



Continual Usage in the Context of E-government: Focusing on Information Privacy Concern

Joyce F. Jamile^a, Maureen Nettie N. Linan^b, Richard C. De Leon^c, Remia L. Doctora^d

^{abcd}Iloilo Science and Technology University

Email: ^ajoycejamile@gmail.com, ^bmaureennetti@gmail.com,
^cdeleonrichardc@gmail.com, ^dremiadoctora0530@gmail.com

ORCIDID: ^a0009-0007-1386-2717

ABSTRACT

With the advent of ICT technologies, governments have engaged in e-government initiatives to ensure efficiency and effectiveness in delivering services and information to their citizens, businesses, and other agencies. However, as ICT grows, citizens are now concerned about privacy and security issues due to potential threats to adopting e-government. This study intends to understand citizens' continual Usage by focusing on privacy concerns as a moderator. It examines how the relationship between citizen satisfaction and continual Usage differs according to the level of privacy concerns. The hypotheses were tested using partial least squares structural equation modelling. The findings supported the hypotheses regarding the causal path from citizen satisfaction to continual Usage. Likewise, the dual roles of privacy concerns (risk-taking and risk-averse) affect citizens' satisfaction and continual Usage. Furthermore, this study contributes to the extant literature on the continual Usage of e-government sites in developing countries.

Keywords: e-government, continual Usage, citizen's satisfaction, privacy concern

I. INTRODUCTION

Governments have adopted ICT projects aimed at serving the government, business, and its residents as a result of the proliferation of ICT technology, which has significantly influenced goods and services (Gupta et al., 2008). With this, it offers the government the chance to digitalize its operations, which will eventually increase internal efficiency and service quality, particularly in poorer nations (Kramer et al., 2007; UNa, 2022).

UN reported a sharp rise in the number of countries that use e-government to provide public services. Accessing public services is made simpler by providing them online through a single platform (UNa, 2022; UNb, 2020). Eventually, this leads to citizens' satisfaction; however, despite the numerous benefits for citizens, e-government only sometimes meets the expectations of its citizens. Additionally, better information and more suitably designed portals may increase user happiness and discourage individuals from accessing e-government services (AlAwadhi & Morris, 2009). Lessa et al. (2012) added that e-government is successful if the majority of stakeholders achieve their objectives and do not encounter substantial negative effects.

Shi et al. (2016) mentioned that protecting a citizen's privacy has become a challenging problem when building an e-government website. Along with this new form of communication, personal information relayed on a distributed system is risky, and privacy might be compromised (Akour et al., 2022). Furthermore, discontinuance may occur if citizens are no longer satisfied with an e-government site (Limayenm et al., 2003). According to Heeks (2005) and Kramer et al. (2007), e-government strategies and experiences from developed nations may not be applicable to developing countries due to the significant variations in many e-government issues connected to technology conditions between developed and developing countries.

Against this backdrop, this study aims to answer the following research questions (RQ):

“RQ1: Do higher levels of citizen satisfaction influence the continual Usage of e-government sites?”; and

“RQ2: Will there be a change in the impact of citizen satisfaction on continual change with the different levels of privacy concerns?”

By extending the models of Davis (1989) and Garrity & Sanders (1998) based on these concerns, we are able to better comprehend citizens' ongoing usage. Assemble more research on privacy issues in developing nations. The relationship between citizens' pleasure and continued usage is also examined, as well as the moderating impacts of privacy concerns.

The rest of this study is organised as follows: Section 2 presents the literature review, which includes the e-government in developing countries, followed by the theoretical framework and the research model with the definitions of each construct/variable. Then, Section 3 reports on the methods and procedures, including data collection, measures, measurement items, and results. Section 4 presents the discussion and conclusion. Lastly, section 5 presents the implications.

II. LITERATURE REVIEW

a. E-government in developing countries

The most widely used definitions are based on those of the Organisation for Economic Cooperation and Development (OECD) and the United Nations (UN), and they involve the application of ICTs to enhance the provision of governmental services and operations with the sole objective of achieving better government (OECD, n.d.; UNa, 2022). To properly adopt e-government, numerous difficulties and problems must be resolved.

Even while ICT is thought to be a powerful accelerator for the sustainable development of e-government (Kramer et al., 2007), the promise for e-government in developing nations, particularly Southeast Asia, mostly remains unrealized. According to Heeks (2005), many e-government programmes, particularly those in poor nations, failed, with 35% of them ending in complete failure and 50% ending in partial failure. E-government programmes were only successfully implemented in 15% of cases. Additionally, according to the UN's report on the rankings of e-ready countries, half of the Southeast Asian nations are in the lower half and the other half are in the middle (UNa, 2022; UNb, 2020; UNc, 2018; UNd, 2016). For evaluating the dependability and security of every transaction, connectivity and technological infrastructure are crucial indications. As a result, maintaining communication and connection is the biggest task and poses significant threats to developing nations (Akour et al., 2022; Shi et al., 2016).

Table 1
E-government Development Index Ranking in Southeast Asia

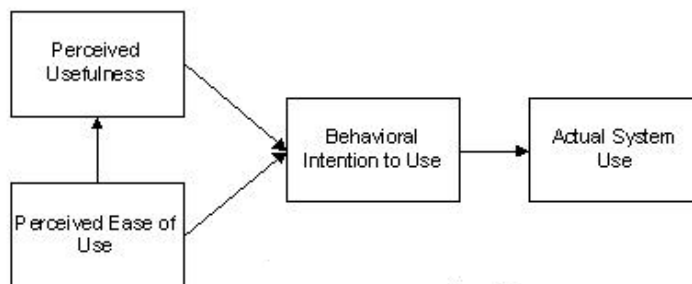
COUNTRY	2016	2018	2020	2022
Singapore	4	7	11	12
Malaysia	016	018	020	022
Singapore	83	58	60	68
Brunei Darussalam	89	1	2	86
Vietnam	0	81	7	75
Malaysia	3	77	0	73
Philippines	8	116	8	57
Brunei Darussalam	9	8	0	88
Thailand	9	116	107	88
Indonesia	9	148	6	162
Vietnam	9	148	6	162
Lao People's Dem. Rep.	9	148	6	162
Philippines	1	158	7	145
Cambodia	1	158	7	145
Myanmar	7	169	7	157
Timor-Leste	7	160	7	142
Indonesia	16	07	8	7
Lao People's Dem. Rep.	16	07	8	7
Philippines	16	07	8	7
Malaysia	16	07	8	7
Brunei Darussalam	16	07	8	7
Thailand	16	07	8	7
Indonesia	16	07	8	7
Vietnam	16	07	8	7
Lao People's Dem. Rep.	16	07	8	7
Philippines	16	07	8	7
Cambodia	16	07	8	7
Myanmar	16	07	8	7
Timor-Leste	16	07	8	7
Indonesia	16	07	8	7

Table 1 presents the e-government development index (EGDI) rank by countries in South East Asia where the Philippines' EDGI has been decreasing, as reported by the UN from 2016 to 2022.

b. Theoretical Framework

The “Technology Acceptance Model (TAM)” by Davis (1989) has been cited by Wangpipatwong et al. (2009) as one of the most influential and often used models for analysing a person's acceptance of information systems. For a brief period of engagement, TAM is frequently used to explain the user's initial purpose to adopt an information system, but it has also been used to foretell the user's continued use of information systems (Wangpipatwong et al., 2009; Zhou, 2013).

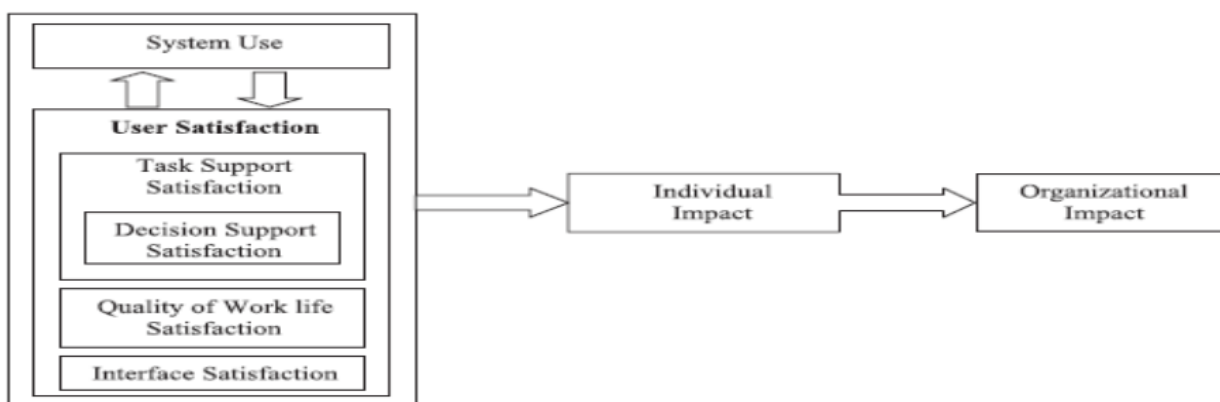
Figure 1
“Technology Acceptance Model (TAM) (Davis, 1989)”



The framework developed by (Garrity & Sanders, 1998) for organisational and sociotechnical systems is another effective one. The model shown in Figure 2 specifies four aspects of user happiness: quality of life, task support, interface satisfaction, and decision support satisfaction. These indicators align with the perspectives of information systems: Organising and sociotechnical perspectives (Garrity et al., 2005; Garrity & Sanders, 1998)

Figure 2

“Garrity and Sanders model for IS Success (Garrity & Sanders, 1998)”

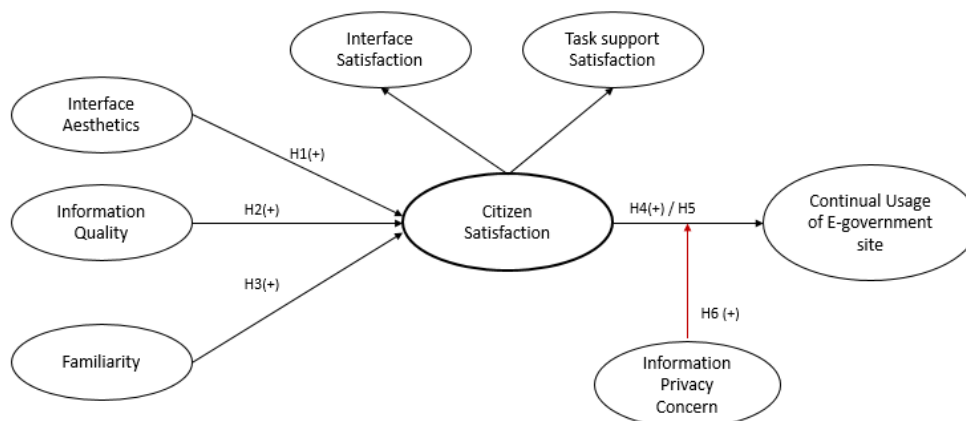


c. *Research Model*

The choice of a user to continue using a particular information system is referred to as IS continuation, as stated by Lee and Kwon and quoted by Wangpipatwong et al. (2009). They continued by saying that the early use of government websites is a key sign of e-government success. Limayenm et al.'s (2003) argument, however, asserted that information systems generally shown that their long-term effectiveness relied on continued use rather than early adoption.

Figure 3

“Research Model for Continual Usage: Focusing on Privacy Concerns”



The research model (see Figure 3) incorporates Garrity and Sanders' (1998) and Davis' (1989) TAM and model of IS success. A direct influence is shown by the black line, while a mediating impact is shown by the red line. The second construct is citizen satisfaction. Task support satisfaction and interface satisfaction are first-order constructs.

Interface Aesthetics

One of the difficulties faced by website designers who must cater to the various needs of diverse individuals and guarantee high-quality government service is developing a website that can draw consumers. Interface aesthetics are the extent to which a user's engagement with a system is appealing and satisfying, according to International Organisation for Standardisation (ISO) 25010, a standard evaluation of high-quality software (iso25000.com, 2022). The impact of design aesthetics on user happiness has been investigated by many writers (Abbasi et al., 2012; Garrity et al., 2005; Lessa et al., 2012).

According to Mttus et al. (2013) and Pajusalu (2012), a website's aesthetics can be exhibited through the use of colour and layout design components (such as images, headers, and typefaces). According to Abbasi et al. (2012), a user's opinion of the website may be favourably impacted by these elements' good presentation and style. Furthermore, according to Pajusalu (2012), task completion rates and aesthetic appeal have an impact on more than just the system's quality. Task completion was impacted by using a more appealing design, and users were happy with the system. On the other hand, poorly designed portals have reportedly been linked to website failures and a decline in user satisfaction (Abbasi et al., 2012). Thus, we hypothesised:

H1: Interface aesthetics positively impacts citizen satisfaction on e-government sites.

Information Quality

Information quality is described as conforming to requirements and meeting or exceeding consumer expectations by Kahn et al. in 2002. The standards were not met or exceeded, and the information was deemed insufficient. They held that the most important aspect in determining how people will make decisions is the quality of the information. According to certain empirical studies (Kahn et al., 2002; Wangpipatwong et al., 2009), the quality of the information is related to the level of customer satisfaction. Furthermore, they argued that reliable information motivates users among the populace. Low information quality will prevent e-government from meeting and exceeding user satisfaction, according to Kahn et al. (2002). The correctness, relevance, consistency, and completeness of the information can be used to gauge its quality. Thus, we hypothesised:

H2: Information Quality positively impacts Citizen Satisfaction on e-government sites.

Familiarity

In the stage of familiarity, people make use of their prior knowledge or are frequently based on interactions, experiences, and learning to comprehend what, where, why, and when others act in a certain way (Alsaghier et al., 2011). According to Li and Yeh (2010), the majority of familiarity studies are conducted in e-commerce settings and are frequently linked to customer behaviour. According to Ha and Perks (2005), customers are more inclined to loiter or examine a product on an e-commerce site if they think it is nice. According to Ha and Perks (2005), a study by Lane and Jacobson indicated that brand familiarity affects a brand's performance. Therefore, a

user who spends a lot of time on a website may remember it. Therefore, a high level of familiarity results greater satisfaction. Thus, we hypothesised:

H3: Familiarity has a positive impact on citizen satisfaction on e-government sites.

“Citizen Satisfaction”

According to Chiu et al. (2005), satisfaction is a person's joy or disappointment as a result of comparing a performance or result to what the person had anticipated. User satisfaction has three dimensions, according to Garrity et al. (2005): task support, decision-making, and interface. The task support satisfaction does, however, include decision support. Contrarily, interface satisfaction is associated with both task assistance and decision-making. Thus, we hypothesised:

H4: Higher Citizen Satisfaction positively influences citizens' Continual Usage of e-government sites.

It is proposed that, in light of the many viewpoints expressed in H1, H2, H3, and H4, citizen satisfaction acts as a mediator between familiarity, information quality, and interface aesthetics in the ongoing use of e-government websites. Having a more attractive design had an impact on work completion, according to Pajusalu (2012), and the users were happy with the system. In exchange, users continue to utilise the system. The same is true for information quality; when a website has high-quality content, users are happy. As a result, it motivates consumers to frequent the website frequently. An e-government website's users are more likely to investigate it if they have previously used it. Thus, we hypothesised:

H5a: Citizen Satisfaction mediates Interface Aesthetics' influence on Continual Usage of e-government sites

H5b: Citizen Satisfaction mediates Information Quality's influence on Continual Usage of e-government sites

H5c: Citizen Satisfaction mediates familiarity's influence on Continual Usage of e-government sites

“Information Privacy Concern as the moderator”

All governments and concerned citizens now have serious concerns about information privacy. Risks associated with the introduction of e-government include security and privacy (Akour et al., 2022; Shi et al., 2016). According to Campbell (1997), a person's subjective perceptions of fairness within information privacy are referred to as an information privacy concern. Citizens are therefore very aware of and concerned about security and privacy due to uncertainties regarding the website's security. According to Malhotra et al. (2004), a person's propensity to care about information privacy affects how they see a certain circumstance.

We use the risky shift phenomenon suggested by Wallach et al. (1964) to understand the moderating effect of privacy concerns. Using e-government sites, we can assume continuous Usage as a risk-taking behaviour for citizens with more serious privacy concerns. In contrast, hesitation towards using e-government sites can be considered risk-averse (reluctant) behaviour. The theory of reasoned action (TRA), which postulates that personal traits affect salient beliefs (Fishbein & Ajzen, 2011), is compatible with this claim. A person's level of information privacy concern will probably have an impact on the correlation between continued usage and citizen satisfaction. Thus, we hypothesised:

H6: “The information privacy concern moderates the relationship between citizen satisfaction and continual Usage of e-government sites.”

III. METHODS AND PROCEDURES

Utilising partial least squares (PLS), the research model was evaluated. According to Hair Jr. et al. (2002), this method has been applied to the development of theories in exploratory research. PLS structural equation modelling (PLS-SEM), in contrast to covariance-based SEM, focuses on explaining the variance in the dependent variable while evaluating the hypotheses model, which is how it develops theories in exploratory research. Furthermore, even with a small sample size, PLS-SEM makes no assumptions about a normal distribution (Hair Jr et al., 2021).

a. “Setting, Sample, and Data Collection”

An online survey is a suitable technique to measure the goal since, as was already said, the primary goal of this study is to evaluate how frequently residents use e-government. Sample information was acquired between September 2022 and December 2022 via an online poll.

A link to an online survey was provided to 250 staff members of a public institution in the Philippines, and 147 of them (or 59%) responded. The target audience comprised government workers who are still employed and have previous experience using search engines to browse and find information online. To guarantee that the group under consideration has been accurately defined, identifying who will participate in an online survey is essential.

Based on the demographic information in Table 2, 76 participants were male participants, and 71 were female. Regarding Internet usage, 64 participants answered "Always." Sixty-three of the participants answered that they use the Internet for "inquiry and searching on the e-government site, with a percentage of 44%. Before the actual online survey, the measurement items were adapted from different authors and were already validated for reliability by experts.

Table 2
Demographic Information

Characteristics		Frequency	Percentage (%)
Gender	Male	76	52%
	Female	71	48%
Age	21 – 30 years old	30	21%
	31 – 40 years old	40	27%
	41 – 50 years old	49	33%
	Older than 50 years old	28	19%
Internet Usage			
	Always	64	44%
	Frequently	38	26%
	Often	27	18%
	Seldom	18	12%
Purpose of using E-gov site	Inquiry and searching	63	43%
	Online Applications (e.g., passports, government loans,	35	24%

etc.)		
License Renewal	27	18%
Tax Payment	22	15%

b. "Measures"

Table 3 summarises the measurement items for each variable of the model. Furthermore, all measurement items were adapted from prior studies using a five-point Likert scale ranging from 1 = *strongly disagree* to 5 = *strongly agree*.

Continual Usage. Continual Usage is the willingness of a person to continuously use the services provided by the government on the e-government site. This was assessed via three (3) measurement items.

Interface Aesthetics. Interface aesthetics is where the person is satisfied and pleased with the design aesthetics of a website. This includes the layout, screen designs, and fonts which can influence the users' satisfaction with the e-government site. Three (3) measurement items evaluated interface aesthetics.

Information Quality. Information quality is concerned with the measure of information that the e-government website produces and whether the information is adequate. The information on the e-government website must be appropriate, correct, reliable, and sufficient for users. This was assessed using four (4) measurement items.

Familiarity. Familiarity can be based on previous experience or interactions with e-government sites. Once a person is familiar with an e-government site, it is more likely that the person will explore the site further. This was assessed using three (3) measurement items.

Citizen Satisfaction. Citizen satisfaction comprises user satisfaction and task satisfaction. User satisfaction and task satisfaction are first-order constructs. User satisfaction was assessed using two (2) measurement items, whereas task satisfaction was evaluated using three (3) measurement items.

Information Privacy Concern. Information privacy concern implies the tendency of a person to worry over information privacy. This was evaluated using five (5) measurement items.

Demographic information. Demographic information (see Table 2) includes gender, age, internet usage, and the purpose of using the e-government website, including gender, age, Internet usage, and the e-government website's purpose. Gender was coded as "1 = Male" and "2 = Female". While age was recoded into: "1 = 21 – 30 years old", "2 = 31 – 40 years old", "3 = 41 – 50 years old",; and "4 = older than 50 years old". For internet usage: "1 = Always", "2 = Frequently"; "3 = Often"; and "4 = seldom". The purpose of using the e-government site was coded into: "1 = Inquiry and searching"; "2 = Online Applications (e.g., passports, government loans, etc.)"; "3 = License renewal"; and "4 = Tax payment".

“Table 3: Measurement Items

Construct	Items	Adapted From
<i>Interface Aesthetics (IA)</i>	(1) The layout is easier to grasp.	Pajusalu (2012) and Mõttus et al. (2013)
	(2) The screen design (i.e., colours, boxes, navigation bars, etc.) is attractive.	Li and Yeh (2010)
	(3) The layout appears professionally designed.	Pajusalu (2012) and Mõttus et al. (2013)
	(4) Appropriate fonts are used for text.	Pajusalu (2012) and Mõttus et al. (2013)
<i>Information Quality (IQ)</i>	(1) The volume of information is appropriate.	Wangpipatwong et al. (2010)
	(2) The information is correct and reliable.	Kahn et al. (2002)
	(3) The information has sufficient breadth and depth.	Kahn et al. (2002) and
	(4) The information corresponds to the need and applies to the task at hand.	Wangpipatwong et al. (2010)
<i>Familiarity (FA)</i>	(1) I am familiar with the e-government site	Alsaghier et al. (2011)
	(2) I am familiar with the process of registration on the government site.	Alsaghier et al. (2011)
	(3) I am familiar with looking for government services on the Internet.	Alsaghier et al. (2011)
Citizen Satisfaction	<i>Interface Satisfaction (first-order construct)</i>	
	(1) The e-government site has a visually appealing design and a consistent look and feel.	Abbasi et al. (2012)
	(2) The e-government site is easy to navigate.	Garrity et al. (2005)
	<i>Task Satisfaction (first-order construct)</i>	
	(1) The e-government site is more valuable than I expected.	Davis (1989)
	(2) The e-government site makes it easier to do my task.	Davis (1989)
	(3) The e-government site assists me in making decisions more effectively.	Davis (1989)
<i>Continual Usage (CU)</i>	(1) I will continue using e-government services.	Chiu et al. (2005)
	(2) I will regularly use the e-government site.	Chiu et al. (2005)
	(3) My intention is to continue using, then to use the alternative way (e.g., manually submit the form)	Chiu et al. (2005).
<i>Information Privacy Concern (IPC)</i>	(1) Compared to others, I am more sensitive about how e-government sites handle my personal information.	Malhotra et al. (2004)
	(2) I am concerned that the e-government site collects too much information about	Malhotra et al. (2004)

- me.
- (3) I am concerned about threats to my privacy today. Malhotra et al. (2004)
- (4) I am concerned that the e-government site may need my authorisation to share my personal information with other parties. Malhotra et al. (2004)
- (5) Other people are too concerned with online privacy issues. Malhotra et al. (2004)

Source: Self-developed”

Table 3 presents the measurement items used in this study. These measurement items were adapted from prior studies.

c. “Measurement Model”

Avoiding misinterpretations of structural correlations is advised by the psychometrics literature by Anderson & Gerbing (1988). The structural model depicted in Figure 4 was tested using the two-way approach proposed by Anderson & Gerbing (1988) after a valid and trustworthy measurement was first created.

Internal consistency reliability, convergent and divergent validity, and other factors were looked at to assess the measurement model's quality. In SmartPLS 3.0, Cronbach's alpha was used to evaluate the constructs and composite reliability (Fornell & Larcker, 1981). The degree of internal consistency is inversely correlated with Cronbach's alpha score. Internal consistency and “composite reliability (CR)” were fulfilled because all values (see Table 4) were higher than 0.7. The “average variance extracted (AVE)” method was also employed, and values for all constructs were significantly higher than 0.5 (see Table 4). In order to meet the requirement for convergent validity, factor loadings had to be more than 0.707 (Hair Jr et al., 2021).

Table 4

“Results of validity and reliability tests for the measurement items”

	CA	CR	AVE	Correlation Matrix						
				CS	CU	FA	IA	IQ	IS	TS
CS	0.899	0.926	0.714	0.845						
CU	0.886	0.926	0.808	0.693	0.899					
FA	0.885	0.928	0.812	0.481	0.603	0.901				
IA	0.862	0.906	0.708	0.676	0.456	0.337	0.841			
IQ	0.953	0.966	0.876	0.743	0.678	0.361	0.697	0.936		
IS	0.939	0.970	0.942	0.918	0.560	0.583	0.678	0.640	0.971	
TS	0.829	0.898	0.746	0.945	0.717	0.335	0.589	0.736	0.738	0.864

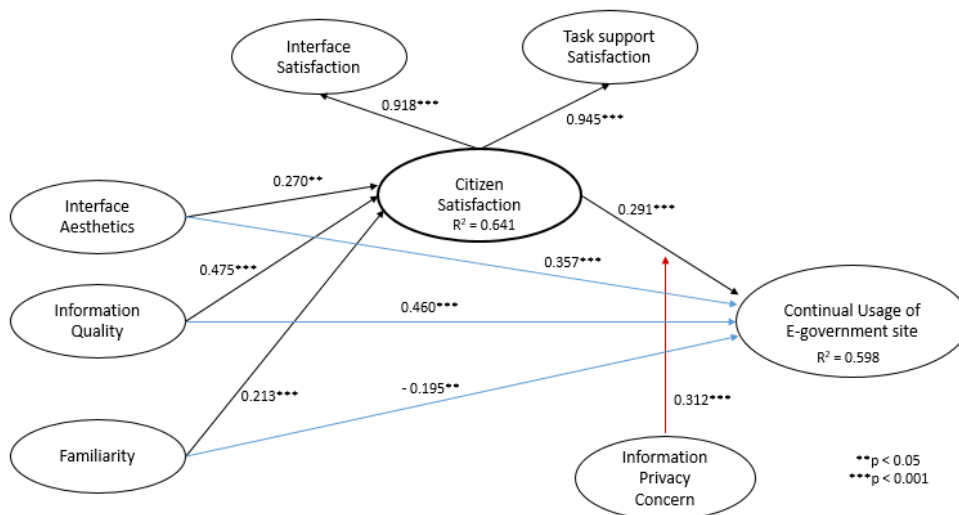
Note: CA = Cronbach's Alpha; CR = Composite Reliability; AVE = Average Variance Extracted; CS = Citizen Satisfaction; CU = Continual Usage; FA = Familiarity; IA = Interface Aesthetics; IQ = Information Quality; IS = Interface Satisfaction; TS = Task-support Satisfaction. IS and TS are the first-order constructs for CS (second-order construct)

The comparison of the squared root of the “average variance extracted (AVE)” and correlations for each construct, as well as the computations for Cronbach's Alpha, composite reliability, and average variance extracted (AVE) are shown in Table 4. Additionally, the degree of collinearity between the independent variables was evaluated to determine whether there were any problems. Hair Jr et al. (2021) assert that collinearity can be avoided if the “variance inflation factor (VIF)” is less than 5.

d. “Structural Model and Research Hypotheses”

“Figure 4 illustrates the structural model testing result (path coefficients and their significance level). It was found that interface aesthetics (*path coefficient* = 0.270; *T – Statistics* = 3.176; *p* < 0.05) significantly affected citizen satisfaction, thus supporting H1. Likewise, information quality positively influenced citizen satisfaction (*path coefficient* = 0.475; *T – Statistics* = 5.695; *p* < 0.001), supporting H2. Also, familiarity significantly influenced citizen satisfaction (*path coefficient* = 0.213; *T – Statistics* = 3.207; *p* < 0.001), in which H3 was supported. Moreover, citizen satisfaction (*path coefficient* = 0.291; *T – Statistics* = 3.653; *p* < 0.001) significantly affected continual Usage. Hence, H4 was supported”.

Figure 4
Structural Modeling testing result



“Another suggestion by Hair Jr et al. (2021) is to assess the effect size (f^2) shown in Table 5. This model assesses a specified construct's impact on the endogenous variable, similar to the role of the path coefficient. Based on the criterion suggested by Cohen (1998) as cited by (Rosenthal et al., 1994) on effect size, *significant effect* > 0.35, *medium effect* > 0.15 and *small effect* > 0.2 in which an effect less than 0.2 indicate that there is no effect on the endogenous construct”.

Table 5
Summary of Results

	Mean	SD	f ²	T-Statistics	Pvalue
CS -> CU	0.291***	0.038	0.924	3.653	0.000
CS -> IS	0.918***	0.008	5.371	111.489	0.000
CS -> TS	0.945***	0.011	8.318	88.832	0.000
FA -> CS	0.213***	0.066	0.113	3.207	0.001
IA -> CS	0.270**	0.085	0.103	3.176	0.002
IQ -> CS	0.475***	0.081	0.314	5.695	0.000

Note: CU = Continual Usage; FA = Familiarity; IA = Interface Aesthetics;

IQ = Information Quality; IS = Interface Satisfaction; CS = Citizen Satisfaction

IS = Interface Satisfaction; TS = Task-support Satisfaction; SD= Standard Deviation;

where: $p < 0.05^{**}$; $p < 0.01^{***}$

“As listed in Table 5, the three (3) independent variables, namely: interface aesthetics ($f^2 = 0.113$), information quality ($f^2 = 0.103$), and familiarity ($f^2 = 0.314$), have a medium effect on citizen satisfaction. At the same time, citizen satisfaction with continual Usage had a significant effect ($f^2 = 0.923$)”.

By using a bootstrapping (5000 resamples) resampling procedure, the model's mediation effect is investigated. After executing the bootstrapping, the total indirect effects were seen, and the findings revealed a substantial relationship between the following: “Interface aesthetics (path coefficient = 0.079; T-Statistics = 2.250; $p < 0.05$); information quality (path coefficient = 0.138; T-Statistics = 4.014; $p < 0.001$); and familiarity (path coefficient = 0.062; T-Statistics = 1.967; $p < 0.05$) on ongoing usage (dependent variable) of e-government site”.

“Additionally, as shown in Table 5, there were significant relationships between interface aesthetics (path coefficient = 0.213; T-Statistics = 3.207; $p < 0.001$), information quality (path coefficient = 0.475; T-Statistics = 5.695; $p < 0.001$), and familiarity (path coefficient = 0.213; T-Statistics = 3.176; $p < 0.05$) and citizen satisfaction”. Finally, familiarity and information quality were positively correlated with continued Usage when the direct effects of the path coefficients were examined. Therefore, as was already established, H5b and H5c were supported by the partial mediation between the relationships. Although interface aesthetics are negatively correlated with ongoing usage (path coefficient = - 0.195; $p < 0.05$), supporting H5a was only partially able to mitigate this association.

In order to assess the moderation effect, the dependent variable must also include an interaction term. H6 contends that users who are more concerned about information privacy are more likely to pose a risk, which would moderate the association between citizen happiness and continued usage of e-government websites.

Figure 5
Moderating Effect – Information Privacy Concern as moderator

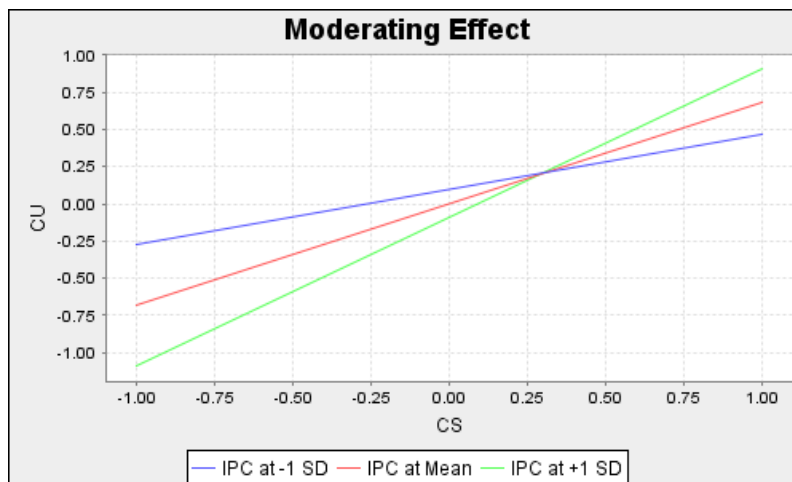


Figure 5 shows that users are more satisfied and more inclined to investigate the e-government website the higher the information privacy worry indicated by the green line argues. As a result, hypothesis H6 was supported.

IV. DISCUSSION AND CONCLUSIONS

In order to better explain the ongoing usage of e-government, we enlarged the frameworks of Davis (1989) and Garrity et al. (2005) by including citizen satisfaction as a second-order construct in addition to interface satisfaction and task support satisfaction as first-order constructs. This study also contributes to the body of research in Southeast Asia, where data privacy issues are far more prominent.

Aesthetics of the interface, the accuracy of the information, and familiarity have all been found to positively influence Results showed that interface aesthetics, information quality, and familiarity all had a beneficial impact on citizen satisfaction, and that citizen contentment directly influences continued use. A website's layout and aesthetics have a beneficial impact on users' perceptions, according to studies by Abbasi et al. (2012) and Mttus et al. (2013) on interface aesthetics. According to Kahn et al. (2002), in order to satisfy users, web material should be comprehensive, pertinent, and simple to grasp.

High information quality may entice consumers to use a system, according to Wangpipatwong et al. (2009). In terms of familiarity, the findings of this study are in line with those of Alsaghier et al. (2009) and Ha & Perks (2005), who discovered that users are more inclined to investigate a website in depth and spend more time there, which can leave an impression on the user, based on their prior interactions and experiences with it. According to the findings, citizen happiness has a direct impact on ongoing change. Additionally, this study suggests that good interface design, accurate information, and user familiarity have a favourable impact on users' perceptions, which results in satisfaction. A user explores a website more the more satisfied they are with it. Thus, in

the ongoing use of e-government websites, the relationship between information quality, familiarity, and interface aesthetics was mediated by citizen pleasure.

The framework of Garrity et al. (2005) and Davis (1989) was developed by this study by including information privacy concerns as a mediator. It was shown that a person with higher information privacy concerns is more likely to be risk-taking, which can result in continued usage of the website when the relationship between citizen happiness and continued use of e-government sites was explored. In addition, we successfully tested the study model employing task-support satisfaction as the second-order component, citizen satisfaction as the second-order factor, and interface satisfaction as the first-order element.

V. IMPLICATIONS

From a theoretical standpoint, this study contributes to the body of literature by focusing on citizen satisfaction as the second-order component, with task-support satisfaction and interface satisfaction serving as the first-order factors. By looking into this, we have also expanded the body of knowledge on issues about information privacy in the context of developing nations. Few research especially on e-government in underdeveloped countries were done; the majority of them took place in rich nations. According to Heeks (2005), there are significant disparities in a variety of technology conditions, e-government tactics, and developed country experiences that may not be applicable to developing nations.

Additionally, if these websites assist citizens in achieving these goals, it might be extremely beneficial for the government to analyse their e-government websites. The government should also tighten its e-government website policies and regulations.

Declaration of Competing References

The authors affirm that none of their known financial or personal affiliations might have seemed to affect the research described in this paper.

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References

- Abbasi, M. Q., Weng, J., Wang, Y., Rafique, I., Wang, X., & Lew, P. (2012). Modelling and evaluating user interface aesthetics employing ISO 25010 quality standards. *2012 Eighth International Conference on Information and Communications Technology Quality*, 303–306.
- Akour, I., Alnazzawi, N., Alshurideh, M., Almaiah, M. A., Al Kurdi, B., Alfaisal, R. M., & Salloum, S. (2022). A Conceptual Model for Investigating the Effect of Privacy Concerns on E-Commerce Adoption: A Study on United Arab Emirates Consumers. *Electronics*, *11*(22), 3648.
- AlAwadhi, S., & Morris, A. (2009). Factors influencing the adoption of e-government services. *J. Softw.*, *4*(6), 584–590.

- Alsaghier, H., Ford, M., Nguyen, A., & Hexel, R. (2009). Conceptualising citizen's trust in e-government: Application of Q methodology. *Electronic Journal of E-Government*, 7(4), pp295- 310-pp295- 310.
- Anderson, J. C., & Gerbing, D. W. (1988). Structural Equation Modeling in Practice: A Review and Recommended Two-Step Approach. *Psychological Bulletin*, 103(3), 411.
- Campbell, A. J. (1997). Relationship marketing in consumer markets: A comparison of managerial and consumer attitudes about information privacy. *Journal of Direct Marketing*, 11(3), 44–57.
- Chiu, C.-M., Hsu, M.-H., Sun, S.-Y., Lin, T.-C., & Sun, P.-C. (2005). Usability, quality, value and e-learning continuance decisions. *Computers & Education*, 45(4), 399–416.
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, pp. 319–340.
- Fishbein, M., & Ajzen, I. (2011). *Predicting and changing behaviour: The reasoned action approach*. Taylor & Francis.
- Fornell, C., & Larcker, D. (1981). Structural equation models with unobservable variables and measurement error: Algebra and statistics. *Journal of Marketing Research*, 382–388.
- Garrity, E. J., Glassberg, B., Kim, Y. J., Sanders, G. L., & Shin, S. K. (2005). An experimental investigation of web-based information systems success in electronic commerce. *Decision Support Systems*, 39(3), 485–503.
- Garrity, E. J., & Sanders, G. L. (1998). Dimensions of information systems success. In *Information systems success measurement* (pp. 13–45).
- Gupta, B., Dasgupta, S., & Gupta, A. (2008). Adoption of ICT in a government organisation in a developing country: An empirical study. *The Journal of Strategic Information Systems*, 17(2), 140–154.
- Ha, H.-Y., & Perks, H. (2005). Effects of consumer perceptions of brand experience on the web: Brand familiarity, satisfaction and trust. *Journal of Consumer Behaviour: An International Research Review*, 4(6), 438–452.
- Hair Jr, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2021). *A primer on partial least squares structural equation modelling (PLS-SEM)*. Sage publications.
- Heeks, R. (2005). E-Government as a Carrier of Context. *Journal of Public Policy*, 25(1), 51–74.
- iso25000.com. (2022). *ISO/IEC 25010*. <https://iso25000.com/index.php/en/iso-25000-standards/iso-25010>
- Kahn, B. K., Strong, D. M., & Wang, R. Y. (2002). Information quality benchmarks: Product and service performance. *Communications of the ACM*, 45(4), 184–192.
- Kramer, W. J., Jenkins, B., & Katz, R. S. (2007). The role of the information and communications technology sector in expanding economic opportunity. *Cambridge, MA: Kennedy School of Government, Harvard University*, pp. 22, 1–45.
- Lessa, L., Negash, S., & Belachew, M. (2012). From Failure to Success: Using Design-Reality Gap Analysis as a Mid-implementation Assessment Tool for e-Government. *Proceedings of the 6th International Conference on Theory and Practice of Electronic Governance*, 535–540.

- Li, Y.-M., & Yeh, Y.-S. (2010). Increasing trust in mobile commerce through design aesthetics. *Computers in Human Behavior*, 26(4), 673–684.
- Limayem, M., Hirt, S. G., & Cheung, C. M. (2003). *Habit in the context of IS continuance: Theory extension and scale development*.
- Malhotra, N. K., Kim, S. S., & Agarwal, J. (2004). Internet users' information privacy concerns (IUIPC): The construct, the scale, and a causal model. *Information Systems Research*, 15(4), 336–355.
- Möttus, M., Lamas, D., Pajusalu, M., & Torres, R. (2013). The evaluation of interface aesthetics. *Proceedings of the International Conference on Multimedia, Interaction, Design and Innovation*, 1–10.
- OECD. (n.d.). *Implementing E-Government in OECD Countries: Experience and Challenges*. www.oecd.org/mena/governance
- Pajusalu, M. (2012). *The Evaluation of User Interface Aesthetics*. Tallinn University.
- Rosenthal, R., Cooper, H., & Hedges, L. (1994). Parametric measures of effect size. *The Handbook of Research Synthesis*, 621(2), 231–244.
- Shi, Y., Piao, C., & Pan, X. (2016). Differential-Privacy-Based Citizen Privacy Preservation in E-Government Applications. *2016 IEEE 13th International Conference on E-Business Engineering (ICEBE)*, 158–163.
- UNa. (2022). *UN E-Government Survey 2022: The Future of Digital Government*. <https://publicadministration.un.org/en/>
- UNb. (2020). *UN E-Government Survey 2020: Digital Government in the Decade of Action for Sustainable Development*. <https://publicadministration.un.org/en/>
- UNc. (2018). *UN E-Government Survey 2018: Gearing E-Government to support transformation towards sustainable and resilient societies*. <https://publicadministration.un.org/en/>
- UNd. (2016). *UN E-Government Survey 2016: E-Government for Sustainable Development*. <https://publicadministration.un.org/en/>
- Wallach, M., Kogan, N., & Bem, D. (1964). Diffusion of responsibility and level of risk-taking in groups. *Journal of Abnormal and Social Psychology*, 68, 263.
- Wangpipatwong, S., Chutimaskul, W., & Papasratorn, B. (2009). Quality enhancing the continued use of e-government web sites: Evidence from e-citizens of Thailand. *International Journal of Electronic Government Research (IJEGR)*, 5(1), 19–35.
- Zhou, T. (2013). An empirical examination of continuance intention of mobile payment services. *Decision Support Systems*, 54(2), 1085–1091.