MANAGEMENT OF NON-REVENUE WATER AND FINANCIAL PERFORMANCE OF KAMPALA WATER-NATIONAL WATER AND SEWERAGE CORPORATION

BY

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19/GMBA/18884/PE

A DISSERTATION SUBMITTED TO THE DIRECTORATE OF RESEARCH AND GRADUATE TRAINING IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTER OF BUSINESS ADMINISTRATION OF KYAMBOGO UNIVERSITY

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DECLARATION

I, Patrick Nyokos, hereby declare that this dissertation titled "*Management of Non-Revenue Water and Financial Performance of Kampala Water*" is my original work and it has never been submitted to any higher education institution for consideration of any academic honor.

Signature……..……. Date……..……

APPROVAL

This is to certify that this dissertation titled "*Management of Non-revenue water and Financial Performance of Kampala water*" by Patrick Nyokos (19/GMBA/18884/PE) has been conducted under our supervision and approved to be submitted for examination.

Signature……..……..…… Date……..…….

DR. REGIS ZOMBEIRE

Signature……..… Date…….

ASSOC. PROF. JACOB L. OYUGI

DEDICATION

I dedicate this dissertation to my dear mother Kokop Musau and my brother Mr. Sabila Allan in appreciation of their love, care, and support both materially and spiritually since the beginning of my academic struggle. May this research serve as a source of inspiration to you in the days ahead, and may the Almighty God abundantly bless you all.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

CAPL	Current Annual Volume of Physical Losses
FY	Financial Year
IDA	International Development Association
IWA	International Water Association
MAAPL	The Minimum possible or Achievable Annual Physical Losses
NRW	Non-Revenue Water
NWSC	National Water and Sewage Corporation
SPSS	Statistical Package for Social Scientists
UGX	Uganda Shillings
UK	United Kingdom
UN	United Nations
UNBS	Uganda National Bureau of Standards
USAID	United States Agency for International Development
WDS	Water Distribution System
WHO	World Health Organization

ABSTRACT

This study examined how the management of NRW affects the financial performance of Kampala Water. The study was guided by three research objectives: examining the effect of illegal use control on Kampala Water's financial performance, the effect of meter management on Kampala Water's financial performance, and the effect of response rate to leaks and bursts on Kampala Water's financial performance. A cross-sectional survey research design was used, and a quantitative research approach was considered in the study. Data was gathered using research questionnaires, and a total of 101 respondents were targeted, but 81 respondents responded. The findings revealed that all constructs of management of NRW in the study combined affect the financial performance of Kampala Water by 27.0%. Illegal water use control was an insignificant predictor of financial performance at B =.049 and with a weak relationship at r =.390**; meter management was a significant predictor of financial performance of Kampala water at B =.470 and with a moderate relationship at r =.541**; and response rate to leaks and bursts was an insignificant predictor of financial performance of Kampala water at B =.064 and with a weak relationship at r = 371**. The study recommended that the Kampala Water Finance Department needs to increase the budget for field monitoring to effectively facilitate people who monitor illegal use of water and effectively reward those who report illegal water use cases in the community, and they need to establish a team and effectively facilitate it to effectively implement the penalties and fines charged on people who use water illegally. The Kampala water procurement department needs to work hand in hand with UNBS to make sure that meters that are imported and those manufactured in Uganda meet the required standards, and they need to hire qualified technicians to help fix those cases of undersized and oversized water meters. It was also recommended that the Kampala non-revenue water department needs to install a system in the water pipes that detects and reports water pipe leakages and bursts in time and also empower the community members so that they have the capacity to detect and report water pipe leakages and bursts to NWSC Kampala offices.

CHAPTER ONE: INTRODUCTION

1.0 Introduction

The aim of this study was to investigate the non-revenue water levels in the water service delivery in Kampala water and to examine the management practices being adopted to manage non-revenue water in Kampala and then to come out with some recommendations that would help in the reduction of non-revenue water. In this chapter, the following were presented: the background to the study, purpose of the study, statement of the problem, scope of the study, significance to the study, and conceptual framework.

1.1 Background to the study

This background was divided into the historical background, the theoretical background, the conceptual background, and the contextual perspective as illustrated herein.

1.1.1 Historical background

One of the main sectors of the world's economy is the supply of water, which is necessary for sustaining life and livelihoods. A large amount of the estimated US$500 billion annual turnover of the sector is produced by sewerage and water utilities in developing nations (Global Water Intelligence, 2009). Improving access and raising service quality were made possible by improving the financial and operational health of these utilities. Superior financial performance is required everywhere, not only in emerging nations. Urban sewage and water utilities are being pushed harder than ever to deliver. During the last decade, the Millennium Development Goals for sanitation and water supply have served as a major driving force in the sector. Amidst rapidly growing urban populations, the median supply of water coverage increased from 81 percent in 2000 to 91 percent in 2008 between the years 2000 and 2007. However, good numbers conceal some astonishing inconsistencies (Berg &

Denilenko, 2011). Although progress has been made toward the Millennium Development Goal (MDG) goal in the context of world-wide availability of safe drinking water, 780 million people still lack this basic human right. Sub-Saharan Africans only have cleaner water supply sources available to 61% of the population. Due to the strain that growth in urbanization puts on existing facilities, systems are unable to invest in, create, or sustain them properly, and as a result, people lack sufficient services (World Bank, 2012).

In Africa, population has increased approximately by 2.5 percent per year over the last ten years, with the town and slum community's inhabitants increasing at a pace that is almost twice as fast (World Bank, 2010). An estimated 3.4 million cubic meters of water go wasted every day in Africa, costing an estimated $600 billion in revenues annually, severely influencing the financial health of utility companies. According to a World Bank study, physical water losses globally are projected to be 32 billion cubic meters yearly, with 50% of those losses occurring in countries that are developing. Water utilities are burdened by the significant financial expenditures of purifying and distributing water only to have it seep back into the earth and the missed sales opportunities for that water. Financial performance is an operational marker leading to the long-term viability question of utilities, making it an important metric that makes it easier to assess the effectiveness of business activities by the utilities (Halcrow, 2012). If water loss in less developed nations could be cut in half, the water saved could be sufficient to hydrate about 90 million people. The hardest obstacle to attaining the MDG goals for water and sanitation is the African continent. The degree of increase in urban water supply coverage must be doubled, and that of sanitation coverage must be tripled in order to meet the MDGs. Sub-Saharan Africa, according to recent estimates, would only attain the Millennium Development Goal (MDG) objectives for water

supply services by 2040 and those related to sanitation by 2076 if current conditions continue (UNDP, 2006).

In Kenya government is cognizant that in order for the nation to fulfill its plans for reducing poverty and achieving the MDGs, water must be made available, accessible, and low-cost, notably for the underprivileged. This is done in light of the truth that all eight of the MDGs have some connection, either through direct or indirect access to water. The Kenyan water industry has been plagued for years by inefficiency, the absence of investments, weak leadership, and an overwhelming number of organizational and legal regulations. In addition, companies are under more strain to provide service to untapped areas due to the rapid growth of Kenya's urban centers. The Kenyan Government implemented enormous changes in the water industry to streamline and enhance sector financial performance in response to these issues and in line with a global trend (Kiptala, Jared , & Tanui , 2019).

National Water and Sewerage Corporation (NWSC), like all infrastructure businesses in Uganda at the time of political unrest of the 1970s and 1980s, suffered a significant decrease. The majority of the assets had deteriorated, and the level of service was drastically diminished. The firm changed from being a successful organization with investment capital in the early 1970s to having outdated water and sewage infrastructure in the 1980s. At the time, NWSC had substantial accounts receivable arrears of UGX 30 billion, or around 14 months' worth of debt age. The company employed a costly, ineffective workforce that lacked performance rewards. Like most public sector companies, its operations were strangled by bureaucracy, high management hierarchies, and a disgruntled workforce. Due to a lack of an external customer survey system and ineffective billing and collection

practices, customer orientation was poor, and the running monthly financial deficit was approximately UGX 348 million, according to NWSC (2010).

In 1998, the government of Uganda and the corporation decided to reform the way water sector services are provided and managed in order to improve performance and reduce costs while maintaining the government's commitment to sustainability and equitable development. In 1997, the World Bank, the International Development Association (IDA), and other donors launched a reform program to improve water and sanitation services by decoupling or separating investment ownership from system operations, as well as the commercialization of delivery of service via public-private partnerships (Muhairwe, 2009). The goal of these reform efforts was to realize efficient and environmentally friendly water operations as well as enhance sector investment and service coverage in the sector, thereby reducing the financial burden on the government (Muhairwe, 2007).

Despite all these, the corporation has continued to experience inefficiencies in its financial performance, which has made its performance vulnerable (Muhairwe & Lutaaya 2005). Therefore, the goal of this study is to establish the effect of non-revenue water management on the financial performance of Kampala Water.

1.1.2 Theoretical Background

Inasmuch as several theories like transparent water management theory and game theory, among others, have been advanced to explain water losses, this study was guided by international water balance theory, which was designed by Lambert and Hirner (2000) of the International Water Association's (IWA) water loss task force.

To resolve the problem of non-revenue water in the water management sector, an in-depth understanding of the reasons and factors that determine water loss is required. As a result, one will be able to devise strategies for dealing with each factor (Farley & Liemberger, 2005). The water balance theory determines the elements of non-revenue water by using an average annual water balance template developed by International Water Balance, which provides the volume of water produced, sold, or lost (Lambert & Hirner, 2000). The annual computation of the water balance is a guide that provides information indicating what amount is lost as leakage from real losses. Butler and Memon (2006) opined that service reservoirs and water mains with leaks, bursts, and overflows up to the point of client water meters are real losses, while apparent losses include water theft, illegal water use, meter reading errors, and corrupt meter readers (USAID, 2010).

According to IWA (2003), water loss includes both real and apparent losses. The water loss metrics demonstrate the magnitude of effectiveness of management of the water distribution network (Butler & Memon, 2006). Therefore, to be capable of putting in place an effective reduction and management of non-revenue water, issues of technological, operational, organizational, planning, budgetary, and administrative challenges must be addressed in a coordinated manner, as cited in Butler & Memon (2006).

The water balance theory is important to utility managers because it assesses the state of trends in a region's water resource availability over a given time period, and its estimates assist utilities in strengthening water management decisions by assessing and improving non-revenue water reduction strategies (NWC, 2005).

1.1.3 Conceptual Background

The study had two main variables: non-revenue water management (independent) and financial performance (dependent variable).

Financial performance (dependent variable) refers to a company's financial state or standing over a particular time period, which encompasses the collecting and utilization of funds as assessed by several metrics such as capital adequacy ratio, liquidity, leverage, solvency, and profitability; it is thus the company's capability of controlling and managing its resources (Matar & Bilal, 2018). Kampala Water's financial performance was evaluated based on sales growth, billing, non-revenue water, and revenue collections. In this case, sales refer to the water generated or produced and sold. Billing refers to the revenue or finances realized after selling the water, and collections refer to the monies collected from the sale of the water.

Non-revenue water is the difference between system input volume and billed authorized consumption. Management of NRW was divided into the following sub-variables: (IWA, I. W. (2016)

Illegal use control, unauthorized connections to the water network, and meter manipulation are just two examples of the many different types of illegal use control (UN Habitat & NWSC, 2012). Unauthorized water use mostly includes theft of water, meter bypassing, unauthorized connections, and improper use of fire hydrants (Lambert A., 2002).

Meter management: Water meters are prone to wear and tear like any mechanical instruments; therefore, with time, they lose accuracy (Brinkley & Ilemobade, 2020). As a consequence of the meters being frequently installed directly in the ground, damage from

usage can also be associated with environmental conditions such as changes in quality of water, heat or cold, and in some locations, soil conditions. Other problems in flow measurement could arise from shoddy meter installation, improper repairs, or a lack of frequent checks for tampering. Negligence and corruption can sometimes be used to readily introduce faults (Liemberger & Rudolf, 2010).

Response rate to leaks and bursts: Depending on passive observation, the down awareness time is transcribing into the loss of more water. Rapid leak detection and maintenance are crucial steps in any water delivery company's effort to reduce NRW. This is due to the fact that leaks inevitably occur. Therefore, it is crucial to have a team of employees that are entirely committed to addressing leaks (UN Habitat & NWSC, 2012). These management strategies were assumed to have positive or negative impact on the financial performance of Kampala Water.

1.1.4 Contextual Background

Financial performance is one of the fundamental functions performed by all organizations. Financial performance, according to Verma (2022), is the degree of success of a firm stated in terms of total earnings and losses over a given time period. Despite significant improvements in service delivery to clients, Kampala Water still faces a number of challenges in meeting customer needs due to liquidity, billing efficiency, revenue collection, cost reduction, and non-revenue water.

According to USAID (2018), Uganda's non-revenue water stands at 33%, while NRW in the Kampala Water Area is 43.7%, which contributes to the largest number of losses in the National Water and Sewerage Corporation (NWSC, Herald, 2022). Furthermore, the area's

target for water sales in FY 2019/20 was 24.698 million cubic units of water, but actual sales were 20.517 million cubic units of water, representing a 27% shortfall. The same FY board approved a reduction in NRW to 34.0%, but actual performance was 37.9%. Total actual billing was UGX 64.017 billion against UGX 80.238 billion targets, representing a 17% shortfall among others according to the financial report (NWSC, 2020).

A report carried out by water.org indicates that there have been population shifts from rural communities to informal settlements around urban centers, straining sewage systems and water. UBOS posits that 11 million Ugandans live without access to clean water. The Technological Enabled Universal Access to Safe Water Technology (2007) found that the scarcity of drinkable water was actually caused by the utility companies' inability to satisfy the demands of the expanding population rather than a lack of water resources.

As a result, the most important factor to recognize in all of these challenges is that the National Water and Sewerage Corporation lacks the economic resources in terms of finance to build the necessary infrastructure for supply to satisfy demand. This necessitates the implementation of critical water loss management strategies in order to strengthen its financial position and continue to provide clean and safe water to its citizens. Therefore, the goal of this study was to establish how Kampala Water's financial performance was impacted by non-revenue water management (TECHNEAU, 2007).

1.2 Statement of the Problem

To guarantee that government agencies' financial performance is efficient, management should support and encourage structural changes that promote internal management reforms in these organizations. Baker (2008) contends that formal management policies and

procedures, function segregation, managerial autonomy, accountability, and customer orientation are all necessary for agency work processes to function properly. Kampala Water, like many other government agencies, has begun to improve its financial performance through initiatives such as SCAP 100, Customer Reconnect, and House to House, among others. Despite all of these reforms and strategies, the corporation's financial performance continues to deteriorate. According to the Managing Director, Kampala Water's NRW is 43.7%, contributing to the corporation's highest number of losses, NWSC Herald (2022), along with insufficient billing efficiency and revenue collection, thus contributing to Kampala Water's inefficient financial performance. NRW in the Kampala area was reported at 39.1% in FY 2016-17, 39.5% in FY 2019-20, and 42.2% in FY 2020-21 (NWSC, Corporate Plan, 2021-2024). According to an analysis of the average tariff for FY 2016-17, this translates into financial losses of approximately UGX 77.5 billion. Despite the corporation's increasing turnover over the years, unpaid arrears increased to UGX 93 billion in the 2019/20 fiscal year. Kampala Water, on the other hand, has consistently failed to meet its set billing targets of UGX 30 billion for FY 2021/22. Revenue collection felt short by 3% in financial years 2019-20 and 2020-21 against set targets of 100% collection efficiency. It’s against this background that the researcher carried out this study in a bid to establish the effect of non-revenue water management on the financial performance of Kampala Water.

1.3 Purpose of the study

The purpose of the study was to establish how the management of Non-revenue water affects financial performance of Kampala water.

1.3.1 Specific objectives of the study

The study was guided by the following alternative specific objectives;

1. To examine the effect of illegal use control on financial performance of Kampala water.
2. To investigate the effect of meter management on the financial performance of Kampala water.
3. To establish the effect of response rate to leaks and bursts on the financial performance of Kampala water.

1.3.2 Research hypotheses

The study was guided by the following alternative hypotheses;

H_1: Illegal use control has no significant effect on the financial performance of Kampala water.

H_2: Meter management has no significant effect on the financial performance of Kampala Water.

H_3: Response rate to leaks and bursts has no significant effect on the financial performance of Kampala water.

1.4 Scope of the study

1.4.1 Concept scope

The study investigated the effect of non-revenue water management on the financial performance of Kampala water. The study particularly examined illegal use control, meter management and response rate in handling leaks and bursts on the financial performance of Kampala water.

1.4.2 Geographical scope

The study was conducted out in the three Kampala water zones of Eastern, Central and Western. The study area was selected because it harbors a significant number of branches. Three branches were chosen in each zone.

1.4.3 Time scope

The study drew focus on non-revenue water management in Kampala water old branches that had been in existence for 15 years in operation. The year 2019 was considered as a benchmark since it was the period in which non-revenue water went up.

1.5 Significance of the study

This investigation was directly in line with the African Union's Agenda 2063, Aspiration 1 of securing the prosperity of Africa via sustainable development and inclusive growth. It also aligns with SDG 6: "Ensure everyone has access to and participation in sustainable water and sanitation management." In response to that:

i) The findings may assist policy makers in addressing the technical and financial consequences of non-revenue water, hence increasing the proportion of sanitation and water coverage in accordance with Africa Water Vision 2025.

ii) It may motivate the government of Uganda to work on initiatives to reduce NRW as well as to build best practices and policy measures, setting an example for other nations facing comparable NRW management difficulties.

iii) To ensure improved project planning that aims to sustainably minimize water losses in general so that it is possible to deliver consistent water distribution and increase water services to consumers, Kampala Water and NWSC as a whole may learn from this study.

iv) The study's results may close the gap between actual water usage and the water supply's coverage.

v) Finally, this research may advance the body of knowledge on NRW and the methods that may be applied to its sustainable reduction.

1.6 Conceptual framework

Non-revenue water is the variance or difference between the amount of water a utility distributes to the distribution network and the amount billed. NRW is a wastage of money, and water wasted due to leaks is a loss of drinking water resources. Non-revenue water management was conceptualized in to three dimensions of illegal use control, meter management and response rate to leaks and bursts which was hypothesized to have no significant effect on financial performance.

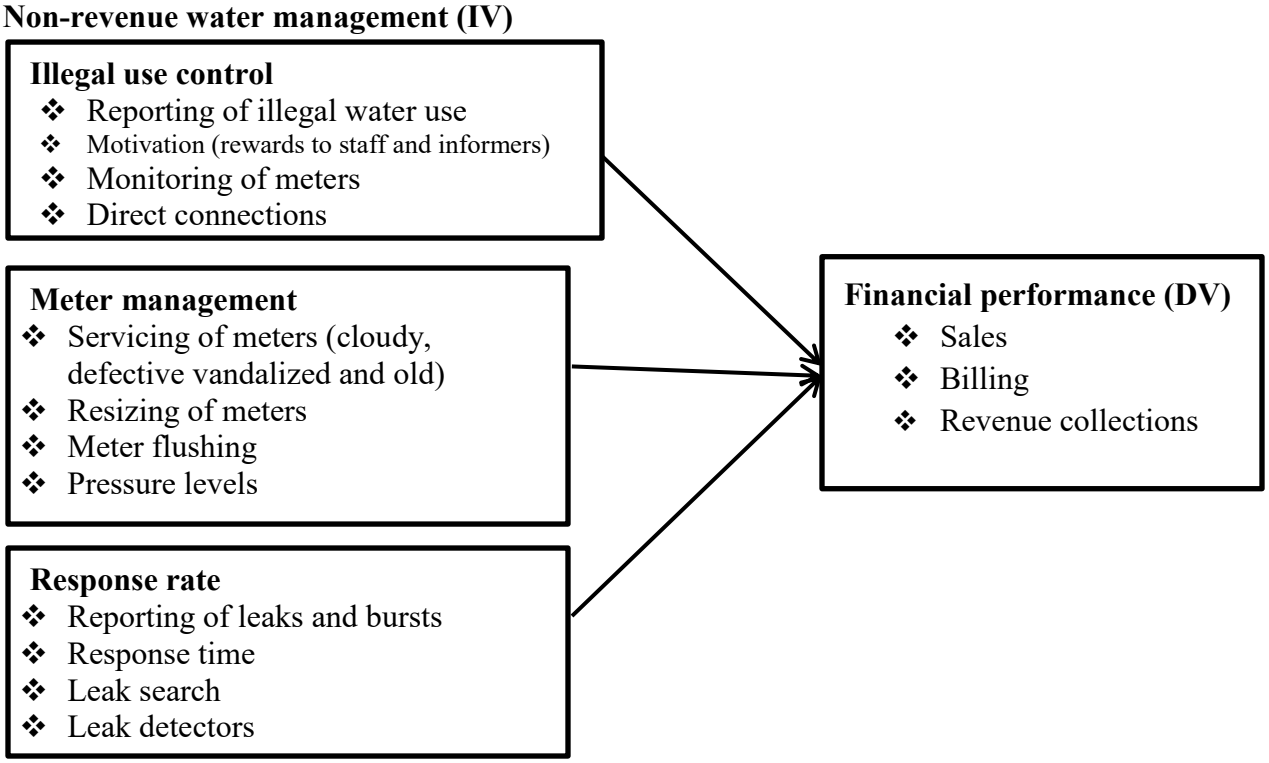

Figure 1.1: Conceptual Framework for Non-revenue Water management and Financial Performance of Kampala Water: Source: Based on Robert, and Jude, 2020

1.7 Chapter Summary

The first chapter provided background information on non-revenue water management and the financial performance of Kampala Water. In addition, the chapter explained the study's particular objectives, the significance, importance, and scope of the study, as well as working definitions of specific terminology used in the study.

CHAPTER TWO: LITERATURE REVIEW

2.0 Introduction

This chapter highlighted the reviewed literature about the study variables obtained from reports, theses, periodicals, journals, books and dissertations.

2.1 Theoretical Review

This section explains the different theoretical perspectives that reinforce the link between non-revenue water management and financial management.

2.2 The water balance theory

The International Water Association's theory of water balance served as the study's foundation. According to this theory, the input volume of a water supply system can be split into two parts: allowed use and water losses. According to the notion, approved consumption can also be classified as billed authorized consumption and authorized but unbilled consumption. A further division of water losses into visible (commercial) losses and actual losses is also suggested by the theory. According to the theory, water that is invoiced for approved use should be revenue water, whereas the total of unbilled approved or authorized use, visible losses, and real losses should be considered non-revenue water, which is the subject of this research study. Its estimates assist utilities in strengthening water management decisions by assessing and improving non-revenue water reduction strategies (NWC, 2005).

System input volume	Authorized consumption	Billed authorized consumption	Billed metered consumption	Revenue water
			Billed unmetered consumption	
		Unbilled authorized consumption	Unbilled metered consumption	Non-revenue water
			Unbilled unmetered consumption	
	Water losses	Apparent losses	Unauthorized consumption	
			Metering inaccuracies	
		Real losses	Leakage on transmission and or distribution mains	
			Utility storage tanks leakage	
			Service connections leakage up to the customer	

Source: Standard International water balance according to Lambert A. (2002) system input volume showing the different ways water is lost by water utilities

System Input Volume is the annual volume input to that part of the water supply system.

Authorized Consumption is the annual volume of metered and non-metered water taken by registered customers, the water supplier, and others who are implicitly or explicitly authorized to do so (e.g. water used in government offices or fire hydrants). It includes exported water and the leaks and overflows after the point of customer metering.

Non-Revenue Water (NRW) is the difference between system input volume and billed authorized consumption. NRW consists of unbilled authorized consumption (usually a minor component of the water balance) and water losses.

Water Losses is the difference between system input volume and authorized consumption. It consists of commercial losses and physical losses

Commercial Losses sometimes referred to as apparent losses; consist of unauthorized consumption and all types of metering inaccuracies

Physical Losses, sometimes referred to as real losses are the annual volumes lost through all types of leaks, bursts and overflows on mains, service reservoirs and service connections, up to the point of customer metering.

2.3 Conceptual review

This section provides a conceptual review of the major study variables as identified in the conceptual framework

2.3.1 Non-revenue water management

Management of water loss solutions have been created in various nations over a long period, since the development of water reticulation networks. However, despite the magnitude of the water loss problem, the notion of water loss control has gotten very little attention in many developing countries. Water management is a top responsibility for all water utility providers due to its global significance. Urban water supply networks are frequently thought to be buried and forgotten. When such leakages come to the surface, something must be done to stop them from continuing to leak. This type of water loss can go undiscovered for a very long time; therefore, the degree of the loss increases with time and may have a detrimental impact on managing and maintaining of the operation of the water supply network. (Mutikanga H. E., 2009).

Non-revenue water is broadly described as the aggregate of all real and apparent losses, as well as any unauthorized unbilled water consumption. Generally, water for firefighting and water for cleansing the main network are included in the approved unbilled usage (Mutikanga et al., 2010b). NRW is typically used as a measure of the effectiveness of water distribution networks. If water losses prevent a utility from realizing all of its income, the utility cannot operate effectively. Kingdom et al. (2006) provide evidence to support this claim, stating that approximately 48 billion cubic meters of water are lost annually, costing water supply utilities roughly 14 billion dollars. Furthermore, they claim that 55% of the global water is lost in poorer nations. As a result, infrastructure and operational effectiveness in developing nations are severely hampered.

In addition, significant water losses in water supply networks represent water resources that are untapped and can be economically recovered. regrettably, these underutilized and

wasteful water have already been cleaned up to drinking water standards and powered to exert pressure enough to reach the users. Losses in water have social and public health implications in addition to economic and environmental ones. Specifically, leakage frequently results in service interruptions and may worsen water quality through pathogen incursion (Karim et al., 2003; Almandoz et al., 2005). When the water pressure outside surpasses the water pressure inside the pipe, the polluted water is able to flow via tiny cracks and holes and enter the piped network.

Given that rural-to-urban migration is on the rise, causing major challenges in terms of food supply, accommodation, water supplies, as well as public health, there is a strong demand for water. WHO (2005) reports that urbanization is more prevalent in developing country's urban regions. Rapid population expansion and growing urbanization raise worldwide water demand, causing finite water supplies to deplete (Rosegrant et al., 2002). Because of these unplanned urban growth, ethical urban planning and development of infrastructure have been badly breached. Furthermore, water distribution system extensions were completed without sufficient assessment, resulting in severe system pressure deficits, system head losses, poor quality water supply network materials and insufficient water supply installation quality workmanship, and unanticipated demand in the future. The issues of rising water demand are worsened by a lack of funding to invest in water infrastructure development, particularly in poor nations. As a result of increased demand for water challenges, a change in perspective is required to use water resources effectively as possible (Baietti et al., 2006). If there is no proper action, finite water supplies will be diminished even quicker in the coming decades as demand for water rises. It is anticipated that total demand for water in nations that are developing will grow by 27% by 2025 in comparison to 1995 demand (Rosegrant et al.,

2002). Africa south of the Sahara is the home to around 23% of the world's population who lack access to clean water resources (UNDP, 2003). Whereas the other part of the world is on course to fulfill the millennium target, Africa, particularly Saharan Africa, is unlikely to accomplish this goal as opined by WHO & UNICEF (2010), which targets to cut in half the proportion of people who do not have sustainable access to clean water for drinking by 2015.

2.3.2 Financial Performance

2.3.2.1 Collection efficiency and collection period

This is a vital performance metric that applies to the utility's capability in collecting revenue from client bills. The more people who receive bills, the more money is collected. The length of time it takes to collect an average bill is known as the collection period. The financial stability of utilities is impacted by long collection times. The goal is complete bill payment (WHO, 2009).

2.4 Empirical review of non-revenue water management constructs

2.4.1 Illegal use control and financial performance

The provision of secure and dependable supply to customers is a major obligation for water utilities. On the other hand, customers also have a duty to make sure that their consumption of water is approved and controlled by a written contract with the utility. Finding out how much water is provided, consumed, and wasted in the supply chain is done through a process called a water check or audit. A number of urban water companies can use this data to make informed O&M and financial choices. In turn, this leads to ineffective operations and fragile finances. Unauthorized water use minimization cannot be handled haphazardly; rather, it should be a key part of a utility's effort to minimize unaccounted usage of water, increase sales, and improve operational effectiveness (UN Habitat & NWSC, 2012).

One of the most significant ideas is that many small urban utilities face a major issue with unauthorized water consumption, which must be controlled if these companies are to become financially viable. Another key takeaway is that unaccounted for water tracking and control should be part of a comprehensive strategy that addresses unlawful water consumption. With all the difficulties they encounter, small urban utilities cannot afford to lose water due to unauthorized connections, meter manipulation, and other illicit water consumption practices (UN Habitat & NWSC, 2012).

Losses in business encompasses all errors related to client metering, processing of data, mistakes (meter reading and invoicing), as well as unlawful consumption (theft or unauthorized use). According to UN Habitat & NWSC (2012), business losses are occasionally referred to as visible losses or non-technical losses. Any illegal use of water is considered unauthorized usage, which might involve illegal connections, by-passing consumption meters, or manipulating with meters. Illegal tapping of water from hydrants (for instance, for building reasons) is another example. Illegal use of water is the term used to describe unrestricted water consumption (UN Habitat & NWSC, 2012). Categories of illegal usage cases according to Butler & Memon (2006) are meter by-pass, illegal connection, illegal reconnection, Fetching water at a point before the meter, meter reversal, and meter tampering.

2.4.2 Meter management and financial performance

Water measurement is a vital component of water distribution systems (WDS) since water revenues account for a large portion of their revenue, and it is hard to efficiently manage a water distribution system without understanding how water is consumed and distributed

throughout the system. However, few utilities have properly installed water metering systems (Zyl, 2011).

Without knowledge of its water supply and flow patterns, a water distributions system (WDS) cannot effectively manage its water resources. Water meters are thus vital tools for tracking how much raw water is extracted from resources like large dams, how much of it is treated before leaving the plant, how much is bought in bulk or sold to other municipalities, how it is circulated within the water distribution network, and finally how much is delivered to individual consumers. Water meter management errors can have a detrimental effect on a utility's revenue. Yet, if water metering is implemented properly, it can boost a utility's net income while enabling personnel to oversee the supply system as efficiently as possible (Zyl, 2011). Real losses (leakage) and apparent losses (commercial) are the two categories used to classify water losses in the supply system. The accuracy of water usage statistics is negatively impacted by apparent losses that result from unlawful use, inaccurate metering, inaccurate meter readings, data handling errors, and billing problems (AWWA, 2009).

By evaluating the functioning of meters and pinpointing the primary reasons of malfunction, non-revenue water stemming from meter errors and ineffective water meter management can be decreased. The metrology of mechanical water meters is now commonly accepted to degrade over time as a result of the wear and tear of the recording components (Arregui et al., 2006b; Male et al., 1985). For newer types of meters in the Department of water in Seattle, Lund (1988) found that failure rates were 1%. Due to Kampala's distinct water system characteristics, the rate of meter failure is around seven times higher than in Seattle. The water distribution system in which meters are connected has a significant impact on their accuracy and rate of failure. According to a study, inconsistent supply makes meters more

likely to stop functioning in underdeveloped nations (Criminisi et al., 2009). According to Butler and Memon (2006), who quote Gokhale (2000), the following are some of the meter issues when supply systems are interrupted; unwanted strain is put on the meter's mechanisms by abrupt changes in flow rates, alternating between drying and soaking meter sections; prolonged efficient performance of meters is negatively impacted by water contact; at the beginning of the supply, air that enters the supply system is driven out through the water meter, which causes meters to run too quickly and increasing the 'wear and tear' of meter components. About 15,000 connections, or 10% of all connections in the Kampala business area, are invoiced directly through submetering. The annual revenue loss to the provider due to sub-metering is roughly calculated at UGX 1.2 billion (Mutiganga 2010). Based on an average yearly usage per service connection of 240 m3 and an average rate (July-June 2010) of UGX 1,800 per m3 (about 5.5 ZAR per m3). According to reports, under-registering of meters takes place when the client's meter only records a portion of the entire volume of water that has gone through it. This implies that the client will only be charged for the amount shown on their meter. Rizzo (2007) claims that the following factors contribute to meter under registration in a water supply utility: inappropriate meter sizing, improper installation techniques, a lack of repair or calibration, and general meter tear and damage. Ranhill (2011) proposes client meter accuracy testing as the answer to this issue, which can be carried out either right away at the customer's premises or at a meter laboratory.

According to USAID (2010), Errors can easily be introduced during the stages of reading meters and billing clients due to negligence, aging, cloudy meters, or even corruption. Meter readers who are incompetent or inept may read the meter incorrectly or make simple mistakes, such as putting a decimal in the wrong place. Meter reading errors can also be

caused by dirty dials, faulty meters, and jammed meters. Meter readers should quickly report any observed inconsistencies, and the team tasked with responsibility of maintenance should take immediate response to resolve the issue. Meter readers may become discouraged and less likely to report anomalies if corrective action is delayed.

These mistakes are addressed by adopting new meter reading and billing systems. Effective meter reader supervision, rotating routes, and field spot audits for example, will help to alleviate these issues. Meter readers are the companies' first point of contact with clients, and their actions have an immediate influence on cash flow. Utilities should invest in capacity building in order to train and motivate their meter readers (UN Habitat & NWSC, 2012).

2.4.3 Response rate and financial performance

Water delivery systems (WDS) are one of the most significant public facilities that offer a critical service to populations, the supply of sufficient quantity, pressure, and quality of water. Most WDS in industrialized nations were built years ago and are now dealing with substantial water losses and frequent pipe breaks, necessitating ongoing maintenance and immediate execution of reconstruction plans. In actuality, the cost of operating and maintaining (O&M) water distribution networks is mostly driven by repairs for pipe bursts. The related costs for O&M and loss of water decrease as soon as a burst is discovered and fixed (Capelo et a, 2021). According to CWWA (2004), there are a number of reasons to make sure that reasonable care is taken when responding to and fixing linear system failures. First off, water is lost when a system fails, so figuring out how much water is lost and swiftly finding it can assist cut losses and save a valuable resource. Water interruptions are typically inevitable when fixing watermain failures, however prompt detection and location of water main faults might assist prevent greater-scale failures. Detecting problems before they

become catastrophic enables system managers to prepare effectively for repair and customer communication. This is because consumers expect and deserve an excellent quality of service. On the other hand, water main breakdowns and water shortages may result in poor customer relations. Every water main break also presents the risk of pollution. A prompt response also helps to safeguard the surroundings and public property. As a result, in 2003, the International Water Association (IWA) developed a concept for managing system water losses and leakage. These four elements form the basis of a standard procedure aimed at ensuring the proper management and operation of a water distribution system. This best practice focuses on the effectiveness and speed of the repair aspect.

It should also be made clear that for the sake of this best execution, "speed" refers to how rapidly one learns about, reacts to, and identifies a water main breakage rather than how fast one performs the actual water main repair. In this, "speed" or responsiveness is discussed. The pace at which linear faults are detected, discovered, and fixed is influenced by three crucial factors. (Capelo et a., 2021). There are three components to this runtime. As described by Farley and Trow (2003), this is: Awareness time, Location time, and Repair time. Each of these temporal components affects how a system operates in terms of leakage control techniques, which in turn affects how much water is lost in the system. One of the key efforts in leakage mitigation management techniques, as stated by Farley and Trow (2003:102), should be to reduce the time it would take for fixing a leak when it is discovered. It is necessary that the associated speed and high caliber of repair be carried out in order to achieve the greatest savings and also to lessen customer annoyances because leak location practices have evolved and progressed so quickly with outcomes that leak awareness and identification times have been significantly reduced (IWA 2003).

2.5 Empirical Literature

A study was conducted by Kiptala et al., (2019) in Kenya to determine the effect of unbilled authorized consumption on the financial performance of Eldoret Water and Sanitation utility, which involved collection of data from 50 staffs, this research focused mainly on the implications of unbilled authorized consumption on financial performance, this study discovered a statistically significant relationship between financial performance and unbilled authorized usage. The financial performance of ELDOWAS is impacted by unbilled authorized consumption, which includes illegal connection, meter bypassing, illegal use of fire hydrants, and inadequate billing systems for collection.

The primary focus of a study on non-revenue water management in Lidgetton, uMgungundlovu District Municipality in KwaZulu-Natal was an assessment of the break - down for NRW aspects (apparent or noticeable losses, real losses, and unbilled authorized consumption) with reverence to Lidgetton Water Scheme's current NRW assessment methods and management policy reforms by uMgungundlovu district municipality. According to the study, top executives must address the problem of developing, embracing, and implementing policies because it continues to be difficult. The municipality does not actively manage NRW in Lidgetton; rather, it is more of a reactionary organization that only responds to complaints made by the locals, their representatives, and municipal staff. The investigator also discovered that no NRW evaluation was performed in the Lidgetton water supply network (Buhlebakle, 2015).

In response to the Brundland Commission (1987), research studies have revealed that non-revenue water has a significant effect on the financial viability of water supply utility companies. The greater the NRW in the water network, the fewer gallons are billed and thus

less money collected, resulting in increased maintenance and operation expenses in producing water to satisfy consumer demand. Water utility viability is critical because only financially sound water providers can ensure the delivery of services that satisfy both present and future demands. Lack of financial viability of water utility companies entails running with loses and long-term cash flow shortfalls which can cause deterioration of infrastructure leading to poor services at all times. Financially sustainable water utilities have greater access to outside financing, such as loans and grants from global financial organizations. Water companies that are financially viable are the most effective and efficient in terms of offering customers with services that meet their desires at the most affordable rate (Frauendorfer and Liemberger 2010).

Mons (2010) conducted research on NRW management strategies in developing nations: a research of a case in Kampala, Uganda. The study's goals were to assess the loss of water phenomenon in Kampala area delivery network, to determine the current global approaches in fighting NRW, to analyze the prevailing 16 approaches for combating NRW in Kampala city, to assess the feasibility of implementing new tactics, including technical challenges and stakeholder motivation, and to make recommendations regarding strategy implementation, effectively minimizing non-revenue water in Kampala. A case study on Kampala's water supply was used as the methodology. The researcher reached a conclusion that the majority of water companies in developing nations have high non-revenue water, owing to deteriorating connections, competing interests, as well as a lack of approaches and culture.

Yeboah (2008) conducted a research on non-revenue water management: a case study of the water delivery or supply in Accra, Ghana, with the study goals being to assess the existing NRW phenomenon in Accra, the management approaches in place to overcome the issue, to

ascertain the magnitude to which NRW has had an impact on overall performance of the Accra water company, and to make recommendations on how to improve current NRW management approaches. The case study methodology was used in the research. It was discovered that management's present approaches for dealing with NRW levels in the network were unbalanced in the sense that all initiatives are presently geared toward solving obvious losses, particularly water theft. The findings additionally indicated that, aside from the loss of earnings that would have generally come to the system by means of direct sales of water, almost all of the system managerial focus has been shifted around the creation of plans and initiatives for the control of NRW, to the near disregard of other similarly critical activities that must be executed out in any water utility for the most effective performance of the system, such as system expansion.

According to (Onsomu et al, (2013) non-revenue water has a direct effect on water utilities' financial standing. The Gusii Water and Sanitation Company Limited case study was utilized by the researchers to examine the connection between non-revenue water and financial viability. The conclusions show that non-revenue water directly affects revenue sufficiency. Furthermore, the researcher discovers that non-revenue water, energy, and staff expenses influence service delivery costs. One could conclude that because non-revenue water affects expenses and earnings, this will significantly affect how profitable water providers can be. According to the study, every 1% increase in non-revenue water diminishes the Gusii utility's financial viability by 19%.

2.6 Summary of literature review

In general, the body of literature on non-revenue water influencing water utility profitability as sampled above has made significant contributions. Yet, there is little acknowledgement of

how water losses affect utility finances. This study aims to fill that void by using a regression analysis to investigate the relationship between non-revenue water management and financial performance.

CHAPTER THREE: METHODOLOGY

3.0 Introduction

This chapter described the methodology used to carry out the study in order to meet the objectives. The data and information from the Kampala water branches was used in the study. These data were then analyzed in the manner described in this section.

3.1 Research Design

According to Spector (2019), the study's design is a particular strategy or procedure that helps the researcher translate the theoretical idea into a workable investigation. The survey was only completed once during the course of the investigation because this study used a cross-sectional survey approach. Studies that are cross-sectional are carried out all at once or for a short time. They are usually conducted to ascertain the frequency of information or data outcomes within a particular group.

Consequently, the design offers an overview of the outcomes and related characteristics at a certain point in time (Levin, 2006). Designing a cross-sectional survey is economical and rapid. A questionnaire was used as a data collection tool to acquire primary information during the survey.

3.2 Study population

According to Banerjee and Chaudhury (2010), the study population includes all people who share specific traits or characteristics and are relevant to the researcher. The study was conducted in three different branches of Kampala water three zones out of 31 branches in Kampala water. The population for this study comprised of staff from different departments namely NRW Department, billing and data management, commercial department, finance

department, Technical and water loss and prevention unit. These departments were selected because they deal in water sales, revenue collection and reduction of non-revenue water. The study targeted a total population of 155 participants (NWSC, 2022).

3.3 Sampling size and composition

A sample size is a collection of some population elements. Each member in the sample is referred to us as a subject. According to Singh and Micah (2014), a sampling technique is a strategy for obtaining a sample of a population in such a way that the sample elements chosen accurately depict the entire population. According to Friesen (2012), the primary purpose of sampling is when a researcher draws a representative sample from a large population (Saunders et al., 2012). Purposive sampling on the other hand was applied where it was necessary to select representatives from a relatively small population. A sample of 101 respondents was selected from a population of 155 basing on the statistics from HR department 2022 to create a sample composition, 50 technical, Finance, commercial, legal and human resource departments were randomly chosen to take part in the study.

Table 3.1: Staff distribution in the five departments of the target population.

S/N	Category of Respondent	Target Population	Sample Size
1	Technical Staff	70	50
2	Finance Staff	15	10
3	Commercial	50	25
4	Legal Department	10	8
5	Human Resource	10	8
Total		155	101

The areas of study were as follows: Kampala eastern zone (KEZ), this zone consists of Mukono, Kireka, Mbalala, Kyaliwajalla, Ntinda, Seeta, Bulindo and Luzira branches. Kampala Western Zone (KWEZ), this zone consists of Bwaise, Luteete, Kyengera, Nansana,

Matugga, Kakiri, Masanafu, Bulenga, Gayaza, Wakiso and Kanyanya. Kampala Central Zone (CEZ) branches where, Nakawa, Salaama, Bunga, Nakawa, Ndejje, Nakulabye, Nateete, Najjanankumbi and City Centre.

3.4 Data sources and methods of collection.

The primary and secondary data were collected by the researcher. Primary data is information provided by respondents Mbabazi (2011) while secondary data are those that were obtained by review of already existing information (Oso & Onen, 2010). Utilizing primary and secondary data provided a comprehensive picture of non-revenue water management on the financial performance of Kampala Water.

3.5 Data Collection Instruments.

3.5.1 Questionnaire.

Five questions with a 5 Likert-type scale were utilized in a closed-ended survey (questionnaire). In response to comments outlining the study's objectives, the Likert-type scale had five options: 1-Strongly disagree (SD), 2-Disagree (D), 3-Neutral (N), 4-Agree (A), and 5-Strongly Agree (SA). Using such a scale enabled respondents to openly express their ideas while both saving time and being convenient. All of the chosen respondents were given the questionnaire. (Levin, 2006)

3.6 Data collection procedure.

After approving research proposal, the investigator sought for an introduction letter from the university allowing him to conduct the study thus making it authentic. Two research assistants were trained in the administration of questionnaires and data collection. The questionnaires were then edited, cleansed, and coded for analysis with SPSS.

3.7 Measurement of Data Variables.

The variables were assessed with items adapted from previous studies that used similar constructs. In the sections that followed, each of the variable with its respective items and sources of the items were presented.

3.8 Quality assurance of data.

Data quality techniques were used to ensure that the data collected is valid and reliable; the tools were tested first to ensure their validity and reliability, as well as the validity of the research instrument.

3.8.1 Reliability of the instrument.

The degree to which the data collection process produces conclusions that are consistent, comparable observations or outcomes to those reached by fellow investigators, or there is honesty in how sense was created from unprocessed data is referred to as reliability (Saunders et al., 2012). This was ensured by using a questionnaire administered by the researcher and research assistants instead of the "drop and collect later" approach. By the researcher administering the questionnaire, it enabled the respondent to have an understanding where they got stuck during data collection process.

Pre-testing by means of piloting was carried out to make sure that the instruments used for research were reliable and that they produced consistent results. This entailed managing the study instruments of ten participants from Kampala water, which was outside the scope of the study (two weeks apart) in order to assess the instruments' reliability. A Pearson product moment equation was used to determine the instrument's reliability by calculating the correlation coefficient across the two sets of outcomes. The calculation yielded a correlation

coefficient (r) of +0.68. Kerlinger (1986) states that a correlation coefficient of not below 0.5 is necessary for the instruments to be used in the research. For the reason the questionnaire was used to conduct the study.

3.8.2 Validity of instruments.

The validity of the findings was concerned with whether they are truly about what they would seem to be about (Saunders et al., 2012). Furthermore, validity was associated with the idea that the study design fully attempts to address the research questions and objectives that the researcher was attempting to answer and achieve. This study used Content validity which shows how reflective the tools on the instrument are in reference to the content calculated (Kathuri & Pals, 1993). The content validity method was used in this study to assess the validity of the instruments that would be used. The instruments were written in simple English that the respondents could easily understand. The instrument's content validity was determined in two stages. After considering the constructs to be measured, the investigator critically examined each tool in the instrument to check if it stipulated accurate description or representation of the needed content and if it was capable of measuring what it was designed to measure. Second, the tool was shown to two research consultants, followed by the supervisor, who assessed the content's relevance and effectiveness, as well as its clarity and instrument's suitability from a research position. They highlighted whether or not every question in the questionnaire would measure what was anticipated of it by ticking or crossing it. The research experts and supervisor's guidance were considered and incorporated into the final instrument.

3.9 Data analysis.

The study data was collected for a period of one month. After data collection, quantitative data was checked for completeness and then analyzed using SPSS to generate descriptive analysis or statistics such as frequencies, means, standard deviations and percentages, to describe the variables. Statistics were mainly used to determine and justify the perceptions of the data reported. The relationships between the independent and dependent variables were analyzed using multiple regression (Kothari , 2004). Statistically, the data was analyzed through the 23rd version of SPSS.

3.10 Ethical Considerations.

According to Nilesh (2013) ethics are rules of conduct that direct research in respect to the rights of individuals who are affected by or the subject of the study. The researcher paid attention to key ethical issues in the study with confidentiality, privacy and voluntary participation of the respondents. The respondents were first asked to give their consent to be part of the study, and this was based on only those who are voluntarily giving their approval to participate in the study. More so, participants' details, particulars and personal information such as names, and contacts were concealed and not included in any data tool to be reported by the researcher. Each of the chosen respondents was called at their workplaces, and the researcher did not note the specifics of any office or responder on the survey to protect their anonymity and privacy.

CHAPTER FOUR: PRESENTATION, ANALYSIS AND INTERPRETATION OF FINDINGS

4.0 Introduction.

This chapter captures the presentation, analyses and interpretation of the study findings. It presents the descriptive statistics in form of frequencies, percentages, means and standard deviations. The study findings are presented and analyzed following the specific research objectives which included examining the effect of illegal use control on financial performance of Kampala Water, the effect of meter management on the financial performance of Kampala Water and the effect of response rate to leaks and bursts on the financial performance of Kampala water.

4.1 Response Rate.

This section presents the number of respondents who managed to respond back and those who failed to respond back as shown in the figure below. (Balkaran & Wyke, 2002).

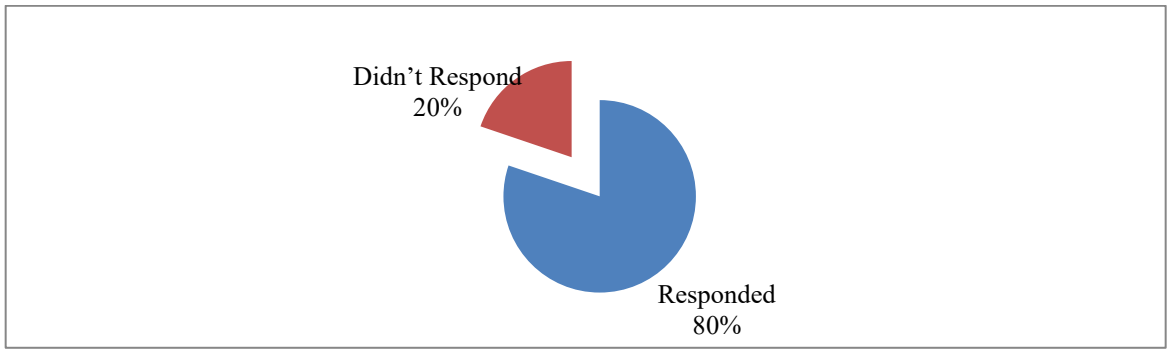

Figure 4.1: Pie chart showing the response rate.

From figure 4.1, it is seen that out of 101 targeted respondents, 81 (80%) of the respondents responded back while 20 (20%) did not respond back. This showed that the response rate was well above the 70% threshold as recommended by the Guttmacher Institute (2006) where it

was asserted that for a study to be considered satisfactory, 70% response rate must be achieved.

4.2 Bio-data of respondents.

The study captured the bio-data information of respondents. This was done to ascertain the nature of respondents in relation to their; gender, age, position, education, and number of years spent working with NWSC. The findings are presented in form of frequencies and percentages as shown in the tables below.

Table 4.1: Gender of respondents.

Category	Frequency	Percent
Male	44	54.3
Female	37	45.7
Total	**81**	**100.0**

Source: Primary data 2022

From table 4.1 above, majority of the respondents 54.3% were male while the remaining 45.7% were female. Despite majority of the respondents being male, the views of female respondents at 45.7% were good enough to capture the gender perspective.

Table 4.2: Age bracket of Respondents.

Category	Frequency	Percent
25-35 years	61	75.3
36-45 years	15	18.5
46-55 years	5	6.2
Total	**81**	**100.0**

Source: Primary data 2022

Results presented in table 4.2 indicated that majority of the respondents 75.3% were below the age of 35years and below as compared to 24.7% who were above 35 years. This could be attributed to the fact that the majority of Uganda's population are of young age below 40

years. Furthermore, the results implied that most of the respondents were still energetic and in their young age, allowing them to perform their duties in National Water and Sewage Corporation effectively.

Table 4.3: Positions held by respondents

Category	Frequency	Percent
Manager	3	3.7
Supervisor	34	42.0
Officer	44	54.3
Total	**81**	**100.0**

Source: Primary data 2022

From table 4.3 results showed that 3.7% were Managers, 42.0% were supervisors and 54.3% were National water officers. The results of study demonstrate that the views of different staff members at different levels of management in NWSC were widely captured in this study.

Table 4.4: Respondents' education level.

Category	Frequency	Percent
Advanced Certificate/Diploma	13	16.0
Bachelor degree	51	63.0
Postgraduate	11	13.6
Maters	6	7.4
Total	**81**	**100.0**

Source: Primary data 2022

In table 4.4 it shows that the majority 63.0% of the respondents had attained a university education degree, followed by 16.0% who had attained an Advanced Certificate/Diploma, 13.6% had attained post graduate diploma while 7.4% had attained master's education. Since majority had a degree, it implied that respondents were largely educated to understand

questions asked and they were in good position to give reliable answers about how the management of non-revenue water had affected the financial performance of Kampala water.

Table 4.5: Number of years spent working NWSC

Category	Frequency	Percent
Less than a year	6	7.4
1-5 years	34	42.0
6-10 years	24	29.6
10 years and above	17	21.0
Total	81	100.0

Source: Primary data 2022

As presented in table 4.5 above, results indicated that 7.4% of the respondents had spent less than a year working with NWSC, 42.0% had spent between 1-5 years, and 29.6% had spent between 6-10 years while 21.0% had spent more than 10 years. Therefore, since the majority of the respondents had spent more than one year working with NWSC - Kampala, it signified that the respondents were in a good position to give reliable information regarding the study objectives. The results implied that the biggest period respondents spend in an organization, the more they get information about the organization's operations hence putting them in a better position to provide reliable information.

4.3 The Effect of non-revenue water management constructs on finance performance of Kampala water

4.3.1 The effect of illegal use control on the financial performance of Kampala water

The first study objective examined the effect of illegal use control on the financial performance of Kampala water. Respondents were instructed to rank their responses basing on Likert scale. Frequencies, Percentages, Means, and Standard deviations were used to interpret the results as presented in table 4.6 below.

Table 4.6: The effect of illegal use control on financial performance of Kampala water

Statement	***SD***		***D***		***N***		***A***		***SA***		***Mean***	***Standard Deviation***
	F	%	F	%	F	%	F	%	F	%		
Kampala water staff report illegal water use	01	1.2	03	3.7	13	16.1	52	64.2	12	14.8	**3.88**	**.748**
Kampala water informers report illegal water use	03	3.7	02	2.5	19	23.5	47	58.0	10	12.4	**3.73**	**.852**
Kampala water has a reward-based system on reporting illegal cases	02	2.5	10	12.4	21	25.9	31	38.3	17	21.0	**3.63**	**1.030**
Reward based system is effective in reporting illegal cases	04	4.9	10	12.4	27	33.3	22	27.2	18	22.2	**3.49**	**1.119**
Motivating staff helps Kampala Water to reduce illegal water use	02	2.5	05	6.2	12	14.8	35	43.2	27	33.3	**3.99**	**.981**
Direct connections help Kampala water reduce illegal water use on suspected accounts	-	-	02	2.5	14	17.3	38	46.9	27	33.3	**4.11**	**.775**
Monitoring of accounts helps Kampala water reduce illegal water use	-	-	03	3.7	05	6.2	40	49.4	33	40.7	**4.27**	**.742**
Clamping of accounts suspected to be using water illegally helps Kampala water reduce illegal water use	01	1.2	02	2.5	10	12.4	42	51.9	28	34.6	**4.11**	**.806**
Penalties and fines imposed on customers who steal water have helped Kampala water reduce illegal water use	01	1.2	11	13.6	24	29.6	33	40.7	12	14.8	**3.54**	**.949**
Penalties and fines imposed on customers who steal water have helped Kampala Water to reduce water loss	02	2.5	07	8.6	22	27.2	42	51.9	08	9.9	**3.58**	**.878**
Relocating of meters from customers suspected to be stealing water helps reduce water loss	01	1.2	04	4.9	15	18.5	42	51.9	19	23.5	**3.91**	**.854**

Source: Primary data 2022

The findings from table 4.6 reveal that 14.8% of the respondents strongly agreed that Kampala water staff report illegal water use, 64.2% agreed, 16.1% remained neutral, 3.7% disagreed and only 1.3% strongly disagreed. With little variance in responses (Std. Dev =.748), a relatively high mean value of (Mean = 3.88) was scored. Similarly, 12.4% of the respondents strongly agreed that Kampala water informers report illegal water use, 58.0% just agreed, 23.5% remained neutral, 2.5% disagreed while 3.7% strongly disagreed with the statement. There was little variance in the responses (Std. Dev =.852) hence scoring a relatively high mean value of (Mean = 3.73). It was revealed that both staff of NWSC Kampala and its informers report illegal water use. This helps NWSC to fine and panelize those who have been using water illegally for it to recover the money for the water used.

The finding from table 4.6 indicate that, 21.0% of the respondents strongly agreed that Kampala water has a reward-based system on reporting illegal cases, 38.3% just agreed, 25.9% remain neutral on the statement, 12.4% disagreed while only 2.5% strongly disagreed. Besides registering a high response variation (Std. Dev =1.030), the statement scored a relatively high mean (Mean = 3.63). This implied NWSC-Kampala water to keep people who report illegal water use and develop a reward-based system for those reporting illegal water use. Relatedly, on the effectiveness of reward system, 22.2% strongly agreed with it, 27.2% agreed, 33.3% chose to remain neutral, 12.4% disagreed and only 4.9% strongly disagreed with the statement. This meant that majority 49.4% concurred with the statement and it was supported by a relatively high mean of (Mean=3.49). Therefore, the results revealed that NWSC-Kampala did not develop a reward-based system but it was also effective in rewarding those who report illegal water use.

Furthermore, results from table 4.6 showed that 33.3 % of the respondents strongly agreed that motivating staff helps Kampala Water to reduce illegal water use, 43.2% agreed, 14.8% remained neutral, 6.2% disagreed, while only 2.5% strongly disagreed with the statement. On top of registering a little variance in the responses (Std. Dev =.981), a relatively high mean value of (Mean = 3.99) was recorded. Therefore, this suggested that staff members are motivated which makes them to work hard to detect and report illegal water use hence reducing institution's water losses through illegal use.

Still from Table 4.6, 33.3% of respondents strongly agreed that direct connections help Kampala water reduce illegal water use on suspected accounts, 46.9% agreed, 17.3% remained neutral, while only 2.5% disagreed with the statement. The statement registered little variance in responses (Std. Dev = .775), which resulted into high mean score of (Mean = 4.11). Relatedly, on top of direct connections, 40.7% of the respondents revealed that there is monitoring of accounts which helps Kampala water reduce illegal water use, 49.4% agreed with it, 6.2% remained neutral while 3.7% disagreed with the statement. The statement registered less variance in response (Std. Dev = .742) and scored a high mean value (Mean=4.27). With majority of the respondents concurring with the two statements, it implied that, illegal water use in Kampala has been reduced because NWSC-Kampala makes direct connections and continuous monitoring of those customers/ accounts that are suspected of be using water illegally.

From table 4.6, 34.6% of the respondents strongly agreed that clamping of accounts suspected to be using water illegally helps Kampala water reduce illegal water use, 51.9% just agreed, 12.4% remained neutral,2.5% disagreed while only 1.2% strongly disagreed with

the statement. Accordingly, the results, indicated that there were few response variability (Std, Dev = .806) and a high mean value (Mean = 4.11) was scored. With majority agreeing with statement, it implied that suspected accounts are people who are speculated to be using water illegally are clamped or closed in order to stop further losses because of people removing meters.

Furthermore, those who use water illegally are penalized and fined, this statement was supported by 14.8% of the respondents who strongly agreed with it, 40.7% just agreed, 29.6% remained neutral but few. 13.6% disagreed while only 1.2% strongly disagreed with the statement. This statement was also supported by a moderate mean value of (Mean=3.54) with little variance in the responses (Std, Dev = .949). Relatedly, 9.9% of the respondents still strongly agreed that the imposed penalties and fines customers who steal water reduces water loss, 51.9% agreed with it, 27.2% remained neutral, 8.6% disagreed with only 2.5% strongly disagreeing with it. Besides registering elements of disagreements, a moderate mean value (Mean=3.58) was registered with little variance in responses (Std, Dev = .878). Therefore, the findings implied that NWSC-Kampala imposes penalties and fines on people who steal water which helps the institution to recover the money for the stolen water hence reducing on the loss made by the institution.

Lastly table 4.6 reveal that, 23.5% of the respondents strongly agreed in the pursuit to reduce water loss, on relocation of meters from customers suspected of stealing water, 51.9% agreed, 18.5% remained neutral, 4.9% disagreed and the remaining 1.2% strongly disagreed with the statement. Results further showed that the findings recorded minimal variance in responses (Std. Dev =.854), hence scoring a high mean value of (Mean = 3.91). This meant that by

relocating the meters, they are put in places or positions where they are easily monitored hence eliminating chances of the customer playing around with meters in pursuit of by-passing or removal of water meters.

4.3.2 The effect of meter management on the financial performance of Kampala water.

The second study objective examined the effect of meter management on the financial performance of Kampala water. Respondents were instructed to rank their responses basing on Likert scale. Frequencies, Percentages, Means, and Standard deviations were used to interpret the results as presented in table 4.7 below.

Table 4.7: The effect of meter management on the financial performance of Kampala water

Statement	***SD***		***D***		***N***		***A***		***SA***		***Mean***	***Standard Deviation***
	F	%	F	%	F	%	F	%	F	%		
Kampala water service defective, aged, vandalized and under registering meters on a monthly basis	01	1.2	01	1.2	06	7.4	41	50.6	32	39.5	**4.26**	**.755**
Kampala water replaces leaking, defective, aged, under registering and vandalized meters on time	06	7.4	22	27.2	18	22.2	24	29.6	11	13.6	**3.15**	**1.184**
Meters that are oversized are resized on time	08	9.9	21	25.9	25	30.9	17	21.0	10	12.4	**2.95**	**1.142**
The meter flushing schedule is prepared every month and followed	07	8.6	17	21.0	22	27.2	30	37.0	05	6.2	**3.00**	**1.064**
The supply department regularly controls pressure levels	07	8.6	09	11.1	27	33.3	31	38.3	07	8.6	**3.33**	**.998**
Servicing defective meters helps Kampala water improve on financial performance	02	2.5	03	3.7	09	11.1	47	58.0	20	24.7	**4.02**	**.795**
Servicing cloudy meters helps Kampala water improve on financial performance	-	-	05	6.2	19	23.5	43	53.1	14	17.3	**3.84**	**.770**
Replacing leaking meters helps Kampala water improve on financial performance	02	2.5	03	3.7	12	14.8	44	54.3	20	24.7	**4.00**	**.832**
Replacing defective meters helps Kampala water improve on financial performance	01	1.2	01	1.2	08	9.9	48	59.3	23	28.4	**4.15**	**.695**
Replacing aged meter helps Kampala water improve on financial performance	-	-	03	3.7	09	11.1	47	58.0	22	27.2	**4.14**	**.655**
Replacing vandalized meters helps Kampala water improve on financial performance	-	-	02	2.5	05	6.2	48	59.3	26	32.1	**4.24**	**.621**

Source: Primary data 2022

From table 4.7, results showed that 39.5% of the respondents strongly agreed that Kampala water service defective, cloudy, aged, vandalized and under registering meters on a monthly basis, 50.6% agreed, 7.4% remained neutral, 1.2% disagreed, and the remaining 1.2% strongly disagreed. Little variance in responses were registered (Std. Dev = .755), and high mean value of (Mean = 4.26) was scored. Relatedly, 13.6% of the respondents strongly agreed that leaking, defective, aged, under registering and vandalized meters are replaced on time, 29.6% agreed with it, 22.2% remained neutral, 27.2% disagreed with it, 7.4% strongly disagreed. Despite registering much variance in responses (Std. Dev = .3.15), a moderate mean value of (Mean=3.15) was recorded. This indicated that on monthly basis Kampala water detects and replaces the aged, defective, vandalized and under registering meters to bring them back to standard and estimate consumption for effective water delivery to the community hence increasing the performance of NSWC – Kampala.

To whether meters that are oversized are resized on time, 12.4% of the respondents strongly agreed with it, 21.0% just agreed, 30.9% remained neutral, 25.9% disagreed with it, while the 9.9% strongly disagreed with it. A significant response variance was registered (Std. Dev =1.142), with a low mean value (Mean = 2.95). Despite a large number of respondents agreeing with statement, majority disagreed. Therefore, this meant that, most of the meters that are overused are not resized on time. This could be attributed to the fact that NWSC-Kampala water does not have modern technology to detect oversized water meters in time.

Still from table 4.7 findings revealed that 6.2% of the respondents strongly agreed that the meter flushing schedule was prepared every month and followed, 37.0% agreed, 27.2% remained neutral, 21.0% disagreed, while 8.6% strongly disagreed with the statement.

Responses varied widely (Std. Dev = 1.064), while the mean value was moderate (Mean = 300). With majority of the respondents remaining indifferent, it implied that majority of the respondents were aware whether the meter flushing schedule was prepared on monthly basis and followed.

On whether the supply department regularly controls pressure levels, 8.6% of the respondents strongly agreed, 38.3% agreed, still 33.3% remained neutral, 11.1% disagreed, and the remaining 8.6% strongly opposed the statement. A minimal variety in responses was registered (Std. Dev = 998) and a relatively high mean value of (Mean = 3.33) was scored. It implied that most the water pressure is regularly leveled. This is done to maintain leveled or equal distribution of water in different areas.

Still from table 4.7 above, whether servicing defective meters helps Kampala water improve on financial performance, 24.7% strongly agreed with it, 58.0% just agreed, 11.1% remained neutral, 3.7% disagreed, and 2.5% strongly disagreed. Responses varied slightly lower (Std. Dev = .796) and high mean score (Mean = 4.02) was registered. Therefore, there is servicing of defective meters where non-function lines are put to function, clogged meters are cleaned hence making water meters' register consumption accurately which has helped Kampala water to improve on financial performance.

Furthermore, 17.3% of the respondents strongly agreed that Servicing cloudy meters helps Kampala water improve on financial performance, 53.1% agreed, 23.5% chose to remain neutral, while 6.2% disagreed with the statement. There was little variance in the responses (Std. Dev = .770), while the mean value was relatively high (Mean = 3.84). This implied that indeed servicing cloudy meters helps Kampala water improve on financial performance. This

is because servicing cloudy meters improves the meter reader's visibility during meter reading this avoids capturing wrong figures or under or over-estimating customers which improves financial performance.

Results in Table 4.7 further revealed that 24.7% of the respondents strongly agreed that replacing leaking meters helps Kampala water improve on financial performance, 54.3% agreed, 14.8% remained neutral, 3.7% disagreed, and the remaining 2.5% strongly opposed the statement. Little variation in responses was registered (Std. Dev = 832) and a high mean value of (Mean = 4.00) was recorded. Relatedly, 28.4% of the respondents strongly agreed that replacing defective helps Kampala water improve on financial performance, 59.3% agreed with it, 9.9% remained neutral, 1.2% disagreed and the remaining 1.2% strongly disagreed. The study registered little variance in the responses (Std. Dev = .695) and a high mean value (Mean=4.15). This implied that replacing leaking and defective meters has been a key factor in improving the financial performance of Kampala water. This is because water losses are reduced and there is increase in water served to the community hence increasing the revenue collections.

Similarly, 27.2% of the respondents strongly agreed that replacing aged meters helps Kampala water improve on financial performance, 58.0% agreed, 11.1% remain neutral, while 3.7% disagreed with the statement. Little variance in the responses (Std. Dev = .655) was registered and mean value was high (Mean = 4.14). Relatedly, from table 4.7, replacing vandalized meters helps Kampala water improve on financial performance, 32.1% of the respondents strongly agreed with it, 59.3% agreed, 6.2% remained neutral while 2.5% just disagreed. With little variation in responses (Std. Dev = .621), a high mean value was

registered (Mean=4.24). With majority of the respondents agreeing with the statements, it implied that that indeed replacing aged and vandalized meters had helped Kampala water improve on financial performance. This is because it increases water served to the customers through efficient meters hence increasing the water sales which impacts positively on revenue collections.

4.3.3 The effect of response rate to leaks and bursts on the financial performance of Kampala water

The third study objective examined the effect of response rate to leaks and bursts on the financial performance of Kampala water. Still, respondents were instructed to rank their responses basing on Likert scale and in the same case Frequencies, Percentages, Means, and Standard deviations were used to interpret the results as presented in table 4.8 below.

Table 4.8: The effect of response rate to leaks and bursts on the financial performance of Kampala water

Statement	***SD***		***D***		***N***		***A***		***SA***		***Mean***	***Standard Deviation***
	F	%	F	%	F	%	F	%	F	%		
Staff report leakages and anomalies on time while in the field	-	-	08	9.9	14	17.3	42	51.9	17	21.0	**3.84**	**.873**
When leakages, bursts and other anomalies are reported in the field, there is quick response in solving these anomalies by the technical team	01	1.2	09	11.1	18	22.2	43	53.1	10	12.4	**3.64**	**.885**
When data errors and other anomalies are reported in the field, there is quick response in solving these anomalies the commercial team	02	2.5	06	7.4	29	35.8	32	39.5	12	14.8	**3.60**	**.880**
Staff and customers use Social media platforms such as WhatsApp and twitter among others in reporting anomalies in real time and giving feedback	-	-	05	6.2	09	11.1	40	49.4	27	33.3	**4.10**	**.831**
There is a leak search team in place which responds on time to reported leaks and bursts	02	2.5	09	11.1	12	14.8	39	48.2	19	23.5	**3.82**	**.965**
Kampala water have leak detection machines and teams which searches for leakages and alerts repair team on time to repair leaks	05	6.3	11	13.6	09	11.1	37	45.7	19	23.5	**3.67**	**1.162**

Source: Primary data 2022

Results from Table 4.8 showed that 21.0% of respondents strongly agreed with the statement that staff report leakages and anomalies on time while in the field, 51.9% just agreed, 17.3% remained neutral, while the remaining 9.9% disagreed with the statement. The result registered a relatively high mean value of (Mean = 3.84) with little variation in responses (Std. Dev =.873). Relatedly, it was revealed that when leakages, bursts and other anomalies are reported in the field, there is quick response in solving these anomalies by the technical team. This was supported by 12.4% of the respondents who strongly agreed with the statement, 53.1% agreed, 22.2% remained neutral, while few 11.1% disagreed and only 1.2% strongly disagreed. Little variation in responses was registered (Std. Dev =.885) with a relatively high mean of (Mean=3.64). With majority concurring with the statements, it implied leakages and anomalies are reported on time hence allowing immediate repairs to be done by technical team hence stopping water losses that would have caused reduction in revenue collections.

Then on when data errors and other anomalies are reported in the field, there is quick response in solving these anomalies by the commercial team 14.8% of the respondents strongly agreed with the statement, 39.5% agreed with it, 35.8% remained neutral, 7.4% disagreed while 2.5% strongly disagreed with it. With little variance in responses (Std. Dev =.880), a relatively high mean value (Mean = 3.60) was registered. This suggested that indeed there is quick response in solving these anomalies by the commercial team whenever data errors and other anomalies are reported in the field. This reduces water losses hence increased revenue collections.

Furthermore, from table 4.8 results indicated that, 33.3% of the respondents strongly agreed that staff and customers use Social media platforms such as WhatsApp and twitter among others in reporting anomalies in real time and giving feedback, 49.7% just agreed, 11.1% remained neutral, while 6.2% disagreed with the statement. The participants' responses subsequently indicated minor variances (Std. Dev =.831), with a high mean value of (Mean = 4.10). This suggested that indeed social media platforms are used by staff and customers to report anomalies in time and giving feedback. This is because most of the people and even institutions have developed social media networks and pages that help them share and receive information in time and at cheaper costs.

Accordingly, results in table 4.8 further revealed that, 23.5% of the respondents strongly agreed that there is a leak search team in place which responds on time to reported leaks and bursts, 48.2% agreed, 14.9% remained neutral, 11.1% disagreed, and the remaining 2.5% strongly disagreed. A low variation in responses was registered (Std. Dev =.965) was attained a relatively high mean value of (Mean =3.92).

Relatedly, from table 4.8 above, on whether Kampala water have leak detection machines and teams which searches for leakages and alerts repair team on time to repair leaks, 23.5% of the respondents strongly agreed with the statement, 45.7% agreed with it, 11.1% remained neutral, 13.6% disagreed, and 6.3% strongly disagreed. Despite registering much variances in responses (Std. Dev =1.162), a relatively high mean value (Mean = 3.67) was registered. With majority respondents concurring with statement, there is real time of reporting leaks and bursts because NWSC has a leak search team in place and leak detection machines.

Therefore, repairs are made in time hence reducing water losses thus increasing water revenue collection.

4.3.4 The financial performance of Kampala water

The study also requested the respondents to rate the financial performance of Kampala water and they were instructed to rank their responses on Likert scale. Frequencies, percentages, means, and standard deviations were used to interpret the results as presented in table 4.9 as presented below.

Table 4.9: The financial performance of Kampala water

Statement	***SD***		***D***		***N***		***A***		***SA***		***Mean***	***Standard Deviation***
	F	%	F	%	F	%	F	%	F	%		
Kampala water has enough capital for investment	01	1.2	05	6.2	30	37.0	31	38.3	14	17.3	**3.64**	**.885**
The liquidity of Kampala water assets has increased	02	2.5	02	2.5	28	34.6	30	37.0	19	23.5	**3.80**	**.877**
The trend in sales has been increasing for the last four years	01	1.2	02	2.5	11	13.6	39	48.1	28	34.6	**4.12**	**.827**
The trend in billing has been increasing for the last four years	-	-	02	2.5	08	9.9	40	49.4	31	38.3	**4.23**	**.729**
The trend in revenue collection has been increasing since the last four years	-	-	02	2.5	10	12.3	41	50.6	28	34.6	**4.20**	**.701**
The trend in arrears have been increasing since the last four years	-	-	08	9.9	27	33.3	31	38.3	14	17.3	**3.69**	**.908**
The collection strategies have enabled the set revenue targets to be met by Kampala water	01	1.2	02	2.5	19	23.5	45	55.6	14	17.3	**3.90**	**.784**
There is improved risk management	-	-	11	13.6	28	34.6	33	40.7	09	11.1	**3.54**	**.895**

Source: Primary data 2022

From table 4.9, The results showed that 17.3% of the respondents strongly agreed that Kampala water has enough capital for investment, 38.3% agreed, 37.0% remained neutral, 6.2% disagreed and 1.2% strongly disagreed with the statement. The findings revealed little variation in responses (Std. Dev =.885), a relatively high mean value of (Mean = 3.64) was scored. With majority concurring with the statement, it indicated that Kampala water has enough capital for investment which is both from water revenue collections and government contribution to the development and operations.

The results from table 4.9 above shows that 23.5% of the respondents strongly agreed that the liquidity of Kampala water assets had increased, 37.0% agreed, 34.6% stayed neutral, 2.5% disagreed and the remaining 2.5% strongly disagreed with it. The responses showed little variance (Std. Dev =.877), and a relatively high mean value high (Mean = 3.80). This implied that indeed there is increase in the liquidity of Kampala water. Therefore, they have the capacity to serve more community members.

On whether the trend in sales has been increasing since the last four years, 34.6% of the respondents strongly agreed with the statement, 48.1% just agreed, 13.6% remained neutral, 2.5% disagreed while 1.2% strongly disagreed with statement. With little differences in the responses (Std. Dev =.827), a high mean value was (Mean = 4.12) was registered. This implied that sales have been increasing since the last four years. This could be linked to the ever-increasing customers served by the NWSC.

Still from table 4.9 above, 38.3% of the respondents strongly agreed that the trend in billing had been increasing since the last four years, 49.4% agreed with the statement, 9.9% remained neutral, and 2.5% disagreed with the statement. The responses showed minimal

variance (Std. Dev =.729), and a high mean value (Mean = 4.23) was observed. This clearly showed that trend in billing has been increasing since the last four years because the level of service delivery has been increasing for all the last four years.

The Results in table 4.9 above further revealed that 34.6% of the respondents strongly agreed that the trend in revenue collection has been increasing since the last four years, 50.6% respondents agreed, 12.3% remained neutral while 2.5% disagreed. There was minimal variance in the responses (Std. Dev =.701), and high mean score (Mean = 4.20) was registered. With majority the respondents concurring with the statement, it clearly showed that the revenue collection has been increasing since in the last four years, the Kampala water coverage and number of clients served had increased.

Still from table 4.9 above, 17.3% of the respondents strongly agreed that the trend in arrears have been increasing since the last four years, 28.3% agreed, 33.3% stayed neutral, while 9.9% disagreed with it. The responses showed little variance (Std. Dev =.908), and a relatively high mean value (Mean = 3.69). This implied that for the last four years some of the clients have not been regularly paying the water bills hence leading to increase in the trends in arrears.

On whether the collection strategies have enabled the set revenue targets to be met by Kampala water, 17.3% of the respondents strongly agreed with the statement, 55.6% agreed, 23.5% remained neutral, 2.5% disagreed while 1.2% strongly agreed with statement. There was little variance in the responses (Std. Dev =.784), and a relatively high mean value was registered (Mean = 3.90). The findings implied that indeed the collection strategies employed by Kampala water have worked since the institution meets its set revenue targets.

Lastly from table 4.9 above, 23.5% strongly agreed that there is improved risk management, 40.7% agreed with it, 34.6% remained neutral, while 13.6% disagreed with the statement. A relatively high mean value of (Mean = 3.91) was registered as a result of minimal response variations (Std. Dev =.894). Therefore, it meant that risk management at Kampala water had improved. This was so because of reduced number of frauds, embezzlement of money and other kinds of loses in the institution.

4.4 Inferential statistics

Correlation analysis and linear regression analysis were adopted to determine the relationship between the study objectives and the predictive potential of non-revenue water management constructs and financial performance variables

4.5 Correlation analysis

To examine the relationship between non-revenue water management and financial performance, a Pearson correlation analysis was generated using SPSS and presented below.

Table 4.10: The illegal use of control on the financial performance of Kampala water

		Illegal use control	**Financial Performance**
Illegal use control	Pearson Correlation	1	.390**
	Sig. (2-tailed)		.000
	N	81	81
Financial Performance	Pearson Correlation	.390**	1
	Sig. (2-tailed)	.000	
	N	81	81
**. Correlation is significant at the 0.01 level (2-tailed).			

Source: Field data, 2022

The results from Table 4.10 revealed that there was a weak but significant and positive relationship between illegal use control and financial performance of Kampala water at (r =

.390**). This implies that a reduction in illegal water use will lead to an improvement in financial performance of Kampala water (UN Habitat & NWSC, 2012). Therefore, for Kampala water to continuously improve their finances, illegal use control mechanisms have to be tightened.

Table 4.11: The meter management on the financial performance of Kampala water.

		Meter Management	**Financial performance**
Meter Management	Pearson Correlation	1	.541**
	Sig. (2-tailed)		.000
	N	81	81
Financial performance	Pearson Correlation	.541**	1
	Sig. (2-tailed)	.000	
	N	81	81
**. Correlation is significant at the 0.01 level (2-tailed).			

Source: Field data, 2022

The results from Table 4.11 above, revealed that meter management and financial performance of Kampala water were significantly and positively related at a moderate coefficient (r =.541**). This indicated that any positive adjustment in the water meter management will lead to increase in the financial performance of Kampala water. This implies that cases of non-revenue water will be eliminated and will keep all the water produced efficiently metered and commissioned for community use. Therefore, water meter management has to be a priority by Kampala water.

Table 4.12:The response rate to leaks and bursts on the financial performance of Kampala water

		Response Rate	Financial Performance
Response Rate	Pearson Correlation	1	.378**
	Sig. (2-tailed)		.001
	N	81	81
Financial Performance	Pearson Correlation	.378**	1
	Sig. (2-tailed)	.001	
	N	81	81
Correlation is significant at the 0.01 level (2-tailed).			

Source: Field data, 2022

From table 4.12 above, results revealed that response rate to leaks and bursts of water pipes and financial performance of NWSC were positively and significantly related at a low rate (r =.378**). Besides scoring a low relationship, since it is significant and positive, this implies that quick response rate to anomalies will lead to an increase in financial performance of Kampala water. Therefore, the faster the leaks and bursts are reported, the higher the financial performance of Kampala water. This is because it will reduce water losses since all the leakages and bursts will be worked on in time.

4.5.1 Regression analysis

A linear regression analysis was used to assess the extent to which management of non-revenue water with its constructs of (Illegal use control, Meter management and Response rate) predicted the financial performance of Kampala water

Table 4.13: Regression analysis

Regression Coefficients					
	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	1.775	.459		3.869	**.000**
Illegal use control	.060	.157	**.049**	.383	**.702**
Meter management	.449	.135	**.470**	3.324	**.001**
Response rate to leaks and bursts	.052	.099	**.064**	.522	**.603**
Model Summary					
R Square	.298				
Adjusted R Square	**.270**				
ANOVA[b]					
F	10.877				
Sig. (P)	**.000[a]**				

Source: Field data, 2022

The results in table 4.13 above, shows that management of non-revenue water with its constructs of (Illegal use control, Meter management and Response rate) combined can influence 27.0% of Kampala water's financial performance (Adjusted R Square = .270). The remaining 73.0% is due to other factors outside this study. According to the results, it was clear that the regression model successfully predicted financial performance. ($F= 10.877$, $P<0.05$) thus, the model shows a goodness of fit.

For the individual constructs of the independent variable, using Beta values only Meter management was significant in predicting the financial performance of Kampala water. Other constructs were found to be insignificant predictors. For Illegal use control, it was an insignificant predictor of Kampala water's financial performance at (Beta =.049, $p>0.05$), this implies that a unit increase in illegal use control leads to .049 increase in Kampala water's financial performance, and a unit decrease in illegal control leads to .049 decrease in Kampala water's financial performance. It was insignificant since it scored a Sig. level of .702 which is greater than 0.05. This is attributed to fact that illegal water use control

mechanisms were not effectively implemented. Therefore, the study accepted the study hypothesis: *Illegal use control has no significant effect on the financial performance of Kampala water*

The results revealed that Meter Management predicts the financial performance of Kampala water at (Beta = .470, $p<0.05$). This means that a unit increase in meter management leads to .470 increase on the Kampala water's financial performance, and a unit decrease in meter management leads to .470 decrease in Kampala water's financial performance. Therefore, the study rejected the study hypothesis: *Meter management has no significant effect on the financial performance of Kampala water.* Lastly, response rate to leaks and bursts of water pipes was also found to be an insignificant predictor of Kampala water's financial performance at (Beta= .064, $p>0.05$). More so, the results implied that a unit increase in response rate leads to .064 increase in Kampala water's financial performance, and a unit decrease in response rate leads to .064 decrease in Kampala water's financial performance. It was insignificant because of scoring a Sig. level of .603 which is greater than 0.05. This is attributed to fact that most times leaks and burst of pipes are not reported in time. Therefore, the study accepted the study hypothesis: *Response rate to leaks and bursts has no significant effect on the financial performance of Kampala water.*

CHAPTER FIVE: SUMMARY OF KEY FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.0 Introduction

The chapter summaries, discusses the study's findings and presented the conclusion, and recommendation. The results were presented in accordance with the order of the objectives, which included examining the effect of illegal use control on financial performance of Kampala water, the effect of meter management on the financial performance of Kampala water and the effect of response rate to leaks and bursts on the financial performance of Kampala water. This chapter also captures areas that require further analysis following the gaps that were identified in this study.

5.1 Summary of key study findings

5.1.1 The effect of illegal use control on financial performance of Kampala water

The study findings revealed that there was a low but significant and positive relationship between illegal use control and financial performance of Kampala water. There was insignificant predictability level of illegal use control to the financial performance of Kampala water but it was positive. This means that positive adjustments in illegal use control will lead to financial performance of Kampala water. With such findings, the study accepted the study hypothesis: *Illegal use control has no significant effect on the financial performance of Kampala water.*

5.1.2 The effect of meter management on the financial performance of Kampala water

The study findings revealed that meter management and financial performance of Kampala water were significantly and positively related. It was found that meter management was the highest predictor of financial performance of Kampala water. Therefore, positive adjustments

in meter management will lead to financial performance of NWSC-Kampala water. Therefore, the study rejected the study hypothesis: *Meter management has no significant effect on the financial performance of Kampala water.*

5.1.3 The effect of response rate to leaks and bursts on the financial performance of Kampala water

The study findings revealed that the response rate to leaks and bursts of water pipes and the financial performance of Kampala water were positively and significantly related at a low rate. Response rate to leaks and bursts of water pipes was also found to be an insignificant predictor of Kampala Water's financial performance. Therefore, the study accepted the study hypothesis: *Response rate to leaks and bursts has no significant effect on the financial performance of Kampala water*.

5.2 Discussion of the study findings

5.2.1 The effect of illegal use control on financial performance of Kampala water

The study findings revealed that despite having a positive relationship, illegal water use control was weakly related to financial performance of Kampala water. NWSC-Kampala was not investing much in controlling illegal use of water and it was found to be an insignificant predictor of financial performance of Kampala water. Therefore, the contribution of controlling illegal water towards financial performance of Kampala water was very minimal. This is because staff and community informers were not reporting cases of illegal water use. Besides, the budget for controlling illegal use of water was inadequate, hence making it hard to reward all the informers reporting illegal use cases. The weak relationship and the insignificant predictability could be linked to the fact that informers were rewarded selectively because Kampala water had no clear reward-based system for informers. Despite

having penalties and fines imposed on customers who steal water, they had not helped Kampala water reduce illegal water use because the penalties and fines were not effectively implemented hence continued illegal use of water and failure to pursue those already fined to pay in Kampala water.

These were in agreement with Farley et al., (2008) and UN Habitat & NWSC (2012) who revealed that community members have continued with the elements of watertheft, meter bypass, unauthorized connections, and improper use of fire hydrants as all examples of unauthorized water consumption. The source of these illicit consumptions can be determined using a proactive strategy based on analysis of questionable billing data trends. A water utility could hire informers (whistleblowers) to reduce illegal water use. In order to discourage illegal water usage, offenders can face harsher penalties. However, these have not worked in Kampala because some of Kampala water staffs are also involved in such ill practices. Additionally, there are a lot of kickbacks, in case the informer lands on someone who uses water illegally, they are most times given some money and the case does not go any further.

Relatedly, USAID (2010) opined that corrupt staffs that are in charge meter reading can have a significant effect on monthly billed usage. A meter reader who traverses the same route over and over may be acquainted with the clients and their monthly bill usage. Meter readers who are corrupt will not be in position to report illegal water use in exchange for money.

5.2.2 The effect of meter management on the financial performance of Kampala water

The study findings revealed that there is significant and positive relationship between meter management and financial performance with the significant predictability level. It meant that positive adjustments in the meter management will significantly increase the financial

performance of Kampala water. This is because Kampala water regularly services defective, aged, vandalized and under registering meters. Servicing of the defective meters helps Kampala water improve on financial performance since leaking, defective, aged and vandalized meters are always replaced. This reduces the amount of water loss since the water used were correctly metered and paid for by the customers.

These results of the study were in agreement with USAID (2010) who revealed that detecting and repairing a physical loss will result in a decrease in Variable maintenance expenses. When a business or commercial loss is identified and corrected, the savings result in an instant boost in revenues and are thus based according to the water sales pricing. For all profitable water utilities, the water sales price is greater than the variable production expense; in some instances, the sales price is three or four times the production expense. A smaller quantity of business loss may have a greater financial value, so commercial losses should be prioritized if increasing financial resources is the goal. When water meters are defective, aged or vandalized, some clients receive less than a twenty - four - hour availability, and supply coverage is less than 100 percent, hence reducing water use and water collection. If boosting water supply is the goal, prioritizing regular servicing of defective, aged, vandalized and under registering meters could allow customers to receive water twenty-four hours a day or connect new clients to the water network hence increasing collections from water use which increases the financial performance.

5.2.3 The effect of response rate to leaks and bursts on the financial performance of Kampala water

The study findings revealed that despite having a positive relationship, the relationship between response rates to water pipe leaks & bursts and the financial performance of

Kampala water was weak. It was found out that Kampala water was not effectively responding to water pipe leakages and bursts. Therefore, the contribution of response rate to leaks and bursts towards financial performance of Kampala water was very minimal since its predictability levels were insignificant. This is because informers were not reporting leakages and anomalies on time while in the field and the few that were reported, were not quickly responded to by the responsible team. Furthermore, NWSC-Kampala water had no strong and adequate leak search team in place to respond on time to reported leaks and bursts and the machines that can be used in searching, detecting and alerts repair leakage teams on time were not in place.

These results concurred with Makaya (2015) who revealed that leakage between the service connection and the client's meter is frequently hard to detect because it is not always detectable, and leakage surveys must be conducted in order to locate these leaks. Because of leakage survey programs' irregular intervention period, these leaks lead to massive physical losses. Utilities frequently used noise detectors to detect and locate leakages; this was not the case with Kampala water. The system pressure, the distance between listening stations, the size and shape of the leak, the pipe material, and the pipe diameter all have an impact on how well these leak detection systems work but all these were not part of the system in Kampala water. As put forward by (Mashford et al., 2011). It is the sole obligation of a water utility to localize and locate leaks. With the expense of excavation, extreme accuracy is required to locate leaks. The many methods of leakage detection come under one of the LLP (Localise, Locate, and Pinpoint) principal categories which NWSC-Kampala water need to put in place.

5.3 Conclusions

In conclusion, the study findings prove that illegal use control is instrumental towards improving financial performance of Kampala water. For instance, monitoring meters, putting meters on direct connection, motivating staff and informers with money who report illegal use is so important in reducing illegal water use by Kampala water. Secondly, the findings proved that meter management constructs such as servicing of defective, cloudy, vandalized, old meters, meter flushing, resizing of meters, controlling pressure levels is important in improving the financial performance of Kampala water. However, some notable gaps in response rate were identified for example informers not reporting leakages and anomalies on time and if reported have no quick response and no strong and adequate leak search team in place to respond on time to reported leaks and bursts. It was also noted that there were no machines that can be used in searching, detecting and alerting repair leakage teams on time which need immediate intervention by the management of Kampala water.

5.4 Recommendations

The following recommendations were put forward;

i) There is need for Finance department of Kampala water to increase the budget of field monitoring to effectively facilitate people who monitor illegal use of water and effectively reward those who report illegal water use cases in the community. Furthermore, NWSC - Kampala need to establish a team and effectively facilitate it to effectively implement the penalties and fines charged on people who use water illegally.

ii) Procurement and compliance department of Kampala water needs to work hand in hand with UNBS to ensure that meters that are imported and those manufactured in

Uganda meet the required standards. This will help to eliminate the cases of under sized or oversized meters. Furthermore, the department needs to hire qualified technicians or train staff to fix those cases of under sized and oversized water meters.

iii) There is need for non-revenue water department of Kampala water to install a system in the water pipes that detects and reports water pipe leakages and bursts in time. Furthermore, non-revenue water department of Kampala water needs to empower the community members so that they have the capacity to detect and report water pipe leakages and bursts to NWSC - Kampala offices.

5.5 Areas for further research

The following areas were put forward for further research in future.

i) This current study on the effect of management of non-revenue water on financial performance was done in the Kampala area therefore; future studies should focus on the same topic focusing on different areas such Masaka, Mbarara, Gulu, Soroti among others.

ii) Most of the areas regarding illegal water use and response to leaks and bursts of water pipes were lacking. Therefore, Kampala water needs to focus on the employee competency and the performance.

iii) Lastly, another study should focus on the management support and productivity of employees at NWSC-Kampala water.

REFERENCES

ADB. (2010). Every drop counts; Learning from Good Practices in Eight Asian Cities. *Asian Development Bank*.

Akhtar, I. (2016). Reasearch in social science: interdisciplinary perspectives.

Alegre , H., Hirnir, W., Baptista, J., & Parena, R. (2006). Performance Indicators for Water Supply Services, IWA Manual Best Practice, first edition, IWA Publishing, London.

Almondoz, J., Enrique , C., Francisco, A., Enrique, C. J., & Ricardo, C. (2005). Leakage assessement through water distribution network simulation. *Journal of water resources planning and management*.

Baker, A. B. (2008). Positive organisational behavour: engaged employees in flourishing organisations. *Journal of organisational behaviour*.

Balkaran, C., & Wyke, G. (2002). Managing water loss: strategies for assessement, reduction and control of NRW - Trinity and Tobago.

Banerjee, A., & Chaudhury, S. (2010). Statistics without tears: Populations and samples. *Industrial psychiatry journal, 19*(1), 60.

Beecher. (2002). Survey of State Agency Water Loss Reporting Practices. . Colorodo USA: AWWA.

Berg, & Denilenko, A. (2011). *Water supply & sanitation performance blue book, the international benchmarking for water & sanitation utilities, World Bank.*

Beuken, R., Lavooij, C., Bosch, A., & Schaap, P. (2006). Low leakage in the Netherlands confirmed. *8Tth annual water systems analysis synposium (WDSA)*.

Brinkley, & Ilemobade, A. A. (2020). *Water meter replacement and its impact on water consumption, utilty revenue and payback periods.* Midrand.

Butler , D., & Memon , F. (2006). *Water Demand Management.* UK.

Capelo M, B. B., Monteiro, L., & Covas, D. (2021, july). Near real time burst and sizing in water distribution systems using artificial neural networks. *Near–Real Time Burst Location and Sizing in Water*.

Carpenter, T., Lambert, A., & Mckenzie, R. (2003). Applying the IWA approach to water loss performance indicators in Australia. *Water science and technology*.

City of Harare. (2011). Harare Municipality:. *Water and Sanitation Infrastructure rehabilitation and replacement project.*

Creswell, J. (2009). Research design: Qualitative,quantitative and mixed approaches. In *Research Design* (p. 23).

De, S., Mashford, J., & Burn, S. (2011). Computer aided leak location and sizing in pipe networks.

E, S. P. (2019). Do not cross me: Optimizing the use of cross-sectional designs. *Journal of business and psychology*, 34(2), 125-137.

EPA. (2010). Control and mitigation of drinking water losses in distribution systems. Washington DC Environmental Protection Agency.

Fantozzi, S., & Fantozzi M. (2008). Practical Application of Economic Intervention in active leakage control., (pp. 14-15). Waitakere Auckland.

Farley , M., & Liemberger. (2005). *Developing a non revenue water reduction strategy.*

Farley , M., Wyeth , G., Ghazali, Z., Istander , A., & Singh, S. (2008). *The managers non revenue water handboo; A guide to understanding water losses.* UK.

Farley, & Trow. (2004, June). Developing a strategy for leakage management in water distribution systems.

Farley, M., & Trow, S. (2003). Losses in Water Distribution Networks: A Practitioner's guideto assessement, monitoring and control.

Furong , F. (2007). *Municipal Water Supply Infrastructure Governance in Canada: Uptake of water conservation technologies in the context of utility restructuring. University of British Columbia.* Columbia.

Girard, M., & Stewart, R. (2007). Implementation of pressure and leakage management strategies on gold coast, Australia: Case study. . *Journal of water resources planning and management*, 133, 210.

Halcrow, i. (2012). *United water retained halcrow to perform Non revenue water study, New Rochelle.*

Herald, Nwsc. (2022, JANUARY 22). FIGHT AGAINST NRW IN KAMPALA. p. 1.

IWA. (2003). New innovative water balance software.

IWA, I. W. (2016). *How can we reduce non revenue water for better water services.* International Water Association.

Kanakoudis, V., & Tsitsifi, S. (2010). Results of an urban water distribution network performance evaluation attempt in Greece. *Urban water channel*.

Karim, M. R., Morteza , A., & Mark, L. (2003). Potential for pathogen intrusion during pressure transients. *Journal American Water Works Association*, 134-146.

Kerlinger, F. N. (1986). *Foundations OF behavioural research.* . New York.

Kingdom, B. L. (2006). *The Challenge of Reducing Non Revenue Water (NRW) in Developing Countries. How the Private Sector Can Help:* .

Kiptala, T. K., Jared , B. B., & Tanui , P. M. (2019). Effect Of Unbilled Authorized Consumption Financial Performance Of Eldoret Water And Sanitation Company. *International Journal of Economics, Commerce and Management*.

Kothari , C. (2004). Research Methodology: Methods and techniques. *New Age International Journal*.

Lambert, A. (2002). *Standard international Water Balance.*

Lambert, A., & Hirner , W. (2000). *Losses from supply system: standard terminology and recommended perfomance measures.*

Levin, A. K. (2006). Study design III: Cross- sectional studied. Evidence-based dentistry, . 7(1), 24-25.

Liemberger, R., & Rudolf, F. (2010). *The issues and challenges of reducing Non-revenue Water.* Asian development bank.

Liemberger, R., Brothers, Lambert, A., A, M., R, S., & Waldron, T. (2007). Water loss performance indicators: Proceedings of IWA specialised conference. Bucharest-Cyprus: IWA London.

Makaya, E. (2015). *Water loss management strategies for developing countries:.*

Marques, & Monteiro. (2003). Application of performance indicators to control losses results from the Portuguese water sector. *Water science and technology*, (pp. 127-133).

Matar. (2011). *Performance Based Contract as a tool for Water Loss Based Contract as a tool for Water Loss Reduction in Water Utilities Case Study: Madaba Governorate.* Unpulished work accessed online from http://www.acwua.org/sites/default/files_acwua_best_practices_conference feras _matar-_final.pdf,.

Matar, A., & Bilal, M. E. (2018). Derterminants of financial performance in industrial firms: Evidence from Jordan. *Asian journal of agricultural extension, economics & sociology*, 2.

Mons, J. (2010). Strategies for non-revenue water management in developing coutries: a case study of Kampala Uganda.

Muhairwe, W. T. (2007). Using internal incentive contracts to improve water utility performance.

Muhairwe, W. T. (2009). *Making Public Enterprises work.* Amazon France: IWA.

Mutikanga, e. a. (2010). Customer Demand profiling on loss reduction, in proceedings of water loss. IWA specialist confrence june 2020. Sao paulo: IWA.

Mutikanga, H., Sharma, S., & Vairavamoorthy, K. (2010b). Assessment of water apparent losses in Urban water systems. *Water and Environment*, 25.

Nilesh, G. (2013). Ethical Consideration in Research. *international journal for research in education*.

NWC. (2005). *Austrailian Water balance.*

NWSC. (2010). *ANNUAL REPORT.*

NWSC. (2011). *ANNUAL REPORT.* KAMPALA.

NWSC. (2020, july). Corporate plan.

NWSC. (2021-2024). *Corporate plan.*

NWSC. (2022). *Herald.*

Ofwat. (2010). Service and Wales and delivery-performance of the water companies.

Onsomu, Bichanga, Munene, & Obonyo. (2013). *Factors influencing the financial viability of water service provider in Kenya: The case of Gusii water and sanitation company limited.* Nairobi.

Saunders, M., Lewis , P., & Thornhill, A. (2012). *Research Methods for Business.* London: Pearson Education limited Harlow England.

Saunders, M., P, L., & A, T. (2012). *Research methods for business students.*

Sekaran, U., & R, B. (2013). *Research Methods for business Chichester: Wiley.*

Shukla, S. (2020). Concept of population sample.

Singh, A., & Micah, M. (2014). Sampling techniques and determination of sample size in applied statistics research. *international journal of commerce and management*.

Spector, E. P. (2019). Do not cross me: Optimizing the use of cross-sectional designs. Journey of business and psychology.

TECHNEAU. (2007, JULY). *Accra case study-stakeholder interviews travel report*. Retrieved november 2, 2022, from http://www.techneau.org/fileadmin/files/News/accra.pdf

Tiltnes, A. (1998). Ability and Willingness to Pay for Water and Sewage Services in two palestinian cities Results from a Household Survey in Nablus and Gaza City.

UN Habitat, & NWSC. (2012). *Reduction of illegal water use - utility management series for small towns.* Kampala.

Understanding water losses. (World bank 2010).

UNDP. (2006). *United Nations Development Programme* .

USAID. (2010). *A guide to understanding water losses.* USAID.

USAID. (2018). *Planning for resilience in east africa through policy, adaptation, research and Economic develoment (PREPARED).*

USAID, United states agency for international development. (2018). *Non revenue water jinja and iganga.*

Verma, E. (2022, November). Financial performance: Understanding the concepts and its areas.

WHO. (2009). *Water safety plan manual.*

World Bank. (2010). *The non revenue water handbook.*

Yeboah, P. A. (2008). *MANAGEMENT OF NON-REVENUE WATER: a case study of water supply in Accra, Ghana.* Accra, Ghana.

Zyl, J. E. (2011). A NEW GUIDE BOOK ON INTEGRATED WATER METER .

APPENDICES

Appendix I: Questionnaire for Respondents

Dear Respondent,

I am **Nyokos Patrick**, pursuing a Degree of Master of Business Administration from Kyambogo University. As a partial requirement for this award, I am undertaking a study on the topic, **"Management of Non-revenue water and financial performance of Kampala water''** As an employee at Kampala water, where this study is being undertaken, please feel at ease to respond to the questions within this questionnaire. Note that none of the responses is wrong, but instead, provide what you feel is the most applicable response. Please tick the level to which you agree with the given statements. The answers provided will be exclusively used for this study purpose, and will be treated with the highest level of utmost confidentiality and anonymity.

Proposed Questionnaire for the study

SECTION A: **Bio data and general information**.

1. What is your gender**?**

a) Male ☐ b) Female ☐

2 Which age category do you belong to?

a) Below 25years ☐ b) 25-35years ☐ c) 36-45 years ☐ d) 46-55years ☐

e) 55years and above ☐

3. What position do you hold?

a) Manager ☐ b) Supervisor ☐ c) Officer ☐

4. What is your level of education (highest attained)?

a) Certificate ☐ b) Advanced certificate/Diploma ☐ c) Bachelor degree ☐

d) Post graduate ☐ e) Masters ☐ f) others (please specify)

……

5. How many years have you served in Kampala water/NWSC?

a) Less than a year ☐ b) 1-5 years ☐ c) 6-10 years ☐

d) 10 years and above ☐

SECTION B: <u>ILLEGAL USE CONTROL</u>

In this section, please put a tick in the space provided to show the degree to which you agree with the statements following the scale below. 1-Strongly Disagree (**SD**), 2-Disagree (D), 3-Neutral **(N**), 4- Agree (**A**), and 5- Strongly Agree (SA)

Statement	**SD**	**D**	**N**	**A**	**SA**
	1	2	3	4	5
Illegal water use control helps Kampala water improve financial performance					
Kampala water staff report illegal water use					
Reporting of illegal water use helps Kampala reduce water losses					
Kampala water have a reward-based system on reporting illegal cases					
Reward based system is effective in reporting illegal cases					
Motivating staff helps Kampala Water to reduce illegal water use					
Direct connections help Kampala water reduce illegal water use on suspected accounts					
Monitoring of accounts helps Kampala water reduce illegal water use					
Clamping of accounts suspected to be using water illegally helps Kampala water reduce illegal water use					
Kampala water informers report illegal water use					
Reporting of illegal water use has helped Kampala water reduce water loss and improve financial performance					

SECTION C: <u>METER MANAGEMENT</u>

Statement	**SD**	**D**	**N**	**A**	**SA**
	1	2	3	4	5
Kampala water service defective, cloudy, aged, vandalized and under registering meters on a monthly basis					
We replace leaking, defective cloudy, aged, under registering and vandalized meters on time					
Meters that are oversized are resized on time					
The meter flushing schedule is prepared every month and followed					
The supply department regularly controls pressure levels					

SECTION D: <u>RESPONSE RATE</u>

Statement	**SD**	**D**	**N**	**A**	**SA**
	1	2	3	4	5
Staff report leakages and anomalies on time while in the field					
When leakages, bursts and other anomalies are reported in the field, there is quick response in solving these anomalies by the technical team					

When leakages, bursts and other anomalies are reported in the field, there is quick response in solving these anomalies the commercial team					
Staff and customers use Social media platforms such as WhatsApp and twitter among others in reporting anomalies in real time and giving feedback					
There is a leak search team in place which responds on time to reported leaks and bursts					
Kampala water have leak detection machines and teams which searches for leakages and alerts repair team on time to repair leaks					

SECTION E: FINANCIAL PERFORMANCE

Statement	**SD**	**D**	**N**	**A**	**SA**
	1	2	3	4	5
Kampala water have enough capital for investment					
The liquidity of Kampala water assets has increased					
The trend in sales has been increasing since the last four years					
The trend in billing has been increasing since the last four years					
The trend in revenue collection has been increasing since the last four years					
The trend in arrears have been increasing since the last four years					
The collection strategies have enabled the set revenue targets to be met by Kampala water					
There is improved risk management					

END

THANK YOU VERY MUCH

Appendix II: Plagiarism Test Results