

AN EMPIRICAL STUDY ON THE DETERMINANTS OF USER ACCEPTANCE OF e-GOVERNMENT IN PUBLIC SECTOR

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Keywords: e-Government, Public Sector, Technology Acceptance Model (TAM), Extended Technology Acceptance Model (TAM2), Diffusion of Innovation (DOI), Trust, Cambodia.

Abstract: The purpose of this paper is to examine the determinants of user acceptance of e-Government in public sector by using the technology acceptance model (TAM) as a based theoretical model. The model of e-Government acceptance in public sector integrates constructs from TAM, the extended TAM (TAM2), the diffusion of innovation (DOI), and trust literature. To empirically test the model, the data were collected from 112 public officers in 10 ministries in Cambodia. The finding shows that image and output quality are significant influential determinants toward perceived usefulness. Perceived usefulness, relative advantage, and trust are significant determinants toward the acceptance of e-Government usage in public sector.

1 INTRODUCTION

Since the advent of a worldwide revolution in information and communication technologies many governments in the world have become aware of the potential of using it, particularly internet as a tool in enhancing their services and increasing their efficiency in terms of accessing information and transaction services. These electronic services often referred to as e-Government (OECD, 2003). However, not all e-Government initiative is success. Although many governments have promoted these e-Government services for many years, its uses and achievement are few. According to Gartner (2007), more than 60 percent of all e-Government initiatives either fail or fall short of expected outcomes. Heeks (2008) has analyzed more than 40 e-Government-for-development projects in developing / transitional countries and estimates that 35 percent of these were total failures, while 50 percent partially failed, and only 15 percent were successes.

A key problem from this higher rate of e-Government failure particularly in most developing countries is a lack of awareness of the potential factors that help citizens to adopt e-Government services. However, before electronic transactions with citizens can be successful in providing information and services to citizens, government users at all levels must first enhance and update their own internal systems and procedures

which involves sharing data and conducting electronic exchanges between governmental actors (Jeffrey, 2003). These electronic services often defined as Government-to-Government (G2G) e-Government setting. This G2G e-Government is considered as a backbone of e-Government implementation and development (Jeffrey, 2003) because it will pave the way for e-Government usage in the country as a whole. Hence, the objective of this study is to examine the determinants of user acceptance of e-Government services in public sector by using Technology Acceptance Model (TAM) as a based theoretical model. The results would help government decision makers develop policies and strategies to increase the use of e-Government services in public sector.

The remainder of this paper is organized as follows. Section 2 provides literature review, followed by the research model of public officers' acceptance of e-Government services as well as hypotheses development presents in section 3. Section 4 describes the research method. Section 5 presents the results of the study. Section 6 discusses the results of the findings. Section 7 brings this paper to a conclusion including implications and suggestion for future research.

2 LITERATURE REVIEW

2.1 Technology Acceptance Model

As shown in Figure 1 (Davis et al., 1989), TAM proposed that two particular beliefs are the primary drivers for technology acceptance *perceived usefulness* (“the degree to which a person believes that using a particular system would enhance his or her job performance”) and *perceived ease of use* (“the degree to which a person believes that using a particular system would be free of physical and mental efforts). *Perceived usefulness* and *perceived ease of use* influences one’s *attitude towards system usage*, which influences one’s *behavioral intention to use* a system, which, in turn, determines *actual system usage* (Davis et al., 1989). However, the external variables which impact the *perceived usefulness* and *perceived ease of use* are not fully explored in TAM. Moreover, Davis et al. (1989) also found that *attitude* did not fully mediate *perceived usefulness* and *perceived ease of use*. Based on these complimentary findings, therefore, a more parsimonious TAM was suggested which removed the *attitude towards usage* construct from the model (Carter and Bélanger, 2005; Davis et al., 1989).

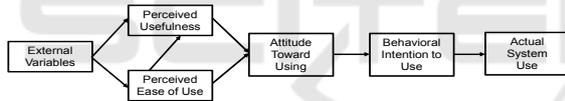


Figure 1: Technology Acceptance Model.

2.2 The Extended Technology Acceptance Model

Venkatesh and Davis (2000) proposed an extended TAM, TAM2, which consist of *social influence* and *cognitive instrumental processes* as the determinants of *perceived usefulness*, but it omitted *attitude to use* due to weak predictors of either *behavioural intention to use* or *actual system use*.

As shown in Figure 2 (Venkatesh and Davis, 2000), the social determinants are *subjective norm* (the influence of others on the user’s decision to use or not use the technology), *image* (the desire of the user to maintain a favourable standing among others), *voluntariness* (it reflects whether usage is mandated or voluntary). The cognitive determinants are: *job relevance* (the degree to which the technology was applicable), *output quality* (the extent to which the technology adequately performed the required tasks), and *result demonstrability* (the production of tangible results).

Experience and *voluntariness* were included as

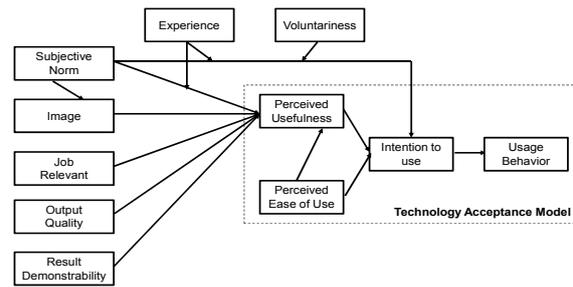


Figure 2: The Extended TAM.

moderating factors of *subjective norm*.

2.3 Diffusion of Innovation

The diffusion of innovation theory has been used extensively to explain the acceptance of IT innovations in an organization or society (Urbaczewski et al., 2002). The rate of diffusion of innovation is affected by five attributes (Rogers, 2003): *relative advantage* (the degree to which an innovation is seen as being superior to its predecessor), *compatibility* (the degree to which an innovation is seen to be compatible with existing values, beliefs, experiences and needs of adopter), *complexity* (the degree to which an innovation is seen by the potential adopter as being relative difficult to use and understand), *trialability* (the degree to which an idea can be experimented with on a limited basis), and *observability* (the degree to which the results on an innovation are visible).

2.4 Trust

Trust is defined as “a set of beliefs that other people would fulfil their expected commitments under conditions of vulnerability and interdependence” (Rousseau et al., 1998). Lack of trust on the online transactions has been identified as one of the major obstacles in the adoption of e-Government services (Carter and Bélanger, 2005) because performing transactions over the internet involve many uncertainties and risks (Bélanger and Carter, 2008).

3 RESEARCH MODEL AND HYPOTHESES

Based on the preceding theoretical background, TAM, TAM2, DOI, and trust literature are incorporated to propose a model of user acceptance of e-Government in public sector (see Figure 3).

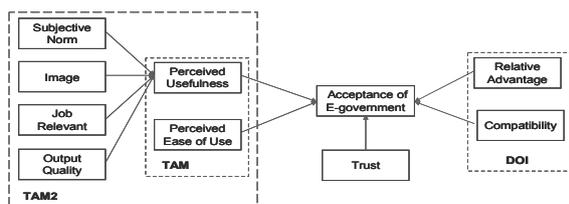


Figure 3: The Research Model.

3.1 e-Government and TAM

Over the years, many researchers have found that *perceived usefulness* and *perceived ease of use* explained a large portion of the variance for *intention to use* IT (Davis et al., 1989; Gefen et al., 2000). In the context of e-Government, public officers will perceive e-Government services as useful if it can help them to find the information that they want, to conduct or facilitate administrative procedure transaction. So, high level of usefulness is likely to increase user's intention to use. Moreover, they will perceive easy to use when they find e-Government system (e.g. website format, administrative process, and accessing speed) are clear and understandable and not require a lot of mental effort. Thus, high level of ease of use is likely to increase user's intention to use. It will also contribute to higher perceived usefulness of the system.

- **H1.** Perceived usefulness will be positively related to intention to use of e-Government.
- **H2.** Perceived ease of use will be positively related to intention to use of e-Government.

However, in public sector, usually public officer who have adopted the new innovation like e-Government service may impress others that they don't adopt. This may enhance their social status. As such, public officers having a higher need for social recognition are likely to perceive the usefulness of e-Government services.

- **H11.** Subjective norm will be positively related to perceived usefulness of e-Government.
- **H12.** Image will be positively related to perceived usefulness of e-Government.
- **H13.** Job relevant will be positively related to perceived usefulness of e-Government services.
- **H14.** Output quality will be positively related to perceived usefulness of e-Government.

3.2 e-Government and Trust

Trust is very important in e-Government services because when public officers browse government website, they expect the information presented to be

accurate, correct, and timely. Because governmental agencies may be required by law to share information with other agencies or with the public officers, the need for trust in the maintenance of accurate public officers' information will increase (Wang and Liao, 2008).

- **H3.** Trust will be positively related to intention to use of e-Government.

3.3 TAM and DOI

TAM was modified with adding the DOI theory as a factor affecting the *intention to use* technology and it is found that only *relative advantage*, *compatibility* and *complexity* are more important than others in predicting user intention to use a technology, particularly e-Government (Carter and Bélanger, 2005; Agarwal and Prasad, 1998; Urbaczewski et al., 2002). In addition to this, it is suggested that the *complexity* construct in the DOI is often considered to be *perceived ease of use* construct in TAM (Moore and Benbasat, 1991). Hence, it is arguable to include only *relative advantage* and *compatibility* constructs in the model.

- **H4.** Compatibility will be positively related to intention to use of e-Government.
- **H5.** Relative advantage will be positively related to intention to use of e-Government.

4 RESEARCH METHOD

4.1 Sample

This research was accomplished by conducting a questionnaire survey. We administered a survey to 112 public officers within 10 ministries in Cambodia. Of the 112 surveys administered, all were complete and use in the analyses. Table 1 presents the profile of the demography of the respondents to the survey questionnaire.

4.2 Instrument Development

The items used in this survey were adapted from previous studies (Davis, 1989; Carter and Bélanger, 2005; Gefen et al., 2000, Venkatesh and Davis, 2000) with minor changes to the context of e-Government in public sector. Each item is rated on a 7-point Likert-type scale ranging from 1 (strongly disagree) to 7 (strongly agree). The reliability of the items was examined using the Cronbach's alpha (Cronbach, 1970). The reliability for each construct is illustrated in Table 2. All of the items are above

the acceptance level of 0.7 (Hair et al., 2006).

was taken (Hair et al., 2006).

Table 1: Demographic profile of respondents.

Category	Frequency	Percentage
Gender	Male	91 81.2%
	Female	21 18.8%
Age	18 – 25	13 11.6%
	26 – 35	78 69.6%
	36 – 45	20 17.9%
	46 – 55	1 0.9%
Level of education	TAFE	4 3.5%
	Bachelor	67 59.8%
	Master	39 34.8%
	Doctor	2 1.8%
Position	Top level	5 4.5%
	Middle level	41 36.6%
	Low level	57 50.9%
	Others	9 8%
Place of using internet	Office	73 65.2%
	Home	4 3.6%
	Both	15 13.4%
	Internet cafe	20 17.9%
Experience of using internet	< 1 year	12 10.7%
	1 – 3 years	30 26.8%
	4 – 5 years	28 25%
	> 5 years	42 37.5%

Table 2: Reliability analysis.

Construct	No. Items	Cronbach's Alpha
Intention to Use (IUSE)	2	.926
Perceived Ease of Use (PEOU)	4	.957
Perceived Usefulness (PU)	4	.935
Subjective Norm (SN)	2	.764
Image (IMG)	3	.877
Job Relevant (JR)	2	.768
Output Quality (OQ)	2	.710
Relative Advantage (RA)	4	.929
Trust (TRUST)	2	.861
Compatibility (CP)	4	.867

5 RESULTS

Since the research model involves more than one independent variable, multiple regression analysis is used to test the hypotheses. Because linear regression cannot test all relationships in a single statistical test, it is necessary to use two separate regressions to test the model fully (See Table 4).

Factor analysis was used to evaluate construct validity. Principal Components Analysis (PCA) was used as the extraction method and Varimax was used as a rotation technique. As can be seen from Table 3, all of the items loaded properly on their expected factors. However, subjective norm (SN1 and SN2) and output quality (OQ2) were drop from further analysis (factor loading less than .70) since the threshold value of 0.7 for factor loading criterion

Table 3: Factor analysis.

Construct	Items	Component								
		1	2	3	4	5	6	7	8	9
Perceived Ease of Use (PEOU)	PEOU1	.926								
	PEOU2	.898								
	PEOU3	.927								
	PEOU4	.948								
Perceived Usefulness (PU)	PU1		.848							
	PU2		.840							
	PU3		.897							
	PU4		.743							
Relative Advantage (RA)	RA1			.835						
	RA2			.885						
	RA3			.873						
	RA4			.844						
Compatibility (CP)	CP1				.853					
	CP2				.791					
	CP3				.782					
	CP4				.757					
Image (IMG)	IMG1					.790				
	IMG2					.771				
	IMG3					.795				
Trust (TRUST)	TRUST1						.796			
	TRUST2						.846			
Intention to Use (IUSE)	IUSE1							.808		
	IUSE2							.829		
Job Relevant (JR)	JR1								.879	
	JR2								.847	
Output Quality (OQ)	OQ1									.773

Table 4: Regression variables and results.

First regression variables and results					
Dependent variable	Independent variable	# items	Mean	Std. Dev.	
PU		4	5.6183	.9562	
	IMG	3	4.8929	1.1575	
	JR	2	5.0000	.9275	
	OQ	1	4.9018	1.2463	
Model Summary					
R	R Square	Adjusted R square	Std. Error of the estimate		
.522	.272	.252	.8269		
Hypothesis Testing					
	Variable	Coeff.	t-value	Sig.	Supported
H11	SN	n/a	n/a	n/a	n/a
H12	IMG	.378	4.266	.000	Yes
H13	JR	.125	1.496	.138	No
H14	OQ	.191	2.162	.033	Yes
Second regression variables and results					
Dependent variable	Independent variable	# items	Mean	Std. Dev.	
IUSE		2	5.5759	.9959	
	PU	4	5.6183	.9562	
	PEOU	4	5.0737	1.1388	
	TRUST	2	4.8839	1.1230	
	CP	4	4.7790	1.0082	
	RA	4	5.6763	1.0508	
Model Summary					
R	R Square	Adjusted R square	Std. Error of the estimate		
.552	.305	.272	.88495		
Hypothesis Testing					
	Variable	Coeff.	t-value	Sig.	Supported
H1	PU	.347	3.650	.000	Yes
H2	PEOU	-.146	-1.670	.098	No
H3	TRUST	.257	3.125	.002	Yes
H4	CP	.094	1.017	.311	No
H5	RA	.212	2.275	.025	Yes

6 DISCUSSION

The Hypothesis 1 (H1) is supported. As shown in Table 4, the coefficient for perceived usefulness of e-Government acceptance is .347, which is statistically significant at the .000 level. This indicates that the perceived usefulness of e-Government services is a major determinant of user acceptance of e-Government services in public sector. It implies that an increase in perceived usefulness is positively influencing on the user acceptance of e-Government in public sector, i.e., public officers use e-Government services if they perceive it is efficiency and effectiveness to their job. Government’s web portals, for example, should be simple but more important tools that allow public officers to complete the information search they want or administrative procedure quickly and accurately. In addition to this, the web portals need to be updated on a regular basis in order to prevent from having inaccurate information, broken links, and incorrect email contact information. By

maintaining the portal sites and placing more materials online, government would be encouraging public officers, citizens and members of the business community to go online and use e-Government resources (West, 2008). Moreover, each government agency should concentrate on how the delivery of their services online could save citizens time and money. Each government agency could make its own public officers understanding the important of e-Government by providing further training to make the system attractive to them. Training programs should stress the potential of e-Government system rather than concentrate on only basic skills (e.g. typing skills) because some public officers do not need to type document by themselves.

The Hypothesis 12 (H12) and Hypothesis 14 (H14) are supported, i.e., the two main determinants of the perceived usefulness in the model – image and output quality – have a direct effect on perceived usefulness. It implies that as the public officers perceive of having e-Government as a status symbol of their organization, they consider the e-Government services to be important. Furthermore, they perceive e-Government to be useful when it is adequately performed the required tasks or the quality of the output they get from the system is high. Hence, each department or agency within a government organization that provides services through an electronic channel need to ensure that the information they display on website is useful, relevant, accurate, and up-to-date, in order to provide a high level of information quality.

The Hypothesis 3 (H3) is also supported. The result reveals that trust of e-Government services have a significant effect on the user acceptance of e-Government services in public sector. The result is consistent with the previous studies (Carter and Bélanger, 2005). Public officers’ acceptance of e-Government services will increase if public officers perceive the e-Government services to be trust and secured because they are concerned about the level of security present when providing sensitive information online and they are only willing to participate in the interactions if a certain level of trust present. Hence, a trust and enforce security mechanisms for e-Government services should be developed. Furthermore, a legal framework for e-Government services should be set up which include laws for acceptance of document in electronic format (such as downloaded documents), cyber laws that protect against unauthorized hacking, and laws to enable electronic authentication.

The Hypothesis 5 (H5) is also supported. It indicates that higher levels of perceived relative advantage are associated with increased public officers' acceptance of e-Government services. This result is consistent with the previous studies (Carter and Bélanger, 2005). This implies that the public officers will use the e-Government services if these services enhance their efficiency (e.g. in gathering information from government agency).

7 CONCLUSIONS

The determinants of the proposed model – perceived usefulness, relative advantage, and trust – are significant predictors of user acceptance of e-Government services in public sector. The model explains 30.5 percent of the variance. At the same time, the important determinants of perceived usefulness include image and output quality.

The contributions of this study have both theoretical and practical implications. From a theoretical point of view, the study proposed a comprehensive theoretical framework to identify determinants of user acceptance of e-Government services in public sector. Furthermore, it may serve as the basis study for e-Government acceptance in public sector because so far there have been few studies of e-Government acceptance in public sector.

From a practical point of view, the results of this study would help and benefit governmental policy makers and governmental agencies to design and implement policies and strategies to promote and increase the use of e-Government services by public officers, i.e., they should implement policies and strategies that emphasize the usefulness, the efficiency, and user trust of e-Government services.

The limitation of this study is that though the research model explained some of the variance in public officers' perceived usefulness, relative advantage, and trust, much of the variance remains unexplained. Hence, identifying the independent variables that account for the remaining variance is important suggestion for future research. Moreover, the sample is devoted to the public officers situated in Cambodia. The view of them may differ from those who are in the other countries. Thus, the result may be limited to the specific location.

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