

STANDBY 1

THE ROLE OF ADVANCED UTILITY BILLING AND CUSTOMER SERVICES SOFTWARE IN MAXIMIZING MUNICIPAL REVENUE

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ABSTRACT

Effective revenue collection for Water & Sanitation services is paramount for the sustainable operation of South African municipalities. However, current statistics reveal a concerning average revenue collection rate of 72.5%, with some municipalities falling below 50%. In contrast, concessions contracts managed by private entities in South Africa boast nearly perfect collection rates, whilst in two neighbouring African countries, the water utilities serving 2.3 million and 1.2 million people respectively, have a collection rate of over 95%.

Non-Collected revenue is not simply a result of non-paying customers. This paper delves into the complex composition of non-collected revenue and further sheds light on the factors contributing to commercial losses.

A critical differentiator between municipalities achieving high collection rates and low commercial losses and those lagging, is the adoption of proper Utility Billing and Customer Services software. Despite serving similar customer bases and employing comparable personnel, municipalities utilizing legacy Municipal billing systems struggle to achieve optimal performance. Conversely, those leveraging advanced Utility billing and Customer Services software, supported by robust commercial databases, efficient business procedures, covering the full facet of Commercial Activities and Operations, with sufficient audit trail, controls, and authorization, minimizing risks of human error and frauds, demonstrate far superior performance.

While many municipalities recognize the shortcomings of their existing billing systems, apprehension surrounding the associated costs and implementation risks inhibits progress. The paper advocates for exploring alternative procurement approaches where vendors' pricing can suit municipalities of any size and where vendors assume the risk, thereby mitigating concerns and facilitating affordable and smoother transitions to modernized billing systems.

In conclusion, this paper emphasizes the urgent need for municipalities to prioritize the adoption of advanced Utility Billing and Customer Services software to optimize revenue collection and operational efficiency. It proposes innovative procurement strategies to alleviate implementation concerns and drive positive transformation in an affordable manner within the sector.

INTRODUCTION

The main Components and Characteristics of a proper Utility Billing software are explained. Emphasis is placed on the need for a robust database encompassing all elements necessary to accommodate all possible physical entities and transactions as well as best practice

business procedures covering all possible applications/activities. The software should have enough functionality to cover all commercial operations avoiding the need of integration with many sub-systems as such integration presents a big challenge in terms of sustainability and costs for maintaining the links. Components of commercial losses are also described, and the use of Utility Billing highlighted in addressing such losses.

The use of proper Utility Billing greatly enhances revenues and reduces wastage, a main characteristic of non-paying customers as well as illegal/unregistered connections.

The replacement of commonly used legacy Municipal Billing systems, is a must if Municipalities can hope to improve performance in terms of accurate billing, better collections and lower commercial losses. Such replacement is often associated with high risk of failure and associated costs. An alternatively, to common practice, procurement model is proposed to greatly reduce such risks and costs.

PROPER UTILITY BILLING SYSTEM & CUSTOMER SERVICES SOFTWARE

Main Components & Characteristics

A proper Billing & CRM (Customer Relationship Management) system must be a fully functional consolidated commercial management system that has been specifically designed to cater for the unique requirements of Utility Service Providers and Municipalities. It should cover all facets of revenue management, customer relationship lifecycle, including on-line enquiries, meter readings, including smart meters interface, walk route management, debt management, revenue collection, direct sales, meter and connection management, billing and management reporting and be fully integrated with Geographical Information systems.

It is important that the new software should have enough functionality to cover all commercial operations avoiding the need of integration with

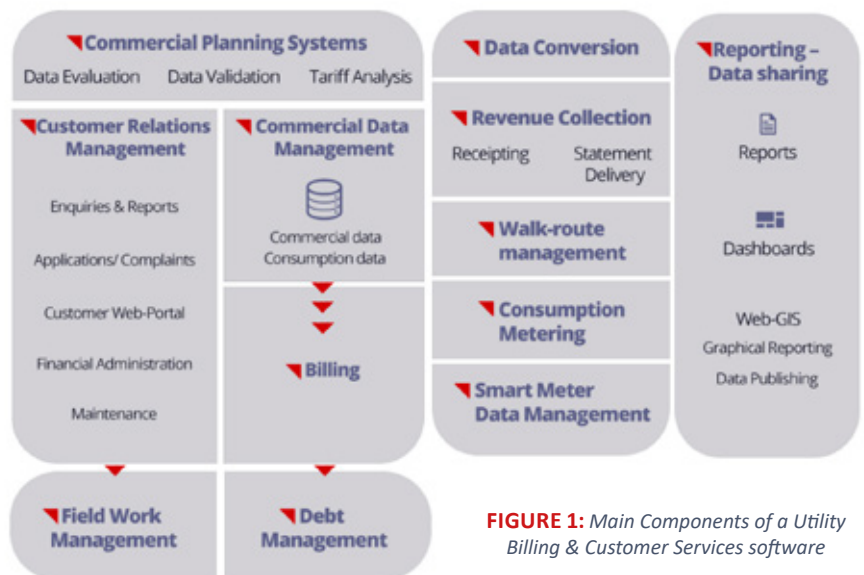


FIGURE 1: Main Components of a Utility Billing & Customer Services software

many sub-systems as such integration presents a big challenge in terms of sustainability and costs for maintaining the links. Furthermore, it ensures that no data duplication exists and enables workflows between different functions.

Main characteristics should include:

- It must provide multiple levels of authorisation throughout a business procedure.
- It must allow ease of communication with customers via various ways (emails, SMS, WhatsApp, Telegram etc) and keep history of the specific communication for reference.
- It must avoid duplication of input data and be designed to protect data integrity and security. It must support Data Encryption where this is considered vital.
- It must provide enough automation and foolproof mechanisms and controls to reduce user's effort and minimize risks of human error and frauds.
- It must, nevertheless, have a scalable audit trail mechanism where the system administrator is able to monitor the level of Audit trail and focus on particular areas and functions of the system.
- It must be open to interface to any other 3rd party system via API (Application Programming Interface) and provide enough raw data towards the reduction of unaccounted of water, identify faulty meters, possible water leakages etc.
- It must provide a portal and a mobile application for customers to navigate their account, view historical transactions and readings, pay their bill, and view a summary of their profile through business intelligence dashboards.
- It should also allow customers to submit a complaint or a request and have interactive communication regarding that, till full completion.
- Modern Utility Billing systems will even allow a non-customer to apply for a new account.

Finally, but not last, it must support tablet or mobile access of field staff (e.g. Meter Readers, inspectors, technicians, engineers, disconnection/reconnection teams etc) to receive and execute tasks assigned to them.

DATA BASE MODEL

The Billing & Customer Information data model should make provision

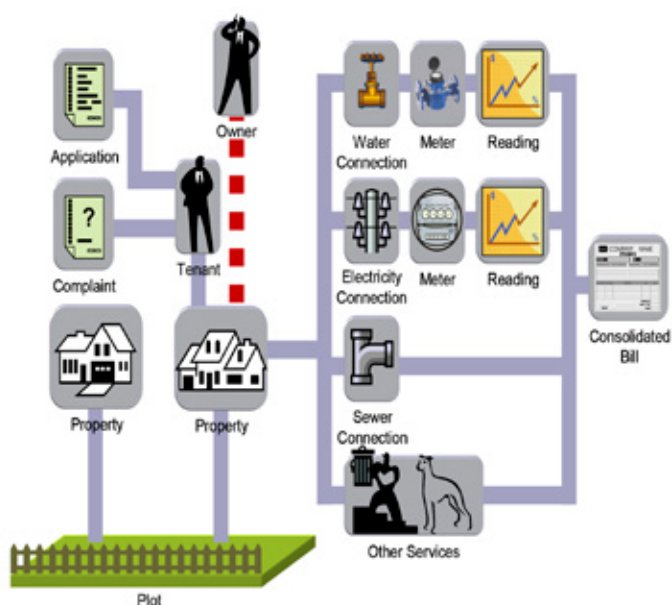


FIGURE 2: Database Entities in a proper Municipal/Utility Billing system

for the unique nature of Utility data. It must include all entities involved, maintain links between them and update such links only through proper authorised application procedures. For example, it must deal effectively with the dilemma of non-paying tenants by maintaining a link to the owner of the property. Furthermore, it should allow for multiple properties per plot and multiple connections per property. It must also make provision for all types of metered and flat-rate services required by a Utility or municipality, combining it all into a single consolidated bill.

COMMERCIAL BUSINESS PROCESSES

The fallacy that a Billing system is simply turning meter readings into a bill, such as a simple spot-billing system, does not hold. A proper Billing system must have robust, efficient business procedures as per best-practices and be flexible enough to adopt and adjust to the requirements, policies and legislation, a specific Utility or Municipality is governed under.

Table 1 below gives a list of typical working procedures, whilst the diagrams that follow illustrate some of the most common ones in a proper Billing system.

TABLE 1: List of Typical Commercial Procedures

#	Module	Process	
1.	Collections	Cashier's Cycle (HQ and Area)	
2.		Import external Receipts	
3.	Meter Reading	Meter Reading Cycle	
4.	Billing	Billing Cycle	
5.	Customer Services	New Water Connection	
6.		New Sewer Connection	
7.		New Borehole Connection	
8.		Termination of Account	
9.		Termination of Service	
10.		Reconnect Service	
11.		Remove Sewer Connection	
12.		Change of Tariff, Change of Township, Estimated Consumption	
13.		Change of Tenant	
14.		Change of Owner	
15.		Change of Billing Group	
16.		Update Customer Details	
17.		Replace Meter	
18.		Installation of Meter	
19.		Removal of Meter	
20.		Disconnect Customer (customer request)	
21.		Reconnect Customer (customer request)	
22.		Customer Complaint	
23.		Financial Services	Financial Investigation
24.			Delete/Modify Non-Billed Meter Reading
25.			Cancel Billed Meter Reading
26.		Cancel a Debt Rescheduling Agreement	
27.	Credit Control	Debt Management Cycle	
28.	Call Center	Call Center Architecture	
29.		Call Center Commercial/Technical	

REPORTING & BUSINESS INTELLIGENCE

Commercial Performance Indicators (PI)

Suitable Performance Indicators (PI) for Commercial Management must be defined in line with Municipal expectations and must be aimed at improving efficiency and providing the means for better control and effective decision making at all levels. The list of proposed PI is given in the table below.

It should be possible to produce such PI as a function of variables such as: period, Complaint type, Application type, Billing Group, Consumer Type, Tarif category and Township as applicable.

Operational Reports

Operational Reports are extremely important and should come in all relevant forms (summary, detailed, customer, lists and forms) and should cover all commercial functions including: Enquiries, Collections, Meter Reading, Billing, Debt Management and Customers.

Business Intelligence/ Dashboards

Business Intelligence/ Dashboards are a must for Monitoring and Evaluation of all commercial operations at all relevant levels. They are best presented in a Utility Management Portal, organised in a hierarchical manner enabling authorised access to appropriate persons, enabling authorised access to all relevant information at all management levels, such as Operator, Supervisor, Departmental Manager, Senior Management levels and stakeholders.

COMMERCIAL LOSSES

Main Components Of Commercial Losses

The adjacent table shows all components of “non-revenue water” as per the IWA (International Water Association) proposed classification.

The IWA classification is extended – as indicated in the diagram in the next page - to a more comprehensive breakdown in order to separate problems of a different nature that will require a different approach in their solution.

The approach considers various additional factors regarding Apparent (Commercial) Losses, such as:

1) NRW vs UFW: Non-revenue water (NRW) is differentiated from Un-accounted for Water (UFW). UFW is defined as the difference between the volume of water produced and water sold, whilst NRW is defined as the difference between the volume of water produced and water paid for.

TABLE 2: Proposed commercial Performance Indicators (PI)

No.	Category	PI ref B&C-	Performance Indicator Description	Unit
1	Connections & Coverage	1	Number of Properties	Number
		2	Number of Water Connections	Number
		3	Number of Sewer Connections	Number
		4	% of connections metered (metering)	%
		5	% of population served with drinking water	%
		6	% of population served with adequate sanitation services	%
2	Collections	7	Year to date Collections	currency
		8	% of Collections through cashiers	%
		9	% of Collections through internet	%
		10	% of Collections through banks	%
		11	% of Collections through pre-paid meters	%
		12	% of Collections through other means	%
3	Metering & Billing	13	Frequency of domestic customer meter reading	no.months
		14	Frequency of non-domestic customer meter reading	no.months
		15	Frequency of billing domestic customers	no.months
		16	Frequency of billing non-domestic customers	no.months
		17	Payment period after bill delivered	weeks
4	Meter Reading	18	Number of Meters Read	Number
		19	% of Meters with High or Low Meter Readings	%
		20	% of Meters with no Reading	%
		21	% of Readings Rejected	%
5	Consumption/ Charges	22	Total Billed Revenue	currency(c)
		23	Total Consumption	ML
		24	Average Consumption per connection	l/day/conn
		25	Average Charge per connection	c/day/conn
6	Billing	25	% number of estimates	%
		26	% number of high consumption/ high charges	%
		27	% number of high adjustments (Debit/ Credit)	%
		28	% of Bills with high closing balance	%
		29	% of Bills with credit or zero balance	%
7	Complaints/ Service	30	Number of Complaints submitted	Number
		31	Number of Complaints submitted /1000 connections/ year	No/1000 con /year
			Complaint types	
		32	% number of complaints addressed	%
		33	% number of complaints addressed within SLA timeframes	%
		33	% number of Complaints per Complaint type	%
			Response time	
		34	Average Response time to Customer call	hours
8	Applications/ Customer Services	35	Number of applications	Number
		36	Number of applications outstanding	Number
		37	Number of applications per type	Number
		38	Average response time per application type	days
9	Credit Control	39	Number of Disconnections (due to non-payment) per month	Number
		40	Number of Reconnections (after payment) per month	Number
		41	% of connections subjected to unjustified disconnection	%
		42	Debt Impairment transactions (Bad debt) per year	Number
		43	Debt Impairment Amount (Bad debt) per year	Amount
		44	% Debt Impairment (over Billed Revenue) per year	%
		45	Aging Analysis- number of Bills	Number
		46	Aging Analysis- Amount	Amount



FIGURE 3: Billing Cycle

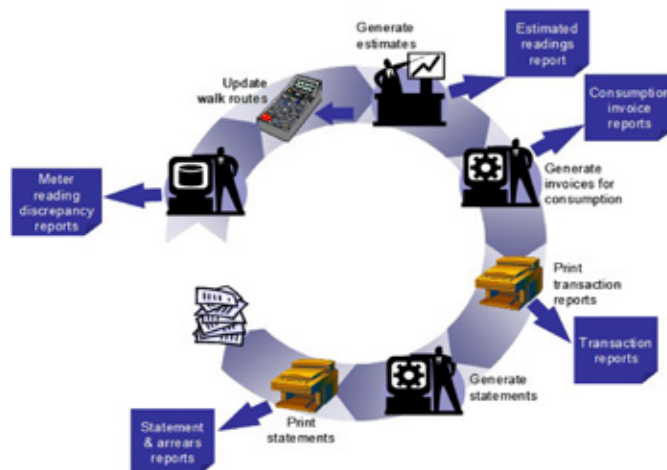


FIGURE 4: Customer Services Cycle

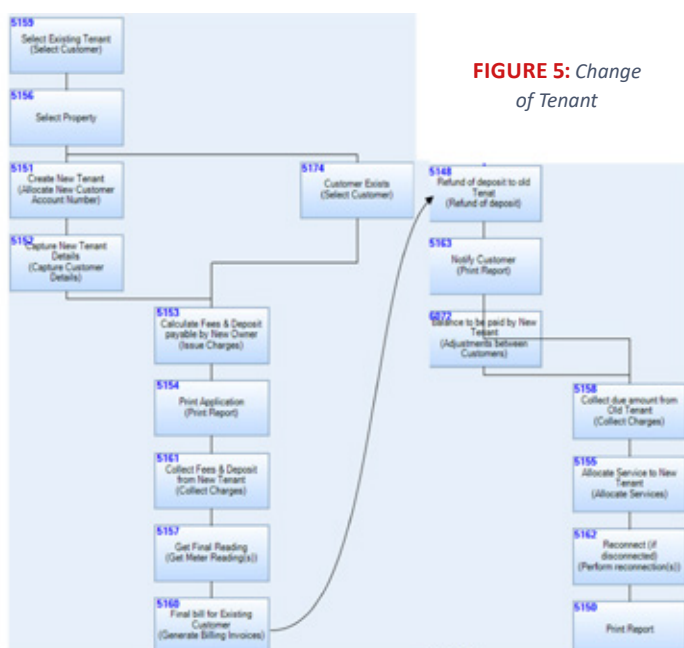


FIGURE 5: Change of Tenant

REVENUES NOT COLLECTED

It follows from the above breakdown that Revenues not collected are not necessarily revenues that could have been collected as non-payers as well as customers without meters are known to waste water and mostly ignore internal leaks. A study done in Motherwell, an area of Port Elizabeth a few years back which was not metered indicated that approximately 1/3 of the demand was due to useful consumption, 1/3 due to leakage and 1/3 due to wastage and internal leakage. Similarly in the United Kingdom many Utilities faced huge losses once they introduced meter at households as demand dropped dramatically and consequently their revenues dropped.

COMMERCIAL rehabilitation planning

A good Utility Billing system should have a commercial rehabilitation planning module, expected to be run by the Utility on a regular basis and form the basis of identifying "apparent" losses; resulting fieldwork will result in higher revenues.

The module should produce discrepancy lists summarized in a report regarding:

- 1) Suspect meter readings
- 2) Missing data analysis exception report addressing: Plots, Properties (dwellings), Connections, Consumption meters, Customers information.
- 3) Exceptions Analysis Reports (relationships between elements), including Plots vs. Properties, Connections vs. Consumptions, Connections vs. Meters, Connections vs. Walk Routes, Consumer vs. Properties, Consumer Categories Usage, Consumer Categories Reconciliation (correct assignment)
- 4) Suspect problem meters: - List of meters that might need replacing, including Oversized Meters, Undersized Meters, Malfunctioning Meters, stuck-meters.

- 2) Non-paying customers are allowed for as they are addressed both in terms of debt management policies and procedures as well as in terms of the reasons for non-payment
- 3) Wastage and internal leakage are allowed for as it can be a major component of the water production and manifest themselves mainly at non-paying customers and illegal connections as well as institutional customers (e.g. Government schools). Addressing those issues will greatly reduce such components of unaccounted for water.
- 4) Customer metering inaccuracies: these are separated into two categories and those into further categories highlighting the different nature of the problems and leading towards their appropriate remedies.

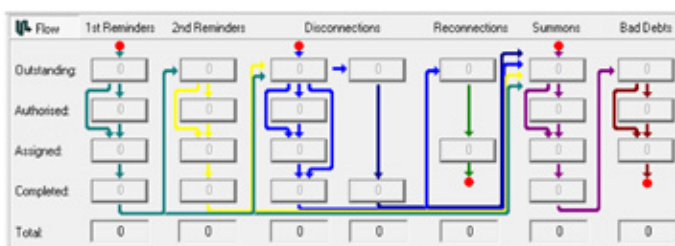


FIGURE 6: Credit Control

		IWA Classification		
System Input Volume	Authorised Consumption	Billed & Paid	Metered	Non-Revenue Water
			Unmetered	
	Water Losses	Unbilled	Metered	
			Unmetered	
	Apparent Losses		Unauthorised	
			Customer Metering Inaccuracies	
Real Losses			Leakage on pipes	
		Tank Leaks & overflow		
		Connection Leaks		

FIGURE 7: IWA Classification for NRW

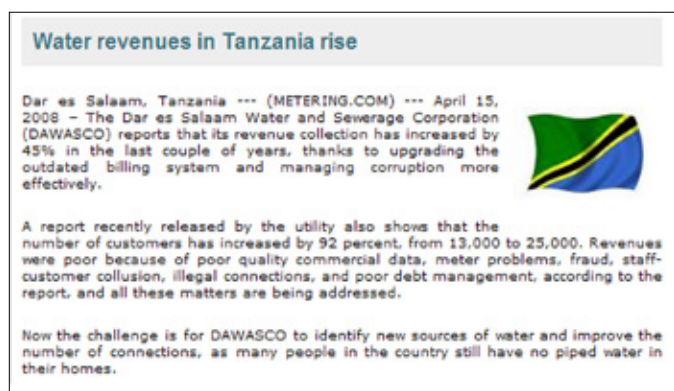


FIGURE 9: Article on Dar Es Salaam's Water Revenue Increases

High Collection Ratios

Examples of clients in sub-Saharan Africa with high collection ratios (over 95%) include: Swaziland (EWSC) (population served 1.2 mil), Lesotho (WASCO) (population served 2.3 mil) and Balito (SA-SIZA Water).

PROPOSED PROCUREMENT PROCEDURES

While many municipalities recognize the shortcomings of their existing billing systems, apprehension surrounding the associated costs and implementation risks inhibits progress. There has been reports of Billing systems costing over 1 billion Rand and then replaced due to various reasons, including customer dissatisfaction (wrong bills) and failure to meet financial controls.

Utility Billing and Customer services software supply is internationally quite competitive, and vendors are competing to increase market share and increase recurrent revenues rather than realise high upfront profits. Prospective customers should take advantage of this.

The sections below recommend guidelines for RFP (Requests for Proposal) that would be acceptable by many worthwhile vendors and pass on the risk to the vendor rather than the Client.

Pricing Considerations

- 1) Pricing for Software licensing should be recurrent, on an annual basis, payable at commencement of the year. Contract duration should be at least 5-years with an option for another 5-years.
- 2) Costs for implementation should only be payable on software functional acceptance, prior to going live.
- 3) Variable Costs. Do not accept pricing variables relating to number of users or number of connections. Rather stipulate population served and requested an unlimited number of user licenses and connection licenses to suit your requirements.

Prequalification Requirements

- 1) Ask for references for Utilities/Municipalities of at least similar size.
- 2) Do not insist of many or any South African references. There are a lot more worthwhile Utility Billing systems elsewhere.
- 3) Do not request certifications other than the internationally accepted ISO standards. There are a lot of other organisations giving all sort of certificates that might or might not be known to all worthwhile vendors and this may exclude them from tendering.

Drawing up the Right Technical Requirements

- 1) Functional specifications regarding the scope of work should be detailed to avoid "misunderstandings" and extra costs arising during implementation.
- 2) Technical specifications should cover both software functionality as well as the implementation process with emphasis on requirements

definition, data conversion, functional acceptance testing, training, and go-live support.

- 3) Make provision for a period (2 – 3 months) to address discrepancies that initial data conversion will highlight regarding mismatching information, opening balances, etc.
- 4) Through an expression of interest ask potential vendors to describe their software, so you can have a good idea of what is available. Ask them to give you a detailed list of the standard forms, reports, Performance Indicators and Dashboards they can provide as part of the pricing as customising such might cost a lot of money.
- 5) Employ a consultant to draft them up that will at least do a preliminary requirements definition and consider vendor's software functionality.
- 6) Have a look at other TOR published by your counterparts. They might provide useful input, though I haven't seen anything worthwhile locally.
- 7) Decide if you want an in-house hosted or a cloud hosted solution. Small to medium size utilities/ municipalities that don't have elaborate ICT departments are better off with cloud solutions.
- 8) Do not mix unlike things in the tender, for example:
 - a. ERP (Enterprise resource planning) systems: that include Financial Management, Stores and Procurement and Human resources should not be tendered with a Utility Billing system.
 - b. Computer Hardware: Rather ask the vendor for minimum specifications and procure independently. It will be cheaper.
- 9) Ask for a Utility Billing and Customer Services solution that will meet all your commercial needs and ask for integration only where other type of vendors are involved, like:
 - a. with Human Resources, Stores and Support Services for work scheduling
 - b. AMI (Advanced Metering Infrastructure)/ AMR (Automatic meter reading)/ Smart meters
 - c. Pre-paid meter manufacturers
 - d. Means of communication with customers, such as: emails, SMS, WhatsApp, Telegram etc)
 - e. Integration with payment gateways and banks
- 10) Do not ask to integrate with existing peripheral software you might have, such as: CRM, spot billing, mobile apps for field work, etc. Let the vendor supply an integrated solution and let him guarantee the integrity and integration of the overall system during the contract duration.
- 11) GIS: The system should integrate with the GIS/LIS and can use Google Maps as background for better reference. The user should be able to drill down to the selected element from the GIS or vice versa. The vendor should be asked to provide all necessary GIS licenses required and ensure integration with the GIS as otherwise this can be a considerably additional expensive item.
- 12) Include the requirements functionality that can assist you lower commercial losses, as described under commercial rehabilitation planning. This should include an automated interface with the Municipal land parcel/ property data to perform reconciliation analysis to properties without connection or other discrepancies that lead to apparent losses.
- 13) The system should provide a specialized module for the periodical import of Georeferenced data from the Land and Survey Department/ Town Planning. These data must be automatically imported, validated and discrepancy reports against existing data must be produced.

CONCLUSIONS

In conclusion, this paper emphasizes the urgent need for municipalities to prioritize the adoption of advanced Utility Billing and Customer Services software to optimize revenue collection and operational efficiency. It proposes innovative procurement strategies to alleviate implementation concerns and drive positive transformation in an affordable manner within the sector.