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The Factors Affecting User Behavior on Mobile Voting in Vietnam

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Abstract

The significant development of Information Technology has delivered to peoples' lives so many conveniences, benefits, and advantages. Convenience is one of the important points considered as the requirement to affect users' behavior on the adoption of new technology. For enhancing convenience, the mobile voting system was applied as the main point to improve fairness, freedom, and democracy in the Vietnamese voting process. The aim of this study is to clarify the satisfaction, feasibility, and user behavior intention in using the Vietnam Mobile Voting service. This study investigated 3 main group factors as "Social", "Individual" and "Technics" to evaluate the Mobile voting service. The research is assessed based on the data from 228 participants using the questionnaire. The data is used to test the research model and proposed hypothesis. The results of this research can be used to increase the quality of the service and evaluate user intention and satisfaction on Mobile Voting in Vietnam.

Keywords*: Mobile voting, Social, Individual, Technics, UTAUT Model, Vietnam*

1. Introduction

The traditional voting system based on paper voting has been substituted by some new modern voting technologies in many countries [1-2]. Day by day, these voting systems are improved and developed by applying many advanced equipment and technologies, such as the Internet voting system, which is called as I-voting.

From the Internet voting survey of [3], the I-voting system can be classified under three types: Remote, Poll site, and Kiosk. First, Remote I-voting optimizes accessibility of polls and convenience by acceptance for any electorate to vote from any computer that has an Internet connection. Secondly, Poll site I-voting related to Internet voting at public-sites where election officials handle the voting physical environment and platform. Finally, Kiosk is one kind of voting in which all voting machines are replaced in many public locations and facilities such as supermarkets, libraries, shopping malls or community centers *etc.* In fact, Voting is not restricted to a limited area in which the election is

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happening. This means people (such as military personnel) who have difficulties in voting in the past can also do it. Usually, I-voting may be called electronic or Internet voting.

In contrast, there is a basic variable: electronic voting is more encompassing and creative than Internet voting when it can be introduced in any electronic voting means (consist of punch card, kiosk, optical scans, telephone or Internet. Nowadays, Mobility has shown an absolutely incredible ICT trend, that affects all of us in our daily lives [4]. Because of technological revolutions in the ICT industry, all of complex and sophisticated services (like mobile information systems, mobile payments, mobile television and mobile government) can be provided by the mobile system's deployment. Furthermore, I-voting based on mobility (M-voting) will be the next step of I-voting systems. From all of those reasons, M-voting systems have been paid increasing attention both in theory and practice [5].

2. Literature Review

2.1. UTAUT Model

The Unified Theory of Acceptance and Use of Technology (UTAUT) is one of the models in the information systems literature area that can explain and predict user intention on using new technology. This model was synthesized and introduced by Venkatesh [6] from eight different information system models: Motivation Model (MM) [7]; Technology Acceptance Model (TAM) [8]; Theory of Planned Behavior (TPB) [9]; Combined TAM and TPB (C-TAM-TPB) [9]; Innovation Diffusion Theory (IDT) [10]; Model of PC Utilization (MPCU) [11]; Theory of Reasoned Action (TRA) [12]; Social Cognitive Theory (SCT) [13]. The UTAUT is used to completely explain and predict users' behavior and intention, which many older separate models have failed to prove alone [6]. In fact, the UTAUT is based on the previous research theory to carry out the independent variables.

2.2 Transforming from Traditional Voting to Mobile Voting

Through participation of a given population, an election enables certain decisions to be made [14]. There are research which showed the voting system started from oral voting, the rasing of the hand, to the Kudavolai system – which is used in ancient India. In addition, people voted by black or white balls/stones in the bucket for ancient Greece. For many years, the use of ballots at polling centers or postal mails for elections has been considered as the only traditional voting method [15, 16]. However, in the last decades with the high-speed development of ICT, many countries have utilized the ICT in the voting process and especially with the emergence of the Electronic voting (E-voting) [15]. Electronic voting differs from traditional voting methods in a way that E-voting is not limited by geography. E-voting systems enable voters to cast a ballot from any location where they have access to a computer with an Internet connection. E-voting is considered as the fastest, the most efficient and inexpensive way to count voters and administer elections [17].

In the present, there are various E-voting systems such as voting through the Internet, mark sense (optical scan ballots), punch cards, and kiosks [16]. Most of the E-voting systems have the same features such as guaranteeing voter authenticity while guaranteeing vote-counting proof and vote anonymity. However, it is necessary to assure the uniqueness of the vote and allow for vote automation. This necessary to be done at the same time with guaranteeing avoidance of hardware or software problems that could affect the voting process [18]. Moreover, people who use the e-voting system are from diverse groups with diverse training, experience, opportunity, and motivation that might have influence on the results [17]. Accordingly, in order to ensure the success of any E-

voting systems, there should be a control over the combination between technology and human labor.

In a modern life, mobility has become the ICT trend to develop the technology and get convenience for the users [19]. Mobile voting (M-voting) is similar to an electronic voting system that removes the limitations of traditional requirements and the e-voting systems, for example, the physical presence of the citizens in the polling location [20]. With M-voting, the voters can vote via mobile devices anytime and anywhere they want. They seem to need less effort than traditional voting method. As the result, it enhances voters' participation in elections.

3. Hypothesis

3.1. UTAUT Model's Variable

Performance expectancy refers to the degree of using the system to help the user attain gains in job/life performance [6]. For the new technology, performance expectancy can be the most important point in predicting the behavioral intention to use and indicate the significance of users. Furthermore, effort expectancy is defined as "the degree of ease associated with the use of the system" [6]. Effort expectancy is a strong key to predict behavioral intention in using technologies in early stages. If participants believe that mobile voting can be easy to learn or perform, they will be more interested in using the system. Social influence is defined as "the degree to which an individual perceives that significant others believe he or she should use the new system". Besides, social influence has been regarded a main key in innovation diffusion theory [21]. Support from influential people has always been an important role, which can affect the behavior of others because individuals adapt their beliefs and attitudes to their social context. Facilitating condition is one of the main factors of UTAUT model, which is considered to have influence on technology adoption. Facilitating condition refers to the degree that individuals consider in existing technical conditions and helping for facilitating from the organization can support for users intention to use the system [6]. Satisfaction is defined as the extent of service pleasurable fulfillment based on the individual feeling [22]. On the other hand, satisfaction is measured based on the relationship between what the users received and what they expected to receive. In this study, satisfaction explains how using Mobile Voting can satisfy users.

Self-efficacy is an individual's evaluation of their capabilities to do an action that requires some performance outcomes [23]. The concern of self-efficacy is the degree of judgment for extent to which the participant skill can be performed rather than what skills one possesses [23]. Besides, self-efficacy is not concerned about the performance outcomes in the past, but rather with the performance outcome that could be done in the future [13].

For uncertain situations, when users have to act, trust plays a role as a solution for the issues of risk [24]. In general, Trust is considered as an important factor in many social interactions involving uncertainty and dependency [25] especially for concerning decisions and new technology [26].

Compatibility is one of the factors in the diffusion of innovation theory, which is defined as "the degree to which an innovation is perceived as being consistent with the existing values, past experiences and need of potential adopters [27]. An idea that is incompatible with the values and norms of a social system will not be adopted as rapidly as an innovation that is compatible". The theory of compatibility captures the voters' perception, which can be suitable to their lifestyle.

Therefore, the study designed the following hypotheses:

H1: Performance expectancy has a positive effect on Mobile voting satisfaction.

H2: Effort expectancy has a positive effect on Mobile voting satisfaction.

H3: Social influence has a positive effect on Mobile voting satisfaction.

H4: Facilitating condition has a positive effect on Intention to use Mobile voting.
H5: Mobile voting satisfaction has a positive effect on Intention to use Mobile voting.
H6: Self Efficacy has a positive effect on Mobile voting satisfaction.
H7: Trust has a positive effect on Mobile voting satisfaction.
H8: compatibility has a positive effect on Mobile voting satisfaction.

4. Data Analysis/Hypotheses Test

In order to assess the research model, a questionnaire was designed to collect data. The scales used in the questionnaire were largely built upon the scope and structure of previous studies. Constructs were measured based on seven-point Likert-scales ranging from strongly disagree (1) to strongly agree (7). A total of 228 responses were returned from 240 participants giving a response rate of 95%. The respondents consisted of 166 males and 62 females.

In Table 1, the 6 common model-fit measures were used to estimate the measurement model fit: (1) chi-square/degree of freedom (v2/df), (2) comparative fit index (CFI), (3) the goodness- of-fit index (GFI), (4) the Adjusted goodness- of-fit index (GFI), (5) root mean square error of approximation (RMSEA), and (6) Tucker Lewis Index (TLI). Therefore, we can conclude that the measurement model has a good fit with the data collected.

Table 1. Model Fit Indices

Model fit indices	Cmin/df	CFI	GFI	AGFI	RMSEA	TLI
Recommended value	<3	>.8	>.7	>.7	<.08	>.8
Obtained	1.843	.932	.812	.770	.063	.921

All the factor loadings are above the threshold of 0.5. As described in Table 2, Cronbach's alpha values range from 0.886 to 0.944, with 9 research concepts: PE (Performance Expectance), EF (Effort Expectance), SE (Self-Efficacy), TR (Trust), Co (Compatibility), SI (Social influence), FC(Facilitating condition), SA (Satisfaction), and UB (User Behavior) are satisfied internal consistency reliability after refining scales.

Table 2. Cronbach's Alpha and Model Fit Indices

	TR	SI	SE	FC	CO	PE	UB	EF	SA
Cronbach's Alpha	.886	.944	.929	.936	.913	.902	.925	.913	.915
CR	.890	.927	.913	.914	.887	.860	.922	.891	.869
AVE	.620	.759	.725	.726	.725	.674	.748	.732	.689

Table 3 shows the correlation matrix, with correlations among constructs and the square root of AVE on the diagonal. Following the same procedure used for Mobile voting CFA analysis, items producing large standardized residuals were excluded from the final measurement model. Reliability of each factor was confirmed with the final set of measurements (Table 4). An examination of discriminant validity verified that each construct is independent from each other.

Table 3. Discriminant Validity

	TR	SI	SE	FC	CO	PE	UB	EF	SA
TR	.787								
SI	.576	.871							
SE	.585	.757	.852						
FC	.492	.720	.608	.852					
CO	.001	.020	.013	.003	.851				
PE	.436	.579	.647	.602	.000	.821			
UB	.528	.639	.709	.561	-.009	.764	.865		
EF	.538	.597	.633	.440	-.023	.649	.754	.855	
SA	.594	.672	.693	.654	.085	.602	.661	.601	.830

Table 4. Structural Paths Assessment and Hypothesis Test

			Estimate	S.E.	C.R.	P	Label
SA	<---	SI	.203	.082	2.323	.020	**Supported**
SA	<---	SE	.227	.094	2.348	.019	**Supported**
SA	<---	CO	.071	.045	1.431	.152	Rejected
SA	<---	PE	.230	.080	2.831	.005	**Supported**
SA	<---	EF	.158	.067	1.966	.049	**Supported**
SA	<---	TR	.184	.068	2.644	.008	**Supported**
UB	<---	FC	.169	.070	2.344	.019	**Supported**
UB	<---	SA	.641	.076	7.982	***	**Supported**

Almost all the factors supported with the P-value are less than 0.05. Compatibility does not affect Satisfaction in M-Voting with P-value over 0.1.

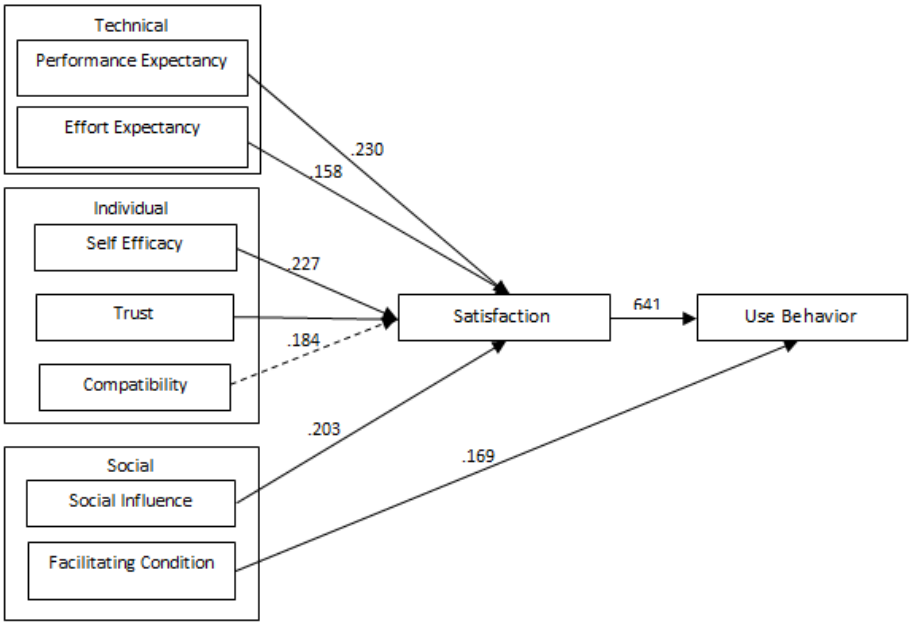

Figure 2. Final Research Model

5. Conclusion

This research was based on the UTAUT theory and model with main factors including Performance expectance, Effort expectance, Social influence, and Facilitating condition. Moreover, "Individual" factor group was mentioned in this study with 3 factors: Self-efficacy, Trust, and Compatibility, in order to investigate the impact of Individual to User satisfaction.

Basing on the results, “User Satisfaction” in Mobile Voting has the biggest impact on User satisfaction (0.641). It is also indicates that “User Satisfaction” has an important role in adopting and implementing a new system, especially in developing countries with low IT development. For the impact of “Self-Efficacy” to “User Satisfaction” (0.227), in the aspect of users when adopting a new system, they need to have motivation to use and get the benefit from the useful system. For the relationship between Social Influence and User satisfaction (0.203), it shows that people in Vietnam are still affected by the people who are influential to their minds. The advice can influence how users choose and use new technology. For the impact of Facilitating condition to User satisfaction (0.169), in the aspect of users when adopting a new system, they need to be instructed clearly and specifically, and must ready to support them for solving problems, which is totally suitable with Vietnam context.

With people in developing countries, there is the limiting condition for the user to use the new technology. Therefore, if users can easily use and receive the benefit from new technology, they can try to or intend to use it. For the Technical group, Performance Expectance explains the use of and Effort Expectance expresses the perceived ease of use of the Mobile voting system. Both of them have an important role in applying Mobile voting in Vietnam, they also affect “user satisfaction” in Mobile voting in Vietnam. Moreover, basing on the results, Trust has the weakest impact to User satisfaction (0.184). Trust affects adopting and implementing a new system, especially in developing countries with low IT development as Vietnam.

Compatibility does not affect User Satisfaction. This means Mobile Voting is still difficult for Vietnamese people. In developing countries, people do not have enough conditions (technical condition, demand condition...), which are suitable for their national technologies, and it also becomes a barrier for making Mobile voting more popular in elections in Vietnam.

Research Limitation:

This research focused only on Vietnamese people, and there is no chance to expand this research to other countries or other foreign people.

There is a limitation on the number of participants in this research. For the next research, more samples are needed to have clearer data and more exact results.

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