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Abdullah Alghamdi

Monash University, Abdullah.alghamdi@monash.edu

Md Mahbubur Rahim

Monash University, md.mahbubur.rahim@monash.edu

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Understanding Individuals' Intention to Use E-Government Services: Development of an Integrated Model

Abdullah Alghamdi and Md Mahbubur Rahim
Faculty of Information Technology, Monash University, Australia
Email: Abdullah.alghamdi@monash.edu, md.mahbubur.Rahim@monash.edu

Abstract

In recent years, governments worldwide have acknowledged the importance of delivering services to their citizens using multiple channels. Thus, in addition to letting citizens access government services via traditional channels, governments are making substantial investments in e-government initiatives. However, the success of these initiatives is largely influenced by the usage intention of individuals to access e-government services. In this research-in-progress paper, a model is proposed to better understand individuals' intention to use various types of e-government services. The model includes a set of factors which were identified through a rigorous three-step filtering and tailoring process which represents four theoretical perspectives: technology acceptance and adoption, trustworthiness, channel preference, and national culture. The implications of this model to theory and practice are outlined.

Keywords: E-government, Intention to Use, Individuals, Model Development

INTRODUCTION

Electronic government (also known as e-government) refers to the interaction between government agencies and citizens that offers them information and services as well as enabling them to participate in government policy-making (Jaeger, 2003). Over the past few years, e-government has received considerable attention around the globe. In response, most governments worldwide have begun investing in expensive e-government initiatives. Some of these initiatives are intended to deliver services directly to citizens. Nowadays, services delivered through e-government initiative go beyond disseminating information to residents, citizens and businesses to conduct transactions. Different stakeholders including government agencies, businesses and citizens can gain benefits from the use of e-government services. However, citizens who are quite vocal in interacting with government represent the most critical stakeholder for the successful implementation of e-government initiatives. We therefore argue that the success of citizen oriented e-government services is driven by individuals' intention to use these services. This research thus focuses on citizen oriented initiatives which are also known as Government-to-Citizens (G2C) e-government services. There exists a rich body of literature that discusses how individuals use e-government services and what motivates them to use such services (AlAwadhi & Morris, 2008; Carter, 2008; Carter & Bélanger, 2005; Ozkan & Kanat, 2011). The focus of the existing e-government literature is on such issues as acceptance, adoption, usage, and satisfaction. These studies make a significant contribution to knowledge and practice by determining the factors affecting individuals' adoption decisions of e-government services. However, inadequate attention has so far been given by scholars to the effect of cultural traits on usage intention. In addition, little research has recognised that government organisations adopt multiple channels to offer services, and that channel and communication media preference could influence the use of e-government services by individuals (Van Dijk et al., 2008). An understanding of individuals' channel preference is important to evaluate the effectiveness of online channels to deliver services to individuals (Pitereson and Ebbers, 2008). To address these concerns, in this research-in-progress paper, we report on the development of a research model integrating key constructs chosen from four theoretical sources: technology adoption, trustworthiness, national culture, and communication media literature. We are currently engaged in an online expert panel review to further refine this model. We believe that the model can provide a rich understanding of individuals' usage intentions because it integrates constructs from multiple theoretical perspectives. The paper is organised as follows: the next section discusses the relevant literature. Then, a theoretical model and a set of hypotheses derived from that model are presented. Following that, the research method to evaluate the model is briefly discussed. Finally, the current status of our research work-in-progress and future directions of our research are presented.

BACKGROUND LITERATURE

As this research is concerned with developing an integrated model, a total of four literature streams were considered relevant to identify a rich set of factors affecting individuals' intention to use e-government services. These are technology acceptance and adoption, trustworthiness, channel preference and national culture. Technology acceptance and adoption theories dominate e-government usage literature. In addition, trust and risk related frameworks are generally considered important for investigating individuals' intention to use e-

government services (Bélanger & Carter, 2008). The sole focus on these two streams to build e-government services usage theoretical frameworks however results in the neglect of other important relevant factors. Channel preference and choice is one important issue that needs to be considered because most of the government organisations facilitate different communication channels with citizens including face to face, telephone and websites (Pieterse, 2009). Another concern that needs to be taken into consideration is culture. According to Nwabueze et al. (2009), the difference in a particular technology adoption rate in different countries indicate that national cultural traits influence technology diffusion among individuals as well as communities. A literature analysis of each of the major four streams is presented below to further our understanding.

Technology Acceptance and Adoption: From a review of e-government literature, we observe that individuals' attitude formulation and their intention to use e-government services have traditionally been investigated using a number of theoretical frameworks. We categorize them into three broad groups depending on the discussion areas from which they have originated. A high level summary of these frameworks and their application to e-government usage and adoption context is provided in Table 1 and a number of observations are made: a) diffusion theory (Roger, 2003) and the theory of planned behaviour (TPB) (Fishbein & Ajzen, 1975) can be applied to explain adoption and behavioural intention for a broader class of innovation, b) theories developed in IS (i.e. TAM, UTAUT, and IS success model) are derived on the ideas borrowed from diffusion theory and TPB, and were regularly applied to help explain adoption of various types of IT-based systems, c) not all the factors included in the theoretical frameworks have received empirical support, and d) some support has been consistently found for such factors as attitude, subjective norms, usefulness, and information quality.

Table 1: Theoretical perspectives on usage intention

Area	Theory	Brief description	Examples of the application of theory in e-government literature
Sociology	Diffusion Theory (Roger, 2003)	Relative advantages, compatibility, complexity, and image influence adoption decision of a new innovation	Lean et al. (2009), Carter & Belanger (2005)
Social psychology	The Theory of Planned Behaviour (TPB) (Fishbein & Ajzen, 1975)	Attitude towards behaviour, subjective norms, perceived behaviour control affect intention behaviour	Hung et al. (2006), Ozkan & Kanat(2011).
Information System	Technology Acceptance Model (TAM) (Davis, 1985)	Perceived usefulness and perceived ease of use affect attitude towards use	Lin et al. (2011), Hsiao et al. (2012)
	Unified Theory of Acceptance and Use of Technology (Venkatesh et al., 2003)	Performance expectancy, effort expectancy, and social influence affect usage intention, while facilitating condition affects actual use	AlAwadhi & Morris (2008), Loo et al. (2009), Israel & Tiwari (2011).
	IS Success Model (Delone & McLean, 1992)	Information quality and system quality affect use and satisfaction with new systems	Shareef et al. (2011)

Cultural Influence on Adoption and Usage Intention: The association between culture and IS research is widely reported in the literature. Cultural values are found to be significant in IT practices including IT acceptance and usage, IT management, and IT success. Leidner and Kayworth (2006) affirm that the success and effective use

of information systems can be influenced by national, organisational, and group culture. According to Gong et al. (2007), the adoption and diffusion of a new technology varies across nations with different cultural backgrounds. A number of studies related to IT acceptance and usage integrate national cultural dimension with other theories. For example, regarding e-commerce innovation, Pavlou and Chai (2002) integrate cultural factors with TPB to investigate consumers' intention to conduct online transactions. For e-government context, limited research is available that explains how cultural traits affect individuals decision making process. However, one exception is the work of Al-Hujran et al. (2011) which combines uncertainty avoidance and power distance with technology acceptance models to explore Jordanians acceptance of e-government services.

Culture has been defined and conceptualized by scholars in several ways. According to Straub, Loch, Evaristo, Karahanna, and Srite (2002), culture can be conceptualized in two different approaches. The first approach conceptualizes culture based on shared values which represent the most common perception of culture. Scholars following this approach emphasize shared values that shape individuals' beliefs and behaviours and distinguish one culture from another. The second approach interprets culture based on problem solving. Hofstede (1984) proposes a cultural framework (that represents an example of the first approach) which is quite popular in IS. This framework identifies four dimensions that explain the differences between nations in terms of thinking and social actions: power distance, uncertainty avoidance, individualism, and masculinity. Hofstede (1991) defines power distance as the unequal distribution of power between members in their nations. Individualism refers to culture that prioritize individual's desires and goals over society's goals. Uncertainty avoidance simply refers to the degree of uncertainty and ambiguity perceived by individuals from their communities. Masculinity refers to the clear distinction between genders in terms of social roles.

Communication Channel Choice and preference: The concept of channel choice preference has recently been incorporated in e-government literature. Pitereson and Ebbers (2008) state that there are various e-government studies that investigate citizens' use of different communication channels. One study by Tomas and Streib (2003) concerns citizens-initiated contacts with public administrators. In their study, the authors argue that there are two differences between traditional and web contacts. First, contacting public administrations online is easier and quicker, particularly in the case of contacts initiated by citizens who are more likely to fall into requesting services, making comments or complaining regarding issues and policies which require quick response. Second, face-to-face or phone contacts support two-way communication especially when there is a need for explanation and interaction. Although Web communication also supports two-way communication, it is usually slower than traditional communication channels. . Another study by Reddick (2005) examines citizens channel choice in the case of citizen-initiated contact. Comparing the use of the web and phones, the study finds out that channel choice varies based on the task. When citizens need to complain or have problems, they prefer communicating by phones. Citizens choose the Web when they seek information or conduct transactions. Reddick and Turner (2012) agree with the previous studies that the nature of interaction between government and citizens plays an important role in determining communication channels. Apart from the work of Dijk et al. (2008), the relationship between channel preference and intention to use e-government services has not been examined. Moreover, the effect of media richness and social presence on communication channel preference between government organisations and individuals is not adequately discussed. Media richness theory (Daft and Lengel, 1986), and social presence theory (Short et al. (1976) have originated from communication literature. For media richness, four characteristics are identified that contribute to information richness: immediate feedback, multiple cues, personalization, and language variety. Based on these characteristics, face-to-face communication is the richest, followed by voice calls, personal documents, impersonal documents, and finally numeric documents. In social presence, communication media are ranked based on their degree of social presence in terms of sociability, warmth, personalness and sensitivity. Face-to-Face is the highest in terms of social presence followed by audio and video mediums, audio mediums, and finally print media.

Trustworthiness and Risk Perception: Trustworthiness and risk is a topic that has received considerable attention from IT scholars. In the e-commerce context, trust-related factors are considered to influence consumer behaviour in conducting transaction online. For example, Buttner and Goritz (2008) develop a model that investigates the effect of trustworthiness and risk perception on consumers' intention to shop online. As with e-government context, the role of trust in using e-government services is considered to be important. For example, according to Carter and Belanger (2005), institution-based trust and trusting belief both affect individuals' usage and behaviour intention. Institution-based trust is defined as the psychological perspective of trust entailed in ones' perception of surrounding environment, while trusting belief refers to one's perception that trustee has the ability and integrity to provide services (McKnight et al., 2002). A number of e-government studies (e.g. Carter and Belanger, 2005; Belnager and Carter, 2008) report frameworks on institution based-trust and trusting belief theories. Table 2 summarizes those studies that relate to e-government service acceptance and usage with trustworthiness and risk perception.

Table 2: Trustworthiness related factors in e-government literature

Literature Source	Trustworthiness related factors
Carter and Bélanger (2005)	Trust of the internet, trust of government.
Carter (2005)	Trust of the internet, trust of the government.
Bélanger and Carter (2008)	Trust of the internet, trust of the government, and perceived risk.
Schaupp et al. (2010)	Trust of the e-filing system, trust of the internet, perceived risk
Ozkan and Kanat (2011)	Trust of the internet, trust in government
Horst et al. (2007)	Trust of e-government, trust of governmental organisation, risk perception.
Hsiao et al. (2012)	Trust of e-government service
Lee and Lei (2007), Lean et al. (2009)	Trust

RESEARCH MODEL DEVELOPMENT AND HYPOTHESIS CONSTRUCTION

The model proposed in this paper includes 15 factors chosen through a three-step filtering and tailoring process. Drawing on a review of the literature discussed in the previous section, a total of 42 factors were initially identified which can potentially influence individuals' intention to use e-government services. Out of the 42 factors, 20 factors were identified from the application of the relevant theories reported in e-government literature (Table 1). Another nine factors were chosen from risk and trustworthiness related issues discussed in relation to e-government usage and acceptance (Table 2). The remaining factors (e.g. anxiety and perceived service response) were chosen from other literature sources (e.g. service quality). The initial set of 42 factors was identified as a result of reviewing 18 articles that discuss different models to investigate individuals' intention to use e-government services. These models vary widely. Some of them apply only either TPB (e.g. Ozkan & Kanat, 2011), or TAM (e.g. Lin et al., 2011), and still others use these two models and integrate them with such frameworks as trustworthiness (Schaupp et al., 2010). In addition to the most significant factors identified from the reviewed models, the filtering and tailoring process aimed at proposing a model that includes factors from other important theoretical frameworks which (to the best of our knowledge) have not been investigated.

As the list of 42 factors is quite comprehensive, it is therefore essential to apply shortlisting criteria to identify the most important factors that would influence individuals' usage intention. We now briefly describe the filtering and tailoring process.

The Filtering and tailoring Process: A three-step filtering and tailoring process was applied to shortlist the most important factors from a pool of 42 factors identified from the literature analysis (this list is not included due to paper size limitation) The first step in the filtering and tailoring process was to identify those factors that have overlapping in their meanings and were thus removed. A total of 15 factors (i.e. usefulness, ease of use, social influence, perceived behaviour control, attitude, trust in the Internet, trust in government, risk perception, perceived awareness, optimism bias, anxiety, channel choice preference, perceived information quality, perceived service response, multilingual option) were retained through this step. The second step in the filtering and tailoring process was to retain those factors that were identified via step 1 which received consistent empirical support. A total of 3 factors (i.e. anxiety, perceived service response, and multilingual option) received little empirical support and were thus removed. As a result, a total of 12 factors were retained. The third step involved the addition of three factors (i.e. cultural traits, media richness, and social presence) that were considered to be relevant based on our discussion in the previous section.

These 15 factors are now included in the model (shown in Figure 1) which are arranged in second-order format. The left hand side of the model includes 3 sets of factors (representing the first order). Five factors (i.e. social influence, perceived behaviour control, attitude, risk perception, channel choice preference) are placed in the middle of the model and represent the second order. The right hand side represents the dependent variables. The association between the dependent variables and the second order variables is mediated by cultural traits. Those 15 factors included in the model have strong theoretical foundations. We will now justify the derivation of hypotheses based on relevant theories and the finding reported in e-government empirical literature.

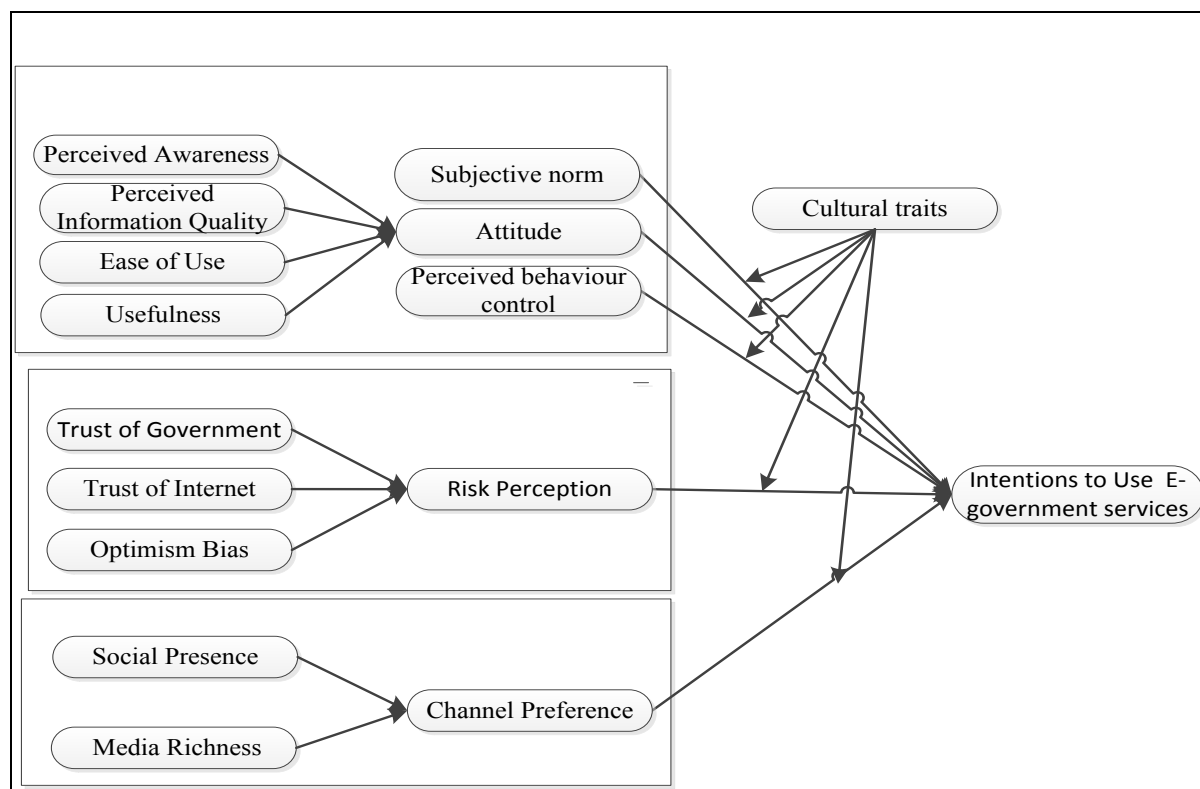


Figure 1: Research Model

Hypotheses Development: Fishbein and Ajzen (1975) developed the theory of planned behaviour (TPB) and identified three factors that affect behaviour intention: attitude towards an action, subjective norm, and perceived behaviour control. Attitude towards an action is affected by an individual's silent beliefs while normative beliefs affect subjective norms. Attitude is defined as the positive or negative feelings towards a certain action. A person's attitude is affected by his /her belief that is in turn influenced by the information he/she receive about the action. Individual's subjective norm represents the beliefs that other people think his/her should perform a certain action. Perceived behaviour control is an antecedent which considers the issues of control. The notion of TPB has been applied in some e-government research. For example, Ozkan and Kanat (2011) use the Theory of planned Behaviour to examine individuals' intention to use e-government services. They found that attitude, subjective norms and perceived behaviour control influence individuals' intention to use e-government services. Building on these arguments, the following hypotheses are developed:

H1: Attitude towards using e-government services has a positive influence on individuals' intention to use municipal e-government web sites for all types of services.

H2: Subjective norm regarding e-government services has a positive influence on individuals' intention to use municipal e-government web sites for all types of services.

H3: Perceived behaviour control over e-government services has a positive influence on individuals' intention to use municipal e-government web sites for all types of services.

According to TAM (Davis (1985), perceived usefulness and perceived ease of use affect an individual's attitude towards using a new technology which in turn influences individuals' intention to use that technology. Perceived usefulness is defined as the perception that a new system satisfies individuals' work needs, while perceived ease of use refers to individuals' perception that a new system does not require physical and mental effort. TAM has been applied in some e-government research. For example, Lin et al. (2011) apply TAM to individuals' intention to use e-government services, and their findings show that perceived ease of use and perceived usefulness affect attitude. The following hypotheses are thus developed based on these findings:

H4: Perceived usefulness of e-government website has a positive effect on user attitudes regarding the intention to use municipal e-government web sites for all types of services.

H5: Perceived ease of use of e-government website has a positive effect on user attitudes regarding the intention to use municipal e-government web sites for all types of services.

Information quality involves the integrity, accuracy and relevance of information and whether information is up to date (Shareef, Kumar, Kumar, & Dwivedi, 2011). It has been argued in the literature that the importance of information quality in affecting individuals' intention to use e-government services can be derived from the development of the IS success model by DeLone and McLean (1992). According to Shareef et al. (2011), this model concerns use and satisfaction behaviours that lead to regular adoption. Lin and Lu (2000) identified quality concerns factors affecting the use of a website and argue that information quality might influence individuals' behaviour attitude towards using a website. Driven by these arguments, the following hypothesis is developed:

H6: Perceived information quality has a positive effect on user attitudes regarding the intention to use municipal e-government web sites for all types of services.

Awareness describes the effort public administrations make to inform citizens of the introduction of a new technology (Shareef et al., 2011). Individuals' perceived awareness reflects their ability to be aware of the availability of public online services offered by government agencies for the public. Van Dijk, Peters, and Ebbens (2008) argue that individuals might not use available e-government services if government agencies do not make an effort to make citizens and residents aware of online services availability. According to Shareef et al. (2011), research in e-government has pointed out that awareness of e-government services influence individuals' attitude to use these services. The following hypothesis is developed based on these arguments:

H7: Perceived awareness a positive effect on user attitudes regarding the intention to use municipal e-government web sites for all types of services.

Bélanger and Carter (2008) develop a risk and trust framework to examine citizens' intention to use e-government services. In doing so, they adopted the definition of risk introduced by Warkentin et al. (2002) which is "the citizen's subjective expectation of suffering a loss in pursuit of a desired outcome". In e-service literature, Bélanger and Carter (2008) report that risk perception is influenced by trust of internet and trust of government. Shaupp et al. (2010) use this framework to investigate taxpayers' intention to use e-filing systems. They conclude that trust of the internet and trust of government influence risk perception which in turns influences taxpayers' intention use e-filing system. Driven by these arguments, the following hypotheses are developed:

H8: Perceived risk has a negative influence on individuals' intention to use municipal e-government web sites for all types of services.

H9: Higher trust of the Internet will reduce the perceived risk of using e-government services for all types of services.

H10: Higher trust of the government will reduce the perceived risk of using e-government services for all types of services.

Optimism bias was introduced in the field of psychology as "Unrealistic optimism" by Weinstein (1980). It is described in terms of negative and positive events in which people have a common belief that they are more likely/less likely to experience positive events/negative events than other people. Weinstein (1980) finds that cognitive and motivational determinants including degree of desirability/undesirability of an event, perceived probability of an event, previous experience with an event, perceived controllability of an event, and stereotype silence affect level of optimum bias. The study uses various positive and negative events in different fields such as health and personal events. The literature presents the relationship between optimism bias and risk. According to Costa-Font et al. (2009), higher individuals' optimism can lead to higher risk perception in different risk issues including climate changes, and genetically modified food. In e-government literature, optimism bias however is conceptualized as a factor affecting intention to use e-government services. Driven by the argument that optimism bias is related to risk perception, the following hypothesis is developed:

H11: High optimism bias of individuals will reduce perceived risk of using e-government services for all types of services.

Dijk et al. (2008) develop a model to measure e-government usage intention behaviour that includes factors related to media and channel use. Their study suggests that digital media preference influences individuals' intention to use e-government services. According to Pieterse and Ebbens (2012), recent studies conducted in

different countries from Europe, North America, and Australia reveal that traditional channels such as telephone and face-to-face are the most popular ones used by citizens to communicate with government organisations. The choice and preference of communication channels is influenced by media characteristics. As indicated in the literature review, media richness and social presence influence the use of communication channel which in turns affects individuals' intention to use e-government services. Thus, the following hypotheses are developed:

H12: Individuals' preference for offline channels has a negative influence on individuals' intention to use municipal e-government web sites for all types of services.

H13: The perceived importance of media richness in communicating with government organisations has a positive influence on individuals' preference of offline channels.

H14: The perceived importance of social presence in communicating with government organisations has a positive influence on individuals' preference of offline channels.

According to Ford et al. (2009), national cultural traits are most appropriate as moderating factors. In their study, Nwabueze et al. (2009) focus on the effect of national culture on the intention to use telemedicine technology. They use the Unified Theory of Acceptance and Usage Technology (UTAUT) integrated with cultural traits (Uncertainty avoidance, power distance, individualism-collectivism, and masculinity-femininity) in which these traits are used as moderating factors. Another study by Yoon (2009) investigates consumers' intention to shop online. The relationship between factors identified from TAM and trust literature, and the intention to use online shopping is examined, using cultural traits as moderator factors. Thus, the following hypotheses are proposed:

H15: Cultural traits (Uncertainty avoidance, power distance, individualism-collectivism, and masculinity-femininity) moderate the relationship between attitude and individuals' intention to use municipal websites.

H16: Cultural traits (Uncertainty avoidance, power distance, individualism-collectivism, and masculinity-femininity) moderate the relationship between subjective norms and individuals' intention to use municipal websites.

H17: Cultural traits (Uncertainty avoidance, power distance, individualism-collectivism, and masculinity-femininity) moderate the relationship between perceived behaviour control and individuals' intention to use municipal websites.

H18: Cultural traits (Uncertainty avoidance, power distance, individualism-collectivism, and masculinity-femininity) moderate the relationship between perceived risk and individuals' intention to use municipal websites.

H19: Cultural traits (Uncertainty avoidance, power distance, individualism-collectivism, and masculinity-femininity) moderate the relationship between individuals' preference of offline channel and individuals' intention to use municipal websites.

RESEARCH DESIGN

The research design followed involves two stages: conceptual and empirical. Each stage is further divided into several phases. Each stage is discussed below.

Conceptual Stage: This stage consists of two phases: literature identification and model development. In phase 1 (literature identification), a rigorous search technique was applied to identify the articles most relevant to the research context. The focus was on well-known databases such as Business Premier and Google Scholar. Moreover, a group of eight top-level IS journals (known as the basket of IS journals) were used. Additionally, all electronic journals focusing on e-government issues were consulted. Such search terms as "individuals' intention and e-government", "adoption of e-government services", "citizens' use of e-government services" and "e-government adoption" were used to retrieve relevant articles. A coding technique was applied to identify the theories used, the research methodology, the journal or conference names, and the focus of the articles. The articles that focused on other e-government categories apart from G2C were however excluded. A total of 18 articles were finally identified as the most relevant to our research context. The second phase "model development" involved a filtering and tailoring process to identify the most significant factors from the 18 articles identified via phase 1. This process included three steps: identifying the factors that have similar or overlapping meaning; identifying those factors that were not thoroughly supported either theoretically or

empirically; and the addition of new factors that had not been examined in e-government literature but considered to be important.

Empirical Stage: A rigorous four-phase research approach has been developed to evaluate the proposed model: an online experts' panel review, survey development, a pilot test, and survey administration. The aim of the first phase (online experts' panel review) is to refine the research model proposed in the previous section. This will be achieved by inviting eight experts (academic and council officials). Academic experts are to be chosen from universities based on their research interests published on their universities' web sites. The council officials will be chosen by contacting the general office of two large city councils. The expert panel members will be contacted via email to seek their willingness to participate in model evaluation exercise. The email will include a brief description of our research project. This phase will be conducted in an online forum which created for this purpose. The online forum is appropriate as experts can interact by making their comments and suggestions visible to each other. The second phase is the survey development. It includes the operationalization of each factor included in the research model. The factors are operationalized in terms of number of indicators which were chosen from various relevant literature sources. The outcome of this phase is an initial survey questionnaire which contains 51 survey items measured in five point Likert scale. The third phase is concerned with conducting a pilot test of the survey questionnaire. This involves the distribution of the survey questionnaire to 30 individuals at a leading Australian university and seeking feedback to revise the questionnaire. In the fourth phase, the revised questionnaire will be distributed to individuals using the following strategies: a) the survey questionnaire will be given to individuals who visit offices of those selected local councils that agreed to take part in our study. This will be done in consultation with those councils; b) an electronic copy of the survey questionnaire will be linked to the websites of those councils.. The estimated representative sample size is about 400 individuals from each participation country. The estimated sample size was calculated using 95% confidence level and 5% standard error.

CONCLUSION

Due to the importance of engaging citizens in government policy formulations, governments worldwide have taken initiatives to encourage residents and citizens to use various types of e-government services. However, there is no assurance that people will use e-government services just because they are available online. Many factors involving trust, technological concerns, channel preference, and cultural traits may influence individuals' intention to use e-government services. Recognising this, we have reported the development of an integrated model which includes key factors chosen from multiple theoretical frameworks. This model will be evaluated in two countries (Australia and Saudi Arabia) which differ in terms of cultural characteristics. The proposed model when validated across two culturally different countries will help in empirically evaluating the role of cultural traits on individuals' intention to use various types of e-government services. This aspect has not been reported in the existing literature. We believe that this model is useful to theory because it provides a rich understanding of individuals' usage intentions because it integrates constructs from multiple theoretical perspectives. For practice, the empirical findings of evaluating this model are expected to help local government agencies in Saudi Arabia and Australia formulate policies to better guide the development and upgrading of online services based on the knowledge of the significant factors.

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