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Trust in Tax Software as an Antecedent to Intention to E-File

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I. Introduction

We explore multiple factors that contribute to individual taxpayer intention to use tax software electronically to file (e-file) a tax return, including trust in tax software, affective commitment, calculative commitment, and quality of alternatives. We find that the commitment-based model of taxpayer intention to e-file is significant, with trust as the underpinning factor. A successful transaction is dependent upon trust. Our goal is to understand how an individual taxpayer's decision to e-file is influenced by trust and commitment toward e-file and in the tax software that supports it. Our research model derives its foundation from several extant theories of technology commitment and e-government. Data were collected from 121 U.S. taxpayers who volunteered to participate.

Our examination of e-file is within the context of the E-Government Act of 2002, which is a U.S. statute intended to improve citizen access to government services. The U.S. ranks seventh in e-government, surpassed by Republic of Korea, Australia, Singapore, France, Netherlands, and Japan (UNDESA 2014). This ranking reflects a drop from third place in 2008 (West 2008), and fifth place in 2012 (UNDESA 2012). Anecdotal explanations include the following: 1) a slowing of technology acceptance overall; 2) the failure of individuals in the U.S. to use e-government; and 3) the existence of obstacles to the individuals choosing not to initially participate.

E-filing is part of a U.S. e-government initiative to redefine the infrastructure of document preparation and retention for a variety of services (e.g., income taxes, social security, and welfare). The essential purposes of e-government include cost reduction, data transparency, and the participation by individuals in their own governance (GAO 2009). The Internal Revenue Service (IRS) Restructuring and Reform Act of 1998 (RRA) established an e-filing goal that eighty percent of individual taxpayers would e-file their returns by 2007 (IRSOB 2011).[1] The actual volume of e-filed individual returns in 2013 was eighty-three percent (IRSOB 2014), surpassing the original goal.

The full conversion to e-filing provides service improvements for taxpayers and is of strategic importance for the U.S. Government. E-filing affords expedited filing, faster refunds, greater return accuracy, and confidentiality protections for taxpayers. The strategic benefits afforded to the IRS are indirectly beneficial to the taxpaying public. Specifically, processing costs are substantially lower for electronic submissions. According to the IRSOB (2011), the submission processing cost for an e-file is $0.17 versus $3.60 for a paper return. Additionally, e-filing has yielded a reduction in the number of IRS processing sites from ten in 2003 to five in 2011. Processing costs are lower due to reduced error rates because the IRS can check for errors as part of the e-filing process and return an incorrect return via the tax software

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[1] We define e-filing in accordance with the IRS requirement that individuals use an IRS-approved tax software vendor to act as intermediary between the taxpayer and the IRS (e.g., TurboTax®).

to the taxpayer for correction. The costs avoided due to e-filing typically are reinvested into other IRS programs that provide additional services for taxpayers.

Filing an annual tax return is a legal requirement, but the manner in which it is filed is a taxpayer choice. The push for adoption of the technology is purely about efficiency and cost savings. For example, it is easier for the IRS to match W-2 forms with e-filed returns than with paper returns. There is a significant cost savings for the IRS not to have to handle paper (GAO 2009). The Li et al., (2006) model is applicable because the taxpayer is not required to use the tax software technology to meet the legal requirement of tax filing. Our sample consists of 121 taxpayers who had not previously e-filed drawn from the general population with a cross-section of demographic features. We demonstrate the importance of trust in a taxpayer's intention to use e-file services through a commitment-based model adapted from prior work on technology use. We extend, refine, and test a theoretical framework adapted from Li et al., (2006) that explores the association of trust, affective commitment, calculative commitment, and quality of alternatives to an intermediary on an individual's behavioral intention to use an e-file tax software.

The Government Accountability Office (GAO 2009) issued a report recommending that the IRS assess risks associated with the use of tax software, including the associated security, because of its critical role in maintaining and exceeding e-filing goals. A subsequent report (GAO 2015) reiterated the need for the IRS to assess the risks, and documented that the existing system of authentication tools has limitations, noting that the IRS does not have a plan to assess the risk of identity theft and tax fraud associated with e-filing (GAO 2015, 26):

> Honest taxpayers who have had fraudulent tax returns [e-filed] in their name have the burden of proving to IRS who they are and waiting for delayed refunds.

Thus, the significance of trust on e-file adoption has policy implications. Recent reports of security breaches in income tax returns filed with tax software may have the consequence of reversing the trend in e-filing as a result of concerns over 1) identity theft, and 2) inability to obtain refunds in a timely manner and without hassle. Both the Federal Bureau of Investigation (FBI) and the IRS's criminal division have launched investigations into the cause of the breaches (Keizer 2015, Saunders 2015). Working theories of how the frauds were perpetrated include: 1) the practice of unlinked tax returns by some tax software vendors (i.e., permitting the filing of only state returns as opposed to both state and federal); 2) criminals used usernames and passwords from breaches unrelated to the tax software to mine for matches knowing that people have a habit of using the same usernames and passwords for a variety of online providers; 3) the no-cost state filing promotion by one tax software vendor in 2015 offered encouragement for unlimited attempts at perpetration (McKinnon and Saunders 2015; Saunders 2015).

The GAO (2015) acknowledged that sources of information for identity theft are limitless, and that a proactive prevention strategy by the IRS is essential. A major attraction to a taxpayer of e-filing through tax software is the ability to obtain a rapid refund. Ironically, that convenience enables criminals to file phony returns and collect billions of dollars of fraudulent refunds without detection. According to McKinnon and Saunders (2015), an estimated two million instances of e-file fraud occurred in 2013 worth about $5.2 billion. The risk of identity theft could cause a taxpayer to become an entrenched paper filer by choosing to stop or not to initiate e-filing.

Section II presents the theoretical foundation of the research model and eight corresponding hypotheses. In Section III we present the research design, followed by a summary of the results in Section IV. We discuss the findings, implications, limitations, and suggestions for research in Section V.

II. Theoretical Foundation

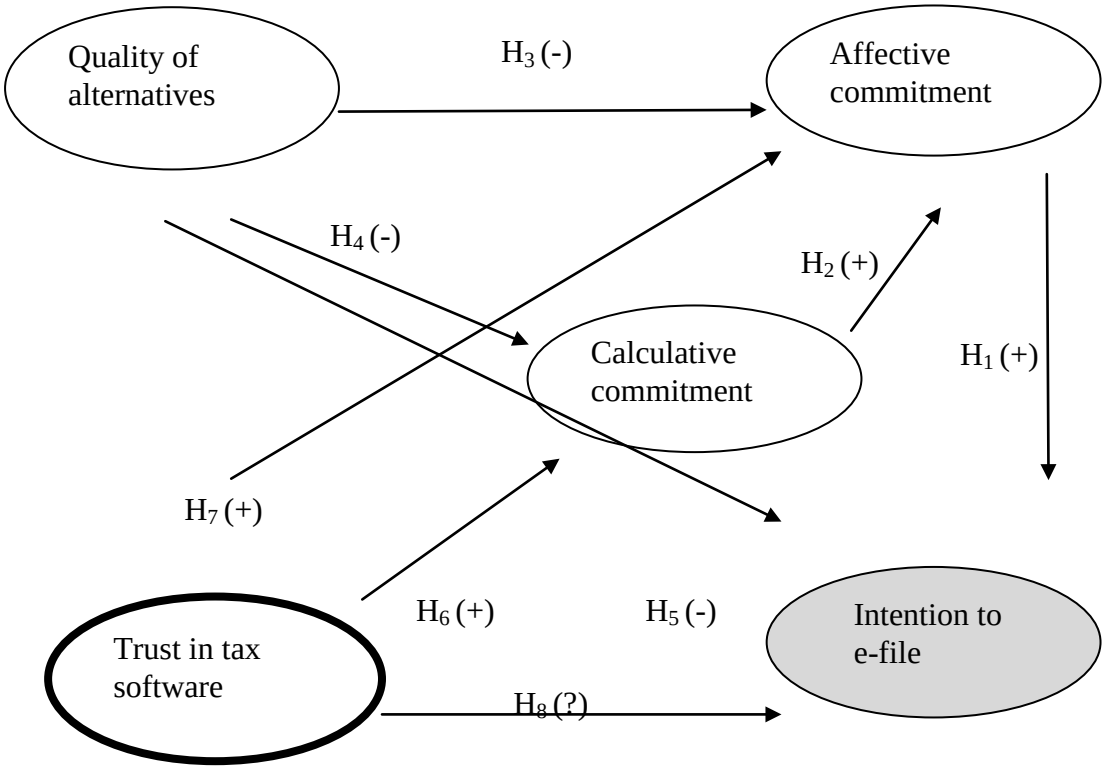
We draw from the technology commitment literature to address the role of the intermediary vendor (tax software) in e-filing. A taxpayer is required to file a tax return or face penalties prescribed by law, but is not obligated by law to e-file. We contribute to the literature by examining technology adoption in a

hybrid context wherein technology options are available to satisfy a legal obligation. Prior work has focused on purely voluntary contexts (e.g., Li et al., 2006). Our study considers the distinctive role of the intermediary vendor in the context of e-filing. A taxpayer must select an IRS-approved tax software to e-file. Alternatives to tax software include use of an IRS-approved tax preparer who will e-file and pass along those costs, or a manually prepared, paper and pencil submission. E-filing offers a unique lens through which to examine technology commitment because a tax return is required by law if income is above a certain level, but the format of the return (paper or e-file) is not mandated.[2]

Commitment generally refers to a mindset that motivates a course of action (e.g., Ilias et al., 2009; Meyer and Herscovitch 2001). Extant literature has explored the impact of commitment on technology adoption in the context of e-commerce (e.g., Gefen et al., 2003; Li et al., 2006; Piccoli et al., 2004), but to our knowledge e-filing has not to date been studied specifically. We construct a theoretical model of taxpayer intention to e-file, which is depicted in Figure 1. The outcome of interest is intention to e-file a U.S. individual tax return. The items within the construct are adapted from Agarwal and Karahanna (2000) and Li et al., (2006). We explore the influence of four constructs on a taxpayer's intention to e-file: 1) affective commitment; 2) calculative commitment; 3) quality of alternatives; and 4) trust in tax software. We describe the development of these constructs next.

[2] An individual not obligated to file a tax return may choose to do so to benefit from certain tax credits (http://www.irs.gov/uac/Do-I-have-to-File-a-Tax-Return%3F).

Figure 1: Hypothesized Commitment-Based Model of Intention to E-file



Affective Commitment

Li et al., (2006) define affective commitment as a scenario in which a technology user exhibits an emotional attachment to an e-vendor, in our case tax software, which we extend to the e-filing context. The items we use in our affective commitment construct are adapted from Li et al., (2006, 443).[3] Affective commitment suggests that a taxpayer has used a technology in the past and formed positive attitudes that are associated with affection, happiness, and pleasure (Jaros et al., 1993). These attitudes form during an individual's interaction with a technology. Research shows that an individual can develop an emotional bond with a website (Benbasat and DeSanctis 2001), which promotes continued patronage. Interpersonal social and psychological exchanges connect an individual to a technology, although these interactions may be difficult to measure in terms of economic benefits. Thus, we posit a formative relationship between affective commitment and intention to use tax software to e-file.

H_1: Affective commitment is positively associated with intention to use tax software to e-file.

[3] Allen and Meyer (1990, 6) describe commitment in an organizational setting from which Li et al., (2006) derive their measures.

Calculative Commitment

Calculative commitment occurs when a taxpayer perceives that the benefits associated with use of a service provider (e.g., tax software) exceed the costs or when the costs associated with stopping use or switching to another provider are too high (e.g., Allen and Meyer 1990; Becker 1960; Salancik 1977). We infer that an individual's knowledge of, or experience with, e-file may serve as a reinforcement in the relationship (e.g., Anderson and Weitz 1992; Kumar et al., 1995). The items we use to develop the calculative commitment construct are adapted from Li et al., (2006, 443), which were derived from Allen and Meyer (1990, 6-7). Calculative commitment as defined in our study is a situation where the end user recognizes the benefits associated with using e-file tax software. As a result of recognizing the net benefits of use, the taxpayer may develop a positive attitude and loyalty towards the relationship being built with the tax software. The front-end investment of time and energy into technology generates inertia, which leads us to hypothesize a positive association between calculative and affective commitment.

H_2: Calculative commitment is positively associated with affective commitment.

Quality of Alternatives

Quality of alternatives refers to the perceived attractiveness of comparable services to the one a taxpayer is currently using (Li et al., 2006). In our context, alternatives to an e-file tax software provider include the employment of a tax professional, tax-preparation entity, or manual preparation and mailing. To our knowledge, we are the first to study the quality of alternatives in an e-government initiative. Rusbult (1983) recognized that the presence of an alternative will threaten an existing relationship. In the context of e-filing, as the quality of alternatives increases, the intention to e-file should decrease. The items in our construct are adapted from Li et al., (2006, 443) as derived from Rusbult et al., (1998, 388). The following three hypotheses regarding the quality of alternatives reflect our expectation of a negative association with affective commitment, calculative commitment, and intention to e-file:

H_3: Quality of alternatives is negatively associated with affective commitment.

H_4: Quality of alternatives is negatively associated with calculative commitment.

H_5: Quality of alternatives is negatively associated with intention to e-file.

Trust in Tax Software

A taxpayer is required to use an IRS-approved e-file tax software, which creates an essential intermediary relationship. Individuals may hesitate when transacting with an internet-based vendor (in this case, tax software) due to the perceived risk of compromised personal data (McKnight et al., 2002).[4] Trust of electronic services has been explored extensively in both the e-commerce and e-government literatures, and it has been shown that without trust a transaction is unlikely to occur (e.g., Carter and Bélanger 2005; Gefen et al., 2003; Gefen and Straub 2003; Jarvenpaa et al., 1998; McKnight et al., 2002; Pavlou 2003; Schaupp and Carter 2008; Tan and Theon 2001; Warkentin and Gefen 2002).

E-file commitment depends on the belief that e-file tax software (i.e., a third-party intermediary) is capable of providing electronic services effectively and confidentially. We assert that a taxpayer's level of trust in the intermediary is an essential element of intention to e-file. We develop our construct for trust in tax software from McKnight et al., (2002, 355) and Morgan and Hunt (1994, 35).

With regard to e-filing, a taxpayer's perception of the integrity and ability of the provider is an important part of commitment, which has been well-documented in the literature (e.g., Becerra and Gupta 1999; Ganesan and Hess 1997; Jarvenpaa et al., 1998; Kim et al., 2008; Lee and Turban 2001; Mayer et al.,

[4] In early 2015, TurboTax®, the largest provider of e-filing tax software, temporarily suspended state return filings amid a spike in fraudulent activities regarding individual returns (Wells 2015).

1995; McKnight et al., 2002). Further, Keh and Xie (2008, 737) observe that user confidence in an e-vendor is positively impacted by the vendor's reputation. The level of trust that a taxpayer has in an intermediary's ability to accurately and securely process the tax return impacts intention to e-file, which leads to the following two hypotheses:

H_6: Trust in tax software is positively associated with calculative commitment.

H_7: Trust in tax software is positively associated with affective commitment.

With respect to the association between trust in tax software and intention to e-file, we posit that e-filing is unique from e-commerce because tax filing is an obligation, whereas website use is voluntary (Li et al., 2006). Our model incorporates the legal obligation to file an annual individual tax return. Although we anticipate an association between trust in tax software and intention to use an e-file service, we are unable to assert an *a priori* expectation about the direction of the association in the absence of relevant theoretical or prior empirical outcomes and thus hypothesize the following:

H_8: Trust in tax software is associated with intention to e-file.

Research Design

Instrument Development

We incorporate the technique advanced by Moore and Benbasat (1991) who developed a survey instrument useful for eliciting user perceptions about technology innovation adoption. The items within each construct were adapted from empirically validated instruments in the adoption literature (e.g., Carter and Bélanger 2005; Carter and Schaupp 2009; Fu et al., 2006; Li et al., 2006). A seven-point Likert scale, ranging from 1=strongly disagree to 7=strongly agree was used. The instrument was pre-tested with a group of seven professionals, and then pilot-tested with fifty-six senior-level accounting students at a mid-Atlantic university in the U.S. Constructs in the pilot test showed internal consistency levels exceeding 0.70 as measured by Cronbach's alpha. The survey items are summarized in Table 1.

Table 1: Construct and Item Definitions

Item name	Construct and variable definitions	Reference
	Intention to e-file	
INEF1	1. Filing taxes via e-file is something that I would do.	Agarwal and Karahanna (2000); Li et al., (2006)
INEF2	2. I would use the internet to file my taxes.	
INEF3	3. I intend to use an internet filing method for my income tax return next year.	
	Affective commitment	
AFFC1	1. I enjoy discussing the good aspects of e-filing with other people.	Allen and Meyer (1990);
	2. It is easy to become attached to e-file.	Li et al., (2006)
AFFC2	3. E-file has a great deal of attraction for me.	
AFFC3		
	Calculative commitment	
CALC1	1. To stop using e-file would require considerable personal sacrifice.	Allen and Meyer (1990);
	2. Some aspects of my life would be affected if I stop using e-file.	Li et al., (2006)
CALC2		

	Quality of alternatives	
QUAL1	1. An alternative method (i.e., traditional means such as via the mail) of tax filing is more appealing.	Li et al., (2006); Rusbult et al., (1998)
QUAL2	2. An alternative method of tax filing is better than e-file.	
QUAL3	3. To my knowledge, another method of filing my taxes (i.e., traditional means such as via the mail) is closer to ideal than e-file.	
	Trust in tax software	
TRIN1	1. IRS-approved tax software can be trusted at all times.	McKnight et al., (2002); Morgan and Hunt (1994)
TRIN2	2. IRS-approved tax software can be counted on to do what is right.	
	3. IRS-approved tax software providers have high integrity.	
TRIN3	4. IRS-approved tax software providers are competent and knowledgeable about electronic tax filing.	
TRIN4		

Data Collection

Our objective was to obtain a sample of U.S. taxpayers to measure their intention to e-file their personal income tax return. We obtained participants from public venues in several different areas in the mid-Atlantic region of the U.S. over the course of one year following our pilot studies. The researchers and graduate assistants identified volunteers in a variety of places frequented by a cross-section of taxpayers.[5] Participants were assured anonymity, thus no identifying personal data were obtained. The survey was completed by 121 taxpayers ranging in age from eighteen-eighty-nine and fifty-three percent were male.

Data Analysis

Our research model, which is depicted in Figure 1, was tested using partial least squares (PLS) techniques using SmartPLS[6] software. PLS is a structural modeling method that uses least squares parameter estimation to minimize the residual variances of all dependent variables (e.g., Chin 1998; Marcoulides and Saunders 2006; Marcoulides, Chin, and Saunders 2009). PLS has fewer theoretical requirements than competing structural equation methods (i.e., no distributional assumptions). The computational efficiency of the algorithm allows the estimation of large complex models with minimal sample size requirements. In our study, the sample size of 121 exceeds the generally accepted rule of thumb (Chin 1998, 311).

Results

Validity Tests of the Measurement Model

PLS requires that convergent and discriminant validity be assessed prior to analysis of the research model, which we conducted in three steps. We first assessed convergent validity with three tests recommended by Anderson and Gerbing (1988) as reported in Table 2. The standardized factor loading is indicative of the degree of association between a scale item and a latent variable (i.e., the construct). The loading values suggest convergent validity. Average variance extracted measures the variance in the items explained by the latent variable (Netermeyer et al., 1990). These values range from 0.60 to 0.90, all exceeding the recommended lower limit of 0.50 prescribed by Fornell and Larcker (1981). Composite

[5] All participants were entered into a drawing for four fifty dollar gift cards as an incentive to participate. The public places included airport lobbies, public libraries, post offices, motor vehicle registration offices, shopping malls, farmer markets, and community centers.
[6] http://www.smartpls.de/forum/

reliability values, which are similar to Cronbach's alpha, range from 0.82 to 0.97, all exceed the acceptable lower limit of 0.70.

Table 2: Three Tests of Convergent Validity

Construct and items	Mean	SD	Test 1: Standardized factor loading	Test 2: Average variance extracted	Test 3: Composite reliability
Intention to e-file	6.16	1.16		0.90	0.97
INEF1			0.95		
INEF2			0.95		
INEF3			0.96		
Affective commitment	5.18	1.25		0.66	0.85
AFFC1			0.64		
AFFC2			0.89		
AFFC3			0.88		
Calculative commitment	3.96	1.58		0.81	0.90
CALC1			0.94		
CALC2			0.86		
Quality of alternatives	2.56	1.14		0.60	0.82
QUAL1			0.84		
QUAL2			0.85		
QUAL3			0.62		
Trust in tax software	5.34	1.15		0.80	0.94
TRIN1			0.89		
TRIN2			0.91		
TRIN3			0.89		
TRIN4			0.89		

Our second step of the validity analysis determined whether the items loaded as expected on the intended construct. The item-construct correlations are presented in Table 3. The correlation pattern shows that an item posited to form a given construct has a stronger correlation with the intended construct than an alternative construct, which provides further evidence of both convergent and discriminant validity (Anderson and Gerbing 1988).

Table 3: Item-Construct Correlations

Item	INEF	AFFC	CALC	QUAL	TRIN
INEF1	**.946**	.714	.256	-.641	.532
INEF2	**.945**	.627	.293	-.583	.478
INEF3	**.960**	.639	.270	-.702	.465
AFFC1	.259	**.644**	.487	-.103	.492
AFFC2	.572	**.890**	.555	-.551	.528
AFFC3	.760	**.884**	.470	-.554	.598
CALC1	.303	.622	**.938**	-.330	.390
CALC2	.196	.445	**.862**	-.173	.255
QUAL1	-.587	-.453	-.296	**.835**	-.387
QUAL2	-.554	-.494	-.314	**.852**	-.438
QUAL3	-.421	-.282	.011	**.618**	-.276
TRIN1	.507	.616	.432	-.440	**.893**
TRIN2	.478	.630	.307	-.490	**.913**
TRIN3	.377	.521	.278	-.414	**.887**
TRIN4	.477	.582	.288	-.375	**.888**

Refer to Table 1 for item definitions.

In the third step we assessed discriminant validity of the constructs. The results of our analysis are presented in Table 4. A construct is considered to be distinct from the others if the average variance extracted for it is greater than its squared correlations with other constructs (e.g., Fornell and Larcker 1981; Nunnally and Bernstein 1994; Smith and Barclay 1997). The values on the diagonal are the average variance extracted. As a result of the analysis, we conclude that appropriate discriminant validity exists.

Table 4: Construct Discriminant Validity

Constructs	INEF	AFFC	CALC	QUAL	TRIN
Intention to e-file (INEF)	**.903**				
Affective commitment (AFFC)	.484	**.663**			
Calculative commitment (CALC)	.082	.368	**.811**		
Quality of alternatives (QUAL)	.459	.295	.086	**.601**	
Trust in tax software (TRIN)	.269	.435	.136	.232	**.801**

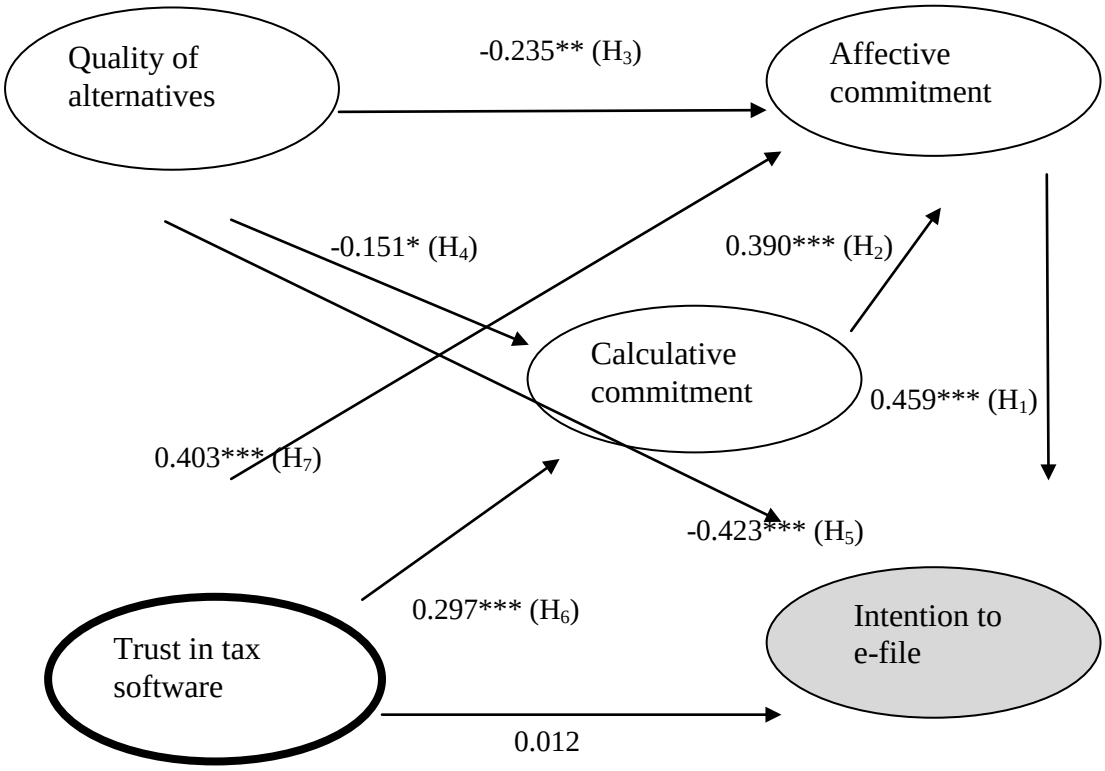
The diagonal values are the average variance extracted; the remaining cells are the squared correlations.

Estimated Model and Hypotheses

We present the estimated PLS model results in Figure 2. PLS provides goodness-of-fit measures for the endogenous constructs in the model. The model (based on R^2 measures) explains 61.2% of the variance in intention to e-file, 62.9% of affective commitment, and 15.4% of calculative commitment. Figure 2 shows the path coefficients for each hypothesized relationship and the corresponding *p-values*. Seven of the eight paths are significant at traditional levels. The signs of each coefficient are as predicted.

We find support for H_1 because affective commitment is significant in explaining a taxpayer's intention to e-file (coefficient = 0.459; $p < 0.001$). This result indicates that positive attitudes, favorable feelings toward, and emotional attachments are salient. H_2 is supported; the effect of calculative commitment on affective commitment is positive (coefficient = 0.390; $p < 0.001$).

Figure 2: Commitment-Based Model of Intention to E-file



***$p < 0.001$; ** $p < 0.01$; *$p < 0.05$

We tested three hypotheses about a negative association with quality of alternatives. In H_3, quality of alternatives has a negative association with affective commitment (coefficient = -0.235; $p < 0.01$). In H_4, quality of alternatives has a negative association with calculative commitment (coefficient = -0.151; $p < 0.05$). In H_5, quality of alternatives has a negative association with intention to e-file (coefficient = -0.423; $p < 0.001$). These findings reveal that a taxpayer is less likely to be committed to the current use of e-file and the relationship with the tax software if he or she is aware of an alternative that is more attractive.

In our test of H_6, trust in tax software is found to have a significant positive relationship with calculative commitment (coefficient = 0.297; $p < 0.001$), as reflected in our hypothesized model. Our findings are consistent with Li et al., (2006) and reveal that the taxpayer's trust of the tax software is a precursor to establishing a favorable cost-benefit evaluation that is necessary to proceed as an e-filer. Thus taxpayers perceive that the costs of switching to an alternative are too high.

In our test of H_7, we find a significant positive relationship between trust in tax software and affective commitment (coefficient = 0.403; $p < 0.001$), consistent with our expectation and prior literature (e.g., Morgan and Hunt 1994). This finding suggests that the more an individual trusts the tax software, the more likely he or she is to be attached to the relationship.

In H_8, we hypothesized the existence of an association with trust in tax software and intention to e-file. However, extant literature does not provide us with an *a priori* expectation of the direction of the association. The path, however, is not significant. Thus H_8 is not supported. The non-significant path

suggests that trust does not directly lead to an intention to e-file. However, a joint interpretation of H_2, H_6, and H_7 is that trust is a necessary and influential condition for the two factors (affective and calculative commitment) that directly indicate intent to e-file.

Discussion

Understanding intention to use an e-file service informs regulators focused on goals of adoption rates and those addressing concerns about risks of identity theft. We develop a model of intention to e-file with tax software grounded in and adapted from the theoretical framework and constructs empirically validated by Li et al., (2006). We design our model based in theory from the trust, commitment, technology acceptance, and adoption literatures.

Our measurement model captures over sixty percent of the variability in intention to e-file, suggesting comparable explanatory power to prior work. The coefficients of seven of the eight paths are significant in the hypothesized directions. We infer that the non-significant path between trust in tax software and intention to e-file is reflective of the indirect effect that trust has on intent. Only through its influence on calculative and affective commitment does trust operate as an antecedent to intention to e-file.

Research shows that trust is essential when perceived risk is present (e.g., Mayer et al., 1995). Trust in the intermediary (tax software) is an important element of technology adoption, and captures the integrity and ability of the tax software to meet the taxpayer's expectations and desired outcomes (e.g., privacy of data, processing speed, and convenience surpass the alternatives). We conclude that the IRS-approved tax software vendors should be attentive to the way new entrants to industry earn trust, because once earned, it fortifies the commitment. However, if trust is breached, it may be irretrievable, emphasizing the GAO's (2009, 2015) concerns about the potential frailty of the e-filing system. Based on a sample of 121 taxpayers who volunteered to complete our survey, we conclude that the antecedents of intention to e-file include trust in tax software, affective commitment, calculative commitment, and quality of alternatives.

The manner in which taxpayers access the Internet has shifted from a dial-up modem to the proliferation of smartphones, tablets, and savvy users. This technological shift has allowed individuals who in the past did not have Internet access to now having the capability via mobile devices to access online tax software. The advantage to these nontraditional e-file users is that it provides them access to tax software, which aids in the tax filing process, but also provides access to refund monies more quickly than traditional means. The availability of e-file tax software at no charge also provides tax assistance that would otherwise require funds.

The robustness of our results suggests that the constructs inform the discussion about meeting the goals of e-filing set forth by the IRS and the identity-theft cautions expressed by the GAO (2009, 2015) and others (e.g., McKinnon and Saunders 2015). As with similar survey research methods, our data may suffer from self-report bias. The survey was not administered in a controlled setting, which may alter the generalizability of our conclusions. Future research may validate our model in settings that more explicitly isolate potential confounds.

Our research can be extended in several ways. First, the proliferation of mobile devices and tablets offers low-cost access to the Internet, which should increase adoption of e-filing technology, but also increase the attendant risks of fraud. Implications on the IRS mandate for compliance and smartphones should be studied in a commitment-based environment. Second, when conducting our data collection we did not delineate between e-filing for federal vs. state tax returns. To our knowledge, federal returns to date have not been [publicly] affected by e-filing fraud, perhaps because the IRS has implemented stronger fraud detection policies, such as the requirement of knowledge of adjusted gross income and a PIN requirement not present on state returns (Wells 2015). However, the GAO (2015) expressed concerns that these protections may not be sufficient. Prior literature has suggested the critical link between trust and intention to use an e-file system (Chen et al., 2015), and the potential for harm caused by fraudulent

activity would arguably hinder the trust relationship between the tax software vendor and the individual tax filer. Research regarding intention to e-file in different tax contexts may be important. Third, future research should address intention to *reuse* e-filing to ensure that IRS compliance rates are maintained in the presence of concerns about identity theft and delayed refunds, and whether the IRS is adequately assessing and responding to these risks. The role of the impact of security breaches on trust and e-filing has not to date been explored. Fourth, individual taxpayers who are not sophisticated in tax law may unknowingly be lured into using a tax software that does not optimize deductions and credits, which could produce a higher tax burden. Research should benchmark the tax liability generated by various software vendors and tax preparers to ascertain if e-filing is in the best interest of the taxpayer. Fifth, we surveyed individuals from general venues who may or may not have been knowledgeable of tax law. Future research should consider if our model applies to different levels of tax knowledge, tax brackets, and experience with tax preparation.

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