CONCEPTUAL MODEL OF CITIZEN ADOPTION OF E-GOVERNMENT

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ABSTRACT

The primary objective of most e-governments is to better serve citizens, however, very little has been written on citizens' likelihood to use e-government. This paper presents the citizens aspect of e-government. The objective is to understand how citizens perceive e-government as a primary government interaction channel and the factors that affect their level of usage. The proposed conceptual model of citizen adoption of e-government integrates constructs from the Technology Acceptance Model (TAM) [1], trust and risk literature. The paper differentiates between citizen's intention to get government information and citizen's intention to conduct government transactions on e-government website. The model will assist governments in increasing citizens' adoption of their online services. In addition, it will fill the gap in the literature by providing a unique model of citizens' e-government adoption especially considering trust and risk issues.

Keywords: e-government, Technology Acceptance Model, Trust, Perceived Risk, Citizen Adoption

1. INTRODUCTION

The fast development of the Information and Communication Technology (ICT) derived the rapid growth in the number of government websites as well as the variety of services offered [2]. Nearly all countries across the glob, from the poorest countries to the most advanced ones, have some sort of Internet presence, or so-called *e-government* [3]. The United Nations Division for Public Economics and Public Administration (UNDPEPA) defines e-government as "*Utilising the Internet and the World Wide Web for delivering government information and services to citizens"* [4]. Most researchers, however, define e-government with respect to ICT. Moon [5], for example, defines e-government as *"the use of all information and communication technologies, from fax machines to wireless palm pilots, to facilitate the daily administration of government…".* Zhou [6] suggests three constituents of an e-government model: government, citizens, and businesses. Accordingly, e-government could be put into three main categories: Government-to-Government (G2G), Government-to-Business (G2B), and Government-to-Citizen (G2C) which is the focus of this paper [7]. G2C initiatives are designed to facilitate citizen interaction with government, which is what some observers perceive to be the primary goal of e-government. These initiatives attempt to make transactions, such as renewing licenses, paying taxes, and applying for benefits, less time consuming and easier to carry out [8].

The advantages of e-government are unquestionable. In the US the Internal Revenue Service (IRS) saves millions of dollars annually by decreasing spending on printing, sorting, and mailing tax materials through offering taxpayers web access to tax return forms and publications [9]. Online services are cheaper, faster and more readily available (24/7). They also reduce travel and waiting time (from in-line to on-line), introduce a more efficient payment methods, improve transparency of government's operation, improve poor governance and reduce systemic corruption, and eventually lead to transformation of governance [10], [11] & [12]. E-government projects are initiated as a key factor in the national strategies to enhance the efficiency and effectiveness of the government operations, and improve the relationships between citizens and the state [13]. However, the dark side of e-government is not cost overruns, turf battles or integration issues; it is low adoption rates [14]. E-government is far from reaching its maximum potential and until the gap between what is offered and what is used is bridged, governments can not justify large investments in e-government and will not get all of the value possible out of these investments. Therefore, it is important to understand the factors that might influence citizens'

intentions to engage in government services provided over the Internet. Congruent with this, the aim of this paper is to explore the nature, drivers and consequences of citizen adoption of e-government. This will provide the practitioners and researchers with a set of manageable, strategic levers to promote greater acceptance of e-government. This paper aims to find answers to the following questions:

1. How are intentions towards the use of e-government formed and to what extent are they related to the actual use of e-government?
2. To what extent the intentions to get information and to conduct transactions differ from each other?
3. What are the beliefs that influence citizens' propensity to use e-government? How do these beliefs affect their intentions towards the use of e-government?
4. Are there any perception and adoption differences between segments of citizens on the basis of their technology readiness and demographic characteristics?

2. REVIEW OF E-GOVERNMENT RESEARCH

Many approaches have been established towards founding an e-government stages model (e.g., [15], [16] & [17]). Although the models differ in the numbers and names of stages most of them have similar characteristics for each stage. One of the most used, however, is Gartner Group's[1] model that classified e-government services offered online into four evolutionary phases: (1) publishing (web presence); (2) interacting; (3); transacting and (4) transforming [18]. *Publishing* is the earliest stage where static information about the agency mission, services, phone numbers and agency address are provided for further communication. *Interacting* goes one step further by enhancing the site's features with search capabilities and intentions-based programmes. *Transacting* represents a full-featured online service that allows users to conduct and complete entire tasks online. *Transforming* is considered to be the long-term goal of almost all e-government services. In this stage all information systems are integrated and services can be obtained at one virtual centre [19]. These four stages of e-government development were further validated by Ebrahim *et al.* [20] in a comparison study on all e-government adoption-staged models.

There are few research studies on e-government and most of these studies focus on general e-government implementation framework. The technological infrastructure aspect of e-government dominated most research studies. For example, Leigh and Atkinson [21] focused their work on evaluating government's web sites and provided recommendations on how to improve the design and functions of web sites to make them more useful and easier to use by citizens. Other researchers discussed the G2G issues in depth such as Ezz [8] who focused on government adoption to e-government in Egypt and concluded that e-government adoption may have a limited impact unless the decision making process is better understood and the related organisational problems are addressed. Yet others investigated the barriers and challenges to e-government such as technological, financial, governmental, managerial, and political problems. Certainly the importance of these studies is not denied, but very little has been written on citizens' themselves and their readiness to use and adopt e-government. One study tried to answer the question of what makes people use or not use the online services offered by the government. The study was based on two sets of secondary data -in thirty countries- to examine the use of online government services. It identified four factors that are significantly associated with the use of online government services. Countries with heavy usage of online government services are: 1) rich (high per capita GDP), 2) have better access to Internet, 3) more competitive and less restricted ICT environment, and 4) they spend more money on ICT. All these variables were found significantly and positively correlated with the online usage of government services. They accounted for 89.5% of the variation in the dependent variable. "Access" accounted for 81% of the change in the use of online government services. This indicates public access to the Internet is the most important

[1] Gartner: an international research and consultancy firm. http://www4.gartner.com/Init

factor affecting the use of online government services [11]. Surprisingly, however; the same study indicated that not every one using Internet has been using it to access government services. For example, only 23% of the citizens of Hungary, and 27% Polish citizens who use Internet were using it for government services. It seems that access is not the number one factor affecting e-government usage.

The E-Government Index developed by DPEPA ranks four Arab countries including United Arab Emirates, Kuwait, Bahrain and Lebanon in the category of high e-government capacity and five Arab countries including Saudi Arabia, Qatar, Jordan, Egypt and Oman in the category of medium e-government capacity, suggesting that there is a great potential for Arab countries to boost up their e-government index performance [22]. Despite the enormous potential, citizen adoption of online government services has not been met yet [9]. Heeks [23] surveyed forty e-government initiatives in developing and transitional countries by reviewing the published case studies of the e-government projects. His survey indicated that 35% of the projects were classified as "total failures" meaning they were either "not implemented" or "abandoned immediately". Fifteen percent of the projects were classified as "success" meaning they attained their major goals for all the stakeholders. The rest 50% were classified as "partial failures". Governments are investing heavily in developing their websites and services provided via them and they should learn from the commercial experience and look into citizens' readiness and actual behaviour to use the online services in earlier stages than the commerce did. Table 1 summarizes the extent research in e-government; it shows that most studies have frequently focused on G-G issues of e-government initiatives and relatively little research has addressed the G-C issues such as the barriers to citizens' adoption of e-government. It also shows that there are not enough quantitative studies investigating the drivers, barriers and citizens' perceptions towards the use of e-government.

TABLE 1: Review of E-Government Research

Study	Topic of Analysis (Perspective)	Findings
1. Warkentin *et al* [9]	Encouraging citizen adoption of e-government by building trust (G-C)	Citizen trust is an important predictor of e-gov usage.
2. Abanumy *et al.* [10]	Evaluating e-government web sites (G-G)	The four stages model of e-gov. development is a useful way of evaluating the websites of e-gov.
3. Ebrahim *et al* [20]	Stages of e-government development (G-G)	Compare different adoption models
4. Ezz [8]	E-government adoption (G-G)	Strategic and managerial issues should be solved first before implementing e-gov.
5. Ghaziri [13]	Requirements of building e-government (G-G)	Leadership, ICT readiness, and human capital are requirements of e-gov. initiatives
6. Holden *et al* [24]	Government adoption of e-government (G-G)	Barriers of e-gov. adoption .
7. Lau [25]	Challenges of e-government development (G-G)	There are more than technical barriers to e-gov. such as citizens trust, level of Internet access, & legislative barriers.
8. Li [26]	Managing e-government (G-G)	Recommendations on solving strategic management issues when implementing e-gov.
9. Melitski [27]	Managing e-government (G-G)	Develop a model for e-gov. implementation and give insight from a managerial position.
10. Prattipati [11]	Difference between countries in the use of e-government (G-G)	Countries with heavy usage of e-gov have high GDP, better Internet access, more competitive ICT environment, and spend more on ICT.
11. Davidrajuh [3]	Planning for e-government (G-G)	Analysing implementation strategies of e-gov. initiatives.
12. Gilbert *et al* [28]	Barriers and benefits in the adoption of e-government (G-C)	Trust, financial security, information quality (adoption barriers) and time and money (adoption benefits) all predict potential usage.
13. Reddick [29]	Models of E-government Growth (G-G)	Empirical examination of e-gov. adoption stages within local governments. Privacy and security issues limit e-gov. growth.
14. Carter and Belanger [30]	The Influence of Perceived Characteristics of Innovating on e-government Adoption (G-C)	Perceived: relative advantage, image & compatibility are significant elements of e-gov adoption.

The next section presents the technology acceptance model and examines the concept of trust and perceived risk in the context of e-government; leading to the development of a conceptual model that intends to explain the citizen adoption of e-government.

3. CONCEPTUAL MODEL OF CITIZEN ADOPTION OF E-GOVERNMENT

Given that an e-government website is both an IT and a channel through which citizens interact with the government, technology-based and trust-based antecedents should work together to influence the decision to partake in e-government. This section elaborates on the technology acceptance model TAM [1]and examines the concept of trust and perceived risk and derives the hypotheses leading to the development of a conceptual model that intends to explain the citizen adoption of e-government. The proposed model follows the TAM and explains the intention towards the actual use of e-government website by postulating four direct determinants: *perceived usefulness, perceived ease of use, trust,* and *perceived risk.* The TAM offers promising theoretical bases for examining the factors contributing to acceptance of new technologies and has been successfully applied in customer behaviour, technology acceptance and system use, and a variety of instances of human behaviour. Given the uncertain environment of internet, trust and perceived risk are theorized as direct determinants of intentions. The research model is depicted in Figure 1.

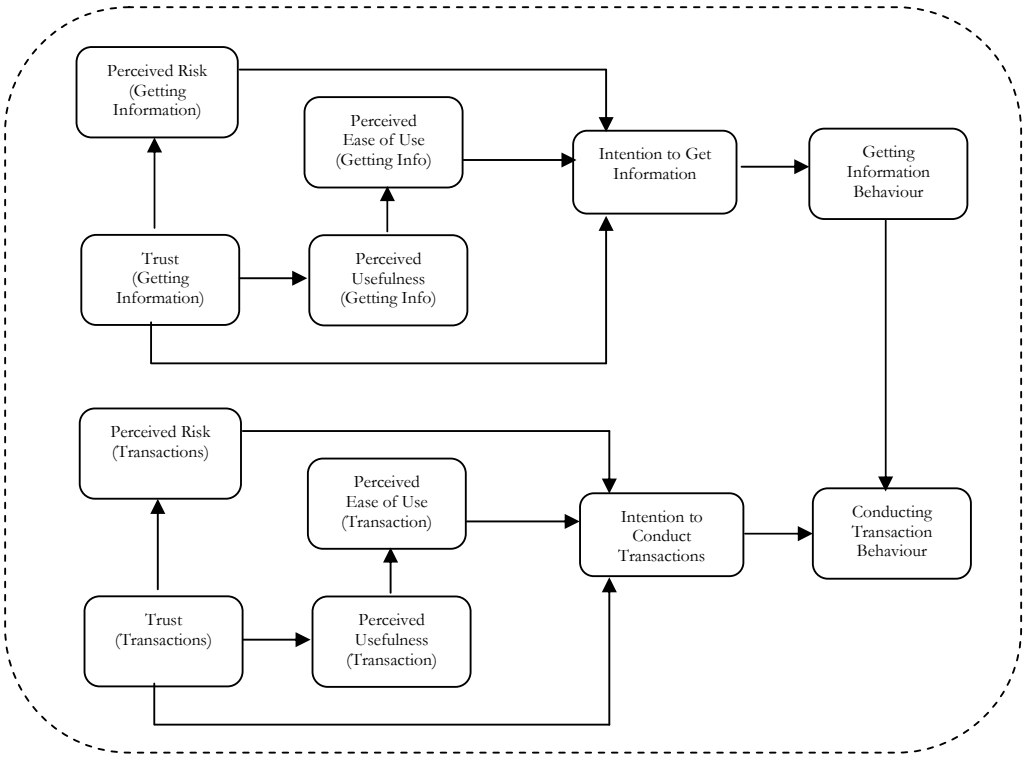

Figure 1: Conceptual Model of Citizen Adoption of E-Government

3.1 Behavioural Intentions and Actual Behaviour

Behavioural intention, a central concept in both the Theory of Reasoned Action TRA [31] and the TAM, is defined as a 'person's subjective probability that s/he will perform some behaviour'. Research following the TRA and the TAM consistently showed a high correlation between intentions and actual use [32]. Following the TRA and the TAM, we expect a positive relationship for our two focal behaviours - getting information and conducting transactions – and their respective intentions. Table 2 gives examples of these two focal behaviours.

TABLE 2: Examples of Getting Information Behaviour and Conducting Transaction Behaviour

Getting Information	Conducting Transaction
Citizen *DOES NOT* have to provide any personal nor financial information to receive this service.	Citizen MUST provide either personal information or financial information or both in order to receive the service.
Examples: - Obtain opening hours information - Download government forms - Find out what services a government agency provides - Send comments about an issue to a government official - Obtain government personnel contacts (names and numbers) - Search for required documents to complete a transaction.	*Examples*: - Inquiring specific information where a citizen must provide at least e-mail address to get the desired reply. - Paying for parking tickets where credit/debit card information must be provided - Apply for government benefits - Apply for a government job - Renew a driver's license or car registration.

Source: Authors

H1a: *Behavioural intention to use e-government website for getting information will positively influence the actual getting information behaviour.*

H1b: *Behavioural intention to use e-government website for conducting transactions will positively influence the actual conducting transactions behaviour.*

To explain the relationship between the two focal behaviours we refer to Pavlou [33], who suggested that conducting transaction decision is contingent upon getting information. His research further provided evidence that getting information facilitates the transactions process. Past empirical studies also report a positive correlation between getting information and conducting transaction [34]. Therefore we suggest that:

H2: *Getting information from an e-government website positively influences conducting transactions on e- government websites.*

3.2 The Technology Acceptance Model

The TAM is a pre-eminent theory of technology acceptance in IS research. Numerous empirical tests have shown that TAM is a parsimonious and robust model of technology acceptance behaviours in a wide variety of IT across both the levels of expertise [35], and across countries [36]. TAM hypothesizes that a person's acceptance of an IT is determined by his/her voluntarily intentions to use that technology. The intention, in turn, is determined by two beliefs dealing with (1) the perceived usefulness (PU) of using the new IT and (2) the perceived ease of use (PEU) of the new IT. PU is the user's "subjective probability that using a specific application system will increase his or her job performance within an organizational context" and PEU is "the degree to which the user expects the target system to be free of efforts" [1]. PU is influenced by PEU. As shown in previous research [37], we hypothesize that paths predicted by TAM apply also to e-government. Thus, the more useful and easy to use is the e-government website in enabling the citizens to accomplish their tasks, the more it will be used.

H3a: *Perceived usefulness of getting information will positively influence the intention towards getting government information from an e-government website.*

H3b: *Perceived usefulness of conducting transactions will positively influence the intention towards conducting government transactions on an e-government website.*

H4a: *Perceived ease of use of getting information will positively influence the intention towards getting government information from an e-government website.*

H4b: *Perceived ease of use of conducting transactions will positively influence the intention towards conducting government transactions on an e-government website.*

H5a: *Perceived ease of use of getting information will positively influence perceived usefulness of getting government information from an e-government website.*

H5b: *Perceived ease of use of conducting transactions will positively influence perceived usefulness of conducting government transactions on an e-government website.*

3.3 The Importance of Trust and Perceived Risk in E-Government

Trust is central to mostly all daily interactions, transactions, and practices; that be financial, economical, social and even religious interactions. Literature of e-commerce has at large picked up trust as a major obstacle in its growth and adoption. The widely cited study of Cheskin Research [38] suggested to the e-businesses that the customer's 'untrust' perceptions must be overcome if they want to build, confirm, and maintain trust. The open nature of the Internet as a transaction infrastructure and its global constitution has made trust a crucial element of e-commerce [39]. Just like trust is considered as a crucial enabler in e-commerce (see for example [40], [41] and [42]); government-citizens' trust is an important catalyst of e-government adoption. Although there is little agreement in the literature about how to define citizen trust in government or how it is gained and lost, most writers agree that it is an important determinant of public action and cooperation, and that it has been declining for years [43]. Researchers studied the issue of trust from many angels. Al Sawafi [44], for example, argued that in order for e-government to succeed and prosper, citizens must have a strong trust in the security of electronic communications. He further suggested that trust in digital technology requires a reliable, stable and up-to-date technology of embedding digital signatures. Palmer [45] looked at the website quality as a factor of developing trusting intentions toward an e-government website. A survey released by the Council for Excellence in Government in the US showed that almost half of Americans strongly agree that government will provide them with better services if they submit personal information to government websites. However, nearly the same number believed they risk security and privacy by doing so [46]. In another study on the feasibility and technicality issues of e-government, Dawes *et al.* [47] concluded that while some web-based applications entail major security risks because they involve true interaction and exchange of information between the agency and the user, the typical agency starts out with-low risk applications such as information dissemination, downloadable documents, limited site search and e-mail. This does not mean, however, that governments can ignore security simply because it offers passive information. The research showed very clearly that a lot of perceived security issues are controllable.

Citizen's trust in e-government has some unique dimensions, that is, the impersonal nature of the online environment, the extensive use of technology, and the inherent uncertainty of using an open infrastructure. The online environment does not allow the natural benefits of face-to-face communications and to directly observe the service provider's behaviour, assurance mechanisms on which humans have depended on for ages [48]. This separation of time and space increases fear of opportunism. To further complicate the situation, there is concern about the reliability of the underlying internet and related infrastructure with the extensive media coverage about privacy, security, and frauds on the internet. Overall, these unique differences decrease citizens' perceptions of control and increase their hesitation about adopting e-government. This provides a unique challenge for the government to find ways in which to initiate and foster electronic relationships with their citizens.

The literature on trust dating from Deutsch [49], generally suggest that trust is interwoven with risk, because it then reduces the risk of falling victim to opportunistic behaviour [50]. Risk has been called the element that gives the trust dilemma its basic character [51]. Trust is essentially needed only in uncertain situations since trust effectively means to assume risks and become vulnerable to trusted parties [52]. If there was no risk and actions could be taken with complete certainty no trust would be required. Prior research has discussed the role of trust in reducing the risk of opportunistic behaviour in channel relationships [53] and in inter-organisational exchanges [54]. E-government websites are open to the public and accessible from anywhere in the world. That is why external risk must be considered to explain citizens' intention to use e-government services. Following the literature on trust and risk it is proposed that:

H6a: *High trust on getting information from an e-government website will lead to low perceived risk.*
H6b: *High trust on conducting transactions on an e-government website will lead to low perceived risk.*
H7a: *Low perceived risk in getting information will positively influence the intention towards getting information from an e-government website.*
H7b: *Low perceived risk in conducting transactions will positively influence the intention towards conducting transactions on an e-government website.*
H8a: *High trust on getting information will positively influence the intention towards getting information from an e-government website.*
H8b: *High trust in conducting transactions will positively influence the intention towards conducting transactions on an e-government website.*

CONCLUSION

The potential impact of internet-related technologies on users' behaviour has begun to puzzle researchers. With the arrival of e-commerce the notion of uncertainty is introduced in technology acceptance because users are required to use internet in order to communicate, collaborate, and transact without organizational barriers, transcending secure face-to-face interaction [24]. While conventional customer behaviour is well described by economic and marketing theories, overwhelming evidence suggests that technology-related variables have become as important as traditional factors in predicting online users' behaviour (e.g. [42], [55], and [56]). The primary objective of this paper was to provide a conceptual model that determines the drivers of citizens' intention towards e-government on one hand, and their relation to the use of e-government, on the other. The comprehensive, yet parsimonious model proposed in the present paper makes an important contribution to the emerging literature on e-government adoption by grounding new variables into well-accepted model (TAM) and applying them to a new context of e-government. This paper provides several preliminary insights into the citizen's' adoption of e-government. It also highlights the nature of trust on e-government and proposed a research model of citizen adoption of e-government. Once the relative importance of the trust is established, the government can concentrate on influencing the important trust and perceived risk attributes (for example perceived security, perceived privacy, and trust in medium). Perhaps the topic that demands the most attention is how the government can enhance the citizen's perception of trustworthiness, by using their established credibility and benevolence.

The model presented in this paper provides a coherent framework for further empirical research on the phenomenon of e-government adoption. With proper operationalisation and methodology, an empirical testing of the hypotheses generated from the model will lead to a better understanding of citizen's adoption of e-government. The results will clarify and enrich the proposed model and will extend its boundaries. This will assist the e-government practitioners to determine which antecedent to focus on in order to increase the adoption rate of e-government. Bearing in mind that we have proposed that the antecedents of intentions are perceptual in nature, they can be influenced by appropriate advertising and marketing campaigns, visible privacy policies and the web site design. Finally, the proposed model describes a concrete set of factors that will help to transform a citizen from a curious observer to one who is willing to perform e-government transactions. Such understanding will provide the practitioners with a set of manageable, strategic levers to promote greater acceptance of e-government.

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