

**THE EFFECT OF ELECTRONIC PAYMENT SYSTEMS ON REVENUE
COLLECTION OF WATER UTILITIES IN UGANDA: A CASE OF NATIONAL
WATER AND SEWERAGE CORPORATION (NWSC) - KABALE BRANCH**

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MAY 2022

DECLARATION

I, ATUHEIRE GRACE, hereby declare that this is my original work and has not been submitted to any other academic institution for any award.

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DEDICATION

I dedicate this dissertation to Almighty God who gave me life, the idea, courage and power to pursue the study; and my beloved mother, Mrs. Harriet Turyazooka, for nurturing me and granting me the opportunity to grow my career in the business world. I also dedicate it to my brothers and sisters for their encouragement, assistance, financial support and constructive advice and prayers during the entire period of my study. I further dedicate this research to academic scholars willing to conduct further research in similar aspects as we build knowledge for the future.

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LIST OF ABBREVIATIONS

ATM: Electronic Teller Machine

EFT: Electronic Fund Transfer

E-PAYMENT: Electronic Payment

NWSC: National Water and Sewerage Corporation

RDT: Revenue Diversification Theory

TAM: Technology Acceptance Model

LHS: Left hand side

ABSTRACT

The study established the effect of Electronic Payment on Revenue collection of National Water and Sewerage Corporation (NWSC) of Uganda. The specific objectives included: to assess the contribution of e-payment methods; to establish the relationship between electronic water payment systems and revenue collection performance; and, to establish the challenges faced by National Water and Sewerage Corporation staff and customers in revenue collection. The study design was both descriptive and correlational. The study covered staff and clients of NWSC. Primary and secondary data were collected and analyzed with the aid of SPSS. Secondary data on revenue collection from 2011 to 2020 was analyzed. The study found that electronic payment systems do not have a significant contribution on revenue collection. The study found a strong and significant relationship between electronic payment systems and revenue collection but limited by network inconsistencies. Therefore, the study recommended that service providers improve on network connectivity and response time to challenges as they come through, as well as encourage and ease offline receipting in gazetted places in times of unstable network.

CHAPTER ONE

INTRODUCTION

1.1 Introduction

This chapter presents the background to the study, the statement of the problem, purpose, objectives, research questions, and significance, scope, conceptual framework, as well as definitions of key terms used in the study.

1.2 Background to the study

This sub section presents the historical, theoretical, background and contextual background of the study.

1.2.1 Historical Background

In Africa, the payment of water bills had been dominated by the postpaid systems for many years. In order to minimize the risks pertaining to water distribution in low-income settings, water service providers adopted prepaid systems (Hope, Foster, Krolikowski, & Cohen, 2011). The electronic bills payment system was not new system and could be traced way back in Mogale City municipality South Africa that borders western Johannesburg which pioneered electronic water bills payment in 1999. The idea was to increase access to water by low-income people and the ideology was welcomed by low income earners who had challenges of paying bills (Syed, Suhail, & Daimi1, 2016).

The customers of water utility companies were incurring high transaction costs through manual payment of cash while the companies were incurring high operational costs and these were threats to effective and secure revenue collection by the water utility companies. The introduction of electronic payment was therefore a vital invention for better water bill payments and hence improving revenue collection of the companies (Boyle, 2014). This innovation was applauded due to its convenience and it was seen as the most secure method with low cost and better method to enhance revenue collection through reduced costs (Crosio & Gupta, 2016).

Electronic payment increased the convenience of customers in paying their bills and this led to timely payment that eventually boosted the revenue collection of the service providers while reducing the administrative and operational burden of processing bills. The reduction in the cost backed by the convenience of the system strengthens the financial performance of the utility companies (Hope, Foster, Krolkowski, & Cohen, 2011).

The National Water and Sewerage Corporation (NWSC) is a public water utility company that is owned by Government which was established by Decree No. 34 of 1972 with the mandate to improve water and sanitation services in the major urban centers of Uganda (NWSC Annual Report, 2020). To improve on its financial performance, NWSC has undergone tremendous structural changes in its operational and financial improvement and one of them was the adoption of electronic water payment method (NWSC Annual Report, 2020). Electronic water payment (usually referred to as e-payment) is a financial platform for NWSC clients that enables them to have the flexibility of when and how to pay for their water services (Muhairwe, 2011; Ministry of Water and Environment, 2014; NWSC Annual Report, 2020). This reduces the administrative and operational costs that would be incurred in revenue collection which has improved on its revenue collection. Long before the introduction of this system, the corporation operated cash offices at every branch and had to employ personnel to collect money from water users. Therefore, embracing the e-water payment method helped to reduce costs linked to running cash offices and bill collection and reducing the inconveniences of payment for its bills, which has enhanced its revenue collection (Ndaw & Mutono, 2015).

1.2.2 Theoretical Background

This study was underpinned by the Technology Acceptance Model (TAM) and Revenue Diversification Theory (RDT). TAM adopts Theory of Reasoned Action's (TRA) causal links to explain an individual's IT acceptance behaviour which was developed by Davis (1989). This theory highlights two important aspects of computer acceptance which include the users' perception on its use and its ease of use (Igbaria, 1992). This model is theoretical in nature and it elaborated the technological uptake and use by users (Davis, 1989). E-payment technology was based on the assumptions that the user's perception on usefulness and ease of use was independent of the external factors associated with technology uptake (Lu & Gustafson, 2004). The use of electronic payment system was said to be of high efficiency in technology

uptake and this made it a convenient system (Boyle, 2014). It is for the same reason that the users' perception on the use of e-payment and ease of use is believed to have an effect on effectiveness. As a result, the uptake of the new technology was enhanced and the actual use of the system was boosted (Lu & Gustafson, 2004).

On the other hand, the Revenue Diversification Theory (RDT) was invented by Bernelot (2013) and it assumed that revenue diversification usually improved financial performance. Revenue diversification implied an equal balance between various sources of incomes applied in revenue collection of organizations. According to Bernelot (2013), the revenue diversification theory emphasized on whether adoption of a diversified and balanced revenue strategy enhanced financial performance of an organization through reduced revenue volatility. A strategy that was adopted in revenue collection had an effect on revenue collected and this theory assumed that the adoption of commercial and market-oriented revenue collection approaches enhanced the revenue collection performance. For the case of this study, a positive relationship between electronic payment as a new technology uptake and revenue collection was assumed.

1.2.3 Conceptual Background

The implementation of electronic payment is vital in enhancing revenue collection performance of the utility companies (Urumsah, 2015). In this study, it was assumed that revenue collection depends on the electronic payment method used. Hence, revenue collection efficiency was the dependent variable of this study. Revenue collection efficiency was the proportion of total amount collected by a water utility company out of the total amount billed in a given period (Boyle, 2014). Revenue collection efficiency indicates how efficiently the water utility company manages its revenue (Boyle, 2014). It also indicates the extent to which the service consumers are willing to pay for the service. The willingness of service consumers to pay for the service is linked to their satisfaction with the service or available payment systems (Chitonge, 2013). It is therefore assumed that adoption of electronic payment will have an impact on this indicator and this justifies the reason why it has been chosen as a dependent variable.

The electronic payment methods are the independent variables considered in this study. There are various Electronic Payment platforms available for bills payment by customers. There are various ways through which electronic payments can be made and these include Point of Sale

terminal devices, bank services or mobile services (Hope, Foster, Krolikowski, & Cohen, 2011). With electronic payment system, customers can pay the water bills using various methods such as mobile money transfers, bank cash deposits, bank standing orders or electronic Fund Transfer. In addition, these systems enable customers to access information about their accounts and perform transactions comfortably from wherever they are (Wahab, 2012). The choice of the payment system available for the service consumers is said to affect the revenue collection efficiency (Zekos, 2014). Electronic payment system is one of the payment systems that have been associated with comfort, security and convenience in payment of water bills and improving revenue collection performance (Urumsah, 2015).

Furthermore, the researcher reviewed the moderating variables which include customers' knowledge and awareness as well as willingness of customers and ability to pay. It is important to note that studying these variables is important since they affect technological uptake (Altendorf & Schreiber, 2015). Awareness and willingness to take on a new technology plays an important role in promoting the intention to use services and the results also reduce the risk perception, leading to a positive decision on electronic payment system (Lu, Yang, Chau, & Cao, 2011). Therefore, it can be said that awareness and willingness of trust play an active role in consumers' decision to use electronic payment and therefore should be considered as moderating variables. It can be assumed that when consumers are aware and are willing to take up the electronic payment system, it will minimize barriers to its implementation and hence the water utility company can realize its intentions. The above background highlights the need to conduct this study to find out the relationship between electronic payment system and revenue collection of NWSC.

1.2.4 Contextual background

National Water and Sewerage Corporation is a government semi-autonomous body that is mandated to oversee the water and sewerage services in towns of Uganda (NWSC, 2016). Over the past years, NWSC has been going through tremendous changes aimed at improving on its financial performance and adoption of electronic payment system is one of them. NWSC established a fully-fledged Information Technology department and this has helped the organization to utilize ICTs to support a number of business processes including the implementation of an electronic water payment system which is a financial platform that enables

customers to have the flexibility of when and how to pay for their water services (Ndaw & Mutono, 2015).

The corporation initially operated cash offices at every branch and had to employ personnel to collect money from water users. This increased operational costs, increased default rates and reduced revenue collection efficiency (NWSC Annual Report, 2020). In efforts to surmount these challenges, the corporation embarked on plans to phase out cash offices and relinquish non-core services, for example relinquishing the collection of bills to institutions that have the facilities to manage those services. This was meant to reduce on costs associated with physical collection and increase revenue collection efficiency and reduce the inconveniences of payment for its customers (Ndaw & Mutono, 2015).

According to Ndaw & Mutono (2015), adoption of electronic water payment system has helped NWSC to collect payments from 98% of its current customer base. This is because customers have more payment options and points since the participating banks and telecom companies have more branches than the utility countrywide. Despite introduction of the e-payment system, the corporation has continued to face shortfalls in its revenue collections characterized by accumulated arrears and unpaid bills (NWSC Annual Report, 2020). The recent report has revealed a sharp drop in revenue collection of the corporation in 2020 when billed revenue dropped by 78% and collection was as low as 28% (Danilenko, 2020). Increase in unpaid and arrears implies a decrease in revenue collection efficiency. This calls for interventions to understand if the e-payment system has achieved its intended purpose. It is therefore due to the above background that the researcher sought to conduct this study to establish the contribution of different e-payment platforms towards revenue collection efficiency of NWSC.

1.3 Statement of the Problem

In 2011, NWSC adopted the e-water payment system mainly to facilitate and improve payment for water services by customers. Additionally, it was intended to lower the costs that were arising from operations of running cash offices and bill collections and reduce the inconveniences of payment for its customers. This was expected to reduce on the operational costs, improve on payment convenience and hence increase on the revenue collection efficiency (Ndaw & Mutono, 2015). According to the NWSC 2020 Annual Report, NWSC faced a reduction in its revenue collections in form of accumulated arrears and unpaid bills (NWSC Annual Report, 2020). The

report by Danilenko (2020) revealed a sharp drop in revenue collection of the corporation in 2020 when billed revenue dropped by 78% and collection was as low as 28% (Danilenko, 2020). This reduction in billed revenue translates into a reduction in revenue collection efficiency of the corporation. Specific to Kabale branch, out of 2,521,350,231/= billed revenue for the 2020/2021 financial year, only 2,142,946,740 was collected giving revenue collection efficiency of 85%, as compared to 89% collection efficiency for 2019/2020 year. This postulated a 4% decline in the revenue collection efficiency (NWSC Kabale, 2021). More so, there is limited literature on how different e-payment methods affect the revenue efficiency of NWSC. This study was therefore conducted to find out the effect of e-water payment methods on revenue collection efficiency of National water and Sewerage Corporation by assessing how various e-payment methods used by National Water and Sewerage Corporation contribute to revenue collection efficiency and to find out the relationship that exists between e-payment methods and revenue collection efficiency.

1.4 General Objective

The general objective of the study was to establish the effect of Electronic Payment on Revenue collection of National Water and Sewerage Corporation (NWSC) of Uganda.

1.5 Specific objectives

- i. To assess the effect of mobile money transfers on NWSC's revenue collection performance;
- ii. To establish the effect of bank cash deposits on NWSC's revenue collection performance;
- iii. To determine the significance of pay way systems on revenue collection performance;
- iv. To establish the effect of electronic fund transfer on revenue collection performance.

1.6 Research hypotheses

H₀₁: There is no significant effect of mobile money transfers on NWSC's revenue collection performance.

H₀₂: There is no significant effect of Bank cash deposits on NWSCs revenue collection performance.

H₀₃: There is no significant effect of pay way systems on NWSC's revenue collection performance.

H₀₄: There is no significant effect of electronic fund transfer on NWSC's revenue collection performance.

1.7 Scope of the study

This section covers the content scope, geographical scope, and the time scope.

1.7.1 Content Scope

The study focused on E-water payment method and revenue collection of National Water and Sewerage Corporation (NWSC). The study identified various e-payment methods used by National Water and Sewerage Corporation and find out their contribution towards revenue collection. The content also covered the relationship between electronic water payment and revenue collection efficiency as well as the challenges faced by NWSC in revenue collection.

1.7.2 Geographical scope

The study was conducted in National Water and Sewerage Corporation Kabale Branch. NWSC Kabale Branch is located in Kabale district, Plot 32, Nyerere road in South-western Uganda. Kabale District is located between coordinates: 1° 15' 0" S and 30° 0' 0" E in Southwestern Uganda. Kabale District is bordered by Rukungiri District to the North, Rukiga District to the Northeast, the Republic of Rwanda to the East and South, Rubanda District to the West and Kanungu District to the Northwest (Kabale District Report, 2020).

1.7.3 Time Scope

The study considered a period of ten years, that is from 2011 to 2020, because it was between these periods that NWSC implemented the electronic payment methods. This period was adequate for the researcher to acquire information from the relevant literature necessary for proper investigation of the variables of interest.

1.8 Significance of the study

This study provided information of e-water payment methods and the effect on revenue collection of NWSC. The findings of this study would inform the management of NWSC to adopt revenue collection techniques that can enhance their revenue.

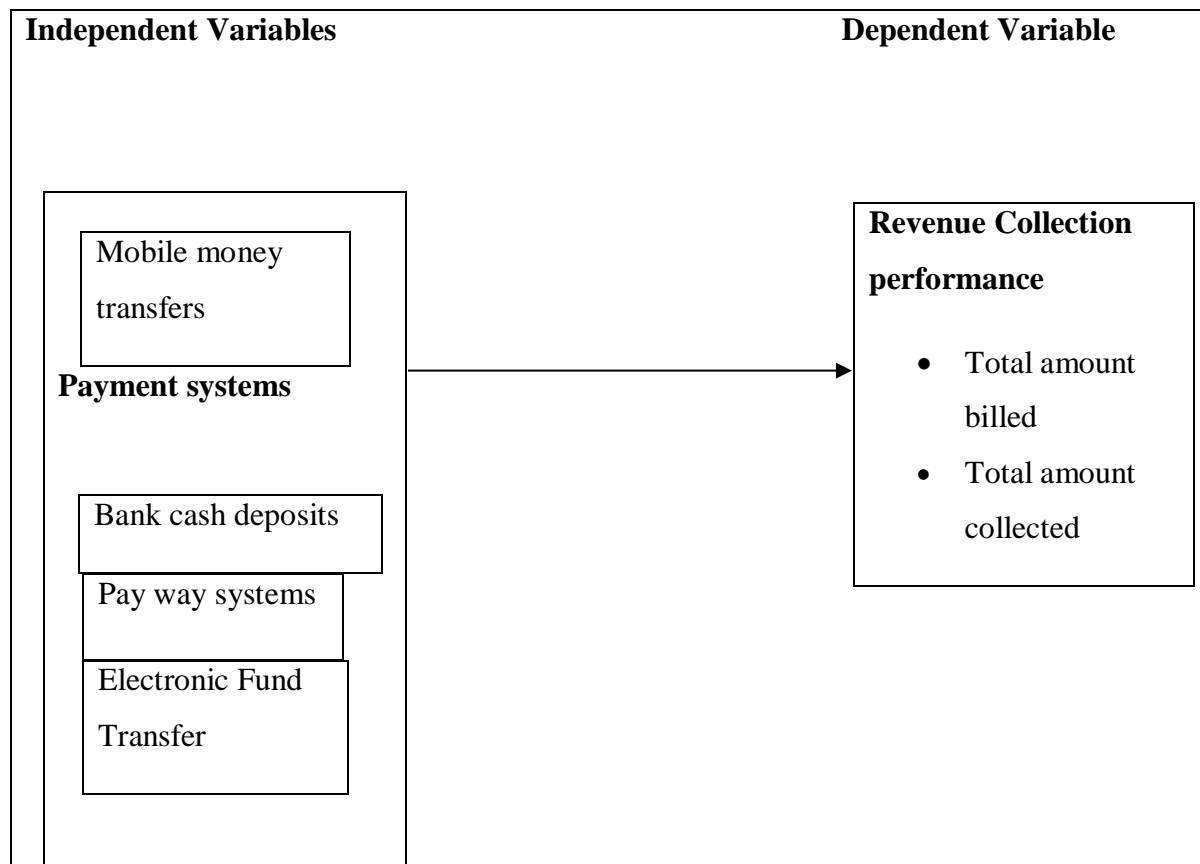
To the policy makers, the findings of this study could be helpful to them by highlighting how electronic payment contributed towards efficiency and effectiveness of revenue collection for their services. This information could also be utilized in revising the existing policies or formulating better strategies and regulatory tools to enhance the water sector performance.

To the scholar and researchers, the findings of the study would add to the existing literature about electronic payment and revenue collection especially in public water utilities.

1.9 Conceptual framework

The relationship of the independent variable (e-water payment methods) was reviewed to establish if there was any relationship between the four methods, that is, mobile money transfers, Bank cash deposits, Payway and electronic fund transfers and revenue collection, and a dependent variable measured by total revenue collected. Technical knowhow of the customers on these electronic payment methods was the moderating variables for this study, as shown in Figure below.

Figure 1.9.1: Conceptual Framework



Source: Adopted basing on information from Boyle (2014); Foster, et al. (2012)

The conceptual framework above relates the dependent variable to the independent variables. The dependent variable of this study is the revenue collection performance. Revenue collection performance is measured by the total amount of revenue collected compared to the total amount billed in a given period (Boyle, 2014).

Electronic payment system is the independent variable of this study. This is measured by the electronic payment methods/platforms available for bills payment by customers such as mobile money transfers, bank cash deposits, payway or electronic Fund Transfer. This study assumes that revenue collection performance depends on the choice of payment methods available for consumers, their convenience, reliability and security.

1.10 Definition of key terms

E-payment System: E-payment system refers to an electronic payment system by means of direct credit, electronic transfer of credit card details or other electronic means contrary to payment by either cheque or cash (Altendorf & Schreiber, 2015).

Revenue: Revenue is referred to as the income obtained from water sales by water to their consumers (Barnes & Corbitt, 2013).

Revenue collection performance: Revenue collection performance is defined as the total amount collected by water utility company compared to the total amount billed in a given period(Boyle, 2014).

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents a review of related literature on electronic payment and revenue collection as presented in textbooks, journals, magazines and newspaper articles. The review is arranged according to the study objectives.

2.2 Theoretical Review

This study was underpinned by the Technology Acceptance Model (TAM) and Revenue Diversification Theory (RDT).

2.2.1 Technology Acceptance Model (TAM)

TAM adopts Theory of Reasoned Action's (TRA) causal links to explain an individual's IT acceptance behaviour, and it was developed by Davis (1989). This theory argues/highlights two important aspects of computer acceptance which include the users' perception on its use and its ease of use (Igbaria, 1992).

This theory is based on the concept of acceptance and it assumes that if people contemplate that embracing the technology will yield positive results, they will easily adopt that technology (Irick, 2008). This implies that this theory is a measure of the attitude of the service consumer towards uptake of new technology from different areas. This implies that this model measures the attitude and behaviour of the consumers in regard to technology uptake (Ahmed & Majid, 2016).

This model is theoretical in nature and it elaborates the technological uptake and use by users (Davis, 1989). E-payment technology is based on the assumptions that the user's perception on usefulness and ease of use is independent of the external factors associated with technology uptake (Lu & Gustafson, 2004). The use of electronic payment system is said to be of high efficiency in technology uptake and this makes it a convenient system (Boyle, 2014). It is for the same reason that the users' perception on the use of e-payment and ease of use is believed to

have an effect on effectiveness. As a result, the uptake of the new technology is enhanced and the actual use of the system is boosted (Lu & Gustafson, 2004).

2.2.2 Revenue Diversification Theory (RDT)

The Revenue Diversification Theory (RDT) was invented by Bernelot (2013) and it assumes that revenue diversification usually improves financial performance. Revenue diversification implies that various sources of income applied in revenue collection of organizations perform equally. According to Bernelot (2013), the revenue diversification theory lays emphasis on whether adoption of a diversified and balanced revenue strategy enhances financial performance of an organization through reduced revenue volatility. A strategy that is adopted in revenue collection will have an effect on revenue collected and this theory assumes that adoption of commercial and market-oriented revenue collection approaches such as electronic payment system will have a positive effect on revenue collection. According to Bernelot (2013), if an organization aims at having continuous revenue, it must embrace various collection sources that can potentially improve on the profit of the organization which will be a measure of improvement in financial performance. Electronic payment is one of the revenue collection methods that have the potential to increase the revenue of the organization (Amankwaa, Asaaga, Fischer, & Awotwe, 2020)

2.3 Electronic payment methods and revenue collection

Electronic payment can be described as a process water utility companies use to collect payments electronically from their clients through systems like the internet, Automated Teller Machines (ATMs) and mobile platforms (Ayo, 2017). From the definition above, it is clear that the two platforms that enable electronic payment include banks and mobile platforms.

2.3.1 Banking platform

Under this platform, the clients are able to pay their water bills using various ways such as electronic fund transfers, bank deposits, ATMs, standing orders among others. There are two categories of electronic bill payments using banking platform, that is, biller-direct and bank-aggregator. Biller-direct category is where the utility organizations provide their clients with the option to pay bills directly on the website of the utility company (Brosio & Gupta, 2016). On the

other hand, bank-aggregator category is where a client has capacity to pay several different bills from their bank accounts (Brosio & Gupta, 2016). These bill payment methods have been facilitated by increasing number of people using banking services across the world (Gbolahan, 2015).

Electronic funds transfer (EFT) refers to the process through which clients pay bills through electronic transfer of money from their bank account to the water utility company's account through computer systems (Ayo, 2017). According to Schlichter (2017), this system is an important and safe means of electronically sending money from an entity to another. Water utility companies have been able to increase revenue collection by making payments convenient for customers through use of electronic bank transfers for their clients who have bank accounts (Koehler, Thomson, & Hope, 2015).

It is evidenced that banking platform offers more convenience to the customers to pay their bills. However, it implies that to benefit from this payment method, you must be having a bank account since transactions are done using bank systems. Therefore, it can be concluded that one the customers are able to access the banking services easily, the use of banking systems in paying their water bills will increase and hence the revenue collection of the water utility companies will be enhanced.

2.3.2 Mobile banking

Mobile banking is another platform that service consumers use to pay for their water bills. This system can be used by those who have bank accounts and those who do not have but use mobile financial services such as mobile money accounts. The use of this payment system has been boosted by the rapid growth in the ownership and use of mobile gadgets such as mobile phones (Foster, et al., 2012). A technological advancement that links the water service delivery and bill payment is the use of mobile money service (Ayo, 2017). This method is applauded for its convenience, security and is associated with low costs. It is also acknowledged to penetrate faster in the areas where services are delivered and hence eases the bills payment for customers in remote areas. This saves the time and costs that would be incurred by the customers such as travel costs (Hellström & Jacobson, 2014). The convenience that is portrayed by this system

gives the customers room to clear their bills in time, and as a result, the service the operational costs of the service providers are reduced and the revenue collection performance is enhanced.

Mobile banking method allows the consumers to perform various transactions at their convenience and can monitor their transaction by checking their account balance from anywhere without any inconveniences (Barnes & Corbitt, 2013). This method is applauded to have curbed the challenge of corruption in bills payment that characterized physical bills payment by the service consumers (Mishra, 2012).

From the above background, it can be seen that inventions in revenue collection, such as the use of mobile payment systems, can improve revenue collection. However, the knowledge in using these systems and ownership of the mobile devices is paramount. Therefore, for effective use of this system, the customers should be having these devices and properly trained on operating them in regard to making their payments.

2.4 Electronic payment systems and revenue collection

In order for the water utility company to enhance its revenue collection performance, it has to adopt the systems that are associated with low costs. This helps them to maintain an effective billing and collection systems which are the vital elements for improving the revenue collection of the company through which its financial visibility is achieved (World Bank, 2013). Therefore, it is important for utility companies to acknowledge how these systems can improve on their efficiency by reducing on their operational costs and hence targeting improvement in their revenue collection efficiency.

An investigation on the revolutionalization of revenue collection with government e-payment gateway system in Tanzania by (Sausi & Mtebe, 2021) found a 44.2% rise in revenue collection and a 27.1% cost reduction between 2015/16 and 2019/20. The study, which was conducted in selected government institutions showed that the implementation of e-payment services does not only promote a rise in revenue collection but increases public trust, transparency and traceability. The findings further revealed a gap between the e-system and the billing systems, which jeopardizes the strength of e-payments in revenue collection.

In Rwanda, (Kamana, 2016) examined the effect of e-filing and e-payment on revenue collection by Rwanda Revenue Authority. The author found that electronic systems resulted in a revenue

collection rise of 48.1% and 42.9% in 2012 and 2013 respectively. While the study was generally conducted on the Revenue Authority, it bears significant importance to NWSC since both entities belong to government.

A related study on the effectiveness of electronic payment system on revenue performance in Kenya's hotel industry by Munyao (2020) shows significant relationships between e-payment benefits and revenue performance, e-payment challenges and revenue performance, and e-payment strategies and revenue performance. While the study shows significant relationships between e-payments and revenue performance, it was based on private institutions. The findings might somewhat differ from NWSC, which is a government entity.

Revenue collection can be boosted in many ways and one of them is through adopting clear revenue collection policies and strategies as well as improving service quality. This will eventually enhance the revenue collection efficiency through improved customers' willingness to pay (Ngotho & Kerongo, 2016). Therefore, adoption of policies that favor the use of more secure, convenient and low-cost payment systems such as electronic payment can boost revenue collection.

A study on electronic payment and revenue collection in local government authorities in Tanzania by Kessy (2019) shows that a positive relationship exists between e-payment and revenue collection. However, the authors observe that poor connectivity, and limited awareness of e-payment services can easily undermine the relevance of e-payment in revenue collection. Mukai and Phiri (2020) investigated the effect of e-services on revenue collection and tax compliance in Zambia. Drawing evidence from small and medium enterprises in urban Zambia, the authors showed that the popularity of use of e-services was dependent on social influence, perception of performance expectations, and effort expectancy. Given the current study, it can be argued that much as e-payments have multiple positive effects on revenue collection, the characteristics of individual business owners have their own place in influencing the adoption of e-payment services.

Previous studies have indicated the relationship that exists between revenue collection performance and the collection systems available to the customers. According to the study by Nuluva (2015), revenue collection is affected by the administrative issues such as corruption,

poor planning, and workers with no experience, among others. Sanga (2015) posited that adoption of technology-based revenue collection systems helps to overcome such challenges, reduces operational and administrative costs, increases monthly revenue returns and increases transparency (Sanga, 2015).

Adopting strategies such as electronic bills payment services could help the water service providers to improve on the payment of bills hence boosting the revenue collection efficiency (Koehler et al., 2015). Much as this system is convenient, it should be noted that for it to be implemented successfully, the use of mobile gadgets should also be boosted in the area. Therefore, increase in mobile payments should be backed by increase in phone penetration among the customers of water utility companies.

A study that was conducted by Amancaya et al. (2020) on the effect of electronic payment on revenue collection of water utilities in Ghana found out that electronic payments reduce collection costs. They demonstrated that the cost of cash collection ranged from 3 to 20 percent of revenue collected and electronic payments reduced collection costs by 57–95 percent, with most of the savings stemming from reduced staff time and vendor commissions. Another study conducted in Tanzania by Krolkowski and Hope (2016) revealed that electronic payments increased revenue and enabled new business models. They demonstrated that revenues increased from 15 to 37 percent for providers who reported data, driven by improved billing, increased efficiency, and a shift to prepaid models enabled by digital payments. A similar study conducted in Arusha, Tanzania examined the contribution of e-payment in enhancing resource mobilization and allocation. The results showed a change in revenue performance in the two tax regimes. The latter regime that involved e-payment showed efficient performance and effectiveness than the former tax systems that were marred with low levels of tax compliance and revenue collections.

From the above empirical studies, it can be clearly seen that electronic water payment has the potential to enhance the revenue collection of water utility companies. Being a technology-based system, it is very vital to ensure that the customers have the knowledge of its operation. It is also to put into consideration the technology penetration of the areas from which these companies operate, the availability of services such as banking and mobile services as well as proximity to these services. These have the potential to influence on the uptake of electronic payment system.

2.5 Challenges faced by water utility companies in revenue collection

Studies on the use of e-payments in revenue collection as adopted in government corporations show that clients seem to lack trust in e-payment services, which affects their interest in them. More so, the importance of security in e-payment is a continuous debate in e-payment literature (Fatonah, Yulandari, & Wibowo, 2018). A study on the issues and challenges of electronic data payment systems by Arachne and Singh (2013) lists theft of payment data, personal data, and fraudulent rejection of customers. Because of the limitations that might be associated to many of these payment methods, clients are left without options but to use those e-payment methods that guarantee some level of security and privacy. Hassan et al. (2020) analyzed 131 articles on electronic payment between 2010 and 2020. The questions of security and the properties needed to comply for secure electronic payments dominated the studies. The results showed that electronic payment systems must offer integrity, authentication, authorization, non-repudiation, and availability to strengthen their security methods. Given the current study, the actual challenges of using electronic payment systems to both clients and customers require investigation. However, studies on water billing systems present the following challenges.

2.5.1 Cost Recovery

According to Ngigi and Macharia (2006), when utility companies adopt poor billing and revenue collection systems, they end up incurring high cost of operation and recovery and hence leading to low revenue collection efficiency. The majority of the water utility companies fail to accurately bill for every unit of water produced, either on account of the lack of any incentives to bill or for other internal factors such as inadequate customer records, inadequate processes and systems or unwilling customers who default on payments because they are dissatisfied with the services they receive (Boyle, 2014). Water utility companies register their success in revenue collection through an increase in billing and collection rates. This eventually leads to an increase in their financial viability and hence an increase in revenue collection (Ngigi & Macharia, 2006). It is therefore important for water utility companies to realize that the importance of the best revenue collection techniques embedded within the electronic bills payment system to improve their revenue collection.

2.5.2 Cost inefficiencies

The cause of cost inefficiency in revenue collection arises from poor billing and collection practices that the utility company adopts. The poor billing and collection practices results in high recovery cost and hence decreasing the collection efficiency (Amankwaa, Asaaga, Fischer, & Awotwe, 2020). The utility companies should therefore allocate enough time and resources on identifying effect of revenue collection systems since failure to do that would result into cost inefficiencies (Boyle, 2014). The utility companies may decide to adopt electronic payment methods which are computerized in nature, but failure to increase their revenue collection efficiency implies wastage in time and resources (Boyle, 2014). It has been reported that utility companies that adopt electronic payment systems have higher chances of improving their revenue collection efficiency due to the fact that it lowers their costs and thus consumes less time and resources (Chitonge, 2013).

2.5.3 Consumer Accountability

Adoption of poor revenue collection practices results into billing inefficiencies which in turn result into incorrect billing errors such as delivery of bills to wrong customers, inaccurate bills, among others. As the errors increase, the customers' willingness to pay also decreases. A decrease in the customers' willingness to pay leads to a decrease in revenue collection efficiency and this greatly affects the financial performance of the utility company (Foster, et al., 2012).

An increase in errors implies that the utility company has to employ more manpower to curb these errors which increase its operational and administrative costs. The errors also increase customers' complaints, an implication of customer dissatisfaction. As a result, the service providers will incur more costs in establishing mechanisms to address these complaints and as the costs increase, the accountability of the company is weakened (Hope, et al., 2011). However, to address such challenges, the water utilities have resorted to technology-based systems that require less manpower. Adoption of systems such as electronic payment has solved challenges related to staffing and operations and hence saving time and resources that would be allocated to these activities. This in turn results in improvement in its financial collection performance (Amankwaa, Asaaga, Fischer, & Awotwe, 2020).

2.6 Literature gap

This chapter has presented the theoretical and empirical review of previous studies that related electronic payment and revenue collection. Most of the reviewed studies provided very useful insights to the present study; however, very few have addressed the revenue collection efficiency being influenced by the payment platforms used. Specifically, various payment mechanisms have been laid down but few studies have tried to elaborate which platforms work better in regard to client convenience and other associated factors such as knowledge and willingness to use. In addition, very few studies have been conducted in Uganda's context to study how electronic payment methods affect the revenue collection of water utility companies. The reviewed studies also presented the challenges faced by water utility companies in revenue collection; however, the challenges that apply in Uganda's context remained unclear. This presented an empirical literature gap that this study sought to bridge.

2.7 Conclusion

This study has presented the theories that are paramount in studying the effect of electronic payment and revenue collection of water utility companies. These include the Technology Acceptance Model (TAM) adopted from Theory of Reasoned Action's (TRA) and Revenue Diversification Theory (RDT). Various empirical studies have also been reviewed basing on the objectives of this study. The gaps that exist in the reviewed literature have also been identified.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the research design, data sources, data collection procedure, data processing and analysis and the empirical models that were used in this study.

3.2 Research Design

A research design is the glue that holds a study together (Cooper & Schindler, 2014). It can be described as a way to achieve the research objectives through empirical evidence that is acquired economically (Chandran, 2004). This study utilized a descriptive survey design and correlational design. This focused on understanding and explaining the effect of electronic payment and revenue collection of NWSC. Quantitative methods were used to help the researcher generate numerical data, which was statistically handled to meet required objectives. Quantitative methods were used to allow greater objectivity and accuracy of results. This enabled generalization of the findings for this study. Qualitative data were collected from NWSC staff through key informant interviews.

3.3 Target Population

A population is described as the total collection of items that a researcher would make inferences about (Cooper & Schindler, 2014). The target population of this study included all the active clients of NWSC from Kabale main branch. By the end of 2019/2020 financial year, the total active clients of NWSC Kabale main branch were 5969 (NWSC Billing system, 2020). It also included all the staff of NWSC from Kabale main branch. The total staff of NWSC Kabale main branch was 38 (NWSC Annual Report, 2020).

3.4 Sampling techniques

This study used systematic sampling technique to sample the clients for the study. All the customers were allocated numbers in ascending order. The sampling interval was determined by

dividing the population size (5969) by the desired sample size (375). The sampling interval for this study was 16. Therefore, with a random starting point, every 16th client was selected until the sample size is achieved. This study used census sampling technique on the staff of NWSC from Kabale main branch in all the departments who were the key informants for this study. This gave the researcher room for interaction and detailed discussion about the subject of the study and the researcher obtained clear and accurate responses to come up with appropriate conclusion based on the study objectives.

3.5 Sample size determination

Sample size was determined based on the formula by (Yamane, 1967);

$$n_r = \frac{N}{1 + N(e)^2}$$

Where;

n_r is the desired sample size,

N is the total number of active clients of NWSC at Kabale main branch, $N=5969$

e is the allowable error, taken as 5%

$$n_r = \frac{5969}{1 + 5969(0.05)^2}$$

$$n_r=375$$

Therefore, a total of 375 clients were considered for this study.

In addition to this, thirty-eight (38) staff of NWSC from different departments were interviewed as key informants. This made a final sample size of 413 respondents.

Table 3.5.1: Sample distribution

Department	Total population	Sample size	Sampling technique
Customers	5969	375	Systematic
Finance	3	3	Census

Commercial	10	10	Census
Technical	18	18	Census
IT	2	2	Census
Audit	1	1	Census
Administration	4	4	Census
Total		413	

3.6 Data types

This study utilized both primary and secondary data. Primary data is the type of data that a researcher collects directly from primary sources in its original form (Mugenda & Mugenda, 2003). On the other hand, secondary data refers to the data that has already been collected through primary sources and is available for researchers to use for their own research. This data was extracted from the NWSC database for the period of consideration.

3.7 Data sources

Primary data was collected the staffs of National Water and Sewerage Corporation at Kabale main branch through the use of questionnaires. According to Das (1993), a questionnaire is the most used technique of data collection. This method was preferred for this study because it was considered to be convenient for the participants and offered utmost confidentiality. This method was used to collect data from the staff of NWSC of Kabale main branch.

On the other hand, secondary data was collected from secondary sources with the help of the desk checking method. Data was extracted from the financial statements and annual reports of NWSC for the period of 10 years, from 2011 to 2020. The data included both the billed revenues and revenues collected for the whole period of consideration from which the revenue collection efficiency computed. The modes of payment used by different clients were extracted from the database.

3.8 Data Quality Control

The researcher pre-tested the research tools to ensure data quality control by carrying out reliability and validity tests aimed at finding out the appropriateness of the data collection instruments

3.8.1 Validity of the Instrument

Validity is the degree to which a result obtained from analysis of the data actually represents the phenomenon under study (Mugenda & Mugenda, 2003). The content and construct validity for this study was evaluated to check if the questions in the research instrument were well formulated and if the questions represented the objectives of the study. The researcher consulted the academic supervisors for guidance. This helped to improve the validity of the data collection instruments.

3.8.2 Reliability

While popular studies that are anchored on scale variable measure reliability using Cronbach's alpha coefficient, the reliability of the secondary data was determined by its source, and the mode of collection, which was automated. The data was collected from authentic sources (NWSC Billing system). Secondly, the data were collected and compiled by a system. These two attributes were the basis of the reliability.

3.9 Data processing and analysis

The panel data extracted from the database were organized and revenue collection efficiency for each year was computed as the proportion of collected revenue as a proportion of total billed revenue. Data analysis was aided by SPSS. The primary data collected from the staff of NWSC were entered into SPSS software and analyzed. Descriptive statistics for the respondents were generated through frequencies and percentages. Correlation coefficient between revenue collection efficiency and electronic payment methods was computed. Logistic regression analysis was used to analyze the effect of each payment method on revenue collection efficiency. The null hypotheses were tested using the significance value approach. The qualitative data

generated through interviews were integrated with quantitative data and themes generated. For emphasis, the verbatim quotes were used in reporting of these results.

3.10 Model specification

This is the approach employed in the event of determining suitable explained variables to be included and excluded from the regression model (George & McCulloch, 1993). In this study, the independent variable was performance measured as efficiency (depending on the company revenues projected and collected) of water payment from the NWSC customers.

Revenue collection efficiency = (Total billed revenue / Total revenue collected) x 100

Revenue collection efficiency was computed for all the years (2011 to 2020).

Revenue collection efficiency is a continuous variable. However, for the suitability of the model specified for this study, efficiency was converted into a categorical variable, (i.e., $\geq 90\%$ “good performance” and **coded** as “1”; $< 90\%$ “bad or poor performance” and coded as “0”). Independent variables for this study included different e-payment methods used by the customers, and were measured on a continuous scale. These were Mobile money, bank cash deposit, pay way and electronic fund transfer. For each year, the revenue collected through each of these methods was collected. Therefore, the independent variables also continuous variables.

Conceptual model

In this study, the Logistic regression model was preferred and used to fit NWSC’s performance via revenue collection. Logistic regression methods are employed to model probabilistic systems in order to predict future events. The choice for this method was that, these models are direct probability models that do not require both the explanatory (independent) and explained (dependent) to have a specified distribution(s), (Vaughan & Ormerod, 2005).

A binary choice of the i^{th} revenue collection is represented by a random variable, y_i that takes on the value of 1 if collection is efficient or good ($\geq 90\%$) and 0 if collection is not efficient, poor or bad ($< 90\%$).

If p is the probability that a binary response (dependent) variable $Y = 1$ when input variable $X = x$, then the logistic response function is modeled as:

$$p = (Y = 1|X = x) = \frac{e^{\beta_1 + \beta_0 x}}{1 + e^{\beta_1 + \beta_0 x}} \dots \text{Eq.3.1}$$

Equation (3.1) represents an S-shaped curve and is non-linear. In this equation, β is the coefficient of the independent variable x used in a regression equation. A simplified version of this function can accommodate multiple independent variables and is linear. It is referred to as a logistic regression function, superior to the logistic response function (Stoltzfus, 2011):

$$p = P(Y = 1|X = x_1, \dots, X_p = x_p) = \frac{e^{\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_p x_p}}{1 + e^{\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_p x_p}} \dots \text{Eq.3.2}$$

Equation (3.2) computes the probability of the dependent variable to be 1, given multiple independent variables. This model is again non-linear, and only transformed into linearity by employing the logit response function. The equation for logistic response function then becomes:

$$\frac{p}{1-p} = e^{\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_p x_p} \dots \text{Eq.3.3}$$

The term $\frac{p}{1-p}$ in Eq 3.3 is the odds ratio of the event. Applying natural logs on either side of Eq 3.3,

$$\log\left(\frac{p}{1-p}\right) = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_p x_p \dots \text{Eq.3.4.}$$

Meanwhile, the L.H.S is a function of x_1, \dots, x_p :

$$g(x_1, \dots, x_p) = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_p x_p \dots \text{Eq.3.5}$$

It is now clear that, Eq. (3.5) is linear and can be used to determine relationships between any variables of interest.

There are five main assumptions for logistic regression:

- The model must fit the nonlinear shaped curve. Logistic regression does not assume a linear relationship between the dependent and independent variables.
- The dependent variable must be a dichotomy, consisting of two categories.
- The independent variables need not be interval, nor normally distributed, nor linearly related, nor of equal variance within each group.

- The categories must be mutually exclusive and exhaustive; a case can only be in one group and every case must be a member of one of the groups.
- Larger samples are needed than for linear regression because maximum likelihood Coefficients are large sample estimates. A minimum of 50 cases per predictor is recommended (Pallant, 2010).

CHAPTER FOUR:

DATA PRESENTATION AND ANALYSIS

4.1 Introduction

This chapter presents the analyzed results of the study. Firstly, background characteristics of the staff of NWSC are presented. Next the background characteristics of NWSC clients are also presented. Again, the contribution of e-payment methods used by NWSC towards revenue collection and application of the logistic regression model in answering the research hypotheses are clearly stated. Lastly, the results of the logistic regression model in answering the research hypotheses are presented. The chapter ends with a summary of results.

4.2 Background characteristics of staff of NWSC

Table 4.2.1: Background characteristics of staff

Variable list	Categories	Counts	Frequency
Gender	Male	7	87.5
	Female	1	12.5
	Total	8	100
Age in complete years	23 – 35	7	87.5
	36 – 45	0	0
	46 – 55	1	12.5
	Over 55	0	0
	Total	8	100
Highest Education level	Diploma	2	25
	Bachelor's degree	4	50
	Master's degree	2	25
	Total	8	100
Working experience	1 – 3 years	2	25
	4 – 6 years	2	25
	7 – 10 years	3	37.5
	Over 10 years	1	12.5
	Total	8	100
Department	IT	1	12.5

Technical	4	50
Finance	1	12.5
Administration	1	12.5
Commercial	1	12.5
Total	8	100

Source: Field data, 2021

The participation indicates that a substantial number of the staff were men (87.5%) and a number of the participants belonged to 23 –35 years’ bracket (87.5%). Degree holders were the majority (50%). Though there were no significant differences in the number of years taken while working at NWSC, the majority of the participants had worked at NWSC for about 7 to 10 years (37.5%). While the study does not show significant differences in participation according to department, the majority of the participants belonged to the technical department (50%).

4.3 Background characteristics of clients of NWSC

The researcher investigated the bio data of the clients of NWSC. The table below summarizes these characteristics.

Table 4.3.1: Background characteristics

Variable list	Categories	Counts	Frequency
Gender	Male	62	68.1
	Female	29	31.8
	Total	91	100
Age in complete years	Below 23	3	3.2
	23 – 35	54	59.3
	36 – 45	20	21.9
	46 – 55	10	10.9
	Over 55	4	4.3
	Total	91	100
Highest Education level	Primary	1	1.1
	Secondary	12	13.1
	Tertiary	18	19.7
	University	43	47.2

	None	3	3.2
	Total	91	100
Marital status	Single	27	29.6
	Married	61	67.0
	Divorced	1	3.2
	Widowed	1	3.2
	Total	91	100
Years with NWSC	Less than 1 year	4	4.3
	1 – 3 years	16	17.5
	4 – 6 years	19	20.8
	7 – 9 years	18	19.7
	10 and above	33	36.2
	Total	91	100
E-payment methods used	Bank deposits	27	29.6
	Mobile transfers	63	69.2
	EFT	1	1.1
	Total	91	100

Source: Field data, 2021

Male clients constituted (68.1%) of the study participants and the majority of the participants belonged to the 23 – 35 years' age bracket (59.3%). In terms of education qualification, most of them had a university degree (47.2%). Most of the participants were married (67.0%). It was established that most of the participants had used NWSC services for 10 years and over (36.2%). Most of the participants pay NWSC bills using mobile transfers (69.2%). The number of years, which participants had used NWSC services were adequate enough to guarantee confidence of the information provided by the clients.

4.4 The contribution of e-payment methods used by NWSC towards revenue collection

The conceptual framework has resulted in four hypotheses that try to explain the effects of different money transaction systems on NWSC's revenue collection performance. To test these hypotheses, a stepwise logistic regression analysis is conducted. The logistic regression analysis was performed in two stages. In the first stage, logistic regression is conducted with one of the independent variables and the dependent variable. In the second stage a multivariate logistic

model is performed with all the explanatory variables included in the model. Hypotheses 1 to 4 are reported in Section 4.6, which describes the effects of the various NWSC's revenue collection methods on the revenue collection efficiency.

Application of the logistic regression model

For the analysis of the stated hypotheses, stepwise logistic regressions are performed. The Logistic regression approach was aimed at modelling the relationship between the dependent (explained/predicted) and independent (explanatory/predictor) variables. Logistic regression estimates the probability of an event occurring. The outcome of a logistic regression is not a precise numerical value of the predicted variable, because the predicted variable is dichotomous, that is to say, it is the probability (p) that the event occurs. The interpretation of the logistic coefficient is more difficult than in multiple linear regression. As a result, instead of the conventional Beta coefficients as in the linear regression models, the logistic regression model is rewritten in terms of the odds of an event occurring. This is defined as the ratio of the probability that an event will occur to the probability that it will not Equation 1.

$$Odds (Y = 1) = \frac{Pr(Y=1)}{1-Pr(Y=1)} \dots\dots\dots Eq. 4.1$$

Factors with values greater than 1 indicate that the odds are increasing and those with values less than 1 indicate that the odds are decreasing (Bruin, 2006). The logistic regression function is denoted by

$$P = \frac{\exp(\beta_0 + \beta_1 x_1 + \dots + \beta_n x_n)}{1 + \exp(\beta_0 + \beta_1 x_1 + \dots + \beta_n x_n)} \dots\dots\dots Eq. 4.2$$

From Eq (2), 'P' is the probability that an event will occur, *e* is the base of the natural logarithm and β_0 and $\beta_{1,...,n}$ are the parameters of the model. The logistic regression procedure (Bruin, 2006) automatically creates new variables for categorical variables. In this study, 'performance' becomes a dummy variable with two categories, "poor" < 90" and "good ≥ 90".

Logistic regression with a single continuous predictor variable

In this section models with single continuous predictor variable are presented. These models describe the relationship between the different payment methods for national water and the log odds of the revenue collection performance of NWSC.

Testing Hypothesis 1

H₀₁: There is no significant effect of mobile money transfers on NWSC's revenue collection performance. Direct logistic regression is performed to establish the effect of mobile money transfers on the likelihood of NWSC's revenue collection will be good. The model contains one predictor variable *mobile money transfers*.

Variables in the Equation								
	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
MOBILEMON EY	.000	.000	1.791	1	.181	1.000	1.000	1.000
Constant	1.068	1.145	.870	1	.351	2.909		

Table 4.4.1: Hypothesis 1: Mobile money

In this case, the estimated coefficient for the constant is the log odds of a mobile money transfer method with zero transfers being classified as good performance. In essence, the odds of a mobile money transfer method being regarded or classified as of good performance when there are no transfers made is $\exp(1.068) = 2.909$. These odds are high and make little practical sense. So, the constant/intercept in this model corresponds to the log odds of mobile money transfer method being in the good or efficient performance category when mobile money is at the *hypothetical* value of zero transfers.

$$\text{Log}(p/(1-p)) = \text{logit}(p) = 1.068 + .00 * \text{Mobile Money} \dots \dots \dots \text{Eq.4.3}$$

From Eq (3), for a one-unit increase in the mobile money transactions/ transfers, the expected change in log odds is .00. Translating this change in log odds B, to odds $\text{Exp}(B)$, i.e $\text{Exp}(0.00) = 1.00$, Table 4.4.1 column 6. Hence, it can be stated that for a one-unit increase in mobile money transfers, there is expected to be a 0.0% increase/change in the odds of being in the good performance category. Therefore, these quantitative results indicate that the null (**H₀**: 1) cannot be rejected. Hence, it is concluded that mobile money transfer method does not have a significant effect on NWSC's revenue collection performance. It is also evident from the model Table 4.4.1 that mobile money transfers are statistically not significant ($p = .181$). This result could be the

effect of the size of the data used in the analysis or rather indeed, clients who use NWSC services do not prefer to use mobile money transfers as they come with a significantly high charge per transaction made (PWC, 2021).

Testing Hypothesis 2

H₀₂: There is no significant effect of bank cash deposits on NWSC’s revenue collection performance. In the baseline model, first the independent variable bank cash deposits are solely used, but are not significant (0.738), Table 4.4.2.

	Variables in the Equation						
	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)
							Lower Upper
BANKS	.000	.000	.111	1	.739	1.000	1.000 1.000
Constant	.551	2.933	.035	1	.851	1.735	

Table 4.4.2: Hypothesis 2: Bank cash deposits

From Table 4.4.2, the intercept is explained exactly the same way as previous done in model for hypothesis 1, Table 4.4.1.

$$\log(p/(1-p)) = \text{logit}(p) = .551 + .00 * \text{Bank cash deposits} \dots \dots \dots \text{Eq.4.4}$$

Further, from Eq. (4), it can be explained that for a one-unit increase in the bank cash deposits, the expected change in log odds is .00. Translating this change in log odds B, to odds Exp(B), i.e., $\text{Exp}(0.00) = 1.00$, Table 4.4.2. Hence, it is stated that for a one-unit increase in bank cash deposits, there is expected to be a 0.0% increase/change in the odds of being in the good performance category. Thus, we fail to reject the null (**H₀: 2**) hypothesis and conclude that bank cash deposits do not have a significant effect on NWSC’s revenue collection performance. The model in Table 4.4.2 indicates that bank cash deposits are statistically not significant ($p = .739$). Depositing cash in the bank requires one to take time off, lining up the long queues as stated by one of the study participants (Chapter 5). This could be the reason why bank deposits are not significant in paying for NWSC utility bills.

Testing Hypothesis 3

H₀₂: There is no significant effect of PayWay cash deposits on NWSC’s revenue collection performance.

Variables in the Equation								
	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
PAYWAY	.000	.000	1.241	1	.265	1.000	1.000	1.000
Constant	.752	.896	.703	1	.402	2.120		

Table 4.4.3: Hypothesis 3: Payway

From the table above, a one-unit increase in the Payway deposits is expected to change log odds by .00. Translating this change in log odds B, to odds Exp(B), i.e., $\text{Exp}(0.00) = 1.00$ (Table 4.4.3.) Hence, it is stated that for a one-unit increase in Payway deposits, there is expected to be a 0.0% increase/change in the odds of being in the good performance category. Thus, we fail to reject the null (**H₀**: 2) hypothesis and conclude that Payway deposits do not have a significant effect on NWSC’s revenue collection performance. The model in Table 4.4.3 indicates that PayWay deposits are statistically not significant ($p = .265$). PayWay is an electronic payment service that accepts payments on behalf of other companies. This method uses high-tech innovations to solve varying customer payment requirements (Wonders, 2020). Noting that Payway services are a new approach of paying utility bill in Uganda, and few people have embraced it, yet this could be the reason why it is not significant in paying NWSC revenues.

Testing Hypothesis 4

H₀₄: There is no significant effect of EFT payments on NWSC’s revenue collection performance.

Variables in the Equation								
	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
EFTPAYMENTS	.000	.000	1.382	1	.240	1.000	1.000	1.000
Constant	.571	.982	.338	1	.561	1.771		

Table 4.4.4: Hypothesis 4: EFT Payments

From the table above, a one-unit increase in the EFT payments is expected to change log odds by .00. Translating this change in log odds B, to odds Exp(B), i.e., $\text{Exp}(0.00) = 1.00$ (Table 4.4.4). Hence, it is stated that for a one-unit increase in EFT payments, there is expected to be a 0.0% increase/change in the odds of being in the good performance category. Thus, we fail to reject the null (H_0 : 2) hypothesis and conclude that EFT payments do not have a significant effect on NWSC's revenue collection performance. The model in Table 4.4.4 indicates that EFT payments are statistically not significant ($p = .561$). Data size used in the study could as well have been the problem and subsequently explaining why this result is in this direction as this seems to be contradicting several studies, see Section 4.5.

4.4.1 Logistic regression with multiple predictor variables

In general, it is also possible to have multiple predictor variables in a logistic regression model, Eq. (5)

$$\text{logit}(p) = \log(p/(1-p)) = \beta_0 + \beta_1 * x_1 + \dots + \beta_k * x_k \dots \dots \dots \text{Eq. 5}$$

Applying a multiple predictor variable model to the entire dataset, each estimated coefficient is the expected change in the log odds of being in the good performance category for a unit increase in the corresponding predictor variable holding the other predictor variables constant at certain value, Eq. (6).

$$\text{logit}(p) = \log(p/(1-p)) = \beta_0 + \beta_1 * \text{Mobile money} + \beta_2 * \text{Bank cash} + \beta_3 * \text{Pay way} + \beta_2 * \text{EFT} \dots \dots \dots \text{Eq. 6}$$

Step	Chi-square	df	Sig.
1	.000	8	1.000

Table 4.4.5: Hosmer and Lemeshow (HL) Test

Table 4.4.5 shows the HL test, which is a goodness of fit test for logistic regression. A goodness of fit test informs the researcher or modeler how well the data fits the model. HL test output returns a chi-square (a Hosmer-Lemeshow chi-squared) and a p-value. Small p-values, usually under 5%, imply that the model is a poor fit of the modelled data. However, large p-values do not necessarily imply that the model is a good fit, only that there is not enough evidence to say it is a poor fit. From Table 4.4.5, it is evident that the model is significant at 5 % level of significance, ($p = 1.00$), implying that there is not enough justification to indicate that the model is a poor fit of the data.

		Variables in the Equation							
		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
								Lower	Upper
Step 1 ^a	EFTPAYMENT	.000	.000	.000	1	.999	1.000	1.000	1.000
	S								
	BANKS	.000	.000	.000	1	.998	1.000	1.000	1.000
	MOBILEMONE	.000	.000	.000	1	.998	1.000	.999	1.001
	Y								
	PAYWAY	.000	.008	.000	1	.997	1.000	.984	1.016
	Constant	-191.956	61284.523	.000	1	.998	.000		

Table 4.4.6: a. Variable(s) entered on step 1: EFT Payments, Banks, Mobile Money, and Payway

All the electronic payment methods do not show any significant effect on revenue collection in NWSC as observed by their p-values ($p > .05$), and $\text{Exp}(.00) = 1.000$, implying that the odds that electronic payment systems will improve the efficiency of revenue collection are insignificant.

Generally, the statistics provide some evidence that electronic payment systems of NWSC bills do have a significant effect on revenue collection. The more NWSC has raised the awareness of her clients to pay bills by electronic payment methods, the less clients have used the methods and the less revenue has been collected. The findings seem to agree with URA Client Service Centre (2019), which reported that automation of payment methods has improved institutional efficiency and effectiveness. While there might be some indicators of institutional efficiency and

effectiveness due to automation of payments at Uganda Revenue Authority, the current findings do not provide such evidence in NWSC, Kabale branch. Take Payway, for instance. According to secondary data provided by NWSC, pay way was introduced to clients in 2016. Therefore, the possibility that clients could have gained confidence and trust in using it could be low. Otherwise, like any other modes of payment for utilities, it is a matter of time that clients get accustomed to the services.

4.5 The relationship between electronic water payment systems and revenue collection efficiency

This study used correlation analysis to establish the relationship between electronic payment methods and revenue collection efficiency. Correlation is the statistical measure of the degree of the strength of the relationship between two numerical variables. Coefficients closer to zero indicate weak relationships while correlations closer to one indicate strong relationships. Similarly, positive coefficients indicate that both variables change in the same direction while negative correlations indicate that the variables change in opposite directions.

	Electronic Funds Transfer	Bank Deposits	Mobile money	Payway	E-Payment Methods	Revenue Collection
Electronic Funds Transfer	1	.706*	.902**	.930**	.884**	.884**
Bank Deposits	.706*	1	.694*	.619	.949**	.949**
Mobile money	.902**	.694*	1	.933**	.871**	.871**
Payway	.930**	.619	.933**	1	.819**	.819**
E-Payment Methods	.884**	.949**	.871**	.819**	1	1.000**
Revenue Collection	.884**	.949**	.871**	.819**	1.000**	1

* Correlation is significant at the 0.05 level (2-tailed). Correlation is significant at the 0.01 level (2-tailed). Small correlations: 0.10 - 0.29; medium correlations: 0.30 - 0.49; Large correlations: 0.50 - 1.000

Table 4.5.1: Correlations

The overall statistics ($r = 1.000$; sig. $<.000$) show that e-payment methods are perfectly associated with revenue collection. By implication, variations in the adoption of e-payment methods to pay for NWSC bills are associated to a perfect variation in revenue collection. The

relationship between EFT and revenue collection ($r = .884$; sig. $<.05$) is very strong. The relationship between Bank deposits and revenue collection ($r = .949$; sig. $<.05$) is very strong. The relationship between mobile money and revenue collection ($r = .871$; sig. $<.05$) is very strong. The relationship between Pay way and revenue collection ($r = .819$; sig. $<.05$) is very strong. These statistics suggest that paying for NWSC bills using mobile money, EFT, pay way, and bank deposits is associated a significant positive change in revenue collection. Therefore, the more NWSC raises the awareness of her clients to using e-payments in paying for NSWSC bills, the higher the likelihood of registering improved revenue collection. However, the NWSC ought to encourage her clients to embrace the use of bank deposits. The popularity of bank deposits owes from its traditional position as a payment method. Besides, bank deposits have been used for some years by many clients who have gained confidence and trust in the method. However, the other payment methods that do not require queuing in the banking halls are likely to take precedence over the traditional bank deposit method.

The sample consisted of a 10 total revenue corrections of NWSC-Kabale branch, spanning from 2011 - 2020. Small values of the bivariate correlations are evident, signifying that, there are no multicollinearity problems among the independent study variables. However, there is a significant number of variables that present substantially large correlation, implying that a number of variables are correlated, thus, the multicollinearity problem does arise in the study data set.

4.6 The challenges faced by NWSC staffs and customers in revenue collection

The researcher used open-ended questions to assess the challenges faced by NWSC staff and clients in revenue collection.

SN	Emerging issues	Occurrence	Frequency
1.	Delayed updates	////////	7
2.	Network issues	////////////////////////////////////	39
3.	Double deductions	//	2
4.	Mobile money charges	////	5
5.	Inaccessible account	///	4

6.	Data security	/	1
7.	Multicurrency	/	1
8.	Overcharging	/////	6
9.	Bank delays	////////	8
10.	Technical issues	//	2
11.	Fraud	////	5

Table 4.6.1: Challenges facing NWSC

The study was conducted among 92 clients of NWSC. However, 78 clients, which is equivalent to 84.7% of the sampled clients indicated some challenges with the collection of NWSC. Only 14 clients (15.3%) did not indicate any challenge with the revenue collection of NWSC bills. Among the 78 who indicated some challenges with the revenue collection, network issues appeared to be the commonest.

The key challenge to revenue collection as reported by clients is network. This was reported by about 39 respondents who responded to this question, which is equivalent to 50% of the sampled clients. Respondents used many phrases to connote the challenges associated to network. Such phrases include ‘poor network’, clogged system, unstable network, system is off, etc. The respondents established that whenever there are issues with the network, payment are delayed, deductions are delayed, and updates are delayed. The research further established that when network is disrupted, clients suffer the consequences of delayed reconnection. Even when payments are made, the clients might take long to confirm the success or failure of the transaction, which puts the clients’ money at a risk.

Besides generalizing the delays, some respondents reported the excessive delays in banks. The issues raised surrounding banks were more of the long lines. However, the long lines could have been created due to some delays in the performance of the bank. However, whether the delays in the banks are due to other factors other than the long queue is some matter that needs exploration. Through interviews, the researcher found a misconception that delays in the bank were caused by banking agents. Actually one client said:

“...there is nothing that hurts like lining for hours in the bank because you are paying for NWSC. Painfully moreover, the tellers in the bank sometimes leave you in the line and proceed with other tasks...as if you do not have things to do...”

(INTERVIEW 7)

This excerpt paints some picture that the delays caused in the bank are from the bankers and not from the poor network. However, one interviewee observed:

“...nobody would love seeing a client hanging for long in the banking hall...only that when the network jams, it has jammed. You cannot force it but just give it time. Now this is something that we cannot keep explaining to the clients...”

(INTERVIEWEE 2)

From these excerpts, it emerges that clients of NWSC are burdened with network, an aspect which seems to be well known to the staff of NWSC but unknown to the clients. The management of NWSC has to get their clients informed on the challenges which network failure brings in the payment of NWSC bills.

The staff of NWSC were asked to indicate the challenges they faced in collecting revenue for NWSC. All the nine staff contacted confirmed the issue of network, which is escalated by unstable power supply. Besides the network challenges, some staff reported delayed payments, expensive tariffs, and computerized hacks.

CHAPTER FIVE:

DISCUSSION OF RESULTS

5.1 Introduction

The chapter presents the findings of the study based on research objectives.

5.2 Contribution of e-payment system on revenue collection in NWSC

The objective sought to assess the contribution of e-payment methods used by National Water and Sewerage Corporation towards revenue collection. The study found that electronic payments do not have a significant effect on revenue collection in NWSC. Traditionally, payment of water bills used to be made across the counter. Defaults used to be high and staff who were at the center of collection used to channel the collected revenue to their own interests. Accountability of the revenue was generally poor, exacerbated by too much paper work. This view was supported in several interactions with NWSC as recorded below:

“...you rarely come into physical contact with the clients to negotiate any differences in your own interest. Even when you meet a client, the evidence of payments are automated, and there is no chance to fraud. Just fraud at your own risk! Otherwise the law has to catch up with you...”

Another staff made this observation:

“...as we tend towards a cashless economy, more electronic payment services are yet to come on the market. These will not only increase the revenue NWSC is likely to collect, but a checking on the fraudulence...”

From these conversations, it emerges that the introduction of electronic payment methods of revenue collection cut down the costs of revenue collection and checking on unsound practices among the staff of NWSC. However, the efficiency of revenue collection appears to be lacking. The findings disagree with Okiro (2015) who found that adoption of e-payments significantly influences revenue collection by 92.2%. This study was conducted on Nairobi City County, Government in Kenya. While e-payments could have significantly affected the revenue

collection in Kenya, electronic payment systems are not well developed in Uganda. Possibly, time will tell how effective they are likely to be in Uganda.

This study has found that one of the contributions of electronic payment methods in revenue collection of NWSC bills is the online contact between the clients and the NWSC. While the traditional method of paying NWSC bills involved the physical presence of the client at the counter, the chances of contacting the client were very minimal. Today, NWSC reaches out to her clients on a 24-hour basis. A click of a button on the computer is just enough to send a notification, an advert, a reminder or a communication of any kind to the client. Whether the note is a reminder to the client to pay, he/she is notified electronically. Despite the fact that water users are frequently reminded of their obligations to pay for water bills, the findings from NWSC Kabale do not provide evidence of a positive response in water bills payment.

The findings that e-payments do not significantly contribute to revenue collection in NWSC Kabale disagrees with United Nations (2018) who indicated that Uganda was one of the countries that pioneered e-commerce transactions with almost all transactions earmarked as m-transactions. By 2017, it was estimated that 63 trillion Uganda shillings were transacted via electronic payments. The importance of e-payments is the fact that they complement traditional banks as the main providers of payments. While many transactions could have been made via e-payments and many are still being made, the efficacy of these payment modes on revenue collection in NWSC Kabale is still daunting.

The findings that e-payment do not contribute to revenue collection is not consistent with (Ministry of Finance, Planning and Economic Development, 2019) who establish that introducing and processing tax administration electronically makes significant reduction in processing times including registration, taxpayers accounts, tax returns, payments, and basic information. The introduction of e-payments could have proved effective in tax payment but still lagging in water revenue collections.

The absence of a significant effect of e-payment on revenue collection in NWSC, Kabale disagrees with Adegbe and Akinyemi (2020) who found a significant effect of ATMs (Automated Teller Machine) and ETC (Electronic Transfer Card) in improving personal income tax generation in Lagos. While the study was purely about revenue collection in a local

government, it bears little support to the NWSC study. The low contribution of electronic payment also disagrees with Kishura (2020) who compares two eras that is the era before introducing e-payments in revenue collection and the year of revenue collection in Tanzania. The authors observe a rise in revenue collection in the times of e-payment. The findings in NWSC reveal a steady rise in revenue collection for the period 2011 to 2020. The introduction of multiple e-payment methods has seen the revenues of NWSC rise from UGX 1,296,965,513 in 2011 to UGX 3,883,366,383 in 2020. However, these payment methods do not provide a solid foundation to explain the efficiency and effectiveness of NWSC in revenue collection.

Yet, secondary data has established that revenue collection through Pay way as an electronic method is negligible. Secondary sources on revenue collection in NWSC have shown that Pay way as method of revenue collection was introduced by NWSC in the year 2016. It was therefore not obvious that the method of payment would attract clients as did the other methods. It is possible that Pay way has not attracted clients to its usage in paying NWSC bills just because of time. One staff of NWSC remarked:

“...unlike mobile money which is accessible to the farthest person in Kabale, pay way is not accessible that much. Banking agents are gradually registering for pay way, otherwise it will become popular with time...”

Commenting on the popularity of Pay way, one staff at NWSC made the following observation:

“...if you could remember how skeptical Ugandans were with mobile money at its introduction in Uganda, you will easily accept why pay way has not gained popularity among some clients of NWSC. Mobile money at that time could not be used by the skeptics for doubt of the safety of their money and the transaction. I am sure some of our clients hold the same mentality. We shall continue sensitizing over and over...”

From these conversations, it emerges that Pay way is still fetching little revenue for NWSC just because it has not been popularized. The staff of NWSC do believe that it is just a matter of time that Pay way will become as popular as the other electronic payment methods. The findings disagree with ABA Bank (2021) who state the valuable benefits of PayWay online payments such as great checkout experience, absence of monthly fee, and flexible plugins. PayWay

integrates platforms with business. While NWSC incorporated PayWay into their business platforms, the platform still remains unpopular among NWSC clients. The failure of Pay Way to contribute much to revenue collection resonates with Rachna and Singh (2013) who report that e-payments have been received and consumed differently in the world. There are some e-payment methods that have been adopted quickly while some have not. The study of NWSC is one of the few studies that have revealed the inappropriateness of PayWay as an e-payment method. The low adoption of PayWay agrees with Dangol and Kautish (2019) who observed that the more information clients have on cyber-fraud incidents, the higher the resistance to adopting a given e-commerce. This is further fueled by diversity of gender, age, and education level. Given the study in NWSC, PayWay has not been taken up by the clients because of the fear of fraudsters that hide behind cyber.

Considering the fact that some electronic payment methods might be less used by clients, this study established from staff the possible ways to make these payment methods known to clients. The strategies to raise awareness include radio and television talk shows, social media, and advertisements by banking institutions, websites/internet, printed bills, SMS, and community sensitization. The use of multichannel to raise awareness among clients on a given brand, service or product by a given provider has been supported by different scholars such as United Nations (2018) who found that training of employees and operations of the digital economy in Uganda is still a challenge. Uganda has promoted access to online public services; however, uptake of these services is still low due to low information on the existence of these systems. Similarly, Highfields (1990) who notes that many e-payments have been proposed, but they suffer from accountability and jurisdiction over the internet. However, the author notes that providing an audit trail of any e-payment is very possible.

5.3 Relationship between electronic water payment systems and revenue collection efficiency

The study established that a strong relationship exists between electronic payment and revenue collection in NWSC. The study found very strong relationships between the different electronic payment methods and revenue collection of NWSC. The findings seem to agree with Eike (2019) who found a significant relationship between electronic tax systems and revenue performance.

This author investigated this relationship basing on Uganda Revenue Authority. The consistence of the results from both studies relates to their methodical approaches to revenue collection as public corporations. The significant relationship in the current study supports Lau (2020) who established that the use of e-payment system in revenue collection in Arusha city shows significant results in comparison to the previous days before introducing e-payment.

Similarly, Mukuwa and Phiri (2020) found a significant relationship between electronic services on revenue collection on tax compliance among small and medium enterprises in Zambia. Significant relationships were observed amongst performance expectancy, effort expectancy, and social influence predictors to use e-services. Just like other organizations that provide utility services, NWSC has registered a steady change in her revenue collection as a response from the introduction of electronic payment methods. The strong relationship between electronic payment methods and revenue collection in NWSC borrow support from previous research studies that have found strong relationships (Ejiku, 2019; Fatonah, Yulandari, & Wibowo, 2018; Kamana, 2016). Moreover, this study established that electronic payments have significant associations with revenue collection in NWSC.

5.4 The challenges faced by NWSC staffs and customers in revenue collection

This study has found that the greatest challenge to the revenue collection and payment of NWSC bills is network. Network delays the updates of clients' payment details, it delays notification of reception of payments, it results in unexpected double deductions, and system clogging. The effect of network on the efficiency of operations at NWSC is not a new phenomenon in utility management. Studies have revealed this challenge before. For example, Fatimah, Yulandari, and Widow (2018) emphasize that in the era of electronic payment systems, businessmen have to look out for how to clients trust their electronic payment systems. While customers are interested in using electronic systems, they are conscious about the security offered by the electronic system.

The findings that network is the greatest challenge of e-payment to revenue collection disagrees with Hassan, Shukur, Hasan, & Al-Khaleefa (2020) who listed challenges of e-payment as relating to availability, authorization, integrity, non-repudiation, authentication, and

confidentiality. The authors noted the need for security in electronic payment systems beyond security on the web. In a related finding, Nasr, Farrag, and Nasr (n.d) show that the major challenge to e-payment is fraud. While the authors took a view of E-business in Egypt, NWSC clients suffer from system network because of the relief barriers to signal strength.

However, this research established that the problem of network can be lessened in two ways: upgrading the system and waiting for the system to stabilize. The former mitigation is long-term while the latter is short term. Waiting for the network to stabilize might imply that clients have to give up whatsoever they have to do (their own responsibilities) to wait for the network to stabilize. While this approach appears friendly to the organization and the banking institutions, it is time-wasting to clients. This study observes that upgrading the system (long-term mitigations) to reduce the problems related to network is likely to be effective. NWSC should go this way – upgrading the system. The entire infrastructure should be upgraded, which will bring an end to the system hackers. The importance of upgrading the system remains consistent with Ministry of Finance, Planning and Economic Development (2019). The report observes that URA had used Oracle 11g to run her databases but the system requires an upgrade. This might coincide with NWSC whose system has been reported to be very slow. NWSC requires urgent upgrade of their system if they will continue serving their clientele to satisfaction.

The study has observed that clients tend to delay in banks. This is also related to the poor network system. Clients tend to stay in the line in the banking halls when the system is not responding. Consequently, the effectiveness of bank deposits in revenue collection at NWSC is compromised. The findings seem to contradict (essay (2019) who investigated the role of e-payment on revenue collection in Kinondoni Municipal, Dar es Salaam. The author found lack of technical assistance, poor connectivity, poor experience of technology by tax collectors and unreliable power supply as key challenges to the e-payments systems. While the author seems to differ on network system, he agrees on the unreliability of power and connectivity. These issues, though not mentioned popularly among clients of NWSC, featured in some conversations with NWSC staff. The unreliability of power and network in Kabale relates to the mountainous location of the clients, which weakens the signals of the e-payment systems.

CHAPTER SIX:

CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

This chapter presents the summary of findings, conclusion, recommendations, and areas for future research.

6.2 Conclusion

The study used secondary data to draw conclusions on the revenue collection in NWSC. The study covered a period of 10 years (2011 – 2020). NWSC employed a number of methods to improve her revenue collection efficiency. The study established that electronic payment systems do not affect revenue collection nor revenue collection efficiency. While most of the e-payment methods indicate efficiency in revenue collection except Pay way, there is no statistical evidence to confirm. Bank cash deposits, for example, appear to be successful in supporting revenue collection at NWSC is due to the transparency, standards of exchange of information, and automatic exchange of information. However, this study observes that revenue collection through Pay way appeared negligible because of people's failure to see trust of the system against cyber fraud, inefficient technology experience among staff, and the less education of the clients.

The relationship between electronic payment methods and revenue collection was perfect. For every client who used electronic method to pay NWSC bills, revenue collection increased equally. The efficiency of revenue collection drawn from the use of NWSC is because of its long-standing security and reliability of transactions, and easy audit trail. Banks provide secure transaction platforms, which have been tested over time. Other e-payment methods will attract the confidence clients with time.

This study established that network remains the greatest challenge to revenue collection by NWSC, which is worsened by power instability. This was reported among staff and clients. Due to network challenges, clients struggle in making payments, while NWSC staff struggle to

update clients' accounts. While the study has evidence of the greatest revenue collection through bank deposits, some of the clients using bank deposits as a method of payment complain of the delays created in banks.

In conclusion, revenue collection in NWSC has grown steadily over the years; however, the growth cannot be attributed to the introduction of electronic payment systems in revenue collection. This contrasts greatly with the previous methods of revenue collection, especially over the counter. Notwithstanding the success, revenue collection is still a challenge due to network system. This study contributes empirically tested contributions of electronic payment methods in paying for utilities.

6.3 Limitations to the study

Sample size limitations

In this study, the size of the sample was considerably small (10 years of revenue aggregates) and could have made it difficult to determine if particular outcomes were a true finding and may have resulted in a type II error, i.e., this could have led to the failure to reject the null hypotheses, thus stating that the e-payments methods were not significantly contributing to the effective or performance of revenue collection by NWSC.

Confounding

A confounder could be a serious issue. In this study, latent variables that affect the dependent variable (performance of payments of NWSC) may have been missed. Not examining the confounders could have seriously affected the relationships detected between the predictor or independent variables and thus, giving be inaccurate outcomes. For instance, distance of households to the banks, or mobile money points was not examined. Distance is known to affect payment of utility bills in case customers do not have or are not comfortable with other payment options like using their phones. Therefore, if distance is not included as a confounder in the study, its effect could be under or overestimated.

6.4 Recommendations

The study has established that the revenue collected by NWSC through PayWay is very negligible. Strengthen sensitization drive on e-payments platforms especially PayWay and how it works. Work with service providers to increase access to credit to establish and expand business in Kabale since it's evident that PayWay machines are few within the area.

The study has established that the inconsistency of the network remains the greatest challenge in paying NWSC Kabale bills and collecting revenue. Encourage service providers to improve on network connectivity and response time to challenges as they come through as well as encourage and ease offline receipting in gazette places in times of unstable network.

The study has established through NWSC staff that NWSC bills are expensive. The government should reduce the tax on the equipment used by NWSC in providing services to its clients by reducing the cost of production and in turn reduce tariffs.

6.5 Areas for future research

The study has established that electronic payment systems do not have a significant effect on revenue collection in NWSC. There is need for another study to establish the factors influencing revenue collection in NWSC.

The study has found that revenue collection using pay way is still low. There should be a study to examine the challenges of using pay way in promoting revenue collection in NWSC.

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APPENDICES

APPENDIX I: DATA EXTRACTION TOOL

Dear respondent, I am Grace Atuheire, a Graduate student of Kabale University pursuing a Master's Degree in Business Administration. I am conducting an academic research entitled **“The Effect Electronic payment systems on revenue collection of water utilities in Uganda: A case of National Water and Sewerage Corporation-Kabale Branch”**. To enable me achieve my objectives, I kindly request the information pertaining the revenue billed and revenue collected for the period of 2011 to 2020. Also, the electronic payment methods that customers used to pay their bills within that period is very necessary for this study. This research is purely intended for academic reasons only and all the information provided to me will be treated with utmost confidentiality.

SECTION A: REVENUE COLLECTION EFFICIENCY

YEAR	TOTAL REVENUE BILLED	TOTAL RENEU COLLECTED	REVENUE COLLECTION EFFICIENCY
2011			
2012			
2013			
2014			
2015			
2016			
2017			
2018			
2019			
2020			

SECTION B: ELECTRONIC PAYMENT METHODS

Please specify how much of the total revenue collected in each year that was paid through the following electronic payment platforms.

Year	Total revenue collected per Each Payment method from 2011 to 2020				
	Mobile transfer	Bank deposits	Bank standing orders	Electronic Fund Transfer (EFT)	Others, (specify)
2011					
2012					
2013					
2014					
2015					
2016					
2017					
2018					
2019					
2020					

APPENDIX II: DATA COLLECTION TOOL FOR NWSC CUSTOMERS

Dear respondent, I am Grace Atuheire, a Graduate student of Kabale University pursuing a Master's Degree in Business Administration. I am conducting an academic research entitled **“The Effect of Electronic payment systems on revenue collection of water utilities in Uganda: A case of National Water and Sewerage Corporation-Kabale Branch”**. This research is done in partial fulfillment of the requirements for the award of Master's Degree in Business Administration of Kabale University. You have been selected to participate in this study because you are one of the clients of NWSC Kabale branch. You are kindly requested to spare about 20 to 30 minutes of your time to assist and provide your honest feedback to the questions.

Please note that the responses given will be treated with utmost confidentiality and will only be used for academic purpose only. Anonymity of the respondent is also guaranteed.

Thank you in advance

SECTION A: DEMOGRAPHIC CHARACTERISTICS (Please tick as appropriate))

1. Kindly indicate your gender

Male	Female

2. What is your highest Academic qualification?

None	Primary	Secondary	Tertiary

3. Kindly indicate your age range

Below 23 years	23 – 35 years	36 – 45 years	46 – 55 years	Above 55 years

4. What is your marital status?

Single	Married	Divorced/separated	Widowed

5. How many years have you been using the services of NWSC?

Less than 1 year	1– 3 Years	4 – 6 Years	7– 9 Years	10 and Above

SECTION B: ELECTRONIC WATER PAYMENT AND REVENUE COLLECTION

6. What are the current electronic payment methods available to customers for bill payment are you aware of? (Please tick as appropriate)

E-Payment method	Tick all that apply
Mobile transfer	
Bank deposits	
Bank standing orders	
EFT	
Others (Specify)	

7. What electronic payment methods have you ever used for bill payment? (Please tick as appropriate)

E-Payment method	Tick all that apply
Mobile transfer	
Bank deposits	
Bank standing orders	
EFT	
Others (Specify)	

8. Kindly use the following Likert Scale to tick (✓) your answer: Strongly Disagree = 1, Disagree = 2, Neutral = 3, Agree = 4, Strongly Agree = 5)

No.	Statement	1	2	3	4	5
i.	E-payment technology is convenient for me when paying my water bills					
ii.	E-payment provides me with secure option of making payments of my reservations.					
iii.	Electronic payment saves my time that I would have put in to go and pay my bills at the office					
iv.	E-payment enables me to have access to my account information and even transfer money to other accounts in my own comfort					
v.	E-payment allows me to pay my bills without having to actually move to the firm premises.					
vi.	Using electronic payment method enables me to pay my bills on time					
vii.	I can choose the method of payment that is convenient for me without disturbance					
viii.	I always get feedback from NWSC whenever I make my payments using electronic systems					
ix.	I am knowledgeable enough about the current electronic payment options available for payment of my bills					
x.	I am satisfied with the electronic payment methods of NWSC					

9. What are the challenges do you face in bills payment using electronic payment system?

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10. In your opinion, how do suggest that the above mentioned challenges can be solved?

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THANK YOU FOR YOUR TIME

APPENDIX III: KEY INFORMANT INTERVIEW GUIDE FOR NWSC STAFFS

Dear respondent, I am Grace Atuheire, a Graduate student of Kabale University pursuing a Master’s Degree in Business Administration. I am conducting an academic research entitled **“The Effect of Electronic payment systems on revenue collection of water utilities in Uganda: A case of National Water and Sewerage Corporation-Kabale Branch”**. This research is done in partial fulfillment of the requirements for the award of Master’s Degree in Business Administration of Kabale University. You have been selected to participate in this study because you are knowledgeable about the revenue collection dynamics of this organization. You are kindly requested to spare about 20 to 30 minutes of your time to assist and provide your honest feedback to the questions.

Please note that the responses given will be treated with utmost confidentiality and will only be used for academic purpose only. Anonymity of the respondent is also guaranteed.

Thank you in advance

Demographic characteristics

1. Gender
 - a. Male
 - b. Female
2. Age.....
3. Education level
 - a. High school
 - b. Diploma
 - c. Bachelor’s degree
 - d. Master’s degree

- e. Doctorate
- f. Others.....

4. Experience

- a. 1 – 3 years
- b. 4 – 6 years
- c. 7 – 10 years
- d. Over 10 years

5. Department

- a. Finance
- b. IT
- c. Technical
- d. Commercial
- e. Audit
- f. Administration

ELECTRONIC PAYMENT AND REVENUE COLLECTION

1. What are the current electronic payment methods available to customers for bills payment?
2. How do you create awareness to your customers about these electronic payment methods?
3. What feedback mechanisms do you have in place to ensure safety of clients in bills payment using electronic systems?
4. In which ways have the above mentioned payment methods helped this organization in revenue collection? (*Administration, operation.*)
5. What others measures have you put in place to improve the collection efficiency?
6. What challenges does this organization face with regard to electronic payment and revenue collection?
7. What measures have you put in place to mitigate the above mentioned challenges?

-End-

Thank you for your time and responses