

**ON-SPOT BILLING SYSTEM, COST OF
WATER, REVENUE COLLECTION
MECHANISM & REVENUE COLLECTION
PERFORMANCE OF PUBLIC UTILITY
ENTITIES EVIDENCE FROM NWSC
MBARARA CENTRE**

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ABSTRACT

Revenue collection performance is vital in promoting efficiency in the service delivery and economic development of organizations. The purpose of the study was to determine the contribution of on-spot billing system, cost of water and revenue collection mechanism on revenue collection performance of public entities in Uganda. The study objectives were to establish the contribution of cost of water on the revenue collection performance in NWSC, to examine the contribution of revenue collection mechanism on revenue collection performance in NWSC, and to find out the relationship between on-spot billing system and revenue collection performance in NWSC.

The study was guided by the cash management theory which focuses improving liquidity and it adopted a cross-sectional research design. Data was collected using a questionnaire and an interview guide. 108 respondents participated in the study. Data was entered into SPSS, and analysed using descriptive statistics. Findings show that the cost of water significantly contributes to revenue collection

performance in NWSC, Mbarara Centre. Results also indicate that location of pay points, the failure to automate revenue collection, the number of pay points, and mode of paying bills significantly contributed to Revenue Collection Performance Findings. Further affirm that on-spot billing has a significant effect on revenue collection performance at NWSC because it enhances revenue collection performance.

Basing on the results of the study, it is recommended that the government should subsidise more the cost of water, customers be engaged in the pricing or mode of payment for water bills, number of pay points be increased and establish more convenient ways of paying for water like of mobile money agents and more attention be attached on improving on the on-spot billing system and meter reading challenges and also that customers be sensitized on their roles to NWSC.

Keywords: on-spot billing, revenue collection mechanism, cash management theory,

Introduction

Revenue collection is very important for every organization in the world as it enables the organization to acquire assets which are not liable to debt and which the organization uses to develop (Ngotho & Kerongo, 2014). More importantly, high revenue collection performance is vital to promote efficiency in the service delivery and economic development of the countries and organizations.

USAID (2015) argues that in relation to the delivery of services, billing is the principal mechanism that drives all cash flow and is the main source of customer information. Billing is thus critically fundamental for NWSC to succeed. When much of NWSC revenue comes from the delivery of services the customers' needs to bill

customers regularly and accurately, payment invoices that reflect the true nature and quantity of services delivered are more likely to be paid. Agrawal (2008) argues that improving billing, as well as collection services, will have a swift impact on the revenue streams of a service provider. In relation to the provision of water and sanitation, the author argues that any successful billing practice must ensure that bills are raised on a monthly basis and based on volumes. This way customers pay for what they consume. This is best carried out through the adoption of 100 per cent metering of customer connections.

However, it is known that at NWSC, some customers are connected and given water even without meters. Agrawal (2008) posits that effective billing and collection systems that are based on these principles can bring about immediate improvements in revenue streams.

Regardless of the existence of on-spot billing and different platforms for payment, growth in arrears continues to be one of the challenges affecting service delivery in most of the Areas. For instance, during the FY2016/17, arrears increased by 39%, from Ushs63.2 billion in FY2015/16 to Ushs87.8 billion. This is the same for Mbarara Centre which has reported an increase in arrears UGX 3,654,973,869; 3,724,722,479; and 5,874,979,852 in 2015, 2016, and 2017 respectively (Integrated Annual Report, 2016, 2017). With such an upward trend in arrears accumulation at the corporation, there is need to evaluate the influence of on spot billing system on, revenue collection mechanism, and cost of water revenue collection levels at the corporation with a view of making recommendations on how the accumulation of arrears/uncollected bills can be mitigated based on the new study findings.

Problem Statement

Water consumers both individual and cooperate organisations have always avoided paying their water bills which led NWSC to face huge financial budget deficits. NWSC previously used flat rate system of billing water consumers. This is where there was a flat monthly levy on whoever had water connection. This situation was no better as it led to high operating costs and less returns.

The board and management later introduced the metering system in a bid to enable customers pay for exactly what was consumed. With the metering system, the meter recorded the amount of water consumed, after which a bill was sent to the consumer for payment. However, NWSC officials did not consistently record monthly meter readings. This system also had loopholes resulting into over or under billing the customers. Complaints still emerged from customers who did not receive bills.

As a mitigating measure, NWSC came up with On-spot billing system where the billing of water is done and bill delivered to customers immediately after meter reading.

Despite of all the efforts by NWSC to improve on revenue collection performance, NWSC still grapples with huge unpaid water bills or arrears. For instance, during the FY2016/17, arrears increased by 39%, from UGX.63.2 billion in FY2015/16 to UGX.87.8billion. In particular Mbarara Centre arrears increased from UGX.3,654,973,869 in 2015 to UGX.5,874,979,852 in 2017 (Integrated Annual Reports, 2015,2016, 2017).

Literature shows that revenue collection performance is associated with water billing systems, Cost of water and

Revenue collection mechanisms. However, the cause for ever increasing water bill arrears in NWSC is still unexplained hence the cause for this study.

Theoretical foundation of the study

The study was guided by the cash management theory. Cash management theory tends to focus on how to improve on liquidity and reasons holding cash (Lawrence, et al., 1984). Efficient management of cash involves collecting debts as early as possible (shorter average collection period) and paying accounts payables as late as possible (longer average payables period) without damaging credit worthiness of the firm (Soenen, 1993).

For instance, there are several reasons for holding cash: to cover transaction needs; for precautionary motives; for speculative purposes; for compensatory reasons, among others (Brigham, et al., 2005). Cash balances are determined by the level of daily, weekly, and monthly inflows and outflows and although the generation process may be continuous, inflows are unpredictable and uneven, (Block & Hirt, 1992). The theory was adopted to investigate the cash cycle that is the billing system, revenue collection mechanism, and cost of water and revenue collection performance.

Literature Review

The concept of on-spot billing system is relatively new in Uganda. From the foregoing discussion above, several studies on the global stage have been carried out in reference to on-spot billing system. However, few researches have been done in Uganda to show the efficacy

of such as a system as shown in the review of literature above.

Evidently, while majority of global and local literature have concentrated on the qualitative aspects of on-spot billing system, such as opinion and perceptions of the on-spot billing system users and acceptability of the on-spot billing system, quantitative aspects of on-spot billing system have not been adequately explored. Hence no such research has been done on the effect of on-spot billing system on revenue collection performance at all. This study therefore seeks to assess the effect on-spot billing system has had on revenue collection performance at National Water and Sewerage Cooperation and disclose any link that may exist between these parameters.

Research Methodology

Research Design

The researcher adopted a cross-sectional research design, a cross-sectional research design is the study of a particular phenomenon (or phenomena) at a particular time (Paul & Jeanne, 2013). Cross-sectional studies often employ the survey strategy (Easterby-Smith et al. 2008). The study was both descriptive and analytical in nature. The descriptive aspect provided the overall understanding of the data.

According to Saunders, et al., (2009), the descriptive aspect includes surveys and fact-finding enquiries of different types. The main objective of this type of research is to describe the state of affairs as it exists at present. The main characteristic of this method is that the researcher has no control over the variables; he can only report what has happened or what is going on. In this type of research,

all kinds of survey method are utilized including comparative and correlational method.

On the other hand, the researcher had to use facts and information which are available and after collecting these data the researcher analysed and made a critical evaluation of the study variables. The study employed both qualitative and quantitative approaches.

Study Area

Mbarara Centre is one of the towns operated by National Water & Sewerage Corporation. It was gazetted in 1988 after IDA Financed rehabilitation project. It is located along Kampala-Kabale Road approximately 260 km from Kampala with Offices at plot 3 Galt Road with in Mbarara Municipality (Opoka, 2014). The Area of operation stretches in the divisions of Kakoba, Kamukuzi, Nyamitanga, Biharwe, Nyakayojo and Kakiika in Mbarara Municipality. However, the researcher chose Kakoba, Kamukuzi, and Nyamitanga divisions because they have continued to register increase in arrears year after year regardless of the existing measures that were put in place to reduce them (Integrated Annual Report 2018).

Study Population

The Unit of analysis of this study was NWSC whereas the Unit of Inquiry were Management and employees of NWSC Mbarara Centre. The study targeted a population of 130 respondents. According to NWSC main payroll (2018), there are 130 employees for Mbarara Centre. These include employees working in the Finance,

Administration, Technical, Commercial and Customer Care departments.

These were selected because they were expected to have the necessary information on on-spot billing system, revenue collection mechanism, and cost of water and revenue collection of NWSC-Mbarara Centre. The study also considered the 10 big customers of NWSC who included Pearl Dairy, GBK, Kazire, Nile Breweries, Coca-Cola plant, Mbarara Regional Referral Hospital, Hotel Triangle, Lake View Hotel, Mayanja Hospital and Ntare School. Each was represented by one respondent especially the accounting officer.

Sample Size Determination

The sample size was determined accordingly using a formula by Yamane (1967).

$$n = \frac{N}{1 + Ne^2} = \frac{130}{1 + 130(0.05^2)} = \frac{130}{1.325} = 98.11320754 \approx 98$$

Using a formula suggested by Kothari (2004), the sample size can be categorised as follows

$$n = \frac{N_{group} * n}{N}$$

Where N_{group} is the size of the strata, n is the sample size of the total population, and N is the total number of participants. For example, for engineering department,

$$n_{engineering} = \frac{52 * 98}{130} = 39.2$$

Data Collection Instruments

Questionnaires

A research questionnaire is a productive survey which is used for accumulating response regarding any particular research work. The questionnaires were developed in harmony with the guidelines specified by (Umar, 2003).

The researcher used a set of self-administered questionnaires intended for in order to collect all the completed responses within a short time since clarity to questions were given on spot to the respondents at NWSC Mbarara Centre. The respective self-administered questionnaires started with a main title, followed by an introductory letter, and had three sections. Section one consisted of the demographics of respondents, section two was about on-spot billing system, economic and cultural factors that influence revenue collection as the independent variables while section three consisted of items about the revenue collection as the dependent variable. The researcher used a Likert scale questionnaire with a five-point agreement scale which was used to measure respondent's agreement. Questionnaires were administered to employees of NWSC who were randomly selected

Interview Guide

Interviewing was done with the help of an interview guide. The interview guide was used to capture data from key informants on on-spot billing system, other factors (economic and cultural factors) and revenue collection in NWSC Mbarara Centre. The instrument was helpful as it provided an alternative means of getting detailed

information and opinions from heads of departments in NWSC Mbarara Centre. While conducting interviews, probing was used in cases where respondents give inadequate answers or where confused meanings are given to the question. The interview guide was used to collect data from key informants who were purposely selected and they included the biggest consumers (companies and hotels) and heads of department in NWSC.

Data Quality Control

The validity and reliability of the study instruments was ensured through the following strategies.

Validity of the Research Instruments

Validity is the accuracy and meaningfulness of inferences, which are based on the research results. Content Validity Index (CVI) was computed in this study to examine the validity of the questionnaire and interview guide. Four research experts were served with the questionnaires and interview guide to get their opinion on the clarity of question wording and meaning. Their feedback was incorporated into the final version of the instruments. The results of the content validity index were calculated as 0.97. The instruments were regarded valid since the computed CVI was above 70% as recommended by (Amin 2005).

$$CVI = \frac{\text{Number of items judged valid}}{\text{Total items of the questionnaire}}$$

Reliability of the Instruments

The researcher assessed the reliability of the questionnaire using data collected from a pilot study. The reliability of the questionnaire was established using the Cronbach Alpha coefficient to ascertain dependability and trustworthiness. The Cronbach alpha provides a coefficient of inter-item correlations, that is, the correlation of each item with the sum of all the other relevant items, and is useful for multi-item scales (Cohen, Manion, & Morrison, 2007). The reliability of the instruments as measured by internal consistency was found to be satisfactory (Cronbach $\alpha = 0.94$). The results of test-retest reliability were $r = 0.85$, $p < 0.001$. The tool was deemed fit for the study since the Cronbach Alpha coefficient was more than the recommended 70% as provided by (Geroge & Mallery, 2003).

Data Analysis, Presentation, and Interpretation

Quantitative Data Analysis

Data from the questionnaires was edited and coded. Thereafter, the coded data was entered in a computer software known as SPSS version 23. Data was then analysed using descriptive statistics such as mean, and standard deviation. Descriptive statistics were used to provide a better understanding of the data. Also, inferential statistics such as correlation was used to determine the relationships between the variables. Results of the analysis are presented in tables.

Qualitative Data Analysis

The qualitative data collected through interviews was categorized, cleaned, interpreted, and analysed under their respective themes which were drawn from the study objectives. This was used to triangulate and support findings obtained through quantitative data analysis.

Research Results

Response Rate

As shown in Table 6 below, out of 98 questionnaires that were administered amongst randomly selected participants, 98 (100%) were collected. This is because the researcher administered the questionnaires himself.

The participants were asked to fill the questionnaire there and then since it would take them less than 30 minutes of their time. According to Amin, (1970) a response rate of 75% is recommended as the results can be relied on. Thus, the researcher had to proceed with the data analysis.

Table 1: Descriptive statistics of Cost of Water and Revenue Collection Performance

Statement	N	Mean	Std. Deviation	Std. Error Mean
When clients relocate to other estates, they don't pay water bills.	98	4.3571	0.48162	0.04865

Lack of funds makes customers delay paying the water bills.	98	4.2449	0.43224	0.04366
The water suppliers do not allow for negotiation to paying water.	98	4.0306	0.58246	0.05884
Defaulting Customers who default on payments are disqualified from e services.	98	3.9388	0.60609	0.06122
Customers who find the price of water is not affordable.	98	3.6837	1.00100	0.10112
The unreliability of Water supply deters customers' willingness to pay promptly.	98	3.5408	1.00687	0.10171
Pricing Tariffs are not friendly and this influence the ability to pay water.	98	3.7353	1.14445	0.10338

Source: Primary data, 2019

Results in Table 6 show that a mean of 3.68 with a standard deviation of 1.001 in responses obtained regarding the view that the price of water is not affordable which affects my ability to pay for water. This implies that majority of the respondents agreed with the statement since the mean is closer to 4. The finding therefore implies that some people still view the price of water as not affordable which affects their ability to pay for water.

Further results in Table 6 show that respondents were in agreement with the view that Pricing Tariffs are not friendly and this influence my ability to pay water. This attracted a mean of 3.73 and a standard deviation of 1.144. These findings show that due to pricing tariffs not being friendly, influenced people's ability to pay water.

The study findings in Table 6 show that a mean of 4.03 was obtained regarding the view that the water suppliers do not allow for negotiation to paying water. This attracted a standard deviation score of 0.582. This shows that most respondents agreed with the statement and hence indicate that the fact that the water suppliers do not allow for negotiation to paying water, has hindered some people from accessing water.

Table 6 results of the study show that Customers who default on payments are dissatisfied with the services they receive and this attracted a mean response of 3.98 was obtained in regard to this statement and there was a standard deviation of 0.606 obtained regarding the statement and as such it was agreed that Customers who default on payments are dissatisfied with the services they receive. Better services thus implied less default in clients in Mbarara.

Furthermore, in Table 6, respondents provided their views on Lack of funds making customers delay paying the water bills. Their perceptions showed a mean of 4.24 implying that they agreed with the statement. In addition, a standard deviation of 0.432 was obtained suggesting that there were no significant differences/variances in opinions. The findings revealed generally that Lack of funds makes customers delay paying the water bills.

The study findings in Table 6 show that a mean of 3.54 indicates that the unreliability of Water supply deters customers' willingness to pay promptly. This attracted a standard deviation score of 1.006. This shows that most respondents agreed with the statement and hence indicate that the fact that the unreliability of Water supply deters customers' willingness to pay promptly, has hindered some people from accessing water.

The study findings in Table 6 show that a mean of 4.35 was obtained regarding the view that when clients relocate to other estates, they don't pay water bills. This attracted a standard deviation score of 0.048. This shows that most respondents agreed with the statement and hence indicated that the fact that when clients relocate to other estates, they don't pay water bills.

In an interview with one of the respondents, he asserted that:

“... .. the cost of a unit of water has increased and yet the number of litres in a unit has remained constant. For me who uses water as a raw material, it has reduced my profits since the cost of production has gone high thus making it hard for me to pay my water bills promptly like I used to do when the unit cost was down.....”

This is in agreement with the findings of Boakye & Nyieku (2017) who found out that the cost of water was a challenge in revenue collection performance.

The Contribution of Revenue Collection Mechanism on Revenue Collection Performance

The second objective aimed at examining the contribution of revenue collection mechanism on revenue collection performance in NWSC, Mbarara Centre. The findings of the descriptive statistics are presented in Table 2.

Table 2: Descriptive statistics of Revenue Collection Mechanism on Revenue Collection Performance

	N	Mean	Std. Deviation	Std. Error Mean
The location of pay points are easily accessible which makes paying water bills promptly.	98	3.7245	1.00289	0.10131
The automation of revenue collection increases clients' chances of paying for water promptly.	98	4.0482	1.14821	0.06295
There are insufficient numbers of pay points which discourage clients from paying bills.	98	2.6020	1.24966	0.12623
There is ineffective mode of Paying bills which discourages me from paying water promptly.	98	3.731	1.162701	0.14718

Source: Primary data, 2019

In Table 7, respondents provided their views on the assertion about existence of insufficient Number of Pay Points which discourage clients from paying bills and a mean of 2.60 was obtained, showing that they disagreed with the statement. Additionally, a standard deviation of 1.249 was obtained suggesting that there were no

significant differences/variances in opinions as regards existence of insufficient Number of Pay Points which discourage clients from paying bills.

More so, findings showed that majority of the respondents agreed with the assertion that the failure to automate revenue collection reduces clients' chances of paying for water promptly. This was indicated by a mean response of 4.04, although there was a high standard deviation score of 1.148. This indicated a high level of inconsistency in the opinions raised by respondents during the study. From these scores, it was established that the failure to automate revenue Collection reduces clients' chances of paying for water promptly.

Results of the study in Table 7 show that a mean value of 3.72 was obtained regarding the assertion that most of the respondents agreed to the view that The Location of pay points are not easily accessible which make me not paying water bills promptly. It was also established that most of the respondents were consistent in their opinions as shown by a greater standard deviation figure of 1.002. Generally, the study conferred to the fact that more location of pay points and establishment of many more could easily increase accessibility which makes people to pay water bills promptly.

In a discussion with one of the key informants, she said that:

“... the revenue collection mechanism is becoming costly. We used to pay our water bills at the NWSC offices without any charge, but now all the methods of payment include some charges and which keeps on increasing every financial year for example the mobile money payment has also been increased and going to the bank needs time ...”

This concurs with the findings of Oracle (2009) who concluded that in order to improve the revenue collection performance, there is need to have a fair mode of paying bills.

The Relationship Between on Spot Billing System and Revenue Collection Performance

The third objective aimed at finding out the relationship between on spot billing system and revenue collection performance in NWSC, Mbarara Centre. The findings presented in Table 3 below indicate the descriptive statistics of on-spot billing system and revenue collection performance. These indicate that participants agreed (Mean = 4.5612 and standard deviation = .49879) that NWSC today fail to accurately bill for every unit of water produced.

In addition, the participants agreed (Mean = 4.4490, standard deviation = 0.49995) that on-spot billing system makes customers trust the accuracy of the bills, and are therefore more willing to paying them. Maintaining up-to date customer databases improves revenue collection as indicated by mean of 4.3469 and standard deviation of 0.47844.

Table 3: Descriptive statistics of on-spot Billing System and Revenue Collection Performance

	N	Mean	Std. Deviation	Std. Error Mean
NWSC today fail to accurately bill for every unit of water produced.	98	4.5612	0.49879	0.05039
On spot billing system makes customers trust the accuracy of the bills, and are therefore more willing to paying them.	98	4.4490	0.49995	0.05050
Maintaining up-to-date customer databases improves Revenue collection efficiency in NWSC.	98	4.3469	0.47844	0.04833
For metered supplies the bills accurately raised according to meter readings.	98	4.3265	0.47135	0.04761
Billing systems based on consumption are more	98	4.1429	1.26001	0.12728

likely to be paid by individual users.				
Customers who default on payments are dissatisfied with the services they receive.	98	4.1020	0.56513	0.05709
The current method of Delivering water bills to customers is good and should be maintained.	98	4.0918	0.74732	0.07549
Poor billing and collection practices prevent water utilities from recovering sufficient costs to properly operate	98	4.0714	0.25886	0.02615
Bills raised by NWSC Staff are clear, simple and understandable to most customers.	98	3.6735	1.24168	0.12543

Source: Primary data, 2019

Results of the study in Table 9 below show that on spot billing was highly related with revenue collection performance. A significant positive Pearson correlation ($r = .864$, $p < .05$). Poor billing and collection practices significantly prevent water utilities from recovering sufficient costs to properly operate and therefore on-spot billing system makes customers trust the accuracy of the bills, and therefore more willing to paying them. Therefore, there is a significant relationship between on-

spot billing system and revenue collection performance of NWSC Mbarara Centre as indicated by $r = 0.864$, $p < 0.05$.

Table 4: Correlation between on spot billing system and revenue collection performance

		On-spot billing system	Revenue collection performance
On-spot billing system	Pearson Correlation	1	0.864**
	Sig. (2-tailed)		0.000
	N	98	98
Revenue collection performance	Pearson Correlation	0.864**	1
	Sig. (2-tailed)	0.000	
	N	98	98

***. Correlation is significant at the 0.01 level (2-tailed).*

In an interview with one of the respondents, she clearly asserted that:

“.....on spot billing is a very good method because it the reduced on the operating costs. Previously we would pay for someone going to take the meter readings, then we again pay the person taking the bills. More so our clients have now built trust in us because they always bill them when they are seeing. This has increased our revenue

collection performance.....” This is in agreement with the works of Sualihu & Rahman (2014) who found out that on spot billing reduces the operating costs hence increasing performance.

Conclusions

NWSC is plagued with severe deficiencies in the delivery of services, with access to reliable, sustainable, and affordable water supply and sanitation services remaining poor in general. The sector’s worrying performance is caused, among other reasons, by financial and capacity constraints, including the absence of a commercial orientation to services, institutional deficiencies, and the lack of systemic incentives to deliver ongoing quality services.

Effective billing and Revenue collection systems are a critical component for ensuring the viability of NWSC. Improving billing and revenue collection activities has an immediate impact on the revenue streams of NWSC that can, in turn, help NWSC in improving services. The price of water is not yet affordable and affects customers’ ability to pay for water and customers are not engaged in negotiations to paying water and planning and most of the customers’ delay to pay their water bills mainly lack funds while others fail to pay because they are not satisfied with the services and this greatly affects revenue collection performance.

Recommendations

The study found out that the cost of water is high thus not affordable especially to low income earners. Therefore, the study recommends that government should set minimum price and tariffs to enable people afford water since it is a necessity

The findings recommend that to achieve proper reduction in revenue collection costs, NWSC needs to install prepaid meters under prepaid billing system. Prepaid water meter is used to improve the operational efficiency as there is no need of men for meter reading. The study findings revealed that there are a lot of unpaid bills due to clients who relocate from estate to estate.

The study recommends that clearing bills should be shifted to the landlords instead of tenants since landlords do not easily relocate.

The study findings revealed that the customers are not allowed to negotiate for the units of water they use. The study recommends that customers should be accessed thoroughly to gauge whether they will be able to pay the bills.

NWSC should cluster its customers according to income classes and ensure that middle level class customer who can afford to pay for average consumption are put under prepaid billing system.

On the hand, high class people who own equipment that consume a lot of water should be left with credit meters to continue enjoying water for they pay without much cost and putting prepaid meter to them may have the same effect of self-disconnection like the low class people.

The study findings indicate that there are various modes of payment such as bank payment, mobile money,

and pay way. The study recommends that the customers should be trained and sensitised on how to use the new and existing payment platforms that NWSC. This would enable customers to be able to pay their bills promptly.

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