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EGOVERNMENT ADOPTION

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Abstract

Online government – eGovernment – has the potential to fundamentally change how public services are provided by increasing the responsiveness, immediacy, and quality of service, while reducing costs compared with traditional alternatives. As with most new technology-driven solutions, eGovernment is subject to barriers to adoption. This study empirically examines how governments can increase their citizenry acceptance for their online public services. Investigating online tax services, we show that trust, social influence, and website ease-of-use impact perceived usefulness of the interface, which, together with social influence, predict intended use of eGovernment. The most important predictor, citizen trust, increases through: (a) institutional mechanisms, (b) expected nature of interaction, (c) perceived social characteristics of the government agency, and (d) social tendency to trust others.

Keywords: Trust, eGovernment, TAM, perceived usefulness, perceived ease of use, social influence

Introduction

eGovernment encompasses applications of various technologies to "provide citizens and organizations with more convenient access to government information and services; and to provide delivery of public services to citizens, business partners and suppliers, and those working in the public sector" (Turban, King, Lee, Warkentin, and Chung 2002, p. 451). Despite the enormous potential, ubiquitous adoption has not yet been met. One likely reason for this is that eGovernment exposes citizens[1] to unique threats to data privacy and the security of information. If true, building citizens' trust in this new technological medium could accelerate and provide advantageous results to both governments and citizens.

In other media applying the Internet, namely electronic Commerce (eCommerce), trust is crucial because of such threats to privacy (Gefen, 2000; Jarvenpaa and Tractinsky, 1999). In eCommerce, where consumers are exposed to far lesser degrees of dependence and risk than with electronic tax filing, trust is a crucial enabler affecting purchase intentions, inquiry intentions, and sharing personal information (Gefen 2000; Jarvenpaa and Tractinsky. 1999; Pavlou. 2001, 2002).

Extending these results to eGovernment, the focus of this study is on one key aspect of eGovernment – electronic filing of tax returns. Paying taxes is a legal requirement throughout the modern world. Tax filing typically involves providing an obligatory annual statement to the appropriate governmental agency – optionally, online. Online filing is in the government's interest because of its speed, efficiency, and ubiquity. However, to date, adoption of Internet-based tax filing has been extremely small (Wolverton, 2001). While causes for this limited adoption are not empirically understood, the practitioner press gives some indication for this lack of acceptance. Primarily, this lack of willingness to adopt electronic filing is because of fears regarding security and privacy (McNaughton, 1999). These fears seem reasonable given that the Internal Revenue Service (IRS) itself

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[1]The term "citizen" will be used in this paper to indicate all constituents of eGovernment, including resident aliens, businesses, and other potential users of eGovernment. In the tax filing context, citizens can be viewed as 'taxpayers', who are usually all legal residents.

admits it cannot really be trusted to protect taxpayers data from hackers once data has arrived from an online source (Wolverton). Accordingly, this study examines the effect of citizen trust in government on their intentions to file their tax returns online through its effect on the perceived usefulness of the interface. More importantly, the study examines some actions that the government can introduce to engender this trust.

Conceptual Background

eGovernment

Around the world, government agencies at various levels have initiated electronic government services with the hope of improving effectiveness in providing services to their citizenry. Within the US, these initiatives are driven by the 1998 Government Paperwork Elimination Act as well as by a 1999 Presidential Memorandum on eGovernment, which (among other things) directed government agencies to construct a secure eGovernment infrastructure. eGovernment in the US includes electronic benefits transfer (EBT), eProcurement (sometimes through reverse auctions), intra-governmental activities ("G2G") through "Interlink" and Buyers.gov, and so-called "Government-to-Employees" activities for providing online services to its vast workforce (see lifelines2000.org).

The primary tax agency in the United States, the IRS, has developed and implemented services to replace traditional mail and phone communication with taxpayers. "Since 1996, the IRS has offered taxpayers Web access to tax return forms and publications in Adobe Portable Document Format (PDF), a move that yielded impressive results: The agency saves millions of dollars annually by decreasing the money it spends on printing, storing, and mailing tax materials" (Adobe, 2002, p. 1). The result of this initiative has also reduced call volume greatly. Any reduction in call volume is seen as a success since volume had been growing at 10% per year. This reduction in volume has saved the agency millions of dollars in mailing costs alone. Each mail-based transaction costs the IRS approximately $3 per mailing; in contrast, the marginal cost of transferring an additional electronic version of a document costs about one cent (Adobe, 2002). IRS Web-based initiatives are not limited to electronic distribution of forms and information – US citizens can also file their taxes electronically. However, as indicated previously, electronic filing has not been widely adopted, in part due to concerns about the privacy of personal data. The purpose of this investigation is to empirically understand the antecedents to electronic filing. The proposed conceptual model aims to predict intentions to engage in eGovernment services drawing from (a) the Technology Acceptance Model, (b) the Trust and Risk literature, and (c) Social Norms (Influence). The paper discusses the proposed drivers of intentions to file taxes online, in addition to the interrelationships among the predictor variables and some of their antecedents.

A Technology Perspective to eGovernment

Two of the key benefits of electronic filing that governments are likely to promote are the convenience and simplicity. For example, the central message on the IRS "e-file" home page is captured in the first two sentences on the page, "Filing Your Taxes Was Never Easier."[2] The IRS *e-file* program offers quick, easy, and accurate alternatives to paper returns." Therefore, any investigation into eGovernment adoption must take these constructs of convenience and simplicity into consideration.

In MIS terms, convenience would correspond with Perceived Usefulness (PU). Simplicity, or in MIS terminology, perceived *ease of use* is an antecedent to PU and together the two constructs are two central beliefs leading to the acceptance (i.e., use) of technology. Perceived usefulness is defined as the degree to which consumers believe that a particular technology interface would facilitate the interaction process. Perceived ease of use is defined as the degree to which a consumer believes that using a particular technology interface would be free of effort. These two beliefs are at the core of the Technology Acceptance Model (TAM) (Davis, 1989; Davis, Bagozzi, and Warshaw, 1989), which has received a substantial attention in the MIS literature since it focuses on system use, has reliable instruments with excellent measurement properties, is parsimonious, and is empirically sound. TAM has been showed to apply to a wide variety of IT, including eCommerce [or a detailed description of this research see Gefen and Straub (2000)]. The general premise is that perceived usefulness directly influences intention, while perceived ease of use acts indirectly through usefulness (Davis, 1989). Gefen and Straub (2000) extensively discuss this relationship, showing that in most cases perceived ease of use should affect use intentions through perceived usefulness, unless ease of use is of intrinsic

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[2]http://www.irs.gov/efile/display/0,,i1=51andgenericId=10088,00.html.

value to the IT. This finding has been shown extensively in the eCommerce context [e.g., Gefen and Straub (2000) and Teo et al. (1999)].

> **H₁: Perceived usefulness increases intentions to engage in eGoverment.**

> **H₂: Perceived ease of use increases perceived usefulness.**

The practical relevance of these variables stems from the fact that they can be influenced by the government's actions through external variables, as will be discussed later. Applied to eGovernment adoption, a Web interface that is perceived to facilitate the online tax filing process while being easy to manage is likely to indirectly facilitate citizen adoption intentions.

TAM has its origins in the theory of reasoned action (TRA), developed by Fishbein and Ajzen (1975). According to the TRA, behavioral intentions are influenced by two sets of antecedents: (1) attitudes based on behavioral beliefs about consequences of behavior, and (2) subjective norms based on compliance with normative expectations of referent individuals or groups, with whom the decision maker is motivated to comply with through a sense of social pressure. These two sets of antecedents have independent effects on intentions. The former deals with internal cognitions and if they apply correctly to behavior. This former set of antecedents corresponds to and is the basis of TAM, discussed above. The latter set of antecedents deals with external influences and the need for social correctness. Especially among inexperienced users of a new IT, social norms increases behavioral intentions (Karahanna, Straub, and Chervany, 1999). Extrapolation to eGovernment suggests:

> **H₃: Social Influence increases intentions to engage in eGoverment.**

Social influence should also affect beliefs among inexperienced users lacking other sources of information about the IT. Indeed, research dealing with social construction emphasizes the importance of social influence on the adoption of new IT, because this adoption is not only based on the technical aspects of the IT but also on the social climate surrounding it in which social influence affects beliefs about the IT as well as behavior toward it (Brown and Duguid, 1991; Fulk, 1993).

> **H₄: Social Influence increases perceived usefulness.**

Citizen Trust

Trust is a central defining aspect of many economic and social interactions. It is the belief that the other party will behave as expected in a socially responsible manner, and in doing so, it will fulfill the trusting party's expectations (Luhmann, 1979). Hence, trust reduces the social complexity that is the result of people being independent agents whose behavior cannot always be controlled or anticipated (Gefen, 2000) and thus reduces the risk and uncertainty involved in interacting with them (Luhmann 1979). Trust is crucial in economic transactions because it reduces the risk of falling victim to harmful behavior (Williamson, 1985). The same should apply to tax payments, a relatively one-sided interaction in favor of government.

Trust and the Technology Acceptance Model

Trust has been integrated with TAM in multiple contexts online (Gefen and Straub, 2002; Chircu, Davis, and Kauffman, 2000). As such, there is theoretical and empirical support for linking trust with TAM variables. Trust is one of the determinants of perceived usefulness, especially in an online environment (Gefen, 1997; Gefen and Straub, 2002). Trust also reduces transaction costs (Williamson, 1985), making the interaction more worthwhile. The same applies to online tax payments. If the agency operating the tax website cannot be trusted to behave in a socially acceptable manner, then there is no reason why citizens should expect to gain any utility from using the site. Following Chircu et al. (2000), we argue that trust positively influences perceived usefulness on the basis that trust allows citizens to depend on the governmental agency and the Web interface to ensure that they receive the expected useful interaction. When trust is low, citizens would be forced to pay particular attention to all aspects and details of the tax filing process, increasing the effort and the time required for using the online system for tax filing.

Chircu et al. (2000) also argue that trust in an e-commerce intermediary increases perceived ease of use. Their underlying logic is that trust reduces the need for an individual to understand, monitor, and control the situation, facilitating the interaction and making it effortless. In this context, trust would reduce citizen needs to monitor the government's actions and checking every detail, making online tax filing easier.

> **H₅: Citizen Trust increases the perceived usefulness of an online tax service.**

H$_6$: Citizen Trust increases the perceived ease of use of an online tax service.

Perceived Risk

When engaging in an online transaction process, individuals are rightfully alarmed about the different types of risks present (Jarvenpaa and Tractinsky, 1999), such as performance, financial, time, psychological, social, privacy, and overall risk (Featherman and Pavlou 2002). However, since risk itself is difficult to capture as an objective reality, the established research literature has predominantly addressed the notion of *perceived risk*, which is defined here as a citizen's subjective expectation of suffering a loss in pursuit of a desired outcome. Following Jarvenpaa and Tractinsky (1999), perceived risk is viewed as a belief that attenuates when trust is present. In eCommerce, perceived risk reduces intentions to exchange information and transact (Featherman and Pavlou 2002, Pavlou 2002). In eGovernment, perceived risk should negatively influence the perceived usefulness of the online tax filing process because increased risk reduces the utility, thus usefulness of any interaction.

H$_7$: Perceived risk reduces the perceived usefulness of an online tax service.

Trust and Perceived Risk

When people trust others they assume that those they trust will behave as they are expected to, reducing the social complexity of the interaction. When a party is trusted, people allow themselves to *a priori* assume away that it will engage in unwarranted behavior (Gefen, 2000). Consequently, trust reduces the risk people perceive. Indeed, research in eCommerce supports this proposition (Jarvenpaa and Tractinsky, 1999, Pavlou 2001). The same logic applies to an online tax agency. When the agency can be trusted to show integrity, benevolence, and acceptable ability, there is much less risk involved in interacting with it, if only because the agency can be trusted to take greater care of the sensitive information it collects and reduced other risks associated with online tax filing.

H$_8$: Trust reduces perceived risk.

Building Trust in eGovernment

How then can trust be built? In her seminal study, Zucker (1986) suggested that there are three basic modes by which trust is created in an economic environment. These include (a) institution-based trust, (b) characteristic-based trust, and (c) process-based trust. Institution-based trust deals with third party guarantors that provide (1) *certification* about trustworthiness of a person and (2) *escrows*, which guarantee expected outcomes. Institution-based trust applies to a government agency managing the online tax process. Independent third party certification implies that the agency behaves in a certain manner and that it is managed by trustworthy people; hence, it builds trust. Escrows also create citizen trust. In the case of online tax payments, a third party guarantor could verify that the money is not made available to the government until a third party verifies that the transaction is correct. Such mechanisms are widely used in eCommerce (Kollock, 1999).

Characteristic-based trust deals with social similarity in issues such as gender, kin, and nationality. These are actually quite rational assessments because they mean that all the parties have the same set of expectation as to what constitutes acceptable social behaviour (Zucker, 1986). Applying this mode of trust creation may not be feasible in many cases because applying it explicitly may contradict the legal statutes. Nonetheless, the notion that people who share the same values handle the governmental tax collection agency and beliefs should increase citizen trust.

Process-based trust is trust based on prior experience. This is probably the most important of the three modes (Zucker, 1986). Governments can create trust this way by convincing their citizens that the same rigorous controls, which make government handling of traditional tax returns trustworthy (assuming that they indeed are perceived as such), also apply to online tax filing. The basis of process-based trust is the fulfillment of previous expectations. This is the most basic form of creating trust (Blau, 1964). When an entity who is trusted behaved in a trustworthy manner, then that entity is trusted more, and when that entity breaks that trust, then, that entity is no longer trusted.

Lastly, trust is also the product of psychological dispositions that are beyond the short-term control of any government. These psychological dispositions deal with life-long socialized tendencies to (1) believe in humanity and (2) to believe that better results will occur if one trusts others (McKnight, Cummings, and Chervany, 1998; Rotter, 1971). Although government cannot readily manipulate these beliefs, it can take advantage of opportunities afforded by different cultural segments in the population, and aim at those segments that are more inclined to trust first, in an attempt to build a critical mass of users for an online tax system.

H$_9$: Belief in Humanity increases Trust.

H$_{10}$: Disposition to Trust increases Trust.

H$_{11}$: Nature of Expected Interaction increases Trust.

H$_{12}$: Perceived Social Characteristics of Government increases Trust.

H$_{13}$: Institutional Guarantees increase Trust.

Research Methodology

Instrument Development

In order to test the above hypotheses, an instrument was developed with attention to appropriate content validity, reliability, and construct validity (Boudreau, Gefen, and Straub, 2001).   Items and scales were adopted from existing validated measures (a summary of the validated constructs and their sources is found in Table 1). These items were then adjusted to accommodate the concepts of online filing of taxes and subsequently revalidated with a pilot (n = 4) and pretest (n = 70 taxpayers). Validity was demonstrated with Principal Components Factor Analysis and Cronbach's α tests based on the guidelines of Hair et al. (1998). Measures were found to load as expected within constructs (> .60 within and < .40 outside target) and to have appropriate levels of internal reliability (α > .70). Based on these results, the original questionnaire was also administered in the main data collection effort, and the data from the pretest and the main data collection were pooled.

Table 1. Validated Constructs and Sources

Source	Constructs
McKnight et al. (1998)	Trust; Predictability; Belief in Humanity and Disposition to Trust;
Mayer et al. (1995); Mayer and Davis (1999)	Integrity; Benevolence; Ability
Davis (1989); Gefen and Straub (2000)	Use Intention; Social influence; Perceived Usefulness; Perceived Ease of Use
Zucker (1986)	Perceived Social Characteristics; Institutional Guarantees; Process-mode Trust; Nature of Expected Interaction

Data Collection and Analyses

The questionnaire was distributed to senior undergraduate and MBA students in three states of the USA. The students were told that participation was voluntary and that no class credit would be given for taking part in the study. The objective of the study was not shared prior to completing the questionnaire. Average response rate was over 97%. In all, 243 completed questionnaires were returned from Pennsylvania (n=35), California (n=95), and Mississippi (n=113), representing three distinct parts of the United States. All but nine had previously paid Federal taxes; 40.3% had inquired about taxes online, although 82.3%, approximately the national average (Wolverton, 2001), never paid their taxes online. There were 150 men and 83 women, 10 skipped the question.

The convergent and discriminant validity of the scales was assessed with a PCA. Items that loaded above .40 on more than one factor or that loaded below .50 on the factor where the other items of their construct loaded above .50 were dropped, following Hair et al. (1998). The PCA had 11 factors with an eigenvalue above 1.0.[3] Average item communalities wer .72 with a range between .61 and .82. Cronbach's α values are above the accepted threshold (Nunnally and Bernstein, 1994).

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[3]According to Hair et al. (1998), at least 100 data points would have been needed to reach a conclusive conclusion in the PCA.

Hypotheses Testing

Stepwise linear regression shows that Use Intentions is increased by both PU (β =.27, p-value<.01) and Social Influence (β=.40, p-value <.01) with an R^2 of .33, supporting H_1 and H_3. PU in turn is increased by PEOU (β=.39, p-value <.01), Social Influence (β=.25, p-value <.01), Trust (β=.13, p-value <.05), while reduced by Risk (β=-.14, p-value <.05), with an R^2 of .30, supporting hypotheses H_2, H_4, H_5 and H_6, respectively. Risk is decreased by Trust (β=.18, p-value <.01), albeit only slightly with an R^2 of .03, supporting H_8. Trust also increased PEOU (β =.33, p-value <.01), with an R^2 of .11, supporting H_6. Trust itself is increased by Belief in Humanity (β =.11, p-value <.05), by the Nature of Expected Interaction (β =.21, p-value <.01), by the Perceived Social Characteristics (β =.16, p-value <.01), and by Institutional Guarantees (β = .38, p-value <.01), but not by Disposition to Trust, with an R^2 of .48, supporting hypotheses H_9, H_{11}, H_{12} and H_{13}, but not H_{10}, respectively.

Discussion

eGovernment, in contrast with traditional government, is notably characterized by (a) the extensive use of communication technology, (b) the impersonal nature of the online environment, (c) the ease by which information can be collected, processed (data-mined), and used by multiple parties, (d) the implicit uncertainty of using an open technological infrastructure for transactions, and (e) the newness of the communication medium. Recent embarrassing findings about hackers gaining access to taxpayers data and possibly even changing it (Wolverton, 2001), are one example of such threats. The interaction with a government website further increases the spatial and temporal separation between the citizens and the government, increasing uncertainty, threat of opportunistic behavior, and creating new concerns about the reliability of the Internet and related government infrastructure. Moreover, personal data can be easily collected, manipulated, and used by multiple parties not directly linked to the given interaction. Overall, these unique differences increase data privacy concerns and reduce perceptions of citizen control, imposing a trust barrier to eGovernment adoption.

Successful implementation of eGovernment in all its forms will be an important issue for the coming decade. For national and local governments to cut costs, improve services, and become more responsive to their citizenry, it is imperative that they establish trust in the online services they provide or will be providing. There are many facets to this issue, and the role of culture, risk, and control is fundamental to the adoption process. As with eCommerce adoption, technology acceptance is also likely to be an important factor. Government officials and the private companies that assist them must be aware of the role of the proposed variables and their antecedents in the online environment, and must take in account the prospective findings of this research in their technical and organizational plans.

This research suggests some tentative advice toward achieving such a goal. Taxpayers, just as other IT users, use a system because they perceive it as useful and because of social influence. Trust, ease of use, and risk are all important, but their importance is indirect through perceived usefulness. Accordingly, governmental agencies thinking of going online should first and foremost invest in the usefulness of their site and create the kind of social influence that will encourage taxpayers to go online. Having said that, trust, ease of use and risk should not be overlooked as they contribute significantly to the perception of usefulness. In this regard, the study also shows the key antecedents that governmental agencies should consider toward increasing acceptance of their online services.

Trust engenders by the nature of the expected interaction, by the perceived social characteristics of the agency, and mostly by institutional guarantees. The data indicate that investing in these antecedents – through the establishment of independent guaranties, good service, and explaining the governmental agency has the same values and beliefs as the citizenry has, and then make the public knowledgeable about them – can build this trust and through it increase the usefulness of the site. Interestingly, belief in humanity, a culture-dependent issue, also increases trust. This means that different cultures may be differently inclined to adopt online governmental agencies, in this case a tax collecting agency. In contrast to belief in humanity, disposition to trust, the belief that better outcomes will come about by trusting others, did not increase trust. This may be because of the nature of the interaction with a governmental agency which practically controls the situation, making such a belief irreverent under the circumstances. Thus, the implementation of online taxpaying may not work equally well everywhere. It might be advisable to start in communities that have a strong sense of belief in humanity, and it may be advisable to seek individuals who may be more open to adoption first, which may include high power distance segments, technology-savvy users, or risk takers. Each success story can help the process grow by 'word of mouth' communication, increasing social influence.

Conclusion

The widespread adoption of electronic interactions throughout national and local government agencies is a process that can create a "fundamentally different sort of government that provides much more value to citizens" (Leigh and Atkinson, 2001). Data privacy concerns are among the most significant barriers to the adoption of eGovernment and, through it, to the creation of an efficient and responsive New Public Management. Obstructing this adoption, data privacy concerns have been the most significant barriers to eGovernment adoption Drawing primarily from the eCommerce literature, this study shows the importance of trust in alleviating data privacy concerns and facilitating eGovernment diffusion. The proposed model portrays a comprehensive view of where and how governments should focus their efforts in terms of encouraging citizen use of their online services. This paper aims to entice future research on how governments can alleviate data privacy concerns toward building an effective public management.

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