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Moderating effect of technology readiness on the relationship between electronic tax invoice adoption and its determinants among small and medium enterprises in Embakasi sub-county, Nairobi, Kenya

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ABSTRACT

The purpose of this study was to examine the moderating effect of technological readiness on the relationship between perceived benefit, perceived security, relational trust and the adoption of electronic tax invoices among small and medium enterprises (SMEs) in Kenya. Guided by the Innovation Diffusion Theory, the Technology Acceptance and Use of Technology Theory, and the Standard Economic Theory, the study employed an explanatory research design targeting 859 SMEs in Embakasi Sub-County. A sample of 273 SMEs was selected through stratified and simple random sampling techniques. Data were collected using semi-structured questionnaires and analyzed using descriptive and inferential statistics, including regression analysis. The findings revealed that perceived benefit, perceived security, and relational trust all had positive and statistically significant effects on electronic tax invoice adoption. Additionally, technological readiness was found to significantly moderate these relationships, enhancing the adoption process. The study supports theoretical perspectives emphasizing the importance of perceived advantages, trust, and security in technology adoption. It recommends that SME managers focus on improving technological readiness and trust-building initiatives, while policymakers should invest in supportive legal frameworks, digital infrastructure, and capacity building to drive broader adoption of electronic tax systems among SMEs.

INTRODUCTION

The discussion on the implementation of e-invoices, especially in developing nations, has garnered attention from academics, professionals, and regulatory bodies. Recently, global tax authorities have faced pressure to integrate advanced information technology into their tax system

operations via the internet (Shim & Song, 2016). Nevertheless, tax authorities have encountered considerable obstacles in using such technology due to taxpayers' discomfort with the system's ability to accurately capture their incomes. Notwithstanding this perspective, the majority of nations, particularly in emerging contexts, have acknowledged the necessity of adopting essential information technologies, such as electronic invoicing (e-invoicing), to enhance income that significantly underpins governmental operations.

Electronic invoicing is an information system service utilized to gather transaction data and transmit that data over the internet (Hernandez-Ortega, 2012). The swift emergence of e-commerce and the digital economy has rendered e-invoicing essential for preserving company information across the whole supply chain (Chang et al., 2013). In the context of tax administration, an electronic tax invoice is characterized as an invoice generated and transmitted electronically, utilizing technology such as computers, software, and the internet (Mwacha & Kashasha, 2021; Hsu & Yen, 2018). Hsu and Yen (2018) contended that the implementation of electronic tax invoicing enhances operational efficiency, reduces expenses, improves tax compliance, and bolsters overall financial performance. Likewise, the implementation of e-tax invoices will enable tax authorities to enhance the scrutiny of tax declarations, payments, and refunds of businesses (Nguyen et al., 2020). Consequently, e-tax invoicing represents a vital study domain that necessitates comprehensive comprehension.

An analysis of prior research indicates that the adoption of e-tax invoices is significantly affected by diverse factors. A cohort of scholars focusing on Nigerian small enterprises contended that the adoption of e-tax invoices is influenced by technological infrastructure, perceived utility, considered ease of use, perceived risk, governmental support, and tax authority enforcement (Nwokah et al., 2019). The efficacy of e-tax invoicing in Tanzania is ascribed to technological infrastructure, availability of training and support, robust governmental laws and regulations, and the engagement of stakeholders, including tax authorities and business associations (Komba & Lema, 2019). A study in Korea indicates that creating a complimentary website for small taxpayers and offering multiple issuance techniques for different taxpayers are essential for success (Shim & Song, 2016).

No research, particularly from an emerging economy, has specifically investigated the factors of e-tax invoicing, as evidenced by earlier studies. Prior research has concentrated on the impact of the e-tax invoice on outcomes like tax compliance processes, transparency in corporate transactions, and taxpayer services (Lee, 2016; Susilo, 2022). The nearest study aimed to identify factors affecting e-invoice adoption (Qi & Che Azmi, 2021), although it did not specifically investigate the determinants of e-tax invoices or the role of technology readiness as a potential moderator in this connection. The current study has two objectives: to investigate the factors influencing the adoption of electronic tax invoices and to analyze the moderating function of technical readiness.

Lee (2016) demonstrated that electronic tax invoices equip tax authorities with robust mechanisms to amalgamate taxpayer-provided tax information with efficient, transparent, and reliable services, thereby improving the overall tax management process. Consequently, corporations are more inclined to implement e-tax invoicing for tax management. Fu et al. (2006) posited that individuals may refrain from using a system if they perceive deficiencies in the security characteristics of the e-government system. Consequently, if the company recognizes that the use of electronic tax invoices provides enhanced security, it will be more inclined to adopt this system. Moreover, Hart and Saunders (1997) posited that the implementation of computerized tax invoicing necessitates resources and modifications to the normal activities of each firm. Consequently, if a corporation possesses a substantial level of faith in e-government, it will be more inclined to implement electronic tax invoicing to streamline its interactions with tax authorities. Although these parameters have been empirically examined, the outcomes remain unclear and

inconsistent; therefore, further investigation is essential, particularly in emerging environments with varying technological stages.

Technology readiness can be assessed via the lens of Information Technology human resources and technological infrastructure (Zhu and Kraemer, 2005). From a technological infrastructure standpoint, the implementation of electronic invoicing necessitates a comprehensive information system platform for service center collaboration to manage substantial data volumes and link the company's internal system with the external system of the tax authorities. From the standpoint of IT human resources, the implementation of electronic invoicing necessitates workers possessing expertise in the online tax system and the company's information system (Cartwright et al., 2005). These two techniques assist organizations in comprehending the IT landscape and the human resources related to IT. Consequently, organizations possessing a significant level of technical preparedness can more readily embrace and implement electronic invoicing. Consequently, the study posits that technology can either enhance or diminish the relationship between the adoption of e-tax invoices and their determinants.

Institutional set-up for SMEs in Embakasi Sub-County in Nairobi

Small and Medium Enterprises, as articulated in Kenya's Vision 2030, are essential to the nation's economic development. Small and medium-sized enterprises (SMEs) are acknowledged as a fundamental economic pillar for realizing Vision 2030, owing to their contributions to employment and gross domestic product (GDP). Furthermore, SMEs are tasked with tax collection and remittance (Akinboade, 2020). Consequently, they hold a crucial position within the tax framework of any nation. Small and medium-sized enterprises exhibit a greater likelihood of defaulting relative to other taxable categories (Walsh, 2021). The OECD (2020) reported that this category constitutes a high-risk population characterized by a significant default rate. In numerous situations, demonstrating non-compliance is unattainable. Non-compliance among SMEs is approximately 50%, as reported by the Kenya Revenue Authority (Okello, 2014), and conducting tax audits within this sector is costly. Enhancing voluntary compliance among small businesses is therefore a worthwhile pursuit.

Embakasi East Sub County is one of the seventeen constituencies located in Nairobi. A prosperous commercial center accommodates numerous SMEs. The majority of trading activity occur in Pipeline, Donholm, Imara Daima, Utawala, and Tassia, among other trading centers. The sub-county's liveliness has attracted numerous investors. Nevertheless, tax authorities have encountered challenges in capturing revenue due to the absence of clearly defined corporate structures (Nairobi County, 2017). Possibly due to the fact that the majority of SMEs in this region are family-owned single proprietorships. Embakasi East sub-county is a diverse urban area inhabited by individuals from many backgrounds.

The implementation of e-tax invoices enables tax authorities to access and process digital information instantaneously, enhancing taxpayer awareness of potential audits, which in turn diminishes non-compliance in tax returns and optimizes tax refund procedures (Qi & Che Azmi, 2021). Taxation is the primary source of money for the government's development programs and ongoing expenditures. The KRA's total revenue performance amounted to Kshs. 4,849.3 billion, falling short of the 7th Corporate Plan target of Kshs. 4,899.3 billion by Kshs. 50 billion. Small and medium-sized enterprises (SMEs) exhibit low tax compliance rates, and the Kenya Revenue Authority (KRA) has had difficulties in collecting Value Added Tax (VAT). Countries globally are utilizing technology to enhance revenue collection, reduce fraud, and improve taxation efficiency, including Kenya. KRA will utilize TIMS to streamline electronic tax invoice management through the standardization, validation, and real-time or near real-time transfer of invoices to KRA. The Electronic Tax Invoice Management System (TIMS) was scheduled to be implemented by August 1, 2022; however, due to the limited adoption of TIMS by taxpayers, particularly small and medium-sized firms, the date has been postponed three times.

Countries that have globally adopted Electronic Tax Registers include Rwanda, Hungary, Belgium, Canada, Sweden, and Austria. A fiscal control unit was implemented alongside computerized cash registers in Hungary. In the impacted sectors, VAT revenue increased by 15% after the inaugural year of operation (Deloitte, August 2019). In 2017, Rwanda implemented electronic tax registries, resulting in a 48% increase in VAT collections since that time. As of December 2022, 94% of significant organizations, defined as those with annual revenues over Sh1.3 billion, had adopted electronic invoicing and integrated with the Tax Invoice Management System (TIMS), the authority's platform, while 82% of medium-sized enterprises had achieved compliance, as reported by KRA. The Kenya Revenue Authority (KRA) projected a revenue deficit, as indicated by the compliance rate of merely 43% among Kenya's SMEs with an annual turnover below 200 million regarding the new internet-enabled tax registers (ETRs). This finally resulted in a loss of billions of shillings in value-added tax for the tax authority. Limited information exists regarding the adoption of TIMS in Kenya and the factors that may influence its implementation. This review reveals a vacuum in the literature; thus, this study aims to determine whether perceived benefit, perceived security, technical preparedness, and relational trust influence the effective adoption of the TIMS.

Literature review

Perceived Benefit and Electronic Tax Invoice Adoption

E-tax systems have become an essential element of tax administration in both developed and developing countries. Nevertheless, small and medium-sized enterprises (SMEs) in developing countries persist in adopting e-tax systems at a comparatively low rate. In their 2018 study, Shah, Jaffari, and Hussain analyzed the factors of perceived value, perceived simplicity of use, perceived trustworthiness, and perceived risk as primary influences on SMEs' propensity to adopt e-tax in Pakistan. A survey conducted on 349 SMEs revealed that four criteria greatly enhanced the intention of SMEs to adopt e-taxation. Specifically, perceived utility emerged as the paramount element, succeeded by perceived danger, perceived legitimacy, and perceived ease of use. The research found that perceived utility served as a mediator variable between perceived ease of use and the desire to embrace e-tax. This study's findings provide direction to tax authorities and politicians in developing nations on establishing realistic, credible, and user-friendly e-tax systems to encourage adoption among SMEs.

Wahyuni and Suhardi (2020) examined the adoption of e-tax systems by small and medium-sized enterprises (SMEs) in Indonesia, emphasizing the significance of perceived security, utility, and ease of use. The ambition to implement e-tax systems was greatly enhanced by all three factors, as indicated by a poll conducted with 120 SMEs. Perceived utility emerged as the predominant influence, whereas perceived security and ease of use were identified as secondary variables. The research revealed that perceived utility served as a partial mediator between perceived ease of use and the intention to embrace e-tax systems. This study's findings provide direction to Indonesian tax authorities and policymakers for developing secure, efficient, and user-friendly e-tax systems that will encourage adoption among SMEs.

Lee and Kim (2019) investigated the use of electronic tax filing, or e-filing, by small and medium-sized enterprises (SMEs) in South Korea. A study involving 219 SMEs revealed that the desire to embrace e-filing was highly affected by perceived value and ease of use. Perceived compatibility, perceived trust, and perceived government help were identified as having positive influences on the propensity to adopt electronic files. The research revealed that perceived usefulness served as a partial mediator in the relationship between perceived ease of use and the desire to embrace e-filing. This study's findings provide direction to South Korean tax authorities and policymakers for developing user-friendly, practical, dependable, and suitable e-filing systems to encourage adoption among SMEs.

Electronic tax (e-tax) is a digital system for the filing and payment of taxes. The Malaysian government has instituted the e-tax system to enhance efficiency, efficacy, and transparency in tax administration. Small and medium-sized enterprises (SMEs) in Malaysia have not yet adopted e-tax. This study by Rosli, Yusof, Ahmad, and Shafie (2018) presents a conceptual model examining the determinants affecting the adoption of e-taxation among Malaysian SMEs. The approach comprises five components: perceived benefit, perceived ease of use, perceived danger, perceived trust, and perceived government backing. The model also incorporates the moderating effect of organizational size on the relationship between perceived usefulness and the adoption of e-tax. The conceptual model provides a framework for future empirical investigations to examine the factors influencing the adoption of e-tax by Malaysian SMEs. The results of this study may assist tax authorities and policymakers in Malaysia in developing e-tax systems that are user-friendly, secure, and conducive to promoting adoption among SMEs.

H₀₁: Perceived benefit has significant effect on the adaption to electronic tax invoice

Perceived Security and Electronic Tax Invoice Adoption

The utilization of electronic tax filing (ETF) has become increasingly significant for small and medium-sized enterprises (SMEs). However, there is limited knowledge regarding the factors that affect SMEs' inclination to utilize exchange-traded funds. Shen, Wu, and Lin (2020) examined the factors affecting SMEs' inclination towards ETF adoption. The trust-based model and the technology acceptance model (TAM) provide the basis for the formulation of the research model. A total of 230 valid responses were collected from a survey conducted among SMEs in Taiwan. The results demonstrate that SMEs' inclination to use ETFs is significantly affected by perceived ease of use (PEOU), perceived usefulness (PU), perceived risk, and trust. Furthermore, it was found that the relationship among PEOU, PU, perceived risk, and ETF intention was mediated by trust. This study elucidates the factors affecting SMEs' decision-making regarding ETF adoption and provides valuable insights for policymakers and tax authorities to enhance SMEs' uptake of ETFs. Almutairi, Qureshi, and Baabdullah (2019) examined the correlation between small and medium-sized enterprises' (SMEs) views of security and trust in relation to the adoption of electronic tax invoicing (ETI) by SMEs in Saudi Arabia. A sample of 175 Saudi Arabian SMEs was selected for the study utilizing the stratified random sampling method. Data were collected using structured survey instruments, and structural equation modeling was employed to analyze the results. The study's findings indicate that the adoption of ETI by Saudi Arabian SMEs is positively connected with their perception of security. The research revealed that the correlation between SMEs' adoption of ETI and their perception of security is facilitated by trust. The findings indicate that the relationship between perceived security and trust in SMEs' adoption of ETI is influenced by the perceived usefulness of ETI. The findings of this study can facilitate the formulation of strategies to enhance ETI adoption among SMEs and assist policymakers and tax authorities in Saudi Arabia in comprehending the determinants affecting SMEs' adoption of ETI. Park, Yoon, and Park (2020) investigated the factors that small and medium-sized enterprises (SMEs) in South Korea deem significant when determining the use of electronic tax invoice (e-Tax) systems. A survey of 326 SMEs was conducted to achieve this objective, and a research model integrating the diffusion of innovation (DOI) theory and the technological acceptance model (TAM) was developed. The results indicated the significant impact of compatibility, observability, perceived usefulness, and perceived ease of use on SMEs' adoption of e-Tax systems. Nonetheless, relative advantage and complexity demonstrated no significant effect. The results indicated that adoption was highly influenced directly by perceived usefulness and indirectly by perceived compatibility, ease of use, and observability. Based on the findings, various recommendations are proposed to legislators and providers of electronic tax systems to enhance the adoption of these systems by SMEs.

H₀₂: Perceived security has significant effect on the adaption to electronic tax invoice

Relational Trust and Electronic Tax Invoice Adoption

Concerns regarding justice and legitimacy significantly influence confidence in authorities across various contexts, including: (i) voluntary compliance with their standards and requirements (Levi, 1998; Levi and Stoker, 2000; Rothstein, 2005, 2009; Rothstein and Teorell, 2008); (ii) tax compliance (Frey and Feld, 2002; Murphy, 2004; Alm and Martinez-Vazquez, 2007; Feld and Frey, 2007); (iii) law enforcement (Sunshine and Tyler, 2003); and (iv) collaboration with authorities (De Cremer and Tyler, 2007). Similar to how the consumption of goods and services enhances human value, economists have been exploring whether procedural justice contributes to individual pleasure (Frey et al., 2004; Frey and Stutzer, 2005). The experimental observation that conferring voting rights to taxpayers enhances tax compliance may be attributed to their pursuit of justice (Alm et al., 1993, 1999; Feld and Tyran, 2002; Wahl et al., 2010). We must recognize that individuals likely do not perceive government institutions as a singular, homogeneous entity in order to understand the origins of trust. Rothstein and Stolle's (2008) factor analysis revealed two separate dimensions of institutional trust when assessing the uniformity of public trust in government institutions. Examples of input-side institutions include the government, political parties, and parliaments. Conversely, the police, military, and judicial institutions exemplify output-side organizations, operating on a distinct dimension. The findings of a subsequent study utilizing Sweden's SOM survey were analogous. The slippery slope framework was developed by Kirchler (2007) and Kirchler, Hoelzl, and Wahl (2008) to determine the relationship between tax authorities and taxpayers. This notion emphasizes trust and authority as possible factors of tax compliance behavior. The capacity of tax authorities to govern taxpayer behavior via penalties and tax audits is termed authority. Legitimate power and coercive power constitute two distinct forms of power (Turner 2005; Kastlunger, Lozza, Kirchler, & Schabmann 2013). Conversely, trust denotes the connection founded on confidence between tax officials and taxpayers. Kastlunger et al. (2013) assert that heightened trust in tax authorities correlates with improved taxpayer compliance. Research by Wahl, Kastlunger, and Kirchler (2010) and Kastlunger et al. (2013) indicates that trust and power may influence tax compliance. The findings of this study suggested that tax compliance would be enhanced by a strong level of trust in the authority and its power. Kirchler's 2007 classification indicates a positive and strong correlation between trust and power and enhanced tax compliance. He elucidated the distinctions between mandatory and discretionary tax compliance. It is presumed that several factors affect each of these compliances. The authority of tax agencies is believed to affect enforced tax compliance, but taxpayers' trust in these agencies is seen to influence voluntary tax compliance. The majority of research on electronic tax registers has predominantly occurred in European countries such as the Czech Republic, Italy, Russia, and Austria.

Mas'ud, Abd Manaf, and Saad (2015) performed a slippery slope analysis in African countries. Bukhari (2010) utilized this paradigm in her research in Malaysia to examine the impact of trust on voluntary tax compliance. Kastlunger et al. (2013) proposed that slippery slope research should be conducted in regions with sociocultural demographics different from those of Europe. This study will utilize the slippery slope method to bridge the gap and conduct research beyond Europe, focusing on the tax compliance methods of Asian countries, including Malaysia.

H₀₃: Relational trust has significant effect on the adaption to electronic tax invoice

Technology readiness and Electronic Tax Invoice Adoption

Technological readiness refers to the level of preparedness and capacity of SMEs to adopt and effectively use technology in their business operations and tax compliance processes. The use of electronic invoicing, or "e-invoicing," by small and medium-sized businesses (SMEs) has garnered the interest of academics and governments alike. Using the technological readiness perspective, Huang and Liao (2019) conducted a study to look at the factors that affect SMEs' intention to embrace e-invoicing. 250 SMEs in Taiwan participated in a survey and partial least squares structural equation modeling (PLS-SEM) was used to evaluate the data.

The findings indicate that the perceived ease of use and usefulness of e-invoicing, as well as SMEs' intention to embrace it, are highly impacted by technological phobia and innovativeness. Furthermore, the effect of technology anxiety on perceived ease of use is moderated by technology insecurity, and the effect of technology innovativeness on perceived usefulness is moderated by technology insecurity and technology support. These findings offer useful implications for encouraging e-invoicing adoption among SMEs and advance our understanding of e-invoicing adoption in the context of SMEs.

Zhang, Hu, and Zhu (2018) used the technology-organization-environment (TOE) paradigm to investigate the factors influencing Chinese small and medium-sized firms' (SMEs) intention to embrace e-tax. Through a survey, we gathered information from 345 Chinese SMEs, which we then used structural equation modeling to examine. The findings show that e-tax adoption intention is highly influenced by factors such as perceived utility, compatibility, technology readiness, subjective norm, and perceived behavioral control. Specifically, the best indicator of e-tax adoption intention is perceived utility. Moreover, the relationship between perceived usefulness and e-tax adoption intention is mediated by compatibility, while the relationship between subjective norm and e-tax adoption intention is moderated by perceived behavioral control. These findings contribute to the theoretical and practical understanding of e-tax adoption in the context of Chinese SMEs.

Yu and Fang (2019) looked at the connection between Taiwanese small and medium-sized businesses' (SMEs) use of e-invoicing and their perception of technology preparedness. A survey of 303 SMEs was carried out, and structural equation modeling (SEM) was used to examine the results. The results indicate that perceived technology readiness positively affects perceived ease of use and perceived usefulness of e-invoicing, which in turn positively influences e-invoicing adoption. Furthermore, perceived trust mediates the relationship between perceived ease of use and e-invoicing adoption, and perceived risk mediates the relationship between perceived usefulness and e-invoicing adoption. Additionally, firm size moderates the effect of perceived technology readiness on perceived usefulness. These findings contribute to the understanding of e-invoicing adoption among SMEs and provide practical implications for promoting e-invoicing adoption in Taiwan.

To find out what factors affect individual taxpayers' adoption of electronic tax filing systems (ETFS), Hsu and Yen (2018) conducted a study. This study specifically looks at how perceived risk, privacy concerns, and technological readiness affect the adoption of ETFS. 362 individual taxpayers in Taiwan participated in a survey, and structural equation modeling (SEM) was used to analyze the results. The results indicate that technology readiness, privacy concerns, and perceived risk all significantly influence ETFS adoption. Moreover, privacy concerns mediate the relationship between technology readiness and perceived risk. The findings of this study provide insights into the factors that affect ETFS adoption among individual taxpayers and have important implications for policymakers and tax authorities seeking to promote the use of ETFS.

H₀₄: Technological readiness has significant moderating effect on the relationship between:

- a) Perceived benefit and the adaption to electronic tax invoice*
- b) Perceived security and the adaption to electronic tax invoice*
- c) Relational trust and the adaption to electronic tax invoice*

RESEARCH METHODS

Population and sample size

The study targeted registered SMEs operating within Embakasi Sub- County in Nairobi County. Currently, there are 859 SMEs spread across different industries (KRA, 2022). These firms were appropriate for the study because of their extensive use of information technology which has intensified introduction and use of electronic tax system in tax administration (Nwabachili et al., 2024; Awai & Oboh, 2020), and elaborate legal framework for SMEs support in tax management (Okunogbe & Santoro, 2023). This region was specifically chosen due to its robust representation of SMEs across various industries. Embakasi was deemed appropriate for the study due to the significant adoption and integration of information technology within its SMEs. This technological inclination has made the region a prime area for the implementation and utilization of electronic tax systems, an essential element in modern tax administration. Therefore, the target population of the study was demonstrated in the Table below.

The sampling strategy involves utilizing part of the population to make inferences about the whole population (Zikmund *et al.*, 2013). According to Kothari (2008), sampling is the process of choosing a small number of objects (a sample) from a larger group (the population) in order to estimate or forecast the prevalence of an unknown circumstance, event, or piece of information pertaining to the larger group. The sample size was determined from SMEs stratified based on the industry they operate in: Tourism and Hospitality, Retail and Wholesale, Jua Kali, Agriculture, as well as Transport and Telecommunications. This approach was deemed appropriate owing to its ability to ensure greater representation across the population of interest, register a small sampling error and give a better precision of estimation (Kemper *et al.*, 2003).

Table 1: Target population

Sector of economy	Population	Percentage %
Tourism and Hospitality	103	11.9
Retailer and Wholesalers	317	36.9
Jua Kali	224	26.1
Agriculture	105	12.2
Transport and Telecommunications	110	12.8
Total	859	100

Source, Author (2025)

From the target population of 859 SMEs in Embakasi Sub-County, a sample size of 273 enterprises was obtained using the formula developed by Yamane (1973). Although the sampling frame is relatively low, the sampling strategy is economical and provides a representation of the total population (Acharya *et al.*, 2013). The sample size formula was expressed as follows:

$$n = \frac{N}{1 + N(e)^2}$$

Where: n = Sample size; N = Total population size; e = the error of Sampling

The sample size was determined based on the sampling error of on 0.05 as follows:

$$n = \frac{859}{1 + 859(0.05)^2} = 273 \text{ SMEs}$$

The Neyman allocation formula (1934) was used to select the enterprises. With Neyman allocation, the best sample size for stratum h would be:

$$n_h = \left(\frac{N_h}{n} \right) n$$

Where: n_h - The sample size for stratum h ; n - Total sample size; N_h - The population size for stratum h ; N - The total population. Hence, distributions were as follows.

Table 2: Population distribution

Stratum	Population	Sample Size Distribution
		$n_h = \left(\frac{N_h}{N}\right)n$
Tourism and hospitality	103	32.7
Retailer and wholesalers	317	100.7
Jua Kali	224	71.2
Agriculture	105	33.4
Transport Telecommunications	110	35
Total	859	273

Source, Author (2025)

Data collection instruments

Primary data involves the collection of raw data (Wahyuni, 2012). Primary data enables researchers to learn something new which may be confirmed by others and to eliminate own biases in the process (Driscoll, 2011). The study collected primary data on the adoption of e-tax invoice and its determinants as well as the moderating effect of technology readiness in the relationship. The list of the licensed small and medium enterprises in Nairobi County, Embakasi Sub-County was obtained from the County government of Nairobi directory of enterprises and Kenya Revenue Authority (KRA) for the period ending 2022 and mid-2023 respectively.

Closed-ended questions were specifically chosen for their ability to direct respondents toward answers that align with the study's objectives, ensuring consistency and reliability in the data collected (Saunders et al., 2007). The survey items were derived from established, validated scales to maintain research rigor but were carefully modified to reflect the context and nuances of the study's focus. To quantify responses effectively, the questionnaire employed a five-point Likert scale, ranging from 1 ("Strongly Disagree") to 5 ("Strongly Agree"). This scale allowed respondents to express varying degrees of agreement or neutrality concerning the survey items.

The distribution of questionnaires targeted owners of the selected SMEs that had implemented the e-tax invoicing system since its introduction. This focus ensured that the participants had direct experience with the system and could provide informed responses, enhancing the relevance and applicability of the findings. The structured design and targeted approach of the questionnaires contributed to the collection of reliable, objective, and meaningful data for the study.

Regression model

The main regression model used to test the hypotheses was as shown as follows:

Model 1 below presents the equation for control variables: Fa = firm age fs = firm size

$$ETA = \beta_0 + \beta_1 Fa + \beta_2 fs + \epsilon \dots \dots \dots (2)$$

The equation of the main effects was estimated in model 2 as follows:

$$ETA = \beta_0 + \beta_1 Fa + \beta_2 fs + \beta_3 (PB) + \beta_4 (PS) + \beta_5 (RT) + \epsilon \dots \dots \dots (3)$$

The moderated regression model 3 with a moderator was estimated as follows:

$$ETA = \beta_0 + \beta_1 Fa + \beta_2 fs + \beta_3 (PB) + \beta_4 (PS) + \beta_5 (RT) + \beta_6 (TR) + \epsilon \dots \dots \dots (4)$$

Where, **TR** – Technology Readiness is the moderator

The hierarchical regression model 4 with interactions was shown as:

$$ETA = \alpha + fa + fs + \beta_1 (PB) + \beta_2 (PS) + \beta_3 (RT) + \beta_4 (TR) + \beta_5 (PB*TR) + \epsilon \dots (4)$$

The hierarchical regression model 5 with interactions was shown as:

$$ETA = \alpha + fa + fs + \beta_1 (PB) + \beta_2 (PS) + \beta_3 (RT) + \beta_4 (TR) + \beta_5 (PB*TR) + \beta_6 (PS*TR) + \epsilon \dots (5)$$

The hierarchical regression model 6 with interactions was shown as:

$$ETA = \alpha + fa + fs + \beta_1 (PB) + \beta_2 (PS) + \beta_3 (RT) + \beta_4 (TR) + \beta_5 (PB*TR) + \beta_6 (PS*TR) + \beta_7 (RT*TR) + \epsilon \dots (6)$$

Where, **ETA** = Electronic Tax Adoption; β_0 = constant term or intercept; **C** = Control variables; β_1 to β_3 = are the coefficients of the independent variables; **PB** – Perceived benefit; **PS** – Perceived security; **RT** – relational trust; **TR** – Technological readiness; ϵ = error term

Measurement of variables

Table 3: Measurement of variables

Variables	Dimensions	Scale	Level
<u>Independent</u>	Perceived benefit	5-point Likert scale	Nominal
	Perceived Security	5-point Likert scale	Nominal
	Relational Trust	5-point Likert scale	Nominal
<u>Moderator Variable</u>	Technology Readiness	5-point Likert scale	Nominal
<u>Control Variables</u>	Firm Age	5-point Likert scale	
	Firm Size	5-point Likert scale	
<u>Dependent Variable</u>	Electronic Tax Invoice Adoption	5-point Likert scale	Nominal

Source, Author (2025)

FINDINGS AND DISCUSSIONS

Response rate

Response rate in moot research is a crucial pointer of participant engagement and data quality. It's calculated by dividing the number of complete survey responses by the total number of requested participants. A higher response rate enhances the study's validity and generalizability. According to a recent study by Sheehan (2020), a response rate of 60% or more is typically thought to be suitable for guaranteeing accurate results. Nevertheless, the context, research design, and target population should be considered, as lower response rates might still yield meaningful insights in specific cases according to Göritz (2020). The survey of the study as shown in Figure 4.1 indicates a response rate of 89%. Since the respondents were 224 out of 273 that were invited

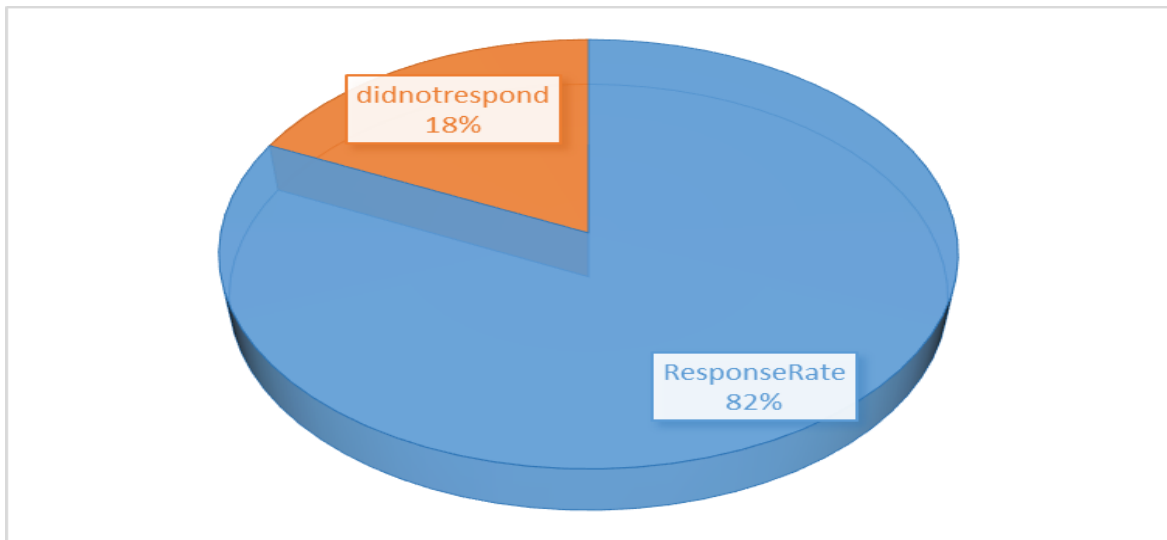


Figure 1: Response Rate

Reliability and validity results

Table 4 shows results for the reliability test where electronic tax invoice adoption $\alpha = 0.765 > 0.70$, perceived benefit $\alpha = 0.901$, perceived security $\alpha = 0.899$, relational trust $\alpha = 0.911$ and lastly technological readiness $\alpha = 0.766$ this concludes that the questionnaire replies are reliable, since all alpha results are > 0.70 .

Factor analysis works on the assumption that measurable and observable variables in the research can be reduced to smaller underlying variables which share common variance and are unobservable (Bartholomew *et al.*, 2011). Therefore, in the present study, factor analysis was carried out in order to lessen and summarize the set of data items into controllable factors without losing the initial information. The exploratory factor analysis was used because of its ability to examine data to identify a reasonable and specific set of factors that can be studied together (Fricker *et al.*, 2012). EFA was therefore performed to determine the accuracy and validity of the reflective multi-item scales (Bagozzi & Yi, 1988). Equally, the principal component analysis (PCA) with Varimax rotation was performed. Factor loadings were produced for all items to assess the validity of the construct.

Table 4: Reliability Tests

Variable	Cronbach's Alpha	N of Items
Electronic Tax Invoice Adoption	0.765	4
Perceived Benefit	0.901	5
Perceived Security	0.899	5
Relational Trust	0.911	5
Technology Readiness	0.766	3

Source, Author (2025)

Factor Analysis

Prior to the collection of factors, a range of measures were used to determine the suitability of the respondent data for factor analysis. The measures used to evaluate the appropriateness of the data included the Kaiser – Meyer – Olkin (KMO) sampling adequacy assessment and the Bartlett Sphericity test. In order for the data to be appropriate for factor analysis, the required value for KMO is .50 and the Bartlett Sphericity Test should be significant ($p < .05$) (Hair *et al.*, 2010; Tabachnick & Fidell, 2007). The convergent validity of the research instruments was tested using Average Variance Extracted (AVE) for all variables (Hair *et al.*, 2014).

The Kaiser-Meyer-Olkin (KMO) test is a measure that quantifies the adequacy of data for performing factor analysis according to Kaiser & Meyer, (1974). It evaluates the pattern of

correlations among variables and provides a score ranging from 0 to 1. A KMO score above 0.5 is generally deemed acceptable for factor analysis. This is because it indicates a sufficient level of intercorrelations among the variables. According to Bartlett (1954) The Bartlett's test is a statistical procedure that examines the assumption of equal correlations across variables. If the test rejects the null hypothesis of correlation matrix homogeneity, it suggests that the variables are interrelated to a degree that warrants their use in factor analysis. If p Bartlett's test is appropriate when the significance value is less than 0.05.

Table 5 indicates the results of the Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy and Bartlett's test suggest that the data is suitable for factor analysis. The KMO values for Perceived Benefit (0.772), Perceived Security (0.685), Relational Trust (0.775), Technological Readiness (0.886), and Electronic Tax Invoice Adoption (0.901) range from acceptable to excellent, indicating a good degree of coherence between variables. Furthermore, the Bartlett's test values for all variables are less than 0.05, suggesting a significant level of interrelatedness among the variables. Therefore, it can be concluded that all variables are appropriate for factor analysis.

Table 5: KMO & Bartlett's test

	perceived benefit	perceived security	relational trust	technology readiness	e-tax invoice adoption
KMO	0.772	0.685	0.775	0.886	0.901
Bartlett's test for sphericity	0.000	0.022	0.035	0.000	0.000

Source, Author (2025)

Factor analysis is a statistical method employed to uncover underlying patterns and associations within a dataset of observed variables. It seeks to identify latent factors contributing to the observed variability. EFA is particularly valuable for simplifying data by grouping correlated variables, abetting in reducing complexity. By assessing shared variances among variables, EFA exposes inherent structures and offers insights into potential underlying constructs.

As highlighted by Costello and Osborne (2005), EFA assists researchers in comprehending intricate datasets by identifying variables that cluster together and contribute to the same underlying factor. Widely used in psychology, social sciences, and market research, EFA reveals essential dimensions influencing observed behaviors or attitudes a weak factor has low factor loadings and fails to explain a significant proportion of the variance. A strong factor exhibits high factor loadings, indicating it well represents observed variables. Loadings above 0.7 are often considered strong.

In the provided factor loading table, which pertains to the results of the exploratory factor analysis (EFA), strong factor loadings are typically identified based on a threshold of 0.7 or higher in absolute value. Following this criterion, several factor loadings can be categorized as strong, signifying robust associations between latent factors and observed variables.

In academic research, verifying statistical assumptions is vital to ensure result accuracy. Assumptions like normal distribution, variance homogeneity, and independence underlie statistical methods and ignoring them can yield erroneous conclusions. Recent research by Smith, (2019) and Johnson, (2020) underscores the significance of checking assumptions to enhance result credibility. This practice safeguards against biased inferences, bolstering findings' trustworthiness in disciplines such as psychology, economics, and biology.

Table 6: Factor Analysis (EFA)

	perceived benefit	perceived security	relational trust	technological readiness	e-tax adoption	invoice
PB1	0.752					
PB2	0.906					
PB3	0.356					
PB4	0.566					
PB5	0.456					
PS1		0.922				
PS2		0.898				
PS3		0.901				
PS4		0.917				
PS5		0.897				
RT1			0.887			
RT2			0.906			
RT3			0.916			
RT4			0.916			
RT5			0.889			
TR1				0.516		
TR2				0.745		
TR3				0.532		
ETA1					0.550	
ETA2					0.895	
ETA3					0.456	
ETA4					0.716	

Source, Author (2025)

Test of Regression Assumptions

Test for Normality

Statistical assumption testing for normality, often using the Shapiro-Wilk test, assesses if data follows a normal distribution. In this test, a p-value is generated. The null hypothesis is that the residuals follow a normal distribution. A p-value suggests <0.05 departure from normality. Table 7 indicates the p value for perceived benefit is $0.075 > 0.05$, for perceived security is $0.065 > 0.05$, for rational trust is $0.063 > 0.05$, technological readiness has p value of $0.095 > 0.05$, Lastly, the control variables Firm age and firm size have p value of 0.055 and 0.355 respectively $p < 0.05$. The results indicates that all the independent variables and control variables are normally distributed, $p > 0.05$

Table 7: Normality Test

	Shapiro-Wilk Statistic	df	Sig.
Perceived benefit	.902	224	.075
Perceived security	.933	224	.065
Relational trust	.928	224	.063
Technology readiness	.928	224	.095
Firm Age	.882	224	.055
Firm size	.756	224	.355

Source, Author (2025)

Homoscedasticity Test

Statistical supposition testing, like the Breusch-Pagan test, inspects homoscedasticity, which ensures consistent variability of errors across predictor values. Breusch-Pagan test assesses whether variance in residuals is constant. The null hypothesis was that there is constant variance. A lower p-value indicates significant heteroscedasticity, implying unequal variability. A significant Breusch-Pagan test ($p < 0.05$) highlights potential issues with linear regression, aiding scholars in refining models, considering transformations, or employing robust regression techniques to improve the validity and reliability of their analyses. Recent studies, like Smith (2017) and Johnson (2020), underline the importance of addressing this assumption. Table 8 Breusch-Pagan test is 0.462, which is greater than the commonly used significance level of 0.05. This non-significant p-value indicates that there is no significant evidence of heteroscedasticity in the model's residuals. Therefore, the assumption of homoscedasticity is likely met in this case.

Table 8: Homoscedasticity Test

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity			
Ho: Constant variance			
Variables: residuals			
chi2(1)	0.998	Prob.>	0.462

Source, Author (2025)

Multicollinearity Test

Multicollinearity is vital for robust analysis. The Variance Inflation Factor (VIF), introduced by Hair et al. (2019), is a key metric in this context. VIF quantifies the extent of multicollinearity among predictor variables. A VIF value exceeding 10, as suggested by Hair et al., indicates problematic multicollinearity requiring attention. High VIF values signify that a predictor can be linearly predicted from others. Managing multicollinearity through VIF assessment enhances the reliability of regression analysis, ensuring accurate model interpretation. Table 9 presents the results of the multicollinearity test, assessing collinearity statistics for the model. For the predictor variables: Perceived Benefit: The VIF is 4.950, and the Tolerance is 0.202. Perceived Security: The VIF is 8.772, and the Tolerance is 0.114. Relational Trust: The VIF is 5.495, and the Tolerance is 0.182. Lastly Technological Readiness: The VIF is 8.000, and the Tolerance is 0.125. The control variables firm age has a VIF of 8.696, tolerance of 0.125, and firm size has a VIF of 2.817, and tolerance of 0.355. The assumption for multicollinearity has not been violated since VIFs<10.

Table 9: Multicollinearity Test

Model		Collinearity Statistics	
		Tolerance	VIF
1	Perceived Benefit	.202	4.950
	Perceived Security	.114	8.772
	Relational Trust	.182	5.495
	Technology Readiness	.125	8.000
	Firm Age	.115	8.696
	Firm Size	.355	2.817

Source, Author (2025)

Autocorrelation Test

Testing for autocorrelation assesses whether successive observations in a dataset exhibit intra correlations. For the study of panel data or time series, it is essential. The Durbin-Watson statistic

is used to quantify residual autocorrelation. There are four possible values: 0 to 4. Values that are substantially below 2 indicate positive autocorrelation, values that are over 2 indicate negative autocorrelation, and values that are near 2 indicate no autocorrelation. The null hypothesis was that the residuals are independent (no autocorrelation). Applying similar tests in the social sciences and econometrics is explained in recent literature, such as Wooldridge (2019). A statistic of 2.035 > 2 in Table 4.15 suggests that there is no autocorrelation.

Table 10: Autocorrelation Test

D-Watson Statistic	2.035
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Source, Author (2025)

Linearity Test

Chen (2005). In this study, linearity tests were conducted individually for each variable to assess the likelihood of the data originating from a linearly structured population. If Deviation test is not significant p-value > 0.05, this means that there was a linear relationship between predictor variables and the outcome variable. According to Table 11, showed F statistic of 1.154, and p-value of 0.075 > 0.05, these results indicated that the assumption the there was a linear relationship between the predictors and the outcome variables was not violated.

Table 11: Linearity Test

H0: No significant Deviation from Linearity	
F	1.154
Sig	0.075

Source, Author (2025)

Correlation Analysis

Correlation analysis, a crucial statistical tool in research, examines relationships between variables. It quantifies the degree and direction of associations, helping researchers understand patterns and make predictions Shi et al. (2019). The significance value (p-value), commonly set at 0.05, assesses whether correlations observed in a sample are statistically significant. Significance indicates findings are unlikely due to chance alone. Low p-values (< 0.05) suggest robust relationships, reinforcing the legitimacy of research conclusions, enhancing confidence, and aiding evidence-based decision-making VassarStats (2020).

The correlation analysis reveals notable relationships between the variables under consideration and Electronic Tax Invoice Adoption. Perceived Benefit exhibits a strong positive correlation of 0.780 with Electronic Tax Invoice Adoption ($p < 0.05$), indicating that perceived benefits are closely linked to the adoption of electronic tax invoices. Similarly, Perceived Security demonstrates a substantial positive association of 0.615 ($p < 0.05$), suggesting that a higher sense of security contributes to a greater likelihood of adopting electronic tax invoices. Additionally, Relational Trust displays a meaningful positive correlation of 0.660 ($p < 0.05$), while Technological Readiness shows the strongest positive correlation of 0.805 ($p < 0.05$). The control variables indicated a positive and significant correlation with electronic tax invoice adoption firm age $r = 0.152$ $p < 0.05$ and firm size $r = 0.12$ $p < 0.05$. These findings underscore the interrelated nature of these factors and their influence on the adoption of electronic tax invoices.

Table 12: Correlation Analysis

	ETA	PB	PS	RT	TR	FA	FS
E-Tax Invoice Adoption	1						
Perceived Benefit	0.780**	1					
Perceived Security	0.615**	0.015	1				
Relational Trust	0.660**	0.265**	0.031	1			
Technology Readiness	0.805**	0.552	0.003	0.231	1		
Firm Age	0.152**	0.336**	0.665	0.458	0.665	1	
Firm Size	0.120**	0.665**	0.550	0.115	0.556	0.112	1
N	224	224	224	224	224	224	224

Correlation is significant at 0.05 level ** (2 tailed)

Source, Author (2025)

Regression Analysis

Effect of control variables

The effects of the control variables firm age and firm size on electronic tax invoice adoption was determined by a regression model.

The regression equation was as below.

$$Y = 0.127 + 0.012fa + 0.067fs$$

The model summary table 13 concluded that firm age and firm size collectively have a strong correlation with electronic tax invoice adoption $R = 0.311$, the firm age and firm size also account for a 9.7 % variance caused on electronic tax invoice adoption, the remaining 90.3% of the variation was caused by factors not included in the model. This variance was significant since the f statistic of 11.870 and p-value < 0.05 indicates that the model significantly explains the variance. The model further showed that a unit change in firm age caused a significant unit improvement in adoption of electronic tax invoice of 0.012. Further a unit change in firm size caused a significant increase of 0.067 in electronic tax invoice adoption. The findings showed that the control variable positively impacts the adoption of electronic tax invoice adoption.

Table 13: Regression Model effects of Control variables

Model	Standardized Coefficients β	Std. Error	t	Sig.
1 (Constant)	0.127	0.049	2.592	0.021
Firm Age	0.012	0.006	2.050	0.043
Firm Size	0.067	0.019	3.511	0.001
Model summary				
R	0.311			
R-Square	0.097			
Adjusted R-Square	0.089			
R-Square Change				
F-Statistic	11.870			
p-value	0.000			

Dependent variable: electronic tax invoice adoption

Source, Author (2025)

Direct effects

Multiple Linear regression analysis was used to determine the effects of perceived benefit, perceived security, relational trust, firm age and firm size on electronic tax invoice adoption and its determinants among SMEs in Kenya. The combined estimate of all factors accounted for approximately 50% of the overall variance in financial innovation ($R^2 = .500$, Adjusted $R^2 = .449$). The ANOVA method showed that the combined estimation of all independent variables as shown in Table 14 below was statistically significant ($F = 43.574$, $p < .05$). The model was thus designed to predict electronic tax adoption through perceived benefit, security and relational trust. The following are the hypotheses for the direct relationship. The standardized coefficients showed that a unit change in a unit change in the perceived benefit of electronic tax invoices leads to a significant increase in electronic tax invoice adoption, with a standardized coefficient of 0.045. This suggests that if taxpayers believe they are gaining some benefit from using electronic tax invoices, their willingness to adopt the system will increase significantly. A unit change in the perception of security causes a significant increase in their electronic tax invoice adoption by 0.023. This implies that ensuring the security of electronic tax invoice systems can significantly improve taxpayer compliance. A unit change in relational trust, the trust that taxpayers have in the tax authorities or the system results in a significant increase in electronic tax invoice adoption by 0.025, indicating that building trust between taxpayers and tax authorities plays an important role in promoting adoption of electronic tax invoice systems. A unit change in firm age corresponds to an increase in electronic tax invoice adoption by 0.012, suggesting that older firms are slightly more likely to adopt electronic tax invoices than newer firms. A unit transformation in firm size leads to a significant increase in electronic tax invoice adoption by 0.009, demonstrating that firms with more employees are more likely to adopt the electronic tax invoice systems.

Table 14: Regression Results for direct effect

Model		Standardized Coefficients β	Std. Error	t	Sig
	(Constant)	0.127	0.049	2.592	0.021
2	Perceived Benefit	0.045	0.021	2.143	0.035
	Perceived Security	0.023	0.003	7.667	0.000
	Relational Trust	0.025	0.010	2.500	0.039
	Firm Age	0.012	0.006	2.050	0.043
	Firm Size	0.009	0.003	2.967	0.001
Model summary					
	R	0.707			
	R-Square	0.500			
	Adjusted R-Square	0.449			
	R-Square Change	0.360			
	F-Statistic	43.574			
	p-value	0.000			

a. Dependent Variable: ETA

b. Predictors: (Constant), PB, PS, RT FA, FA
Source, Author (2025)

Model summary with Moderator

The hierarchical model summary in Table 15 illustrates the incremental contribution of different sets of variables to explaining the variance in the adoption of electronic tax invoices. The analysis begins with Model 1, which includes only the control variables firm age and firm size. In this model, the R^2 is 0.097, indicating that these two control variables explain approximately 9.7% of the variance in the adoption of electronic tax invoices. The adjusted R^2 is slightly lower at 0.089, suggesting that when accounting for the number of predictors, the explanatory power remains modest. This finding implies that firm age and size alone do not strongly predict the adoption of electronic tax invoices.

Model 2 introduces the direct effects of the independent variables, perceived benefit, perceived security, and relational trust. The R^2 significantly increases to 0.500, showing that 50% of the variance in electronic tax invoice adoption is now explained by these variables in addition to the control variables. The adjusted R^2 , which accounts for the number of variables added, is 0.449, confirming a substantial improvement in the model's explanatory power. The R^2 change of 0.360 reflects a significant enhancement due to these factors, indicating that perceived benefit, perceived security, and relational trust have a substantial direct impact on the adoption of electronic tax invoices. The significance of F change $p=0.031$, indicates significant change in the explained and unexplained variance.

Model 3 adds the moderator variable, technological readiness, resulting in a slight increase in R^2 to 0.503. This suggests that technological readiness adds a small amount (0.3%) of explanatory power to the model. The adjusted R^2 increases marginally to 0.459, and the R^2 change is 0.003, indicating a minimal but positive contribution. This implies that technological readiness, as a moderator, has a small effect on explaining the adoption of electronic tax invoices, suggesting that firms' readiness to adopt new technology can influence adoption, but not very strongly on its own. The significance of F change $p=0.021$, indicates significant change in the explained and unexplained variance.

Model 4 includes the first interaction term, possibly involving technological readiness and perceived benefit. The R^2 increases slightly to 0.506, with an R^2 change of 0.003, indicating a modest improvement in the model's explanatory power. This suggests a weak moderating effect of technological readiness on the relationship between perceived benefit and electronic tax invoice adoption. The significance of F change $p=0.001$, indicates significant change in the explained and unexplained variance.

Model 5 adds a second interaction term, between technological readiness and perceived security, further increasing the R^2 to 0.510, with an R^2 change of 0.004. This reflects another small improvement, indicating a minor moderating effect of technological readiness on the relationship between perceived security and adoption. The significance of F change $p=0.000$, indicates significant change in the explained and unexplained variance.

Finally, Model 6 introduces a third interaction term, between technological readiness and relational trust. The R^2 rises slightly to 0.511, with an R^2 change of 0.001, showing a minimal contribution to explaining the variance. This suggests that while there are interactions between technological readiness and the main variables, their impact on electronic tax invoice adoption is relatively weak. In conclusion, perceived benefit, perceived security, and relational trust emerge as the most significant predictors of electronic tax invoice adoption, while technological readiness and its interaction with other variables have significant moderating effect on the relationship on electronic tax invoice adoption. The significance of F change $p=0.000$, indicates significant change in the explained and unexplained variance.

Table 15: Model summary with Moderator

Model	R	R ²	Adjusted R ²	Std. Error of the Estimate	R ² Change	Sig. Change	F
1	0.311	0.097	0.089	0.990121	0.097	0.000	
2	0.707	0.500	0.449	0.124211	0.360	0.031	
3	0.709	0.503	0.459	0.223221	0.003	0.021	
4	0.711	0.506	0.477	0.215221	0.003	0.001	
5	0.714	0.510	0.487	0.212221	0.004	0.000	
6	0.715	0.511	0.491	0.127121	0.001	0.000	

Independent Variables: perceived benefit, perceived security, relational trust, firm age firm size

Dependent variable: electronic tax invoice adoption

Source: Data, 2025

ANOVA with moderator

Table 16 shows that the model 6 after the introduction of technological readiness and the interaction terms, that the models are statistically significant $F = 25.567$ $p\text{-value} = 0.000 < 0.05$

Table 16: ANOVA With moderator

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	37.054	2	18.527	11.870	0.000
	Residual	344.946	221	1.561		
	Total	382.000	223			
2	Regression	190.942	5	38.188	43.574	0.000
	Residual	191.058	218	0.876		
	Total	382.000	223			
3	Regression	192.024	6	32.004	36.557	0.000
	Residual	189.976	217	0.875		
	Total	382.000	223			
4	Regression	193.109	7	27.587	31.546	0.000
	Residual	188.891	216	0.874		
	Total	382.000	223			
5	Regression	194.742	8	24.343	27.949	0.000
	Residual	187.258	215	0.871		
	Total	382.000	223			
6	Regression	195.288	9	21.699	25.567	0.000
	Residual	186.712	220	0.849		
	Total	382.000	223			

Source: Data, 2025

Moderating effect of Technology Readiness on the relationship between determinants of electronic tax invoice adoption

Table 17 shows after adding technological readiness to the effect of determinants of electronic tax invoice adoption at a constant of 0.075, and increase of 0.096 on electronic tax invoice adoption is caused by a unit change in perceived benefit, a unit change in perceived security causes a 0.144 increase in electronic tax invoice adoption, a unit change in relational trust causes a 0.226 increase in electronic tax invoice adoption, a unit change in technological readiness causes a 0.010 increase electronic tax invoice adoption. Technological preparedness has a positive and statistically significant moderating effect on the connection between perceived benefit and adoption of electronic tax invoices among small and medium-sized businesses in Kenya. $0.000 < 0.05$, $p = 0.125$.

The results of a further regression model show that technological preparedness has a positive and substantial moderating influence on the link between small and medium-sized businesses in Kenya's adoption of electronic tax invoices and perceived security (0.285, $p=0.000<0.05$). Finally, the regression analysis reveals that technical preparedness significantly modifies the link between the use of electronic tax invoices by small and medium-sized businesses in Kenya and relational trust ($p=0.000<0.05$, 0.402).

Further insights indicate that Firm Age as a control variable represents the how many years the SMEs have been in operation. According to the regression model, the use of electronic tax invoices increases by 0.021 for every unit changed in the age of the firm. Firm Size represents the size of the SMEs represented by number of employees in the samples SMEs the regression model indicates that unit change in firm size causes 0.012 increase in electronic tax invoice adoption., it would suggest that larger firms are more likely to adopt electronic tax invoices.

The equation for the regression analysis after moderation and interaction Model 6 was;

$$Y = 0.075 + 0.096X_1 + 0.144X_2 + 0.226X_3 + 0.010M + 0.125M*X_1 + 0.285M*X_2 + 0.402 M*X_3 + 0.021*fa + 0.012fs$$

Table 17: Hierarchical Model

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Constant	0.101 [0.049] {2.059} (0.034)**	0.127 [0.049] {2.592} (0.021)**	0.021 [0.010] {2.100} (0.038)**	0.027 [0.010] {2.700} (0.006)**	0.021 [0.010] {2.100} (0.028)**	0.075 [0.023] {3.261} (0.001)**
Firm Age	0.010 [0.004] {2.525} (0.020)**	0.012 [0.006] {2.050} (0.043)**	0.016 [0.006] {2.683} (0.009)**	0.017 [0.008] {2.113} (0.038)**	0.017 [0.008] {2.113} (0.038)**	0.021 [0.003] {7.000} (0.000)**
Firm Size	0.008 [0.004] {2.000} (0.049)**	0.009 [0.003] {2.967} (0.001)**	0.007 [0.003] {2.400} (0.005)**	0.008 [0.004] {2.050} (0.042)**	0.008 [0.004] {2.050} (0.043)**	0.012 [0.002] {6.000} (0.000)**
Perceived Benefit	-	0.045 [0.021] {2.143} (0.035)**	0.031 [0.005] {6.200} (0.000)**	0.041 [0.009] {4.556} (0.000)**	0.040 [0.008] {5.000} (0.000)**	0.096 [0.045] {2.133} (0.012)**
Perceived Security	-	0.023 [0.003] {7.667} (0.000)**	0.033 [0.012] {2.750} (0.007)**	0.053 [0.010] {5.300} (0.000)**	0.040 [0.019] {2.105} (0.007)**	0.144 [0.056] {2.571} (0.002)**
Relational Trust	-	0.025 [0.010] {2.500} (0.039)**	0.040 [0.018] {2.222} (0.019)**	0.060 [0.018] {3.333} (0.000)**	0.050 [0.020] {2.500} (0.012)**	0.226 [0.108] {2.093} (0.023)**
Technological Readiness	-	-	0.075 [0.021] {3.571} (0.001)**	0.085 [0.040] {2.125} (0.030)**	0.085 [0.040] {2.125} (0.021)**	0.010 [0.004] {2.500} (0.010)**
Technological Readiness *	-	-	-	0.012 [0.006]	0.013 [0.006]	0.125 [0.035]

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Perceived Benefit				{2.017} (0.041)**	{2.183} (0.015)**	{3.571} (0.000)**
Technological Readiness *	-	-	-	-	0.219 [0.101]	0.285 [0.023]
Perceived Security					{2.167} (0.031)**	{12.391} (0.000)**
Technological Readiness *	-	-	-	-	-	0.402 [0.079]
Relational Trust						{5.089} (0.000)**
R	0.311	0.707	0.709	0.711	0.714	0.715
R ²	0.097	0.5	0.503	0.506	0.51	0.511
Adjusted R ²	0.089	0.449	0.459	0.477	0.487	0.491
Std. Error of the Estimate	0.990121	0.124211	0.223221	0.215221	0.212221	0.127121
R ² Change	0.097	0.36	0.003	0.003	0.004	0.001
Sig. F Change	0	0.031	0.021	0.001	0.000	0.000
F Statistic	11.87	43.574	36.557	31.546	27.949	25.567

Key: []: Standard Error { }: T-Statistic (): P-Value **: Significance at the 0.05 level (2-tailed)

Dependent Variable: Electronic Tax Invoice Adoption

Source: Data, 2025

CONCLUSION AND RECOMMENDATION

The study concluded that perceived benefit, perceived security, and relational trust positively and statistically significantly influence the adoption of electronic tax invoicing among SMEs in Kenya. The results indicated that technological readiness strongly influences the links among perceived benefit, perceived security, relational trust, and the adoption of electronic tax invoices. The results underscore that SMEs are more inclined to use electronic tax systems when they recognize distinct advantages, have confidence in the system's security, and possess robust relational trust with tax authorities, especially when they are technologically equipped. In accordance with previous studies, the findings underscore the pivotal influence of technical readiness in enhancing the impact of perceptual elements on digital tax acceptance. These findings offer essential guidance for policymakers, tax administrators, and SME management seeking to foster the extensive and sustainable use of electronic tax systems.

Policymakers should prioritize augmenting the perceived advantages of electronic tax invoicing by comprehensive awareness campaigns that explicitly illustrate the concrete benefits, including compliance facilitation and operational efficiency. Enhancing system security via ongoing technological advancements and cybersecurity protocols is crucial for reinforcing user trust. Establishing and sustaining relational trust with SMEs by clear communication, inclusive decision-making, and timely support services will augment adoption rates. Furthermore, authorities ought to allocate resources towards enhancing the technical preparedness of SMEs by offering digital literacy training, subsidizing access to essential IT infrastructure, and creating user-friendly platforms. It is essential for SME managers to invest in employee training on e-tax platforms, cultivate a culture of digital adaption, and proactively interact with tax authorities to establish confidence and facilitate smoother migrations to electronic systems. Enhancing technology capability in SMEs will not only promote e-tax adoption but also improve overall business resilience and competitiveness.

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