

**Analysis of Taxpayers' Intention to Use Tax E-Filing System in Tanzania: Controlling for Self-Selection Based Endogeneity**

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**Abstract**

This paper aims at analysing factors that influence taxpayers' intention to use electronic tax filing system. The paper employs Technology Acceptance Model (TAM) framework. We first estimated traditional TAM model using OLS. Using econometric tests we observed self-selection endogeneity bias in intention to use e-filing system. To account for this bias we estimated endogenous switching regression model. Results of endogenous switching model show that risk, social influence and performance expectancy have significant effects on intention to use e-filing. Further, we found that these factors affect users and non-users intentions differently, calling for differentiated strategies in influencing e-filing use intention. Lastly, we recommended both administrative and technical issues to be considered for enhanced intention to use and adoption of e-filing system.

**Keywords:** Electronic tax filing; Self-selection endogeneity; Technology Acceptance Model

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## **1. Introduction**

Electronic tax filing system (e-filing) is not an old phenomenon in the Tanzania taxation system; it was first introduced in VAT in 2007. The Tanzania's tax laws such as the Value Added Tax - VAT Act (1997) and the Income Tax Act (2004) require every taxable person to lodge with Commissioner a tax return in a form prescribed by the Commissioner. The tax returns can be submitted manually or electronically. However, the use of electronic filing is only mandatory for VAT registered taxpayers and voluntary for other category of taxpayers.

This study is conducted to examine factors that influence intention to use the system so as to provide information for planning and scaling up of its usage among taxpayers. Electronic filing system enables submission of tax returns directly from taxpayers' premises into tax administration computers using internet. The introduction of this method is ought to enable taxpayers submit tax returns in a convenient, faster and cost effective way and hence enables efficient processing of tax returns both by the taxpayer and the tax administration (URT, 2010). Other benefits of e-filing include time and money saving for the tax authority through significant reduction in paper work. It has also reported to reduce possibility of keying and input errors. Also e-filing of tax returns cost less to process compared to a paper return (Eichfelder & Kegels, 2014). Fu, Farn & Chao (2006) reported an experience in Taiwan that error rate for electronically filed income tax returns was less than 1% compared to 20% for paper returns. Moreover, e-filing reduced tax evasion and also help reduce potential incidents of corruption by reducing frequency of contact between taxpayers and tax officials thus protecting government revenue. These and other benefits of e-filing have an overall effect of enhancing tax compliance and revenue collection and improves tax yield as the administration costs are significantly reduced.

The uptake of tax e-filing and its adoption among taxpayers in Tanzania has been very little. As e-government is a new phenomenon for most citizens in developing countries like Tanzania it is no surprise that its adoption has encountered many setbacks. Limited adoption of tax e-filing may be attributed to, among other factors, the general low attitude towards tax compliance by majority of the taxpayers and behavioural aspects on adopting to new technologies. Available studies that highlight on e-government adoption and ICT usage in Tanzania (for example Yonazi, 2010; Rumanyika & Mashenene, 2014) despite pointing out related challenges provide little focus on particular technologies for tax administration. A broad literature on tax e-filing is available for studies conducted elsewhere but limited information is available for countries like Tanzania which are peculiarly challenged by level of ICT knowledge and usage, infrastructure development to support uptake of ICT related technology, and low awareness of citizens on e-governance. This study aims to close this knowledge gap by analysing factors for taxpayers' intention to use tax e-filing in Tanzania and prioritize interventions that will enhance adoption.

The purpose of this paper is to analyse the factors that are relevant for taxpayers' intention to use electronic tax filing system. Following the TAM framework which suggests that intention to use a technology is influenced by effort expectance, perceived risk, social influence, optimism bias and performance expectance our study objectives were to find out the effects of these behavioural constructs on e-filing adoption. As such we adopted five null hypotheses of the study which are stated as:

- H<sub>1</sub>: Effort expectance has no effect on intention to use e-filing
- H<sub>2</sub>: Perceived risk has no effect on intention to use e-filing
- H<sub>3</sub>: Social influence has no effect on intention to use e-filing
- H<sub>4</sub>: Optimism bias has no effect on intention to use e-filing

H<sub>5</sub>: Performance expectance has no effect on intention to use e-filing

Since this study used both users and non-users of e-filing and that using e-filing is voluntary for some categories of taxpayers, we observed a problem of self-selection based endogeneity; e-filing users self-select because of specific traits which they possess. This implies that results of OLS estimation are biased. In this paper we used endogenous switching regression model to treat the endogeneity problem. This paper is therefore on the other hand adds to empirical literature on how to handle systematically the problem of self-selection endogeneity in empirical studies on adoption of technologies.

The rest of the paper is organized as follows: Section 2 provides a review of both theoretical and empirical literature on technology adoption by putting more emphasis on electronic tax filing system. Section 3 describes the methodology used including sampling procedure, data collection and instruments validity, and analytical models estimated. Section 4 reports findings of data analysis and their discussions. Lastly, Section 5 concludes the study by providing summary of key findings and provides recommendations to the tax agency for enhancement of e-filing system usage among businesses.

## **2. Literature Review**

### **2.1 Theoretical review on technology adoption**

Theories on technology adoption have evolved over time and there is a vast theoretical body of knowledge on technology adoption. Prominent theories on technology adoption include the Theory of Perceived Risk, Theory of Reasoned Action which was propounded by Fishbein & Ajzen (1975), the Technology Acceptance Model – TAM proposed by Davis, Bagozzi & Warshaw (1989), and the Theory of Planned Behaviour (TPB) by Ajzen (1991).

Of the available technology adoption models, this study is guided by a Technology Acceptance Model (TAM) developed by Davis et al. (1989). The TAM is preferred because it suits the study scenario of self-reported and intention to use. According to Szajna (1994) and Legris, Ingham & Collette (2003) TAM has predictive validity for intent to use and self-reported usage and has proven to be a theoretical model in helping to explain and predict user behaviour of information technology. Also the TAM framework is also one of the most widely used theoretical framework in explaining individuals' acceptance behaviour towards an information system such as tax e-filing. As reported by other scholars (e.g. Park, 2009), TAM is a good theoretical tool to understand why technology is adopted and traces how external variables influence belief, risk, attitude, and intention to use.

The Technology Acceptance Model (TAM) is an information systems theory that models how users come to accept and use a technology. The theory is an adaptation of the Theory of Reasoned Action developed by Fishbein and Ajzen (1975). Davis et al. (1989) further developed a similar model - Technology Acceptance Model (TAM) - with particular application on prediction of the acceptability of an Information System (IS). TAM replaces many of Theory of Reasoned Action's attitude measures with the two technology acceptance measures - *ease of use* and *usefulness* – as were suggested by result from empirical findings (Tornatzky & Klein, 1982; Legris, Ingham & Collette, 2003). According to Davis (1989) users are motivated to use the system by two main factors: perceived usefulness, and perceived ease of use. Perceived usefulness is the users' expectation that by adopting new technology could result into improvement of work performance, while perceived ease of use being a degree to which a person expects that using a particular system would be free of effort.

The TAM has been continuously studied and expanded - the two major upgrades being the TAM 2 and the Unified Theory of Acceptance and Use of Technology (UTAUT). A TAM 3 has also been

proposed in the context of e-commerce with an inclusion of the effects of trust and perceived risk on system use. Refinements in the initial model were trying to find the latent factors underlying perceived ease of use and perceived usefulness. A notable refinement of the TAM model is proposed by McFarland & Hamilton (2006). Their model assumes that six contextual variables (prior experience, other's use, computer anxiety, system quality, task structure, and organizational support) affect the dependent variable (system usage) through three mediating variables (computer efficacy, perceived ease of use and perceived usefulness). The model also postulates direct relations between the external variables and system usage.

Despite several criticisms in the early years of development of the model, such as Hu, Chau and Sheng (1999) who point out that perceived ease of use is less likely to be a determinant of attitude and usage intention, which rendered original proposers to attempt to redefine it several times, the theory has been supported by empirical studies. Although the initial model or its extension does not completely accounts for the observed variance in system usage, the models all agree that computer efficacy affects perceived ease of use, which in turns is strongly related to perceived usefulness.

Since Davis et al. (1989) originally proposed the Technology Acceptance Model (TAM), the importance of technology acceptance as a precursor to the use of technology has attracted much attention from researchers and practitioners (Venkatesh, Morris, Davis & Davis, 2003). The TAM explains the causal relationships between internal psychological variables such as beliefs, attitudes, and behavioural intention and actual system use. The original TAM has been widely studied and accepted as a valid model to predict individual acceptance behaviour across various information technologies and their users.

## **2.2 Empirical review on tax e-filing adoption**

The application of TAM and other adoption theories find their way in tax related studies. Interest in studying adoption of electronic tax technologies has been renewing and governments are increasingly introducing various information technologies in the tax system so as to ease operations and compliance. Fu et al. (2006) reported that governments today have benefited from information technology by easing administration. This study stress that the importance of understanding and influencing citizens' acceptance of e-government services is critical, given the investment in technology and the potential for cost saving.

Various methods are available for filing tax returns and they include manual, internet-based and two-dimensional (2D) barcode. Manual filing is the traditional method where a taxpayer performs arithmetic calculations to determine tax affairs and file information in a prescribed paper form (tax return) using pen or typewriter. This process is cumbersome, time-consuming and paper-intensive for both taxpayers and tax agency. The development in computing enables introduction of internet based and 2D barcode in an attempt to reduce cost of tax collection. These later two methods use tax preparation software and public key certification issued by the tax agency. Once tax information is filed calculations, error checking and suggestions for best tax return option are carried out automatically by the software. Both internet-based and 2D barcode tax filing require connectivity to internet, but 2D is more sophisticated because it uses scanner which send information directly to the tax agency. The 2D barcode method has limitation to taxpayers who have no direct connectivity to internet in their business premises (Fu et al., 2006). For small taxpayers who cannot afford computers and internet connectivity in their business premises the internet-based is preferred because it allow them to them to file returns elsewhere they have access to internet. Thus access to computing and internet facilities can be a major hindrance for adoption of e-filing in developing countries like Tanzania where the economy is dominated by small taxpayers who either cannot afford to have these facilities or have limited skills in information technology.

Apart from the many reported benefits of tax e-filing there are as well offsetting costs. Studies by Sweeny, Soutar & Johnson (1999) and Yilmaz & Coolidge (2014) reported some of these costs. For small taxpayers, additional capital may be needed to invest for e-filing in order to put the system in place. This may entail purchasing of hardware and connectivity to internet. If the costs are high, it is likely that they affect e-filing adoption in the short-run; in the long run the accumulated benefits outweigh these costs. Also additional time may be required to learn the system for practical implementation of the policy in the country. Studies conducted in Tanzania by Yonazi (2010) and Rumanyika & Mashenene (2014) reported constraints related to low level of ICT development in the country. Nevertheless, making compliance with regulations for tax e-filing affordable cannot be neglected in the process of rolling out the system to taxpayers.

There is a rich literature on factors influencing tax e-filing adoption. These factors range from socioeconomic and demographic factors to behavioural constructs. Ilias, Razak & Yasura (2009) assessed the role of education on e-filing adoption. Their study suggested that education background has an important role in influencing the taxpayers' attitude to use e-filing. However, the study found no significant difference between genders in terms of attitude in using e-filing. A study by Lu, Huang & Lo (2010) reported tax equity as one of the factors that affect attitude towards online filing of tax. The influence of behavioural aspects (perceived usefulness, social norm, perceived risk, and perceived ease of use) on intention to use electronic tax systems have been widely studied (for example Ba & Pavlou, 2002; Wang, 2002; Fu et al., 2006; Schaupp, Carter & Hobbs, 2009; Azmi & Bee, 2010; Azmi & Kamarulzaman, 2010; Lu et al., 2010; Azmi, Kamarulzaman & Hamid, 2012; Gupta, Zaidi, Udo & Bagchi, 2015). These studies have used either singly or a combination of models such as TAM and TPB. Generally, these studies are in congruence in their findings that behavioural constructs as proposed by these models play an important role in taxpayers' intention to adopt electronic tax filing. Azmi & Bee (2010) found that perceived risk has been reported to have negative effect on the intention - perceived risk is considered as a key component in achieving public trust of using e-filing. Therefore, while adopting new technologies, governments should consider risk of security, information confidentiality, integrity and availability. Effort expectancy is positively related to intention to use e-filing system (Chiu & Wang, 2008). Since some categories of taxpayers can voluntarily file their tax returns electronically if a system is useful and easy to use, the government should increase its efforts to promote the usefulness and user-friendliness of the e-filing system. Lastly, as Fu et al. (2006) observed the effects of perceived ease of use, subjective norms and self-efficacy on behavioural intention are different for manual and electronic tax-filers give stance to this current study. Since electronic tax filers may have different perception it introduces potential endogeneity.

### **2.3 Selection Based Endogeneity Problem**

The ambition to make causal claims is often a problem in social studies because of inability to control randomized experiments which is a prerequisite for making strong causal inference. As such social studies rely on observational data sets. Since independent variables cannot be exogenously manipulated such empirical contexts are prone of endogeneity bias (Li, 2012). Endogeneity bias arises when a variable or latent factor exist which both affect the dependent variable and is correlated with one or more explanatory variables. In essence, such a condition ensures that included explanatory variables will correlate with the error term as variation in the latent variable will manifest in the error term. This violates an important assumption of the OLS (exogeneity assumption) that an error term has an expected value of zero given any explanatory variable.

According to Heckman (1976, 1979) neglecting selection represent a specification error that is akin to the omitted-variable bias. The basic insight behind selection bias being a form of omitted-variable bias is that the selection process represents an excluded variable that manifests in the error term and

correlates with the endogenous choice construct and outcome variable (Antonakis, Bendahan, Jacquart & Lalive, 2010). Though we couldn't prod much, we noted that studies employing TAM model either have not concern with selection problem or they repress these results in the final presentation. However, Lopez (2013) implicitly indicated the potential of selection problem in TAM model. Moreover, adding new constructs has been performed by many researchers to suit environments in which the model is applied.

Endogeneity bias renders coefficient estimates inconsistent in the sense that they do not converge to true coefficient values. As clarified in Wooldridge (2010) there are three main sources of endogeneity bias: measurement error, simultaneity, and omitted variables. Of these problems omitted variable have received the greatest amount of attention by management scholars as the principle source of endogeneity (Clougherty & Duso, 2015).

Selection-based endogeneity manifests in two main forms: sample selection and self-selection biases. Sample selection bias occurs when a sect of the population is not sampled. Self-selection concern arises when the dependent variables are observed for different subsamples, yet non-randomness is involved with the manifestation of these dependent constructs. Since both electronic filer and non-electronic filers were sampled our empirical work do not have problem of sample selection. Rather our serious concern is self-selection. Self-selection creeps in from taxpayers self-select to operate tax e-filing in our sample. Self-selection to use tax e-filing system represent endogeneity because factors that are associated with use may as well affect perceptions and intention to use. In fact many firms' decisions are endogenous and self-selected. Wooldridge (2010) point out self-selection to be a common source of omitted variable bias in empirical work being done in the behavioural and social sciences.

However, a potentially endogenous treatment exist which partitions our population of study into two subsamples (users and non-users of tax e-filing) we can distinguish between two self-selection variants, viz. endogenous treatment and endogenous switching. The main difference between the two is whether we assume that treatment merely has an intercept effect on the outcome (endogenous treatment) or whether this effect is also on the coefficient estimates - endogenous switching (Maddala, 1986). We postulate that use of electronic filing affects perceptions and hence endogenous switching modelling is appropriate.

### **3. Methodology**

#### **3.1 Population and Sampling procedure**

The population of the study was business taxpayers in three regions of Tanzania namely Dar es Salaam, Mwanza and Coast who are eligible of filing tax returns. The sampling procedures took into consideration number of taxpayers and representation. The study sampled both users and non-users of electronic filing. A total of 226 taxpayers (businesses) were sampled of which 172 (76.1%) were male and 54 (23.9%) were female. Most of the sampled businesses are of small and medium scale, as they represent majority of businesses.

#### **3.2 Data collection and Instruments**

Data for the study was collected through structured questionnaires which were administered directly to business owners/operators. Although the study used mainly primary data from questionnaires, desk review also complemented data for this study. The questionnaire design was adopted from previous studies in tax filing (e.g. Schaupp and Carter, 2009 and Ramayah et al., 2009) and modified to suit study requirements. Questions in the questionnaire used a five-point Likert scale, ranging from 1 (Strongly Disagree) to 5 (Strongly Agree), to measure users' perception in terms of effort expectancy, performance expectance, social influence, perceived risk and optimism bias related to usage of e-

filing. The questionnaire was tested for reliability and validity using Cronbach's Alpha - a common measure of internal consistency ("reliability") of the questionnaire. Nunnally and Bernstein (1994) cited in Yong and Pearce (2013) suggest a cut-off point of 0.7 for a reliable scale. We obtained a Cronbach's Alpha of 0.777 (which is above the cut-off point of 0.7) which suggests that the scales were reliable.

### **3.3 Data Analysis Techniques**

Data were analysed by using bivariate and multivariate statistical techniques combining descriptive, semiparametric and regression analysis in order to answer the hypotheses. Descriptive statistics such as frequency, mean and standard deviation were used to explore the sample characteristics. Our estimation procedure involved several steps: First, we estimated model (1) using OLS and performed post estimation diagnosis; re-estimated model (1) with inclusion of e-usage dummy (3a) using OLS; estimated 2SLS model by including (3b) and then test for endogeneity using Durbin-Wu-Hausman test; and finally we estimated the endogenous switching model.

#### **3.3.1 Theoretical model**

The analytical model of our study is informed by the TAM framework which provides variables that influence intention to use a technology. According to the TAM model, users are motivated to use the system by two main factors: perceived usefulness, and perceived ease of use. Perceived usefulness is the users' expectation that by adopting new technology could results into improvement of work performance, while perceived ease being a degree to which a person expects that using a particular system would be free of effort (Davis, 1989).

The analytical models used are specified as:

$$Y_i = \alpha_0 + \alpha_1 x_i + \varepsilon_i \quad (1)$$

where; Y = intention to use, X<sub>1</sub> = perceived effort expectance, X<sub>2</sub> = perceived risk, X<sub>3</sub> = social influence, X<sub>4</sub> = optimism to use ICT, X<sub>5</sub> = perceived performance expectance, α's are coefficients, and ε<sub>i</sub> is a disturbance term.

#### **3.3.2 Self-selection bias and endogenous switching model**

Following various econometric tests we observed self-selection endogeneity problem in our basic model. In order to deal with the observed selection biases we adopt an endogenous switching regression model. The switching model estimated the intention to use model by combining two models which represent two regimes faced by taxpayers of our sample, i.e. those who use electronic filing, and those who do not use. The endogenous switching model is defined as follows:

$$\begin{cases} Y_i^1 = \alpha_0^1 + \alpha_1^1 x_i^1 + \varepsilon_i^1 & \text{if } z_i = 1 \\ Y_i^0 = \alpha_0^0 + \alpha_1^0 x_i^0 + \varepsilon_i^0 & \text{if } z_i = 0 \end{cases} \quad (2a)$$

$$\quad (2b)$$

where the latent variable ( $z_i$ ) is defined as:

$$z_i = \begin{cases} 1 & \text{if } z_i^* > 0 \text{ (i.e. individual use tax e-filing)} \\ 0 & \text{otherwise} \end{cases} \quad (3a)$$

which is modelled as:

$$z_i^* = \beta_0 + \beta_1 Z_i + \omega_i \tag{3b}$$

where  $Z_i$  represent variables that do not directly affect intention to use tax e-filing but are hypothesized to affect the probability that a taxpayer selected to use electronic filing system. The variables used are education, location, experience, and usage of computer and internet facilities.

The error terms are assumed to have a trivariate normal distribution, with zero mean and non-singular covariance matrix expressed as:

$$\text{cov}(\varepsilon_i^1, \varepsilon_i^0, \omega_i) = \begin{pmatrix} \sigma_{\varepsilon_0}^2 & \sigma_{\varepsilon_0 \varepsilon_1} & \sigma_{\varepsilon_0 \omega} \\ & \sigma_{\varepsilon_1}^2 & \sigma_{\varepsilon_1 \omega} \\ & & \sigma_{\omega}^2 \end{pmatrix} \tag{4}$$

Since  $Y_{1i}$  and  $Y_{0i}$  are not observed simultaneously therefore the covariance between  $\varepsilon_0$  and  $\varepsilon_1$  is not defined (Maddala, 1983). An important implication of the error structure is that the error term of the selection equation (3b)  $\omega$  is correlated with the error terms of the equations (2a) and (2b), and hence there is a selectivity bias because the expected values of  $\varepsilon_0$  and  $\varepsilon_1$  are nonzero. To formalize this reasoning consider the OLS regression of Y on X and take expectation of model (2):

$$E(Y_i | X_i, Z_i = 1) = E(X_i' \alpha + \varepsilon_i | X_i, Z_i^* > 0) = X_i' \alpha + \sigma_{\varepsilon_i \omega} \left( \frac{\phi(z_i' \beta)}{1 - \Phi(z_i' \beta)} \right) \tag{5}$$

where  $\phi(\cdot)$  is the standard normal density function and the selection bias is  $\sigma_{\varepsilon_i \omega} \left( \frac{\phi(z_i' \beta)}{1 - \Phi(z_i' \beta)} \right)$ . Thus, if

the selection into subsample  $z = 1$  is not random the OLS regression of Y on X would led to biased coefficient estimates.

### 3.3.3 Estimation of regression switching model

An efficient method to estimate endogenous switching regression models is by full information maximum likelihood (FIML) estimation (Lee & Trost, 1978; Lokshin & Sajaia, 2004). An alternative estimation method is the two-step procedure. However, this method is less efficient than FIML, it requires some adjustments to derive consistent standard errors (Maddala, 1983). The FIML method simultaneously estimates the binary selection equation (3b) and the regression equation (1) to yield consistent standard errors. The FIML estimates of the parameters of the endogenous switching regression were operationalized using STATA (see Lokshin & Sajaia, 2004).

### 3.3.4 Expected results of parameter estimates

Effort expectancy is expected to have positive relationship with intention to use e-filing ( $\alpha_1 > 0$ ), perceived risk is expected to have a negative effect ( $\alpha_2 < 0$ ), social influence is expected to have positive effect ( $\alpha_3 > 0$ ), optimism bias is expected to have positive effect ( $\alpha_4 > 0$ ), and performance expectancy is expected to have positive effect ( $\alpha_5 > 0$ ). Moreover, the coefficient  $\beta_1$  is expected to be either positive or negative depending on the influence a covariate of a latent variable will have on intention to use tax e-filing.



## **4. Results and Discussion**

### **4.1 Descriptive statistics**

#### **4.1.1 Demographic Profile of the Respondents**

Results on demographic profile of the respondents indicate that majority of respondents were male. Majority (91.6%) of respondents have age between 18 and 55 years. Further, majority (91.1%) of respondents have attained at least secondary education. Being in active age and level of education are important factors for information technology adoption. Trade as a primary activity comprises a largest sect (62.5%) of respondents; this has bearing effect on commitment to invest in business including tax e-filing system for simplifying return preparation work: people who have other primary occupations may be less committed to invest in business especially if they perceive these secondary undertakings have little contribution in their incomes.

#### **4.1.2 Access and usage of ICT facilities**

The study found that only 44% of respondents used electronic filing of tax returns, with more usage in metropolitan areas. Low usage in other areas may be a result of inadequate technical services and scale of businesses operated. Results in Table 1 indicate that majority of respondents use internet although less frequently. Those who use at least few times a week represent 68.5% of the surveyed business owners. Respondents who have computer and internet represent about 51%. Literature shows that ability to use and accessibility to ICT facilities reduce steepness of learning curve and hence enhance adoption of information technologies. For instance, Wang (2002) reported that computer self-efficacy has influence on perceived usefulness, perceived ease of use, and perceived credibility.

**Table 1: Use of ICT facilities**

<b>Description</b>	<b>Number of Respondents</b>	<b>Percent</b>
<b>Internet usage</b>		
Never	48	21.9
Less than once per month	7	3.2
Once a month	7	3.2
Once a week	7	3.2
Few times a week	150	68.5
<b>Ownership of Computer</b>		
Don't have computer	60	27.4
Computer without internet	47	21.5
Computer with internet	112	51.1

#### **4.1.3 Influence of socioeconomic factors**

Results of semiparametric tests of influence of socioeconomic are reported in Table 2. These results enable specification of selection equation (3b). Results shows that usage of tax e-filing has significant association (at  $p < 0.01$ ) with scale of business, location, access to ICT facilities and education. Age, sex and experience were found to have insignificant association with e-filing usage at  $p < 0.05$  significance level. The study by Kamau (2014) in Kenya also found that scale of business is an important determinant of e-filing usage.

**Table 2: Crosstabs of socioeconomic factors and e-filing usage**

<b>Crosstab Relation</b>	<b>df</b>	<b>Chi - square (<math>\chi^2</math>)</b>	<b>Sig.</b>
Scale of business and e-filing	4	40.00	0.00
Location and e-filing	5	13.39	0.01
ICT facilities and e-filing	4	47.04	0.00
Education and e-filing	4	25.07	0.00
Age and e-filing	3	4.87	0.18
Sex and e-filing	1	1.09	0.29
Experience and e-filing	27	27.89	0.42

#### **4.2. Exploratory results of behavioural intentions construct**

Results of respondents' behavioural constructs, which are intention to use, performance expectancy, effort expectance, optimism, perceived risk and social influence, are presented in Tables 6 to 11.

##### **4.2.1 Intention to use**

The results on intention to use e-filing (Table 6) reveal that majority (61.6%) of the respondents scored all factors associated with intention to use e-filing between agreed and strongly agree. About 74% rated willingness to do tax e-filing between agree and strongly agree. These findings suggest that majority are enthusiastic to adopt and use tax e-filing system. Further, these results may suggest the ease of enhancing adoption and usage of e-filing by the tax administration.

##### **4.2.2 Performance Expectance**

Results of respondents' perception on performance expectance (Table 7) indicate that majority of the respondents agreed that e-filing will improve tax returns filing process. It can be seen from Table 8 that most of the factors which indicate that e-filing will improve tax filing process have been rated between 'agree' and 'strongly agree' by majority of the respondents. For instance, a factor 'Using e-filing will speed the tax filing process has' been rated 'I agree' by 81.9% of respondents. Further, majority of respondents (73.5%) perceived that using e-filing will be advantageous.

##### **4.2.3 Effort Expectance**

Results on effort expectancy are presented in Table 7. Results in Table 7 indicate that most of the respondents perceive that there is low effort required in using e-filing. For most of the factors which indicate low effort, majority of the respondents scored them between agreed and strongly agreed. For instance, the factor 'learning to use e-filing will be ease' was scored agreed and strongly agreed by a total of 77.8% of the respondents, the factor 'E-filing would make filing my taxes clearer and understandable' was scored between agreed and strongly agreed by a total of 73.4% of the respondents and the factor 'E-filing system would be easy to use' was scored between agreed and strongly agreed by 72.1% of the respondents. Schaupp and Carter (2009) concluded that effort expectancy is a significant predictor of intention to use e-filing. Thus the reported low effort expectancy in using e-filing may imply a high chance and ease of the system adoption by the taxpayers.

##### **4.2.4 Optimism Bias**

Results of respondents' optimism on e-filing (Table 9) show that except for ability to recognize a fake website, all other factors were scored high by the respondents implying that they are able to do them. More than 58% of the respondents indicate that they can submit personal information to TRA electronically. The fairly reported optimism may be a result of low access to computing facilities, skills in using ICT and lack of experience. For effective adoption and usage of e-filing taxpayers skills on ICT need to be sharpened. Previous studies, such as Schaupp et al. (2009) found that optimism on using ICT positively affect the adoption of new technology.

#### **4.2.5 Perceived Risk**

The results on perceived risk are shown in Table 10. Results reveal that respondents indicate some perception on risk of using tax e-filing. However, this was reported by few respondents. This is contrary to what has been reported in literature. The observed low reporting on perceived risk may be a result of lack of awareness on risks associated with transfer of information electronically. The results also may suggest the trust in confidentiality and security taxpayers have with the tax administration.

#### **4.2.6 Social influence**

Results of social influence are presented in Table 11. These results indicate social influence to be an important determinant of intention to use tax e-filing. Majority (59.1%) of the respondents either strongly agreed or agreed on the role of influential people on e-filing adoption. The influence of important people was found to be most important where 60.8% of the respondents scored this factor between agreed and strongly agreed. This could be a result of perceived benefit that other people who influence them gained after adopting e-filing.

### **4.3 Results of Regression Analysis**

#### **4.3.1 Summary statistics of regression variables**

Variables for regression analysis were constructed by taking mean scores of questions in each factor. Descriptive analysis of the regression variables is presented in Table 3. Results in Table 3 indicate that mean values all variables, except risk perception, are fairly large (above 3 in a 5-point scale) indicating that most respondents showed these factors are important in influencing intention to use tax e-filing. The low score in perceived risk could be attributed to low awareness of the risks associated with electronic transactions. The observed high variability in perceived relative to other factors suggests that respondents perceived this risk differently; this is possible because we sampled both users and non-users.

**Table 3: Summary Statistics of Regression Variables**

<b>Variable</b>	<b>Obs</b>	<b>Mean</b>	<b>Std. Dev</b>
Intention to use	225	3.59	0.82
Effort expectance	225	3.39	0.48
Perceived risk	226	2.61	0.98
Social influence	224	3.26	0.89
Optimism bias	223	3.41	0.83
Performance expectance	220	3.65	0.61

#### **4.3.2 Correlation analysis**

Results of correlation analysis (Table 4) shows that all variables, except performance expectance and effort, have low correlation (less than 0.5). Perceived risk has negative correlation with all variables. All correlation coefficients are significant at  $p < 0.01$ . The observed low correlation among the variables indicates absence of multicollinearity.

**Table 4: Correlation matrix**

	Intention to use	Effort expectancy	Perceived risk	Social influence	Optimism bias	Performance expectancy
Intention to use	1.00					
Effort expectancy	0.44	1.00				
Perceived risk	-0.42	-0.41	1.00			
Social influence	0.49	0.42	-0.41	1.00		
Optimism bias	0.42	0.24	-0.34	0.46	1.00	
Performance expectancy	0.49	0.63	-0.43	0.46	0.29	1.00

- All correlation coefficients are significant at  $p < 0.01$
- Determinant is less than 0.00001 (a rule of thumb for no multicollinearity)

#### 4.3.3 Model estimation results

We estimated the structural model (1) using OLS and performed post estimation tests. The model suffers no multicollinearity as all mean VIF were less than a cut-off point of 5. The null hypothesis of homoskedasticity couldn't be rejected as Breusch-Pagan tests were insignificant at  $p < 0.05$ . However, low explanatory power of the model (R-squared is 0.394) and significance of Ramsey RESET test suggested potential specification problem. Model (1) was re-estimated with inclusion of e-filing usage dummy and then variables found to associate with e-filing usage. The re-estimated model also suffered specification problem. A two-stage least-square (2SLS) model was estimated by instrumenting e-filing usage with factors associated with usage and tested for endogeneity using Durbin-Wu-Hausman specification test. Hausman specification test was significant at  $p < 0.05$  which imply presence of endogeneity. Presence of endogeneity rendered consideration to estimate endogenous switching regression model, this is because adoption process introduced self-selection bias. Lastly, endogenous switching regression model was estimated. Endogenous switching model enables correcting self-selection biases and single out factors that are significant for each category of taxpayers. Results of endogenous switching model are presented in Table 5.

Results in Table 5 shows a significant likelihood ratio test for joint independence of the three equations (Chi-square significant at  $p < 0.05$ ). Also the coefficient of correlation ( $r_1$ ) is significant which indicate that self-selection occurred. The value of  $r_1$  being positive and significant different from zero also suggests that individuals who choose not to use tax e-filing indicated lower perceived intention than a random individual from a sample would have perceived. These results corroborate Fu et al. (2006) who observed large differences between manual and electronic taxpayers in acceptance of electronic tax filing.

Results further indicate that for individual who are not using e-filing social influence and performance expectancy are important factor that influence their intention to use as these are marginally significant at  $p < 0.1$ . These results conform to previous findings by Lu et al. (2010) who found that social norm has significant effects on acceptance of on-line tax filing in Taiwan. Once users become familiar with the system, they may suggest others to use that system. Social pressure also influences change of behaviour (Fishbein & Ajzen, 1975) from manual to online submission. Performance expectancy however can be affected by other factors such as quality of the gadgets, internet connectivity, and skills of the users. It is therefore important to address these issues alongside performance expectancy

in order that users benefit from using tax e-filing system. Effort expectance, perceived risk and optimism were found to be insignificant for this category of taxpayers. This is because they are unaware of risks as they don't use the system and also the system is new. Low knowledge on ICT which is reported by majority of respondents could also be linked to insignificance of effects on effort expectance and optimism. These results carry an implication of developing a more user friendly system that taxpayers can use even with low level of ICT.

For the group of already users, perceived risk and social influence are both significant ( $p < 0.01$ ); perceived risk has a negative effect while social influence has a positive effect. Effort expectance, optimism and performance expectance were found to have positive effect though insignificant. The difference in perception of risk between users and non-users can be explained by experience which users already have. These results imply that integrity of the system such maximum security and confidentiality of the information submitted by the taxpayers. Also integrity of staff in handling taxpayers' information and other related affairs. Azmi et al. (2012) reported that perceived risk of e-filing adoption is affected by performance risk, time risk, psychological risk, privacy risk and overall risk. This implies that risk in e-filing adoption is multifaceted. Further they found that age have significant influence on risk perception.

Education was found to have positive but insignificant effect. Experience, location, internet use and scale of business were found to have a negative and significant effect on intention to use e-filing. These factors have negative effect because we postulate are associated to risk. Taxpayers' location and size of business could be sensitive to risks related to tax compliance. Usage of internet reflects awareness on risks associated with online exchange of information. Experience (proxies age) has negative effect which indicate that older taxpayers have low intention to use e-filing system. The study by Fu et al. (2006) also found that older taxpayers preferred manual filing of tax returns.

Moreover, the results of endogenous switching regression model enables separation of factors important for users and non-users. For instance users perceived a risk associated with e-filing while non-users didn't show it as important. Likewise, social influence was perceived important for both categories. For policy makers and the tax authority this information provides input for effective planning and administration, as such strategies for inducing non-users should be different for already users.

## **5. Conclusion and Recommendations**

### **5.1 Conclusion**

The study found that majority of the respondents have positive intention to use tax e-filing system. Further, effort expectancy, performance expectancy, social influence, and perceived usefulness were found to have positive relationship with intention to use e-filing. Perceived risk was found to have a negative association with intention to use e-filing. However, significance of these factors were different for users and non-users. For users risk and social factors were significant while no non-users performance expectancy and social influence were significant. Thus in both cases social influence plays a critical role in intention to use. Other factors such as location of business, scale of business, availability and use of ICT facilities, and experience were also found to have significant effects on intention to use. Thus it is important to address these issues.

### **5.2 Recommendations**

Based on the above finding this study recommends the following to be addressed so as to enhance behavioural intention and adoption of the system in order to realize its objectives. Firstly, since e-filing is a new technology its rollout must go in tandem with awareness and education to the taxpayers. Also, as show in the findings that social influence is significant for both users and non-users it is

important to identify loyal and progressive taxpayers who have influence in the society to be trained and facilitated to use e-filing, as this may have a bearing effect on social influence.

Secondly, the need to enhance provision of technical supports and backstopping services to the users. Such support may include but not limited to physical visit, online support or special call centre for e-fillers. Technical support may also focus on solving connectivity challenges to make sure that the system is available at all times. High connectivity reduces problems of non-delivery of returns and enhance overall efficiency.

Lastly, the system need to be as user friendly as possible and in some case customized for different types of taxpayers. Easy to use system will saves taxpayers' time and resources and reduces the possibility of making mistakes.

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**Appendix 1: Results of regression analysis**

**Table 5: Estimation results of endogenous switching regression model**

Endogenous switching regression model				Number of obs =	143
Log likelihood = -180.08				Wald chi2 (5) =	22.97
				Prob > chi2 =	0.003
	Coef.	Std. Err.	z	P >  z	[95% Conf. Interval]
<b>intention 0</b>					
effort	0.18	0.18	1.00	0.32	-0.17 0.54
risk	0.06	0.08	0.68	0.49	-0.11 0.22
social	0.16	0.09	1.74	0.08	-0.02 0.34
optimism	0.01	0.09	0.07	0.94	-0.17 0.18
performance	0.29	0.16	1.83	0.07	-0.02 0.61
constant	1.53	0.77	2.00	0.05	0.03 3.03
<b>intention 1</b>					
effort	0.06	0.22	0.25	0.8	-0.38 0.49
risk	-0.26	0.09	-2.87	0.00	-0.44 -0.09
social	0.25	0.09	2.60	0.01	-0.06 0.42
optimism	0.08	0.01	0.83	0.41	-0.09 0.24
performance	0.16	0.16	1.03	0.3	-0.14 0.46
constant	2.05	0.72	2.84	0.00	0.64 3.46
<b>select</b>					
education	0.07	0.09	0.77	0.44	-0.11 0.26
experience	-0.16	0.05	-3.15	0.00	-0.26 -0.06
experience squared	0.004	0.001	2.81	0.01	0.00 0.01
internet use	-0.33	0.11	-2.96	0.00	-0.54 -0.11
location	-0.41	0.1	-4.09	0.00	-0.61 -0.22
scale	-0.19	0.09	-2.01	0.00	-0.38 -0.01
constant	3.41	0.66	5.17	0.00	2.12 4.7
/lns0	-0.73	0.09	-8.48	0.00	-0.89 -0.56
/lns1	-0.39	0.13	-3.03	0.00	-0.65 -0.14
/r0	0.25	0.31	0.79	0.43	-0.37 0.87
/r1	1.15	0.39	2.98	0.00	0.39 1.91
sigma 0	0.48	0.04			0.4 0.57
sigma 1	0.67	0.09			0.52 0.87
rho 0	0.24	0.29			-0.35 0.69
rho 1	0.82	0.13			0.37 0.96
LR test of independent equations:			chi2 (2) = 8.00	Prob > chi2 =	0.02

**Appendix 2: Summary of Responses on Behavioural Constructs**

**Table 6: Intention to Use E-filing**

<b>Factor</b>	<b>I Strongly disagree</b>	<b>I Disagree</b>	<b>I don't know</b>	<b>I Agree</b>	<b>I Strongly agree</b>
E-filing is my first priority in tax filing methods	18 (8.0%)	32 (14.3%)	31 (13.8%)	97 (43.3%)	46 (20.5%)
I recommend e-filing method to others	13 (5.8%)	23 (10.3%)	34 (15.2%)	104 (46.4%)	50 (22.3%)
I predict to use e-filing in future	15 (6.8%)	24 (11.0%)	43 (19.6%)	103 (47.0%)	34 (15.5%)
I will do tax e-filing	11 (4.9%)	23 (10.3%)	24 (10.8%)	118 (52.9%)	47 (21.1%)
I will use internet to file my taxes	12 (5.4%)	24 (10.8%)	31 (14.0%)	108 (48.6%)	47 (21.2%)
I will experiment e-file service then decide to use or not	21 (9.8%)	42 (19.6%)	43 (20.1%)	84 (39.3%)	24 (11.2%)
I intend to use e-filing	31 (14.4%)	25 (11.6%)	69 (32.1%)	66 (30.7%)	24 (11.2%)

**Table 7: Performance Expectance**

<b>Factor</b>	<b>I Strongly disagree</b>	<b>I Disagree</b>	<b>I don't know</b>	<b>I Agree</b>	<b>I Strongly agree</b>
Using e-filing will speed the tax filing process	5 (2.2%)	11 (4.9%)	25 (11.1%)	99 (43.8%)	86 (38.1%)
The advantages of e-filing will outweigh the disadvantages	24 (10.8%)	34 (15.2%)	49 (22.0%)	60 (26.9%)	56 (25.1%)
Overall using e-filing will be advantageous	10 (4.5%)	13 (5.8%)	36 (16.1%)	93 (41.7%)	71 (31.8%)
E-filing will be of no benefit to me	88 (38.9%)	52 (23.0%)	52 (23.0%)	21 (9.3%)	12 (5.3%)
Using e-filing will speed tax filing process	4 (1.8%)	11 (4.9%)	34 (15.2%)	99 (44.2%)	76 (33.9%)
The advantages of e-filing will outweigh the disadvantages	9 (4.0%)	15 (6.7%)	44 (19.7%)	79 (35.4%)	76 (34.1%)
Overall e-filing will be advantageous	4 (1.8%)	16 (7.1%)	42 (18.8%)	87 (38.8%)	75 (33.5%)

**Table 8: Effort Expectance**

<b>Factor</b>	<b>I Strongly disagree</b>	<b>I Disagree</b>	<b>I don't know</b>	<b>I Agree</b>	<b>I Strongly agree</b>
Learning to use e-filing will be easy	4 (1.8%)	15 (6.7%)	31 (13.8%)	114 (50.7%)	61 (27.1%)
E-filing system would be easy to use	5 (2.3%)	17 (7.8%)	39 (17.8%)	94 (42.9%)	64 (29.2%)
It would not be easy to become skilful at using it	59 (26.3%)	100 (44.6%)	32 (14.3%)	24 (10.7%)	9 (4.0%)
Input and modifying data in e-filing is not easy	49 (21.9%)	85 (37.9%)	36 (16.1%)	38 (17.0%)	16 (7.1%)
Instructions would be easy to follow	5 (2.2%)	19 (8.5%)	50 (22.3%)	108 (48.2%)	42 (18.8%)
E-filing would make filing my taxes clearer and understandable	8 (3.6%)	10 (4.4%)	42 (18.7%)	112 (49.8%)	53 (23.6%)
Learning to use e-filing would be easy for me	4 (1.8%)	16 (7.1%)	32 (14.2%)	116 (51.6%)	57 (25.3%)
I find e-filing easy to use	7 (3.1%)	19 (8.5%)	47 (21.0%)	102 (45.5%)	49 (21.9%)
It is not easy for me to be skilful to use it	56 (25.2%)	86 (38.7%)	35 (15.8%)	38 (17.1%)	7 (3.2%)
It is easy to input and modify data in e-filing	19 (8.5%)	29 (13.0%)	58 (26.0%)	71 (31.8%)	46 (20.6%)
Instructions for using e-filing will be easy to follow	10 (4.4%)	37 (16.4%)	41 (18.2%)	93 (41.3%)	44 (19.6%)
Interaction with e-filing is clear and understandable	9 (4.0%)	34 (15.2%)	44 (19.7%)	92 (41.3%)	44 (19.7%)

**Table 9: Optimism on Using ICT**

<b>Competence</b>	<b>Very incompetent</b>	<b>Incompetent</b>	<b>Slightly competent</b>	<b>Competent</b>	<b>Very competent</b>
Submit personal information to TRA	14 (6.3%)	26 (11.8%)	53 (24.0%)	92 (41.6%)	36 (16.3%)
Complete transaction using e-filing	12 (5.5%)	30 (13.6%)	48 (21.8%)	89 (40.5%)	41 (18.6%)
Download forms from TRA website	7 (3.2%)	20 (9.0%)	58 (26.2%)	85 (38.5%)	51 (23.1%)
Recognize a fake website	32 (14.7%)	24 (11.1%)	107 (49.3%)	40 (18.4%)	14 (6.5%)

**Table 10: Perceived Risk**

<b>Factor</b>	<b>I Strongly disagree</b>	<b>I Disagree</b>	<b>I don't know</b>	<b>I Agree</b>	<b>I Strongly agree</b>
Confidentiality is not guaranteed	43 (19.3%)	58 (26.0%)	53 (23.8%)	50 (22.4%)	19 (8.5%)
There is no privacy	41 (18.4%)	57 (25.6%)	52 (23.3%)	53 (23.8%)	20 (9.0%)
Possibility of third party access to my information	50 (22.3%)	60 (26.8%)	55 (24.6%)	36 (16.1%)	23 (10.3%)
Unauthorized party can logged and disclose my information	51 (22.9%)	59 (26.5%)	43 (19.3%)	46 (20.6%)	24 (10.8%)
There may be low security of information	43 (19.3%)	66 (29.6%)	54 (24.2%)	41 (18.4%)	19 (8.5%)
Psychologically uncomfortable to use it	48 (21.7%)	89 (40.3%)	31 (14.0%)	39 (17.6%)	14 (6.3%)
It is not safe	45 (20.1%)	76 (33.9%)	36 (16.1%)	53 (23.7%)	14 (6.3%)
It is risky to provide personal information to TRA	58 (25.9%)	79 (35.3%)	40 (17.9%)	31 (13.8%)	16 (7.1%)
It is risky to provide information through internet	52 (23.2%)	75 (33.5%)	58 (25.9%)	26 (11.6%)	13 (5.8%)

**Table 11: Social influence**

<b>Factor</b>	<b>I Strongly disagree</b>	<b>I Disagree</b>	<b>I don't know</b>	<b>I Agree</b>	<b>I Strongly agree</b>
Advised by influential people	14 (6.4%)	19 (8.6%)	57 (25.9%)	90 (40.9%)	40 (18.2%)
Important people think I should use e-filing	11 (5.0%)	16 (7.2%)	60 (27.0%)	94 (42.3%)	41 (18.5%)
I use because many people around me use it	29 (13.2%)	70 (32.0%)	41 (18.7%)	52 (23.7%)	27 (12.3%)
People who use it have more prestige	30 (13.5%)	54 (24.3%)	66 (29.7%)	44 (19.8%)	28 (12.6%)