PRECURSORS TO REVENUE COLLECTION EFFICIENCY IN THE WATER AND SANITATION SECTOR: A CASE OF NAIROBI CITY WATER & SEWERAGE COMPANY (K) LIMITED

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Abstract

Purpose: The purpose of carrying out this research was to determine the precursors to the revenue collection in water sector.

Methodology: The descriptive design that was applied in carrying out this study by the researcher was a stratified random sampling because population was heterogeneous and a probability sampling in which the population was divided into two or more relevant strata and whether systematic or simple, was then drawn from each of the sub group. The data was gathered through the use of questionnaire and analyzed using the SPSS. The presentation of the research was done using pie charts, bar charts and tables. The researcher conducted a regression analysis to discover the relationship of the study variables and influence on the collected revenue efficiency.

Results: Researcher obtained an R square value of .582 which was significant at .000 indicating that the model explained 58.2% variables within the depended variables. All the variables under study were found to be important. After the study, the researcher rejected the null hypothesis.

Policy recommendation: The study recommends that the organization ought to streamline the water taxes, staff level, ICT and charging framework in perspective of enhancing the income gathering proficiency. This would limit the misfortune in organization income.

Keywords: *Precursors, Revenue Collection Efficiency, Water and Sanitation, NCWSC*

1.0 INTRODUCTION

1.1 Background to the Study

Water is a scarce resource globally. Many people lack adequate to hygienic drinking water. Published figures show that at least a third of world's population does not have access to drinking water which is safe. These positive figures fail to disclose some striking inequalities. While worldwide access to pure drinking water has grown enough to attain the MDG target, 780 million people remain without access to drinking water. Only 61% of the population in Sub-Saharan African has access to improved water supply sources. People lack services because systems fail often since not enough resources was invested to suitably build and maintain them, and also as a result of the stress that urbanization places on the existing infrastructure. In the first decade, Africa's population grew at almost double that rate (World Bank, 2012).

The African continent has the hardest challenge to achieve water besides sanitation MDGs objectives. The MDGs associated with water supply and sanitation services need faster distribution process to satisfy the expansion of the water coverage in water supply in the urban areas. Recent projections show that following the business as usual trends, Sub-Saharan Africa would reach the MDG target for water services by 2040, and those for sanitation by 2076, United Nations Development Programe 2006). United Water ballooned was founded in 1969 and Suez's predecessor partnered with United Water with the idea of privatizing the water system within the U.S. Suez acquired the United Water in 2000 and the project pursued a huge city privatization deals. The processes of the water project failed severally and thought of shifting focus on the competing factors. In 2007, it acquired Aquarion Operating Services and Earth Tech's North America water operation firm the following year (World Bank, 2012).

The firm sold over 40 contracts to the competing companies and the following year it contracted extra contracts and marketed water systems within the Connecticut when they decided to sell the Arkansas system in 2013. The development of United Water's stopped and the customers reduced to around 25%. Statistics shows that United Water served less than 1.8 million customers in 2012 as compared to the opening date (Henning & Rich, 2014). Inappropriate management seemed to have contributed to existence of stagnant water in the surrounding and loss of the major contracts. Atlanta dissolved a project worthy $428 million with the United Water when the company faced challenges. The employees were fired and around 13,000 work orders lacked ability to respond to emergency in the towns. Gary Sanitary District closed the contract with United Water to save money of the public operations. After 12 years, the district board awarded a contract worth $100 million. According to Paul & Robert, (2014), United Water announced partnership with United Water which acquired partners for around 5 years in 2003. In the month of the district board selected in absence of community input to make the company water systems private (World Bank, 2012).

The company planned to fire 62 employees and to eliminate some jobs. Such strategies targeted improving the policy management on the basis of residents and downsized firm. Around 80 cave-ins occurred between 2003 and 2007 when the sewer line fell. A state survey discovered that the district water managed by United Water violated the discharge limits of 84 times

between 2005 and 2007 such had realized 25 pieces of broken pipes. Some 26 count federal indictments complained to United Water Services of the conspiracy and the felony violation of the Clean Water Act for interfering with water quality tests (Rocky & Pitt, 2010). Despite that the jury acquitted the firm of the charges, the case found questions regarding the organizational priority. The federal administration alleged that the company wanted to save money on the chemical expenditure through reducing chlorine levels in the supplied water claimed that the firm's annual appraisal of the project manager provided substantial weight to improving the performance of the United Water Gary District operation as compared to compliance with surrounding requirements. The firm did not reject its' reduction of chlorine levels in the water. It proclaimed that it followed the standards to minimize chlorine level to show the water levels.

The policy makers in Kenya recognize that in order for the country to achieve its objective in poverty-reduction strategies and attain the millennium goals then it means that water needs to be availed, be accessible and affordable, particularly to the needy people. This goes in line with the fact that all the eight millennium goals are in one way or the other are related to access to clean water. The Kenyan water services sector has for many years been faced with inefficiencies, lack of investments, bad management and dismal array of legal and institutional framework. Additionally, the escalating growth of Kenya's urban centers has created an advancing pressure on water utilities to extend services to new areas. To address these challenges and as part of a global issue, the government of Kenya introduced far reaching reforms in the water sector to restructure and overall improve sector performance. The reforms were guided by the Water Act of 2002 that was based upon recognition of monetary value of water and the maintenance recovery as a means of sustainable service provision among others, as indicated in the National Water strategy. According to the constitution there are various key provisions that have major implication on the water sector. Water sector has assigned the responsibility to manage water resources and national public works to national government while devolving the responsibility to supply water besides sanitation services to all the new counties introduced by the year 2010 Kenyan Constitution (Rocky & Pitt, 2010)

Nairobi City Water and Sewerage Company Limited (NCWSC)

This company was formed in accordance with the Water Act of 2002, which created new institutions to manage resources across Kenya. As service a provider, the company was appointed by the water and services board (AWSB) to avail water and sewer services to the people of Nairobi city and its environs. These services were officially provided by the Water and Sewerage Department, widely regarded as highly ineffective (NCWS, 2011). The company remains a subsidiary of Nairobi County Government and both the governor and deputy governor sit on its board of directors, (NCWSC, 2017). The beginning of water supply to Nairobi has tapped water from distant sources to increase water supply in the growing city population with enough water. The achievements and problems in the water company explain the water supply and sanitation within Nairobi (NCWSC, 2017).

The vision and mission of NCWSC is to offer satisfaction to all its customers with water and sewer services. The mission is to provide sustainable sewerage services that satisfy customer needs. NCWSC works to provide good sewerage quality to meet the client requirements to

exceed the objectives that have been established at various functional levels are communicated to all employees in pursuit of commitment, (NCWSC, 2016). The objectives are being implemented, measured, monitored and shall be reviewed regularly within appropriated frameworks and quality management systems requirements. The core values include customer focus, integrity, empowered, creativity and innovation, team work and effective communication within the organization and to the public. To be able to maintain this great momentum the public is also advised to help by contacting the relevant offices as the need arises, (NCWSC, 2016).

Among the challenges facing the water and sanitation sector are the poor quality, illegal connections and intermittent water supply (only 40% of the house connections get water continuously), the loss of storage capacity in reservoirs, lack of access to adequate sanitation in slums such as Kibra, Mathare and Kawangware just to mention but a few where half of the population of the City lives; blockages of sewers resulting in overflows; and unused capacity in the City's largest waste water treatment plant in Dandora. Political infighting and corruption that amounted to the termination of the services of the whole Board of the NCWSC in 2017 (NCWSC, 2016). Of concern is a particular challenge in the county of Nairobi remains how to provide enough and affordable water to its half of the population living in slums. The slum residents with piped water connections built water kiosks where they resell water to other residents in buckets since the 1970s. The number of water kiosks in slums increased from about 150 in 1978 to nearly 1500 in 1994. The municipal water department recommended a resale price, but could not enforce it so that the poorest end up paying much more than those fortunate enough to have a tap in their houses, (Karanja, 2011).

Statement of the Problem

Nairobi is a big county with almost over 6.54 million people operating daily and a lot of water and other related services are always in use according to data from World Bank, 2017. The NCWSC in efforts to offer effective service delivery to its customers, they have employed all means possible to raise necessary resources to serve customers better. In its endeavor to provide a good customer service, the NCWSC requires sufficient revenue for its smooth running. It has been a challenge and the percentage of revenue collected is 75% (Muguna, 2017). This study therefore seeks to fill the gap by carrying out a research on the precursors to the revenue collection efficiency in the water sector, particularly the Nairobi City Water and Sewerage Company Limited. A lot of attention has been paid to big institutions like Kenya Revenue Authority and municipalities while less concern has been given to small companies. Almost all previous studies have occurred in developed countries of Europe and America. Those that have taken place in Kenya such as Musya, (2014) and Ndunda, (2015), talked of the role played by the internal control systems of the county governments in Kenya and the competency of revenue clerks and tax compliance in the optimal revenue collection. None of the previous studies have addressed these issues in NCWSC revenue collection efficiency.

2.0 LITERATURE REVIEW

Theoretical Review

Public based Choice Theory

A precursor of modern theory was the work of Knut Wicksell (1896), which treated government as political exchange*, a quid pro quo,* in formulating a linking taxes and expenditures. Some subsequent economic analysis have been described as treating governments as though it attempted "to maximize some sort of welfare function for society" and as distinct from characterizations of economic agents, such as those in business. In contrast, public choice theory modeled government as made up of officials who, besides pursuing the public interest, might benefit themselves, for example in the budget- maximizing model of bureaucracy, possibly at the cost of efficiency. Modern public choice theory has been dated from the work of Duncan Black, sometimes called *the founding father of public choice*. In a series of papers from 1948, which culminated in the Theory of Committees and Elections (1958), and later, Black outlined a program of unification toward a more general approach. This theory was relevant to water tariffs related to Nairobi Water Company Limited. The company will benefit from controlling the costs. The customers who are the consumers of water of NCWSC will also benefit if the tariffs will be fairly set.

Critique

Public choice theory modeled government as made up of officials who, besides pursuing the public interest, might act to benefit from themselves, for example in the budget-maximizing model of bureaucracy, possibly the cost of efficiency. Some public choice theory scholars claim that politics are plagued by irrationality. In articles published in Econ Journal Watch, economists Bryan Caplan contended that voter choices and government economic decisions are inherently irrational.
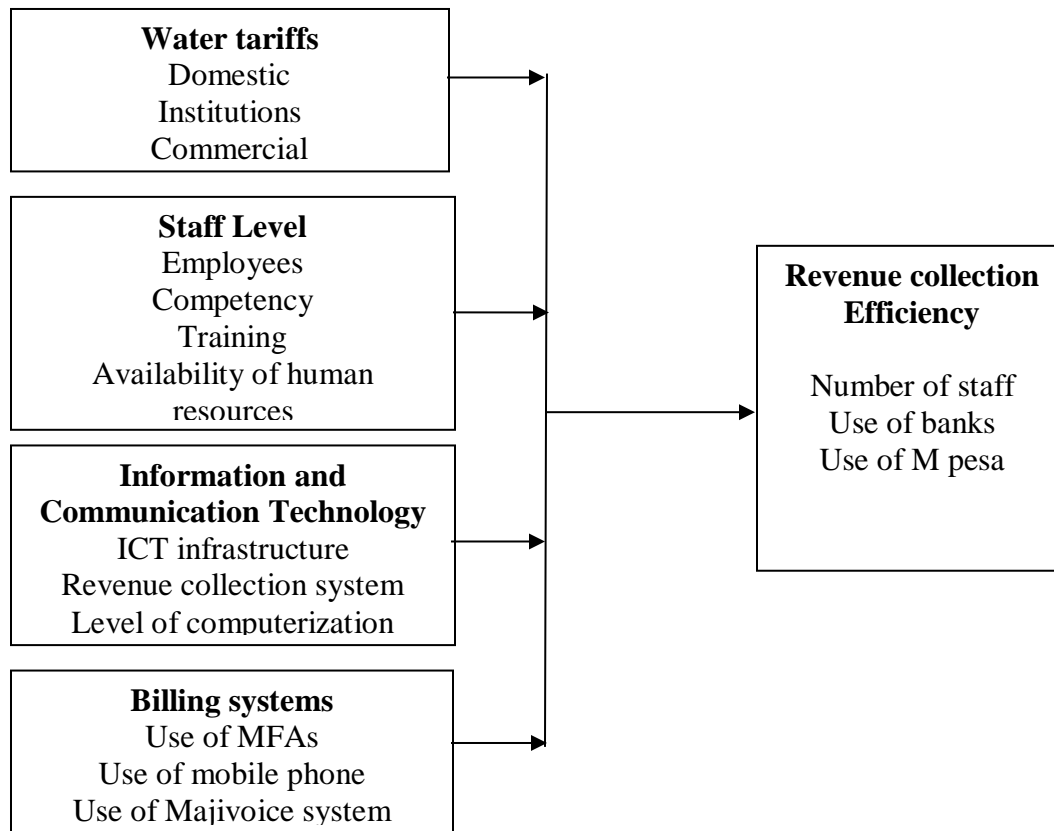
Credit based Risk Theory

This theory was coined by David Lando in 1898. David Lando considers two broad approaches to credit risk analysis: that is based on classical option pricing models and direct modeling of the default probability of issuers. Credit risk is therefore the investor's risk of loss, financial or otherwise, arising from a borrower who does not pay his or her dues as agreed in the contractual terms (Nyunja, 2011). Billing system would reduce credit risk and as a result the company will collect good revenue necessary for the running of the company.

Critique

Credit rating agencies such as standard and poor's (S&P's) and Moody's failed to act quickly enough to warn banks and investors about the risk of investing in securities backed by the US Subprime Mortgages, the sector whose troubles triggered the recent global market volatility. A logical development for managing risk for bank shareholders was the increasing codification of risk in the decision-making process of banks. The codified assessment of credit risk developed by US banks aimed to estimate their portfolio's Probability Density Function (PDF) of credit losses by calculating the amount of capital needed to support their credit risk activities. When debtors for NCWSC fail to pay their bills when they fall due, the company is exposed to the risk of losses.

Conceptual Framework

The independent variables were water tariffs, Information and Communication Technology, Billing systems and Staff level while the dependent variable is revenue collection efficiency.

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┌─────────────────────────┐
│      Water tariffs      │
│        Domestic         │
│      Institutions       │
│       Commercial        │
└─────────────────────────┘

┌─────────────────────────┐          ┌─────────────────────────┐
│      Staff Level        │          │    Revenue collection   │
│       Employees         │          │        Efficiency       │
│       Competency        │          │                         │
│        Training         │          │     Number of staff     │
│  Availability of human  │          │      Use of banks       │
│       resources         │          │      Use of M pesa      │
└─────────────────────────┘          └─────────────────────────┘

┌─────────────────────────┐
│    Information and       │
│ Communication Technology │
│    ICT infrastructure    │
│ Revenue collection system│
│  Level of computerization│
└─────────────────────────┘

┌─────────────────────────┐
│     Billing systems      │
│       Use of MFAs        │
│    Use of mobile phone   │
│   Use of Majivoice system│
└─────────────────────────┘
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Independent variables   **Dependent variable**

Figure 1: The conceptual framework

3.0 METHODOLOGY

The study used descriptive research design. The target population of the NCWSC staff was around 318. The study targeted the top managers, the billing staff and the technical staff. Stratified random sampling design was used in the study. Data was collected using questionnaires. The data was gathered through the use of questionnaire and analyzed using the SPSS. The presentation of the research was done using pie charts, bar charts and tables. The researcher conducted a regression analysis to discover the relationship of the study variables and influence on the collected revenue efficiency.

4.0 RESEARCH FINDINGS AND DISCUSSION

4.1 Demographic Characteristics of Respondents

The respondents were as grouped into the following groups:

4.1.1 Gender of respondents

In the process of data collection, respondents were called to show the gender. The data was as shown in figure 1.
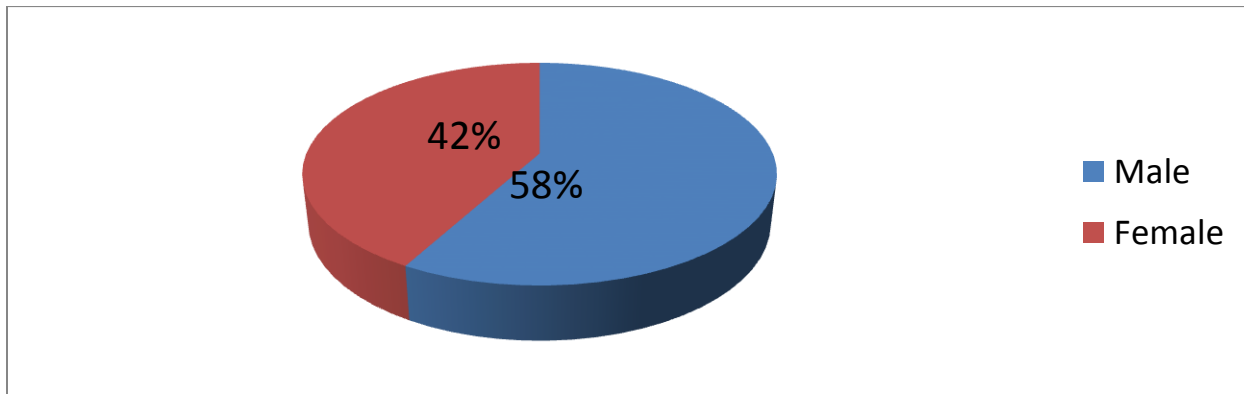

Figure 1: Gender respondents

The findings showed that Male respondent to 58% and the female (33, 42%). The researcher got concerned with respondent's gender because the genders perceived the aspects of life differently and therefore a very important aspect to research on. This evidenced the fact that the distribution of gender among management and employee staff was skewed towards male.

4.1.2 Age of Respondents

The researcher analyzed the age gap of the respondents. The data findings were as shown in table 1

Table 1: Age bracket response rate

	Frequency	Percent	Cumulative Percent
Below 20 Years	11	14	14
21-35 years	13	17	31
36-50 years	40	51	82
51-65 years	8	10	92
Above 65 years	6	8	100
Total	**78**	**100**	

The findings revealed the majority respondents of about 40, 51% aged between 36 and 50. This was followed by respondents aged between 21 and 35 years (13, 17%), then those who were aged below 20 (11, 14%), then followed by those aged between 51 and 65 (8, 10%) and finally

those who were above 65 years (6, 8%). From these findings, the researcher found that many respondents had extra experience with understanding to respond towards the question posed.

4.1.3 Level of Education

The researcher wanted to establish the level education of the respondents as shown in table 2:

Table 2: Level of Education response rate

	Frequency	Percent	Cumulative Percent
Certificate	30	38	38
Diploma	25	32	70
Degree	17	22	92
Masters	6	8	100
Total	**78**	**100**	

From the research findings, the majority of respondents (38%) had a certificate as, followed by Diploma with 32% respondents, followed by those with a degree (22%) and then masters which represented 6%. This showed that respondents had formal education and therefore understood the major problem facing revenue collection in their business operations.

4.1.4 Length of Service

The researcher too, wanted to know the number of years the respondents had served as indicated in figure 2 below:
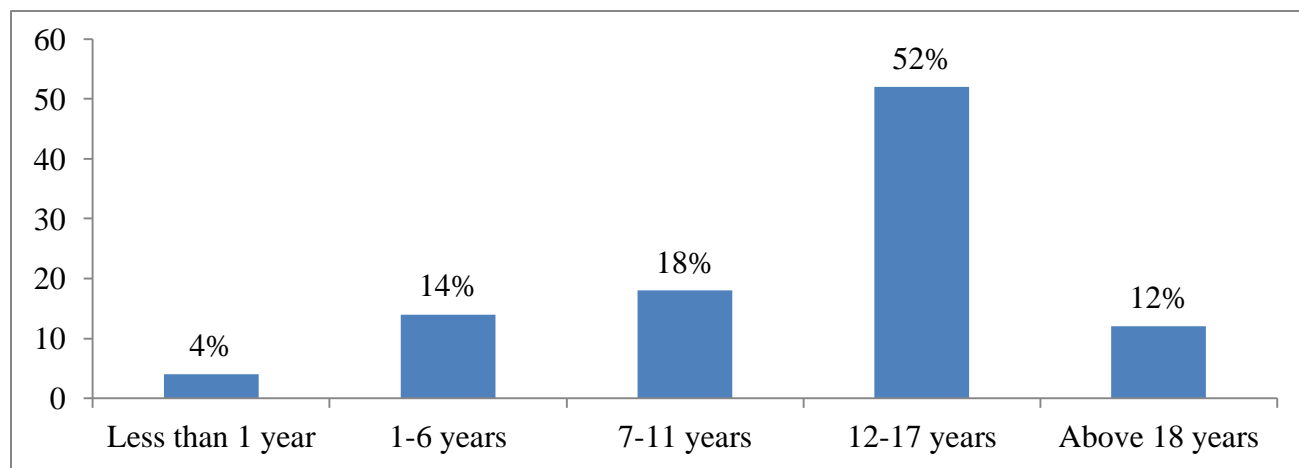

Figure 2: Length of Service

From the findings, 52% of respondents had worked at NCWSCL for 12-17 years, followed by 18% of respondents whose service was 7-11 years, followed by 14% whose service years were 1-6 years, followed by 12% of respondents whose service years were above 18 years and lastly 4% respondents whose service was less than 1 year. This showed that many of the respondents had

served the company for long and thus they were conversant with the revenue recollection of the company.

4.2 Water Tariffs

To start with, the researcher asked the respondents to state whether the NCWSC provided tariffs to customers, the findings were recorded in the table 3:

Table 3: Water Tariffs provision by NCWSC

	Frequency	Percent	Cumulative Percent
YES	58	74	74
NO	20	26	100
Total	**78**	**100**	

4.3 Information and Communication Technology

4.3.1 Descriptive statistics for information communication technology

The respondents were asked to give their opinion on the effect of ICT on revenue collection efficiency as per the level of disagreement or agreement. The researcher summarized the statistical data for revenue collection in regard to ICT using mean and standard deviation on a five- point Likert scale where strongly agree (5.0000-4.500), agree (4.499-3.500), neutral (3.4999-2.500), disagree (2.499-1.500) and strongly disagree (1.499-1.000) as indicated in table 4.8 below.

Table 4: Effect of ICT on revenue collection efficiency in NCWSC.

Statement	Mean	Std. Dev
ICT services are done to enhance revenue collection efficiency of NCWSC.	1.99	.342
NCWSC has implemented payment Integration and digital banking channels such as Mobile banking, mobile money and mobile wallet to enhance revenue collection efficiency.	2.17	.692
NCWSC outsources ICT services to save on costs and reduce expenses incurred from repairs of ICT equipment.	1.76	.539
ICT services at NCWSC was increases the speed at which services are offered customers	1.96	.468
ICT at NCWSC provides better accountability of services to customers.	1.68	.470

From the findings, majority of respondents as shown by the mean of 2.17 agreed that NCWSC has implemented payment Integration and digital banking channels such as Mobile banking, mobile money and mobile wallet to enhance revenue collection; followed by a mean of 1.99 who agreed that ICT services are done to enhance revenue collection of NCWSC, followed by a mean of 1.96 of respondents who agreed that ICT services at NCWSC increased the speed at which services were offered customers, followed by a mean of 1.76 of respondents who agreed on the

fact NCWSC outsources ICT services to save on costs and reduce expenses incurred from repairs of ICT equipment and lastly a mean of 1.68 of respondents who agreed that ICT in NCWSC provides better accountability of services to customers.

This study confirms a research by Michalsons (2017), who argued that ICT services factors such as cost saving, focus on organization's core business, improvement of technology and service quality, access to knowledge and technology that the organization does not have among other. Therefore, ICT services such as Electronic banking, Mobile banking, mobile money and mobile wallet to enhance revenue collection efficiency. The researcher further went ahead to establish the extend rate at which ICT affected revenue collection efficiency in NCWSC. The data findings were as shown in table 5:

Table 5: Extent rate at which ICT affected revenue collection efficiency in NCWSC

	Frequency	Percent	Cumulative Percent
Very Low Extent	4	5	**5**
Low Extent	5	6	11
Not sure	5	6	17
High Extent	50	65	82
Very High Extent	14	18	100
Total	**78**	**100**	

From the findings, 64.1% of respondents agreed to a high extend, 17.9% to a very high extend, 6.4% were not sure, 6.4% respondents agreed low extend while 5.1% agreed to very low extend on the fact that ICT affected revenue collection at NCWSC. From the findings, 74% of respondents agreed that NCWSC did provide water tariffs to their customers while 26% disagreed to the fact NCWSC did provide water tariffs to their customers; 9 this results revealed that the county had adequately captured their water network but had not sufficiently done so; which implied that a lot of customers were still not captured with their usage of water, yet enjoy the services.

4.3.2 Descriptive statistics for water tariffs

Furthermore, the respondents were asked to give their opinion on the opinion as per the level of disagreement/agreement. The researcher conducted summary statistics for revenue collection personnel capacity using mean and standard deviation on a five- point Likert scale where strongly agree (5.0000-4.500), agree (4.499-3.500), neutral (3.4999-2.500), disagree (2.499-1.500) and strongly disagree (1.499-1.000) as indicated in table 6 below.

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Table 6: Effects of water tariff on the collection efficiency NCWSC

Statement	Mean	Std Dev
There are Regular Tariff adjustments for water and sewerage tariffs in NCWSC.	2.04	.729
High water tariffs increases revenue while lower water tariffs lowers the revenue	4.01	.706
For domestic and residential, more than 75% of water is billed for sewage tariffs for all the customers with sewer connection.	3.42	.622
NCWSC provides Exhauster Services for both private and public companies	1.95	.771
Water tariffs ensure simplicity in the pricing structure of water of all customers by relative value signals in their meters.	1.79	.888

From the findings, majority of respondents as shown by the mean of 2.04 agreed that Regular Tariff increase for water and sewerage tariffs at NCWSC; followed by a mean of 2.05 on domestic and residential having more than 75% of water billed for sewage tariffs for all the customers with sewer connections. It had a 1.95 mean offering Exhauster Service for public and private companies and mean of 1.79 on Water tariffs ensuring simplicity in the pricing structure of water of all customers by relative value signals in their meters. This finding asserts to the study by (Farlex, 2012) who argued that local authorities and service providers charge cost effective prices to customers whereas the central government intervenes to ensure there is a systematic adoption of integrated water management and introduction of appropriate pricing mechanisms. Without adequate pricing mechanisms, consumers have no incentives to use water more efficiently as they receive no signal indicating its relative value. Lastly on water tariffs, the respondent extended their rates and tariffs affected revenue collection in NCWSC. The data findings were recorded in Figure 3.
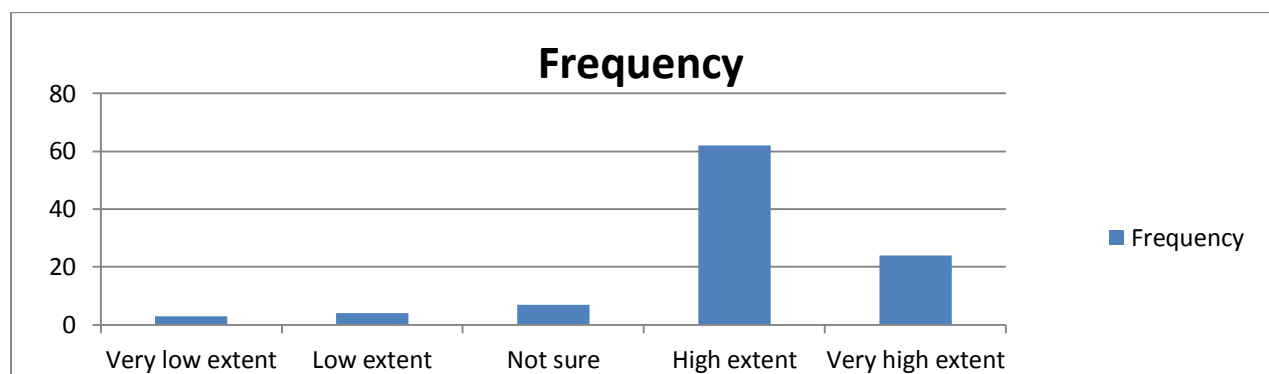

Figure 3: The extent rate of water tariffs on revenue collection efficiency in NCWSC

From the findings, 63% of respondents agreed to a high extent, 24% to a very high extent, 7% were not sure whereas 4% respondents agreed to low extent and 3% very low extent on the fact that water tariffs affected revenue collection at NCWSC.

4.4 Staff Level

4.4.1 Descriptive statistics for staff level

The respondents were asked to give their opinion on the opinion on the effect of staff level on revenue collection as per the level of disagreement or agreement. The researcher conducted summary statistics for revenue collection personnel capacity using mean and standard deviation on a five- point Likert scale where strongly agree (5.0000-4.500), agree (4.499-3.500), neutral (3.4999-2.500), disagree (2.499-1.500) and strongly disagree (1.499-1.000) as indicated in table 7:

Table 7: Descriptive statistics for staff levels

Statements	Mean	Std. Deviation
NCWSC considers employing qualified and competent staff	2.81	.341
There is adequate staff training at NCWSC.	2.00	.413
Employees are satisfied with the pay they receive	3.09	.513
I have a positive attitude towards my work due to fair payment and promotion	2.67	.446
Human resource managers are transparent in staff recruitment, staffing and remuneration	1.00	.000
Staff and management maintain good relations	4.21	.406

From the findings, respondents were neutral with a mean of 2.81 on the statement NCWSC considers employing qualified and competent staff. This implies that its rear cases for NCWSC to consider the qualification of staffs before employing them. Most of workers were employed by tribal cases or even corruption. The respondents disagreed with a mean of 2.00 for the fact that there was adequate staff training at NCWSC. This denotes that there was inadequate staff training at NCWSC which affected revenue collection efficiency. Also, respondents were neutral with a mean of 3.09 on the statement that employees were satisfied with the pay they received. This denotes that not all employees were happy with their pay and they would have preferred payment rise. However, some few staff were satisfied with their pay who included the management staff. Also respondents were neutral with a mean of 2.67 on the fact that had a positive attitude towards their work due to fair payment and promotion. This implies that NCWSC should consider the remuneration of staff to change their attitudes towards work.

In addition, respondents strongly disagreed with a mean of 1.00 on the statement that Human resource managers are transparent in staff recruitment, staffing and remuneration. This implies that corruption exists at NCWSC. Last but not least, respondents agreed with a mean of 4.21 on the fact that management maintained good relations with their staff. This denotes that the working environment of NCWSC was comfortable for the workers and there were no work pressures.

This finding is in line with Paul (2010) who stated that efficient utilization of human power is a critical performance area for NCWSC because staff costs consists of a larger cost factor than usually recognized, draining resources from maintenance and other necessary operating expenses and imposing costs on customers. It is conclusive from the research personnel cost due overstaffing negatively on revenue collection, whereas efficient staff recruitment, staffing and remuneration is characterized by transparency and accountability of management that attract and retain qualified staff. This finding implied that NCWSC should invest a lot in developing the capacity of their staff to the expected competent level in revenue collection. Further, the respondents were called upon to rate the extent at which staff level affected revenue collection at NCWSC. The data findings were as reported in table 8:

Table 8: The extent rate of Staff level on revenue collection efficiency in NCWSC.

	Frequency	Percent	Cumulative Percent
Very Low Extent	2	3	3
Low Extent	3	4	7
Not sure	3	4	11
High Extent	31	39	50
Very High Extent	39	50	100
Total	78	100	

The findings revealed that, 50% of respondents agreed to a very high extend, 39.7% to a high extend, 3.8% were not sure, 3.8% respondents agreed low extend while 2.6% agreed very low extend on the fact that staffing level affected revenue collection efficiency in NCWSC.

4.5 Billing Systems

4.5.1 Descriptive statistics for billing systems

The respondents were asked to give their opinion on the effect of billing system on revenue collection as per the level of disagreement or agreement. The researcher carried out a summary of statistics for revenue collection personnel capacity using mean and standard deviation on a five- point Likert scale where strongly agree (5.0000-4.500), agree (4.499-3.500), neutral (3.4999-2.500), disagree (2.499-1.500) and strongly disagree (1.499-1.000) as indicated in table 9:

Table 9: Descriptive statistics for billing systems

Statements	Mean	Std. Deviation
Billing system improves metering point's water usage rate which remotely sends the bill to customers via email or text message.	4.82	.343
Billing system enhances service delivery system thus providing stronger revenue streams.	3.61	.433
Meter reading and billing errors can be eliminated by limiting the staff handling billing systems.	3.99	.513
To reduce billing fraud, water tariffs should be uniform.	2.55	.456

From the findings, respondents strongly agreed with a mean of 4.82 on the fact that billing system improves metering point's water usage rate which remotely sends the bill to customers via email or text message. This means that billing systems are very essential in increasing revenue collection efficiency. Also, respondent agreed with a mean of 3.61 on the statement that billing system enhances service delivery system thus providing stronger revenue streams. This denoted that effective billing and collection systems that are based on principles that can bring about immediate improvements in revenue streams. Further, respondents with a mean of 3.99 agreed that Meter reading and billing errors can be eliminated by limiting the staff handling billing systems. This implies that fraudulent cases by reading and billing errors can be reduced by letting only the skilled personnel to handle the billing system. This will reduce the cost of metering repairing and maintenance. Lastly, respondents were neutral with a mean of 2.55 on the statement that NCWSC can still reduce billing fraud by setting uniform water tariffs.

This finding is in line with Cole (2002) who points that the issue of remarkable difference between the quantity of water supplied and the billed water. The processes can be improved through the billing systems. Water supply should be fitted with meters to clients (Cole, 2002). He stresses the importance of improving meter reading and billing, noting that a significant portion of commercial losses arise from mistakes in the meter reading and billing chains, because of poor technology, antiquated property registers and data-handling errors among other things.

The researcher sought to find out the extent at which billing systems affected revenue collection efficiency at NCWSC. The data findings were as shown in Figure 4.
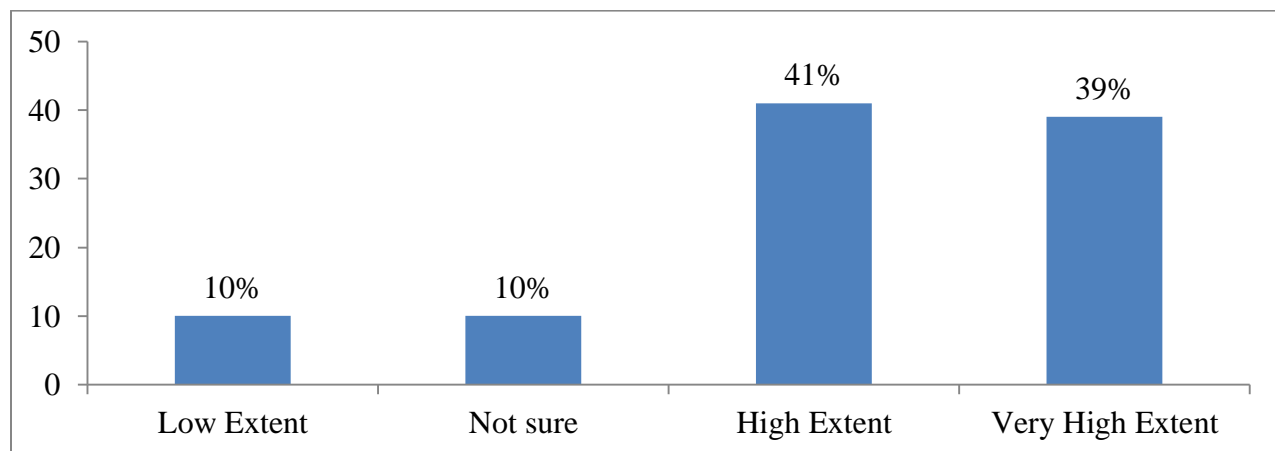

Figure 4: The extent rate of billing systems on revenue collection efficiency in NCWSC

The findings revealed that, 41% of respondents agreed to a high extent, 38.5% to a very high extent, 10.3% were not sure, 10.3% respondents agreed low extent while none agreed to a very low extend on the fact that billing systems affected revenue collection at NCWSC. This finding supports Armstrong (2017), who argues that water billings and charges convey a signal to water users on the value of water. Incentives for water conservation are given by metering, volumetric charges, increasing billing tariffs and a move towards cost recovery as these instruments lead to a better reflection of marginal cost in water prices.

4.6 Regression analysis

The researcher finally conducted a regression analysis to establish the relationship and whether the independent variables under study jointly affected the dependent variables.

4.6.1 Model summary

The researcher obtained the model summary upon conducting the multiple linear regressions as indicated in table 4.13:

Table 10: Regression model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics			
					R Square Change	F Change	df1	Sig. F Change
1	.763[a]	.582	.572	4.5942	.582	60.053	5	.000

The Model summary reveals that the R square is 0.582 and the Adjusted R square is 0.572. This means that the resultant regression equation explains 58.2% of the variation. This further implies the change in the dependent variable (revenue collection efficiency) is explained by the independent variables.

4.6.2 Coefficients of model

The obtained regression coefficients of the model were as indicated in table 4.15:

Table 11: Regression coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	67.294	1.961		34.316	.000
Water tariffs	.96	.025	.211	3.841	.012
ICT	2.699	.671	.190	4.020	.014
Staff level	2.700	.769	.187	3.510	.011
Billing system	1.221	.021	.550	58.143	.002

The t-value of 58.143 on the effect which is the highest shows that there is a strong influence of water billing on revenue collection. At 5% of level significant and 95% level confidence, billing effect had 0.002, water tariff had 0012, ICT had 0.014 and staff level had 0.011. Therefore, the most significant factor was the billing system.

The variables in the analysis were significant values at less than 0.05%. Therefore, one percentage change in water tariffs will lead to Ksh.0.96 million increase in revenue collection. One percentage change in ICT infrastructure will lead to Ksh.2.699 million revenue increase on efficiency. On the same case, staff level facilitated to Ksh 2.700 million revenue increase. Moreover, one percentage change in billing system will lead to Ksh. 1.221 million increase in revenue collection efficiency. Therefore, this results asserted that if all the above factors (water

tariffs, ICT, staff level and billing system are put into consideration by NCWSC, this will have a change in the in the revenue collected thus ability to collect optimal revenue.

5.0 SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

The investigation was centered to break down the antecedents to income gathering proficiency in the water and sanitation segment, an instance of NCWSC. The analyst utilized distinct research plan which empowered the scientist to break down the marvel under the examination in perspective of finding the antecedents to income gathering effectiveness in NCWSC. A sum of 78 respondents reacted to the surveys. The information was gathered utilizing polls with open and shut finished inquiries. The information was investigated utilizing diagrams and graphs where the ends were drawn from the discoveries and proposals made.

The main target of the investigation was to set up the water taxes on income accumulation productivity in NCWSC. The specialist discovered that there are consistent duty increment for water and sewerage levies at NCWSC that in results prompts income gathering productivity. Additionally, the examination uncovered that for local and private, over 75% of water is charged for sewage duties for every one of the clients with sewer association. At long last, the scientist discovered that water taxes had a constructive outcome on the income gathering proficiency in NCWSC

The second goal of the examination was to set up the impact of the ICT on income accumulation effectiveness in NCWSC. The examination found that there was a sound connection between ICT and income accumulation proficiency in NCWSC. The third target was to build up the impact of staff level on income accumulation productivity in NCWSC. The investigation found that there was a positive connection between the staff level and income accumulation effectiveness in NCWSC. The specialist found that directors could design well for the income accumulation productivity in NCWSC when enough and quality staff are locked in. Finally, the target of study was to build up the impact of billing system on income gathering proficiency in NCWSC. The investigation of the examination found the billing system profoundly affected the income gathering proficiency in Nairobi City Water and Sewerage Company Limited and the administrators ought to entirely screen the charging framework.

Conclusions

The investigation infers that water levy is the hugest variable that influences income accumulation proficiency in NCWSC. At the point when the organization follows a decent water levy by setting reasonable duty it can build its income base. Water taxes have turned into a decent apparatus utilized by NCWSC supervisors in settling on choice on income accumulation productivity. The examination likewise infers that staff level influences the income gathering proficiency in NCWSC. At the point when the organization conforms to a reasonable control, by keeping up enough and quality staff the income gathering proficiency will be emphatically influenced. The examination additionally closes a decent ICT foundation assumes a significant job on the income gathering effectiveness in NCWSC. With the organization ICT stage going

step higher, the organization can enhance its income gathering effectiveness. The examination additionally reasons that billing system influences income gathering productivity in NCWSC. A major number of the respondents were of the sentiment that if a decent charging framework could be put, the organization could enhance its income gathering productivity.

Recommendations

According to the discoveries and finish of the investigation, the accompanying strategy proposals were proposed to enhance the general income gathering effectiveness in NCWSC. The investigation suggests that organization ought to streamline the water taxes, staff level, ICT and charging framework in perspective of enhancing the income gathering proficiency. This would limit the misfortune in organization income.

On the client involvement with ICT administrations, it is prescribed that the administration suppliers should resolve all issues relating to either the product or ICT gear in an opportune way and indisputably. Further, the working connection between the service provider and NCWSC needs to be improved. Each party should ensure that they play their part as stipulated in the contract to ensure that there is a smooth working relationship from the top management, technical staff to billing system staff.

Also, more effort is required for a commercially sustainable water services sector that makes efficient use of available resources. The government, non-government institutions and other development actors should understand too the factors influencing revenues and find solutions to the problem of unviable water utilities and poor service provision.

References

Armstrong M. (2017), *A Handbook of Human Resource Management Practice*, 6th

Armstrong M. (2017), *Human Resource Management, 6th Edition*, Loyal Hill

Armstrong, M. (2017), *Handbook on Human Resource Management, 11th Edition,*   Cambridge University Press.

Armstrong, M. (2017), *Handbook on Human Resource Management, 6thEdition,*   Cambridge University Press.

Boxer A. (2009). "*A performance Audit of the Management services   Agreement Camden's Water and Wastewater Collection Systems.*" of the State   Comptroller.

Cairo Patrick, (2013), Public *Works Financing.*

Cairo, P. (2012). United Water: Double Digit Annual Growth Over Five Years*," Public Works Financing.*

Caldwell L. (1998) "Council's lawsuit dismissed.*" The Post Tribune, (1998).*

Caldwell, Lorl, (1998). "Sewerage plant goes private.*" The Post Tribune,*

Camden, N.J, (2012) "Resolution Authorizing Settlement of Litigation.*"*

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Carlson J.A, N.R & Herth, C.D, (2009), *Psychology the science of behavior*, *Toronto Pearson Education*

Churchill. & Iacobucci, D. (2010), *marketing research: Methodological foundations.*

Cole G.A. (2002), *Management Systems and Reward, Prentice Hall, Toronto Constitution.*

Cook, Rhonda, (2008) *Prison cut for ex-Mayor Campbell, and Atlanta Journal*

Crispin D. (2004), *How to Manage Employee Performance, New York:McGraw Hill Edition, London, Kogan.*

Frank L. (2003), *A comparative examination of the failure of privatization of water services delivery in Atlanta (USA)* and Hamilton (Canada), "*Journal of Comparative Policy Analysis: Research and Practice, vol. 13*, Iss 3, 2011 at 294.

Gary L. (2009) "*Annual Financial Report 2009.*"

Gary, Indiana, (2010) "*Wastewater treatment operator and managers charged with conspiracy and violating the Clean Water Act*".

James R, (1998), Understanding Employee Motivation, *Journal by Extension, n3, vol.36.*

John, M., B (2011), *Analysis of Water Governance in Kibera, Kenya.*

Karanja, J (2011), Improves water provision in Nairobi through control of non- revenue water, Global water summit (2017). *Global Water Intelligence, pg 212-213*

Kraly, Christine (2008) "Report: Sewerage plant violated rules" *The Northwest Indiana and Illinois Times.*

Macey, W.H and B.Schneider, (2009), *The Meaning of Employee Engagement, Industrial and organizational psychology, 1:3-30.*

Mullei &Crispin, (1979*Management of Small Enterprises, A training manual volume 6.*

NCWSC, (2011), *Waste water treatment, retrieved 6th November, 2011.*

NWC (2016). *"Board of Directors: National Water and Sewerage Corporation"*

NWSC, (2016) *"National Water and Sewerage Corporation: Our structure."* National Water and Sewerage Corporation (NWSC).

Patten, M. L. (2002), *Understanding Research Methods: An overview of the essentials, 3rd Edition,* Los Angeles; Pyrczak Publishing.

Paul W. (2010); *Lack of investments in Water Sector leaves Kenyan towns parched Publishers.*

Riketta, M, (2002), *Attitudinal Organizational Commitment and job performance.*

Riketta, M, (2008), *The causal relation between job attitudes and performance, a meta-Analysi of panel studies.*

Rubenstein Sarah, (2002) *"City Blasts United Water' 'Atlanta Business Chronicle.*

Schultz and Teresa Auch (2012) *"United Water acquitted of all charges". The Post Tribune, (2012).*

Scott, T.D, Mcmullen, R.S and Bowbin, (2007), *Reward programs: What works and what needs to be improved, world at work journal 16(3).*

Seidel, Jon (2010) *"Gary Sanitary District ends contract with United Water," The Post Tribune.*

Stephen S. (2014). *Minister confirms Ebal as NWSC Board Chairperson.*

Stephen S. (2015). *"NWSC to restructure management team".*

United Water (Press release) *"United Water completes sale of Connecticut regulated operations"* (2012)

United Water (Press release), *"United Water sells Arkanas regulated operations", (2012)*

Webb, Mary. N.O, (2003). *Undeterred after Atlanta cancels lucrative water contract. "New Orleans City Business''.*