

## Research Article

### An Integrated E-government Adoption Model from Both Citizen and Government Perspectives

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**Abstract:** The purpose of E-Government is to provide better services for citizens by taking use of Information Communication Technology and the standard to evaluate the success of an E-Government project is its adoption. The study establishes an integrated E-government adoption model from both the citizen and government perspectives after a deep review of the main support theories in related E-government adoption literatures and the main E-government adoption models. The proposed model includes the citizen adoption model and government adoption model two main parts.

**Keywords:** Citizen adoption, e-government, government adoption

#### INTRODUCTION

The governments began to concern about taking use of the ICT (Information and Communication Technology, ICT) to provide services mainly for the great benefits and convenience citizens getting from the E-Commerce and so people also expect services of the same quality from the governments (Kaliannan and Awang, 2010). E-government means that citizens and institutions obtaining services and information from the governments by informatization ways. E-government can not only help the governments to complete the daily transactions, but also offers a more simple and convenient way to better associate citizens and organizations with governments (Bwalya *et al.*, 2011). E-governments can enhance the efficiency, cut down the cost, better meet citizens' requirements, improve the transparency, reduce the opportunity of the corruption and increase the citizens' trust on governments. Therefore, almost all the governments all over the world are trying to take E-government in practice (Lau *et al.*, 2008). However, according to Heeks (2004), in the development countries, 35% of the E-government projects are totally failed, 50% of them are partially failed and only 15% of them are successful (Lin *et al.*, 2011).

The successful implementation of E-governments not only depends on the strong support from the governments, but also depends on whether the citizens would like to accept and adopt the E-government services (AlAwadhi and Morris, 2009). For the E-government projects always cost a lot of resources, the failure of the E-government projects means great amount of loss on the taxpayers' money. The E-government adoption model can identify the main influencing factors affecting adoption, which can help

the successful implementation of E-government projects (Ozkan and Kanat, 2011). So lots of scholars and experts pay special attention on the E-government adoption research, Carter and Bélanger (2005) call for the development of a prudent model of E-government adoption (Orgeron and Goodman, 2011). Many researchers have already established some adoption model, however, they stand on the point of citizens. Based on the previous researches, the aim of this study is to establish an integrated E-government adoption model not only stand on the point citizens but also on the governments.

#### LITERATURE REVIEW

**The main support theories used in literatures:** The most popular theories used in literatures are TRA (the Theory of Reasoned Action, TRA) (AlAwadhi and Morris, 2009; Bwalya *et al.*, 2011), TPB (the Theory of Planned Behavior, TPB) (Shareef and Kumar, 2011; Ozkan and Kanat, 2011; AlAwadhi and Morris, 2009), TAM (the Technology Acceptance Model, TAM) (Lin *et al.*, 2011; Zafiroopoulos *et al.*, 2012; Sang *et al.*, 2009a; Shareef and Kumar, 2011; Ozkan and Kanat, 2011; Orgeron and Goodman, 2011; Bwalya, 2009), TAM2 or ETAM (Zafiroopoulos *et al.*, 2012; Ebrahim and Irani, 2005; Bwalya, 2009), UTAUT (the Unified Theory of Acceptance and Use of Technology, UTAUT) (Bwalya, 2009; AlAwadhi and Morris, 2009; Alomari *et al.*, 2012), DOI (the Diffusion of Innovation, DOI) (Zafiroopoulos *et al.*, 2012; Bwalya, 2009; Shareef and Kumar, 2011; Alhussain and Drew, 2010).

An evaluation of these models reveals that, two constructs can be observed in each model, under different names. These constructs are the ease of use (perceived ease of use of TAM, technical complexity of

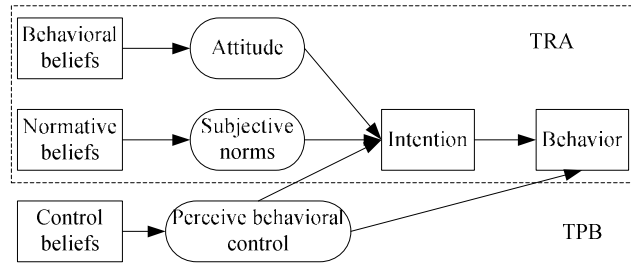


Fig. 1: TRA and TPB

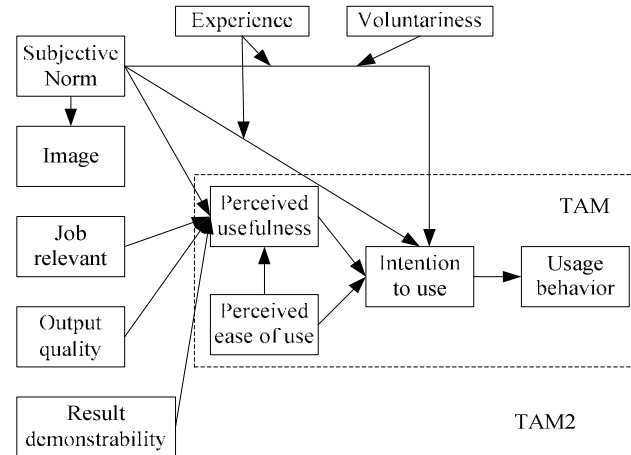


Fig. 2: TAM and TAM2

DOI, effort expectancy of UTAUT) and the Usefulness (perceived usefulness of TAM, relative advantage of DOI and performance expectancy of UTAUT) (Ozkan and Kanat, 2011).

**TRA and TPB:** TRA is model for the prediction of behavioral intention, spanning predictions of attitude and predictions of behavior proposed by Ajzen and Fishbein (1977). The TRA model considers that intention can affect behavior which will be affected by attitude and subjective norms.

Based on TRA, Ajzen (1991) extended the TRA model to establish the TPB model by incorporating the relationship that control beliefs can directly influence the perceived behavioral control which will direct influence the intention and behavior.

The TRA and TPB model is shown in Fig. 1.

**TAM and TAM2:** TAM model has two main fundamental constructs: Perceived ease of use and perceived usefulness. Perceived ease of use is defined as “the degree to which a person believes that using a particular system would be free of physical and mental effort” and perceived usefulness of the system as “the degree to which a person believes that using a particular system would enhance his or her job performance”.

Venkatesh and Davis (2000) proposed an extension of TAM (TAM2) by incorporating two additional constructs: cognitive instrumental processes and social influence processes, in addition, it omitted attitude-

to-use due to weak predictors of either behavioral intention to use or actual system use.

The TAM and TAM2 model is shown in Fig. 2.

**UTAUT:** Venkatesh *et al.* (2003) integrated predictability capabilities from different existing models of technology acceptance into the Unified Theory of Acceptance and Use of Technology (UTAUT) model, which is shown in Fig. 3.

**DOI:** The Diffusion of Innovations (DOI) theory was developed by a sociologist Rogers to explain how an innovation diffuses through a society (Rogers, 2003), it has five constructs: relative advantage, compatibility, complexity, ‘triability’ and ‘observability’. Relative advantage is “the degree to which an innovation is perceived as better than the idea it supersedes”. Compatibility is “the degree to which an innovation is perceived as consistent with the existing values, past experiences and needs of potential adopter”. Complexity is the “degree to which an innovation is perceived as difficult to understand and use”. Triability is the “degree to which an innovation may be experimented with on a limited basis” and observability is the “degree to which the results of an innovation are visible to others”.

**E-government adoption models:** Recently, more and more scholars pay special attention on the establishment

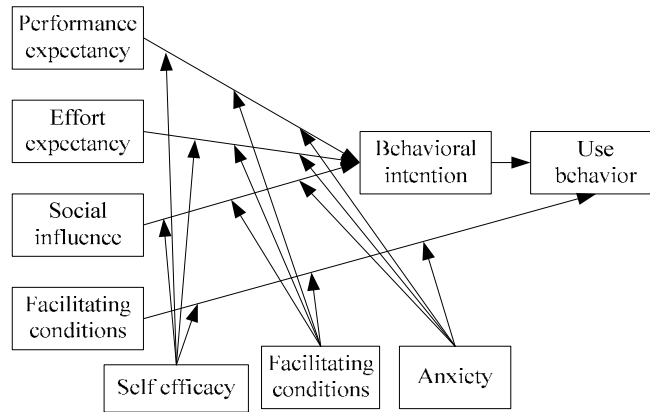


Fig. 3: UTAUT

Table 1: The main e-government adoption model in literatures

Authors	Elements
Kaliannan and Awang (2010)	<ul style="list-style-type: none"> <li>• <b>Organizational perspective:</b> Organizational leadership, perceived usefulness, perceived ease of use and organization facilitators</li> <li>• <b>Technology perspective:</b> IT infrastructure, IT skills and e-perolehan capability</li> <li>• <b>Environmental perspective:</b> Government advocacy, government policy and industry acceptance</li> </ul>
Lin <i>et al.</i> (2011)	Based on TAM model, the author proposed that: <ul style="list-style-type: none"> <li>• Information system quality, information quality and perceived ease of use → perceived usefulness</li> <li>• Perceived ease of use, perceived ease of use → attitude towards using</li> <li>• Perceived usefulness, attitude towards using → behavior intention</li> </ul>
Zafiroopoulos <i>et al.</i> (2012)	Based on TAM, TAM2 and DOI model, the author proposed that: <ul style="list-style-type: none"> <li>• Trust → perceived risk → intention to use</li> <li>• Perceived ease of use → perceived usefulness → intention to use</li> <li>• Compatibility, relative advantage, subjective norm → intention to use</li> </ul>
Moon and Norris (2005)	The authors stand on the point of government and proposed that managerial innovation orientation, government capacity (technological capacity, financial capacity, polity) and institutional variable (form of government size) will affect the adoption of municipal e-government
Carter and Weerakkody (2008)	<ul style="list-style-type: none"> <li>• Relative advantage</li> <li>• Trust</li> <li>• Internet accessibility</li> <li>• Internet skill</li> </ul>
Sang <i>et al.</i> (2009b)	Based on TAM, TAM2 and DOI model, the author proposed that: <ul style="list-style-type: none"> <li>• Subjective norm, image, job relevant, output quality → perceived usefulness</li> <li>• Perceived ease of use, perceived usefulness, relative advantage, compatibility, trust → e-government adoption</li> </ul>
Shareef and Kumar (2011)	Based on TAM: <ul style="list-style-type: none"> <li>• Attitude to use (perceived compatibility, perceived awareness, computer self-efficacy)</li> <li>• Ability to use (perceived ability to use, multilingual option)</li> <li>• Assurance to use (perceived information quality, perceived trust)</li> <li>• Adherence to use (perceived functional benefit, perceived image)</li> <li>• Adaptability to use (perceived service, response)</li> </ul>
Ozkan and Kanat (2011)	Based on TPB, the authors proposed that: <ul style="list-style-type: none"> <li>• Trust in government, trust in internet → trust</li> <li>• Perceived usefulness, perceived ease of use → attitude towards using</li> <li>• Skills, access → perceived behavior control</li> <li>• Trust, attitude, perceived behavior control → intention → adoption</li> </ul>
Orgeron and Goodman (2011)	Based on TAM <ul style="list-style-type: none"> <li>• Trust (internet trust, government trust)</li> <li>• Service quality (reliability, responsiveness, empathy, assurance)</li> <li>• Technology acceptance (usefulness, ease of use)</li> </ul>
Alomari <i>et al.</i> (2012)	Based on TAM and DOI <ul style="list-style-type: none"> <li>• Trust in government</li> <li>• Beliefs</li> <li>• Website design</li> <li>• Complexity</li> <li>• Perceived usefulness</li> </ul>

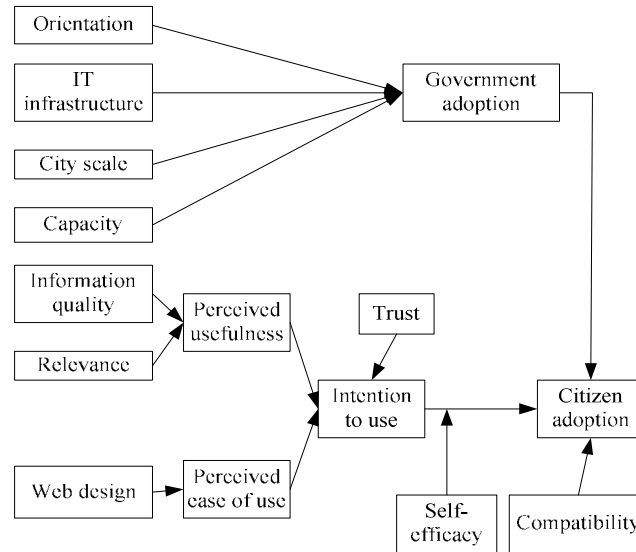


Fig. 4: Proposed model

of E-government adoption model or the factors influencing user adoption and many of them induce the constructs and elements based on TRA, TPB, TAM, TAM2, UTAUT and DOI.

The main E-government adoption models in literatures are listed in Table 1.

### METHODOLOGY

#### The establishment of an integrated adoption model:

According to the UN report, the main reasons that the low level E-government adoption are Usefulness, Content Accessibility, Lack of Trust, Lack of Confidentiality, Social and Cultural Issues, Inadequate Infrastructure, Inadequate Delivery of Services (Ozkan and Kanat, 2011). Based on the support theories and the related researches in E-government adoption model, this study proposes an integrated E-government adoption model from both the citizens and governments perspectives, which is shown in Fig. 4.

**Government adoption:** The study considers that four factors influencing the government adoption: Orientation, IT infrastructure, City scale and Investment.

**Orientation:** In order to implement the E-government project, first of all, the governments should have clear orientation (Zafiroopoulos *et al.*, 2012), which means that the governments clearly understand that they are service oriented, all they want to do is to better meet the citizens' requirements. Moon and Norris (2005) pointed out that entrepreneurial and innovation-oriented governments tend to be more receptive to new managerial and technical approaches (Moon and Norris, 2005). Once the governments confirm that they want to

better serve the citizens through the E-government projects, E-government projects will get high level management support and related government policy will all be set (Kaliannan and Awang, 2010), which of course will affect the Government adoption.

**IT infrastructure:** Rogers (2003) put forward that universal access to Internet services is a necessary precondition-via public access centers and other such policies-for the provision of e-government services (Lau *et al.*, 2008). Without no doubt, if the IT infrastructure of the city is quite poor, almost all the citizens can't access the Internet, then it is no need to implement the E-government projects, for the aim of E-government is to offer services, but if most of the citizens are lack of the condition to access the E-government website to acquire services, then the E-government project is meaningless.

**City scale:** City scale is considered to be one of the major variables in the innovation adoption literature (Moon and Norris, 2005). A city's size is related to the magnitude of its government, level of resources and public services. Large city governments are more likely to adopt E-government than small ones because larger cities are under greater pressure to find alternative ways to provide public services; larger cities also always enjoy more resources to implement E-government. Norris and Campillo (2000), Moon and deLeon (2001) all proposed that larger organizations tend to adopt new technology and innovations more frequently than their smaller counterparts (Sang *et al.*, 2009a). Weare *et al.* (1999) found that the larger cities which are always more affluent with larger populations more tend to accept and adopt new technologies. West (2004) confirmed that large municipalities are more likely to

offer public services online from the empirical result of 79 municipal governments portal sites (Alshehri and Drew, 2010).

**Capacity:** Moon and deLeon (2001) confirmed that organizational capacities, such as technical and financial capacity, have a significant positive influence on the implementation of E-government (Ojha *et al.*, 2011). The more resources and capabilities a government enjoys, the higher possibility it plan and implement a particular innovation such as E-government projects and with the willingness to take some level of risk generated by the E-government projects. Relatively speaking, a technologically rich and resourceful organization may be less concerned about the costs of adoption because of its ability to generate higher, relevant forms of organizational slack (Moon and Norris, 2005).

#### **Citizen adoption:**

##### **Government adoption to citizen adoption:**

Government adoption is a necessary prerequisite condition to the citizen adoption. Government adoption and citizen adoption is in a precedent order, only when the government adopt E-government, can the governments provide related services so that the citizens can have the opportunity to select to adopt or not adopt the E-government services provided by the governments. Therefore, government adoption is a precondition for governments is the service provider, only when the governments choose to adopt E-government can citizens enjoy the rights to adopt or not adopt the services offered by the E-government projects.

**Information quality to perceived usefulness:** It has been confirmed that information quality has significant relationship with web usage rate (Delone and Mclean, 2003). Thomas and Streib (2003) and Misnikov (2005) researches reveal that the most important reason for citizens to visit website is to acquire information (Shareef and Kumar, 2011). Information is the premise of decision, so information quality is of vital importance for appropriate decision. Peppard and Rylander (2005) points out that organizations should take use of information quality as the tool to enhance user satisfaction (Susanto and Goodwin, 2010).

Information quality includes two aspects: information accuracy and information timeliness. First of all, the information provided by governments should be accurate. Information accuracy means that the information in the website has no errors or few errors that the users can tolerate. According to the survey by Hart-Teeter (2003), a lot of people would not like to use the government websites for it is hard to get the useful and expected information. Belanger and Hiller (2006) states that in the primary stage, the biggest challenge for governments is to provide the correct information (Sang *et al.*, 2009b). Information timeliness which means that

the information provided is the latest information is important to information quality. Santos (2003) research demonstrates that periodical updates do not happen for most of the government websites, the information provided in website are always out of date, so the government should provide the newest information (Lu *et al.*, 2012; Schwester, 2009). Government websites should refresh the information in time, otherwise, the information that users get will not be what the users' need, which certainly will not meet users' requirements, as a result, service quality will be reduced and user satisfaction will decrease.

So information quality is an important factor to influence perceived usefulness.

**Relevance to perceived usefulness:** Information relevance means that the information provided by the government website is what the users need and the information is detailed and complete enough (Warkentin *et al.*, 2002). So the information should be deliberate enough, related and easy to understand for users. If the information is not what user need or not detailed enough, the users will not consider the government website be useful.

**Web design to perceived ease of use:** Lots of researches represents that a well design E-government web site is quite important to the website usage. Gilbert *et al.* (2004) empirical study result show that website design significantly affects user intention (Alomari *et al.*, 2012). Schultz (2001) appeals that E-government should take a user service approach to realize the usability and notes that the government website presented to citizens should just like an array of service navigation, which users can easily manipulate. Internal navigation function can be strengthened by setting up website map and internal search engine, by which users can easily skip the information that is not what users are interested in and get what they wanted effortlessly (Bwalya *et al.*, 2011). Auxiliary navigation tools such as menu, directory, control button, theme tree, view map are quite useful for the navigation of website (Zafropoulos *et al.*, 2012).

##### **Perceived usefulness, perceived ease of use to intention to use and intention to use to adoption:**

An evaluation of these models reveals that, two constructs can be observed in each model, under different names. These constructs are the ease of use (perceived ease of use of TAM, technical complexity of DOI, effort expectancy of UTAUT) and the Usefulness (perceived usefulness of TAM, relative advantage of DOI and performance expectancy of UTAUT) (Ozkan and Kanat, 2011). So according to TAM, TAM2, DOI and UTAUT, we can observe that Perceived usefulness and perceived ease of use have a positive influence on intention to use.

Quantities of studies verify that there is a strong relationship between intention to a behavior and the

actual behavior; therefore, behavior intention can be recognized as a predictor of the actual behavior. Also based on the TRA and TPB, intention to a behavior is an antecedent of actual behavior, so in the context of knowledge sharing, the knowledge sharing behavior is dependent on the intention to knowledge sharing.

**Trust to intention to use:** Zafiroopoulos *et al.* (2012) suppose that lack of trust is a most important barrier to citizen E-government adoption. Karavasilis *et al.* (2011) consider that trust have a great influence on user intention (Zafiroopoulos *et al.*, 2012). Carter and Weerakkody (2008) confirm that trust has a positive effect on users' intention to use (Carter and Weerakkody, 2008). Trust includes trust in internet and trust in government (24). Peppas and Poutoka (2012) propose that trust in internet and trust in government all positively affect users' intention (Peppas and Poutoka, 2012). By taking use of TPB, Ozkan and Kanat (2011) verify that trust in internet and trust in government have a significant positive effect on users' intention (Ozkan and Kanat, 2011). Orgeron and Goodman (2011) research also supports the opinion that trust in internet and trust in government can positively affect citizens' intention to use (Orgeron and Goodman, 2011).

**Moderating role of self-efficacy between attitude and intention:** Bandura and Cervone (1986) defines self-efficacy as the individual's judgment on their capability to implement a particular task, which does not mean the assessment of actual skills people hold, but the self-appraisal of what people believe they can accomplish (Sang *et al.*, 2009a). Wasko and Faraj (2005) found self-efficacy as a strong motivator. Perceived self-efficacy plays an important role in influencing individual behavior. People who have high self-efficacy will be more likely to perform related behavior than those with low self-efficacy. Self-efficacy is supposed to facilitate the forming of behavioral intentions, the development of action plans and the initiation of action. For some authors examine the impact of self-efficacy on intention, while others examine its effect on attitude and Chen and Cheng (2012) and Susanto and Goodwin (2010) take self-efficacy as a moderating role between attitude and intention.

**Compatibility to citizen adoption:** Some researchers have modified the TAM by adding the DOI theory as a factor affecting the intention to use technology and they found that relative advantage, compatibility and complexity are more important than others in predicting intention to use a technology (Sang *et al.*, 2009b). And relative advantage is similar to perceived usefulness in TAM and complexity is similar to perceived ease of use. So we consider compatibility, according to DOI, compatibility has significant influence on adoption.

Therefore, in this study, we also support that compatibility positively affect citizens' adoption.

## CONCLUSION

For the rapid development of internet and information technology, almost all the governments in the world are transforming from traditional service to e-service. E-government system becomes an indispensable auxiliary tool to governments. However, a large number of E-government projects are failed which means a great loss to the governments and also to the citizens. The criteria to judge the success of an E-government project is the adoption. So lots of researchers establish the adoption model, but many of them mainly from the perspective of the citizens, not considering the perspective of the governments. Therefore, this study establishes an integrated E-government adoption model from both the perspective of citizens and governments, which is shown in Fig. 4. And the model proposed by this study is of academic value and of practical significance.

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