

THE IMPACT OF INFORMATION AND COMMUNICATION TECHNOLOGY ON REVENUE COLLECTION IN PUBLIC WATER COMPANIES

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ABSTRACT

The specific objective of the study was to examine the impact of Information and Communication Technology on the revenue collection in public water companies. The study applied the Technological Acceptance Theory and adopted a mixed research design. A sample of 500 was drawn from a population of 1000. A stratified sampling technique was applied. Questionnaires were used to collect primary data. Secondary data was used to identify gaps in previous studies. Cronbach's alpha model and Kaiser Meyer Olkin were used to determine the reliability and validity of the research tool, respectively. The key findings using the Statistical Program for Social Statistics were applied, and results were presented by use of tables and graphical presentation. Descriptive and inferential statistics results were displayed. Results on the level of agreement indicated that 3.24% of the respondents disagreed, 6.69% were not sure, and 87.0% agreed that Information and Communication Technology is a financial determinant of revenue collection in public water companies. Using the measure of central tendency agreed (Mean=4.32; Standard Deviation =0.79), Information and Communication

Technology as an independent variable is a determinant of Revenue collection. However, the respondents agreed (Mean=4.41; Standard Deviation=0.702) that technological change has a positive impact on company revenue growth. Which means the management of water companies needs to be sensitive to technological change. The key findings indicated that Information and Communication Technology Revenue Systems adoption significantly improves revenue collection efficiency, with Pearson correlation results showing a weak positive relationship ($r^2 = 0.265$, $p < 0.05$). The study concluded that Information and Communication Technology Revenue Systems enhances revenue collection. The study recommends strengthening the Information and Communication Technology Revenue Systems infrastructure and enhancing staff training for better implementation.

Key words: Integration of Revenue System, Involvement of Stakeholders in System Design, Technological Change, Cyber Security, E-commerce, Bad debts/write-offs, Water Regulatory Bodies in the Water Sector.

INTRODUCTION

The adoption of Information and Communication Technology presents a significant opportunity to streamline revenue collection in Public Water Companies. The study examined the impact of Information and Communication Technology on revenue collection in public

water companies. The study evaluated Information and Communication Technology revenue systems such as e-billing, mobile payments, and automated meter reading. The study assessed the influence of technology on financial performance.

Firms are being urged to adopt Information and Communication Technology revenue systems in sustainable practices. Water utilities remain slow to embrace Artificial Intelligence-driven predictive analytics that could optimize revenue collection by forecasting payment behaviors and detecting billing anomalies, largely due to high infrastructure costs and limited expertise (Brown & Lee, 2025). At the same time, large-scale data centers consume vast amounts of water, with AI workloads intensifying cooling demands (Smith & Patel, 2023; Li et al., 2023), and advanced models in African contexts consuming tens of liters of freshwater per computation cycle (Shumba et al., 2024). Improper disposal of electronic waste further exacerbates water pollution risks (Jones et al., 2022), prompting stricter regulations. These challenges threaten progress toward the United Nations Sustainable Development Goal 7, as insufficient revenue collection constrains investment in water infrastructure, leaving over 2.8 billion people projected to face water stress by 2025 (United States Agency for International Development, 2008).

In Sub-Saharan Africa, water utilities struggle with unreliable internet, inconsistent power supply, and low digital literacy, which undermine mobile payment systems and automated billing technologies, thereby slowing revenue collection and increasing costs (Dorward & Christian, 2022). Institutional weaknesses further exacerbate the problem, as many utilities lack the capacity to maintain digital systems, leading to breakdowns and data loss (Boelens et al., 2020). In Tanzania, governance and financial constraints have limited access to clean water and sanitation, reflecting a broader regional issue where over 2.6 billion people globally lack adequate sanitation (Watkins, 2006). Local Government Authorities also face budget gaps of 5–8%, hindering effective revenue collection strategies (Kimorio, 2014). These systemic challenges highlight the urgent need for innovative solutions and sustained investment to strengthen water service delivery across the region.

The Information and Communication Technology revenue systems sector faces significant sustainability challenges due to high water consumption in cooling data centers and manufacturing processes, compounded by inadequate infrastructure and limited funding for water distribution and sanitation (Smith & Patel, 2023; Li et al., 2023; Shumba et al., 2024). While Information and Communication Technology based revenue systems can enhance financial sustainability and service delivery, their effectiveness depends on strong digital infrastructure, institutional capacity, and community engagement, which remain underdeveloped in many utilities (Hope & Brocklehurst, 2021). Additionally, supply chain risks such as water scarcity and pollution demand stricter regulatory compliance and sustainable practices from Information and Communication Technology firms (Williams, 2024; Brown & Lee, 2025). Innovative technologies and active community participation are therefore essential to balancing resource demand with improvement in the water service sustainability.

Statement of the Problem

The Information and Communication Technology revenue systems have demonstrated benefits in improving revenue collection, yet several barriers hinder their full adoption. High initial investment costs, limited technical expertise, resistance to change, and cybersecurity risks remain major challenges for many water utilities (Bank, 2016; Water Services Regulatory Board, 2018). These issues slow down the transition from traditional billing methods to digital platforms, leaving utilities vulnerable to inefficiencies and financial losses.

Despite policy reforms and commercialization efforts, water companies continue to struggle with financial sustainability. Limited adoption of information and communication technology revenue systems hampers operational efficiency and prevents utilities from fully leveraging data-driven decision-making to improve service delivery (Hope & Brocklehurst, 2021).

The Water and Sewerage Companies face an inadequate Information and Communication Technology infrastructure that limits effective data collection and resource management (Auditor-General, 2022). Water and Sanitation Companies suffer from a shortage of skilled Information and Communication Technology personnel, and financial constraints force reliance on outdated systems prone to inefficiencies (Maoulidi, 2010). Water and Sewerage Companies struggle to align Information and Communication Technology operations with national policies due to gaps in implementation (Auditor-General, 2023). These examples underscore the need for stronger infrastructure, capacity building, and sustainable investment to maximize the benefits of Information and Communication Technology revenue systems in the water sector.

Specific objective

To investigate the impact of Information and Communication Technology on Revenue Collection in Public Water Companies.

Hypotheses of the study

H₀₃: Information and Communication Technology revenue systems as a financial determinant have no significant effect on the Revenue Collection in Public Water Companies.

Significance of the study

The study offers a critical examination of the structural, institutional, and social dynamics influencing public water companies. The mixed-methods approach was adopted, anchored in a robust conceptual framework, addresses key gaps in existing literature, and enhances methodological rigor. A central focus on marginalized populations and informal water economies underscores the importance of equity and justice in service delivery. The study investigates how Information and Communication Technology could improve revenue collection, liquidity, and long-term financial sustainability. Otieno (2021) notes that Information and Communication Technology strengthens accountability and aligns with financial and debt management policies. The findings have practical relevance for policymakers, sector stakeholders, and development partners seeking to improve water and sewerage services.

LITERATURE REVIEW

Introduction

The role of Information and Communication Technology on Revenue Collection has been widely studied. Information and Communication Technology has been identified as a key driver for improving financial efficiency, reducing revenue collection leakages, and enhancing operational transparency (Muriithi, Ochieng', & Nzioki, 2019; Opiyo & Mwalili, 2025; Atuheire, 2022). This section reviews relevant literature on the relationship between Information and Communication Technology adoption and revenue collection in public water companies, highlighting findings that show how mobile payments, electronic billing, and digital service delivery systems enhance both operational and financial performance (Rotich, 2018; Kimorop, n.d.; Otuke, 2016; Achieng, Mwalili, & Mose, n.d.; Maisiba, 2016).

Theoretical framework

The study used the Technology Acceptance Model and Stakeholder Theory to explain the importance of Information and Communication Technology revenue system adoption. The Technology Acceptance Model shows that ease of use and usefulness drive employee acceptance, requiring training and customization for effective use (Davis, 1989). Stakeholder Theory highlights the role of customers, regulators, and providers in shaping implementation, ensuring transparency and accountability (Freeman, 1984). Information and Communication Technology tools, such as mobile payments and electronic billing, improve billing accuracy, trust, and compliance, while regulatory policies influence uptake (Muriithi et al., 2019; Opiyo & Mwalili, 2025; Atuheire, 2022). Integrating the Technology Acceptance Model and Stakeholder Theory offers a holistic view of internal user acceptance and external stakeholder influence, providing a successful framework for Information and Communication Technology revenue systems in the water sector.

Technology Acceptance Theory

The Technology Acceptance Theory explains that adoption of Information and Communication Technology revenue systems depends on user perceptions of usefulness and ease of use, which enhance performance (Davis, 1989). Stakeholder Theory complements this by emphasizing the role of consumers, regulators, and providers in shaping adoption and ensuring accountability (Freeman, 1984). Water and Sewerage Companies provide measures to support vulnerable customers, highlighting the need to balance debt recovery with sensitivity. The Information and Communication Technology revenue systems are vital for improving billing accuracy, compliance, and transparency, supporting development goals in water utilities (United Nations, 2005).

The integrated revenue collection systems influence fiscal policy and administration but face implementation challenges (Mutisya, 2014). Mobile payment platforms and electronic billing have emerged as key tools for enhancing revenue collection and service delivery in the water sector (Obunga, 2023; Guma et al., 2019). The Technology Acceptance Theory and Stakeholder Theory provide a holistic framework for understanding how both internal user

acceptance and external stakeholders influence the adoption of the Information and Communication Technology revenue systems.

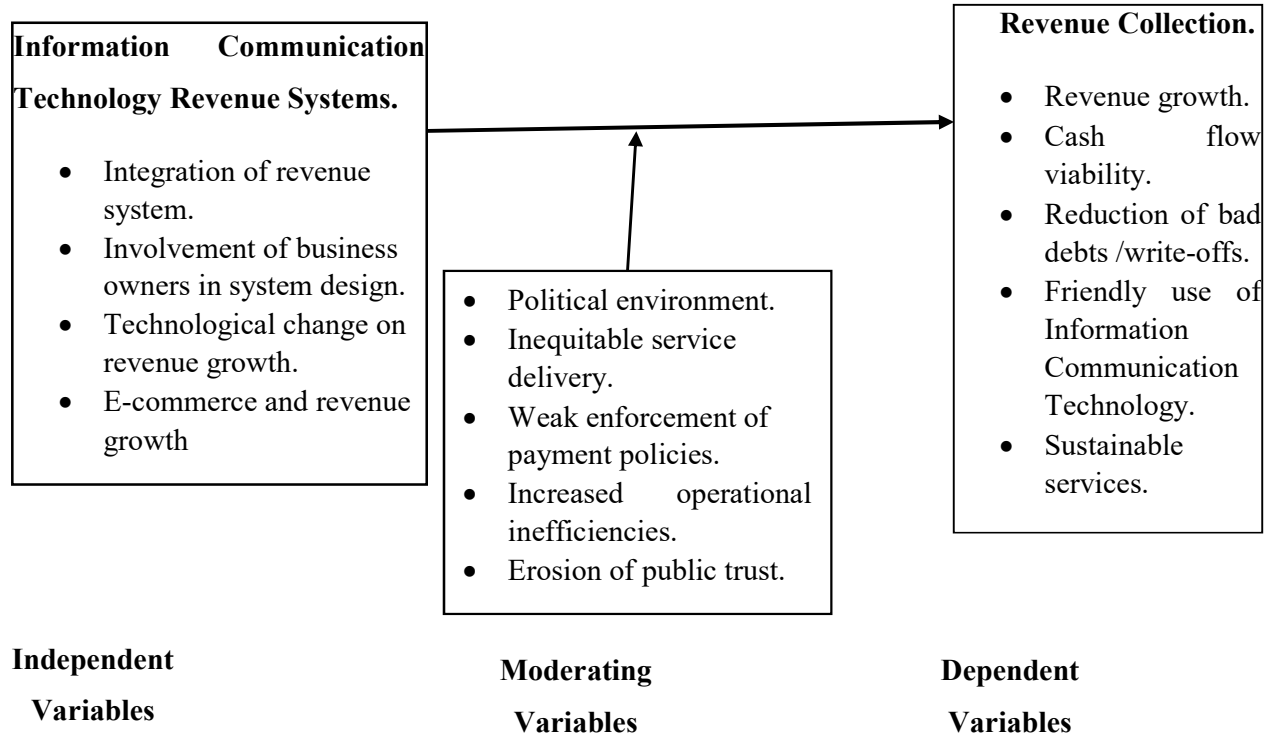
The Technology Acceptance Theory suggests that when people encounter new technologies, their willingness to adopt them depends on how useful they believe the tools will be in improving their work. Davis (1989) highlights this as the degree to which a person feels a system can enhance job performance. In the case of Water and Sewerage Company revenue systems, several platforms such as the Customer Management System, financial oracles, mobile meter reading software, Great Lakes, Tarentum, Custima, and the Local Connection Application are examples of technologies whose adoption can be studied by Technology Acceptance Theory. These systems demonstrate how Information and Communication Technology can play a vital role in strengthening revenue collection, especially in developing countries where efficiency and accountability are critical for growth (Muli & Oduor, 2023; Kamau & Wanjiku, 2023).

The Information and Communication Technology also aligns with broader development goals by enabling governments and organizations to deliver services that meet global standards. Mutisya (2014) emphasizes that integrated revenue collection systems are not just technical tools but essential components of fiscal policy, directly influencing both national operations and local communities. For instance, the Water Company's reliance on Customer Management System, mobile meter-reading software, and Local Connection Application illustrates how technology fuels revenue generation in water and sewerage services (Otieno & Wekulo, 2024).

Conceptual framework

(Guattari, 1991), defines the conceptual framework as a network or a plane of interlinked concepts that together provide a comprehensive understanding of a phenomenon, or the concepts that support a conceptual framework support one another, articulate their respective phenomena, and establish a framework-specific philosophy. The conceptual framework gives a diagrammatic representation of linkages and relationships among the study variables (Robson, 2011). According to the Technology Acceptance Theory, when users are presented with a new model technology, several factors influence their decisions about how and when they will use it. (Devis, 1989) states that the degree to which a person believes that using a particular system will enhance his or her job performance.

Table 2.1: Conceptual framework.



Empirical Studies

Several studies have explored the impact of Information and Communication Technology revenue systems on revenue collection across various sectors. Research by Chepyegon and D. (2018) found that digital payment systems and automated billing significantly improve revenue collection efficiency in water service providers. Despite the proven benefits of Information and Communication Technology in enhancing revenue collection, a significant gap persists between technological adoption and its optimal utilization in public water companies. World Bank (2016) emphasized the role of Information and Communication Technology in boosting financial accountability and reducing costs; these advancements are not uniformly implemented across the sector. Water Services Regulatory Board (2018) reported a 30% increase in revenue collection efficiency among utilities using automated billing systems. However, the study also revealed persistent challenges, including inadequate infrastructure, limited digital literacy, and a shortage of technical expertise among staff.

These barriers hinder the full realization of Information and Communication Technology’s potential and create a disconnect between technological capability and financial outcomes. Similarly, a World Bank report (2016) states that the adoption of Information and Communication Technology leads to increased financial accountability and reduced operational costs. Water Services Regulatory Board (2018) examined the effectiveness of digital billing systems in water companies and found that utilities using automated billing experienced a 30% increase in revenue collection efficiency compared to manual systems. However, the study also highlighted limited infrastructure and a lack of technical expertise

among employees, which hinder optimal performance. More recent studies by Obunga et al. (2022) and Kamau and Wanjiku (2023) reinforce these findings by emphasizing the growing role of mobile money platforms and cloud-based systems in improving revenue transparency and customer payment compliance.

Information Communication Technology

The use of Information and Communication Technology revenue systems in water management extends beyond revenue collection to address non-revenue water reduction, which refers to water produced but not billed due to leaks, theft, or metering inaccuracies. Smart metering technology and real-time monitoring tools have proven effective in significantly reducing Non-Revenue Water losses. More recent studies by Mwangi and Otieno (2022) highlight the integration of Information and Communication Technology sensors in water networks, which enables predictive maintenance and faster leak detection. Similarly, Njenga et al. (2023) show that advanced data analytics improve decision-making in Non-Revenue Water management, enhancing operational efficiency. Despite these advances, challenges such as high initial costs and limited technical capacity remain barriers in developing countries. Overall, Information Communication Technology adoption in Non-Revenue Water reduction is critical for improving water utility sustainability, financial health, and resource conservation.

RESEARCH METHODOLOGY

This study used a mixed research design. It combines quantitative and qualitative approaches (Creswell & Plano Clark, 2018; Mugenda & Mugenda, 2022). The target population comprised public water service providers (Water Services Regulatory Board, 2023; Njoroge & Otieno, 2022). A sample of 500 respondents was selected through stratified random sampling to ensure diversity (Kothari, 2021; Kamau & Wambua, 2023).

Target Population.

The target population is described as a group of individuals, events, or objects with common observable characteristics (Chumo, 2013). (Lumley, 1994) states that the population target is a group the research wants to use in the research study to form an opinion on the study findings. (Kothari, *Research Methodology: Methods and Techniques*, 2004), defines population as all items in any field of inquiry and is also known as the universe. A population is described as the set of sampling units or cases that the researcher is interested in (Newing, 2011; Mwangi & Wekesa, 2022; Achieng & Otieno, 2023).

The research study targeted a population of one thousand (1000) respondents drawn from Water and Sewerage Company staff, Ministry of Water and Sanitation, Water Service Regulatory Board, and professionals from the County. The main focus was on seven regions. The Ministry of Water is responsible for water management. The Water Service Regulatory Board is responsible for regulations and licensing of Water Service Providers. The unionized staff implements the water and sewerage regulations. There are currently 101 licensed water companies (Njiru & Kariuki, 2023; Kamau & Njoroge, 2024). The table below indicates the respondent groups in three categories, which refer to Table 3.1.

The selected group was: water regulators, policy makers, government financiers of water projects, employees who are part of the water and sewerage service users and providers of water services, and are also decision makers of all water and sewerage operations.

Table 3. 1: Target Population.

Cadres of groups	Target
Management, staff and union.	850
Ministry of water and sanitation.	50
Water Service Regulatory Board, Non-Governmental organizations, and professionals from City Water and Sewerage Company.	100
Total	1000

Sampling Frame

According to Memba (2011), the sampling frame is a list of sampling units for the selection of a sample. (Chumo, 2013) stated that a sampling frame is a list of elements from which a sample is drawn. A sampling frame is a list of all items that are in the representative sample (Nachmias, 2008). The sample frame consists of executive members from the Ministry of Water and Irrigation, the Water Service Board, the County officials, the Water and Sewerage Company management and staff. The reasons for the choice were due to resource limitations and accessibility of the required data from the whole target group.

Sample Size and Technique

(Gerstman, 2003), states that a requirement for an appropriate sample size is to first declare an acceptable margin of error (€). The Cochran formula allows you to calculate an ideal sample size given a desired level of precision, desired confidence level, and the estimated proportion of the attribute present in the population. Cochran's formula is considered especially appropriate in situations with large populations. It was established by William G Cochran in 1977 as the following formula for a definite population target. The sample size n for a finite population for the study with a confidence of 95% at a maximum proportion of 50% Z= 1.96, while acceptable within an error margin of 0.0438 of the target population of 1000. As indicated in Table 3.2

Cochran's formula for sample calculation

$$\text{Cochran W, G, (1977)} \quad n = \frac{Z^2 * P * (1-p)}{e^2}$$

Where:

n- The sample size

Z- Z-score associated with the desired confidence level

P- The expected proportion or prevalence of the outcome or characteristic of interest in the population.

e- The margin of error, i.e., the maximum distance between the true population parameter and the sample size.

Table 3. 2: Sampling frame.

Cadres of staff	Target population	Sample size
Management, staff and union	850	425
Ministry of Water and Irrigation	50	25
Water Service Regulatory Board, Non-Governmental organizations, and professionals from the City Water and Sewerage Company	100	50
Total	1000	500

Data Collection Instruments

The study utilized questionnaires for primary data collection. Structured questionnaires ensured coherence and reliability during the pilot phase and main study, allowing respondents to express opinions on the investigated topic in agreement with (Mohamed, 2022). These questionnaires are best used with standardized questions interpreted by all respondents. (Mugenda, 2008), stated the advantages of the quantitative and qualitative methods used after analysis for concluding.

Analyzing quantitative data is easier, and one can determine statistical relations. Questionnaires work best with standardized questions that are interpreted the same way (Kothari, 2014). A questionnaire is a piece of writing that consists of some questions printed in a specific order on a form or collection of forms. The study adopted both primary and secondary data. The literature review was used for secondary data.

Data Collection Procedures

Data collection is a process of gathering, measuring, and analyzing information to answer research questions, test hypotheses, and evaluate outcomes. This is done by a researcher administering questionnaires to respondents during data collection. (Researchers, 2008), defined a questionnaire as a set of questions for gathering information from individuals.

The questionnaires had seven sections. Section one had items on general characteristics, Section four had items on Information and Communication Technology, Section six had items on political and legal framework, and Section seven had items on financial determinants of Revenue collection.

Response Rate

The data was collected through questionnaires, which were sent to 500 respondents. The questionnaires were dropped, and 487 responded, having a response rate of 97.4 percent, while 2.6 % did not return the questionnaire. According to (Kahn, 2007) a response rate of 50 percent is considered adequate, 60 percent good and above 70 percent very good. The respondent rate of 97.4 was considered very good as it exceeded the threshold postulated (Kahn, 2007).

Respondents on Information and Communication Technology

The study sought to examine the impact of Information and Communication Technology on Revenue collection in public water companies. The respondents were asked to indicate their

level of agreement/disagreement with the questionnaires regarding Information and Communication Technology. A Likert scale was used, which indicated Strongly Disagree =1, Disagree =2, Not sure =3, Agree = 4, and Strongly Agree=5. Below is the outcome as indicated in Table 4.19.

The table indicated that 87.8 (%) percent of respondents agreed that the current Information and Communication Technology could easily be integrated with other corporate systems. 80.7 (%) percent of respondents agreed that the water has been involving the business owners in system design for revenue collection application software. 91.2 (%) percent of respondents agreed that Technological change has a positive impact on water companies' revenue growth. 85.8 (%) percent of respondents agreed that Corporate Computer software in use is highly secured through hierarchy levels. 86.8 (%) percent of respondents agreed that E-commerce is used in business transactions in relation to revenue collection growth. 87.9 (%) percent of respondents agreed that Water boards, Water Service Regulatory Board and management have accepted the use of internet banking and revenue collections. 90.4 (%) percent of respondents agreed that Information and Communication Technology has a role in the participation in the procurement of company revenue systems.

Table 4.19: Respondents on Information and Communication Technology by frequency.

Statement	Strongly disagree	Disagree	Not sure	Agree	Strongly Agree
Modern Information and Communication Technology easily connects with other business systems, making integration smooth and efficient	1.8%	3.1%	4.3%	44.6%	43.3%
The water has been involving the business owners in system design for revenue generation application software	2.7%	2.5%	11.3%	37.4%	43.3%
Technological change has a positive impact on company revenue growth.	0.8%	1.2%	4.1%	42.7%	48.5%
Corporate Computer software in use is highly secured through hierarchy levels	0.6%	3.7%	7.2%	43.7%	42.1%
E-commerce is used in business transactions in relation to revenue generation growth	0.8%	2.3%	7.4%	42.9%	43.9%
Water boards, the Water Service Regulatory Board, and management have accepted the use of internet banking and revenue generation.	0.4%	1.0%	7.8%	40.9%	47.0%

Information and Communication Technology has a role in the participation in the procurement of company revenue systems	0.8%	1.0%	4.7%	38.4%	52.0%
Average	1.13%	2.11%	6.69%	41.51%	45.73%

Table 4.20 indicated the output on sampled respondents as follows: agreed (M=4.32; SD=0.79) that Information and Communication Technology as independent variable that determines Revenue collection. However, the respondents agreed (M=4.41; SD=0.702) that technological change has a positive impact on company revenue growth. Which means the management of water companies needs to be sensitive to technological change.

Table 4.20: Respondents of Information and Communication Technology on Revenue Collection.

statement	n	M	SD
The current information and communication technology could easily be integrated with other corporate systems	487	4.29	.836
The water has been involving the business owners in system design for revenue generation application software	487	4.20	.933
Technological change has a positive impact on company revenue growth.	487	4.41	.702
Corporate Computer software in use is highly secured through hierarchy levels	487	4.26	.802
E-commerce is used in business transactions in relation to revenue generation growth	487	4.30	.774
Water boards, Water Service Regulatory Board and management have accepted the use of internet banking and revenue generation.	487	4.37	.737
Information and Communication Technology has a role in the participation in the procurement of company revenue systems	487	4.43	.718
n	487	4.32	0.790

Pearson Correlation

The Pearson Correlation Coefficient was adopted. It was used to measure the level of relation between linearly related variables. The confidence interval of the coefficient was calculated at a 95 percent confidence level with an error margin of 0.05. The coefficient of correlation, denoted as “r,” quantifies the strength and direction of the relationship between two variables. It ranges between -1.0 (perfect negative correlation) and 1.0 (perfect positive correlation).

The study examined the correlation between Information and Communication Technology and Revenue Collection. Correlation Matrix findings were presented in Table 4.26 below.

The Table indicated the p-value for Information and Communication and Technology revenue systems, which was found to be 0.000, less than the significance level of 0.05 ($p < 0.05$). The results indicated that the null hypothesis was rejected and the alternative hypothesis was accepted or failed to be rejected. Additionally, the result indicated that the Pearson Correlation coefficient (R-value) of 0.265** represented a weak, positive relationship between Information and Communication Technology and Revenue Collection in Public Water Companies.

Table 4:26 Correlation Matrix of Information and Communication Technology on Revenue Collection.

Variable	“r” value	Revenue collection	Remarks
ICT	Pearson Correlation	.265**	Weak positive correlation
	Sig. (2-tailed)	.000	
	N	487	

Multiple Linear Regression model ANOVA test of hypothesis

Multiple linear regressions were run at (95%) percent confidence interval of 5% (0.05 margin of error) to show the multiple linear relationship between the independent and dependent variables of the study. The decision to reject or accept the null hypothesis was based on the study outcomes. If the p-value was less than 0.05, then the null hypothesis was rejected, and the alternative hypothesis was accepted. If the p-value was greater than 0.05, then the study fails to reject the null hypothesis. From Table 4:45, the p-values for all variables were less than 0.05, indicating that the study rejected the null hypothesis and accepted the alternative hypothesis. These findings indicate that financial determinants significantly affect revenue collection, and that Information and Communication Technology has a strong positive relationship with Revenue Collection, with $\beta = 0.913$.

Coefficient of Determination (R²)

The coefficient of determination, R², is used to analyze how differences in one variable can be explained by differences in a second variable. The correlation coefficient formula will tell you how strong a linear relationship is between two variables, as indicated in Table 4.25 below. The results indicated (R) = 0.191 and R² = 0.037. R=0.191 indicated a weak positive correlation between Information and Communication Technology and Revenue Collection in

Public Water Companies. The output of R^2 suggested that Information and Communication Technology represents 3.7% of the variation of the revenue collection of public water companies, which implied that 96.3% of the variations in Revenue collection of public water companies are explained by other predictors, which are not part of the study. From the output of the study, it is evident that although Information and Communication Technology, holding other variables constant, has a positive impact on revenue generation of public water companies, there is a need to study other variabilities. This is in line with the recommendations by (Foster-et-al, 2017), The operational and upkeep of rural communities' water points after examination of technical factors in water installations for rural communities, limited positive impact, true sustainability concluded that communities self-financing and sustainability is not enough and holistic approach was necessary which still suggest that more research was recommended or other studies to be done.

Analysis of Variance

The Analysis of variance is defined as an analysis tool used in statistics that splits an observed aggregate variability found within a data set into two parts: systematic factors and random factors.

Hypothesis 4: Information and Communication Technology Revenue Systems

H₀: Null Hypothesis.

H₁: Alternative Hypothesis, which is also called Research Hypothesis, is to be investigated

Where the level of confidence is at 95%, and the significance level is 5%, $t \leq 1.96$

H₀: ≥ 0.05 Not reject

H₁: < 0.05 Reject

H₀: Information and Communication Technology does not have a significant impact on the revenue collection in Public Water Companies.

H₁: Information and Communication Technology has a significant impact on the Revenue Collection in Public Water Companies.

Objective four of the hypothesis is to determine the relationship between Information and Communication Technology and Revenue collection, which was obtained through a logistic linear regression model as indicated in Table 4.41. The table indicates a stepwise method in the regression equation where a value is removed and is based on the probability of F (p-Value) of 0.05, which is tolerable for Information and Communication Technology.

Table 4.41: Variables Entered/Removed.

Variable Entered	Variables Removed	Method
Corporate Computer software in use is highly secured through hierarchy levels		Stepwise (Criteria: Probability-of-F-to-enter $\leq .050$, Probability-of-F-to-remove $\geq .100$).

Table 4.42 indicates the direction of the relationship between Information and Communication Technology and Revenue collection. The analysis further reveals that the determinant

coefficient $R = 0.218$, implying that Information and Communication Technology has a weak positive direction, indicating that Information and Communication Technology has a positive influence of 4.6 (%) percent (adjusted square) improvement on Revenue collection in Public Water Companies.

Table 4.42: Regression Model Summary for the relationship between Information and Communication Technology and Revenue Collection.

Model	R	R Square	Adjusted Square	R-Std. The error in the Estimate
1	.218 ^a	.048	.046	.706

Dependent Variable: The Company still needs in-house Revenue Collection as per the customer demand.

Predictors: (Constant), Corporate Computer software in use is highly secured through hierarchy levels.

$$Y_1 = \beta_0 + \beta_1 X_1 + \epsilon$$

Tables 4.41, 4.42, and 4.43 are represented by the equation below;

Revenue Collection = $237.562 + .218 X_1$ of Information and Communication Technology Revenue Systems.

The number of models being used is (1) one. The total variance in the model under Table 4.43 below is equal to the Regression Plus Residual = $11.871 + 237.562 = 249.433$, which is a total variance that is not explained by independent variables, sometimes called error. The sum of squares is associated with three sources of variables: the total model and. The expression could be SS Total the total variability around the mean.

Table 4.43: Linear relationship of Information and Communication Technology by use of ANOVA Regression Model.

Model	Sum Squares	df	Mean Square	F	Sig.
Regression	11.871	1	11.871	23.787	.000 ^b
Residual	237.562	476	.499		
Total	249.433	477			

- a. Dependent Variable: The Company still needs in-house Revenue Collection as per the customer demand.
- b. Table 4.44 below, Information Communication Technology Revenue Systems ($\beta = 0.218$) was found to be positively related to Revenue Collection. From the t-test analysis, the t -value was found to be 4.877 and the p -value 0.000. Statistically, this null hypothesis H_0 : was rejected because $p < 0.05$. Thus, the study accepted the alternative hypothesis and it concluded that Information Communication Technology Revenue Systems have effects on Revenue Collection in Public Water Companies.

Table 4.44: Coefficients of Variation of Information and Communication Technology on Revenue Collection.

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error			
(Constant)	3.494	.174		20.080	.000
Corporate Computer software in use is highly secured through hierarchy levels	.196	.040	.218	4.877	.000

Dependent Variable: The Company still needs in-house Revenue collection as per the customer demand.

In Table 4.45, Information and Communication Technology ($\beta = 0.218$) was found to be positively related to Revenue Collection of public water companies. From the analysis, the t-value was found to be 4.877 and the p-value 0.000. Statistically, this null hypothesis H_0 was rejected because $p < 0.05$. Thus, the study accepted the alternative hypothesis and it concluded that Information and Communication Technology revenue systems have a significant impact on Revenue Collection in Public Water Companies.

- a. Dependent Variable: The Company still needs in-house Revenue Collection as per the customer demand.
- b. Predictors in the Model: (Constant), Corporate Computer software in use is highly secured through hierarchy levels.

The table shows a relationship between Information Communication Technology Revenue Systems on the dependent variable. In-house Revenue Collection, which is a subset of Revenue Collection in Public Water Companies. Unstandardized beta for Information and Communication Technology Revenue Systems is 196. This implies that for every unit improvement in the Information and Communication Technology Revenue Systems, there were .196-unit improvements in Revenue Collection in Public Water Companies. There is a significant and positive predictor of Revenue Collection ($\beta=.196$, $p=0.000$). The regression equation $Y = \beta_0 + \beta_1 X_1 + \epsilon$, with the constant β_0 being 3.494, the coefficient can be substituted into the formula below to predict Revenue Collection in Public Water Companies using Information and Communication Technology Revenue Systems.

$$Y_1 = \beta_0 + \beta_1 X$$

Revenue Collection = 3.494 + .196 of Information Communication and Technology Revenue Systems.

Y_1 = Revenue Collection.

X1=Information Communication and Technology Revenue Systems.

The direction of the relationship (whether positive or negative) between Information and Communication Technology Revenue Systems and Revenue Collection was analyzed. In Table 4.45, the R squared of.048 indicates that Information and Communication Technology Revenue Systems causes 4.8% change in Revenue Collection in Public Water Companies. This implies that the relationship between Information and Communication Technology Revenue Systems and Revenue Collection is positive and weak; the remaining 95.2% of the change in Revenue Collection is due to other predictors, with the exclusion of moderating factors. Table 4.45 explains the coefficients of variation on a subset of Information and Communication Technology Revenue Systems as follows;

$$Y1 = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \epsilon$$

$$Y1 = 3.494 + 0.105X_1 + 0.084X_2 + 0.123X_3 + 0.130X_4 + 0.072X_5 + 0.109X_6$$

Where

Y1=Revenue collection.

X₁= The current Information and Communication Technology Revenue Systems could easily be integrated with other corporate systems.

X₂= The water has been involving the business owners in system design for revenue collection application software.

X₃= Technological change has a positive impact on company revenue growth.

X₄= E-commerce is used in business transactions in relation to revenue collection growth.

X₅=Water boards, Water Service Regulatory Boards and management have accepted the use of internet banking and revenue collection.

X₆=Information and Communication and Technology Revenue Systems has a role in the participation in the procurement of company revenue systems.

H₀₄: Information and Communication Technology Revenue Systems do not have a significant impact on Revenue Collection in public water companies.

In the table, Information and Communication Technology had a beta of 0.913. It was found to be positively related to Revenue Collection in Public Water Companies. From the t-test analysis, the t -value was found to be 5.572 and the p -value 0.000. The null hypothesis was rejected because $p < 0.05$. Thus, the study accepted the alternative hypothesis, and it concluded that Information and Communication Technology Revenue Systems have a positive impact on Revenue Collection in Public Water Companies.

Table 4.45: Logistic linear regression between Information and Communication Technology and Revenue Collection excluded variables.

Model	Beta	In T	Sig.	Partial Correlation	Collinearity Statistics Tolerance
The current information and communication technology could easily be integrated with other corporate systems	.105 ^b	2.310	.021	.105	.968
The water company has been involving the business owners in system design for revenue generation application software	.084 ^b	1.761	.079	.081	.882
Technological change has a positive impact on company revenue growth.	.123 ^b	2.714	.007	.124	.958
E-commerce is used in business transactions in relation to revenue generation growth	.130 ^b	2.743	.006	.125	.878
Water boards, the Water Service Regulatory Board, and management have accepted the use of internet banking and revenue generation.	.072 ^b	1.554	.121	.071	.925
Information and Communication Technology has a role in the participation in the procurement of company revenue systems	.109 ^b	2.400	.017	.109	.956

SUMMARY, CONCLUSION, AND RECOMMENDATIONS

Summary

The study findings revealed a strong positive impact of Information and Communication revenue systems on Revenue Collection in Public Water Companies.

Impacts of the Information and Communication Technology Revenue System on Revenue Collection

The study showed that the adoption of Information and Communication Technology Revenue Systems has an impact on the Revenue collection in Public Water Companies. The study was

congruent with findings of studies by (Imene, 2020) and (Al-Rousan, 2006) which indicated in their findings that Information and Communication Technology has a positive impact on Revenue collection and sustainability of different organizations, contrary to the findings by Mohammed (2020), which indicated that Information Technology had a negative effect on Revenue Collection.

The p-value for the Information and Communication Technology study was found to be 0.000 which is less than the significance level of 0.05 ($p < 0.05$). Indicating that the null hypothesis was rejected and the alternative hypothesis was not rejected, the result indicated that the Pearson Correlation coefficient (R-value) of 0.265** represented a strong, positive relationship between Information and Communication Technology Revenue System and the Financial Determinants of Revenue Collection in Public Water Companies. Using the rank correlation, it is concluded that a unit of Information and Communication Technology Revenue System causes 4.8% increase in the change of Revenue collection, hence Information and Communication Technology Revenue System is a determinant of Revenue Collection in Public Water Companies.

Conclusion

The study recommends further studies in the following areas: Political Environment, Legislation process, authority structure, governance, internal controls, security and tendering processes.

Areas of study recommended by some experts for further research are: Staff Performance Management, public perceptions, cartels in water companies, Governance, Digitization of county land registration from the old customer *land reference*, legal framework, quality Water and Sanitation service delivery: sensitization and public participation on water and sewerage-related projects towards the enhancement of revenue growth.

Information Communication and Technology Revenue System

Adoption of technology poses a competitive advantage to most organizations. Scholars argue that the incorporation of Information and Communication Technology enhances productivity in organizations. This study also concludes that Information and Communication Technology has a positive impact on Revenue Collection in Public Water Companies.

Recommendations

The study recommends strengthening the Information and Communication Technology installation systems in Public Water Companies to ensure that customers do not install unauthorized systems that compromise the service delivery. The management needs to concentrate on the implementation of guidelines instituted by the government and use system theory where all interrelated points work together towards the achievement of organizational goals.

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