E-Government Continuance Intention of Media Psychology: Some Insights from Psychographic Characteristics

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Abstract—Psychographic is a psychological study of values, attitudes, interests and it is used mostly in prediction, opinion research and social research. This study predicts the influence of performance expectancy, effort expectancy, social influence and facilitating condition on e-government acceptance among Malaysian citizens. The survey responses of 543 e-government users have been validated and analyzed by means of covariance-based Structural Equation Modeling. The findings indicate that e-government acceptance among Malaysian citizens are mainly influenced by performance expectancy ($\beta = 0.66$, $t = 11.53$, $p < 0.01$) and social influence ($\beta = 0.20$, $t = 4.23$, $p < 0.01$). Surprisingly, there is no significant effect of facilitating condition and effort expectancy on e-government continuance intention ($\beta = 0.01$, $t = 0.27$, $p > 0.05$; $\beta = -0.01$, $t = -0.40$, $p > 0.05$). This study offers government and vendors a frame of reference to analyze citizen's situation before initiating new innovations. In case of Malaysian e-government technology, adoption strategies should be built around fostering level of citizens' technological expectation and social influence on e-government usage.

Keywords—Continuance intention, Malaysian citizens, media psychology, structural equation modeling.

I. INTRODUCTION

THERE is a growing number of governmental bodies that are utilizing information and communication technologies, for instance websites, as a means to better address citizen information needs, provide more efficient and effective service, and enhance citizen engagement and democracy. E-government is related to the reform of the administration that involves the use of technology to facilitate communication between citizens and government [1], [2]. In the other words, e-government is a way for public administration to be more efficient and beneficial in their service including openness and transparency; democratic participation; more service-oriented, providing personalised and inclusive services to each citizen; productive, and delivering maximum value for taxpayers' money [3]. Despite this trend, research has shown that government websites usage is still at low levels [4]. As for the Malaysian context, the adoption rate of e-government portals

is lower than expected [5]. Reference [5] reported that mean usage of e-government websites was $M = 2.745$ for younger (16-19 years old) and $M = 2.742$ for older (60 years old). However, [6] previously reported that mean usage of e-government websites was $M = 3.88$. These studies have shown that there is a decreasing pattern of acceptance. Given the decreasing trend in intentions to use e-government websites, there is a need to assess the extent to which these websites are continuously used, and the factors that impact citizens' adoption and continued use of these websites. The rationale of this study is based on the argument that understanding the factors that affect the continuance intention to use e-government services is an essential step toward achieving government goals. Although, information system continuance intention is widely discussed in literature, there is little empirical research that investigates the continuance intention to use e-government services using UTAUT theory. Previous research efforts have studied the role of UTAUT in explaining post-adoption stage [7], [8]. Although these studies also using UTAUT theory to explain post acceptance, little research has been done from the perspective of a developing country such as Malaysia. This research is also in line with recent calls from [7] to replicate their study to other populations – i.e. other countries. In the Malaysian context, research has also overlooked how users continue to use the e-government websites. Preliminary work on e-government acceptance in Malaysia was undertaken by [6] who reports that trust, perceived usefulness, perceived relative advantage and perceived image, respectively, has a direct positive significant relationship towards intention to use e-government service. However, a flaw in Lean's et al. argument would seem to be that it relies too heavily on the initial acceptance stage instead of the post acceptance stage. In another major study conducted in Malaysia, [9] examined the relationship between UTAUT predictors and intentions to use smartcard applications. Their results demonstrate that Malaysians do not have high intentions to use smartcard applications. However, the key problem with this explanation is that they only utilize the descriptive statistics, thus missing out on some important results of the relationships. Another criticism of Loo's work is that they also rely on the initial acceptance stage. Reference [10] identifies attitude and subjective norms to be a strong predictor of intention to use e-government in Malaysia. However, this study also relies on the initial acceptance stage. These studies would have been more convincing if they had considered long-term usage. Thus, the motivation of this study

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is to gain an insight on how UTAUT variables might be able to influence the continuance intention to use e-government services among Malaysian citizens.

II. MALAYSIAN GOVERNMENT SERVICE

In line with the global trend, Malaysia has also embarked upon elaborate programs seeking to upgrade the state of governance and service delivery systems through the application of new technologies. One of the early initiatives in this regard is the introduction of a public service network in the early 1990s [11]. Electronic Government (e-Government) was initiated in Malaysia on 24 February 2004. The Vision of e- Government is to transform administrative process and service delivery through the use of information system (IT) and multimedia. The Malaysian government has launched a website to collate all the services provided from one roof or portal rather than having a separate website for respective services provided. Seven pilot projects have been introduced under the e-government flagship such as Generic Office Environment (GOE), Electronic Procurement (EP), Human Resource Management Information System (HRMIS), Project Monitoring System (PMS), Electronic Services Delivery (EServices), Electronic Labor Exchange (ELX), and E-Syariah [6]

A. E-Filing

Starting in year 2006, the Malaysia Inland Revenue Board (IRBM) launched the e-filing method for individual taxpayers, and thus, citizens can choose whether they want to pay manually or use e-filing [12]. E-filing enables citizens to fill out tax-related information electronically by obtaining a valid digital certificate from the IRBM. This valid digital certificate is designed to help taxpayers to complete their tax filing online. The advantage of e-filing is that the transaction process can be done without using even a single piece of paper [12].

B. Human Resource Management Information System (HRMIS)

HRMIS is a communication technology which is designed to help government officials to communicate and to support transaction processing and maintain management control. A good human resource decision is more likely to follow from a good HRMIS. Such a system should therefore be provided to both human resource and line managers to facilitate decision making [13]. Among the advantages of HRMIS was its ability to collect, gather and help analyze the data necessary for the human resource department to do its job properly [13]. The HRMIS were also able to improve and facilitate administration through quicker information processing, make better employee communications and excellent information accuracy.

C. E-Syariah

E-Syariah (the Malay spelling of Sharia) is one of the seventh E-government initiatives in Malaysia. A total of 39 million ringgit (9.58 million USD) has been allocated to develop the e-Shariah portal by the Malaysian Government in order to facilitate the administration of the Syariah Courts in Malaysia [14]. The E-Syariah project, launched in April 2002, has been implemented at all 110 Syariah Courts in Malaysia in April 2007 [14]. Essentially E-Syariah is limited to muslim only and its primary objective is to improve the administration and quality of services offered by the state Syariah Courts [15].

III. RESEARCH MODEL AND HYPOTHESIS DEVELOPMENT

We next develop our research model and hypotheses based on Unified Theory of Acceptance and the Use of Technology (UTAUT).

The variables implicated in technology acceptance have been of interest to managers, researchers and practitioners for many years. Over this period, a number of models of technology acceptance have emerged [16], [17]. In an attempt to bring together a range of theoretical frameworks and ideas, [18] developed and evaluated a unified theory of technology adoption. The UTAUT consolidated previous research on technology acceptance through the integration of prevalent technology uptake models. Further, the UTAUT has been found to successfully predict a large proportion of variance in users' IT uptake intentions and behavior [18]. Scholars have obtained empirical support for the UTAUT model across contexts ranging from healthcare context [19] to the learning context [20]. The UTAUT framework consists of four antecedents: performance expectancy, effort expectancy, social influence and facilitating conditions [18]. Taken together, these dimensions have been found to explain as much as 70% of pooled variance in behavioral intention to use a technological innovation [18]. Performance expectancy was conceptualized by combining constructs including perceived usefulness, extrinsic motivation, job-fit, relative advantage and outcome expectations [18]. This construct is defined as the belief that using a particular innovation will lead to positive outcomes. Performance expectancy is comparable to perceived usefulness from the technology acceptance model [21]. Reference [18] found that performance expectancy was a strong predictor of an individual's intention to use a new technology in the workplace. Accordingly, the following hypothesis was proposed:

H1. Performance expectancy is positively related to e-government continuance intention.

Effort expectancy, conceptually similar to perceived ease of use [21], is defined as a user's subjective evaluations of ease of engaging with an IT system [18]. Sub-components of this construct include perceptions of system ease of use and complexity [18]. Reference [22] indicated that perceived ease of use was positively associated with continuance intention in the context of a web-enabled phone service. Reference [23] also emphasized the importance of ease of use in the acceptance of e-government services. In their studies on data mining tools acceptance, [24] found that the easier it is to use a data mining tools, the greater chance for an individual to accept the data mining tools. Therefore, we proposed:

H2. Effort expectancy is positively related to e-government continuance intention.

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Social influence is defined as the extent to which important others are perceived to support the user's intention to adopt an IT innovation [18]. Inspired by the construct of subjective norm within the theory of planned behavior [25], social influence was conceptualized as an individual's perceptions of social benefit from using the innovation [18]. Studies by [26] have showed that subjective norm is a significant predictor of continuance intention to the use smartphones. Accordingly, the following hypothesis was proposed:

H3. Social influence is positively related to e-government continuance intention.

The construct of facilitating conditions is the final component of the UTAUT model. Encapsulating perceived behavioral control from the TPB, this construct is defined as the level of accessibility to technological and organizational resources that facilitate use of the IT system [18]. Research has shown that facilitating condition can affect continuance intention to use an IT innovation [27]. Accordingly, the following hypothesis was proposed:

H4. Facilitating conditions is positively related to e-government continuance intention.

IV. RESEARCH METHODOLOGY

A. Sample

Because the population size for this study is unknown, non-random samplings were made to select the sample [28]. Three anonymous organizations, namely government office, private university, and a government secondary school in Kuantan, Malaysia were selected conveniently. The three anonymous organizations were chosen because we believe that most of the users were from those organizations. They agreed to help collect data from their members. The organizations allowed us to conduct an on-site survey and encouraged their members to participate. We visited these organizations and presented the survey questionnaires to 600 members who were willing and eligible to participate. Each respondent was first asked to identify which type of e-government service he or she is familiar. The respondent was then asked to answer the questionnaire on the basis of his or her experience in using that particular e-government service (e:g e-filing, e-syariah etc.). A total of 600 respondents returned completed questionnaires. Responses from 57 respondents were excluded due to missing information and straight line issue [29]. The results are based on 543 usable responses.

B. Instrument Development

The instrument was developed by adapting scales from the previous literature on e-government adoption, except for the dependent variable, which is borrowed from on-line banking literature. Performance expectancy, effort expectancy, social influence and facilitating condition was measured with four items adapted from [30]. Continuance intention was measured with three items adapted from the work of [31] Bhattacherjee (2001). All items were measured using 5-point Likert-type scales, anchored in values ranging from 1 (strongly disagree) to 5 (strongly agree).

C. Data Analysis

Upon completion, the questionnaires were returned and participants were thanked for their time. The data were entered into the SPSS 20 statistical software program and were cleaned and screened with tests for missing values and multivariate assumption.

V. RESULTS

A. Data Screening and Multivariate Assumption

We first conducted a missing data analysis and revealed that all cases had less than 5% of data missing. As such, all cases were retained and 20 missing values were replaced using the midpoint value [32]. We then examined the normality by looking at the values of skewness and kurtosis. The values of skewness and kurtosis did not identify any serious violations of normality, because all the coefficients were below ±1.30 [33]. Table I displays the value of skewness and kurtosis statistics for each item.

The linearity of the dataset is then examined via the matrix scatter plots. To address multicollinearity problem, Variance Inflation Factor (VIF) and tolerance are examined [39]. All VIF values are less than 10, while the respective tolerance is greater than 0.10 (see Table III). Further, an investigation of residual scatterplots showed that multivariate homoscedasticity was free from violation.

B. Test of Measurement Model

Confirmatory factor analysis (CFA) was performed to examine overall fit of three-factor model. The initial CFA yielded a poor goodness of fit to the data (x^2 = 1041.917, df = 142, p < .001, GFI = .52, CFI = .63 and RMSEA = .12) see Table I. We adopt the approach of deleting items with low standardized regression weights [40]. Deleting two items with low standardized regression weights from the measurement model results in a model that is a much better fit of the data. After the elimination of these two items, the resulting measurement model was found to fit the data reasonably well: (x^2 = 577.512, df = 125, p <.001, GFI = .88, CFI = .94 and RMSEA = .08) see Table II. All the model-fit indices exceeded their respective common acceptance levels suggested by previous research. Hence, we could proceed to examine the psychometric properties of the measurement model in terms of reliability, convergent validity and discriminant validity.

Composite reliability (CR) and Cronbach's alpha of the constructs were assessed in this study. The interpretation of CR is similar to that of alpha. As shown in Table IV, the CR's and alpha's of all the constructs in our measurement model exceeded the acceptable criteria of 0.70, indicating that the scales had good reliabilities [41], [42]. For assessment of unidimensionality, both the factor loading (>0.5) and t-value (>1.96) of items are required. As shown in Table II, factor loadings of the items in the proposed model ranged from 0.78 to 0.91 and were significant at the level of p < 0.001. All were greater than the cut-off value of 0.70 recommended by [43]. In addition, the AVEs were all above the threshold value of 0.50,

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which meant that the hypothesized factors accounted for more than one half of the variances observed in their measurement items. Discriminant validity means that a latent variable is able to account for more variance in the observed variables associated with it than other constructs within the research model. It was tested by comparing the square root of the AVE of each construct and its correlation coefficients with other constructs [44]. The results of discriminant validity are shown in Table V. For all the constructs, the square roots of the AVEs were larger than the correlation coefficients with other constructs, thus showing good discriminant validity. In summary, all constructs in the measurement model had adequate reliability, convergent validity and discriminant validity.

TABLE I
MEASUREMENT MODEL (FIRST PHASE)

Construct	Item	Factor loading	No. of item	skewness	kurtosis	x^2/df[a]	RMSEA[b]	CFI[c]	GFI[d]	NFI[e]	PGFI[f]
Performance expectancy	Pe1	0.84	4	-.894	1.106						
	Pe2	0.86		-1.206	1.981						
	Pe3	0.88		-.813	.857						
	Pe4	0.87		-.869	1.054						
Effort expectancy	Ee1	0.84	4	-.579	.298						
	Ee2	0.84		-.483	.111						
	Ee3	0.85		-.539	.363						
	Ee4	0.88		-.665	.614						
Social Influence	Si1	0.87	3	-.576	.514	7.34	0.10	0.90	0.82	0.89	0.62
	Si2	0.86		-.655	.831						
	Si3	0.93		-.562	.546						
	Si4	0.58		-.610	-.068						
Facilitating Condition	Fc1	0.90	4	-.831	.625						
	Fc2	0.92		-.912	.765						
	Fc3	0.55		-.280	-.550						
	Fc4	0.52		-.582	.176						
Continuance intention	Cont1	0.91	3	-1.111	2.287						
	Cont2	0.92		-.990	1.963						
	Cont3	0.91		-1.014	1.909						

*Recommended value [a] < 5.00, [b] <0.08, [c] >0.90, [d] >0.90, [e] >0.90, [f] >0.50.
*Author: [a][34], [b][35], [c][36], [de][37], [f][38]

TABLE II
MEASUREMENT MODEL (REVISED)

Construct	Item	Factor loading	No. of item	x^2/df[a]	RMSEA[b]	CFI[c]	GFI[d]	NFI[e]	PGFI[f]
Performance expectancy	Pe1	0.84	4						
	Pe2	0.86							
	Pe3	0.88							
	Pe4	0.87							
Effort expectancy	Ee1	0.84	4						
	Ee2	0.84							
	Ee3	0.85							
	Ee4	0.88							
Social Influence	Si1	0.87	3	4.62	0.08	0.94	0.88	0.93	0.65
	Si2	0.86							
	Si3	0.93							
Facilitating Condition	Fc1	0.91	3						
	Fc2	0.93							
	Fc3	0.51							
Continuance intention	Cont1	0.91	3						
	Cont2	0.92							
	Cont3	0.91							

*Recommended value [a] < 5.00, [b] <0.08, [c] >0.90, [d] >0.90, [e] >0.90, [f] >0.50.
*Author: [a][34], [b][35], [c][36][de],[37], [f][38]

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TABLE III
MULTICOLLINEARITY TEST

Model	Unstandardized Coefficients B	Standardized Coefficients Std. Error	Beta	t	Sig	Collinearity statistics Tolerance	VIF
Constant	.57	.13		4.23	.00		
Performance expectancy	.60	.04	.58	14.19	.00	.47	2.12
Effort expectancy	.05	.04	.05	1.13	.26	.43	2.35
Social Influence	.17	.04	.17	4.55	.00	.57	1.76
Facilitating Condition	.05	.04	.05	1.31	.19	.55	1.80
Continuance intention	.57	.13		4.23	.00		

Note: Dependent variable: Continuance intention.

TABLE IV
RELIABILITY AND AVE

Construct	Cronbach alpha	Composite reliability	AVE
Performance expectancy	0.91	0.92	0.74
Effort expectancy	0.91	0.91	0.72
Social Influence	0.91	0.92	0.79
Facilitating Condition	0.79	0.84	0.65
Continuance intention	0.93	0.94	0.83

TABLE V
DISCRIMINANT VALIDITY

	FCN	SIN	EEX	PER	CONTI
FCN	**0.81**				
SIN	0.46	**0.89**			
EEX	0.51	0.68	**0.85**		
PER	0.57	0.63	0.72	**0.86**	
CONTI	0.46	0.61	0.62	0.78	**0.91**

Square roots of AVEs are shown as diagonal elements in bold type. The diagonal elements were greater than the corresponding off-diagonal elements in the same row and column, indicating the discriminant validity
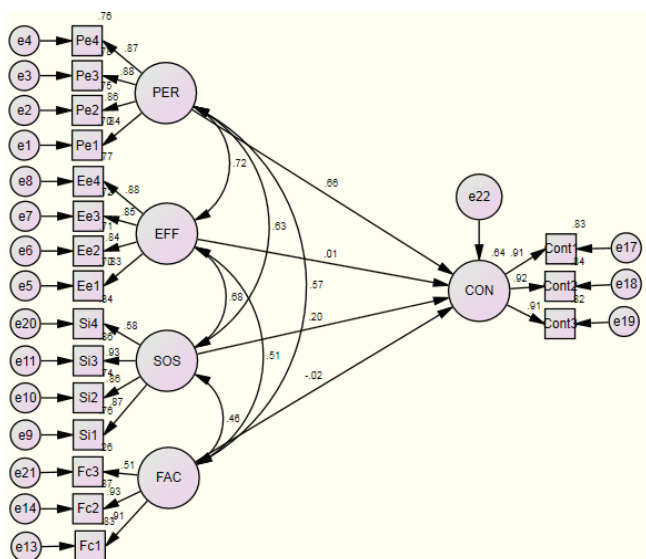

Fig. 1 Structural diagram

C. Structural Model and Hypothesis Testing

Since the measurement model evaluation provided evidence of reliability and validity, the structural model estimates were examined to assess the hypothesised relationships among the constructs in the conceptual model. Similar to the measurement model, comparison of fit indices with their corresponding recommended values demonstrated evidence of a good model fit (see Table VI). Two proposed relationships were found significant. This confirms that there is a positive relationship between Performance Expectancy and Continuance Intention ($\beta = 0.66$, t = 11.53, p < 0.01), confirming H1. Positive relationships are also found between Social Influence and Continuance Intention ($\beta = 0.20$, t = 4.23, p < 0.01) thus supporting H3. However, Effort Expectancy and Facilitating Condition did not correlate significantly with Continuance Intention ($\beta = 0.01$, t = 0.27, p > 0.05; $\beta = -0.01$, t = -0.40, p > 0.05) thus not supporting H2 and H4. (see Table VII and **Fig. 1**).

TABLE VI
STRUCTURAL MODEL FIT

	Fit index					
	x^2/df^a	RMSEA[b]	CFI[c]	GFI[d]	NFI[e]	PGFI[f]
Structural model	4.62	0.08	0.94	0.99	0.93	0.65

*Recommended value [a] < 5.00, [b] <0.08, [c] >0.90, [d] >0.90, [e] >0.90, [f] >0.50
*Author: [a][34], [b][35], [c][36], [de][37], [f][38]

TABLE VII
RESULT OF HYPOTHESIS TESTING

	Path coefficient	Critical ratio
H1:PER-CON	0.66	11.53***
H2:EFF-CON	0.01	0.27
H3:SOS-CON	0.20	4.23***
H4:FAC-CON	-0.01	-0.40

***p< 0.000 Discussion

From the path analysis, we observed that PER and SOS have significant positive effect on the continuance intention to use e-government services. However, EFF and FAC have no significant causal effect on continuance intention to use e-government services. Therefore, with the exception of hypotheses H2 and H3, the other two hypotheses were to be found significant. The most important factor influencing continuance intention to adopt e-government services is PER. Strong association between PER and CON has been listed in literature [18], [45]-[47], which is supported by our statistic results. The second influential factor that impacts on the continuance intention to adopt e-government services is SOS. A significant relationship between SOS and behavioral intention has also been reported in literature [48], [28]. However, this study indicates that EFF does not affect continuance intention to use e-government services significantly. Although, this result differs from some published

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studies [49], [50], these findings are consistent with [51] and [52], who found that ease of use were not significant in the intention to use e-government and online banking services, respectively. In Malaysian context, through this study, we clearly demonstrate that technology perceptions and enviromental factors are a significant predictor of continuance intention to adopt e-government services.

D. Implications for Research

From a theoretical perspective, this research applies UTAUT in post-adoption stage to explain user adoption of e-government service in the Malaysian setting. We found that two UTAUT's predictor, namely performance expectancy and social influence, have a significant effect on user adoption. This shows that, when examining the factors affecting e-government users' adoption, we need to be concerned with both technology perceptions and enviromental factors. Moreover, the model demonstrated high explanatory power. The R-square of the continuance intention construct was 0.64, or 64% of the variance in user continuance intention to adopt e-government services was explained with our model.

E. Implication for Practice

From a practical perspective, our research showed that both performance expectancy and social influence have significant effects on user adoption of e-government services. In addition, we found that performance expectancy has an obvious effect on continuance intention. Thus service providers need to improve the performance expectancy. They can achieve this by presenting an ease-of-use interface, thus reducing effort expectancy and enhancing performance expectancy [52].

F. Limitations

This research has the following limitations. First, we mainly explained e-government adoption using UTAUT. Future research may draw on other theories and perspectives such as quality dimension [53]. Second, user behavior is dynamic and constantly changing. We only collected cross-sectional data. A longitudinal research may provide more insights on how user adoption behavior changes over time. Third, we conducted this research in Malaysia, a country whose fast-developing e-government service is still in its infancy. Our results may not generalize to other countries with relatively mature e-government service. Fourth, the model deployed in this work ignored the moderators in the original UTAUT model. Future research can investigate their roles in e-government acceptance research particularly in the post adoption stage in developing countries. Fifth is the use of convenience sampling which might affect the significance of relationships of the variables. A further study using probability sampling would be very interesting in order to better understand the e-government acceptance in Malaysian context as a whole.

VI. CONCLUSION

The great potential of e-government is to provide citizens and organizations with more convenient access to government information and services. Based on these advantages, e-government services should acquire a wide user adoption. However, the reality is that the current user adoption level of e-government services is much lower. By using UTAUT, this research analyzed factors determining user adoption of e-government. Our results showed that users' adoption of e-government service is affected by their perception on the technology outcome (performance expectancy) and environmental factors (social influence).

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