EXPLORING A NEW E-GOVERNMENT ADOPTION MODEL – A SOCIAL COGNITIVE PERSPECTIVE

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ABSTRACT

Government spending on e-government projects is reportedly over 1 percent of GDP a year (Dunleavy et al., 2008), which forms, undoubtedly, a critical part of government operations. However, the overall uptake of e-government by citizens is still low (United Nations, 2014). To better understand citizens' adoption of e-government, this study takes a comprehensive and integrated approach. Drawing on the well-established social cognitive theory and grounded on its triadic reciprocal causation model, the study develops a new model for e-government adoption research. To test the model empirically, we conducted a questionnaire survey in the United Arab Emirates. The overall findings demonstrate that e-government adoption is significantly influenced by the interrelationships and interactions among personal, behavioral, and environmental factors. In other words, the triadic relationships among the three sets of factors are likely to determine citizens' adoption of e-government. Theoretical and practical implications of the findings are discussed in the paper.

1. INTRODUCTION

Although it has been around for over a decade, research on e-government adoption is still nascent in nature (Reece 2006; Yildiz 2007). Coursey and Norris (2008) have noticed after conducting a thorough literature review that e-government research has long suffered from a paucity of theoretical development and empirical testing with a few exceptions such as the research built on the Diffusion of Innovation (DOI) theories (Rogers, 1995; Mahajan and Peterson, 1985; Legris, et al., 2003), the various technology acceptance models (Davis 1989; Venkatesh et al., 2003) and socio-technical theories (e.g. Fountain, 2001). This study addresses the theoretical deficit. Drawing on social cognitive theory, the study aims to develop an e-government adoption model to better understand citizens' adoption of e-government in a comprehensive and integrated way. In this regard, the study contributes to theoretical advancement of e-government research.

This study also has its practical value. Government spending on e-government projects is reportedly over 1 percent of GDP a year (Dunleavy et al., 2008). Some studies suggest that e-government is likely to provide citizens with fast, convenient and quality services (Gil-Garci-A and Pardo, 2005; Gouscos et al., 2007). However, according to the most recent United Nations e-government survey of its over 190 member states, the overall uptake of e-government by citizens is still low (United Nations, 2014). Therefore, how to improve citizens' adoption and realize the potential benefits of e-government becomes paramount. This study seeks to answer the question by enhancing our understanding of citizens' adoption behavior.

2. LITERATURE REVIEW

2.1 Prominent Theoretical Models for e-Government Adoption

E-government adoption research is built largely on information technology (IT) acceptance research. Among the user acceptance models, Davis' (1989) Technology Adoption Model (TAM) is apparently one of the most widely used. The TAM provides the much-needed theoretical framework to support the shift in the study of technology diffusion from focusing on the supply to the demand side. It has been used to explain e-government use by identifying citizens' adoption behaviour. For example, Carter and Bélanger (2005) are among the first few pioneering e-government research works which apply TAM to the study of citizens' behavioral intention towards e-government services. There are two main constructs of TAM that influences adoption of e-government, namely, (1) perceived usefulness and (2) perceived ease of use which have been tested by many authors in different geographical settings (Chang et al. 2005; Hung et al., 2006; Phang et al., 2005; Almori et al., 2012).

Given the complexity and multiple factorial nature of technology adoption, Venkatesh et al. (2003) developed another well-used model called the Unified Theory of Acceptance and Use of Technology (UTAUT). According to Venkatesh et al. (2003), the UTAUT model is able to explain about 70 percent of the variance in user behavioral intention, compared with 17 to 53 percent if using any of the eight individual models. However, when it is adopted for e-government research, critics argue that the UTAUT cannot capture and specify the complete essence of e-government adoption behavior of citizens, because functional characteristics of organizational, technological, economical, and social perspectives of e-government differ (Shareef, et al., 2011). Moreover, the UTAUT model is relatively new and has limited value because not many empirical studies have been conducted to test the model (Straub, 2009), in particular, in the context of e-government adoption.

Both TAM and UTAUT models share some commonalities although they address and theorize different determinants of intention and/or usage. First, they all follow the same line of inquiry: starting from the study of individual reactions to using information technology, then examining factors that may affect intentions to use information technology, and assuming that intention to use will lead to actual use of information technology. Second, they focus mostly on three characteristics – individual characteristics, innovation (i.e. technology) characteristics, and contextual characteristics. The individual and contextual characteristics are rooted in some of the key components of social cognitive theory (Bandura, 1997, 2001). Third, they tend to study the technology adoption in a unified or one way relationship between technology adoption and factors influencing it. Although the UTAUT examines the moderating effects of personal factors on the relationship between contextual characteristics and behavioral intentions, it does not study the effect of interaction between contextual characteristics and behavioral intentions. Also, although the TAM and UTAUT posit that the relationship between contextual characteristics and behavioral intension is dependent on personal factors, they do not explore the interaction between contextual characteristics and personal factors. To address the theoretical limitation and study e-government adoption in a comprehensive and integrated way, we decide to draw on social cognitive theory.

2.2 Social Cognitive Theory

Social cognitive theory (SCT) is one of the most influential theories in the literature of psychology, education and recently, the adoption of information technology. Unlike other theories that depict human behavior from a unidirectional causation, SCT is best manifested by a triadic reciprocal causation model. 'In this model of triadic reciprocal causation, behavior, cognition and other personal factors, and environmental influences all operate as interacting determinants that influence each other bidirectionally' (Bandura, 1989, p. 2). At the core of the SCT is the perceived self-efficacy – 'the belief in one's capability to organize and execute the courses of action required to manage prospective situation' (Bandura, 1997, p. 2). Self-efficacy comes from the gradual acquisition of complex cognitive, social, linguistic and/or physical skills through experience (Bandura, 1986). Compeau and Higgins (1995) are among the first who applied SCT to the study of computer use, specifically, computer self-efficacy (CSE) referring to the judgment of one's ability to use a computer to accomplish a particular job or task.

The construct of CSE has been used in many of e-government adoption studies and is often conceptualized and tested as one of the key determinants of e-government adoption (e.g. Carter and Bélanger, 2005). For example, the empirical study of Alsaif (2014) finds that behavioral intention of adoption of e-government services depends on citizens' CSE and the availability of resources. However, this line of inquiry into e-government adoption is hardly based on the conceptual model of triadic reciprocal causation (Bandura, 1986). To the best of our knowledge after reviewing the current e-government literature, the generic triadic reciprocal causation model of SCT has hardly been tested and applied to the context of e-government adoption, although it is one of the most influential theories in technology adoption. This study seeks to address this void by empirically testing if the triadic reciprocal causation model can be used to predict e-government adoption with the objective of improving the current understanding of e-government adoption factors.

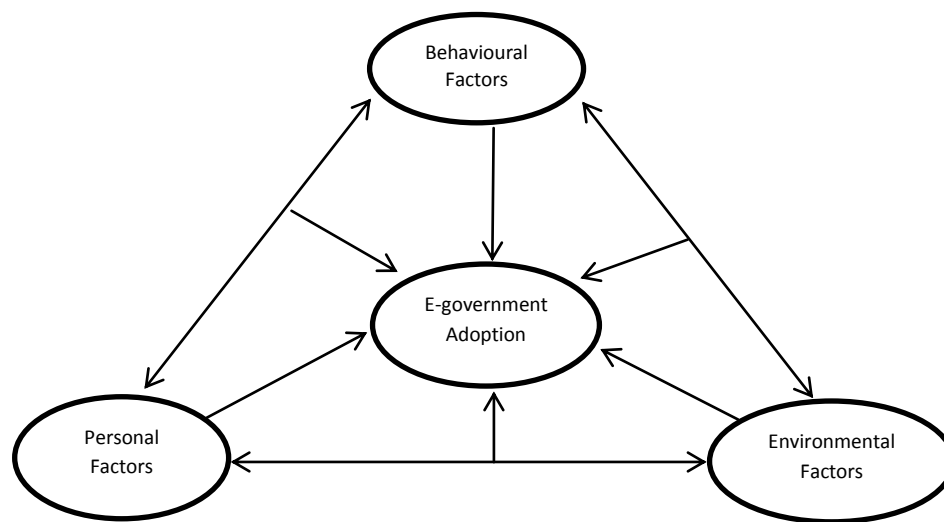## 3.   CONCEPTUALIZING AN E-GOVERNMENT ADOPTION MODEL

Figure 1. A Triadic Causation Model to Study E-Government Adoption

The conceptual model of triadic reciprocal causation posits that personal factors, behavioral factors (i.e. behavioral patterns), and environmental factors influence and interact one another (Bandura, 1986). To conceptualize it in the context of e-government adoption, we first develop three main hypotheses to illustrate how the three factors interact and influence one another in e-government adoption and then, we define and operationalize the variables that are related to the three factors. Figure 1 presents our research model and the hypothetical relationships between the variables. The three main hypotheses are:

H1: *Personal factors and behavioral factors interact and influence e-government adoption.*
H2: *Personal factors and environmental factors interact and influence e-government adoption.*
H3: *Behavioral factors and environmental factors interact and influence e-government adoption.*

3.1 Operationalization of Variables

3.1.1 Personal Factors

We consider that personal factors can be in the form of Internet self-efficacy which is essential to using e-government services. Other personal factors could be gender, age, education, occupation and income that may affect e-government adoption. Internet self-efficacy (ISE) refers to self-perception and self-competency of users in interacting with the Internet (Torkzadeh et al., 2006), whereas computer self-efficacy (CSE) is defined as an individual judgment of one's capability to use a computer (Compeau and Higgins, 1995, Marakas et al., 1998 and 2007). Although CSE has been used to refer to ISE in many research articles, they are not the same construct (Torkzadeh et al., 2006). The construct of ISE occurs far more recently than CSE.

Internet or Web technologies have been growing rapidly over the past decade. For example, Web 2.0-based technologies, such as social networking sites (SNSs) have become ubiquitous in many countries. E-government empowered by the Internet and other Web technologies is significantly different from the back-office automation in government agencies which started a few decades ago. As information technology evolves, e-government in many countries becomes 'Government 2.0' involving web 2.0 technologies. Wigand et al. (2010) define Web 2.0 as a paradigm shift in which users create contents. McLoughlin and Lee (2007) describe Web 2.0 as a personalized and communicative form of the Internet, which enables active participation, connectivity, and collaboration. In this regard, the advent of Web 2.0 provides a better opportunity for e-government participation (i.e. e-participation) than the first generation of Web technologies. As our study focuses on e-government adoption, we, therefore, investigate the effect of ISE on e-government adoption rather than CSE.

As far as self-efficacy measurement is concerned, it should be task specific and relate to the domain of interest (Bandura, 1986). The domain of interest in our study is e-government adoption. Based on the triadic reciprocal causation model, self-efficacy as a personal factor is assumed to interact with behavior factors and environment factors (Bandura, 1986).

3.1.2 Behavioral Patterns (Factors)

In terms of behavioral factors, we look at Internet usage patterns because we argue that usage patterns may influence e-government adoption. To survey the Internet usage patterns, we looked into Internet users' preference in terms of the information they are looking for, the online media and tools, as well as the level of comfortability of paying online and providing personal information online. Drawing on the social cognitive theory, usage pattern is closely associated with self-efficacy.

3.1.3 Environmental Factors

In the context of e-government, we consider that e-government environmental factors are those that are closely related to, and conducive to e-government adoption. Therefore, we investigated these e-government environmental factors - public awareness on e-government services, the accessibility, quality and security of government websites and their design, and the availability of government 2.0. Based on the first three hypotheses (H1-H3) and the operationalization of the personal, behavioral, and environmental variables as shown above, we hypothesize:

H4a: *Internet self-efficacy (ISE) interacts with the behavioral pattern of using the Internet and influences e-government adoption.*

H4b: *Internet self-efficacy (ISE) interacts with e-government environment and influences e-government adoption.*

In addition to ISE, other personal factors including gender, age, education and income may also have an effect on e-government adoption through interaction with behavioral and environmental factors. Some empirical studies suggest that computer self-efficacy is generally higher for male users than for female ones (e.g. Huffman et al., 2013). Other research indicates that gender, age and education affect significantly e-government adoption. For example, the study of Al-Shafi and Weerakkody (2010) found that the adoption rate of e-government is higher among male than female and the majority of e-government adopters are between age 25 and 44 and have university education background. Thus, we hypothesize that:

H4c: *Gender, age, education and income interact with the behavioral pattern of using the Internet and influence e-government adoption.*

H4d: *Gender, age, education and income interact with e-government environment and influence e-government adoption.*

4. METHODOLOGY

To test our research model and the hypotheses, we conducted a questionnaire survey in the United Arab Emirates (UAE). The UAE is one of the most developed economies in the Middle East region and is classified as a high income developing economy by the IMF (2010). The UAE started its e-government initiatives in 2001 when Dubai eGovernment portal was launched. Benchmarking against the performance of over 190 member states in the world surveyed by the United Nations (UN) between 2003 and 2012 in terms

of e-government development, the UAE has been ranked mostly among the top 50 countries and was ranked 28th in the latest survey. The ranking results suggest that e-government in the UAE is well-developed and matured.

4.1 Questionnaire Survey

We administered a quantitative survey to examine whether and how personal, behavioral and environmental factors interact and influence citizens' adoption of e-government services. The survey was conducted between September and December 2013 in the UAE. The survey instrument was developed on the basis of our research model in Figure 1. The survey questionnaire contains three parts. Part 1 collects demographic information about participants. Part 2 attempts to examine the Internet use patterns (i.e. Internet behavioral patterns) of participants. Part 3 seeks to look into e-government use of participants as well as e-government environment through gauging participants' views on what government can do to foster an environment which encourages e-government use. Except for Part 1, all the question items were rated on a five-point Likert scale.

To increase the response rate and achieve a higher representation of citizens in the UAE, two forms of questionnaire survey were administered: an online (website) survey and a paper-based survey. A pilot survey was conducted before the formal launch of the survey to improve the clarity and effectiveness of the questionnaire. A group of colleagues (4) and students (5) at a university in the UAE participated in the pilot survey and provided constructive feedback on it. Some of the question items of the original questionnaire were re-worded, revised and refined based upon the feedback.

4.2 Sample

Our targeted populations are Internet users who may have a need to use e-government services for personal and/or business reasons. For that purpose, we approached a total of around 1000 alumni graduated from a university in the UAE by email requesting for their participation in the online survey. The 1000 alumni were living and working in various emirates of the UAE when the survey was conducted and had a strong presence in both private and government sectors. A total of 167 of them responded to the online survey, which resulted in a nearly 17 percent response rate. Meanwhile, a paper-based survey was administered by a cohort of 30 postgraduate and undergraduate students at the same university. Prior to the paper-based survey, several information sessions were held to brief them about the purpose and the nature of the survey and elicit their support in identifying prospective participants and distributing surveys to the prospective participants. A total of 500 paper-based questionnaires were distributed by the students to their parents, relatives and friends in the UAE. As a result, 194 completed questionnaires were returned, resulting in a response rate of 39 percent. By combining the number of participants in the two forms of survey, we received a total of 361 responses. The demographic data indicates that most of the participants received tertiary and above education. This represents the educational background of the majority of Internet users in the UAE. The majority of the participants are between 20 and 30 years old, which is consistent with the young age structure of the UAE (World Bank 2011). The gender ratio between male and female in the participants is 1(female) vs 1.15 (male), which is representative of the gender ratio in the UAE (World Bank 2011). In terms of the occupation of the participants, 42 percent of them are professionals, 31 percent are full-time students and 11 percent are blue-collar workers. As far as income is concerned, we classify the monthly income of participants into three levels – high-income (i.e. above US$10,000), middle-income (i.e. between US$4,000 and below US$10,000), and lower-income (i.e. below US$4,000). This classification is consistent with the results of UAE salary survey (Salary Explorer, 2014). Of the participants, the majority of them (72 per cent) are from middle and lower income groups. This is not surprising given the young age of the majority of participants.

4.3 Statistical Procedures

In this study, we used two step procedures to test our hypotheses (H1- H4). In step one, given the large number of variables and measures, we used Principal Component Analysis to identify the more important factors related to environment, behavior and e-government adoption. For that purpose, 'Eigenvalue one

criterion' and 'scree plot test' were used to determine what factors to retain. These retained factors were used for further analysis in step two. In step two, to make our analysis straightforward, we calculated mean for e-government adoption patterns and this mean value was used as regressed variable in our regression model. We used ordinary least square with autoregressive errors to test our hypotheses (H1-H4).

4.4 Data Analysis and Results

The results of our Principal Component Analysis using a Varimax rotation procedure show that two factors that explain 67.163% variance in behavioural factors are citizen's online information seeking behavior and citizens trust in online payment system. Two factors that explain 64.049% variance in environmental factors are government's role in e-government development and level of e-government service security. Two factors that explain 56.232% of variance in e-government adoption patterns are using e-government for seeking government information and using e-government for making payment. All the factors that are retained have eigenvalues more than one. Regression results indicate that the interaction between personal factors and environmental factors (t=2.544795; β= 0.000557; p= 0.0116) has greater influence on e-government adoption compared to the interactions between personal factors and behavioral factors (PF-BF) (t=0.149873; β= 0.00000327; p=0.0181), and behavioral factors and environmental factors (BF-EF) (t=1.485194; β= 0.111007; p=0.0389). Based on these results, our H1 to H3 are accepted. The regression results show that Internet self-efficacy (ISE) interacts with the behavioral pattern of using the Internet and influences e-government adoption (t=-5.226020; β= 0.00000327; p= 0.0181). Internet self-efficacy (ISE) interacts with e-government environment and influences e-government adoption (t=-2.472255; β= -0.095903; p= 0.0142). Gender, age, education and income interact with the behavioral pattern of using the Internet and influence e-government adoption (t=-2.423318; β= -0.003633; p= 0.0162). Gender, age, education and income interact with e-government environment and influence e-government adoption (t=2.441513; β= 0.004730; p= 0.0154). Thus, H4a to H4d are accepted.

5. DISCUSSION AND IMPLICATIONS

To better understand citizens' adoption of e-government in a holistic and integrated way, this study takes a fresh approach. Drawing on the well-established social cognitive theory and its triadic reciprocal causation model, the study has developed and tested a new model for e-government adoption research (see Figure 1). The overall findings demonstrate that e-government adoption is significantly influenced by the interrelationships and interactions among personal, behavioral, and environmental factors. In other words, the triadic relationships among the three are likely to determine citizens' adoption of e-government. It is also interesting to find that the level of influence of the interaction between personal and environmental factors is greater than that of interactions between personal and behavioral, and behavioral and environmental factors. For example, Internet self-efficacy as a personal factor is found to have a greater effect on e-government adoption when e-government environment is conducive, than the effect generated when Internet self-efficacy interacts with behavioral factors (e.g. Internet use pattern), and also when behavioral factors interact with environmental factors.

5.1 Implications for Theory

Our e-government adoption model which draws on the triadic reciprocal causation concept provides a theoretical alternative to the existing various technology adoption models in explaining and understanding e-government adoption. The results of this study carry three main theoretical implications. First, unlike the popular approach of TAM and the like that treats the relationships between technology adoption and the variables influencing it as mostly linear, our study takes a new approach, focusing on investigating the effects of *triadic interactions* of the factors that are important to e-government adoption. The triadic interactions among personal, behavior and environmental factors are found to influence profoundly e-government adoption in our empirical testing. This opens up a novel lens through which to view and study the intricate interplays among the three aspects of factors and e-government adoption. For example, future research could

examine how people's Internet efficacy (personal factor) interacts with the way he/she uses the Internet (behavioral pattern) and with e-government environment (environmental factor), which may lead to e-government adoption.

5.2 Implications for Practices

In addition to the theoretical contribution made by this study, the results of the study have implications for e-government strategy. The findings suggest that personal, behavioral and environmental factors are interrelated and influence one another. Therefore, e-government strategy needs to address the issue of e-government environment (e.g. government website security and contents) in line with citizen's Internet use behavior (e.g. being comfortable with making online payment) and also with personal factors (e.g. citizen's Internet efficacy). Simply improving e-government environment alone is not sufficient to improve e-government adoption.

5.3 Limitations and Future Research

As with any piece of research, this study has limitations. First, the study does not intend to be comprehensive in examining empirically all the factors that may influence e-government adoption in terms of the scope of the study. Rather, it focuses on investigating the effects of *triadic interactions* among personal, behavioral and environmental factors. This may result in the limitation to the factors it studies. For example, socioeconomic factors such as the digital divide has been found as an important factor that limits access to e-government services and affects e-government adoption (Zhao et al, 2014a). Second, the causality between personal factors, behavioral factors and environmental factors can only be inferred from the social cognitive theory but not empirically tested because testing causality requires time series data. The data that we collected is cross-sectional but not longitudinal due to our resource constraints. Third, the empirical study was conducted in the UAE only. Studies show that a nation's culture influences the adoption of technologies as well as e-government adoption (e.g. Im et al., 2011, Zhao et al., 2014b). Therefore, caution should be taken when making any generalizations from this study. Finally, the participants in our survey were mainly young and well-educated people who are generally more likely to adopt new technologies and new initiatives like e-government than the population average. This may bias the results of our study.

Therefore, to further validate our e-government adoption model, we suggest that cross-country studies with larger and more representative samples are conducted which operationalize and examine comprehensively the key factors that may interact and influence e-government adoption. A longitudinal study is also recommended to establish the causal relationships among the personal, behavioral and environmental factors. Our research, however, demonstrates and paves the way for, how to study e-government adoption from a social cognitive perspective.

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