

The Factors Influencing Manufacturers' Preference and Use of Electronic Tax Stamps (ETS) in Morogoro Region, Tanzania

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How to cite this paper: Mnjeja, L. E., Naho, A., & Mwonge, L. A. (2023). The Factors Influencing Manufacturers' Preference and Use of Electronic Tax Stamps (ETS) in Morogoro Region, Tanzania. *Open Journal of Social Sciences*, 11, 36-50.

<https://doi.org/10.4236/jss.2023.1110003>

Received: August 21, 2023

Accepted: October 4, 2023

Published: October 7, 2023

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Abstract

Our study assessed the factors influencing the preference and usage of electronic tax stamps (ETS) among manufacturers in the Morogoro region of Tanzania, in line with the potential benefits for revenue collection and combating tax irregularities. Both Economic Deterrence Theory and Allingham and Sandmo Theory were used to inform our study. To gain comprehensive insights into manufacturers' preference for and use of ETS, we employed both descriptive and explanatory research designs, as they serve distinct purposes and provide valuable information. Our sample consisted of 100 respondents selected from five registered manufacturing industries using purposive and random sampling techniques. We collected primary data through questionnaires and interviews, while secondary data was gathered through documentary reviews. A logistic regression model was used to explore the factors influencing manufacturers' use of ETS. The results revealed significant positive relationships between penalties, education level (primary, secondary, and college/university education), expertise, and the usage of ETS. By contrast, inconvenience, cost of purchasing ETS, and tax rate showed significant negative relationships. These findings emphasize the importance of penalties, education, and expertise in promoting compliance and use of ETS, while factors such as cost and tax rate act as barriers to manufacturers' preference for ETS. Based on our study findings, we recommend that policymakers streamline administrative processes, simplify compliance requirements, and consider tax reforms to reduce the burden on manufacturers.

Keywords

Manufacturers, Factors, Use, Electronic Tax Stamps, Morogoro Region, Tanzania

1. Background

Revenue collection is a vital aspect for governments worldwide as it allows them to acquire assets without incurring debt, which in turn supports economic development (Bird, 2010). Revenue administrations have consistently prioritized improving revenue mobilization, often focusing on measuring revenue leakages (Keen, 2003). This approach is frequently utilized by both the World Bank and the International Monetary Fund (Keen, 2003). A robust revenue system for devolved governments sets the stage for successful fiscal decentralization (Bird, 2010). Also, Muema et al. (2014) argued that modern e-payment services, such as smart parking systems, offer convenience in revenue collection by utilizing devices like mobile phones in the parking industry. This technological advancement significantly enhances revenue collection performance and provides a competitive advantage.

Recognizing the advantages associated with electronic tax collection systems, Tanzania has decided to adopt the Electronic Tax Stamp (ETS) system. The introduction of ETS for excisable goods aims to replace physical paper stamps, which were prone to tax evasion, counterfeiting, and the consumption of harmful and unauthorized products. This governmental initiative is part of broader efforts to improve tax administration in the country (TRA, 2022).

The introduction of ETS has effectively addressed long-standing challenges in the administration of taxes on excisable goods. It offers advantages to the government, manufacturers/importers, and consumers. These include safeguarding government revenue by deterring counterfeiting, protecting consumers through mobile phone authentication of tax stamps, facilitating tax compliance for all traders, ensuring fair competition, and enabling tracking and tracing of goods from production to final sale, thus accounting for the production of excisable goods (TRA, 2022).

Despite the numerous advantages associated with the Electronic Tax Stamp system, many manufacturers in Tanzania resist its implementation. This resistance poses significant difficulties for revenue collectors and the government in general. The problem being investigated is the resistance of manufacturers to the use of electronic tax stamps (ETS) by the Tanzanian government, despite the system's potential to increase revenue collection, combat counterfeiting, and reduce tax irregularities. The Tanzanian government introduced the Electronic Tax Stamps Regulations in 2018, mandating the use of ETS on excisable goods. The purpose of ETS is to track, monitor, and authenticate stamps and excisable goods throughout the supply chain to ensure proper accounting and taxation (TRA, 2018). However, many manufacturers are not complying with this requirement, contrary to the government's expectations.

Tax stamps are employed in over 80 countries, with approximately 170 billion tax stamps used annually (Sudán, 2015). The growth of tax stamps is driven by population and consumption growth, the inclusion of new countries, and the expansion of existing stamp programs to cover new products. Tax stamps are in-

creasingly used to verify fiscal compliance, improve supply chain visibility, and authenticate products (TRA, 2018).

In recent years, the Tanzanian government has emphasized the use of technology to strengthen tax administration and compliance. The Electronic Tax Stamps Regulations, implemented in 2018, are part of these efforts to enhance revenue collection and reduce tax irregularities. The implementation of ETS is expected to enable the tracking, monitoring, and authentication of excisable goods throughout the supply chain, ensuring proper accounting and taxation. However, the resistance from manufacturers to adopt ETS undermines the government's objectives. Therefore, this study aims to investigate the reasons behind this resistance. Addressing this problem is crucial because failure to do so would result in revenue loss for the Tanzanian government, potentially slowing down the country's economy, as tax revenue serves as its primary source of income. Therefore, this paper proceeds by presenting the analytical framework in the following section, followed by the methodology. Subsequently, the results and discussion are presented, leading to the conclusion and, finally, policy recommendations.

2. Theoretical Framework

2.1. Economic Deterrence Theory

The classical tax evasion model developed by Allingham and Sandmo (1972) focuses on economic deterrence, wherein the behavior of taxpayers is influenced by various factors. These factors include the tax rate, which determines the benefits of evasion, and the probability of detection and penalties for fraud, which determine the associated costs (Allingham & Sandmo, 1972). Accordingly, economic deterrence theory posits that manufacturers' compliance behavior is influenced by factors such as the tax rate, the likelihood of being discovered, and the fines imposed by the state (Ramidhuna, 2021). In other words, compliance decisions are based on a cost-benefit analysis. Economic analysis suggests that a higher probability of discovery for non-compliance and significant penalties for identified offenders would encourage greater compliance, thereby maximizing tax revenue streams (Munyoro, 2017). Considering that manufacturer compliance is influenced by a range of factors, including individual taxpayer factors, economic factors, and institutional factors, the theory of Economic Deterrence is relevant to our study (Allingham & Sandmo, 1972; Munyoro, 2017; Ramidhuna, 2021).

2.2. The Allingham and Sandmo Theory

The Allingham and Sandmo theory, proposed in 1972, asserts that tax compliance is influenced by the government's use of sanctions and audits to deter tax evasion (Allingham & Sandmo, 1972). According to this theory, when a manufacturer, serving as a taxpayer in our case, perceives the cost of evading taxes to be low and the likelihood of detection or audit to be minimal, they are more in-

clined to breach the law and avoid paying their taxes. Conversely, if the manufacturer believes that the compliance cost is excessive, they may choose to evade taxes by not utilizing (ETS) and avoiding tax payments. The complexity and time-consuming nature of tax systems and procedures tend to encourage tax avoidance, as they create additional burdens for manufacturers (Allingham & Sandmo, 1972). Moreover, manufacturers who perceive the tax rate to be excessively high and punitive are more likely to engage in tax evasion. Factors such as the probability of detection, the severity of punishment, and the high transactional costs associated with tax legislation exhibit a negative relationship with tax evasion (Allingham & Sandmo, 1972). The theory of Allingham and Sandmo is relevant to our study due to its connection with moral obligation, an affordable tax rate, and fairness in tax administration (Allingham & Sandmo, 1972). By considering these aspects, the theory provides insights into the factors influencing tax compliance among manufacturers.

3. Material and Methods

3.1. Research Design

Our study was conducted in the Morogoro region of Tanzania from 2022 to 2023. To gain comprehensive insights into the manufacturers' preference for and use of ETS, we employed both descriptive and explanatory research designs, as they serve distinct purposes and provide valuable information. To provide a precise and detailed description of the manufacturers' reluctance to use ETS, we utilized the descriptive research design (Kothari, 2009). This design allowed us to gather accurate information about the current status of ETS use in the Morogoro region, as well as the behaviors and attitudes of manufacturers towards ETS (Kothari, 2009). Through this approach, we aimed to capture the "what" and "how" of manufacturers' preferences regarding the adoption of ETS in their business operations. On the other hand, the explanatory research design, also known as causal or inferential research, was employed to understand the relationships between variables and uncover the underlying reasons behind observed phenomena (Payne & Grey, 2014). By investigating cause-and-effect relationships, this design enabled us to delve into the "why" and "how" of a particular phenomenon (Payne & Grey, 2014). Consequently, we could gain a deeper understanding of the factors influencing manufacturers' decisions and behaviors to use ETS.

Therefore, the descriptive research design facilitated a comprehensive description of the manufacturers' reluctance to use ETS, while the explanatory research design helped us uncover the underlying reasons and causal relationships behind this phenomenon (manufacturers' reluctance to use ETS).

3.2. Targeted Population

The targeted population were all manufacturing companies liable to ETS in the Morogoro region namely AVJ Water Treatment Limited, Maji ya Kilombero

LTD, Albin Macturu Seiya T/A Faru Banana Drinks, Laverna FSC Itete Limited, Alex Martin Mteme, Best Price Beverage & Food Supply and Newgen Beverages Co. Ltd. Basing on this fact, Morogoro region has seven (7) manufacturing industries in operation to date.

3.3. Sample Size and Sampling Techniques

3.3.1. Sample Size

According to Creswell (2012), a sample is a subset of the target population that researchers select to make generalizations about the entire population. For this study, we focused on investigating five specific industries in the Morogoro region: AVJ Water Treatment Limited, Maji ya Kilombero LTD, Albin Macturu Seiya T/A Faru Banana Drinks, Laverna FSC Itete Limited, and Alex Martin Mteme. As a result, our study involved surveying a sample size of 100 participants from these manufacturing industries.

3.3.2. Sampling Methods

We used both purposive and random sampling techniques to select a sample of 100 respondents from five (5) out of seven (7) registered manufacturing industries in Tanzania. Five (5) industries including AVJ Water Treatment Limited, Maji ya Kilombero LTD, Albin Macturu Seiya T/A Faru Banana Drinks, Laverna FSC Itete Limited, and Alex Martin Mteme from Morogoro region were selected for the study because they have been operating since 2018 when the ETS was introduced in Tanzania. Two (2) industries, Best Price Beverage & Food Supply and Newgen Beverages Co. Ltd, were not selected for the study. Newgen Beverages Co. Ltd is a new industry that started its operations in 2022, while Best Price Beverage & Food Supply has shutdown production. These two industries were not selected as they don't provide the required information on the use of the ETS in the manufacturing sector in Tanzania. In this case, the selected five industries have been operating since 2018, which is the year when the ETS was introduced in Tanzania. Therefore, these industries provided valuable insights into the use and impacts of the ETS on the manufacturing sector in Tanzania. On the other hand, random sampling ensures that every respondent has an equal chance of being selected, which increases the representativeness of the sample. Each of the five (5) selected industries sampling frame was used to randomly select 20 respondents from the manufacturing industry register, resulting in a total of 100 respondents.

3.4. Data Types, Sources, and Collection Methods

Our study incorporated both primary and secondary data. To collect primary data, we utilized a questionnaire and conducted in-depth interviews with key informants, specifically officers from the Tanzania Revenue Authority (TRA) in this case. This approach allowed us to obtain firsthand information from individuals with expertise in the subject matter. Additionally, we sought to enhance the breadth of our study by gathering secondary data from various sources, in-

cluding TRA offices, industry reports, and publications such as journal articles and reports. These secondary sources provided a diverse range of perspectives on the topic under investigation.

3.5. Data Analysis

The logistic regression model was employed to explore the factors influencing manufacturers' use of ETS. This choice was made because the dependent variable in the study is binary, representing whether manufacturers use ETS or not. To estimate the model, the non-linear logit model was utilized, employing the Maximum Likelihood (ML) method, as stated by Brook (2008) and Mwonge & Naho (2021). Additionally, Mwonge and Naho (2021) highlighted that the logit regression model ensures that estimated probabilities fall between 0 and 1. Considering this characteristic, Gujarati (2004) emphasized the frequent use of the logit model when the dependent variable is dichotomous.

Therefore, the empirical logistic regression model is specified in Equation (1):

$$L_i = \ln\left(\frac{P_i}{1-P_i}\right) = \alpha + \beta_i X_i + \mu_i \quad (1)$$

whereby,

$\ln\left(\frac{P_i}{1-P_i}\right)$ is the logarithm of the odd ratio which is equal to the probability

of using ETS (p) divided by the probability of not using ETS ($1 - p$) of the i^{th} observation (respondent).

α is a constant;

β_i 's are parameters to be estimated;

X_i 's are explanatory variables (independent variables);

μ_i is the disturbance term.

In a more detailed specification, Equation (1) is written into Equation (2) as: -

$$L = \alpha + \beta_1 TR + \beta_2 PRED + \beta_3 SED + \beta_4 COED + \beta_5 PM + \beta_6 SL + \beta_7 CB + \beta_8 EXP + \mu \quad (2)$$

whereby;

TR = tax rate (*Manufacturers' perception towards the magnitude of tax rate*;

Binary:

1 if the tax rate is perceived to be high, 0 otherwise);

PRED = primary education (7 years of schooling) 1 if yes, 0 otherwise;

SED = secondary education (8 - 15 years of schooling) 1 if yes, 0 otherwise;

COED = College/university education (16 years and above of schooling) 1 if yes, 0 otherwise);

PM = penalties (*Exact amount in TZS shillings*);

SL = Inconvenience (*Binary: 1 if yes, 0 otherwise*);

CB = Cost of buying ETS (*Exact amount in TZS shillings*);

EXP = manufacturers' expertise in ETS use (*Binary: 1 if expertise in ETS use,*

0 otherwise);

μ is the disturbance term.

4. Results and Discussion

This study aimed to analyze the factors that influence the usage of Electronic Tax Stamps (ETS) by manufacturers in Tanzania, to gain a comprehensive understanding of their preferences and motivations. By evaluating these factors, the study sought to offer valuable insights into the reasons behind manufacturers' decisions to adopt and use or reject ETS in their operations. This understanding is vital for policymakers, tax authorities (TRA), and other stakeholders involved in ETS implementation, as it can guide the development of effective strategies and interventions to promote greater adoption and compliance. The factors examined encompassed various aspects, including economic considerations such as the cost-effectiveness of implementing ETS compared to traditional tax collection methods. Additionally, penalties, inconvenience, purchasing cost, tax rates, and covariate variables such as respondents' education and expertise were considered significant influencers of manufacturers' preferences regarding ETS adoption. By investigating these factors, the study aimed to provide evidence-based recommendations to policymakers, addressing potential barriers and facilitating the wider adoption and efficient utilization of ETS in Tanzania's manufacturing sector.

The coefficients of a specified binary logistic regression model were estimated using the maximum likelihood method in SPSS 25. The model fit was assessed using the Hosmer and Lemeshow statistics (Mwonge & Naho, 2021). The estimated logistic regression model, presented in **Table 1**, yielded an adjusted Pseudo R-squared of approximately 0.680. This indicates that all explanatory variables included in the model accounted for approximately 68.0% of the probability of manufacturers' decision to use ETS or not. Despite the Pseudo R-squared value of 68%, it is important to note that the log-likelihood ratio (LR) was highly statistically significant at a one percent (1%) level. This suggests that the independent (explanatory) variables in the binary logistic regression model collectively provide a strong explanation for the probability of manufacturers' decision to use ETS or not in the Morogoro region of Tanzania.

In other words, our study's findings indicate a strong correlation between the dependent variable (ETS use) and several explanatory variables, namely penalties, inconvenience, the purchase cost of ETS, tax rates, respondents' education, and expertise. The study employed a logistic regression model and assessed its

Table 1. Model summary.

Step	-2 Log Likelihood	Cox & Snell R Square	Nagelkerke R Square
1	65.166 ^a	0.510	0.680

^aEstimation terminated at iteration number 6 because parameter estimates changed by less than 0.001.

accuracy and relevance using two goodness-of-fit measures: Pseudo R-squared and log-likelihood ratio (LR). The results suggest that the logistic regression model is appropriate for predicting the probability level of manufacturers' decision to use ETS or not. Additionally, the study revealed a 68% overall percentage of correct predictions while the p -value was 0.000 indicating a highly significant closeness between the observed and predicted values of the dependent variable. These findings demonstrate that the model effectively estimates and fits the data at an acceptable level.

Furthermore, the analysis conducted in this study demonstrates that the Omnibus tests highlights a probability of the likelihood ratio Chi-square (69.212) being less than 0.01 (1%) level of significance, indicating a highly statistically significant result. This suggests that the logit model utilized in this research is suitable, and it further implies that all the variables included in the model were jointly different from zero (0). The outcomes are presented in **Table 2**.

The study findings show that the application of the logistic regression model in examining the manufacturers' preference and use of ETS in their operations in the Morogoro region was valid and consistent with previous related empirical studies (Sifuni, 2017; Kato, 2000; Boahene et al., 1999). In our study, variables like education categories (primary, secondary, and college/university education), respondents' expertise, penalties, inconvenience, the purchase cost of ETS, and tax rates were identified and hypothesized to explain the manufacturers' decision to use ETS or not.

The results of the binary logit regression analysis demonstrated that five variables, namely penalties, expertise, PRED, SED, and COED exhibited statistically significant positive relationships with the dependent variable (ETS use). On the other hand, three other variables, namely inconvenience, cost of buying, and tax rate were also statistically significant but displayed negative signs, in line with our model assumptions. **Table 3** presents the results.

Table 3 presents the results of a binary logit regression analysis on manufacturers' preference to use ETS. The analysis examines the factors influencing the decision to use ETS, with the dependent variable being a binary indicator of whether manufacturers choose to use ETS or not. The table includes estimates for the regression coefficients (B), the exponentiated coefficients (Exp (B)), the standard errors (S.E.), the Wald χ^2 statistic, and the significance levels (Sig.) for each independent variable.

Table 2. Omnibus tests of model coefficients.

		Chi-square	df	Sig.
	Step	69.212	8	0.000
Step 1	Block	69.212	8	0.000
	Model	69.212	8	0.000

Source: extracted from SPSS, version 25.

Table 3. Logit regression results on manufacturers' preference to use ETS.

Dependent variable: ETS use (Binary)					
Variables	B	Exp(B)	S. E	Wald	Sig.
Penalties	2.268	9.658	1.196*	3.593	0.058
Inconvenience	-2.692	0.068	1.463*	3.384	0.066
Cost	-2.179	0.113	1.219*	3.196	0.074
Tax rate	-1.226	0.293	0.741*	2.742	0.098
Expertise	5.762	318.038	1.939***	8.833	0.003
PRED	2.104	8.201	1.087**	3.749	0.053
SED	2.201	9.031	1.135**	3.762	0.052
COED	2.070	7.928	1.026**	4.070	0.044
Constant	-4.076	0.017	2.019**	4.077	0.043

The goodness of fit measures

LR Chi-square (8) = 69.212

Prob > Chi-square = 0.000

Log-likelihood = 65.166^aPseudo R² = 68.0

^aVariable(s) entered on step 1: *penalties, inconvenience, cost, tax rate, expertise, PRED, SED, and COED*. Source: Extraction from SPSS, version 25. *** = Significant at 1%; ** = Significant at 5%; * = Significant at 10%.

4.1. Penalties

The study results confirmed the expected positive relationship between the use of Electronic Tax Stamps (ETS) and penalties. Statistical analysis revealed that penalties were significant at a 10% level of significance and were positively associated with ETS usage, with a coefficient of 2.268 at a significance level of $p = 0.058$. The study treated penalties as a continuous variable measured in exact values (in TZS). The study considered an increase in penalties as a factor contributing to enhanced tax compliance and the implementation of tax regulations, including the use of ETS among manufacturers.

The study findings indicated that a higher penalty was more likely to influence tax compliance and manufacturers' inclination to use ETS, as perceived by the respondents, assuming other factors remained constant. Consequently, imposing penalties on manufacturers who did not utilize ETS in their business operations increased their business costs. This fact prompted manufacturers to adopt measures to minimize costs, such as complying with tax regulations, including the implementation and use of ETS, and to ensure the continuity of their business operations.

The study's results are consistent with the conclusions drawn from several related studies (Cowell & Gordon, 1988; Muturi & Michael, 2015; Sifuni, 2017), which also found that penalties increase compliance levels among taxpayers, specifically in this case, manufacturers. Therefore, manufacturers who perceive

the penalties to be high are more likely to comply with tax regulations regarding the use of ETS in their business operations. Therefore, the odds ratio of the penalty variable was found to be 9.658, indicating that the odds ratio in favor of manufacturers using ETS would increase by 9.658 times if the penalty increased by one unit (switching from 0 to 1).

4.2. Tax Rate

According to the study results presented in **Table 3**, manufacturers expressed negative views on the tax rate, and this perception had a statistically significant impact on the use of ETS at a 10% level of significance with a p -value of 0.098. The study revealed a statistically significant negative relationship between the tax rate and the use of ETS among manufacturers in the surveyed industries. The findings suggest that when manufacturers perceive a high tax rate, they are more likely to evade taxes by choosing not to use ETS. This indicates that manufacturers (as taxpayers) view a high tax rate as burdensome, despite its potential benefits for government infrastructure improvements, which in turn enhance production and the overall well-being of the majority.

Based on the study's results, an increase of one unit in the tax rate leads the logit to a decrease of 1.226 units in the use of ETS among manufacturers, assuming all other factors remain constant. The odds ratio of the tax rate was determined to be 0.293, indicating that the odd ratio in favour of manufacturers adopting and using ETS decreases by 0.707 (71%) if the tax rate increases by one unit. These findings align with previous studies (Cowell & Gordon, 1988; Nzioki, 2014; Sifuni, 2017), which also demonstrated that an increase in the tax rate results in a negative perception among manufacturers (taxpayers) towards tax payment, leading to a tendency to avoid using ETS.

4.3. Education Level of Manufacturers

In our study, education was classified into four levels: no formal education (NFED), primary education (PRED), secondary education (SED), and higher education (COED). The categories were treated as dichotomous variables, with a value of 1 assigned if a manufacturer attained a certain education level, and 0 otherwise. The slope coefficients for PRED, SED, and COED were 2.104, 2.201, and 2.070 respectively. The odds ratios for these categories were 8.201, 9.031, and 7.928, indicating that manufacturers with higher education levels were more likely to adopt and use Electronic Tax Stamps (ETS) compared to those with no formal education.

The study found a statistically significant positive correlation between education level and manufacturers' preference for using ETS. The significance levels were 5% with p -values of 0.053 for PRED, 0.052 for SED, and 0.044 for COED. This suggests that manufacturers with primary, secondary, and higher education demonstrated a greater capacity to understand and comply with the rules and regulations set by the Tanzania Revenue Authority (TRA), including accessing

tax-related information.

The odds ratios of PRED, SED, and COED indicate that the likelihood of manufacturers adopting and using ETS would be 8.201, 9.031, and 7.928 times respectively compared with no formal education which takes the role of a reference category. This implies that as manufacturers' education increases, their probability of using ETS also increases, indicating that education for manufacturers brings more knowledge and experience in production and operation management, as well as a better understanding of tax regulations.

The significance of the odds ratios, estimated at 8.201, 9.031, and 7.928 for PRED, SED, and COED respectively, highlights that manufacturers with good education were significantly more likely to adopt and use ETS compared to those without any educational background. This finding aligns with previous studies conducted by Sifuni (2017) and Dularif et al. (2019), emphasizing the significant influence of education on manufacturers' decisions regarding the adoption and use of ETS (Sifuni, 2017; Dularif et al., 2019).

4.4. Cost of Purchasing ETS

The study sought to know the cost of purchasing an ETS machine as it is crucial in assessing manufacturers' preference for their implementation and use of ETS in the Morogoro region. The financial investment required to acquire ETS machines directly impacts manufacturers' decision-making processes. The cost factor influences their inclination toward adopting this technology as it affects their operational expenses, production costs, and overall profitability. Therefore, understanding the expense associated with acquiring ETS machines is vital in determining manufacturers' preferences, as it provides insights into the economic feasibility and long-term sustainability of implementing electronic tax stamps in the region.

The findings of this study confirm a prior expectation that the cost of purchasing ETS machines has a negative relationship with the utilization of Electronic Tax Stamps (ETS) among manufacturers. The statistical analysis revealed that expertise played a significant role, with a *p*-value of 0.074 at a 10% level of significance, and was found to be negatively associated with the adoption and the use of ETS. These results indicate that an increase in the cost of purchasing ETS machines leads to a decrease in their usage among manufacturers, assuming other factors remain constant. Specifically, for every unit increase in the cost of purchasing ETS machines, the logit on average decreases to 2.179 units in the utilization of ETS among manufacturers.

Furthermore, the odds ratio for the cost of purchasing was calculated to be 0.113, indicating that manufacturers who face a unit increase in the cost of purchasing ETS machines will result in reducing the odds of opting to use ETS by 88.7%. These findings align with the research conducted by Sifuni (2017), which also highlighted the significant influence of the cost of purchasing ETS machines on the adoption and use of ETS.

4.5. Manufacturers' Expertise in ETS Use

The findings of this study confirm the initial expectation that expertise would have a positive association with the utilization of Electronic Tax Stamps (ETS) among manufacturers. The results indicate that expertise demonstrated a highly statistically significant relationship at the 1% level of significance ($p = 0.003$), and it was positively correlated with the adoption and the use of ETS. Consequently, the study suggests that the logit of expertise in favour of the use of ETS machines is equal to 5.762 assuming that all other variables remain constant.

Moreover, the odds ratio for expertise in this study was calculated to be 318.038, indicating that manufacturers with expertise in ETS machines are 318.038 times more likely to adopt and use ETS compared to those without expertise. These findings align with the research conducted by [Chepkoech et al., \(2022\)](#), which also revealed a strong association between knowledge and expertise in ETS machines and the adoption and use of ETS, offering substantial opportunities for gaining a competitive advantage ([Chepkoech et al., 2022](#)).

4.6. Inconvenience

The use of electronic tax stamps (ETS) in the Morogoro region poses certain inconveniences, as identified in this study. Primarily, the study found that manufacturers face challenges associated with the initial costs of implementing the ETS, which include procuring necessary equipment and software. These expenses strain their financial resources and create a burden. Additionally, the transition from traditional tax stamps to electronic ones necessitates significant changes in production processes, potentially causing disruptions and delays. Manufacturers also encounter technical issues and compatibility problems with the electronic system, leading to operational inefficiencies and possible downtime. Lastly, ensuring compliance with the ETS requires additional employee training, further adding to the logistical complexities and costs. This study emphasizes the significance of considering these inconveniences to comprehensively assess manufacturers' preferences and facilitate the successful implementation of electronic tax stamps in the Morogoro region.

The inconvenience factor was found to have statistical significance at a 10% level with a p -value of 0.066, indicating a negative relationship with the use of ETS. The study's results suggest that manufacturers who experience inconvenience in adopting ETS usage are likely to use them 0.068 times compared to the ones who are at ease in the usage of ETS machines.

5. Conclusion

The study intensively assessed manufacturers' preference and use of ETS in the Morogoro region of Tanzania. The findings reveal a high level of adoption and compliance with ETS among manufacturers but also highlight challenges related to security concerns, usability, technical issues, and inconvenience. These challenges underscore the need for policymakers and tax authorities to address these

issues to maximize the effectiveness and user satisfaction of the ETS system.

The study also evaluated the progress made in the adoption and implementation of ETS, indicating varying levels of adoption and positive perceptions regarding the impact of ETS on countering counterfeits. However, improvements are needed in terms of enhancing recognizability, ease of verification, and addressing counterfeiting issues. Furthermore, the study examines the costs associated with purchasing ETS and the financial burden placed on manufacturers. It reveals that manufacturers perceive the costs as high, potentially impacting their operational costs and profitability.

Also, the study identified significant factors that influence the use of ETS among manufacturers such as penalties, education, expertise, inconvenience, cost of buying ETS, and tax rate. By considering these factors and addressing them effectively, policymakers and tax authorities can encourage greater adoption and usage of ETS among manufacturers, leading to improved tax compliance and revenue collection. The study's results contribute to the overall assessment of manufacturers' preference for using the ETS system and provide important information for future policy decisions.

6. Policy Recommendation

1) Enhancing security and technical support: the study highlights that a significant portion of manufacturers face security concerns, technical difficulties, and inconveniences when using ETS. Policymakers and tax authorities should prioritize addressing these challenges by providing robust security measures, user-friendly interfaces, and technical support to ensure a smooth and secure implementation of ETS. This may involve investing in training programs, strengthening cyber security measures, and improving the overall usability of the ETS platform. By addressing these concerns, policymakers can increase manufacturers' confidence in ETS, leading to higher adoption rates and improved tax compliance.

2) Addressing cost concerns: the findings indicate that the cost of acquiring ETS is perceived as high by manufacturers, leading some to prefer traditional tax payment methods. Policymakers should carefully assess the economic implications of ETS implementation and explore strategies to mitigate the financial burden on manufacturers. This may involve revising the pricing structure for ETS, providing subsidies or tax incentives to offset the costs, or exploring alternative funding mechanisms to make ETS more affordable for manufacturers. By addressing the cost concerns associated with ETS, policymakers can encourage wider adoption among manufacturers, ultimately leading to increased tax revenues and improved efficiency in tax collection.

3) Strengthening education and expertise: the study demonstrates that education and expertise among manufacturers have a positive influence on the preference for using ETS, while inconvenience, high costs, and tax rates have a negative impact. Policymakers should prioritize educational programs and capaci-

ty-building initiatives to enhance manufacturers' knowledge and skills related to ETS use. This can be achieved through workshops, training sessions, and educational campaigns that emphasize the benefits and proper usage of ETS.

4) Additionally, policymakers should explore ways to streamline administrative processes, simplify compliance requirements, and consider tax reforms that reduce the burden on manufacturers. By promoting education and expertise while addressing the barriers of inconvenience and high costs, policymakers can foster a favourable environment for ETS adoption and improve overall tax compliance rates in the Morogoro region of Tanzania.

7. Limitations of the Study

Despite the success of the paper, several problems were encountered during the study. One issue was the lack of cooperation from respondents, which stemmed from certain manufacturers perceiving themselves as being suspected of tax avoidance and evasion. However, researchers managed to overcome this obstacle by providing an introduction letter from Jordan University College (JUCo) and utilizing persuasive techniques to convince most manufacturers to participate. They understood that the study was for academic purposes and that the information provided would be kept confidential.

Another challenge faced was the time constraint. Manufacturers needed to schedule appointments to take part in the research program, but many could only do so after their working hours. To address this, researchers accommodated the manufacturers' preferred time slots.

Acknowledgements

The study conception and design involved contributions from all authors. LEM was responsible for material preparation and data collection, while AN, and LAM reviewed and modified the tool for data collection and then finally conducted the data analysis. LEM and LAM wrote the initial draft of the manuscript, which was subsequently reviewed and commented on by AN. Finally, the final version of the paper was read and approved by all authors.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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