96 indicates that using OGD will help the respondents to achieve objectives in the job performance. Furthermore, the mean value score for effort expectancy with 3.87 indicates that it is easy to use OGD. As for the behavioural intention, most of the respondents are positive in their intention to use OGD in their academic career.

### Findings

The results are discussed and presented as follows. Table 3 and table 4 presenting the frequency of OGD use among academicians, followed by the purpose of using OGD. The assessment of the proposed model was accomplished by using partial least-squares structural equation modeling (PLS-SEM). The minimum sample size for PLS path model assessment should be equal to or larger than 10 times the largest number of structural paths pointing at a construct in the model (J. F. Hair et al., 2011). Generally, PLS -SEM has more flexible assumptions on data contribution and requirements of the sample size.

### *OGD Use Among Academicians*

Table 3 Frequency of OGD Use among Academicians

	Frequency	Percent	Valid Percent	Cumulative Percent
Monthly or multiple times a month	81	20.8	20.8	20.8
Never use	81	20.8	20.8	41.6
Once daily or multiple times a day	7	1.8	1.8	43.4
Weekly or multiple times a week	10	2.6	2.6	46.0
Yearly or multiple times a year	210	54.0	54.0	100.0
Total	389	100.0	100.0	

Table 3 indicates that majority of the respondents use OGD or visits OGD websites yearly or multiple times a year (54%). Meanwhile, about 1.8% of the respondents use OGD once daily or multiple times a day.

Table 4 Purpose of Using OGD

	Frequency	Percent	Valid Percent	Cumulative Percent
For curiosity and/or recreation	91	23.4	23.4	23.4
For daily operation in work	8	2.1	2.1	25.4
For news reporting	5	1.3	1.3	26.7
Never use/Just Browsing	31	8.0	8.0	34.7
To perform policy research	19	4.9	4.9	39.6
To perform statistical analysis	43	11.1	11.1	50.6
To write academic publications	192	49.4	49.4	100.0
Total	389	100.0	100.0	

Table 4 indicates that majority of the respondents use OGD to write academic publications (49.4%). This is aligned with the requirements for the respondents to publish paper as one of their key performance indexes as academicians.

**Measurement Model Assessment**

The measurement model was first examined to assess the reliability and validity of the construct (J. F. Hair et al., 2011). All the constructs were assessed reflectively in the conceptual model. For reflective measurement models, both composite reliability (CR) and indicator loadings should be higher than 0.7, whereas indicator loadings should exceed cross loadings. To achieve convergent validity, the average variance extracted (AVE) of the latent construct should be higher than 0.5. Table 5 gives the results of outer loadings, composite reliability, and AVE. Based on the guidelines in (J. F. Hair et al., 2011), all CR values for all constructs exceed 0.7 and confirm a satisfying result of reliability. All the AVE values were above 0.5 as provided in the Table 5, which reflects a reasonable degree convergent validity. Heterotrait-monotrait ratio of correlations (HTMT) (Table 6) is one of the measurements for discriminant validity with an acceptable range of less than 1 (Henseler et al., 2015).

Table 5 Composite reliability and average variance extracted

Construct	Items	Loadings	Ave	Cr
Behavioral Intention (BI)	BI1	0.912	0.881	0.967
	BI2	0.934		
	BI3	0.961		
	BI4	0.948		
Effort Expectancy (EE)	EE1	0.823	0.737	0.944
	EE2	0.857		
	EE3	0.807		
	EE4	0.871		
	EE5	0.887		
	EE6	0.902		
Facilitating Condition (FC)	FC1	0.870	0.670	0.890
	FC2	0.843		
	FC3	0.790		
	FC4	0.769		
Performance Expectancy (PE)	PE1	0.871	0.757	0.940
	PE2	0.880		
	PE3	0.877		
	PE4	0.869		
	PE5	0.853		
Social Influence (SI)	SI1	0.899	0.740	0.919
	SI2	0.878		
	SI3	0.844		
	SI4	0.818		

Table 6 Heterotrait-monotrait ratio

	BI	EE	FC	PE
<b>Behavioral Intention</b>				
<b>Effort Expectancy</b>	<b>0.644</b>			
<b>Facilitating Condition</b>	0.579	<b>0.730</b>		
<b>Performance Expectancy</b>	0.688	0.790	0.647	
<b>Social Influence</b>	0.400	0.467	0.642	0.471

### Collinearity Test

According to Hair et al. (2014), a collinearity test should be first addressed in the structural model. Collinearity assessments were conducted by examining the tolerance value to be more than 0.20 and variance inflation factor (VIF) values with the range of less than 0 – 5.0 (Table 7). The results show that the values were within the acceptable range and there was no collinearity problem in the data sets (Sarstedt et al., 2017).

Table 7 Lateral Collinearity Assessment

Construct	Behavioral Intention (VIF)
PE	2.289
EE	2.733
SI	1.520
FC	2.336

### Structural Model Assessment

Path coefficients and t-statistics were examined by using the bootstrapping method to test hypotheses. Bootstrapping and blindfolding routines analyzed the effect sizes ( $f^2$ ), predictive accuracy ( $R^2$ ), and predictive relevance ( $Q^2$ ). Table 8 provides the results for hypotheses testing,  $f^2$  effect size,  $R^2$  and  $Q^2$ . In this study, four direct hypotheses were developed between the constructs. In order to test the significance level, t-statistics for all paths are generated using bootstrapping function, based on table 9, only two of the relationships are found to have t-value  $\geq 1.645$ , thus significant at 0.05 level of significance. The relationships that is significant are performance expectancy towards behavioural intention and effort expectancy towards behavioural intention to use OGD. Furthermore, table 8 shows that the overall model is structurally good with firm values ( $R^2$  intention = 0.530,  $Q^2$  intention = 0.461).

Table 8 Hypotheses Testing,  $f^2$  effect size,  $R^2$ ,  $Q^2$

Construct or path	Std. Beta	St. Error	t-value	p-value	LL	UL	$f^2$ effect size	$R^2$	$Q^2$	Decision
BI								0.530	0.461	
H1: PE → BI	0.350	0.076	4.588	0.000	0.220	0.467	0.114			Supported
H2: EE → BI	0.121	0.067	1.800	0.036	0.001	0.236	0.011			Supported
H3: SI → BI	-0.010	0.043	0.238	0.406	-0.084	0.061	0.000			Not Supported
H4: FC → BI	0.013	0.065	0.206	0.419	-0.094	0.114	0.000			Not Supported

### Discussion and Conclusion

The overall findings of this research indicate that performance expectancy positively influence the behavioural intention to use OGD (t-value = 4.588,  $\geq 1.645$ ). The results show that H1, performance expectancy is positively influencing the behavioural intention to use OGD is supported ( $p < 0.05$ ). Furthermore, effort expectancy is also one of the predictors that determine the intention to use OGD (t-value = 1.800,  $\geq 1.645$ ). Effort expectancy negatively influence behavioural intention to use OGD which means that the lower of effort expectancy is to use OGD, the higher the behavioural intention to use the OGD. Thus, H2, effort expectancy negatively influencing the intention to use OGD is supported ( $p < 0.05$ ). These findings is

consistent with the prior findings by Zuiderwijk, Janssen, & Dwivedi (2015), and Talukder, Shen, Hossain Talukder, & Bao (2019). It shows that OGD really helps the academics to increase their job performance as their work is ironically associated to use open government data. The findings reveal that, the higher the behavioral intention to use open data technologies is depend on the higher user's expectation to perform well with it.

However, H3 is not supported in this study. Social influence is not influencing the behavioural intention to use OGD ( $t$ -value = 0.238,  $\leq 1.645$ ). This finding is contradictory to the research findings by Talukder et al., (2019) and Zuiderwijk et al., (2015). The inconsistency is may due to the different background of the respondents in the study. For instance, conference participants may have a different perspective of open data, as compared to the academics or researchers in the public universities. Furthermore, H4, facilitating conditions positively influence the intention to use OGD is also not supported in this study, with  $t$ -value = 0.206,  $\leq 1.645$ . This finding is aligned with studies conducted in the same context by (Talukder et al., 2019), and (Zuiderwijk et al., 2015). This finding verified that facilitating conditions is not the best predictor that influence the behavioral intention to use OGD. It means that organizational and technical infrastructure basically has no direct bearing to support the use of open data technologies, specifically in academic environment.

The results show that only two of the four hypotheses are supported. Performance expectancy is found to be positively influence the intention to use OGD. This is supported by (Zuiderwijk et al., 2015) which found that performance expectancy is one of the predictors to determine the intention to use OGD. Our findings reveal that the higher the user's expectation to perform with the use of OGD, the higher the intention to use OGD in the academic area. In terms of effort expectancy, the respondents perceive that they are able to use OGD in the academic career because the datasets are easily available and accessible at any time. This finding is supported by (Saxena & Janssen, 2017; Zuiderwijk et al., 2015). However, this study found that social influence does not influence the intention to use OGD among academicians. In this case, the academicians perceive that their family, peers and supervisors do not influence them to use OGD. It may happen due to the need and may depends on the subject area of academics. Finally, facilitating conditions did not have a significant influence on the intention to use OGD. This is in-line with research conducted by (Zuiderwijk et al., 2015) which mentioned that facilitating conditions is not the best predictor for intention to use OGD. Identifying the factors that influence the intention to use and the use of OGD may contribute to the practicality of open government data implementation especially in Malaysia. The acceptance factors can give an extensive clue for the government to indicate the level of OGD usage in the country. The findings of this empirical study then could assist the federal, state and local governments, in preparing their respective organizations in the open data publication. In line with the National Agenda towards a Digital Malaysia, this study could ensure that the open government data Malaysia benefits the citizens in various ways.

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