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# Antecedents to e-File Adoption: The U.S. Citizen's Perspective

Ludwig Christian Schaupp and Lemuria D. Carter

## Abstract

In the United States, congress set a goal for 80% tax and information returns to be filed electronically in 2007 (IRS, 2004). Although e-file adoption has grown incrementally the past, 80% has not been reached. This study proposes a model of e-filing adoption that incorporates risk perceptions and optimism to explain e-file diffusion. To test the model we surveyed 260 taxpaying U.S. citizens. Results of a multiple regression analysis are consistent with our predictions; effort expectancy, performance expectancy, social influence, perceived risk, and optimism bias significantly influence intention to e-file. Implications of results for practice and research are discussed.

## 1. INTRODUCTION

The United States (U.S.) government is one of the largest users of information technology (IT) systems in the world (Office of Management and Budget, 2006). A considerable percentage of the government's IT investment is allocated to e-government initiatives. E-government in the U.S. provides its citizens with convenient access to government information and services. The electronic filing of income tax returns (the e-file program) is an invaluable application that assists tax filers with the process of collecting their personal tax information and provides them with the ability to electronically transmit their return. Electronic filing of personal income taxes (e-file) has the potential of improving the overall process of tax filing for the individual filer while at the same time reducing the cost to both taxpayers and tax collection agencies (Fu et al., 2006).

The use of Internal Revenue Service (IRS) endorsed e-file systems has continued to grow over the last couple of years with 52.9 million individual returns being filed in 2003 and approximately 68 million in 2005 (IRS, 2004). In 2008, 90 million taxpayers in the U.S. used e-file to submit their federal tax returns (IRS, 2004). However, despite the numerous IRS endorsed e-file systems that are available, this still only accounts for about 50% of the total number of returns. Congress set a goal of having 80% of all tax and information returns filed electronically by 2007 (IRS, 2004). However, the goal of 80% has fallen well short and the problem of

Ludwig Christian Schaupp, Ph.D. is an Assistant Professor in the Department of Accounting, College of Business and Economics, West Virginia University. E-mail: christian.schaupp@mail.wvu.edu
Lemuria D. Carter, Ph.D. is an Assistant Professor in the School of Business and Economics, Department of Accounting, North Carolina Agricultural and Technical State University. E-mail:

underutilization continues to plague the IRS. The mission statement for e-file services is to ease taxpayer burden and increase compliance through innovative e-government solutions with the use of technology (IRS, 2004). The future vision of the IRS is one in which any exchange or transaction that currently occurs in person, over the phone or in writing can be accomplished electronically.

Throughout the Information Systems (IS) literature, the prediction of usage has always been a focus. With the growing interest in e-government and increased pressures to get to 80% utilization it raises the question of how to increase citizens' adoption of e-file. The literature frequently addresses this question by identifying predictors of behavioral intentions. Behavioral intention to use is defined as an individual's intention to use a specific IS for some purpose either presently or sometime in the near future. There is a large body of previous research which suggests that many usage studies were anchored in behavioral intention to use and have reported a strong link between behavioral intention and actual usage (Chau and Hu, 2001). Previous research has also noted that for survey research, analysis of intention to use is more appropriate than actual usage (Agarwal and Prasad, 1999). Intention to use has been used as a depe

## 2. THEORETICAL DEVELOPMENT

How and why individuals choose to adopt new technologies has forever been the focal point of IS research. Within this broad area of research there is a core of literature that focuses on intention. UTAUT is the most predominant and comprehensive theory existing in the literature to date. The UTAUT model is derived from eight theoretical models: the theory of reasoned action (TRA), the technology acceptance model (TAM), the motivational model, the theory of planned behavior (TPB), a model combining the technology acceptance model and the theory of planned behavior, the model of PC utilization, the innovation diffusion theory, and the social cognitive theory. The goal of UTAUT is to understand intention/usage as the dependent variable (Venkatesh et al., 2003).

In addition to technology adoption factors, the literature also identifies perceived risk as an important predictor of intention (Fu et al., 2006). The proposed model combines adoption factors, perceived risk and optimism bias to explain citizens' intention to use e-filing in the United States.

### 2.1 Technology Adoption

Information technology diffusion has been explored extensively in the literature (Davis, 1989, DeLone and McLean, 1992, DeLone and McLean, 2003, DeLone and McLean, 2004, Doll and Torkzadeh, 1988, McKinney et al., 2002, Seddon, 1997, Szanja, 1996, Wixom and Todd, 2005). The UTAUT model integrates the eight theoretical models noted above and is made up of core determinants of usage intention (performance expectancy, effort expectancy, social influence, and facilitating conditions) and was empirically tested in four different organizational settings over a period of six months (Venkatesh et al., 2003). Four core determinants, performance expectancy, effort expectancy, and social influence were found to significantly predict intention. The UTAUT model is well suited for the context of this study in that the goal is to understand intention/usage as the dependent variable (Venkatesh et al., 2003), as is the case in the present study. UTAUT has also been utilized in prior e-government research investigating e-government service adoption (Al Awadhi and Morris, 2008). Therefore, it is in this setting that the use of the UTAUT model is best suited for an investigation into the use and adoption of an IRS e-file system.

Performance expectancy is defined as the degree to which individuals believe that using the system will help them improve their job performance (Venkatesh et al., 2003). Five variables comprise the performance expectancy construct: perceived usefulness, extrinsic motivation, job-fit, relative advantage, and outcome expectations

Perceived risk reduces users' intentions to exchange information and complete e-commerce transactions (Pavlou, 2003). The literature suggests that perceived risk has

**TABLE 1. RESEARCH HYPOTHESES**

| No. | Hypothesis |
|-----|------------|
| H1. | Effort Expectancy (EE) will have a positive effect on intention to use. |
| H2. | Performance Expectancy (PE) will have a positive effect on intention to use. |
| H3. | Social Influence (SI) will have a positive effect on intention to use. |
| H4. | Perceived Risk (PR) will have a negative effect on intention to use. |
| H5. | Optimism Bias (OB) will have a positive effect on intention to use. |

**FIGURE 1: PROPOSED RESEARCH MODEL**
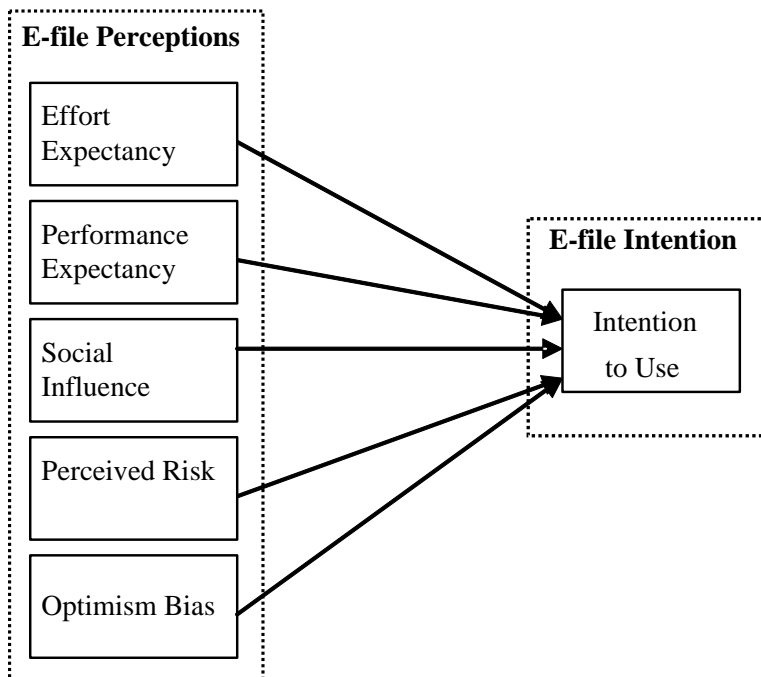


## 4. METHODOLOGY

To obtain study participants, an e-mail announcement was sent to members of master's level accounting and EMBA courses. Respondents were also encouraged to recruit other potential subjects at their workplace. Each survey participant was provided a link to a Web-based survey that they could access. The questions were aimed at assessing their perceptions of the dependent and independent variables. Demographic questions were last, as fatigue effects would have less influence on them. All surveys were confidential and no identifying personal information was required. The results were analyzed using multiple linear regression.

### 4.1 Sample

The survey was completed by 260 respondents. The response rate was quite good with 55% responding. 53 % of the respondents were female and the ages ranged from 21 – 84; 83% of the sample was in the 25-45 age group. 69% were Caucasians. 93% have

## 4.2 Instrument Development & Validity

To investigate users' intentions to use an IRS endorsed e-file system, a questionnaire based data gathering technique was utilized (Moore and Benbasat, 1991). Questions were compiled from validated instruments in the IT adoption literature to represent each construct (see appendix), and wording was modified to fit the e-filing context being studied. The resulting items for each construct were then included in a random order on the survey instrument. Effort expectancy, performance expectancy, social influence, perceived risk, and intention to use questions were measured on a 7-point Likert-type scale, ranging from 1 (strongly disagree) to 7 (strongly agree). Optimisim bias questions were also measured using a 7-point Likert-type scale; anchored by 1 (much less able than the average Internet user), 4 (average ability), 7 (much more able than the average Internet user). Constructs showed internal consistency levels exceeding Cronbach's alpha (Nunnally, 1978) of 0.70.

**TABLE 2. RELIABILITY ANALYSIS**

| Construct | # Items | Reliability |
|---|---|---|
| Effort Expectancy (EE) | 6 | .845 |
| Performance Expectancy (PE) | 3 | .767 |
| Social Influence (SI) | 4 | .783 |
| Perceived Risk (PR) | 5 | .782 |
| Optimism Bias (OB) | 5 | .890 |
| Intention to Use (USE) | 5 | .892 |

Factor analysis using principal components with varimax rotation was used to evaluate construct validity (table 3). As can be seen from table 3, most items loaded properly on their expected factors except for PE2 which was below the .40 cut-off. This item was dropped from further analysis. Cross loading items EE1 and EE 2 were also dropped from further analysis.

**TABLE 3. FACTOR LOADINGS**

| Item | EE | PE | SI | PR | OB | USE |
|---|---|---|---|---|---|---|
| EE1 | | | | | .681 | |
| EE2 | | | | | .662 | |
| EE3 | .438 | | | | | |
| EE4 | .620 | | | | | |
| EE5 | .687 | | | | | |
| EE6 | .402 | | | | | |
| PE1 | | .718 | | | | |
| PE2 | | .389 | | | | |
| PE3 | | .453 | | | | |
| SI1 | | | .845 | | | |
| SI2 | | | .752 | | | |
| SI3 | | | .602 | | | |
| SI4 | | | .760 | | | |
| PR1 | | | | .655 | | |
| PR2 | | | | .632 | | |
| PR3 | | | | .539 | | |
| PR4 | | | | .480 | | |
| PR5 | | | | .446 | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| **OB1** | | | | | .744 | |
| **OB2** | | | | | .746 | |
| **OB3** | | | | | .667 | |
| **OB4** | | | | | .665 | |
| **OB5** | | | | | .583 | |
| **USE1** | | | | | | .894 |
| **USE2** | | | | | | .912 |
| **USE3** | | | | | | .889 |
| **USE4** | | | | | | .608 |
| **USE5** | | | | | | .855 |

**TABLE 4. FINAL REGRESSION VARIABLES**

| Construct | # of Items | Mean | Standard Deviation |
|---|---|---|---|
| Effort Expectancy (EE) | 4 | 5.196 | 0.965 |
| Performance Expectancy (PE) | 2 | 5.372 | 0.985 |
| Social Influence (SI) | 4 | 3.984 | 1.101 |
| Perceived Risk (PR) | 5 | 3.782 | 1.094 |
| Optimism Bias (OB) | 5 | 4.830 | 0.932 |
| Intention to Use (USE) | 5 | 5.091 | 1.248 |

**4.3 Data Analysis**

The research model was tested using multiple linear regression analysis. Regression analysis is used to relate a dependent variable to a set of independent variables. The goal of this study is to determine the relationship between use intentions (dependent variable) and citizens' perceptions of electronic filing systems (independent variables). The model includes five independent variables (effort expectancy, performance expectancy, social influence, perceived risk, and optimism bias) and one dependent variable (intention to use).

**5. RESULTS**

The model explains a notable percent of the variance in citizen adoption of e-filing systems; adjusted R Square equals .727. Since the overall model was significant (F=138.957 p=.000), we tested the significance of each variable. All of the hypotheses were supported. Effort expectancy, performance expectancy, social influence, perceived risk, and optimism bias all have a significant impact on intention to e-file (see table 5).

**TABLE 5. HYPOTHESES TESTING**

| Hypoth. | Coeff. | t-val. | Sig. | Supported |
|---|---|---|---|---|
| H1(EE) | .132 | 1.664 | .097 | YES* |
| H2 (PE) | .592 | 8.763 | .000 | YES*** |
| H3 (SI) | .315 | 7.814 | .000 | YES*** |
| H4 (PR) | -.155 | -3.686 | .000 | YES*** |
| H5 (OB) | .198 | 3.411 | .001 | YES*** |
| *p < 0.10, **p < 0.05, ***p<.001 | | | | |

## 6. DISCUSSION

This study's overall purpose was to investigate users' intention to file their taxes online via an IRS endorsed e-file system. The study's research question focused on

reduce one's intention to use an e-file system. However, citizens who believe they are more competent interacting with electronic systems are more likely to use an e-file system despite the risks. These results are promising for e-service adoption research. Future studies should explore the role of optimism bias in conjunction with other intention predictors such as Internet self-efficacy (ISE). The results of this study suggest that beyond confidence in one's ability to use the Internet (ISE) a belief that one's abilities are better than the average Internet user encourages use of e-services despite risk. This use is motivated by the belief that "since I am more Internet savvy than the average user, I am not as susceptible to Internet risks as the average user." Future research should also integrate trust of the Internet and trust of the government into the proposed adoption model. Research suggests that trust in necessary when risk is present. It will be interesting to see how trust impacts adoption when optimism bias is accounted for.

One surprising finding was that in this study 71% of respondents reported having conducted some kind of e-government transaction previously, however, only 34% of respondents said they had e-filed their taxes. This is surprising given that around 50% of all returns in the U.S. are e-filed presently and with an experienced user base such as the subjects were in this study it would seem logical that they would at least thparith ane sunaon p

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