An Empirical Study on E-government Adoption in Vietnam: Moderating Role of Uncertainty Avoidance*

Thi-Thanh-Thao Vo** and Phuoc-Cuu-Long Le**

[1]Vietnam - Korea University of Information and Communication Technology,
The University of Danang, Danang, Vietnam
{vttthao,lpclong}@vku.udn.vn

Abstract. With the aims to improve government productivity and meet the citizens' requirements, E-government has gained incredible popularity in many nations worldwide. Vietnam has established an E-government to enhance the quality of its public services for many years. Exploring factors affecting E-government adoption in Vietnam has drawn significant attention from many scholars; however, considering the effect of national culture in general, especially the uncertainty avoidance dimension, is still a shortage of studies. Therefore, based on the UTAUT model, this study explores the determinants of usage behavior and the moderating role of uncertainty avoidance dimension to usage behavior of citizens in E-government services in Vietnam. The results show that performance expectancy, effort expectancy, social influence have significant impacts on behavioral intention toward E-government usage behavior, and facilitating conditions play an essential role in forming E-government usage behavior. Moreover, uncertainty avoidance was found to be a moderator to the relationship between social influence and behavioral intention to use E-government.

Keywords: E-government, UTAUT, Uncertainty Avoidance.

1 Introduction

E-government is defined as "the use by government agencies of information technologies (such as wide area networks, Internet, and mobile computing) that can transform relations with citizens, businesses, and other arms of government. These technologies can serve various ends: better delivery of government services to citizens, improved interactions with business and industry, citizen empowerment through access to information, or more efficient government management. The resulting benefits can be less

 In: N. D. Vo, O.-J. Lee, K.-H. N. Bui, H. G. Lim, H.-J. Jeon, P.-M. Nguyen, B. Q. Tuyen, J.-T. Kim, J. J. Jung, T. A. Vo (eds.): Proceedings of the 2nd International Conference on Human-centered Artificial Intelligence (Computing4Human 2021), Da Nang, Viet Nam, 28-October-2021, published at http://ceur-ws.org

** Corresponding Authors.

corruption, increased transparency, greater convenience, revenue growth, and cost reductions" [1]. Especially under the domination of the Covid-19 pandemic, the importance of E-government has been shown off significantly by solving a bunch of issues for citizens, including disseminating information, performing contact tracing, conducting online transactions, etc. make citizens' life much more convenient. Vietnam has developed E-government system with many initiatives since 2009 [2]. With an overall score of 0.66 on the E-government Development Index (EGDI), Vietnam was ranked 86th out of 193 countries in 2020, moved up two places from 2018 [3]. In the Southeast Asia region, Vietnam's EGDI in 2020 was ranked 6th behind Singapore, Malaysia, Thailand, Brunei, and the Philippines. Vietnam E-government is aspired to be among the top four in the Southeast Asia region by 2025 [3]. Up to now, the E-government portal has provided 6,800 administrative procedures at four levels of public services and received more than 116 million visits and over 468,000 registered accounts [4]. Thus, attracting citizens using E-government services has become a priority task to sync the public administration and E-government services with the participation of entire citizens to enhance the productivity and efficiency of government services. Therefore, research investigating determinants of E-government usage behavior is necessary not only for a theoretical aspect but also for a practical one. Exploring factors affecting E-government adoption has drawn significant attention from many scholars; however, considering the effect of national culture in general, especially the uncertainty avoidance dimension, is still a shortage of studies. This study attempts to fill the gap by discovering which factors affect E-government usage behavior in Vietnam and the impact of uncertainty avoidance dimension to the E-government adoption. To do that, this study aims to address two main research questions (1) Which factors have influences on citizens' usage behaviors in E-government services in Vietnam?, and (2) How does the uncertainty avoidance dimension have an influence on citizens' usage behavior in E-government services in Vietnam? An examination into these two research questions would help to discover the most affecting factors as well as their effects on Vietnamese usage behavior in E-government, from that, suggesting solutions for the Vietnam government to attract citizens joining E-government services.

2 Literature Review

2.1 The Unified Theory of Acceptance and Use of Technology

The Unified Theory of Acceptance and Use of Technology (UTAUT), which Venkatesh and others developed, is one of the most recent developments in general technology acceptance models [2]. UTAUT was first synthesized and developed in 2003 aiming to explain user's intention to use an information system and subsequent usage behavior based on four fundamental constructs: performance expectancy, effort expectancy, social influence, and facilitating conditions. Performance expectancy, effort expectancy, and social influence are direct determinants of behavioral intention toward usage behavior; meanwhile, facilitating conditions is a direct determinant of usage behavior. Moreover, the impact of four primary constructs on behavioral intention and

usage behavior is moderated by gender, age, experience, and voluntariness of use [5]. And because of its synthetic, UTAUT was chosen as a base model in this research.

2.2 National Culture

Culture is defined as "the collective programming of the mind that distinguishes the members of one group or category of people from another" [6]. Citizens' shapes values, beliefs, perceptions, expectations, assumptions, and behaviors that distinguish people of one country from others are all parts of national culture [2]. The cultural dimensions theory which Geert Hofstede developed illustrates the impacts of a society's cultures on its members' values and the relations between these values and behavior by using a structure drawn from the factor analysis [7]. Hofstede's cultural dimensions theory has been used extensively in IT/IS research to discover the relationship between national culture and E-government adoption. According to Hofstede's theory, dimensions of national cultures include Power distance, Individualism vs. collectivism, Uncertainty avoidance, Masculinity vs. femininity, Long-term orientation vs. short-term orientation, Indulgence vs. restraint. This research used Uncertainty Avoidance dimensions from Hofstede's theory to examine its moderating role on determinants of E-government usage behavior in Vietnam.

3 Research model and Hypotheses

Based on the prior studies, the research model was proposed (see Fig. 1). In the E-government context, performance expectancy is measured by citizens' benefits perceptions when using E-government services, including convenience, time-saving, effort reduction, service quality improvement, etc. [8]. The positive influence of performance expectancy on behavioral intention in E-government has been confirmed in many studies [2; 8]. Effort expectancy in the E-government context is measured by citizens' awareness about the ease of use of E-government services [8]. Users will have behavioral intention to use the system, which requires less effort when using it. Social influence is defined as how people believe that their essential people think they should use the system [5]. It means that an individual's behavioral intention is affected by the important people or close to them. The positive impact of social influence on behavioral intention was found in several studies [2; 9]. Citizens would be more likely to use E-government services if they know that their family, colleagues, friends already used them. Facilitating conditions can be known as informing, training, encouraging citizens, and supporting them when they have difficulties using E-government services. The positive influence of facilitating conditions on E-government services usage behavior has been found out [2]. Behavioral intention refers to the subjective probability of an individual that he/she would form an actual behavior in the future [5]. It has been discovered that an individual's behavioral intention to use E-government directly affects their usage behavior [2; 8]. Uncertainty avoidance is defined as the extent to which citizens of a country/culture/organization are threatened by unknown or uncertain situations [6]. Citizens in low uncertainty avoidance cultures are willing to take risks and make their

own decisions [10]. Meanwhile, people in high uncertainty avoidance cultures are not comfortable in unknown or uncertain situations, and they do not want to approach new things due to their perceptions [11]. People in countries with low uncertainty avoidance are willing to approach new technological innovation than cultures with high uncertainty avoidance [7]. As E-government is applying ICTs into the government's operations, this research aims to explore the impact of uncertainty avoidance on E-government adoption in Vietnam. Therefore, this study proposes the following hypotheses:
H1: Performance expectancy (PE) has a positive impact on behavioral intention to use (BI) E-government services.
H2: Effort expectancy (EE) has a positive impact on behavioral intention to use (BI) E-government services.
H3: Social influence (SI) has a positive impact on behavioral intention to use (BI) E-government services.
H4: Facilitating condition (FC) has a positive impact on E-government services usage behavior (UB).
H5: Behavioral intention (BI) has a positive impact on E-government services usage behavior (UB).
H6: Uncertainty avoidance affects the impacts among factors in the research model.

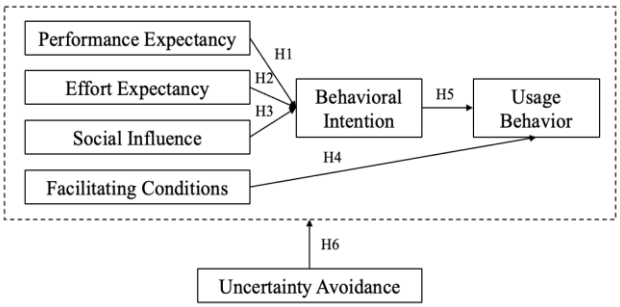

Fig. 1. Research model

4 Data Analysis

The survey by questionnaires methodology was used to collect data. Based on variables adapted from prior studies, a self-administered questionnaire was developed. This study's subjects are users who have been using E-government services in Vietnam. Out of 248 self-administered questionnaires distributed, 232 questionnaires were valid for data analysis. The data analysis was conducted by SPSS 22 and AMOS 20.

Reliability Analysis. All the Cronbach's alpha values are greater than 0.8, indicating the high reliability of the scale [12] (see Table 1).

Table 1. Reliability Analysis Result.

Item	PE	EE	SI	FC	BI	UB
Cronbach's Alpha	0.945	0.937	0.888	0.875	0.924	0.906

Model fit. Table 2 presents the model fit of the research, including the standard-fit indices (the suggested values) and the measurement model's fitness test outcomes. The results show that all the model-fit indices satisfy their respective acceptance criteria indicated in the previous literature [13].

Table 2. Model fit.

Item	Cmin/df	CFI	GFI	AGFI	RMSEA	RMR	TLI	PCLOSE
Recommended value	<3	>.8	>.8	>.8	<.08	<.09	>.8	>.05
Obtained	1.649	.965	.888	.854	.054	.089	.958	.266

Hypotheses Test. As shown in Table 3, all the hypotheses (H1, H2, H3, H4, and H5) are supported with p-values are less than 0.05 [13]. It means that performance expectancy, effort expectancy, and social influence all have significant impacts on behavioral intention; facilitating conditions and behavioral intention were found to have substantial effects on usage behavior.

Table 3. Hypotheses Test

Hypotheses			Estimate	S.E.	C.R.	P	Label
BI	←	PE	.172	.093	2.051	.040	Supported
BI	←	EE	.565	.087	6.891	***	Supported
BI	←	SI	.154	.073	2.376	.018	Supported
UB	←	FC	.431	.069	5.595	***	Supported
UB	←	BI	.227	.040	3.329	***	Supported

Note: *** level of significance $p < 0.001$

Moderator Test. To determine whether Uncertainty Avoidance can be the moderator of the impacts among factors in the research model, the authors conducted the MSEM test. The results show that Uncertainty Avoidance can affect the impacts among factors in the research model, hypothesis 6 is supported. To test the impact of the moderator, the authors divided the moderator into two groups (high and low) to examine the difference. As shown in Table 4, under the moderator of Uncertainty Avoidance, there is a difference in Social Influence on Behavioral intention between the two groups.

Table 4. MSEM testing for Uncertanty Avoidance

Hypotheses	UA_High	UA_Low	z-score	Label

			Estimate	Estimate		
BI	←	PE	0.151	0.243	0.497	Not Different
BI	←	EE	0.462	0.668	1.231	Not Different
BI	←	SI	0.409	0.032	-2.5**	Different
UB	←	FC	0.422	0.355	-0.488	Not Different
UB	←	BI	0.134	0.137	0.030	Not Different

5 Conclusion, Limitation, and Recommendation

This study presented a research framework of E-government usage behavior based on the UTAUT model to test the moderating role of the uncertainty avoidance dimension. Based on the outcomes, effort expectancy has the highest impact on behavioral intention with $\beta = 0.565$, $p < 0.001$, follow by performance expectancy and social influence with $\beta = 0.172$, $p = 0.04$ and $\beta = 0.154$, $p = 0.018$, respectively. The results are consistent with other studies [5; 8]. It can be said that the first factor that affects citizens forming their behavioral intention to use E-government services is the ease of use of these services, the second factor is the usefulness or benefits which are brought by using E-government services, and the last one is the influence of society. When citizens know that the E-government services require less effort to use, they can access these services anywhere, anytime if they have Internet and smart devices along, they will have the intention to use it. In addition, citizens have perceptions about E-government services and their benefits such as time-saving, cost-saving, convenience, transparency, up-to-date information, which can reinforce their intention to use. Finally, the influence of society, the opinions of others can affect citizens' behavioral intention to use E-government services. Therefore, to increase the participation of citizens in E-government services, the administrators should design the E-government system simply for citizens to be able to use it easily and ensure the adequacy and flagrant of information. Facilitating conditions was found to strongly impact usage behavior with $\beta = 0.431$, $p < 0.001$. Obviously, when citizens get supports, guidance from organizations and the government in using E-government services, they are willing to take a chance toward using it. Hence, organizing conferences and workshops about E-government services in institutions, companies, etc., to raise citizens' awareness is necessary. Moreover, actively propagating about E-government services and their benefits in living areas by distributing printed documents introducing E-government services and guiding how to use E-government services can be considered an efficient method for encouraging citizens' participation. E-government usage behaviors of citizens are affected by the uncertainty avoidance dimension. From the results, there is no difference in perceiving the usefulness, ease of use, and getting support in using E-government services between two groups: high and low uncertainty avoidance. Meanwhile, there is a difference between high and low uncertainty avoidance groups regarding social influence. People in the low uncertainty avoidance group with $\beta = 0.032$ have not been affected much by society than people in the high one ($\beta = 0.409$). People with high uncertainty avoidance tend to avoid changes, afraid of trying something new; hence, they need to be convinced and

affected much more by their associated people to use the E-government services. Meanwhile, people in the low uncertainty avoidance group are kind of willing to take risks to try innovation technology, so they do not need many opinions of others to use E-government services; they can decide it by themselves. The more associate people using E-government services, the more people in high uncertainty avoidance will follow. E-government in Vietnam is now in level 4, allowing citizens to fill and submit forms and pay fees online, even though it is still shortcoming and limited. Still, Vietnam E-government has become a bright spot in governmental operation, especially in 2020 [4]. Till 2020, there have been over 940,000 administrative documents were processed online using the E-government system; a total amount of 26.7 billion VND was made with 67,000 e-payment transactions. Especially each year, the E-government portal has saved more than VND 8.1 trillion, along with over VND 1.2 trillion each year in paper and delivery costs [4]. With the current advantages, the popularity of E-government to entire Vietnam citizens is not in the far future; therefore, administrators should have appropriate strategies and policies to encourage citizens to take part in E-government services. While the outcomes of this research contribute to a deeper understanding of the E-government usage behavior in Vietnam, this research still has some limitations that should be noted to leave open future research directions. First is the limit in the size of sample data. Hence, future research can expand the sample of data in different regions, in other countries, or other cultural backgrounds. Second, this research used the UTAUT model as the core model to investigate the E-government usage behavior, which led to the insufficiency of other factors affecting usage behaviors; hence future research should consider more determinants to broaden and complete the study.

References

1. World Bank.: E- Governments (2012). http://web.worldbank.org/
2. Vo, T. T. T., Lee, J. K., Lee, S., Gim, G., & Kim, J. B.: A Study on the Effect of the National Culture on the E-government Usage Behavior in Vietnam. International Information Institute (Tokyo). Information **19**(7A), 2613 (2016).
3. United Nations.: UN E-Government Survey 2020 Report (2020).
4. Khanh Phuong.: Five-year Implementation Of E-Government Development Reviewed (2021). http://news.chinhphu.vn/Home/Fiveyear-Implementation-Of-EGovernment-Development-Reviewed/20213/43183.vgp
5. Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D.: User acceptance of information technology: Toward a unified view. MIS Quarterly **27**(3), 425-478 (2003).
6. Hofstede, G., Hofstede, G. J., & Minkov, M.: Cultures and organizations: Software of the mind. New York: Mcgraw-hill (2005).
7. Hofstede, G.: Culture's consequences: Comparing values, behaviors, institutions and organizations across nations. Sage Publications (2001).
8. AlAwadhi, S., & Morris, A.: The Use of the UTAUT Model in the Adoption of E-government Services in Kuwait. Proceedings of the 41st annual Hawaii International Conference on System Sciences (HICSS 2008). pp. 219-219. Waikoloa, HI, USA (Jan 2008).
9. Lu, J., Yu, C. S., Liu, C., & Yao, J. E.: Technology acceptance model for wireless Internet. Internet research **13**(3), 206-222 (2003).
10. McCoy, S., Galletta, D. F., & King, W. R.: Applying TAM across cultures: the need for caution. European Journal of Information Systems **16**(1), 81-90 (2007).

11. Arslan, A.: Cross-cultural analysis of European e-government adoption. World Applied Sciences Journal **7**(9) (2009).
12. Straub, D. W.: Validating instruments in MIS research. MIS Quarterly **13**(2), 147-169 (1989).
13. Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L.: Multivariate data analysis. Upper Saddle River, NJ: Prentice hall (1998).