

Factors Affecting the Effectiveness of Online Land Development Tax Collection in Bangladesh: Insights from Land Development Tax Officials

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Abstract

This study examines the factors influencing the effectiveness of online land development tax collection in Bangladesh. The study was carried out using a quantitative cross-sectional survey design with a structured questionnaire on a five-point Likert scale. Primary data were collected from 220 land development tax officials across 10 districts of Bangladesh using a convenience sampling technique. The findings reveal that curbing corruption ($\beta = 0.294$, $p < 0.001$), user-centric platforms ($\beta = 0.176$, $p = 0.003$), capacity-building of tax officials ($\beta = 0.112$, $p = 0.006$), awareness campaigns ($\beta = 0.260$, $p < 0.001$), and institutional monitoring ($\beta = 0.272$, $p < 0.001$) significantly enhance the effectiveness of online land development tax collection while digital skills of tax officials demonstrate insignificant reflections. The study recommends reducing corruption, designing user-centric platforms, strengthening the tax officials' capacity, arranging effective awareness campaigns, and maintaining effective institutional monitoring. These measures may contribute to the effectiveness of online land development tax collection in Bangladesh.

Keywords: Land Development Tax; Online Tax Collection; Tax Collection Effectiveness; E-Governance; Tax Officials; Bangladesh

1. Introduction

Land Development Tax (LDT) is an important source of non-NBR revenue in Bangladesh (Kathy et al., 2025). Traditional land development tax collection is aggravated by many challenges, including rampant corruption, bureaucratic inefficiency, administrative delays, revenue leakage, harassment of taxpayers, and land development tax officials not submitting the collected tax to the government account, resulting spoil public trust and hindering effective land development tax collection (Rashid et al., 2025; Chowdory, 2024; Sakib et al., 2022; Kathy et al., 2025). The Government of Bangladesh has increasingly shifted LDT

assessment and collection from conventional, paper-based procedures toward digital platforms to address the manual challenges. The Land Development Tax Act, 2023 provides a legal basis for online land development tax collection, reflecting the government's broader objective of modernizing land development tax administration and improving the effectiveness of land development tax collection (Arifuzzaman & Islam, 2024).

Despite substantial investment in the online land development tax system, the overall effectiveness of online land development tax collection in Bangladesh remains a major policy and research concern (Hasanat and Craddock, 2022). While transitioning to a digital platform creates opportunities to make revenue collection faster, more transparent, convenient, and less vulnerable to informal payments (Ahmed, 2026; Ministry of Land, 2025), the mere availability of an online platform does not automatically guarantee effective revenue collection or resolve the underlying administrative problems inherent to land administration (Hasanat and Craddock, 2022; Swadesh Properties, 2023).

Corruption and informal intervention are major concerns of online land development tax collection in Bangladesh. Historically, land administration in Bangladesh has been vulnerable to unofficial payments, broker involvement, information asymmetry, and discretionary behavior by frontline officials (Chowdory, 2024; Transparency International Bangladesh, 2015). Although digital payment can reduce direct cash transactions, corruption may persist where tax assessment or record correction remains dependent on officials, or where institutional controls are weak (Ahsan, 2024; Chowdory, 2024). Research on Bangladesh's land administration indicates that digitization can reduce some opportunities for corruption but cannot by itself eliminate institutional and informal practices (Sakib et al., 2022; Chowdory, 2024).

The lack of digital skills among Union Land Assistant Officials and other land-tax officials is a hindrance to the effectiveness of online land development tax collection (Sultana & Nahar, 2026). The transition from manual to digital land development tax collection requires officials to operate online systems, verify taxpayer information, resolve technical problems, communicate with taxpayers, and apply updated legal and administrative procedures (Sultana & Nahar, 2026; Sarker, 2025). Recent research specifically on land development tax management indicates that many Union Land Office officials have limited digital proficiency and insufficient practical training (Sultana & Nahar, 2026).

The user-centricity of the online platform is essential for the effectiveness of online land-development tax collection because accessible, transparent, and easy-to-use digital services can improve users' satisfaction and trust in online land administration. If users encounter complicated interfaces, inadequate instructions, system failures, difficulty accessing records, or weak grievance-redress mechanisms, they may continue to depend on land-office staff (Akter, 2023; Arifuzzaman & Islam, 2024). Evidence from digital land services in Bangladesh shows that problems of responsiveness, cooperation, knowledge, and awareness can undermine citizens' satisfaction with digital services (Akter, 2023).

Capacity-building and institutional support remain essential to the effectiveness of online land-development tax collection. Digital reform changes not only the technology used to collect taxes but also officials' work processes, responsibilities, required skills, reporting arrangements, and accountability relationships (Transparency International Bangladesh, 2015; Hossain, 2015). Training should not be

treated as a one-time intervention. Officials require continuous refresher training, practical exercises, updated guidance on legal and administrative procedures, and performance monitoring. Capacity-building should also be accompanied by institutional reforms, including interoperable information systems, adequate staffing, user-friendly services, and effective grievance redress (Ahsan, 2025; Akter & Alam, 2026). Sultana and Nahar (2026) argue that systematic and practical training is indispensable for effective land development tax administration.

The expansion of digital infrastructure for online Land Development Tax (LDT) collection in Bangladesh represents a significant shift toward automated e-governance (Rahman, 2023). Despite the modernization of these platforms, limited user awareness remains a critical barrier to widespread public engagement (Chowdhury et al., 2024). Inadequate taxpayer awareness and insufficient effective awareness campaigns may directly reduce citizens' comprehension and technical readiness regarding online tax portals (Chowdhury et al., 2024). Consequently, a gap exists between the technical availability of digital tax tools and taxpayers' actual willingness to adopt them (Chowdhury et al., 2024). Bridging this gap requires systematic examination of how awareness campaigns affect taxpayer understanding and influence their transition from traditional manual systems to active online LDT service usage (Rahman, 2023).

Robust institutional monitoring and oversight are essential components for ensuring the operational effectiveness, security, and integrity of online Land Development Tax collection (Sarker et al., 2021). An effective supervisory framework must encompass dynamic transaction tracking, real-time performance evaluation, structured complaint-redress mechanisms, prompt detection of financial irregularities, and rigorous accountability protocols for public officials managing the online system (Alam et al., 2022). While the Government of Bangladesh has embedded automated monitoring and reporting modules directly within its national digital land-management architecture, the real-world operational efficacy of these tools remains constrained at the grassroots implementation level (Islam, 2023). Consequently, empirical investigation is required to systematically measure how effectively these incorporated oversight mechanisms function in practice and mitigate administrative bottlenecks (Islam, 2023).

However, there is a need to investigate how curbing corruption, digital skills of tax officials, user-centric platforms, capacity-building of land-tax officials, awareness campaigns, and institutional monitoring collectively influence the effectiveness of online land development tax collection in Bangladesh. Such an investigation can provide evidence for improving the design and implementation of digital land-tax reforms and strengthening the effectiveness of online land development tax collection.

The main aims of this research are to explore the factors that influence the effectiveness of online land development tax collection. To fulfill the aims, the study focuses on two specific objectives: (1) to identify factors affecting online land development tax collection. (2) to assess the impact of the factors on the effectiveness of online land development tax collection.

There are very few studies on land development tax collection in Bangladesh; previous studies have not presented online land development tax collection that is affected by various factors and have not provided a possible solution by analyzing the opinions of land development tax officials. So, the researcher chose two research questions to fulfil the research objectives, outcomes, and for policy drive.

1. What are the factors affecting the online land development tax collection?
2. How do these factors affect the effectiveness of online land development tax collection?

The present study aims to identify the technical, organizational, and social factors influencing the effectiveness of land development tax collection.

2. Materials and methods

2.1 Research Design

Research designs are types of inquiry within qualitative, quantitative, and mixed methods approaches that provide specific direction for procedures in a research study, called *strategies of inquiry* (Denzin & Lincoln, 2011). Creswell and Creswell (2018) argued that research design facilitates a framework for selecting appropriate methods and procedures for conducting research and addressing research questions.

A quantitative research design was selected for this study aims to measure the factors associated with the effectiveness of online land development tax collection and examine the relationships between these factors and land development tax collection effectiveness outcomes. Quantitative research allows the researcher to collect numerical data through a structured questionnaire, measure variables systematically, test hypotheses, and apply statistical techniques to identify statistically significant relationships among variables. It is also appropriate for survey research because standardized measurements facilitate comparison and statistical generalization of findings (Nikolopoulou, 2023; Lim, 2025). The author collected data using a printed survey questionnaire from the land development tax officials. The survey questionnaire was constructed as a closed-ended questionnaire with a five-point Likert scale.

2.2 Study Area

The study area covered 10 selected districts of Bangladesh. The study was conducted in Dhaka, Sylhet, Jashore, Cox's Bazar, Narsingdi, Noakhali, Natore, Bhola, Netrokona, and Panchagarh districts of Bangladesh. These places were chosen for the study for the convenience of data collection and covered all types of land development tax based on land use.

2.3 Study Population

The population is a group of individuals used for specific research purposes. The population of this study is the land development tax officials who are inclined towards online land development tax collection. So, the land development tax officials have been selected as the target population for the research.

2.4 Sampling Procedure and Sample Size

This research employed a non-probability sampling technique to collect the necessary samples from the target population. The researcher was not able to conduct the research using probability sampling techniques due to the high cost and time constraints. The researcher considered the convenience sampling technique for data collection. Convenience sampling is selected because it is the easiest for the researcher to access (Nikolopoulou, 2022); the researcher chooses the sample based on ease of access (Ritchie & Lewis, 2003). The researcher collected 220 samples from the land development tax officials. Basically, the 220 samples were collected from Union Land Development Tax Officials whose were collect land development tax in Bangladesh, and 22 samples were collected from each district. However, the sample

is consistent with the sampling procedure. For general surveys, a commonly recommended minimum sample size ranges from 100 to 200 respondents to ensure sufficient statistical power and representativeness (Krejcie and Morgan, 1970; Bartlett, Kotrlik and Higgins, 2001; Fowler, 2013). A sample size between 100 and 200 is categorized as medium, and a sample size over 200 is regarded as large (Kline, 2005).

2.5 The Study Instruments

The data were collected using a structured and closed-ended survey questionnaire developed from a previously validated scale. Through this validated measurement instrument, the author increases construct validity and ensures research findings can be compared with previous studies (Carpenter, 2018). All predictors were evaluated using a 5-point Likert scale, ranging from strongly disagree to strongly agree that used in behavioral research to effectively capture human attitudes and perceptions (Likert, 1932). This questionnaire covered various constructs, including curbing corruption, digital skills, user-centric platform, capacity-building, awareness campaign, and institutional monitoring. The questionnaire was prepared in English and used back-translation during data collection. A pilot survey was conducted with 30 participants.

2.6 Data Collection Methods

The leaving method and the self-response survey data collection method were used for the printed questionnaire survey. The leaving method and self-response survey data collection method were applied to the land development tax officials. The study areas were 10 districts of Bangladesh, where land development tax officials were busy with their official duties. Therefore, the leaving method and self-response survey were used for land development tax officials to collect data using the questionnaire survey.

2.7 Data Collection Period

The field survey for data collection in the current study was conducted from August 2025 to October 2025.

2.8 Data Processing and Analysis Technique

The collected data were sorted and coded in the Google spreadsheet for further analysis. The coded data were used to ensure that the data were accurate, consistent, and uniform with other facts gathered. The collected dataset was completed as much as possible based on research objectives and research questions. The survey data were progressively analyzed using Exploratory Factor Analysis with IBM SPSS Statistics version 28.0.1.1 (15). In factor analysis, principal axis factoring with the Promax rotation method was used. To identify the factors associated with the effectiveness of online land development tax collection using factor analysis. Moreover, descriptive analysis and multiple regression were also conducted. Descriptive statistics reveal the profile of the respondents, and regression analysis indicates the relationship between the independent variables and the dependent variable, as well as hypothesis testing.

2.9 Ethical Consideration

Respondents of this study have the right to privacy during data collection and to give informed consent. Therefore, the respondents were notified that the information supplied throughout the research survey would be kept confidential. The questionnaire survey would be used only for research purposes, and the supplied information would only be accessible to the researcher. The information would not be disclosed

to the public. Participation in the survey was completely voluntary, and respondents could withdraw themselves from the survey at any time or decide to decline to participate. Moreover, respondents could refuse to answer any question.

3. Theoretical framework

3.1 The Unified Theory of Acceptance and Use of Technology (UTAUT)

The goal of this model, as developed by Venkatesh and others, is to explain users' intention to use an information system and their following usage behavior. Understanding one's desire to use and real usage of an information system is the aim of UTAUT (Venkatesh et al., 2003). According to the theory, usage purpose and behavior are directly influenced by four important constructs: performance expectancy, effort expectancy, societal impact, and facilitating circumstances (Venkatesh et al., 2003).

The Unified Theory of Acceptance and Use of Technology (UTAUT) focuses on constructs such as performance expectancy, effort expectancy, social influence, and facilitating conditions as factors of technology adoption. These factors influence the attainment of performance, the use of the system, and support for the use of the system. The following four constructs are given below:

Performance Expectancy: The degree to which an individual perceives that using a digital platform will help them to achieve specific performance (Venkatesh et al., 2003).

Effort Expectancy: The effort expectancy associated with operating the digital platform easily (Venkatesh et al., 2003).

Social Influence: The extent to which a user perceives that important others, such as capacity building, digital skills, and external factors, induce them to use a digital platform (Venkatesh et al., 2003).

Facilitating Conditions: The land development tax officials' belief that the organizational, technical, and infrastructural support structures are available to help them navigate the digital system (Venkatesh et al., 2003).

The summary of the construct mapping matrix with factors is given below:

Table 1: The adapted UTAUT Construct Mapping Matrix with Factors

UTAUT Construct	Tax Officials Factor	Theoretical Justification
Performance Expectancy (PE)	Curbing Corruption Institutional Monitoring	These factors reflect whether improving online land development collection effectiveness is expected to improve performance.
Effort Expectancy (EE)	Digital Skills User-Centric Platform	Digital skills and user-centric platform determine how easily users can understand and use the online tax system.
Social Influence (SI)	Awareness Campaign	Awareness campaigns can encourage users and stakeholders to adopt and use the digital system.
Facilitating Conditions (FC)	Capacity-Building	Capacity building provides the organizational conditions necessary for effective use.

3.2 Conceptual framework

This conceptual framework is designed based on the Unified Theory of Acceptance and Use of Technology (Venkatesh et al., 2003). The conceptual framework functions as an interconnected ecosystem in which inputs from primary stakeholder groups, such as land development tax officials, directly drive specific outcomes. In the online land development tax collection system, this conceptual framework addresses the factors that will intrinsically transform land development tax collection.

The success of the online land development tax collection depends on internal institutional factors related to land development tax officials. The factors are “curbing corruption”, “digital skills”, “user-centric platform”, “capacity-building”, “awareness campaign”, and “institutional monitoring”. All these factors interact with the digital land development tax platforms, which may reveal expected outcomes (Figure 1).

3.3 Construction of hypothesis

In this research, some independent variables are interconnected with dependent variables. To fulfill the research objectives and research questions, the following hypotheses need to be tested:

H₁: Curbing corruption has a significant positive relationship with the effectiveness of online land development tax collection.

H₂: Digital skills have a significant positive relationship with the effectiveness of online land development tax collection.

H₃: A user-centric platform has a significant positive relationship with the effectiveness of online land development tax collection.

H₄: Capacity-building has a significant positive relationship with the effectiveness of online land development tax collection.

H₅: Awareness campaign has a significant positive relationship with the effectiveness of online land development tax collection.

H₆: Institutional monitoring has a significant positive relationship with the effectiveness of online land development tax collection.

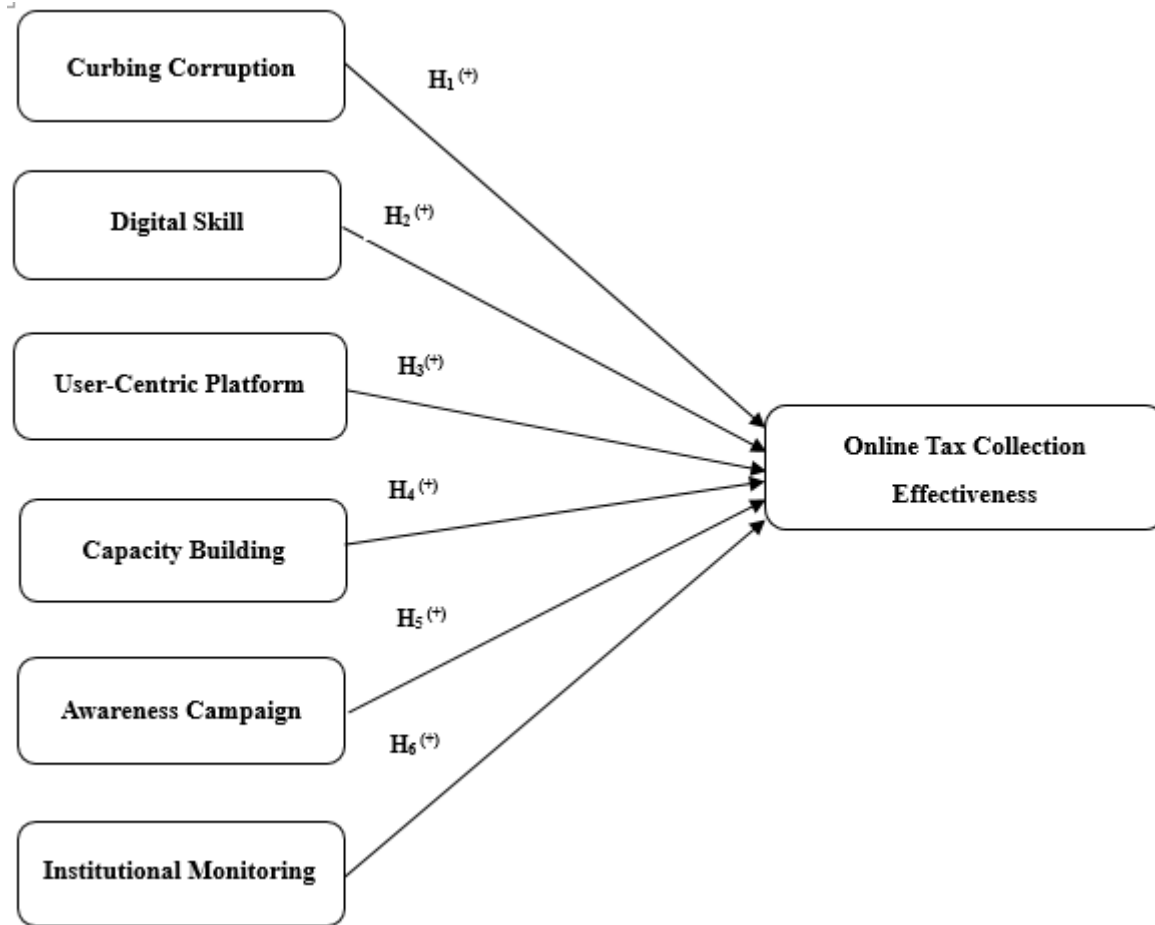


Figure 1: Conceptual framework of the study.

4. Results

The study analyzes the collected survey data to identify the factors that affect the effectiveness of online land development tax collection and the relationship between the independent variables and the dependent variable. The collected questionnaire survey data were analyzed using IBM SPSS software. The researcher conducted descriptive statistics, factor analysis, regression analysis, and an independent-samples t-test.

4.1 Data Normality

The normality analysis checks the data normality before analysis. Generally, Kurtosis and Skewness tests are done to check the normality at the univariate level. Hair et al. (2014) recommended that skewness and kurtosis values should fall within the range of -1 to +1 for normality, while Brown (2019) suggests a broader range of -3 to +3 for skewness and -10 to +10 for kurtosis. Field (2009) offers a slightly more lenient score with a range of -2 to +2 for skewness and kurtosis. Kline (2020) sets higher thresholds for skewness (less than 3) and kurtosis (less than 10), but also stresses the importance of a sample size exceeding 200 for a reliable assessment of normality. Similarly, Hair et al. (2014) recommend ranges of -1.96 to +1.96 for skewness and -7 to +7 for kurtosis, along with a sample size exceeding 200. Moreover, Shapiro and Wilk (1965) set thresholds of 0 to 1 for skewness and kurtosis, along with a wide range of data, not exceeding 2000, for reliable normality. In this study, the data normality test shows values within

the range of -1 to +1.

4.2 The profile of the study population

Table 2: Demographics of land development tax officials

Name of Categories	Index	Frequency (N)	Percentage (%)
1. Gender	Male	190	86.4
	Female	30	13.6
	Total	220	100.0
2. Age Group	21-40 years	71	32.3
	41-60 years	149	67.7
	Total	220	100.0
3. Educational Qualification	Up to diploma	73	33.2
	Bachelor's and higher	147	66.8
	Total	220	100.0
4. Years of Experience	1-20 years	103	46.8
	21-35 years	117	53.2
	Total	220	100.0

Source: IBM SPSS analysis based on data, 2025

Based on the collected data from (N=220) union land development tax officials as respondents. The tax officials refer to union land assistant officers, union land officers, surveyors, and kanungos of land offices in Bangladesh. The demographic table shows the profiles of the respondents (N = 220). The male respondents are the majority (86.4%), and female respondents are in the minority (13.6%). In the age group distribution, older respondents constituted approximately two-thirds (67.7%) of land development tax officials, falling into the 41-60 years age group; while the remaining one-third (32.3%) belong to the young group, falling into the 21 to 40-year-old age group. Almost two-thirds (66.8%) of the land development tax officials are highly educated, while approximately one-third (33.2%) of respondents have a diploma. The distribution of experience shows a slight majority (53.2%) possessing 21–35 years of experience, and the remaining portion (46.8%) having 1–20 years. (Table 2).

4.3 Effectiveness of Online LD Tax Collection

4.3.1 Sample Adequacy Test for Factor Analysis

Table 3: KMO and Bartlett's test statistics

KMO	Bartlett's test of sphericity (χ^2)	df	P value
0.761	223.828	15	< 0.001

df = degrees of freedom

The Kaiser–Meyer–Olkin (KMO) value of sampling adequacy was 0.761, suggesting satisfactory sample

adequacy for factor analysis. Bartlett's test of sphericity was statistically significant ($\chi^2 = 223.828$, $df = 15$, $p < 0.001$), confirming that the correlation matrix was not an identity matrix and that significant correlations existed among the observed variables (Table 3). The factors' shared variance is substantial, suggesting that the proportion of variance in the variables might be caused by the same underlying construct. These results demonstrate that the data were suitable for conducting exploratory factor analysis (Table 3).

4.3.2 Factor Analysis

The exploratory factor analysis was conducted using principal axis factoring with a Promax rotation. Seven consecutive rotations were required to construct the factors. During the Promax rotation, the author excluded the items that had loadings below 0.4.

Table 4: Results of Factor Analysis influencing the online land development tax collection.

Name of Factors and Their Items	Loading	Mean	SD	Cronbach's α
1. Curbing Corruption, Afzal et al. (2025)				
E-payments and digital receipts reduce allegations of cash-based corruption.	0.948	4.47	0.500	0.77
The system reduces human intervention and prevents opportunities for corruption of tax officials.	0.654			
Automated tax assessments reduce human errors and bias in the calculation process.	0.572			
LD tax payments go straight to government accounts.	0.562			
2. Digital Skill, Paroli (2023)				
I have adequate digital skills and competency to handle online tax collection processes.	0.659	4.16	0.595	0.67
I have enough knowledge of digital platforms.	0.653			
I provide feedback for LD tax system improvements based on field experience.	0.469			
3. User-Centric Platform, Rahman & Jyoti (2022)				
The online LD tax platform has a multilingual interface.	0.660	4.18	0.593	0.69
The online complaints system is effective for resolving taxpayers' issues immediately.	0.526			
The digital platform has a tracking system for land development tax-related application and payment progress.	0.521			
4. Capacity Building, Islam et al. (2024)				
I receive continuous professional development training for online land development collection.	0.786	3.78	0.877	0.67

Name of Factors and Their Items	Loading	Mean	SD	Cronbach's α
I received ICT-specific training to manage the digital land development tax system effectively.	0.663			
5. Awareness Campaign, Islam et al. (2024)				
The awareness campaign exhibits the online complaint submission process.	0.724	4.00	0.683	0.64
Taxpayers actively participate in the awareness campaign.	0.620			
The awareness campaign demonstrates the online payment process.	0.419			
6. Institutional Monitoring, Paroli (2023); Ug’iloy (2025)				
The digital tax system is monitored by the higher authorities during office inspections.	0.617	4.39	0.486	0.63
Higher authorities often monitor land development tax collection through a digital dashboard.	0.545			

SD = Standard Deviation, LD = Land Development, ICT = Information and Communication Technology

The table presents six factors identified through exploratory factor analysis (EFA), together with their factor loadings, descriptive statistics, and internal reliability. Overall, the results indicate that the extracted factors represent distinct and theoretically meaningful dimensions of the digital transformation of land development tax collection, with generally acceptable factor loadings and reliability.

Curbing Corruption factor emerged as a significant dimension, with the highest loading of 0.948 recorded for e-payments and digital receipts reducing allegations of cash-based corruption. The remaining items loaded between 0.562 and 0.654, indicating that digital payment, automated assessment, reduced human intervention, and direct government-account payments are closely associated with corruption reduction. The relatively high mean ($M = 4.47$, $SD = 0.500$) suggests strong agreement among respondents that digital transformation can reduce corruption opportunities. The Cronbach's alpha of 0.77 indicates good internal consistency (Table 4).

The Digital Skill factor demonstrated loadings ranging from 0.469 to 0.659, indicating good internal consistency with the same underlying construct. Respondents reported relatively high digital competency ($M = 4.16$, $SD = 0.595$), suggesting that land development tax officials perceive themselves as capable of handling digital tax-collection processes and provide feedback for system improvement. The Cronbach's alpha ($\alpha = 0.67$) indicates acceptable internal consistency for an exploratory factor analysis study (Table 4).

The User-Centric Platform factor demonstrated loadings between 0.521 and 0.660, indicating that platform usability, complaint resolution, and application and payment tracking constitute the same underlying construct. Its relatively high mean ($M = 4.18$, $SD = 0.593$) suggests favorable perceptions that the online land development tax platform is user-centric. The reliability coefficient ($\alpha = 0.69$) is close to the

commonly accepted threshold ($\alpha = 0.70$) and can generally be considered acceptable in exploratory research (Table 4).

Capacity Building exhibited comparatively strong factor loadings (0.663–0.786), indicating a clear association between continuous professional development and ICT-specific training. However, its relatively low mean value and large standard deviation ($M = 3.78$, $SD = 0.877$) suggest that perceptions of different training opportunities vary more substantially among respondents. The Cronbach's alpha ($\alpha = 0.67$) indicates moderate and acceptable internal consistency for an exploratory study. This factor consists of only two item that why bear low Cronbach's alpha (Table 4).

The Awareness Campaign factor demonstrated loadings from 0.419 to 0.724, indicating enough internal consistency among the online complaint-submission process, active participation, and the online-payment process demonstration. The mean value ($M = 4.00$, $SD = 0.683$) indicates generally positive perceptions of awareness campaigns. However, the Cronbach's alpha ($\alpha = 0.64$) indicates that this factor should be interpreted cautiously and is acceptable for an exploratory study. This construct consists of only three items, which indicates a comparatively low Cronbach's alpha (Table 4).

Institutional Monitoring factor reported loadings of 0.545 and 0.617, suggesting enough internal consistency between monitoring by higher authorities during office inspection and digital dashboard-based oversight. The high mean ($M = 4.39$, $SD = 0.486$) indicates strong agreement that digital monitoring is an important institutional mechanism. However, the Cronbach's alpha ($\alpha = 0.63$) is comparatively modest and acceptable for an exploratory study. The Cronbach's alpha is understandable given that the factor contains only two items; however, additional indicators of institutional monitoring would improve its reliability (Table 4).

4.4 Regression Analysis

Table 5: Model Fitness Test of Data for Effectiveness

	Model Fit Statistics		
R^2	F-statistics	DW Statistic	P-value
0.453	29.372 (6df)	1.712	0.001

The model fit statistics suggest that the regression model offers a statistically significant overall explanation of the dependent variable. The R-squared value of 0.453 indicates that the independent predictor variables successfully explain 45.3% of the total variance of the dependent variable. Consequently, the remaining 54.7% of the variance is unaccounted for due to factors excluded from the test. This model has an average level of explanatory power, meaning it explains much of the variance but not all of it. The F-statistic value of 29.372 (6df) is statistically significant ($p < 0.001$), indicating the regression model is significant, and the independent variables together have a significant relationship with the dependent variable. Moreover, the Durbin-Watson (DW) statistic of 1.712 is within the acceptable range of 1.5 to 2.5, indicating that there is no autocorrelation in the regression residuals (Table 5).

Table 6: Regression analysis results for factors influencing the effectiveness of tax collection

Name of Factors	Coefficients ^a	SE	P value		VIF
1. Curbing Corruption	0.294	0.082	0.000	***	1.492
2. Digital Skills	0.058	0.058	0.322		1.404
3. User-Centric Platform	0.176	0.058	0.003	**	1.469
4. Capacity Building	0.112	0.040	0.006	**	1.092
5. Awareness Campaign	0.260	0.055	0.000	***	1.335
6. Institutional Monitoring	0.272	0.061	0.000	***	1.254
a. Dependent Variable: The online land development tax collection is more effective.					

Note: * = $p < 0.05$, ** = $p < 0.01$, *** = $p < 0.001$ (SE = Standard Error, VIF = Variance Inflation Factor)

The regression results reveal that several factors are significantly associated with the perceived effectiveness of online land development tax (LD tax) collection. The coefficient (β) indicates the strength of the relationship. The P-value indicates the statistical significance of that relationship. The variance inflation factor (VIF) value for each factor is within the 1.092- 1.492 range, not exceeding the standard threshold level (5.00), which indicates that there is no multicollinearity. The effectiveness of online land development tax collection is associated with six factors that are discussed below.

The curbing corruption factor has a strong positive and statistically highly significant relationship with ($\beta = 0.294$, SE = 0.082, $p < 0.001$) the effectiveness of the online LD tax collection platform. The positive and significant coefficient indicates that greater curbing of corruption is associated with higher effectiveness of online land development tax collection (Table 6).

The digital skill factor shows a very weak positive and statistically insignificant relationship with ($\beta = 0.058$, SE = 0.058, $p = 0.322$) the effectiveness of online land development tax collection. The result suggests that this factor produces no statistically significant contribution to the effectiveness of online land development tax collection (Table 6).

The user-centric platform factor has a positive and statistically significant relationship with ($\beta = 0.176$, SE = 0.058, $p = 0.003$) the effectiveness of online land development tax collection, suggesting that a better user-centric platform significantly contributes to higher effectiveness of the online land development tax collection (Table 6).

The capacity building factor has a positive and significant association with ($\beta = 0.112$, SE = 0.040, $p = 0.006$) the effectiveness of the online LD tax collection. The result suggests that greater capacity building of land development tax officials significantly contributes to the effectiveness of the online land development tax collection (Table 6).

The awareness campaign factor shows a strong positive and statistically highly significant relationship with ($\beta = 0.260$, SE = 0.055, $p < 0.001$) the effectiveness of online land development tax collection, suggesting that better awareness campaigns significantly improve the effectiveness of the online LD tax collection (Table 6).

The institutional monitoring factor has a strong positive and statistically highly significant relationship

with ($\beta = 0.272$, $SE = 0.061$, $p < 0.001$) the effectiveness of online land development tax collection. The result suggests that strong institutional monitoring significantly fortifies the effectiveness of online LD tax collection (Table 6).

The most influential significant driving factors of the perceived effectiveness of online land development tax collection are curbing corruption ($\beta=0.294$), institutional monitoring ($\beta=0.272$), awareness campaigns ($\beta=0.260$), a user-centric platform ($\beta=0.176$), and capacity building ($\beta=0.112$) (Table 6).

4.5 Hypothesis Test

Table 7: Hypothesis test for the effectiveness of land development tax collection

Hypotheses	Estimation (β)	SD	P values	Decision
H ₁	0.294	0.500	<0.001	Accepted
H ₂	0.058	0.595	0.322	Rejected
H ₃	0.176	0.593	0.003	Accepted
H ₄	0.112	0.877	0.006	Accepted
H ₅	0.260	0.683	<0.001	Accepted
H ₆	0.272	0.486	<0.001	Accepted

SD = Standard Deviation

5. Discussion

This chapter mainly discusses the linkage and comparison of research findings and the previous literature. The survey was conducted to analyze the relationship among the variables using primary data collected from the land development tax officials of Bangladesh. Curbing corruption, digital skills, user-centric platform, capacity-building, awareness campaigns, and institutional monitoring are driving factors that improve the effectiveness of the online land development tax collection. The following identified factors are discussed below:

5.1. Role of curbing corruption on effectiveness

The curbing corruption factor has a positive and highly significant association with the effectiveness of online land development tax collection ($\beta = 0.294$, $p < 0.001$), suggesting that e-payments and digital receipts reduce cash-based corruption; the online system reduces human intervention & preventing opportunities for corruption, automated tax assessment reduces human errors and bias, and online land development tax payment goes straight to the government account. All these items relate to preventing perceived corruption. The effectiveness of online land development tax collection is enhanced, while corruption is reduced in the land development tax collection system. The results support that curbing corruption improves the effectiveness of online land development tax collection in Bangladesh. Okunogbe and Pouliquen (2018) found that electronic tax filing reduced bribery-like corruption.

5.2. Role of digital skills on effectiveness

The digital skills of land development tax officials demonstrate a positive and statistically insignificant relationship with the effectiveness of online land development tax collection ($\beta = 0.058$, $p = 0.322$),

indicating that having adequate digital skills and competency to handle the online land development tax system, having enough knowledge of digital platforms, and providing feedback for land development tax system improvement based on field experience. The digital skills factor shows an insignificant association with the effectiveness of online land development tax collection in Bangladesh.

The expected relationship between digital skills of land development tax officials and the effectiveness of online land development tax collection was not found. The plausible reasons for this non-significant result need further study; it could be tied to capacity building of land development tax officials; the measurement may not adequately capture actual digital skills, and the association may be indirect rather than direct.

5.3. Role of user-centric platform on effectiveness

The user-centric platform demonstrates a positive and statistically significant association with the effectiveness of online land development tax collection ($\beta = 0.176$, $p = 0.003$), suggesting that the digital platform is user-friendly, the online complaints system is effective in resolving taxpayers' issues, and the digital platform provides tracking facilities for online land development tax-related applications and the payment process. The result suggests that while the digital platform is more user-centric, it significantly improves the effectiveness of online land development tax collection in Bangladesh. Henderson et al. (2025) found that the user-friendly portal has simple navigation and clear instructions that boost the effectiveness of tax collection.

5.4. Role of capacity-building on effectiveness

The capacity-building of land development tax officials has a positive and significant relationship with the effectiveness of online land development tax collection ($\beta = 0.112$, $p = 0.006$), indicating that tax officials receive continuous professional development training for online land development tax collection and receive ICT-based training to manage the online land development tax platform effectively. These two types of training are required for land development tax officials to boost capacity-building, which contributes to improving the effectiveness of online land development tax collection in Bangladesh. Sultana and Nahar (2025) found that the union land assistant officers do not receive enough training for capacity-building, and sometimes the training is not aligned with digital land management. Islam et al. (2024) found that the local government tax staff are not capable of managing the digital municipal tax portal and did not receive proper training about it.

5.5. Role of awareness campaigns on effectiveness

The awareness campaign has a positive and statistically highly significant association with ($\beta = 0.260$, $p < 0.001$) the effectiveness of online land development tax collection, suggesting that land development taxpayers actively participated in the awareness campaign (Land Services Week); the campaigns demonstrate the online complaint submission and payment submission process. These characteristics of the awareness campaigns contribute to improving the effectiveness of online land development tax collection in Bangladesh. Henderson et al. (2025) found that the awareness campaign continues outreach and improves familiarity with portals and encourages active usage. Puasa et al. (2025) found that an awareness campaign was effective in encouraging tax compliance.

5.6. Role of institutional monitoring on effectiveness

Institutional monitoring demonstrates a positive and statistically significant relationship with the effectiveness of online land development tax collection ($\beta = 0.272$, $p < 0.001$), suggesting that higher authorities monitor the online land development tax system during on-the-spot office inspections and through the digital dashboard. The institutional monitoring system always encourages the land development tax officials to improve the effectiveness of online land development tax collection in Bangladesh. Jain (2026) found that digital monitoring enhances the effectiveness of tax collection.

6. Conclusions

The findings demonstrate that the effectiveness of online land development tax collection in Bangladesh is influenced by a combination of technological, institutional, human-capacity, and taxpayer-oriented factors. The results indicate that curbing corruption, digital skills, user-centric platforms, capacity-building, awareness campaigns, and institutional monitoring all have positive relationships with the effectiveness of online land development tax collection.

The findings suggest that the effectiveness of online land development tax collection depends on an integrated digital governance environment rather than on the digital system alone. Reducing corruption during online land development tax assessment and holding corrections, designing user-centric digital platforms, strengthening the capacity of tax officials, arranging effective awareness campaigns, and maintaining effective institutional monitoring are significantly improving the effectiveness of online land development tax collection in Bangladesh.

The evidence therefore supports a holistic approach, as the effectiveness of online land development tax collection depends on the integration of technological, institutional, and human resources development factors, rather than relying solely on technological solutions. Such an integrated approach can strengthen the effectiveness of online land development tax collection in Bangladesh.

6.1 Policy Recommendations

This study suggests several policy recommendations to further the effectiveness of online land development tax collection in Bangladesh. To prevent corruption, higher authorities should conduct frequent digital monitoring, and if continuous allegations against a specific officer are found, higher authorities should take action through departmental proceedings. Design the digital platforms to be user-centric, including a multilingual interface, an effective online complaint system, and an effective payment tracking system. Strengthen capacity-building of tax officials by providing practical, professional, and ICT-based training. Arrange effective awareness campaigns demonstrating the online payment process and complaints submission. Maintain an effective institutional monitoring system. All these recommendations bring new insights for policymakers and future land tax administration reforms.

6.2 Contribution of the study

This study has many significant contributions that focus on the literature on technology adoption, especially online land development tax collection in developing countries.

Contextual and empirical contribution: This study provides one of the first empirically validated models created on online land development tax collection effectiveness in Bangladesh, a developing country in South Asia. This study fills the gap in the emerging literature on digital land tax administration by providing tax official-level empirical evidence from Bangladesh, a context in which research on the effectiveness of online land development tax collection remains limited.

Theoretical contribution: The study reveals that the effectiveness of online land development tax collection integrates technological, institutional, and human-resource-oriented dimensions to extend a pure technology-adoption and actual usage perspective.

Practical Utility and Actionable Insights: The usefulness of this model is one of its major contributions. By recognizing practical keys for policymakers, the findings go beyond mere hurdle identification. The effectiveness of online land development tax collection requires a synergistic investment in tax officials' reducing corruption ($\beta = 0.294$), designing a user-centric platform ($\beta = 0.176$), strengthening capacity-building ($\beta = 0.112$), arranging effective awareness campaigns ($\beta = 0.260$), and maintaining institutional monitoring ($\beta = 0.272$) measures.

Authorship contribution statement

The authors' contributions to the study are conceptualization, data curation, formal analysis, investigation, methodology, writing of the original draft, project administration, and others.

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Data Availability

The dataset used to generate and analyze this study will be available from the corresponding author and was not made publicly available to protect the confidentiality of the respondents involved in this research.

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