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FACULTY OF SOCIAL SCIENCES

DEPARTMENT OF LOCAL GOVERNANCE STUDIES

AN ASSESSMENT OF CUSTOMER PERCEPTIONS TOWARDS THE INSTALLATION OF SMART WATER METERS: THE CASE OF CITY OF HARARE

BY

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The undersigned strongly certify that they have read and recommend to the Midlands State University for acceptance of a research project entitled. **An assessment of Customer perceptions towards the installation of smart water meters: The case of City Harare**. The project was submitted in partial fulfilment of the requirements of the Bachelor of Science Honours Degree in Local Governance Studies.

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DECLARATION

I Tafadzwa Chidenga (R144130C) do hereby declare that this research represents my work, and has not been written for me or published by others for any degree programme or publications. All the materials used in this study have been fully acknowledged and sited accordingly in the study as will be shown in the reference and appendices at the end of the research study.

……. ……

Students signature Date

DEDICATION

I dedicate this project to my Family, my friends and not forgetting my loving girlfriend.

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First and fore most I would like to thank the Almighty God, for giving me the vision, strength and courage of going an extra mile in life. I would also like to express sincere gratitude to my supervisor Mrs Rajah for the great advice and consistent guidance, patience and all the other qualities that made this study a success. I would also like to thank the whole Department of Local Government for enriching us academically with priceless information and know how in this academic field. I would also like to thank the City of Harare stuff for giving me the chance to undertake my third year at the institution which has been key to this research study.

LIST OF ACRONYMS.

CBD	Central Business District
CoH	City of Harare
GDP	Gross Domestic Product
NGOs	Non-governmental organisations
SWM	Smart water meters
PWM	Prepaid water meters
LWSC	Lusaka Water and Sewerage Corporation

ABSTRACT.

The research was premised on the need to understand the perceptions of the citizens towards the installation of smart water meters in Harare. The introduction of smart water meters in 2013 has been marred with a number of challenges emanating from Non-governmental organisations (NGOs) arguments based on the fact that it's robbing them of their constitutional rights and there is compromise to social justice. The research was guided by a number of objectives including inter-alia, to explore the levels of customer satisfaction with the portable pricing by the City of Harare and to understand the nature and extent of citizen engagement in the installation process. Quite a number of theoretical underpinnings were outlined in the course of the research. A number of scholarly views and opinions on the subject matter were reviewed. The researcher used mixed method as a research paradigm in order to get an in-depth understanding of the phenomenon. The research thus was anchored on both qualitative and quantitative methodologies. Primary data sources was collected through research instruments like interviews and questionnaires observations were used to gather data from the respondents in the field. Statistical package for social scientists student version 19 was used to analyse data. From the research, it was found out that City of Harare is still lacking in terms of engaging the citizens in terms of policy issues. The research also unearthed that the people of Harare are willing to be on board in the smart water meter introduction discourse. Generally, women were satisfied by the introduction of smart meters as compared to their men counterparts. Some of this research`s recommendations are that City of Harare should optimise on the citizen engagement before coming up with policies that have far reaching effects like the pre-paid water meters, a dedicated team of customer service personnel should be put in place at Council to interact with customers, and also that Council should come up with a new water tariff regime that gives residents a zeal to pay for the service provided.

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CHAPTER I

INTRODUCTION

1.0 Introduction

Local authorities in Zimbabwe are primarily established for development possesses and provision of services to their communities. The provision of potable water is one the most basic and most important aspects of service delivery the City of Harare has to provide to the residents of Harare since water is a basic need of every human being to live a healthy life. There has been acute water shortages in the City of Harare since the year 2001 up to 2018 because of a plethora of challenges like economic hardships and increases in the number population of the residents. The City of Harare officials received a lot of complains of unfair water charges and acute shortages by the residents through their Customer Services Reception Centre at Town House. Therefore City officials has tried to manage the situation by introducing a new metering system of smart water meters. In year of 2013 the City of Harare has carried out a pilot survey of installing prepaid water meters in various parts of Harare. Therefore, the researcher seeks to determine the levels of customer satisfaction in the City of Harare. In this research the researcher will explore the background of the study, research problem, objectives, research questions, literature review, research methodologies, limitations, delimitations of the study, definition of key terms, time frame and the budget of the study.

1.1 Background of the study

The City of Harare is an administrative board which is responsible for providing potable water to the residents of the City of Harare. Through the department of Harare water the City of Harare is responsible for providing potable water to residents of Harare Water. The department of Harare water is headed by the Director of Harare water and this department of Harare water provides about 1400 mega litres (ml) of water per day thus according to Nhapi (2009).According to Zimstat (2012) “the amount of potable water that is currently being provided by the City of Harare only caters for 40% of the population of the City Harare which is above two million” .Moreover, the City of Harare is facing challenges to provide potable water to the residents since the year 2001 because of various factors like economic hardships which has made the residents not to pay their

water bills as a result the city of Harare is running out of funds to buy the chemicals and nozzle filters that are required for the cleaning process of raw water which is extracted from the dams and rivers. The economic hardships being currently faced in Zimbabwe has made residents to have debts that they owe the City of Harare which is approximately 9 million dollars thus according to the Finance Committee report of 2013. This challenge was intensified by the Ministerial directive of 2013 which resulted in the cancellation of the debts that the residents owed the City of Harare. This is mainly because the City of Harare had budgeted those funds thus the City of Harare had to adjust its budget because it lost a lot of funds because of the Ministerial directive.

Another challenge that the City of Harare is facing in terms of potable water provision is that there has been a rapid increase in the number of population due to urban to urban migration and rural to urban migration where by people travel to Harare in search of greener pastures. The increase in population has resulted in the City of Harare failing to provide water to all the residents because the City planners have planned to provide water to a specific number of residents. Also non-revenue water is another challenge that has affected the City of Harare since the water pipes are old hence they are always bursting and leaking out water and this has heavily affected the distribution of portable water in Harare. The problem of non-revenue water has made the City of Harare to lose a lot of funds since the water that is lost through the pipe bursts is not recorded on the customer meters. Moreover, the water sources that are currently being used by the City of Harare are contaminated by the disposal of sewages and industrial affluence which is being dumped into the water bodies like Lake Chivero. This has heavily affected the quality of the water and this has made the purification process of the water to be very expensive for the City of Harare.

The City of Harare has tried to increase the revenue base by sending the debt collectors to collect revenue and property from the residents but this has failed due to corruption by the officials. The residents of Harare were also complaining about the conventional meter system because they claimed that they were unfair water charges by the City of Harare. The residents also complained that they spend more time without water hence they are being charged more than they consume because the City Officials are estimating the water charges.

On the 12TH August 2013 the Environmental Management Committee held a meeting at Town House and made a resolution to introduce the smart water meters as a way to manage the consumption and payment of bills by the residents. The Council meeting which was held in

September 2013 adopted the introduction of the pilot survey of the prepaid water meters in various parts of Harare. At the beginning of the year 2014 prepaid water meters where introduced in areas which includes Sunningdale, Bluffhill, the Avenues, Rhodesville, Budiriro 3, and Eastlea among other areas.

Furthermore there are several factors that are associated with the prepaid water meters systems and these are as follows:

The introduction of the prepaid water meters undermines the legal provisions provided in the Constitution of Zimbabwe Amendment number 20 of 2013. The Constitution of Zimbabwe Amendment number 20 of 2013 section 77 provides for that every person has a right to safe, clean and potable water and the state must take reasonable legislative and other measures, within the limits of the limits of the resources available to it to the realization of this right. This section which is provided by the Constitution of Zimbabwe is being used by pressure groups like the Harare Residents Trust to criticize the installation of the smart water meters in the City of Harare as they claim that the City officials are imposing the prepaid water meters upon the residents of Harare of which they are violating the rights of the people of Harare. Also the right of all humans to have access to potable water is also recognized in the United Nations International Covenant on Economic, Social and Cultural rights. However there is a misconception by most residents that since water is a basic right as provided by the constitution they are not supposed to pay their water bills while every household is supposed to pay bills such that the City of Harare has a source of income to pay for the electricity and the chemicals that are used in the purification process of raw water.

There are social implications which are also associated with the introduction of the Smart water meter in Harare. The prepaid water meters may result in creation of conflicts in the society since water becomes an privately owned commodity because the residents have to pay before the consumption of water this may result in neighbors not willing to share water that they have paid for with the neighbors who had run out of water because of their inability to pay for water before they use it thus according to the ZIMCODE report of 2014. This therefore, may results in conflicts since the desperate neighbors may end up stealing water from each other when they are unable to afford to buy the water they need for domestic use like cooking and bathing. According to research done by Seas (2012) people with prepaid water meters use less water than the residents using

conventional meters but that has resulted in reduced hygiene levels especially in the urban areas where there are few water sources. This is certainly because the people with the prepaid water meters urban areas used the water for multi purposes for an example the water that was used for washing is again used for bathing and this may cause serious hygiene problems. Thus the introduction of the smart water meters reduces the levels of demand of potable water and it also reduces the level of interaction between the service provider and the customer and this may also increase the levels of tension between the City of Harare officials and the residents.

Also the introduction of the prepaid water may undermine the health of the majority of people because the introduction of the prepaid water meters may result in a lot of people who are unable to pay their water bills being cut off their access to water. This may result out breaks of diseases like cholera and typhoid since people will not be able to have access to clean water hence they resort to open water bodies for supply of water hence low levels of hygiene in households. Also the privatization of water through the prepayment system may also result in reduced hygiene and moral levels as family members may opt to use the toilets and not flash the toilets after use such that they can flash at once hence this may result in the outbreak of diseases However it is not always the case that the smart water meters undermine the health of the majority because if the residents pay their bills using the smart water metering system the local authority will be able to collect revenue which is required for the purification process hence water is made available to all the citizens who paid their bills.

Moreover, the prepaid water meters also exacerbates gender inequality since women and children are the ones that are forced to fetch water in case some families are unable to pay for their prepaid water services. The smart water meters may also result in environmental dangers. For an example in the event of firer out break the households are likely to find themselves cut from water provision during the extinguishing of a fire that will be destroying the environment. Also some residents may opt to let the environment get destroyed by fire because they will saving the water for domestic use.

The introduction of the prepaid water meters has economic implications as it increases the revenue base of the City of Harare since the customers pay for the services they are going to be .3provided therefor through the pay as you earn system the residents are getting the value of their money. Also the prepaid water meters has resulted the recovery of the funds that the residents owe the City of

Harare since there is certain percentage that is deducted from the amount that the residents pay for water. However, the prepaid water meter system does not make access to potable water by the urban poor cheaper thus the introduction of prepaid water meters undermines the fact that humans needs water for basic survival. Therefore, the City fathers has to consider analyzing the ability of the residents to pay the bills with the economic hardships that are currently being faced in Zimbabwe.

1.2 Statement of the problem

In the City of Harare there has been erratic water supply because of there has been a high increase in the number of population of people in Harare hence the City of Harare is unable to provide potable water to all the residents especially people in areas like Mabvuku and Glen View which have gone for months without water. Also the residents are not paying for the water that is supplied due to the economic hardships being experienced in the country and this has forced the City of Harare local authority to cut the water supply because the local authority is generating minimum funds to buy chemicals to purify the water. Moreover the erratic water shortages are also being caused by the non-revenue water that is the amount of water that is being loosed through the bursting water pipes thus there is no retention of funds by the City of Harare since the water is loosed and the residents will not pay for the water they have not used. In the year 2008 and 2009 the erratic water shortages has contributed to the outbreak of diseases like cholera and typhoid which killed more than 4000 mainly in urban areas and this greatly shows the dire state of water supply and sanitation in urban areas thus according to Manson (2009) . In the year of 2013 the City of Harare decided to carry out a pilot survey whereby there was installation of prepaid water meters in a bid to address the water shortages and improve the revenue base of the City of Harare. However the installation of the prepaid water meters by the City of Harare has received its fair share of criticism by the Harare Residents Trust as they claim that the introduction violates Chapter 4 Section 77 of the Zimbabwean Constitution and a number of other international charters which provides for citizens' access to safe, clean and portable water. Therefore, this study is meant to explore the perceptions held by the residents towards the smart water meters to determine whether the residents or customers are satisfied with the prepaid water meters.

1.3 Research Objectives.

- To explore Customer satisfaction regarding the quality of potable water supplied by the City of Harare.
- To asses consumer satisfaction levels regarding the availability of the potable water supplied.
- To investigate the consumer perceptions with the charges of potable water by the City of Harare.
- To explore citizen engagement in the installation of the prepaid water meters.
- To explore ways of improving the provision of potable water in the City of Harare.

1.4 Research Questions.

- What are your perceptions regarding the quality of water?
- Is the water always available all the time?
- Are you satisfied with the water charges?
- Where you involved in the installation of prepaid water meters process?
- Is your hygiene levels compromised by the introduction of the smart water meters?

1.5 Justification of the study.

The study is of paramount importance since it addresses issues of customer perceptions to determine the levels of satisfaction of residents by the introduction of the smart water meters. This is in line with the City of Harare Results Based Strategic Plan which states that Harare is to achieve 75 % of customer satisfaction by 2020 therefore study will also help the City officials to know the satisfaction levels of the residents by the introduction of the smart water meters. The research is going to document the findings of the research and access whether the residents are satisfied by the introduction of the prepaid water meters such that the researcher is able to determine if it's feasible to install the prepaid water meters at a large scale as a means of water management in the City of Harare. The research findings will be used by the City fathers to make recommendations

in policy formulation and implementation since the areas were the smart water meters are appreciated will be known.

Be it, as it may that since the installation of prepaid water meters in the residential areas under study the issue of customer satisfaction has not been adequately captured by Council management and other researchers; this has trigged the interests of the current researcher to conduct a study on customer perceptions to determine their satisfaction levels concerning the introduction of prepaid water meters in the City of Harare and the knowledge obtained from this study will help the organization in making strategic decisions. The research will contribute to the body of knowledge as the research addresses a gap of customer satisfaction by the prepaid water meters in the Zimbabwean context. It will set the pace for further research to be conducted and improve the current knowledge particularly on the issue of implementation of new innovations with regards to basic necessities such as water.

1.6 Delimitations of the study.

The research was conducted in the City of Harare in areas where the prepaid water meters were installed and these areas include Glen Norah, Mabvuku, Budiriro 3, Eastlea, Sunningdale 3 amongst others. The research is going to be conducted in these areas because that's where the pilot survey was carried out. The respondents of this research are residents with houses where the prepaid water meters where installed and the officials of the City of Harare from Town House and the department of Harare Water. Secondary data that is used in this research if from the year 1965 to 2017.The research is limited only to customer perceptions towards the prepaid water meters.

1.7 Limitations of the study.

- The findings of the research were based on respondents that are chosen by the researcher and that might create biased results since the chosen respondents might not be the actual representation of the actual population of the residents of Harare.
- Language was also be a barrier since the questions were asked in English language and not everyone understood English language.
- The researcher also face hostility and resistance from the residents and the City of Harare officials.

- Delays in provision of information by the Department of Harare water was a major setback because Council officials release some documents when they are sure that the information they have provided is intended for education purposes or research.
- The researcher will be limited as well by the confidentiality clause thus the researcher had to be cleared with the Human Resources department and the Department of Harare water about the documents which could be used and quoted in the study.

The researcher overcome these challenges by asking for permission from the Human resources department and from the Harare Water Department such that documents with information will be released on time. The researcher has to guarantee that the information is going to be used for academic purposes such that the employees of the City of Harare will be able to respond because an employee is not allowed to speak on behalf of the organization since it is the responsibility of the spokesperson of the organization

1.8 Definitions of terms.

Customer.

A customer is a person who gets or receives services provider or organization after paying a fee or for free. Customer's maybe internal employees or external people. According to Kendall (2006) the term customer and consumer can be used inter challengeable.

Smart water meter.

According to Gass (2012) "smart meter is a meter that records consumptions of energy consumptions of energy or water in intervals of an hour or less and communicates that information at least daily back to the utility for monitoring and billing purposes. Smart water meters enable two way communication between the meter and the central system|". Prepaid water meters can also be defined as system of pay as you use thus according to Okanga (2012).

Non-revenue water.

Non-revenue water is the difference between potable water pumped in the system and the billed water that is authorized for consumption thus according to Lambert and Himer (2000).Non-revenue water is generally the amount of water that is lost in the system before the water gets to the customer.

Customer Satisfaction.

Gunning (2000) argues that customer satisfaction has no universal definition but is generally described in terms of an evaluative, affective or emotional response. Oliver (1981) concurs this by defining customer satisfaction as a summary of psychological state resulting when the emotion surrounding disconfirmed expectations is coupled with customer's prior feelings about the consumption experience.

Muller (2005) defines customer satisfaction as a post consumption evaluation of a product or a service which is dependent on perceived quality or value. Therefore, in light of the above definitions customer satisfaction the researcher has realized that customer satisfaction is the fulfilment of the customer's expectations of a good or services.

1.9 Chapter summary.

This chapter introduced the research understudy and provided other components of the study which includes the back ground of the study, statement of the problem, justification of the study, objectives, research questions, limitations, delimitations of the study as well as the key that are going to be used in the study. The following chapter is mainly concerned about the various literature that other scholars have written about the topic under study and the theories which helps to understand to the topic more.

CHAPTER II

LITERATURE REVIEW.

2.0 Introduction.

Literature review involves taking into account the scholarly views which is already written down about the prepaid water meters bringing about new discoveries and bringing new knowledge that paves way for new research. It is of great preponderance that this chapter is going to address issues to do with the perceptions held by the customers towards the prepaid water meters and provision of potable water, the various theories that are associated with the prepaid water meters, the empirical evidence and the knowledge gap about the literature that has been previously written concerning the concept of the prepaid water meters.

Conceptual Framework.

2.1 Perceptions held by Citizens concerning prepaid water meter charges.

In the city of Harare most of the water charges by the City of Harare were estimated and a lot of resident complained about being charged too much while the use little amount of portable water. After the introduction of the prepaid water meters pilot survey there has been less complains about water charges by the citizens of Harare who has the prepaid water meters thus according to the City of Harare magazine of 2017. Heymans et al (2014) research from the field in Lusaka showed that most residents in Lusaka were satisfied by the prepaid water meters and 60% percent of the residents claimed that they were satisfied by the prepaid water meters because it was easy for them control their budget because they were the ones who decided how much they want to pay and how long it was going to last. However, 40% of the respondents were not satisfied with the system of paying before they use the water because they claimed that money is not always available because of the harsh economic condition which being faced by the residents thus according to Heymans et al (2014). According to RASSP (2005) report of Phiri residents 95% of the people were against the introduction of the prepaid water meters because they claimed that the government is imposing prepaid water to make them poor and that it is unfair for the local authorities to introduce prepaid water meters to poor power people.

The pay as you use system is also not satisfying to pensioners and the old people who are over 65 years since they are one poorest groups in the society hence they do not have the income to pay the water bills before since most of the are taken care of by the children and some only depend on

pension money which provided for at the end of the month therefor they convention meters because they can afford to pay at the end of the month.

In addition, some of the resident who were in debt with the municipality were satisfied by the water charges of the prepaid water meters since 15% of the sum charged was diverted towards debt recovery thus according to Thomas (2013). Some residents in Kampala claimed that the prepaid water meters were cheaper and fair if one has a small family but some respondents who had big families claimed that the prepaid water meter charges were expensive for them since their families consume more water. According to the Daily Business News (2003) the Mayor of the City of Johannesburg said the residents of his ward were satisfied by the prepaid water meters because they said that it is a means of stopping the accumulation of depts that they owe to the Municipality.

2.2 Perceptions held by the residents towards the distribution of portable water.

The City of Harare is currently providing 1400 mega liters of water to be used by the residents of Harare thus according to Nhapi (2009). This amount of water is not able to cater for all the population of the residents of Harare and this is supported by the Zimstat (2012) which suggests that the amount of water that is produced by the City of Harare only caters for 40% of the population of Harare since there is a rapid increase of population due to urban growth and migration. According to Manzungu et al (2016) the areas like Mabvuku which located on high ground have gone for more than Five years without water. However some low and medium residential areas like Borrowdale and Waterfalls are receiving portable water almost daily. The reason for the variations in the distribution is caused by the location of an area and other issues which have to do with gradient but to a larger extent is caused by the City of Harare prioritizing some areas when it comes to distribution of water.

The City of Harare has classified its customers into three categories that is the most valuable customers, second tier and third tier customers. According to Don Peppers and Martha Rogers cited in Payne (2006) the customers can be put in different typologies that helps the business in identifying relevant strategies. The most valuable customers are the residents from low density suburbs like Central Business District and the industrial areas. These residents are provided with water almost every day because the residents pay their bills on time and these customers have great value to the City Council. The second tier of customers is those residents with the highest level potential of paying their bills on time and these residents are from medium density suburbs like

Hatfield and glen view 7. These second tier level customers are also provided with water more frequently than the low tier customers. There is also the low level tier customers are the customers with low potential of paying their bills on time and these areas are the last priority for the Harare City Council since in these areas are not provided with water more often.

According to Victor (2011) about 72 % of the urban population in Nigeria have access to potable water except other parts of Abuja and Lagos. Nigeria is one of the African countries which has a lot of water which is estimated to be around 267.3 million cubic meters. But in Nigeria 52% of the urban dwellers and 39% of the rural dwellers have access to portable water thus according to the thus according to the Multi Indictor Cluster of (1999) Survey Federal Office of Statistics. This therefor greatly shows that a large number of the urban and rural dwellers have no access to potable water. In South Africa in the Cape Town City there has been a disaster in terms of water distribution since there has been scarcity of water which has made most of the urban dwellers not to have access to potable water. This has made the City of Cape Town officials to distribute water through water tankers but the residents are limited to 20 liters per family because of the acute water shortages

2.3 Perceptions held by customers regarding the water quality.

Out of Sixty seven respondents sixty percent of the population of Harare reported that the quality of water is good while 15% said the water quality is fair and 25% argued that the water quality is terrible thus according to Manzungu et al (2016). Currently residents of Harare are complaining about the water quality because of the bad odor and the green substances that are being witnessed in the water. Scholars like Falahee et al (1995) argues that the colour and odor of the tap water has impact on the judgment of the water quality and safety therefor most residents in Harare are complaining about the water quality since is producing bad odor and the water is no longer colourless.

At the press conference held at Town House flag room His Worship the Mayor Councillor Bernard Manyenyeni urged all the residents of Harare not to drink tap water which is being supplied by the City of Harare as he claimed that it is not safe to drink because the water is not properly treated at the Motorn Jeffery water works. Government made an effort to get a loan of 114 million from the Chines government however the efforts were to no avail since they were no real improvements and it was worsened by allegations of corruption in the procurement process thus according to

Manzungu et al (2016). According to Al Dulaimi et al (2017) the customer satisfaction conducted by the Directorate of water in Baghdad City of Iraq showed that most residents fear drinking tap water because they fear that the water is contaminated. The residents of Baghdad City fear of drinking tap water are intensified by the fact that water in Baghdad is hard water. Al Dulaimi et al (2017) argues that "approximately 90 ppm Ca CaCO3". However, according to WHO (2011) water hardness which is less than 100ppm should be strictly monitored to reduce the risk of network corrosion as this may result in the spread of diseases since hard water causes stomach problems. This is similar to the situation in Zimbabwe were by most resident of Harare fear drinking tap water because the water that is coming out of the tap is no longer safe to drink hence most of the residents have resorted to alternative water supply source like boreholes which are being provided by the non-governmental organizations like UNICEF.

2.4 Availability of portable water.

The supply and availability of portable water is one of the major challenges in the City of Harare. The City of Harare is located is located on a plateau which is 1400 m high and some parts of Harare are hilly hence this has contributed to the shortages in terms of water provision by the City Council thus according to Nhapi (2009).Scholars like Manzungu et al (2016) purports that the availability of potable greatly affected by combination of topography and hydrogeology this is greatly envisaged by areas like Budiriro and Mabvuku which are located at high grounds. Areas like Mabvuku and Budiriro receive water for about 6 hours a day and in these areas potable water is available during the night when a lot of people are not using the water. However there are some areas like Borrowdale Brooke and industrial areas in the CBD where potable water is always available because the residents in those areas pay their bills on time hence the local authority priorities those areas. According to the minutes of the decentralization report back meeting held in Budiriro in January 2018 most residents of Budiriro feel that the City of Harare is proving them with portable water the time they want it the most because the City of Harare officials are prioritizing zones which pays the bills the most and on time while marginalizing other zones which are poor.

2.5 Advantages of using prepaid water meters and challenges to Clients or customers.

Most local authorities in African countries like South Africa, Uganda and Kenya have adopted and implemented the prepaid water metering systems to improve the provision of portable water. The

City of Harare has also engaged in a pilot survey of installing the prepaid water meters to address the potable water challenges currently being faced in the City of Harare. The prepaid water metering system has several advantages and disadvantages to the customer. This is illustrated by the table below.

Advantages	Challenges to Clients
Cheaper • Price regulations of water allows for affordable rates. • Attained economic advantages by Council should be shared with the clients.	Investment required Costs contribution to customer has to be weighed, different contribution models are possible according to income situation and affordability. • Full or partially cost contribution for first installation (depending on customer groups) • Replacement of unit at Council costs. • Replacement of battery (Every2 to 5years) of prepaid water meters at Councils costs.
Pay as you drink/use (24/7) The Customer only pays what is consumed that is customers enjoy the value of their money.	Token or other mechanical resolutions is a must and has to be kept safe in case of emergency. Replacement of token or credit card will be charged to the client (normally the charges are not cheap).
No usual overdrafts If the credit is exhausted potable supply will stop automatically thus no more water charges will be estimated.	Very limited overdraft possible. Better self-management and monitoring of consumption is essential.

A lifeline concept is possible and can be planned individually for specific customer groups. • Limited fixed quality for a period of time (for an example 24hours). • Reduced quality (for an example 40 I/hour) on going. This will be handled as arrear and recovered automatically with the next water credit purchased.	
Anti-water theft and water leaking device. The smart water meter help to protect the equipment and to reduce uncontrolled water consumption in general. If water is leaking the meter will not record the non-revenue water.	
Volume management is possible. Depending on the water supply situation and legal, social requirements the council can define client group specific volume management tools such as • Free quality per month (pro poor policy) cannot be accumulated /reset at the end of month. • Limited total amount per month (in case of required rationing/ for an example drought).	
Easy to use Operating and handling of smart water meters is generally easy and convenient for the	

customer if the customer is taught how to use the meter.	
Easy monitoring is possible The consumer has an opportunity to monitor and control the water consumption and will normally be able to save water and reduce the cost of it.	
Affordable, convenient and no discrimination for the poor. If all required pro poor policies are respected, the smart water meters will help to promote equality amongst all customers as long as supply of water is available to all consumers groups.	
No dispute of bills about estimated charges and queuing for payments since it is done through the eco cash and other swiping facilities. Debates and arbitration with the Council about billing, rates and quantities of potable water will not be necessary any more. If the prepaid water meters does not function well it will stop working and has to be repaired.	

Source: Gass (2012).

The table above shows the advantages and the challenges or disadvantages of the prepaid water meters. From the table above it is vivid that the benefits of the prepaid water meters outweighs the shortcomings and this clearly shows that the prepaid water meters has got a lot of advantages it has to offer to the consumers.

2.6 Ways of improving provision of potable water in Harare.

Provision of potable water has been a great challenge in the City of Harare and there are several ways that can be adopted in a bid to address the provision of potable water challenges. One of the ways that can be adopted to make sure that the provision of water has improved is to first amend the budget type that is currently being used by the City of Harare. The City of Harare is currently using the incremental budgeting system where the City Council officials just add a figure on top of the previous approved figure. This has then caused some challenges because the Local authorities have not managed to raise the estimated amount hence 70% of the generated revenue is then not directed to service delivery because the City of Harare has bloated staff. .According to the UNDP Human development (2006) Local governments must spend 1 % of the GDP on water and sanitation this greatly improves the provision of potable water. Therefore, the above mentioned challenge can be solved by making realistic budgets like the results based budgets which are results oriented and participatory in nature. Also the City of Harare can also subsidize the connections for the poor is another way of improving water provision in the City of Harare .According to UNDP (2006) subsidizing the connections for the poor households and the implementation of innovative payment systems reduce the expansion of water supply network.

2.6.1 Improved inter-governmental relations

Another solution to solve the provision of portable water in the City of Harare is to have improved inter-governmental relations that is between the central government and the local authorities. In 2013 after the harmonies elections the central government made a directive to cancel the depts. That the citizens owed the local authorities and this had ripple effects on the service delivery because the City of Harare loosed a lot of money that it was owed by the residents. Therefore, improved relations between the central government and the local authorities can be the solution to improved provision of potable water because consultation of local authorities by the government before making a policy that affects the local authorities may result in improved provision of potable water. For an example if the government had consulted the local authorities before the cancellation of debts, a policy which was friendly would have been created without disadvantaging the local authorities or other citizens.

2.6.2 Reducing the workforce.

Reduction of bloated staff in the City of Harare is another measure that can be taken to improve provision of potable water. The City of Harare has a large number of staff which is above 10 thousand employees and this has created a problem since too much revenue is then directed to salaries instead of service delivery. Thus the reduction of the City of Harare staff may result in an improvement in the provision of potable water since the money that was supposed to be directed to paying the salaries is the diverted to service provision which is the core business of the local authority.

2.6.3 Rehabilitation of infrastructure.

Rehabilitation of water infrastructure is another measure which should be considered in a bid to improve the provision of potable water in the in the city of Harare. In the City of Harare most of the water pipes where established during the Rhodesian era hence most of the potable water is lost through non-revenue water. According to Gass (2012) 60% of portable water that is lost through the old pipes thus non-revenue water. Therefore the challenge of water lose through leaking old pipes can be solved by installing new water pipes and rehabilitation of the old pipes.

2.6.4 Private public partnerships.

Encouragement of partnerships between the City of Harare and Private companies is another measure that can be taken by the City of Harare officials in a bid to address the potable water challenges that are currently experienced in the City of Harare. Partnerships between the City of Harare and private companies can bring about skilled labour and capital which can be channeled towards provision of potable water. According to Grimond (2016) partnerships between local authorities and private companies may result in the private companies assuming responsibility of financing and improving the operating systems this then may reduce water loses hence increased supply. Therefore, the measures mentioned above can improve the levels of water supply in the City of Harare.

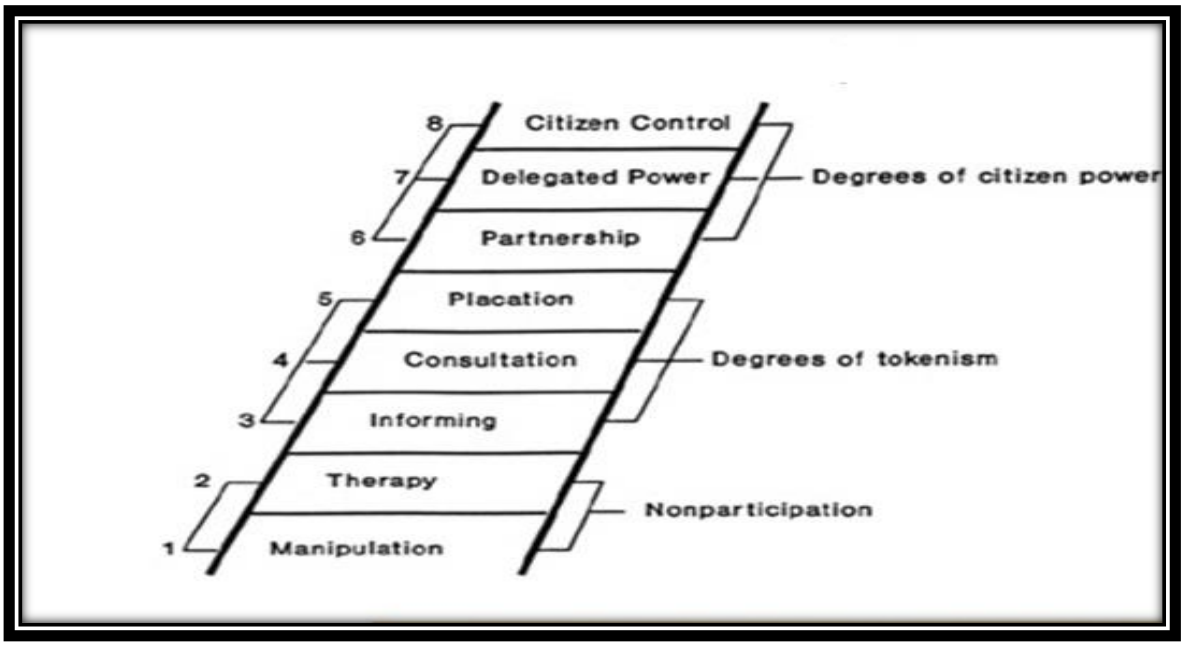
Theoretical Frame work.

2.7 Arnstein's Ladder of Citizen Participation

There is need for insight in the consultations done by the Harare City Council using the ladder of participation which was propounded by Arnstein in 1969. The theory was introduced in a bid to understand and address the issues to do with power distribution using her experience from social programs and poverty alleviation programs. The ladder of participation has eight (8) rungs with each rung corresponding to the extent of citizen's participation power in determining the end product. The first rung from the bottom of the ladder of participation is manipulation and the second is therapy. These two rungs describe the levels of non-participation as the have not's only participate in the planning and conducting programs to enable the power holders to educate participants. The third rung is informing and the fourth rung is consultation. At this stage the have not's can only hear but they do not have the power to voice or they lack power to ensure that their views are heeded by the powerful. Rung five is placation is a high level of tokenism because the have not's can give advice, but retain for the power holder to make the decision. The sixth rung is partnerships in this level and this level of participation enables the have not's to negotiate and engage in the tradeoffs with the power holders. The seventh rung is delegation of power and the eighth rung is citizen control. At these two upper levels, the have not's citizens obtain the majority of decision making seats or full managerial power.

The Arnstein ladder of participation can be illustrated by the diagram below.

Fig 2. 1 The Arnstein ladder of participation



Source: Anstein (1969)

The ladder of participation is greatly applicable to this study because the ladder of participation can be used as a tool to audit the level of participation of the residents. According to the Constitution of Zimbabwe amendment number 20 of 2013 section 13 suggests that people should be involved in formulation and implementation of programmes that affect them thus the ladder of participation is important to the study. Also public participation is recognized as one of the factors that is important for sustainable development to take place in societies. The ladder of participation upper rungs which are partnerships, delegation of power and citizen participation yield more results since there is consultation of stakeholders hence decisions made actually address the needs of the people since decisions are made by the people. This is opposite to cases were the have not's or citizens are manipulated by the top officials when it comes to decision making which is more of a top to bottom approach which in most cases did not yield results.

In other countries like Uganda in Kampala the ladder of participation has been implemented since the residents have participated to the highest levels of rungs which are delegated power, participation and citizen control and this has created confidence in the citizens because they are recognized as an important stakeholders thus according to the study carried by Heymans et al (2014). This has therefore, made citizens in Kampala to pay their water bills because their

confident in their municipality because there are involved in the policy making activities that affect their daily lives.

According to the RASSP (2005) the Johannesburg City Council claimed that there was wide spread of consultation and participation in the installation of prepaid meters by the residents of Phiri in September 2003. Despite the claims by the Johannesburg City Council it seems that sixty percent (60%) of the residents knew about the installation of the prepaid water meters prior to the beginning of the work in Phiri since most the residents knew that there are prepaid water meters to be installed when they saw the Council workers digging trenches. The lack of awareness by the Phiri residents shows that the ladder of participation by Arnstein is relevant since lack of participation shows that the citizens where considered as the have not's hence they were manipulated by the power holders whom then made a decision to install the prepaid water meters without the concern of the residents of Phiri. However there is a danger in manipulating the have not's in policy formulation because once they realized that they have been manipulated they tend to sideline themselves in the development programs and in the case of Phiri residents when they realized they have been manipulated by the Johannesburg City Council officials there was wide spread of protests in Phiri which is a good sign that the residents were not consulted.

2.8 Private Goods Theory.

A Private good can be defined as a product or a service that is produced by a private company or a local authority and purchased by a customer in order to satisfy their needs or wants. According to Elinor (1990) private goods are rivarous that is the consumption of the private good reduces its availability to the other consumer. Also a private good is that once it is produced it can be consumed by an additional consumer at an additional costs. . In Zimbabwe private goods like portable water are produced by local authorities, so for economic efficiency the government or the local authority makes the people to contribute to the production of private goods and then allow the citizens to consume the water. This done to address issues do with cost recovery of the inputs like electricity and chemicals that are used in the purification process of the potable water.

Another characteristic of private goods is that it is excludable thus consumers can be excluded for using the private goods if they are unable to pay for them. In Zimbabwe the residents are excluded from private goods like potable water since people who are unable to pay for their water bills are disconnected or are cutoff to access potable water. This has been widely criticized by pressure

groups like the Harare residents trust because they claim that the prepaid water meters violate people's right to water and that cutting off of the provision of water by the local authority is against the constitution of Zimbabwe since section 77 of the Constitution of Zimbabwe amendment number 20 provides for that every person has a right to safe. These arguments by the Harare residents Trust has emanated because the most people have a misconception that the potable water is a public good of which it's a private good that is supposes to be paid for by the residents. Therefor the introduction of the prepaid water meters is not only concerned with the revenue inflows it is also meant to address the billing system which has given the Harare residents nightmares

The diagram below greatly illustrates that portable water is private good since has all the attributes of a private good.

Table 2. 1 portable water is private good since has all the attributes of a private good.

	Excludable	Non-excludable
Rival	Private good	Common-pool good
Nonrival	Club good	Public good

Source: Cornes and Sandler 1986.cited by Zetland 2016.

However, inefficiency can also be challenge in the production and consumption of private goods like potable water when there are spillover effects. For an example if a water pipe burst a third part can benefit from non-revenue water. This may result in the City of Harare under performing in the provision of water because there will no revenue that is generated since nonrevenue is not paid for by the external user.

2.9 Kano's model of customer satisfaction.

According to Kano's model has six major drivers of customer satisfaction of which the first three attributes are the ones that are very important as the directly influence customer satisfaction. According to Kano (1984) the basic factors are the minimum requirements which may cause dissatisfaction if they are not full filled by the service provider. However, the basic needs do not cause customer satisfaction if they are meet or exceeded thus the customer or residents take the

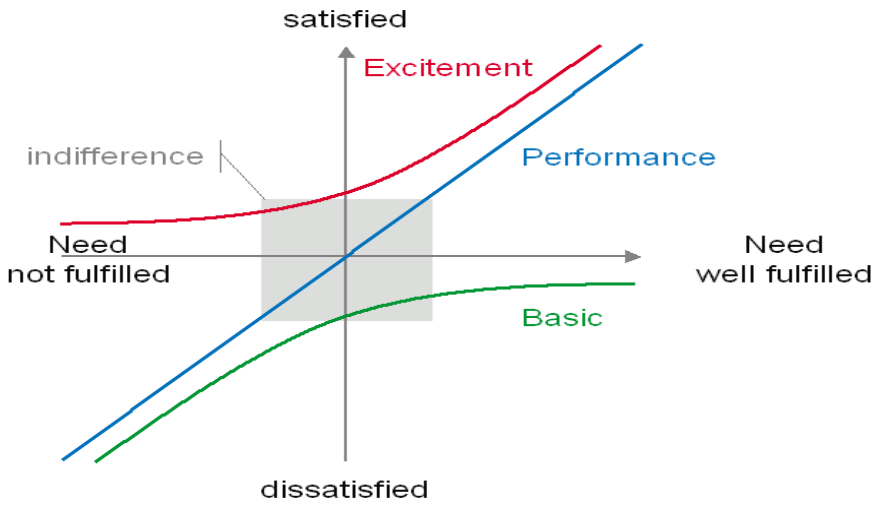
basic factors for granted but they get offended if they are not full filled by the service provider. According to Kano (1984) there is another factor that also contributes to customer satisfaction and this is known as the excitement factors. The excitement factors increases the levels of customer satisfaction when they are delivered but they do not cause dissatisfaction of the customers if they are not delivered to the residents. The excitement factors greatly surprise the customer and creates a zil or delight the customer. For an example in the case of City of Harare the residents are excited by the coming of the prepaid water meters but if the prepaid water meters are not installed this may not cause dissatisfaction of the customer by the conventional meter system.

In addition, the Third factor that Kano (1984) mentions is the performance factor. The performance factor also cause satisfaction of the customers if the performance is high. However, the performance factors can cause dissatisfaction if the performance is low. For instance if the provision of water is high the satisfaction levels is high and if the distribution of water is low the customers of the service providers tend to be dissatisfied by the services. Kano also mentions other three attributes which does not influence customer satisfaction and these attributes include indifferent, questionable and reverse attributes. Indifferent attributes are those attributes which the customer do not care about and in this case the customers may not be worried about the shape and design of the prepaid water meters. The reason why the customers are not worried about the shape of the prepaid water meters is that the shape doesn't have on the final outcome of the product which is water.

Questionable attributes is those kind of attributes which are not crystal clear if they are being expected by the customer or not. However these questionable attributes can have an impact on customer satisfaction in the case that the questionable attribute is the one that the customers are expecting of the product. The last attribute that Kano mentions is the reverse attributes. According to Kano the reverse attributes is the reverse of the product feature which is expected by the customer.

Kano's model is illustrated by the diagram below

Fig 2. 2 Kano's model



Source: Berger et al (1993).

The customer satisfaction model is of great importance to the study because it provides for the attributes that the City of Harare should meet in a bid to satisfy the customers by the services that they are going to offer through the prepaid water metering system. For an example Kano mentions that the performance factors should be high to attain customer satisfaction this certainly means that the performance of the prepaid water meters should be high thus being convenient and reliable that challenges to do with potable water metering are reduced in the City of Harare.

2.10 Service Quality models.

Quality can be defined as fitness to use thus according to Juran (1974). There are five main approaches that can be used to identify quality and the most applicable one to this research is the user based approach. In the user based approach, quality is compared with the satisfaction levels of the consumer thus according to Garvin (1984).According to Garvin (1984) the highest quality results the highest satisfaction levels for the customers. Local authorities are now mainly focused

on providing quality services to the residents to gain a sustainable competitive advantage, customer satisfaction and customer loyalty thus according to Yarimoglu (2014).

There are several factors that determine service quality. According to Parasuraman et al (1985) cited in Yarimoglu (2014) the first determinant of service quality is reliability which is "consistency of performance and dependability, accuracy in billing, keeping records correctly and performing the services right at the right time". This characteristic of the service is very crucial when it comes to service provision through the prepaid water meters because the prepaid water meter should be accurate when it comes to water billing and the smart water meter should be reliable such that it provides service and the right time.

Communication is another determinant of quality services. Parasuraman et al (1985) cited in Yarimoglu (2014) also purports that communication is keeping the customers informed about the new services being provided in a language that the customers understand and listen to them, explaining to the services itself and cost, assuring that the they problems they are facing will be handled. Communication is very important because the residents of Harare need to be communicated with by the officials of City of Harare and Councillor's about the new phenomenon of prepaid water meters because the more the officials communicate with the residents the more the chances to the residents to be satisfied because they would have attained knowledge about the smart water meters.

Moreover, understanding and knowing the customer is another factor determine service quality. According to Parasuraman et al (1985) knowing the customer involves understanding the needs, learning the customer's specific requirements, proving individuals the attention they require. This aspect of knowing the customer very crucial of local authorities like the City of Harare who have introduced the smart water meters on a pilot survey because the City of Harare officials have to know the actual specifics or attributes of the smart metering systems that the residents want.

Last but not least, responsiveness is another critical factor that determine a service quality. Responsiveness include the willingness or readiness of the to provide the service to the customer quickly thus according to Parasuraman et al (1985) cited in Yarimoglu (2014). Therefor for the City Council of Harare to provide quality services in terms of water provision the city officials should be willing to respond quickly to the challenges which will be faced by the residents concerning the prepaid water meters as provided in the client charter of the of the City of Harare.

2.11 Case study of prepaid water meters.

Windhoek, Namibia case study.

Most parts in the country of Namibia are arid areas and this has greatly contributed to water shortages that are currently being experienced in Namibia. The local authority of Windhoek have been seeking ways to minimize water shortages and wastage thus according to Heyman et al (2014).The Windhoek City Council also sought to improve the collection of revenue from the residents since most residents did not pay their water bills and this has proved to be a challenge to the Windhoek City Council which is the service provider. Thus according to water and sanitation report program (2014). Therefore, several challenges that where being faced by the Windhoek City Council when it comes to provision of potable water made the local authorities officials to engage in a pilot survey of installing smart water meters in the year of 1998.According to Heyman et al (2014) the department of infrastructure , water and technical services was the one that where responsible for the smart water meters installation in Windhoek and the employees worked closely with the community development division to address issues to do with user training getting feedback on performance and addressing challenges that where being faced by the residents.

The prepaid water meters improved the access to potable water to the residents of Windhoek and the use of the prepaid water meters was the fairest way of the residents and the Windhoek City Council as both patties benefited from the smart water meters. According to the World Bank (2014) the residents benefited because the gained access to potable and enjoyed the value of their money and the local authority also benefited from the prepaid water meters because there was an increase in revenue generated from the water bills by the Windhoek City Council, and a lot of water was saved because the smart water meters discourage water wastage.

Another type of prepaid water meters was introduced at a larger scale in Windhoek in the year of 2010.The newly introduced prepaid water meters were removed in the City of Windhoek was removed within 18 months because of a plethora of problems encountered chief amongst them was to do with data losses thus according to the World Bank (2014). Scholars like Marvin et al argue that customer satisfaction can be achieved user driven smart metering which gives the residents direct information about consumption and tariffs which is visible at home. The smart water meters installed where not reparable hence they had to be sent back to the supplier and issues of data losses associated with the smart water meters in Windhoek made the customer feedback about

smart water meters positive thus according to Heyman et al (2014). The challenges that were encountered made the Windhoek City Council officials to realize that they incurred a lot of costs in trying to maintain the meters because there was no guarantee hence they opted to another type of smart water meters that was reliable and efficient. It is of great importance to note that the prepaid water meters was an achievement Windhoek City because it increased the revenue base and reduced the amount of consumption of people which resulted in saving of water.

2.11 Case study of Zambia.

In Zambia in the City of Lusaka the Lusaka Water and Sewerage Corporation (LWSC) embarked on a program to install smart water meters. There was several challenges in the provision of potable water that resulted in the LWSC to introduce the smart water meters chief amongst them was increased cost of doing business, high water demand since Lusaka is one Africa's fastest growing cities and poor revenue collection thus according to Heyman et al (2014). The LWSC engaged in a pilot survey for smart water meters prepayment for individuals in year 2007, in the suburb of Libala which had water supply throughout the whole day. However, the residents of Libala faced challenges with the prepaid water meters and these challenges involves the need for batteries to be replaced within months, valves jamming, some credit purchases did not register properly with on the meters and that leaks caused software errors thus according to the Water and Sanitation full report (2014). Scholars liked Heyman et al (2014) purports that an "estimated 60% of the smart meters were delivering free water because valves had jammed open" this then result in the LWSC losing a lot of funds through the non-revenue water. The LWSC then opted for a new prepaid water system because the old metering system proved to be expensive for the LWSC.

In mid-2013 the Ministry of Local Government and Housing issued a directive to all Zambian local authorities to install prepaid water meters on all government properties and institutions such that they do not into arrears with the local authorizes thus according to research conducted by Heyman et al in (2014). The installation of the prepaid water meters on government institutions increased the revenue generation in the coffers of LWSC and the local authority was able to meet the water demands though a lot of people in Lusaka complained about the low pressure of water.

2.12 Knowledge gap.

There has been great debate amongst the resident's and the officials of Council on whether the prepaid water meters should be rolled out on a larger scale in the city of Harare. The real question the researcher feels is really important is about the satisfaction levels of the residents and the Council officials concerning the prepaid water meters. The previous research that has been written about the prepaid water meters mainly focused on the applicability of the prepaid water meters in the urban setup, assessing the impact of the prepaid water meters without much attention being paid on the perceptions of the residents and their satisfaction levels. Also literature about the participation of the residents in policy making which is explained through the model of participation by Ainstein (1969) greatly shows that a little is done in engaging the residents in matters that affect them.

2.13 Chapter Summary

This chapter greatly explored the previous literature and studies that was done concerning the prepaid water meters that are local, regional and international citing relevant scholarly articles and field studies. The Literature review was generally guided by the research objectives and research questions. This chapter also explored the conceptual frame work that is associated with the concept of prepaid water meters. In the theoretical frame work theories, models and case studies were explained for better understanding of the topic understudy. The next chapter is going to be chapter 3 and it is going to address issues which has to do with the methodologies of the study.

CHAPTER III

RESEARCH METHODOLOGY.

3.0 Introduction.

The previous chapter focused on the literature that was written by other scholars about the prepaid water meters. In this chapter the researcher is going to explore the methods that are going to be used in the research in a bid to find data of the identified problem and proffer solutions. This methodology chapter is going to cover concepts which include the research approaches, research designs, data sources, target population, sampling procedures, data collection, the ethical considerations and the research instruments of the topic under study.

3.1 Research Approaches.

The researcher used the mixed research design which is a procedure for collecting, analyzing, and "mixing" both quantitative and qualitative research and methods in a single study to understand a research problem thus according to Bhawna et al 2015. Bhawna (2015) further argues that a mixed methods approach is one in which the researcher tends to base knowledge claims on pragmatic grounds. Aliaga et al (2000) defines quantitative research is "explaining phenomena by collecting numerical data that are analyzed using mathematically based methods". Scholars like Neuman (2007) concurs with Aliaga and his companion by arguing that quantitative researchers use a numerical data approach which requires detailed planning to data collection.

Qualitative research is also described by (Creswell 1994) as an "unfolding model that occurs in a natural setting that enables the researcher to develop a level of detail from high involvement in the actual experiences". Therefore, the qualitative research is mostly concerned with the generalized information or facts gathered from the field. The researcher has chosen to the mixed method research because the mixed approach allows for the researcher to have new insights and having a deeper understanding of the problem at hand. The mixed method approach is appropriate in this study because the quantitative approach disadvantages are covered for by the qualitative approach or the other way round.

3.2 Research designs.

Research design is a plan which shows how the researcher is going to undertake all activities and procedures in gathering and analyzing data. The research design that the researcher is going to use includes the qualitative and quantitative research design. Under the quantitative research design the researcher is going to use the descriptive research approach. Descriptive research design is process of portraying an accurate profile people event, situation or variable understudy so as to make a prediction or gain a clear insight of the issue.

The searcher is also use the exploratory research approach which is part and parcel of the qualitative research. According to Shukla (2010) the exploratory research design is a "technique of data collection which focuses on collecting data from relative small number of respondents by asking questions and observing behavior. Exploratory research gives is crucial clarity to vague questions through the use of open ended questions, in-depth interviews and focus group.

3.3 Population of Interest.

The target population of this research is 100 respondents . Seventy-five (75) of the targeted population involves the residents were the prepaid water meters where installed as part of the pilot survey done the City of Harare. Fifteen (15) of the target population includes the industrial and business community located in the central business district. Ten (10) others are going to be employees of the City of Harare who have knowledge about the prepaid water meters and these may include the engineers and committee officers.

3.4 Sample size.

The sample size of this research is 80 respondents. This is because Krejcie and Morgan model (1970) suggests that if the targeted population is 100 the sample size is supposed to be 80. The Krejce and Morgan model of 1970 is illustrated by the diagram below.

Table 3. 1 Krejce and Morgan Model

TABLE FOR DETERMINING SAMPLE SIZE FROM A GIVEN POPULATION

N	S	N	S	N	S	N	S	N	S
10	10	100	80	280	162	800	260	2800	338
15	14	110	86	290	165	850	265	3000	341
20	19	120	92	300	169	900	269	3500	246
25	24	130	97	320	175	950	274	4000	351
30	28	140	103	340	181	1000	278	4500	351
35	32	150	108	360	186	1100	285	5000	357
40	36	160	113	380	181	1200	291	6000	361
45	40	180	118	400	196	1300	297	7000	364
50	44	190	123	420	201	1400	302	8000	367
55	48	200	127	440	205	1500	306	9000	368
60	52	210	132	460	210	1600	310	10000	373
65	56	220	136	480	214	1700	313	15000	375
70	59	230	140	500	217	1800	317	20000	377
75	63	240	144	550	225	1900	320	30000	379
80	66	250	148	600	234	2000	322	40000	380
85	70	260	152	650	242	2200	327	50000	381
90	73	270	155	700	248	2400	331	75000	382
95	76	270	159	750	256	2600	335	100000	384

Note: "N" is population size
"S" is sample size

Krejcie, Robert V., Morgan, Daryle W., "Determining Sample Size for Research Activities", Educational and Psychological Measurement, 1970.

3.5 Sampling procedures.

The researcher used two sampling techniques that is the stratified random sampling technique and purposive sampling technique.

Probability Sampling Technique.

3.5.1 Stratified random sampling.

According to Shakla (2010) "stratified random sampling involves two steps which includes dividing into mutually exclusive and collective sub populations which are called strata, the second step is simple random selection of the people independently from each group or strata". The population was put into strata's according to their location for an example the residents with prepaid water meters in Budiriro 3 were in one strata. The researcher put residents or population

from the same area in one strata to avoid a case of unequal representation of whereby the residents of area are more than the other. The researcher has chosen this stratified random technique such that they will equal representation and avoid bias in the research.

3.6 Non probability Sampling.

Purposive Sampling Technique.

Purposive sampling technique is a sampling technique that the researcher use and select the people that have the potential of giving the researcher accurate information that is required or appropriate to the research. Therefore, purposive sampling is based on the researcher's judgment of the respondent's ability to give information thus according to Palys (2008). This kind of sampling technique is usually used when an informative research is being carried out. The researcher has chosen purposive sampling technique because it is very effective in an exploratory research especially at the early stages of the research and that it saves time and less costs are incurred. However, judgmental sampling technique has several demerits and these include generalization of information and sample errors thus according to Shalka (2010)

3.7 Data Collection Tools.

3.7.1. A questionnaire.

The researcher used the questionnaire as the research tool to collect information from the respondents. According to Abawi 2013 "a questionnaire is a data collection instrument which consists of a series of questions and other prompts for the purposes of gathering information from respondents". The researcher is going uses the questionnaire to collect data or information from respondents through writing. The questionnaire can have closed or open ended questions. The respondents can complete the questionnaire at their own time with or without the researcher presents. There are several advantages and disadvantages which are associated with using the questionnaire as a data collection tool which are as follows.

Advantages.

- The respondents answered the questionnaire in presents of the researcher thus giving feedback quickly and this allowed the researcher to clarify some of the questions that the respondents did not understand.

- Responses from the questionnaire were quickly be analysed since most similar responses are easily identified by the researcher.
- The self-administered questionnaires that were left by the researcher to complete allows for privacy because they were completed in the absence of the researcher hence the respondents are bound to give real facts without bias.
- Questionnaires collected large qualities of data from considerable people over a short period of time and this made research to spend less time in the field doing research.
- Statical data was be analyzed so that new theories can be formulated.

Disadvantages.

- Questionnaires were expensive since they were being administered to a large number of respondents.
- The element of body language was totally lost because some of the questionnaires that were used where left for the respondents to answer in absents of the researcher.
- Some questions in the questionnaire were not answered and some of the questionnaires that were left for the respondents to answer in absents of the researcher were not returned hence that may limited or distort the actual results of the research.
- When designing the questionnaire tend to assume that they know what is important.
- Validity of data may be reduced by unwillingness or inability of the respondents to give accurate replays to the questions asked.

3.7.2. Interviews.

There are several types of interviews but the researcher is used face to face structured interviews. According to Abawi (2013) in structured interview the questions as well as their order will be prepared already by the researcher. Corbetta (2003) purports that "in a structured interview all the respondents will be asked the type of questions with the same wording and the same sequence". Interviews are appropriate in this study since it gives the researcher room to give clarity about the questions thus allowing for probing. According to Leedy and Ormrod (2001) face to face interviews has the following advantages and disadvantages.

Advantages of interviews.

- It allowed for high response rate
- They are a flexible tool of collecting data since the respondents are allowed to express themselves further.
- They explore each issue in detail and allows for qualitative data capturing of variances.
- Nonverbal cues are captured during research.
- Allows the researcher to ask for clarity on ambiguous answers.
- They allow the respondents to provide more explanation is the answer provided is vague.

Disadvantages

- It was time consuming because some of the respondents explained the same concept over and over again.
- It was expensive since the researcher had to spend the whole day in the field.
- It was tiresome since a large number of participants was involved.
- Impractical when large samples are involved.

3.8. Data sources.

This research used two data sources which is the secondary and primary data sources. Secondary Data involves the collection of data that already exist at the body of knowledge. According to Greener (2008) "secondary data is the data that the researcher did not collect themselves directly from the respondents or subjects". The researcher is going to use the secondary sources that are able to answer the research questions and objectives. In this research the researcher is going to use secondary data sources like internal sources which includes company reports and memorandums. Expert advice like newspapers, reports and interviews are also going to be used as secondary sources to the ongoing research. The researcher is going to use the mentioned above sources because they give the researcher information that solves the research problem without incurring too much costs.

In this study researcher used primary data sources. Primary data sources are sources which the researcher gets firsthand information and these may include questioners, interviews and focus

groups. The searcher has chosen theses sources because they are unique and specifically addresses the objectives and research questions of this research.

3.9 Pretesting.

The researcher did a pilot survey to test if it is feasible to use the research instruments that are created in the actual world. This exercise helped the researcher to identify the areas that the researcher has made a mistake when preparing the research instruments and make amendments. For an example the questionnaire that may seem to make sense for the researcher may prove to be ambiguous and confusing to the respondents thus a pilot survey gives room for corrections of the research methods to be used in the study. The researcher also realized that the business community were not considered when formulating the research instruments when the researcher was doing the pilot survey. The pretest survey is going to be carried out in the suburb of Budiriro.

3.10 Data presentation.

The raw data that is going to be collected from the field through the interviews and questionnaire is going to be classified according to its similarity. The researcher explained the qualitative and quantitative data that was be collected in the research making use of pie charts, bar graphs and narrating to present the findings of the research.

3.11. Ethical considerations.

The researcher asked for permission to carry out the research from the Midlands State University and from the City of Harare. The researcher is also observed the highest level of confidentiality by just using the information obtained during the research for research purposes only. Moreover, the researcher is did not write the names of the respondents such the respondents will not be victims after the research is done. The researcher was also formally dressed whenever he collects data in the field.

3.12. Chapter summary.

This chapter mainly focused on the research methodologies that will be used in the research. Several factors were explored in the research methodology and these include the research approach, the research design, targeted pollution, sampling procedures, pilot survey, data presentation and the research instruments to be used in the research. The researcher also explored the advantages and demerits which is associated with the research instruments used in the study.

The next chapter is going to focus on the research findings, data presentation and analysis. In the next chapter graphs and charts are going to be used to explain the findings of the research.

CHAPTER IV

DATA ANALYSIS AND PRESENTATION.

4.0 Introduction

This chapter is mainly going to focus on data analysis and presentation of the data that the researcher gathered from the field. The researcher used interviews and questionnaires to collect information from the residents and the Council officials. Therefore, the information that was collected from the respondents by the researcher is going to be analyzed and presented using summary paragraphs, tables, pie charts and histograms. This chapter is going to address matters which has to do with the demography of the respondents and explore the resident's experiences with the smart water meters in the City of Harare.

4.1 Response rate of the questionnaires.

The researcher used several research instruments which included a questionnaire and interview guides. The researcher used self-administered questionnaire which were answered by the respondents in the presence of the researcher. This then resulted in the researcher helping the respondents by giving them clarity and interpretation of some of the questions that they didn't understand and also the fact that the questionnaire resulted in the researcher taking less days in the field .There was high response rate of both the questionnaires that given to the employees of City by the diagram below.

Table 4. 1 Questionnaire response rate.

Department and Residents.	**Participation**	**Targeted size**	**Response in percentage**
Committees	5	5	100%
Engineering	4	5	80%
Residents	50	60	83%
Business Community	10	10	100%

Source: Primary Data 2018.

The diagram above greatly shows that there was high response rate to the administered questionnaires. However the response rate of the questionnaires administered to the residents was affected since some the questionnaires that the researcher left behind to be completed in absence of the researcher were not returned. Some of the questionnaires were not answered because some of the residents were not available to answer the questionnaires and that some of the residents were just not willing to answer.

4.1.2 Response rate of the interviews.

The researcher also used the interviews to gather primary data from the respondents. The interviews consumed more time for the researcher in the field because more questions were asked to the respondents when vague answers where provided and the targeted population was high was 80 people hence this consumed more time of the researcher in the field. The response rate of the interviews from the field is illustrated by the table below.

Table 4. 2 Interview response rate.

Types of respondents	Targeted size	Participants	Response rate%
Residents	60	45	75%
Business Community	10	10	100%

Source: Primary Data 2018.

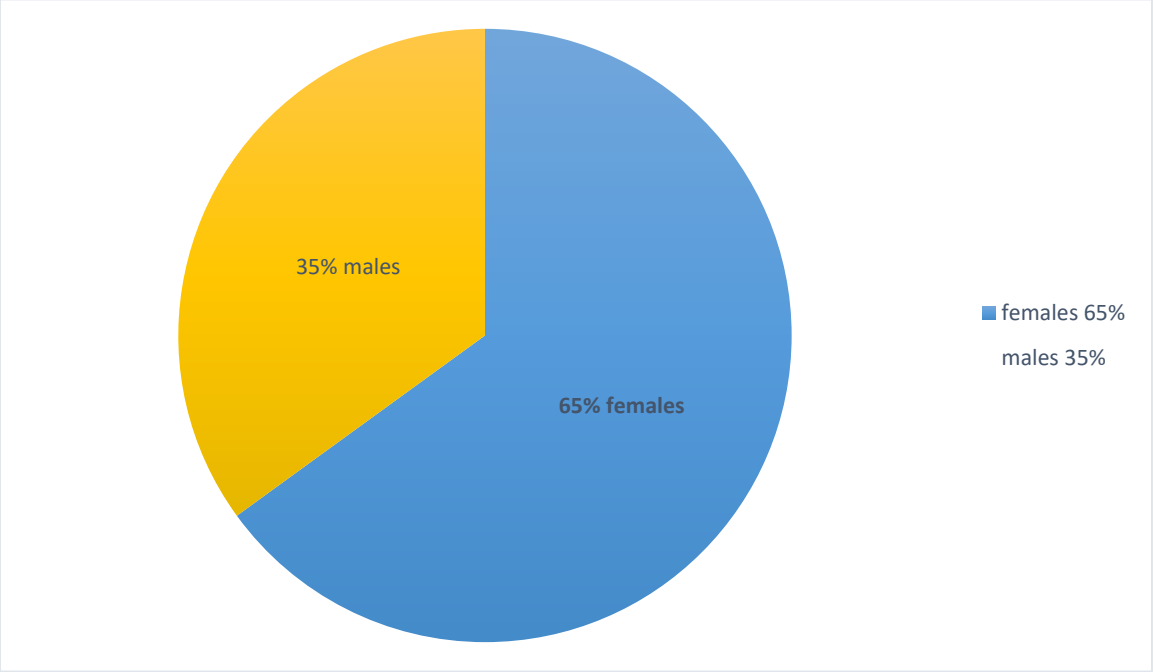
Information provided in the diagram above shows that 45 residents participated in the interviews. Other residents did not participate in the interviews because most of them claimed that they were busy hence they could not be interviewed. The above table also shows that the response rate of the business community in interviews was very high. This may be attributed to the fact that the business community valued the research since it has impact on their businesses.

4.2 Demographic data presentation.

4.2.1 Classification of respondents by gender.

The data that was collected by the researcher showed that the gender the gender that the highest response rate was the females who had 65% response rate. The response rate of females is high compared to that of males which was 35%.The high response rate of the females might be attributed to the fact that most families are dominated by females and the fact that when the researcher visited the field females where the most available respondents. The response rate of females was also high because the researcher targeted females because they are the ones that uses water the most since all the house hold chores are mostly done by the females. The response rate by gender is greatly diagrammatically illustrated below by the pie chart

Fig 4. 1 sex demography.



Source: Primary data 2018

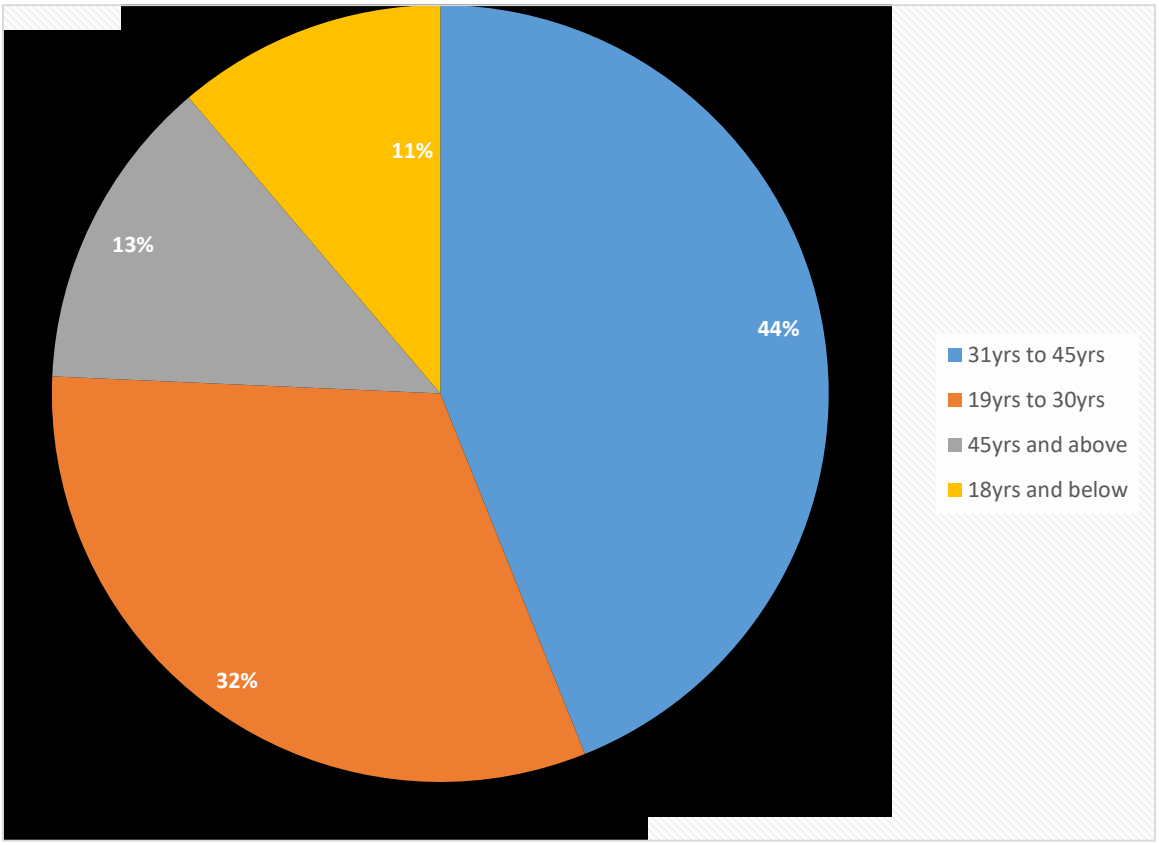
4.3 Classification off respondents by age.

The information collected by the researcher revealed that the majority of the respondents was 44% which were people ranging from the age of 31 to 45 years. This may be attributed to the fact that when the researcher did the field survey the researcher targeted the elderly people who had the capacity to give valid information about water. The second highest response rate was 32% and it

was from the respondents whose age range between19 to 30 years. The response rate of this age group was lower to that of 31 to 45 years due to the fact that when the researcher did the field survey most people who range between where at work so the researcher did not get a chance to give them questionnaires and interview them.

The third group of the respondents had 13% and the age range of this group was 45 years and above. The response rate of this age group was low and this may be attributed to the fact that most of the people with the age range of 45years and above reside in the rural areas. The group which had the lowest response rate was the group with an age range of 18 years and below which had a response rate of 11%. This group response rate was quite low because of the fact that this group could not provide information that the research really wanted concerning water charges and use. The response rate of the residents according to age is illustrated by the diagram below.

Fig 4. 2 classification of respondents by age.



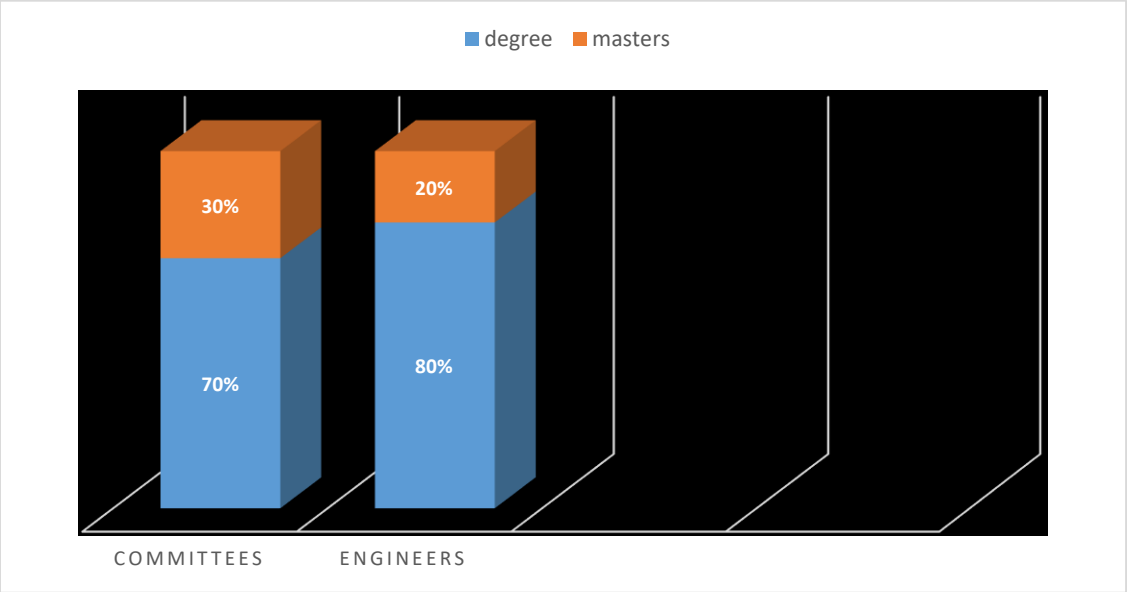
Source: Primary data 2018.

4.4 Education level of the respondents.

Academic qualification of the Council officials.

Most Council officials who participated in the study as respondents were educated since all of them were degree holders and some the respondents had masters degrees. For an example the Committee officers that participated as respondents in the study 70% of them had degrees and 30% had master's degree. Also the Engineers that were respondents to the study were also educated since 80% of them were degree holders and 20% were master's degree holders. This greatly shows that most of the officials in Council who occupy high positions such as Committee officers and Engineers are educated hence their participation in the study would result in the officials' providing viable information. The fact that the officials of the City of Harare are educated means the officials are able to identify the challenges faced concerning water metering systems and proffer solution to the problems identified. The diagram below shows the education levels of the officials of City of Harare that participated in the study.

Fig 4. 3 Academic qualifications for Council officials.

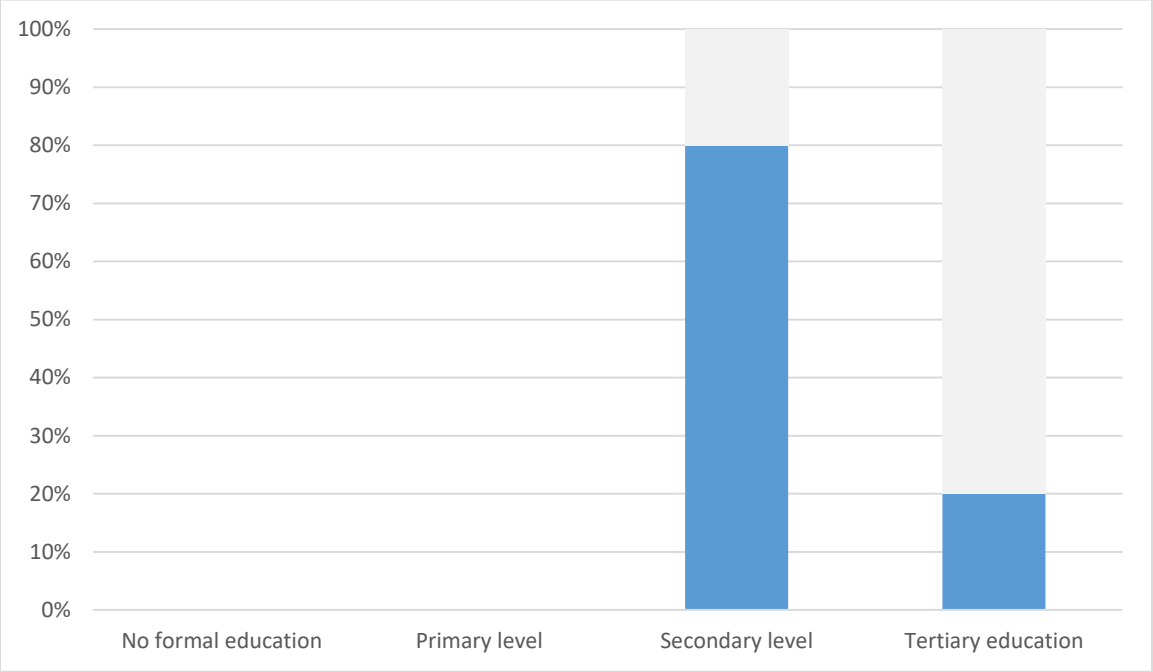


Source: Primary data 2018.

4.5 Academic qualifications of residents.

In the field survey that the researcher conducted the information gathered showed that the 80% of the residents have attained secondary level education. However, the other 20% of the respondents that participated in the survey have attained tertiary education. The fact that most of the residents that participated in the study were educated certainly means that the residents are in a better position to provide viable and relevant information to the researcher. Most of the residents that the researcher interviewed and administered questionnaires to had the academic qualification which are illustrated by the diagram below.

Fig 4. 4 Academic qualifications of residents of Harare with smart water meters.

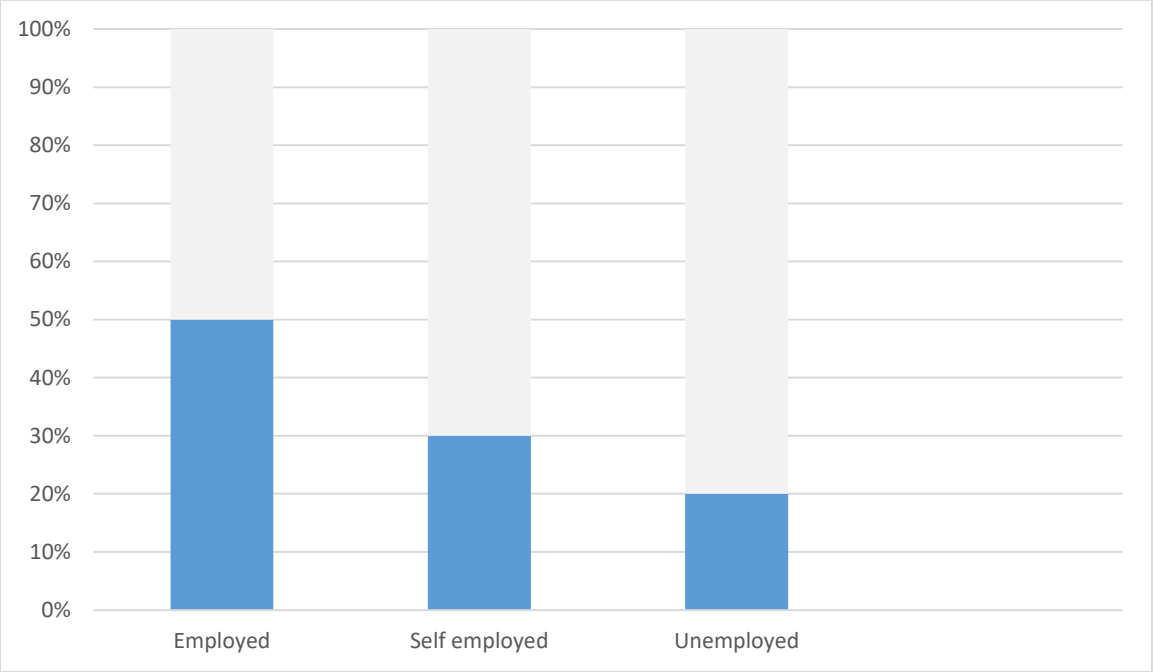


Source: Primary data 2018.

4.5 Economic status of the residents with smart water meters.

Information gathered from the field greatly shows that 50% of the residents who participated in the study in the study were formally employed. The other 30% of the respondents were self-employed in the informal sector and the remaining 20% of the respondents were unemployed. Therefore, the fact that the majority of the respondents were employed meant that the residents are able to pay their water bills since they have a source of income. The economic status of the residents that participated in the study are illustrated by the diagram below.

Fig 4. 5 Economic status of the residents with smart water meters.



Source: Primary data 2018

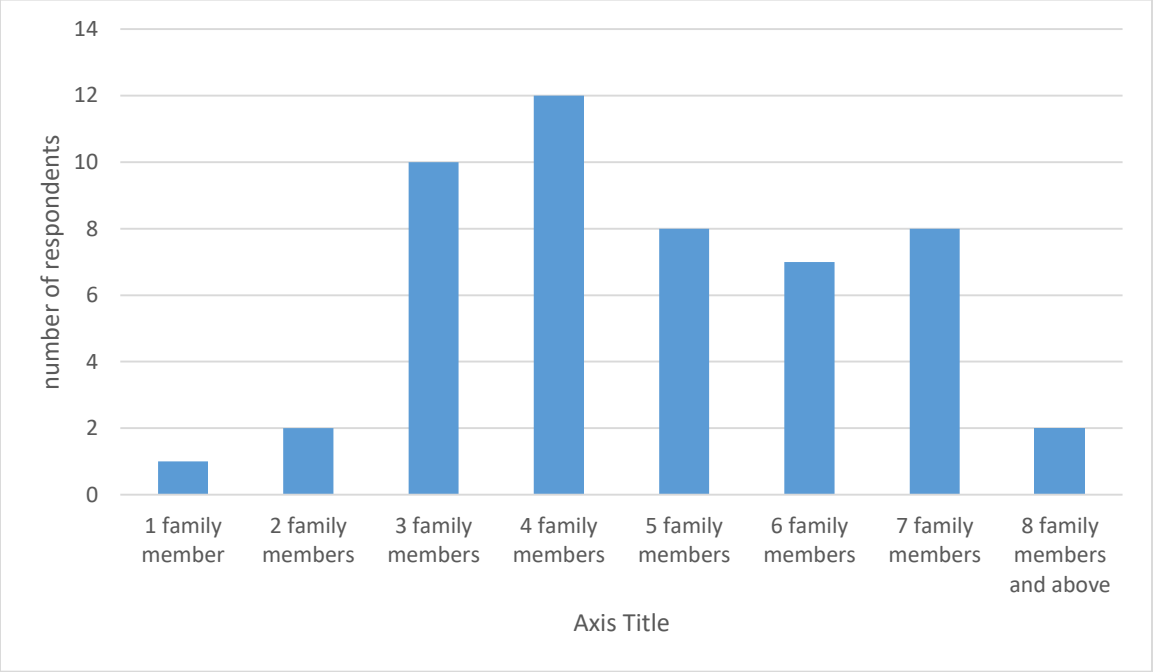
4.6 Average size of households with smart water meters.

The researcher gathered information about the average number of family members of residents with prepaid water meters. The analysis of the gathered showed that 20% of the respondents responded that the average number of their family was 4 family members and this was the largest number of occupants of households with the prepaid water meters. Seventeen percent (17%) respondents also replied that the average number of their family members was 3 family members and this was the second highest occupants of households with the smart water meters.

Moreover, thirteen percent (13%) respondent's also replied that their household has an average of seven family members. This was the third highest occupants of household with smart water meters. The fourth highest occupants was five (5) family members thus according to the responses provided by 13% of the respondents that answered the questionnaire. Twelve (12%) respondents also responded that the average number of their family members was six family members and this was the fifth highest occupants of households with prepaid water meters.

In addition, two percent (2%) respondents also replied that their households have eight (8) family members and this class was the sixth highest number of occupants of households with the smart water meters. Other three percent (3%) of the respondents also replied that the average number of their family members was two family members. This class was the seventh highest number of occupants of households with the prepaid water meters. One responded also replied that their household has only 1 family member and this was the smallest number of occupants of household with smart water meters. The information described above is greatly illustrated by the diagram below.

Fig 4. 6 the average size of households with smart water meters.



Source: Primary data 2018

4.7 Classification of the residents according to suburb.

Table 4. 3 classifying residents according to their suburb.

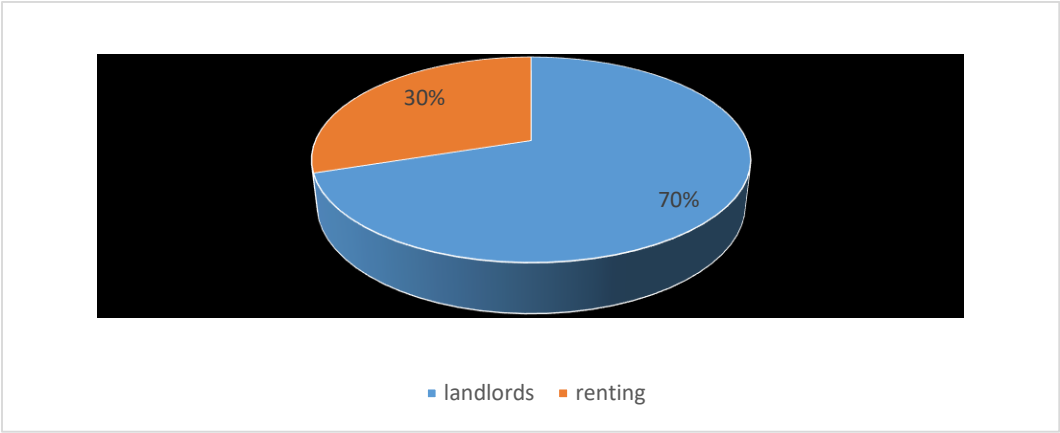
Type of residence	Targeted population	Number of respondents
High density suburb	20	20
Medium density suburb	20	16
Low density suburb	20	14

Source: Primary data 2018.

From the diagram above it is evident that out of 20 respondents that were administered questionnaires in residential areas like Glen Norah, Budiriro and 100% of the respondents replied that they resided in high density areas. The high response rate in high density areas can be attributed to the fact that in high density suburbs were available when the researcher administered the questionnaires. Also out of the 20 questionnaires administered in areas like blufhill and Mountplesent and 80% of the residents replied that they lived in medium density areas and the other 4 questionnaires were not returned. The failure to return questionnaires by the residents may be attributed to the fact that the residents were not available when the researcher came to collect the questionnaires. Also in areas like Borowdale and Avenues 20 questionnaires were self-administered and out of the 20 questionnaires 70% of the people responded that they live in low density suburbs. The other 6 questionnaires were not responded to because most the selected houses the gates where locked hence the researcher could not get a chance to administer the questionnaires.

4.8 Tenure of households with the smart water meters.

Fig 4. 7 tenure of households with smart water meters.



Source: Primary data 2018.

From the information provided in the diagram above it is vivid that from the data collected by the researcher in the field 70% of the households with the smart water meters were occupied by the land lords or the owners of the households. However, the remaining 30% that occupy the households with smart water meters are people renting the households.

4.9 Perceptions held towards Consultation and engagement of the residents.

Out of the 60 residents that were distributed questionnaires to 45 of them responded that they were not consulted or engaged in the policy making and implementation of the smart water meters by the City of Harare. The main cause of this level of dissatisfaction with engagement was mainly caused by the fact that most of the adverts that used by the City of Harare was not done through main stream media houses like Herald. According to the Ansteins ladder of participation which is propounded by Anstein (1960) the residents of the City of Harare would be found at the bottom because most of the residents were not satisfied with the consultation and the engagement measures that were done by the City of Harare. However the Council officials claimed that they consulted the residents. Also the business community who were asked if they were consulted they responded they were consulted by the officials of the City of Harare through social media and invitation letters.

4.10 Perceptions held by the customers toward water charges.

Of all the respondents that participated in the study 90% of them responded that they were satisfied with the water charges that are currently being charged by the City of Harare. The residents were satisfied by the water charges that are currently being provided by the City of Harare because most of the residents claimed that they are now able to control their consumption and their budget since they know the amount of water they need to consume a month. Some of the respondents replied that they are satisfied by the smart water meters because the smart water meters unlike the conventional meters there is no estimation of the water bills so the residents claimed that they consumed what they have paid for in advance. The findings of this research are similar to the findings of Heyman et al (2014) who purports that 60% of the residents of Lusaka are satisfied with the portable water charges which are currently being charged.

4.11 Perception held by the clients towards availability of potable water.

Ninety percent (90%) of respondents that were administered questionnaires replied that potable ewater availability has not improved after the introduction of the prepaid water meters. Shortage of the availability of potable water can be attributed to the fact that the sources of portable that pumps water in areas with the prepaid water meters is the same that provides the areas with the conventional meters. Scholars like Manzungu et al (2016) purports that the availability of water in the City of Harare is also affected by a combination of topography and hydrology as other areas receive portable while others receive nothing. However the other 10% of the respondents were satisfied with the availability of the potable water in their areas. These residents were satisfied by the availability of water because most them are occupied by work during the day and when they go back home at night water will be available since at night a minimum number of residents will using water compared to day time.

4.12 Perceptions towards distribution of potable water.

The residents that were interview and administered questionnaire to 90% of them claimed that the distribution of potable water has not improved after the introduction of the prepaid water meters. The challenge of unfair distribution of potable water in Harare can be attributed to the fact that the smart water meters were installed in a few areas that were chosen for the pilot survey so no major changes can be seen in terms of distribution of water. According to Zimstat (2012) the water that is provided by the City of Harare only caters for 40% of the population of Harare because a lot of

water is lost through non-revenue water. The fact that the distribution of portable in the City of Harare is greatly affected by non-revenue water is supported by the pictures below that was taken by the researcher in the field.

Plate 4. 1 non-revenue water in industrial areas in Harare.

However, the other 10% of the respondents replied that they were satisfied by the distribution of water in their areas. This can be attributed to the fact the areas they live in are located at low gradients so potable water is always available to them.

4.13 Challenges faced by clients after the installation of the smart water meters.

The participants that the researcher interview reported that they faced challenges concerning the introduction of the prepaid water meters. Most of the said that they faced a challenge in terms of paying their water bill at night when their water is cut because the credit will be exhausted. Also the majority of the respondents said that they faced a challenge because the potable water is not available most of the time in the areas they reside in. other residents claimed that their hygiene

was compromised since they are forced to use minimum water because of the fact that are not able to afford a lot of potable water. The business community people that were interviewed said that they are not willing to share water with their neighbors because water is now an expensive commodity. There are some residents that also faced a challenge items of their water because the water meter loosed information. The other 10 % of the respondents claimed the major challenge they have faced concerning the prepaid water meter is the loss of information of the water bill challenge concerning smart water meters and this required them to visit the council offices. Another 20% of the respondents suggested that the introduction of prepaid water meters in this area by the City of Harare has proved to be a challenge to famers because we are not able to afford water to irrigate their gardens. These findings are similar to Heymans et al (2014) findings in Lusaka where by the residents faced a challenge of not affording to buy portable for their normal daily activities.

The Council officials that were also interviewed also replied that supply of the prepaid water meters gadgets is a challenge. Another change that was faced after the introduction of the prepaid water meters was resistance of residents which was promoted by the non-governmental organization like the Harare Residents Trust association. The views above by the residents of Harare greatly shows that the smart water meters has brought about challenges to some of the residents in the City of Harare. The fact that the prepaid water meters installation was resisted by the residence is similar to the findings of RASSP (2005) which purports that the residents of Soweto resisted the installation of smart water meters because the local authority did not engage the residents.

4.14 Advantages of smart water meters.

Of all the residents that the researcher administered questionnaires to and interviewed all of them acknowledged that the smart water meters has got several advantages over the conventional meters. The majority of the respondents reported that the smart water meters are a water conservation tool. 30 % of the residents also suggested that the smart water meters are cheaper to use compared to the convention meters we previously used. Another 30 % of the residents claimed that the prepaid water meters are cheaper to use when your family is small but when your family is big the water bills will also increase. The perceptions above that were provided by the residents of Harare that the smart water meters are cheap are similar the views of Gass (2012) who purports

that the smart water meters are cheaper since prize regulations allows for affordable rates. The Council officials who participated in the study also replied that the advantage associated with the smart water meters is that it is a credit management tool for the City of Harare and that it is a debt recovery tool.

4.15 Suggestions for improvement.

The city of Harare that participated in the study suggested that the smart water meters should be rolled out on a large scale to solve the challenges which has to do with challenges currently being faced by the residents concerning water metering and supply of water. Other officials of the City of Harare from the engineering department also suggested that Council should extend the project to other suppliers to increase competition and expedite installation of the smart water meters. The residents that were interviewed by the researcher suggested that the City of Harare should partner with well-established private companies to improve service delivery in terms of provision of portable water.

4.16 Perceptions held by citizens about portable required per day.

Eight (80%) of the residents from the high density suburbs that were interviewed suggested that their families are big because of extended family hence they require large amount and most of them suggested that they require an average of 150 liters of water just for domestic use. Residents from the middle and the low density suburbs suggested that their families are small hence most of them suggested that they require potable water which is around 60 liters a day.

4.17 Sources of income for the residents.

Fifty percent (50%) of the residents that were interviewed suggested that their source of income was their salaries since their employed in the formal sector. Another 30 % of the residents that participated in the study also suggested that their source of income is the funds they get from their businesses and that some of their income comes from pension funds. However, the other 20% of the residents of Harare that contributed to the study said that they don't have any source of income because they're not employed.

4. 18 Perceptions towards willingness to pay for potable water.

Findings from the field survey showed that 90% of the residents are willing to pay their water bills because they suggested that installation of the prepaid water meters has allowed them to realize the value of their money since the credit is only deducted when they use potable water only. This

therefor, greatly shows that the installation of the smart water meters is a noble idea to most of the residents of the City of Harare. These findings are supported by Manzungu et al (2016) who suggests that residents are willing to pay their bills as long as they realize the value of their money. However they are other residents are just paying because it's their responsibility to pay. This is envisaged by the respondents who claimed that they just pay the water bills not because they are satisfied with the service provision but because it's their duty and responsibility as a resident to pay water bills. The perception above by the respondents shows that there are some residents who just pay their bills because they understand that it's their responsibility to pay for the services that are provided by the City of Harare. The other 10% of the respondents suggested that it's not worth it to pay the water bills because most of the time they will be no potable water in their residential areas.

4.19 Perceptions towards debt recovery measures by the City of Harare.

Most the City of Harare officials that participated in the study concurred each other by suggesting that the smart water meters are a cost recovery tool and a debt recovery tool since the debtor's book of the City of Harare has been greatly increasing. The officials of the City of Harare claimed that after the introduction of the prepaid water meters in the City of Harare there has been an improvement in debt recovery in the areas where the prepaid water meters are installed.

The residents of Harare that were respondents in the interview perceived that the smart water meters debt recovery measures are fair for them. 80% of the residents that participated in the interview sessions suggested that the smart water meters debt recovery measures are fair and reasonable since Council only deducts 15% of the funds paid to cover debts. The reply above by the resident shows that the resident is mostly satisfied because the amount that the City of Harare is deducting to cover the debts is reasonable. The findings of this research are similar to those of Seas (2012) who argues that most of the residents in South Africa were satisfied with the debt recovery measures by the local authorities. The business people that were also respondents to the interviews suggested that the debt recovery measures being taken by the City of Harare through the smart water meters is very effective unlike the previous measures of sending debt collectors which did not yield results because of corruption.

4.20 Improvement in revenue generation in Council.

The Council officials that were administered questionnaires to responded that in the areas where the smart water meters are installed there has been a massive improvement in terms of revenue generation in the coffers of the City of Harare. The massive improvement of revenue generation after the introduction of the smart water meters can be attributed to the fact that the residents has to pay for the service before the Council offers the service to the customers. Also the debt recovery measure being taken by the City of Harare has also resulted in the improved revenue generation in Council.

4.21 Customer perceptions about potable water quality.

The business people that were asked questions in the interviews done by the researcher most of them suggested that they are not satisfied with the water quality that is being supplied by the City of Harare**.** The residents that were also interview suggested that the quality of water that is being supplied by the City of Harare is very poor. 45% of the respondents suggested that the quality of water that is currently being provided by the Harare City Council is very poor to such an extent that were are not drinking tap water since we are afraid that we might have cholera. These findings are similar to Al Dulaimi et al (2017) who purports that most residents in Bangladesh fear drinking tap water because they fear that it is contaminated. Another 55% of the interviewees suggested that the quality of water being provided by the City of Harare is not safe for drinking since the water produces a smell hence we have resorted to drinking borehole water and use the tap water for other domestic use. The above findings are supported by Falahee et al (1995) who suggests that the colour and odor of the tap water has great impact on the judgment of portable water since water that has a bad odor is regarded a poor water quality. The above findings shows that most of the residents of Harare greatly shows that most of the residents where the prepaid water meters are installed are not satisfied with the quality of the potable water that is being provided by the City of Harare.

4.22 Alternative sources of water.

The business people who are located in the Central Business District said that the source of water that they have is the bulk water suppliers who sale water. The business community also said that buying water from the bulk suppliers has proved to be expensive for them so they want the City of Harare to come up with the means and methods to provide them with potable in cases where

there is no water in their areas. Eight percent the residents that were also interviewed suggested that the he alternative source of water they have are boreholes that are established by the non-governmental organisations. Below is a picture taken from the field of the alternative source of water for the residents of Glen Norah.

Plate 4. 2 alternative source of water.

The other 20% of the respondents that were interviewed suggested that their alternative source of water is bottled water they buy in the shops.

2.23 Summary.

The researcher presented the findings of the data collected from the field through graphs like pie charts, tables, bar graphs and pictures**.** The research findings of the data collected in the field about the demography of the residents of Harare showed that the residents and the Business community can survive properly with the smart water meters installed in their areas. The findings also showed that most of the residents are satisfied with the smart water meters that are installed in the areas thus it appears that the City of Harare has achieved its intended objective of customer satisfaction

with services being provided. The next chapter will be about summary of the research conclusions and recommendations**.**

CHAPTER V

SUMMARY, CONCLUSSIONS AND RECOMMENDATIONS.

5.0 Introduction.

The research focused on the perceptions held by customers on the installation of the smart water meters in Harare as a pilot survey**.** This is the final chapter of the research which provides for the summary and conclusions from the previous chapters in this research. The recommendations to the City of Harare to address the smart water meters and water supply problems are also going to be presented in this chapter.

5.1 Summary of the study.

The main focus of the research was to determine the satisfaction levels of the customers by the introduction of the smart water meters in the City of Harare. The first chapter of the study was introduction of the background of the study. This chapter explored issues to do with the background of the study, statement of the problem, objectives of the study, research questions, justification of the study, delimitations, limitations of the study and definition of key terms. The background of the study provided the problems which happen in the past which resulted in the introduction of the smart water meters in Harare. The statement of the problem also highlighted the causes of water shortages which also led to the introduction of the prepaid waters meters. The objectives and the research questions were key in the study as they acted as the guiding principles of the study. The justification of the study gave reasons why it is necessary to conduct the study. On the delimitations the areas and the actual respondents that were going to participate in the study were mentioned. The limitations also provided the limitations that were faced when the researcher conducted the study. The definitions of the key terms that are important to the study were also looked at in chapter one.

Chapter one was followed by chapter two which was about literature review. The literature review had main subtopics which are conceptual framework, theoretical framework, empirical evidence and literature gap. The conceptual framework explored issues to do customers satisfaction with the availability of potable water, the perceptions of customers towards pricing of potable water, the advantages and problems associated with the smart waters and solutions to deal with the supply of water in the City of Harare citing relevant scholars. The theoretical framework explored theories and hypothesizes which are relevant to the study such that there will in-depth analysis of the

problem being faced. The empirical evidence looked at regional case studies were smart water meters were installed in a bid to draw lessons learnt in other countries. On literature review the researcher discovered that no scholars have written on the issue to do with customer perceptions linking it customer satisfaction and this become the literature gap.

Chapter two was then followed by chapter three which explored the methodologies used in the study to collect data from the respondents. In chapter three a lot of issues were addressed and these include research approach, research design, population of interest, sample size, sampling procedures, research instruments, data sources and ethical considerations. In this chapter the searcher used qualitative and quantitative approaches in the study. The population of interest of the research was people with prepaid water meters and the sample size was 80 respondents. The sampling procedures that were used in the study was stratified random sampling and purposive sampling. The researcher also used the questionnaires and interviews to collect data. The data that was used in the study was secondary data which was collect was collected from Council and publications about prepaid water meters that was written by other scholars. The primary data was composed of the information that was collected through the questionnaires and the interviews. The researcher also abide to ethical considerations like confidentiality and observing protocol for seeking permission to collect date when carrying out the study. A pilot survey was also carried out in Budiriro 3 and this helped the researcher to amend mistakes in the questions that were in the questionnaire to make sure that the research instruments are easy to understand such that the required feedback is provided by the respondents.

Chapter four of the study was data presentation and analysis. In this chapter the data was presented using graphs like pie charts bar graphs and pictures were also used to present data. Analysis of the primary data that was collected in the field was done through explanation. The population of the study was 80 including the officials of City of Harare, the residents and the business community. The response rate of the questionnaires was 90% and the response rate of the interviews was 78%. The overall response rate of both the questionnaires and the interviews was 84%. The demographic presentations showed that most females participated in the study than males and that the customers of the City of Harare can live a good life using the smart water meters because the economic status of the residents showed that most the residents and employed in the formal and informal sector.

5.2 Conclusions.

The conclusion on the smart water meters is that they currently effective on the debt recovery in the areas where the pilot survey is done so the general roll out of the smart water meters in the City of Harare can result in the local authority recouping the funds that are invested when buying resources for water purification.

Pro poor strategies should be implemented effectively to accommodate the urban poor and the old people. This is mainly because there are other people in the urban areas who are not able to afford portable water through the prepayment system and these people have to be catered for because it may result in outbreak of diseases in the urban areas.

Water quality and availability remains low in Harare and the expectations of both parties is that with improved debt collection procedures as obviated by the smart water meters, there would be more water and it would be meeting the World Health Associations standards. This expectation has to be met should the programme be rolled out more aggressively after the pilot project in Harare's CBD and residential suburbs.

In terms of customer engagement the City of Harare because most of the residents complained that they were not consulted by the City of Harare thus most of the residents did not take part in the overall decision making and policy making process. The failure of the City of Harare to engage the citizens can be attributed to the fact that the officials used unrecognised platforms to communicate with the customers or residents.

Engaging in private public partnerships is a solution to the portable water challenges being currently faced in the City of Harare. The City of Harare should engage in private public partnerships like rehabilitate operate and transfer where by the private player rehabilitates the infrastructure. The same private player is allowed to operate the infrastructure for a period of time to recoup the initial invested funds and then transfer to the local authority. This can greatly save money for the local authority and the infrastructure for potable water will be conducive enough such that they be reduced non-revenue water. Another solution is to rollout the smart water meters on a larger scale since most residents are satisfied by the components of the smart water meters.

5.2.1 Major Findings of the Research.

The major findings of the research also showed that most of the residents of Harare are satisfied with the potable water charges and the debt control measures that are done by the City of Harare. However the majority of the residents are not satisfied with the distribution of potable water and the quality of the potable water that is provided by the City of Harare because it is producing bad odor and it is contaminated since it has particles.

The research also unearthed that the people of Harare are willing to be on board in the smart water meter introduction discourse especially women. Generally, women were satisfied by the introduction of smart meters as compared to their men counterparts. This mainly because women spend most of their time at home using the water unlike their male counterparts.

5.3 Recommendations.

- The City of Harare should engage the stakeholders more especially on matters that affect the lives of the stakeholders. Engagement of the stakeholders will make the residents more awe of the changes that are made by Council. This may reduce them and use syndrome that exist between the residents and Council which has resulted in resistance by the residence.
- The city of Harare should roll out the prepaid water meters on the larger scale to address the water and metering challenges being faced in Harare. Rolling out the smart water meters on a larger scale may address issues to do with water supply and revenue generation which has been the greatest challenges in the local authority.
- There should be effective implementation of the pro poor policy to cater for people like widows, old people and poor people who are not able to pay the bills.
- The City of Harare should engage in the process of rehabilitation of infrastructure because the major challenge that most of the infrastructure is old hence pipes are bursting contributing to non-revenue water. Therefore, the rehabilitation of the infrastructure must be done regularly to avoid the bursting of pipes.
- Inter-governmental relations should be improved because poor communication networks between the central government and the local authorities have made the local authorities to lose a lot funds after the cancelation of debts in 2013.

- The city of Harare should come up with flexible payment system which allows the residents to pay their bills whenever they want.
- Council should come up with a new water tariff regime that gives residents a zeal to pay for the service provided
- A dedicated team of customer service personnel should be put in place at Council to interact with customers such that the customer's needs are responded to in time.

5.4 Suggestions for further research.

- No research has been done concerning the impact of smart meters on revenue generation in local authorities this can be a topic for further research.
- Evaluation of the legal instruments that concerning provision of potable water in urban areas can be a topic for further research also.
- The use of ICT service delivery and the poor is also a gap for further research.
- Flexible payment of service delivery can be also be an area for further research.

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APPENDICES

Appendix A: Questionnaires.

Questionnaire for the City of Harare Residents.

My name is Tafadzwa Chidenga, I am a fourth year student studying BSC Local Governance Studies at Midlands State University. I am conducting a research on "**Customer perceptions towards the installation of smart water meters: The case of City Harare"**. I kindly request for your assistance in the field research of the above mentioned topic. Your assistance will be in the form of ideas. Please be free to tick the boxes on the right side to provide the answers required in the research.

Section A Demographic Characteristics.

(NB: Please tick the appropriate box)

1. Gender

Female	Male

2. AGE

Below 18yrs	
19 to 30yrs	
31 to 45yrs	
45yrs and above	

3. Education level

No formal education	
Primary level	
Secondary	
Tertiary education	

4. Economic status

Employed	
Self employed	
Unemployed	

5. What is the number of your family members?

1	
2	
3	
4	
s5	
6	
7	
8 and above	

6. What kind of suburb do you live in?

High density	
Medium density	
Low density	

7. What is the tenure of your house hold?

Landlord	
Renting	

Section B: Experiences with smart water meters.

8. Where you consulted in the policy making and implementation process?

YES	
NO	

9. Are you satisfied with the water charges?

YES	
NO	

10. If yes explain why.

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…….

11. Is potable water always available?

YES	
NO	

12. Has the water distribution improved after the installation of the prepaid water meters?

YES	
NO	

13. Have you faced any challenges concerning the prepaid water meters?

YES	
NO	

14. If yes explain what the challenges is.

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15. Is there any advantages of the prepaid water meters over conventional meters?

YES	
NO	

16. If yes explain the advantages.

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……
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Thank you for your time and cooperation.

Appendix B: Questionnaire.

Questionnaire for the City of Harare Officials.

My name is Tafadzwa Chidenga, I am a fourth year student studying BSC Local Governance Studies at Midlands State University. I am conducting a research on "**Customer perceptions towards the installation of smart water meters: The case of City Harare"**. I kindly request for your assistance in the field research of the above mentioned topic. Your assistance will be in the form of ideas. Please be free to tick the boxes on the right side to provide the answers required in the research.

Section A Demographic Characteristics.

(NB: Please tick the appropriate box)

1. Gender

Female	Male

2. AGE

Below 18yrs	
19 to 30yrs	
31 to 45yrs	
45yrs and above	

3. Education level

O level	
A level	
Diploma	
Honours degree	
Masters	

4. Occupation

Committee officer	
Engineer	

Section B: please indicate or comment on the question provided below.

5. Where the residents consulted?

Yes	
No	

6. In your own opinion is the prepaid water meters important?

Extremely important	Important	Not sure	Not important

7. Has they been an improvement in revenue generation after the implementation of the prepaid water meters?

Yes	
No	

8. Has the water supply improved after the installation of the smart water meters?

Yes	
No	

9. Are there challenges being currently faced concerning the smart water meters?

Yes	
No	

10. If there are any challenges can you please explain.

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11. Are they any advantages associated with the smart water meters?

Yes	
No	

12. If there are any advantages can you please explain.

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13.What are your suggestions for improvement?

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Thank you for your time and cooperation

Appendix C: Interview guide for residents of Harare.

Interview guide questions for residents with smart water meters in Harare.

1. Who many liters do you require in a day?
2. What is your source of income?
3. Are you willing to pay your water bills?
4. Are you comfortable with the debt recovery measures taken by the City of Harare?
5. Are you satisfied with the quality of potable water being provided by the City of Harare?
6. Is there any alternative source of water available and where is it located?
7. Are you willing to share water with your neighbors?
8. Have you faced because of the introduction of the smart water meters?
9. What are the possible solutions to address the challenges?