

CUSTOMERS WILLINGNESS TO PAY FOR WATER SERVICES, BLANTYRE, MALAWI

CHIMWEMWE CHIUTULA
Thyolo, Malawi

Dissertation submitted to Ndata School of Climate and Earth Sciences of the Malawi University of Science and Technology in partial fulfilment of the requirements for the Bachelor of Science degree in Water Quality and Management

July, 2021

DISSERTATION APPROVED BY:

SUPERVISOR:
MRS. T. MTEWA Signature: _____

CO-SUPERVISOR
MR. H. YAPUWA Signature: _____

ASSESSOR:

Signature: _____

DISCLAIMER

This document describes work undertaken as part of a programme of study at Ndata School of Climate and Earth Sciences of the Malawi University of Science and Technology. All views and opinions expressed therein remain the sole responsibility of the author(s), and do not necessarily represent those of the school.

COPYRIGHT STATEMENT

This copy of the dissertation has been supplied on condition that anyone who consults it is understood to recognize that its copyright rests with its author and that no quotation from the dissertation and no information derived from it may be published without acknowledgement.

DECLARATION

This is to certify that this thesis is the result of research done by Chimwemwe Chiutula towards the award of the Bachelor of Science in Water Quality and Management at the Department of Water Resources, Malawi University of Science and Technology.

ABSTRACT

Blantyre Water Board is a utility parastatal organization established under the Water Works Act No. 17 of 1995 to supply portable water for commercial, industrial, institutional and domestic use. However, one of the major challenges that the board is experiencing is inefficiencies in revenue collection which is influenced by customers willingness to pay. Hence the study aimed at assessing customers willingness to pay for water services in Blantyre. Three study sites in Blantyre namely; Ndirande, Zingwangwa and Nyambadwe were randomly selected to be used in the study. A total sample size of 120 customers of Blantyre Water Board were sampled using simple sampling method from the three selected study sites for the assessment of customers willingness to pay for water services.

Primary data was collected using observation, key informant interviews with Blantyre Water Board staffs and questionnaires which were administered face to face with BWB customers. Out of 120 questionnaires distributed, 97 of them were achieved which represents 81% response. Secondary data was collected from an excel spreadsheet that contained debtor's data which was provided by Blantyre Water Board staffs. Primary data collected was analysed using Microsoft excel 2016 tool to develop pie charts and bar graphs while secondary data was already analysed by Blantyre Water Board staffs hence it was just extracted from an excel spreadsheet. The findings from the obtained data showed that the majority (81%) of the BWB customers were willing to pay for the water services with respect to the quality water provided. Although the customers were willing to pay for the water services, they were also proposing improvement in the reliability of water supply, pressure of water supply, customer care and billing accuracy. The findings for the study expressed that BWB should ensure proper maintenance of the water distribution system to increase the level of customers willingness to pay for the water services, at the same time minimizing non-revenue water. And also, BWB should be highly responsive when it comes to customers' complaints.

Key words: Customer(s) willingness, water supply, water quality.

ACKNOWLEDGEMENTS

I would like to take this opportunity to thank everyone that supported me one way or the other, to the completion of this thesis.

First and foremost, I want to thank the Almighty God for the life, good health and blessings throughout my entire studies.

I would like to express my sincere appreciation to my supervisors, Mrs T. Mtewa and Mr H. Yapuwa for the guidance and full support throughout my studies. I have gained both academic and professional experiences through my interactions with them.

Much thanks to Mrs Kate Chilemba and the entire staff of the Blantyre Water Board for the help with data which was very important for this research. These people showed their interest in my research and I am grateful for their kindness.

A special thanks to my beloved family and friends for their unconditional support during my study. A very special thanks to my father and mother who have been supporting me since I was young and made sure that I achieve my goals. I would also like to thank my brother and my sister for their support, love and encouragement.

TABLE OF CONTENTS

ABSTRACT i
ACKNOWLEDGEMENTS ii
ACRONYMS/ABBREVIATIONS vi
LIST OF FIGURES vii
LIST OF TABLES viii
CHAPTER ONE: INTRODUCTION 1
1.1 Background 1
1.2 Problem Statement 1
1.4 Main Objective 2
1.4.1 Specific Objectives 2
1.5 Hypothesis 2
1.6 Research questions 2
1.7 Significance of the study 3
CHAPTER TWO: LITERATURE REVIEW 4
2.1 Blantyre Water Board 4
2.2 Customers' perception 4
2.2.1 Water quality 4
2.2.2 Customer care 5
2.2.3 Maintenance 5
2.3 Reliability issues 6
2.4 Socio-economic factors 6
2.4.1 Level of education 6
2.4.2 Household size and personal income 7
2.5 Customers' willingness to pay 8
CHAPTER THREE: METHODOLOGY 9
3.1 Study area 9
3.2. Research design 9
3.3 Materials and methods 10
3.3.1 Primary data 10
3.3.2 Secondary data 10

3.4 Sample design 11
3.4.1 Sample selection method 11
3.4.2 Sample size 11
3.5 Data analysis 12
CHAPTER FOUR: RESULTS AND DISCUSSION 14
4.1 Sample population demography characteristics 14
4.1.1 Gender of respondents 14
4.1.2 Respondents age group 14
4.1.3 Household size 15
4.1.4 Level of education 16
4.1.5 Duration of stay in building 16
4.1.6 Rented or own apartment 17
4.1.7 Household monthly income 18
4.2 Willingness to pay for improved services 19
4.2.1 Access of domestic water 19
4.2.2 Continuity of BWB water supply 19
4.2.3 Average water expenditure per month 20
4.2.4 Services to be improved 21
4.3 Billing 22
4.3.1 Duration of unit connected to BWB water supply 22
4.3.2 Type of water connection 23
4.3.3 Pre-paid or post-paid 23
4.3.4 Problems with pre-paid 23
4.3.5 Receive water bills and bill delivery frequency 24
4.3.6 Water disconnection and reasons 24
4.3.7 Official complaint to BWB and mode of complaint 24
4.4 Customers perception 25
4.4.1 Water quality 25
4.4.2 Courtesy of BWB staffs, interest and customer care 25
4.4.3 Duration taken to maintain a leakage/broken pipe 26
4.4.4 Perception towards current water rates compared to electricity 27

CHAPTER FIVE: CONCLUSION AND RECOMMENDATIONS 28
5.1 Conclusion 28
5.2 Recommendation 28
References 29
Appendix 32

ACRONYMS/ABBREVIATIONS

BWB	Blantyre Water Board
LWB	Lilongwe Water Board
CRWB	Central Region Water Board
SRWB	Southern Region Water Board
NRWB	Northern Region Water Board
WTP	Willingness to pay
GoM	Government of Malawi
NSO	National Statistics Office
HH	Household Head

LIST OF FIGURES

Figure 1: Gender of respondents 14
Figure 2: Respondents age group 15
Figure 3: Household size 15
Figure 4: Level of education 16
Figure 5: Duration in the apartment 17
Figure 6: Rented or own apartment 18
Figure 7: Household monthly income 18
Figure 8: Access of domestic water 19
Figure 9: Continuity of BWB water supply 20
Figure 10: Average water expenditure per month 21
Figure 11: Services to be improved 22
Figure 12: Duration of unit connected to BWB water supply 22
Figure 13: Type of water connection 23
Figure 14: Problems with pre-paid 24
Figure 15: Official complaints made 25
Figure 16: Courtesy of BWB staff 26
Figure 17: Interest and customer care of BWB staff 26
Figure 18: Duration taken to maintain a leakage/broken pipe 27
Figure 19: Perception towards water rates as compared to electricity 27

LIST OF TABLES

Table 1: Sample distribution in each area..... 11

CHAPTER ONE: INTRODUCTION

1.1 Background

Water is essential for life and it has no substitute, inefficiencies in revenue collection by the country's water boards is affecting the water sector from meeting its objectives (Phiri, 2020). Water utilities maintenance as well as investment in infrastructure depends on customers support through payment of water services (Sualihu & Rahman, 2017). However, Mugabi *et al,* (2010) argued that payment of these water services is dependent on customers' willingness to pay. Customers willingness to pay is defined as the maximum amount that a customer is willing to pay for a given good or service (Wertenbroch & Skiera, 2002). Many studies have been done in water sector with the goal of examining water service delivery, (Mukokoma & Dijk, 2011) and service quality (Gowela *et al,* 2017) but the common feature among these studies is customer satisfaction.

Previous study done by Sualihu & Rahman (2017) has also shown that quality of the water service, customer satisfaction and billing issues were factors that influence customers willingness to pay for water services. Therefore, the main aim of the project was to explore how these factors, including any other factors influence Blantyre Water Board Customers' willingness to pay for water services. By using these factors, the water utility company will be able implement more realistic strategies to promote payment for water services.

1.2 Problem Statement

In Malawi, the mandate to supply water lies in the hands of water boards namely Blantyre, Lilongwe, Northern, Southern and Central Region Water Boards. These water boards are government owned (GoM, 1995). When the boards offer services to customers, they collect revenue from their customers in form of utility bills for the sustainability of their operations. Based on the consulted data provided by BWB staffs, it was observed that many customers were owing BWB a lot money as they were more customers on age 30 days, age 60 days, age 90 days and some on overdue, (BWB, 2018). This implied that the board was not collecting enough revenue since customers were not paying for the water services given to them. Study by Breidert et al., (2006)

has expressed that most companies experience inefficiencies in revenue collection due to the missing adequate knowledge of the customer's willingness to pay for services. Research by Sualihu & Rahman, (2017) discussed that customers satisfaction and billing issues were the common factors that influenced willingness of customers to pay for services. Further, Manda, (2014) showed that customers willingness to pay for services was influenced by the quality of services. Hence this study focused on exploring customers' willingness to pay for water services in high, medium and low-density areas which were Ndirande, Zingwangwa and Nyambadwe respectively.

1.4 Main Objective

The main objective of the study was to assess customers willingness to pay for water services in Blantyre, Malawi.

1.4.1 Specific Objectives

The following were the specific objectives of the study:

a. To determine customers' water services expectation and the return.
b. To explore customers' perception on water quality, customer care and maintenance.
c. To assess how reliability issues like clarity of services, bill delivery and correctness of meter reading influence BWB customers willingness to pay for water services.
d. To analyse how socio-economic factors like level of education, household size and personal income influence BWB customers to pay for water services.

1.5 Hypothesis

Customer(s) perception towards water quality, customer care and maintenance offer a potential that is used to address customers willingness to pay for water services.

1.6 Research questions

In order to achieve the objectives above, the study tackled the following questions:

a. Does customers' water services expectation and the return influence BWB customers willingness to pay for water services?
b. Does customers' perception on water quality, customer care and maintenance influence customers to pay for water services?
c. How does reliability issues contribute towards willingness to pay for water services?

d. Do socio-economic factors influence BWB customers willingness to pay for water services?

1.7 Significance of the study

The study will contribute to improvement in services provided by BWB which will increase the level of willingness to pay of its customers hence revenue collection will also increase. Hence dealing with one of the major challenges that BWB is experiencing which is inefficiencies in revenue collection influenced by customers willingness to pay for the provided water services. The study will also be used as a reference by other researchers that will do similar studies in future hence contributing to academics.

CHAPTER TWO: LITERATURE REVIEW

2.1 Blantyre Water Board

Blantyre water board is a utility parastatal organization established under the Water Works Act No. 17 of 1995 to supply portable water for commercial, industrial, institutional and domestic use. The board was first established in January 1929 after the construction of Hynde Dam Scheme which provided the first piped water to residents of Blantyre town in 1930. After completion of Mudi dam, the board was also given an added responsibility to supply water to Limbe town and was reconstituted in 1954 as Mudi River Water Board. Then in 1970 on 1st April, the Board's name changed again to Blantyre Water Board. The Board supplies water to Blantyre city and parts of Chiradzulu and Thyolo district which covers the area of over 76,000 hectares and over 1,000,000 people, (BWB, 2018). The main vision of Blantyre Water Board is to be a dynamic, reliable, effective, efficient and good quality water supply and sanitation services provider and its mission is to provide reliable and affordable water supply services to its customers whilst effectively contributing to the development of the national economy and sustenance of the environment.

The Board grouped its customers in 3 zones namely; Limbe, Soche and Kabula. For the purpose of this project, the focus was on Soche and Kabula zone which is to tackle Zingwangwa in Soche zone, Ndirande and Nyambadwe in Kabula zone. BWB extracts its water from Shire River (an outlet of Lake Malawi) at Walker's Ferry about 40 km away and 800m below Blantyre City, (BWB, 2018). As BWB's main treatment plant, it currently produces 96 million litres per day, which is 95% of the total water production, with the rest being produced from Mudi dam and boreholes. After the completion of the new water source project from Likhubula in Mulanje, Walkers Ferry will then produce 79% of the total production. Mudi Dam currently produces 5 million litres and Likhubula source is expected to produce 20 million litres, (BWB, 2018).

2.2 Customers' perception

2.2.1 Water quality

Water quality is one of the cross-cutting issue in water sector. By definition, water quality refers to as chemical, physical and biological characteristics of water, usually in respect to its suitability for a designated use, (Roy, 2019). Good quality

water supports both plants and animals while poor quality water threatens millions of lives worldwide, (Adekunle *et al.,* 2007). For the purpose of this study water quality has been described by the characteristics of water supply which includes pressure and physical appearance such taste, smell and colour, just as Ohwo & Agusomu, (2018) explained in previous research. The bottom line of which water quality is evaluated is done by customers. Hence customers will be in a position to check whether the quality of water exceeds or is below their expectation. When the water quality exceeds customers expectation it means there will be increase in loyalty as such customers willingness levels will be high since they are satisfied and vice versa. Hence the quality of water that customers receive have an impact on the willingness to pay for the charges.

2.2.2 Customer care

Hejase, (2001) described a customer as the focal point of all decisions and actions of the service organization. Hejase, (2001) further categorized customers as internal and external where internal customers are individuals or departments within your organization who uses your products or services while external customers are individuals or organization who purchases and uses your products and services. The customer being the centre of things requires customer care. Therefore, customer care is defined as the act of assisting both internal and external customers and working on behalf of business films. Customer care ensures that customers complaints are listened to and get proper solution. Personal observations have shown that most customers spend a lot of time which could have been used to do productive things in ques/line waiting to be assisted as such customers get bored and their willingness level to pay tend to go down. And also due to low labour force at the boards, workers get tired as such the customer care given to customers is minimal. Hence this weakens the levels of customers will to pay for water services.

2.2.3 Maintenance

Developing countries are facing a lot of water challenges in water sector. Previous research by Kalulu & Hoko, (2010) shows that one of the major challenges in Malawi is difficulties to maintain aging infrastructures which results

to poor service performance. Due to poor maintenance, there are frequent leaking pipes which results to low water pressure hence customers experience intermittent water supply per explained by Kayaga et al., (2003). Although the boards are experiencing these problems, customers are the one to be mostly affected. As a result, customers tend to find other alternatives of accessing water for their living hence the willingness levels to pay for service becomes very low.

2.3 Reliability issues

Shamir, (2015) described water supply system reliability as the term of shortages that result from failure of a system's physical components. In Malawi, water boards are responsible for collecting bills for the used water services from its customers. The main problem faced by these water boards is non-revenue water as well as water scarcity in some areas, (Kamaludin, 2015). Issues relating to tariff setting, meter reading, billing, and payment options form an important part of facilitating and support services for water utilities, (Sualihu et al., 2017). Previous research by Mugabi et al., (2010) in Uganda have shown that bill delivery, dependability or correctness of meter reading and services, clarity of services, flexibility, and choice in payment options are among the main factors that customers believe to be the facilitators of, or barriers to, timely payment of their water services. Literature have shown that utilities do not achieve efficiency in billing because of inappropriate billing practices. The biggest problem that Malawian customers experience is the clarity of services. Personal observation has shown that at times customers may get disconnected while he/she has already paid the services. This demotivates the customers to pay again for the upcoming services as such they end up not relying on the boards.

2.4 Socio-economic factors

2.4.1 Level of education

Per said by Bhardwaj, (2016), education is an essential human virtue, a necessity in society, basis of good life and a sign of freedom. Education is important in a society since it helps in character building by influencing building of social skills, problem solving skills, decision making skills and also creative thinking skills. In Malawi there are three levels of education namely; primary, secondary and

tertiary education. Report by Ministry of Education Science and Technology (GoM, 2014), has shown that the number of people reaching these levels of education is increasing. Although the number is increasing, but the highest percentage is the number of people attaining primary education. This fact, has a negative impact on customers' willingness to pay for their water services in the way that there is little number of people who reaches tertiary education than primary education together with secondary. People who reached tertiary education have an understanding of the importance of paying for water services since they know the cost of all the operations involved in the treatment of water to the extent of becoming water for consumption unlike those people with primary and secondary education that have knowledge that water is owned by the government as such it is for free hence, they cannot pay for the services. And also, some think that water is for free since it is provided by God.

2.4.2 Household size and personal income

Household size and personal income is one the factors that contribute to willingness to pay for water services. Personal income means all income collectively received by all individuals or households in a country, (Kagan, 2021). Kagan, (2021) further explained that personal income includes compensation from a number of sources which include salaries, wages, bonuses from employment, rental receipts from real estate's investments and profit sharing from businesses. Research by Moffat et al., (2011) showed that many households do a lot of spending in order to cope up with unreliable poor quality public water supply they are currently using hence their study showed that more people are willing to pay for improved water services. Beside that the research further explained that household size is expected to be inversely related to willingness to pay for water services. Big households are expected to be willing to pay less than small households due to associated budgetary costs, (Moffat et al., 2011). Hence the proposed study is expecting to find a negative sign of household size coefficient. And vice versa on the personal income variable, the personal income variable coefficient is expected to carry a positive sign just because personal income is directly proportion to the willingness to pay for water services. Research by Wondimu & Bekele, (2011) showed that richer households are the

ones that are willing to pay more for water services than poor households. Moffat et al., (2011) also showed that those with higher incomes are willing to pay more than those with little income.

2.5 Customers' willingness to pay

Customers' willingness to pay has been an issue of research for so many years. It has been observed that customers willingness to pay is a requirement for business success. On the other hand, it goes together with customers satisfaction since customers do pay their services based on satisfaction. Customers willingness to pay has been defined as the maximum sum of money that an individual is willing to pay for a certain good rather than do without an increase in that good, (Roy, 2015). Normally customers will to pay depends with quality of the consumed product, in this case water. Aging infrastructures, intermittent supply of water, poor service delivery as well poor quality of water devalues customers will to pay for their services. It is the role of parastatal institutions to establish customers willingness to pay for their service through hearing customers voice by ensuring that there is both negative and positive feedback from their customers which triggers improvement of the services provision.

CHAPTER THREE: METHODOLOGY

3.1 Study area

The study was conducted in Blantyre, Malawi. Blantyre city is the oldest and second largest city in Malawi. It was established by missionaries in 1870's and declared in planning area in 1897. The city lies within the latitude $15^0$47010" S and longitude $35^0$00020.10" E and it covers an area of 240km^2, (Mawenda et al., 2020). Blantyre city currently hosts almost five percent of the national population and has the highest population density in the country with 3328 people/km^2, (NSO, 2019). Water supply in the city is operated on and supplied by Blantyre Water board (BWB) under the Water Works Act No. 17 of 1995 to supply portable water for commercial, industrial, institutional and domestic use, (BWB, 2018). BWB abstract its raw water from three surface water sources namely; Walkers ferry, Mudi dam and Likhubula, (BWB, 2018). The clients for BWB includes institutional, industrial and commercial customers.

3.2. Research design

A research design is described as a procedure for collecting, analysing, interpreting and reporting data in research studies, (Boru, 2018). Research by Boru, (2018) indicated three types of research design namely; exploratory, descriptive and explanatory. For the purpose of this study, exploratory design was adopted. Saunders et al., (2007) stated that exploratory approach is adopted when there is no enough known about phenomenon and a problem that has not clearly been defined. Customers' willingness to pay for water services in Blantyre city was the first study done for BWB hence it adopted the exploratory design. Both qualitative and quantitative research methods were used where on qualitative method, personal observation and key informant interviews with BWB staffs were used and on quantitative method, a questionnaire was used. Exploring customers willingness to pay for water services being the main objective, three study sites namely; Ndirande, Nyambadwe and Zingwangwa were selected purposefully and a simple random sampling method was used to select the participants for the study. A questionnaire containing four attributes such demographic details, willingness to pay for improved water services, billing and customers perception was used to collect the data so as to answer the research questions of the study. Secondary data used in the study was obtained from water sector reports, government publications

and excel spreadsheet that contained debtor's data. The data collected was processed and analysed using Microsoft Excel 2016 tool where pie charts and bar graphs were developed in the same excel tool. The collected data was available to the supervisor and no one else, only suggestions for the study was available to the relevant authorities and in this case BWB for privacy's sake.

3.3 Materials and methods

The following materials and methods were employed in the study in order to achieve the objectives of this study which were; to explore customers' perception towards water quality, customer care and maintenance, to assess how reliability issues like clarity of services, bill delivery and correctness of meter reading influence BWB customers willingness to pay for water services, to determine customers' water services expectation and the return and to analyse how socio-economic factors influence BWB customers to pay for water services:

3.3.1 Primary data

The study used a questionnaire as its data collection tool and key informant interviews with BWB staffs to collect primary data. In order to achieve the objective of analysing how socio-economic factors influence BWB customers willingness to pay for water services, a questionnaire was structured by having demographics details which encompassed the socio-economic factors such as level of education as well as household income where materials like pens were used to scribble on the questionnaire when collecting the data. The objective of exploring customers' perception towards water quality, customer care and maintenance and the objective of determining customers water services expectation and return was achieved by using a Likert 5-point scale just like used in previous research by Gowela, (2017) which was in the questionnaire where 1 meant not satisfied and 5 meant very satisfied. The last objective of assessing the reliability issues was also tackled in the questionnaire under section of willingness to pay as well as billing.

3.3.2 Secondary data

The following materials were employed in the study to gather secondary data; phone, documents, computer and notepad. BWB staffs provided debtor's data and data about

areas using post-paid as well as prepaid meters which provided the relevance of conducting this study because the study had to tackle areas where there were post-paid and prepaid meters at the same time the study had to see whether customers were paying for their water services using the debtor's data. A computer was used in data management. The documents were used to supplement the collected data as well as for reviewing literature.

3.4 Sample design

The targeted population of this study was defined as the household head or spouse or elder member of the household in the three study sites with access to portable water. Household head or spouse were targeted just because these are the people who are responsible for ensuring that water is available at the house as such these people have knowledge and better understanding about water services. On the other hand, an elder member was targeted because the study had also to tackle respondents that uses water for commercial purposes and also institutions and among these two; commercial and institution, there was one person who was responsible for everything related to water services which for the purpose of this study was referred to as elder member.

3.4.1 Sample selection method

A carefully chosen sample of 120 members was used to represent the population. Just like a related research by Gowela, (2017); Ojo, (2011), a simple random sampling method was used so that each household had an equal chance of being selected. In each selected household, a questionnaire was used to gather the data from a head of the household or a spouse or an elder member. A household head or a spouse or an elder member of the household was selected to answer the questionnaire because they take the responsibility of ensuring that water is available at the household as such, they have a better understanding and knowledge of water services as compared to the ones who are not responsible to ensure that water is available.

3.4.2 Sample size

Studies by Gowela, 2017; Gowela et al., 2017 for the related research have shown that a service area with more than 30 respondents was suitable for a research as such this study employed the same criteria where a total sample size of 120 households was determined for the study where 45 respondents were targeted in the two selected areas

and 30 respondents were selected in one area as shown in the table below. A sample size of 120 households was chosen so as to give each study area a chance of having at least 30 respondents just as in other studies, (Gowela, 2017). The two study areas namely; Ndirande and Zingwangwa were given 45 respondents because the research had to tackle a lot of households with post-paid meters as compared to prepaid hence those two areas contain a combination of both prepaid and post-paid meters. At the same time these two areas had a larger population as compared to Nyambadwe hence in order for the study to make sense, 45 respondents were selected from the two mentioned study sites. Nyambadwe was allocated 30 respondents because of being low density which means it had low population as compared to the other mentioned areas and also it has only prepaid meters which was partially the target of the study. Table 1 shows number of questionnaires distributed and the number of questionnaires achieved.

Table 1: Sample distribution in each area

Service area name	Number of households targeted	Questionnaires distributed	Questionnaires achieved
Ndirande	45	45	39
Zingwangwa	45	45	39
Nyambadwe	30	30	19
Total	120	120	97

Among 120 distributed questionnaires, only 97 were achieved representing 81% response rate which is much higher compared to other related studies (Gowela, 2017; Ojo, 2011). The study failed to achieve 100 percent response rate due respondents not being at home especially at Nyambadwe.

3.5 Data analysis

Primary data collected was processed and analysed using Microsoft excel 2016 tool by following five stages of analysing data, (Ojo, 2011). Gowela, (2017) stated the five stages which include; data preparation, initial exploration of data, analysis of data and representation and display of the data. The same excel tool was used to display frequency tables, pie charts and graphs (Ojo, 2011). Debtor's data which was the

secondary data for the study was already processed at BWB as such it was just extracted from excel spreadsheet.

CHAPTER FOUR: RESULTS AND DISCUSSION

This chapter presents the results that were found from the study using a questionnaire.

4.1 Sample population demography characteristics

4.1.1 Gender of respondents

Results found that 60 (sixty) percent of the respondents were household heads while 40 (forty) percent of the respondents were spouses. This means that they were a lot of household heads that contributed towards this study as compared to spouses.

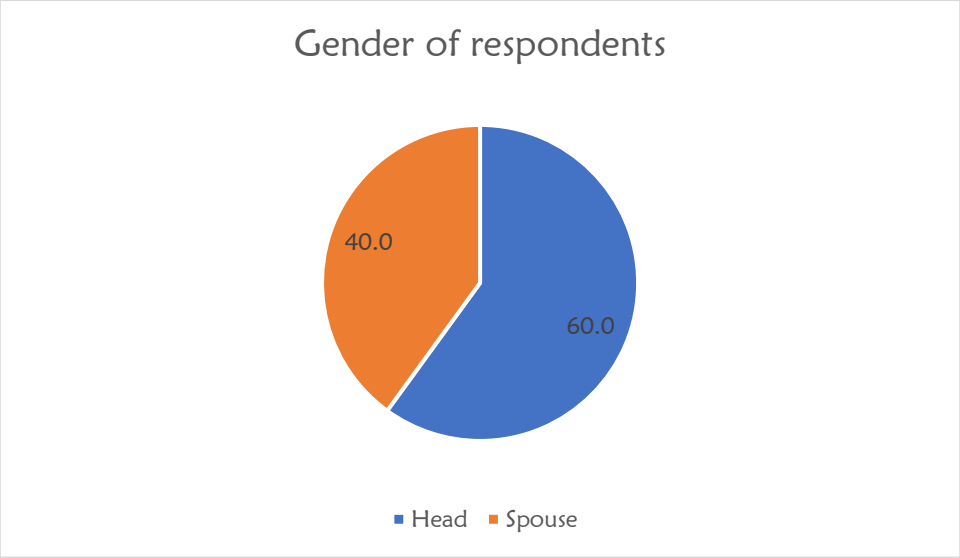


Figure 1: Gender of respondents

4.1.2 Respondents age group

The study found that 46 (forty-six) percent of the respondents were within the age group of 30-34 followed by 35-39 (31%) and 25-29 (13%). According to (Gowela, 2017; Ojo, 2011) these age groups are considered as the working age group which are vital to the economy of a country. 7% were within the age group of 18-24 and then 3% were within the age group of 40-44.

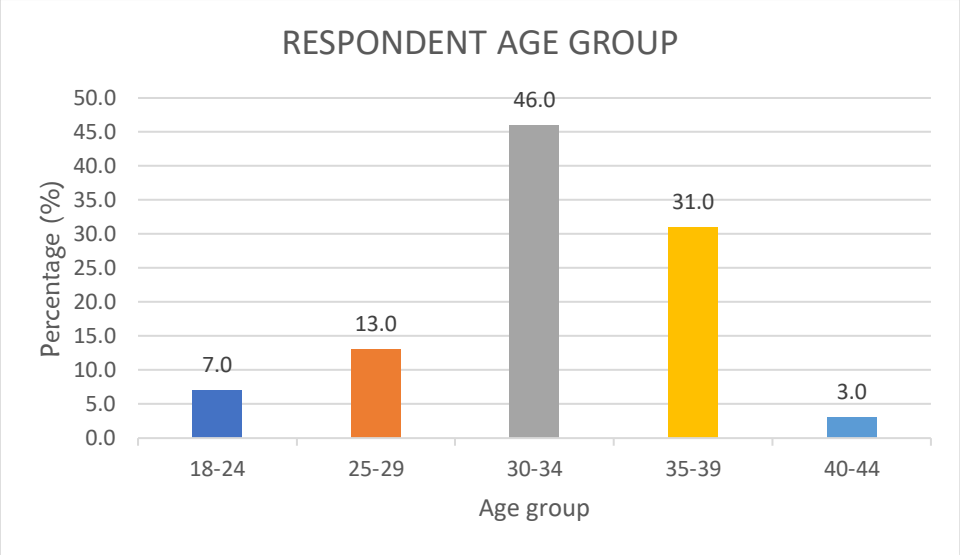


Figure 2: Respondents age group

4.1.3 Household size

The study showed that most houses had 5 people representing 36%. Then followed by 19% which had 6 people, 18% which had 4 people, 13% which had 3 people, 11% which had 7 people, 2% which had 9 people and 1% which had 8 people per house. Based on observation of some residence, one apartment could contain up to 7 households all using one tap which was connected to BWB mains. The justification towards using one tap was that the apartment is owned by one person as such there was no need for different water connections. The percentages had an implication to willingness to pay for water services in the way that a household having a lot of people were likely willing to pay for water services as compared to those having few amounts of people.

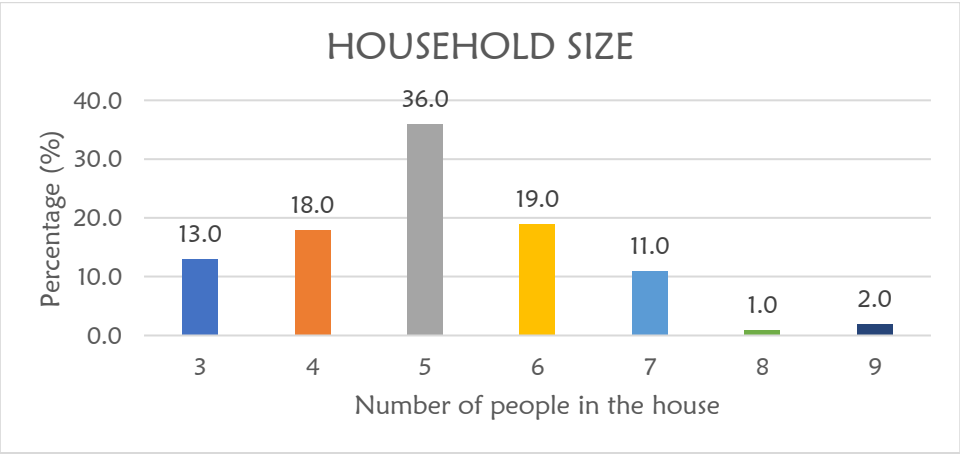


Figure 3: Household size

4.1.4 Level of education

The findings showed a clear representation of level of education where a lot of respondents (39%) attained secondary education, 34 (thirty-four) percent attained primary education followed by 14% who attained college (diploma). 8 and 5 percent reached graduate and post-graduate respectively. This means that only 14, 8 and 5 percent could have a better understanding on why there is a need to pay for water services since they do understand the process that BWB is involved to produce portable water as compared to those that have attained primary and secondary education. And also just like Ojo, (2011) explained that education level correlates with income, majority of the educated people were willing to pay for water services provided by BWB. Observation that was made was that the group with low education level thought that water is just for free since it is provided by God as some of them were saying that.

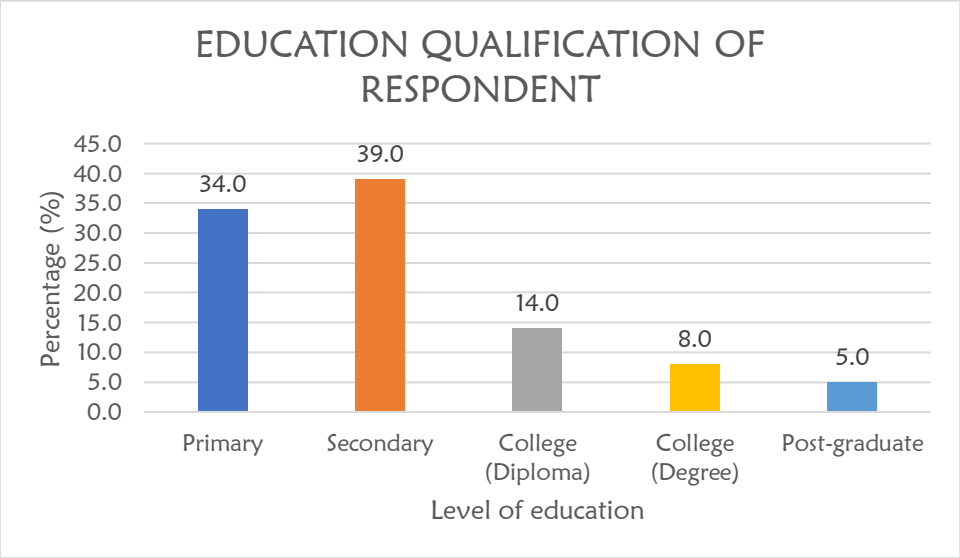


Figure 4: Level of education

4.1.5 Duration of stay in building

Research by Gowela, 2017; Ojo, (2011) have shown that people that have stayed longer in an apartment have more knowledge regarding to services that they do receive. Eighty five percent of the respondents have stayed in the apartment for more than 3 years and 15% of the respondents have stayed within a period of 1-3 years. This means that the study tackled the right customers that had more knowledge regarding to the water services that they receive.

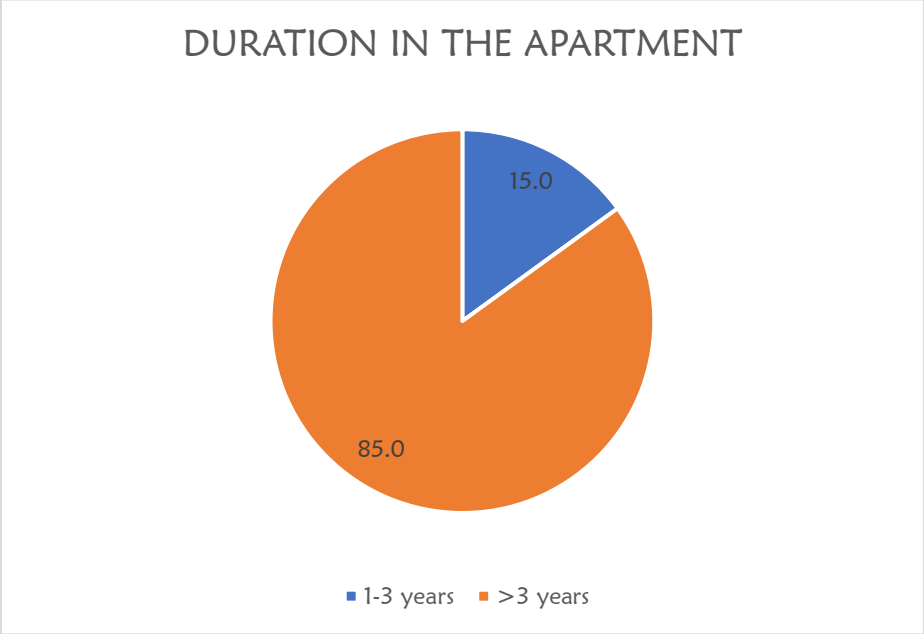


Figure 5: Duration in the apartment

4.1.6 Rented or own apartment

The study showed that 63 (sixty-three) percent of the households were owned by the respondents and 37 percent of the households were rented by the respondents. Just like duration in the apartment, respondents owning an apartment have a lot of knowledge that given concerning water services as compared to those that rent since those that do rent, some of them may stay for a short period of time as such they may lack some knowledge.

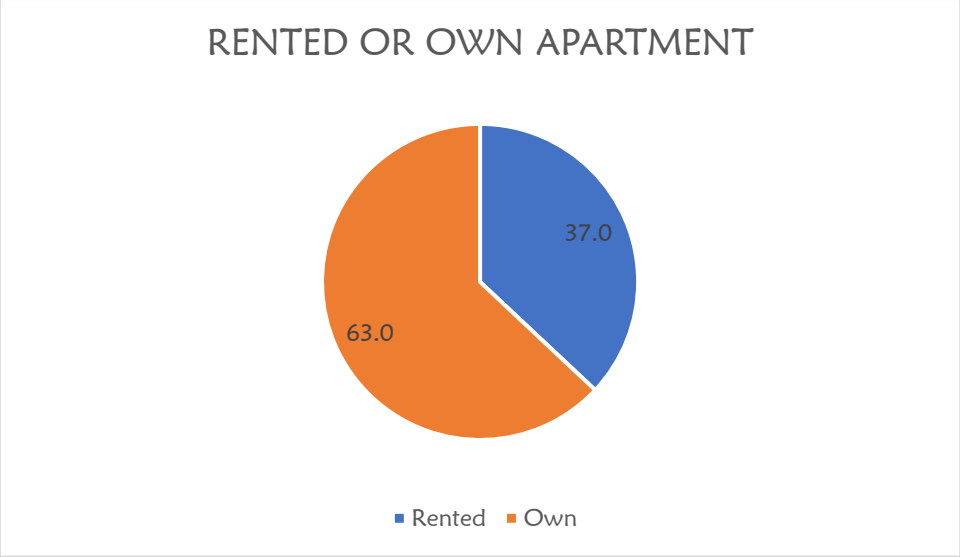


Figure 6: Rented or own apartment

4.1.7 Household monthly income

The study indicated that 37 (thirty-seven) percent earn more than MK 250,000 per month followed by 31 percent that fall within the range of MK 101,000-250,000. Eighteen percent were within the range of MK 25,000-100,000 and 14 percent does not know how much they earn. This is so because some take their income as confidential. It was important know the household monthly income since water services are paid per month since it is expected that high income would result to increase in willingness to pay, (Joseph, 2020). This means that higher the income, the more the people were willing to pay for water services because it was manageable to them.

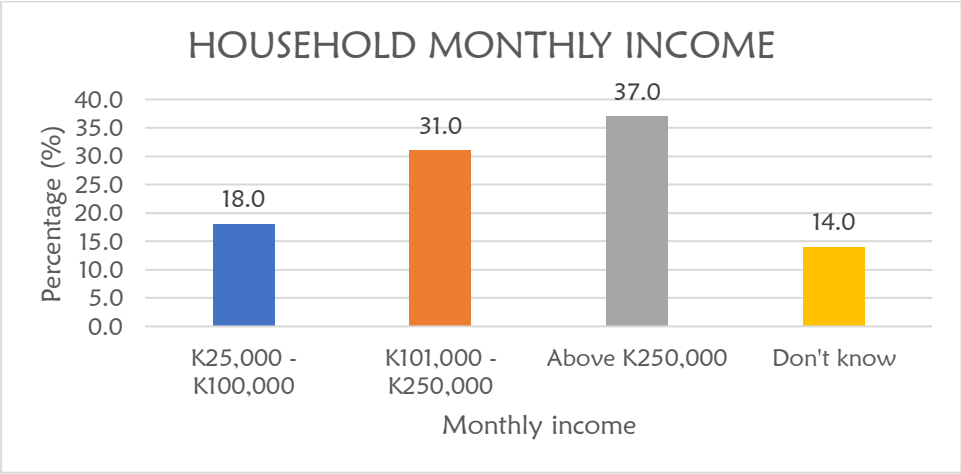


Figure 7: Household monthly income

4.2 Willingness to pay for improved services

4.2.1 Access of domestic water

Results have shown that 51 (fifty-one) percent of people have access to piped water in unit followed by 20 (twenty) percent that had access to water kiosks. The water kiosks were only available in Ndirande and Zingwangwa. 17 (seventeen) percent have piped water (neighbours) per said above that it was observed that one apartment could have 7 households all using one tap. 12 (twelve) percent had access to boreholes or wells. This means that 81% which was coming from the summation of (51%, 20%, 17%) that were using water from BWB were willing to pay for the water services since the water supplied by BWB is not for free.

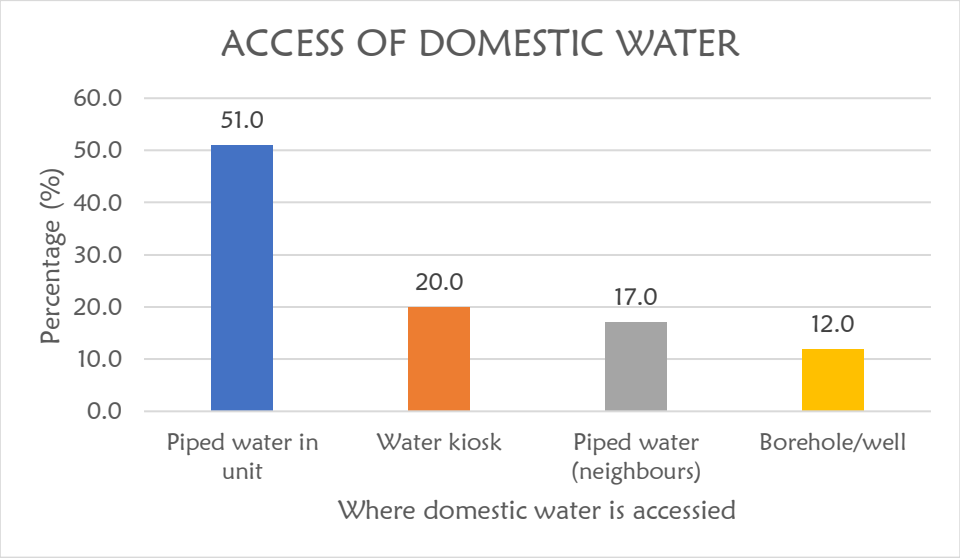


Figure 8: Access of domestic water

4.2.2 Continuity of BWB water supply

The findings portrayed that 78 (seventy-eight) percent had a continuous water supply every 24 hours and 10 percent have less than once every 24 hours. This means that the level of willingness to pay for BWB water services of the seventy-eight percent people was highly as compared to those that were receiving less than once every 24 hours. This also implied that the supply of water by BWB was not the same in all service areas, others receive more water than others may be due to rationale for water by water rationing by BWB just as found in research by (Gowela, 2017). 12 (twelve) percent had no continuous supply which showed that they were not willing to pay.

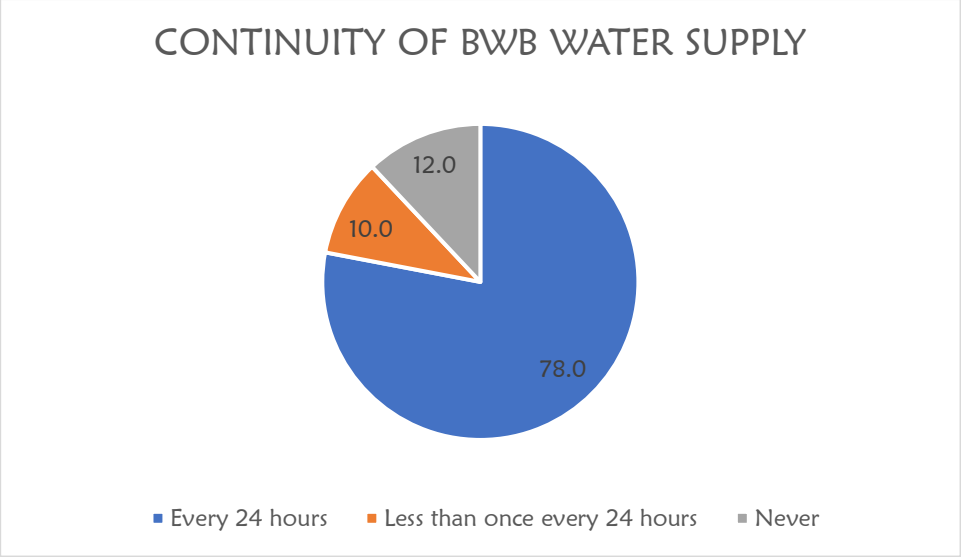


Figure 9: Continuity of BWB water supply

4.2.3 Average water expenditure per month

Outcomes have shown that 36 (thirty-six) percent of the households spend MK20,000 and above on water per month. These types of expenditure were mostly observed in Nyambadwe and in these other areas where water was used for commercial purposes. 32 (thirty-two) percent were within the range of MK5,000-10,000, 18 (eighteen) percent fall within the range of MK2,000-5,000 and 14% falls within the range of MK10,000-20,000. All these expenditures clearly showed that the customers were willing to pay for water services. A range of MK2,000-5,000 was observed on areas where respondents were using boreholes as they spend less on buying water guard to treat their water hence that expenditure.

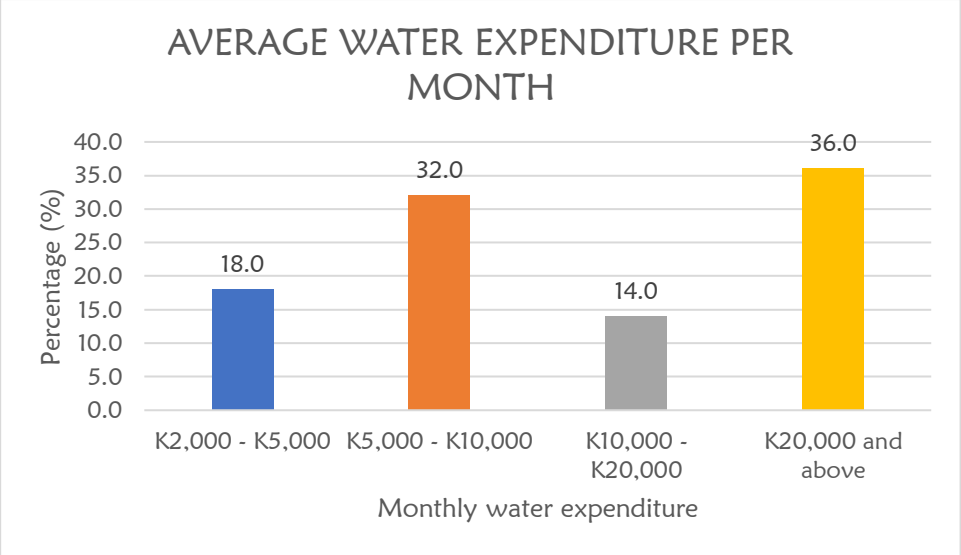


Figure 10: Average water expenditure per month

4.2.4 Services to be improved

Gowela, (2017) stated that there are couple of factors that influence customers willingness to pay for improved water services. Reliability encompasses the rate at which water is distributed or accessed to customers on daily basis, (Ojo, 2011). The study showed that 65.5 (sixty-five and half) percent proposed improvement in reliability. 25.3% proposed improvement in water pressure. Customers complained about the pressure of water they receive, that it is insufficient to the extent that it takes a lot of time to even fill a 20-litre bucket. 8% also proposed improvement in billing accuracy. It was noted that some customers do receive a huge bill as compared to what they receive each and month due to inaccuracy of bills provided by BWB which weakens their willingness level to pay for the water service. 1.1% proposed improvement in customer service at the BWB. Customers complained that it takes long for them to be assisted after reporting.

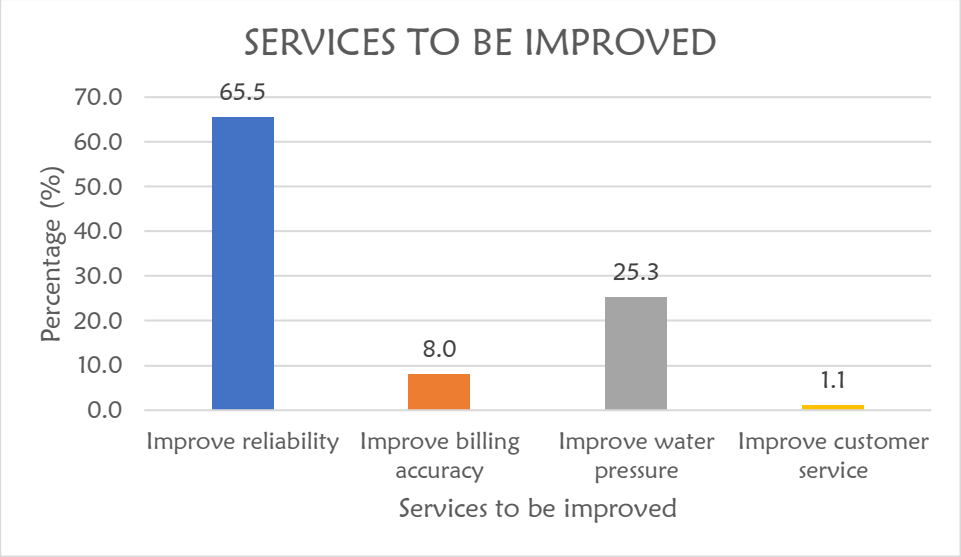


Figure 11: Services to be improved

4.3 Billing

4.3.1 Duration of unit connected to BWB water supply

Households connected to BWB water supply showed that majority (51%) were connected for over six months followed by 47% connected less than six month and two percent which was not connected. This implied that household that have been connected for over six months have a better understanding of BWB water services as compared to the other.

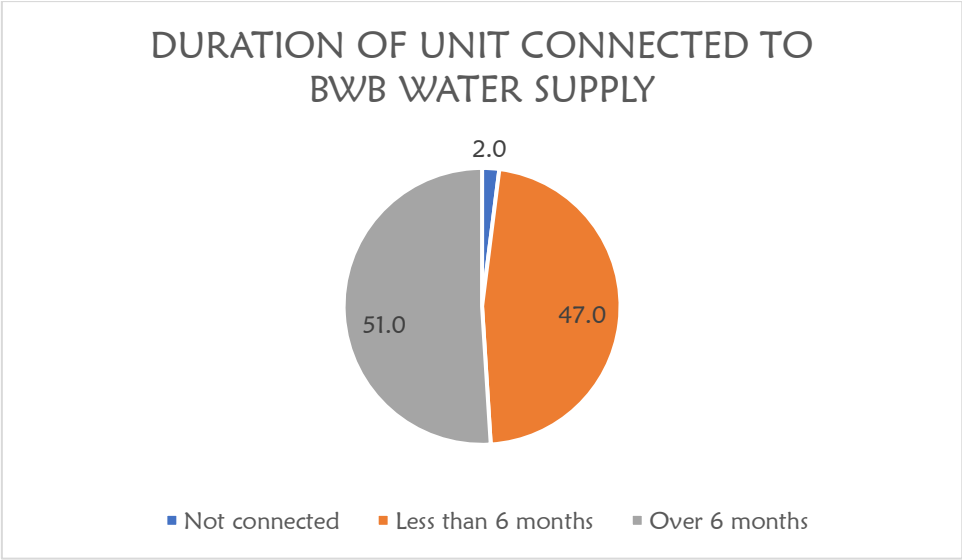


Figure 12: Duration of unit connected to BWB water supply

4.3.2 Type of water connection

The study showed that majority (78.4%) have a domestic water connection followed by 15.7 percent that have a commercial water connection and 5.9 percent have an institution connection.

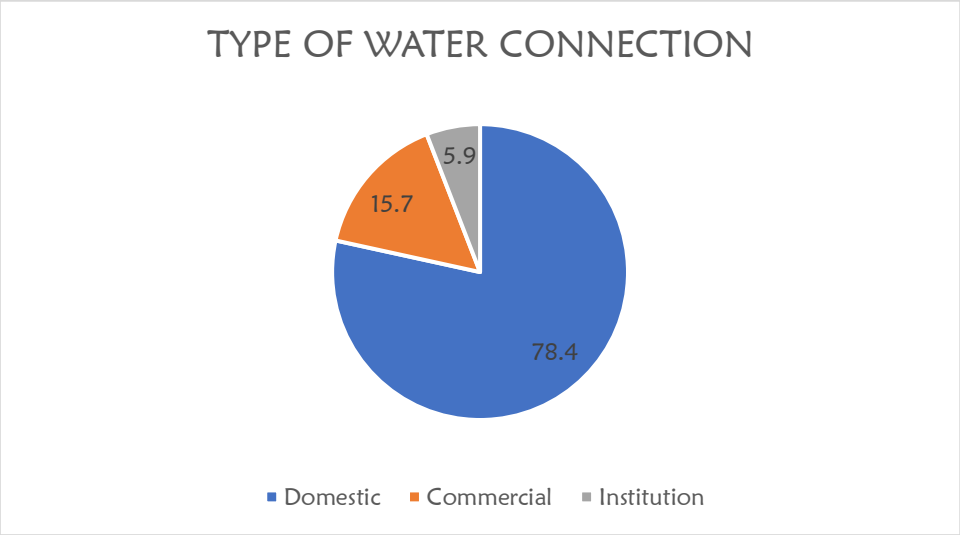


Figure 13: Type of water connection

4.3.3 Pre-paid or post-paid

Most of the interviewed households had post-paid meters as compared to pre-paid meters. At least 56.9 percent represented households that were on post-paid and 43.1 percent those that were on prepaid. This means that the study achieved its target which was to tackle more customers on post-paid since they were the ones that were owing BWB a lot of money as compared to prepaid.

4.3.4 Problems with pre-paid

The study has shown that 62.1 percent of the BWB customers on pre-paid did not experience problems related to their meters. While 20.7 percent explained that they were experiencing network problems when purchasing a token which sometimes make them have no water at all and 17.2 percent complained that the meters were not giving alert when the token is over. This has a negative impact on the willingness to pay for water services.

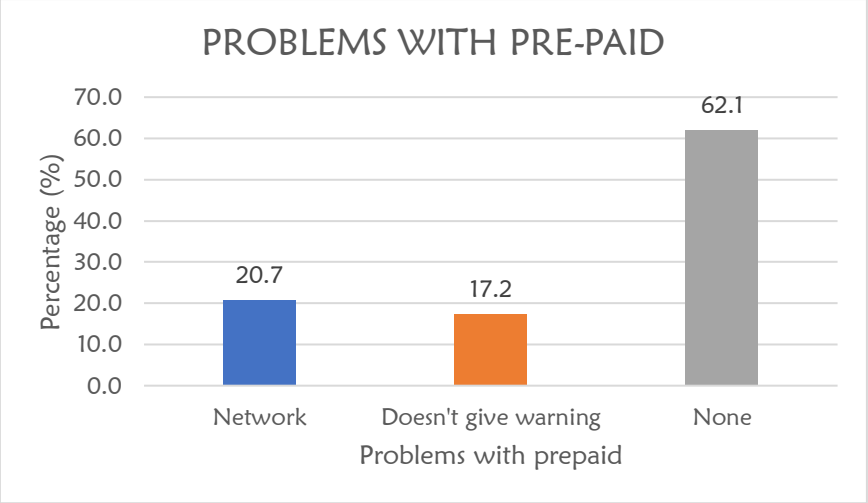


Figure 14: Problems with pre-paid

4.3.5 Receive water bills and bill delivery frequency

All respondents with post-paid meters were receiving bills that were delivered monthly but some customers complained that sometimes there were late delivery of the bills which sometimes lead to disconnections. Irrelevant disconnections result to reduced reliability of BWB water services which lead to decreased willingness level of paying for BWB water services.

4.3.6 Water disconnection and reasons

Households that were questioned if they have been disconnected from BWB mains for a certain period showed that 54.5% have been disconnected and 45.5% have never been disconnected. The respondents were further asked the reasons for their disconnection. The answer showed that a lot of them have been disconnected because they have been indebted and a percentage of 8.3% answered that it was due to wrong disconnection. This has a negative impact on what customers expect and what they get in return, for example those that were disconnected wrongly were likely willing to pay less for BWB water services.

4.3.7 Official complaint to BWB and mode of complaint

The study also showed that among the respondents that get disconnected, 8.3 percent lodged a complaint while 91.7% did not lodge a complaint. All these complaints were lodged in personal. Majority explained that they were not lodging the complaints since BWB takes long to respond to complaints.

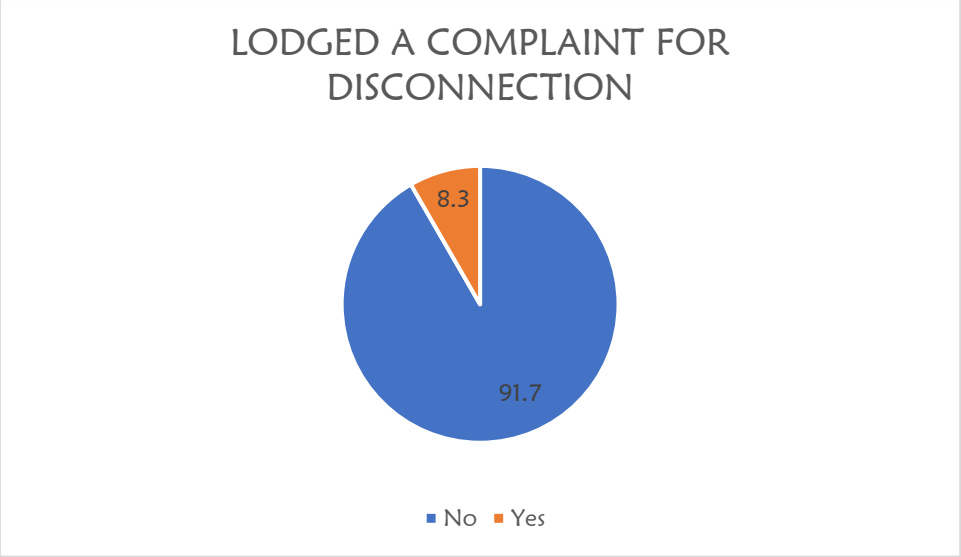


Figure 15: Official complaints made

4.4 Customers perception

4.4.1 Water quality

Water quality was discussed in terms of colour/appearance of water, the taste of water and smell, (Ohwo & Agusomu, 2018). Questions were asked to see how the customers perceive water quality using a Likert scale where 1 means not satisfied and 5 means very satisfied. 65.9%, 75% and 65.9% of respondents were very satisfied with the colour, smell and taste of water supplied by BWB respectively while 34.1%, 25% and 34.1% were just satisfied with colour, smell and taste of water respectively. This showed that customers were willing to pay for the water services since they were satisfied with quality of water they receive.

4.4.2 Courtesy of BWB staffs, interest and customer care

Results in figure 16 and 17 have shown that 46.3% of the customers were satisfied with the courtesy of BWB staffs by giving them a mark of 4 on the scale. 31.7% were partially satisfied with the courtesy of the BWB staffs followed by 17.1% which were very satisfied with the courtesy of the staff and 4.9% of the customers were not satisfied with the courtesy of the staffs. On how customers perceive customer care and interest by BWB staff, 43.9% were satisfied, followed by 41.5% which were partially satisfied and 7.3% were very satisfied while the other 7.3% were not satisfied. This means that BWB customers perceive well the courtesy of BWB staff hence influencing their willingness to pay for water services.

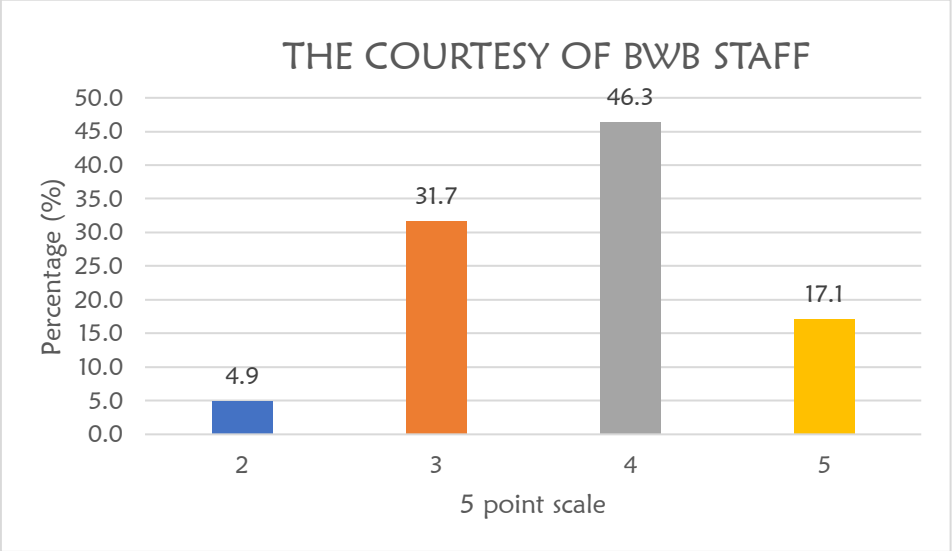


Figure 16: Courtesy of BWB staff

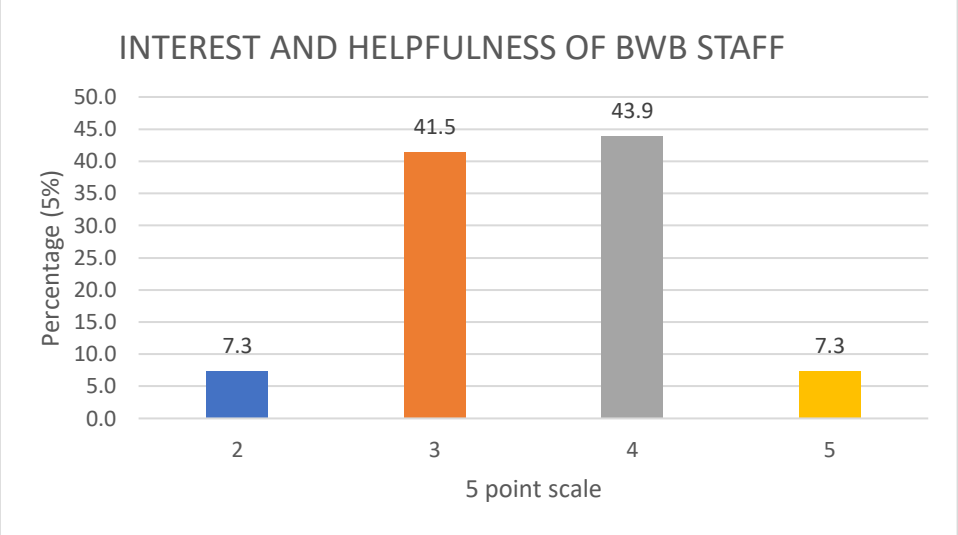


Figure 17: Interest and customer care of BWB staff

4.4.3 Duration taken to maintain a leakage/broken pipe

Results have shown that 38.5 percent of the respondents were fairly satisfied with the time taken by BWB to fix or maintain a leakage followed by 30.8% that were not satisfied at all, then 15.4% that were not satisfied and 7.7%, 7.7% that were satisfied and very satisfied respectively. This had a negative impact on customers' willingness to pay for service since the more they take long to maintain a leakage, the more customers started to lose interest which reduces their willingness level to pay for water services.

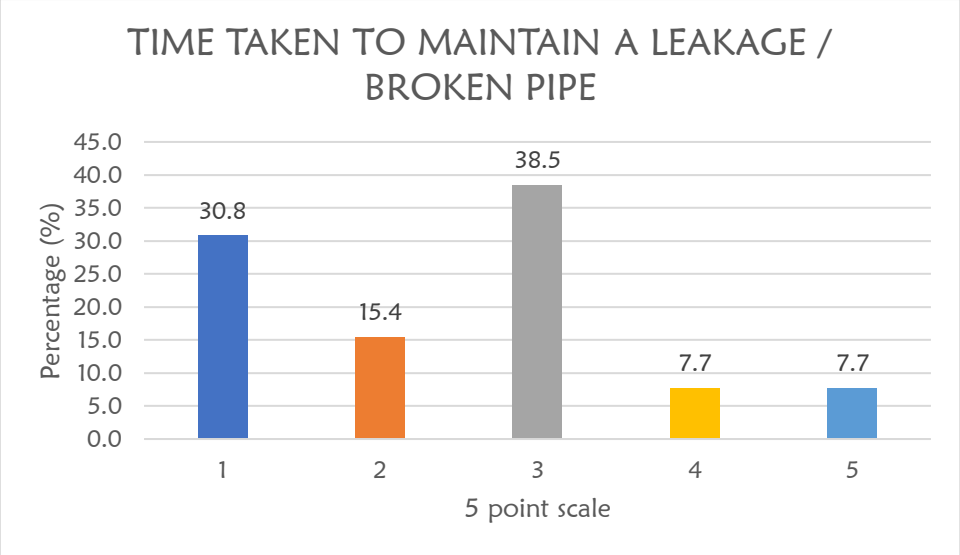


Figure 18: Duration taken to maintain a leakage/broken pipe

4.4.4 Perception towards current water rates compared to electricity

Findings have shown that 47.7 percent were satisfied with the current water rates, followed by 42.3% that were very satisfied with the current water rates as compared to water rates. Only 9.1% showed that were partially satisfied with the current water rates as compared to electricity. This means that BWB customers were willing to pay for water service since they were satisfied with the current water rate.

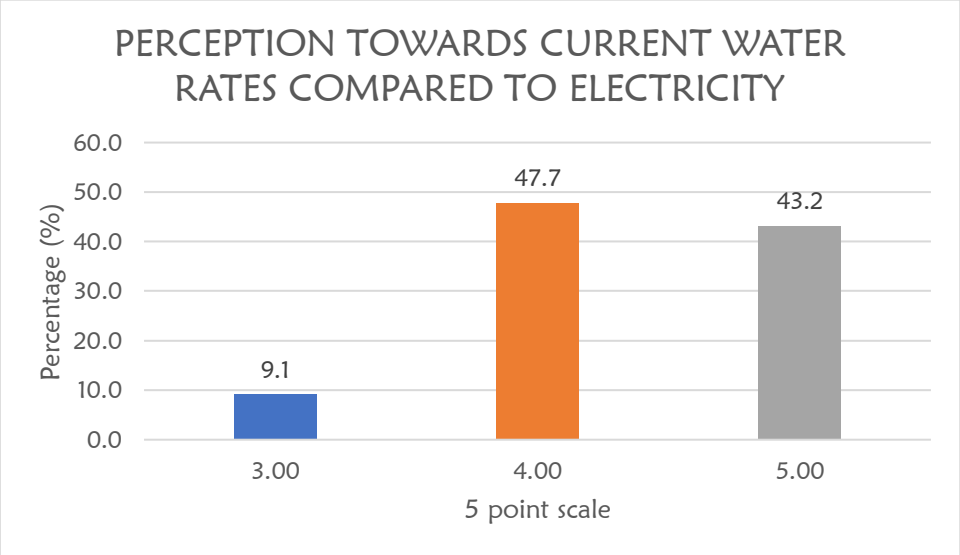


Figure 19: Perception towards water rates as compared to electricity

CHAPTER FIVE: CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

The study showed customers were highly affected by reliability of the water supplied by BWB as shown in the results, followed by water pressure and bill accuracy hence need for improvement. Further, the study also indicated that BWB customers were satisfied with the water quality supplied by BWB which include colour, smell and taste supplied by BWB. Lastly, considering willingness to pay, more customers (81%) were willing to pay more with the quality of service provided by BWB. Though more customers were willing to pay, a certain percentage were not willing to pay more with reliability of water supply, accuracy in billing, time taken for BWB to maintain a leakage/broken pipe and water pressure provided by BWB.

5.2 Recommendation

The following are the recommendations drawn from the study:

- There is a need for BWB to ensure proper maintenance of the water distribution system so as to reduce the dissatisfaction levels with respect to inadequate water pressure. Apart from that proper maintenance of the distribution system will also help to reduce non-revenue water hence it will boost revenue collection just as proposed by Gowela, (2017) in his research. This will also increase the customers willingness to pay since the customers will start enjoying the services hence being responsible.
- There is also a need for BWB to be highly responsive in terms of time take taken for them to fix a leakage. By doing this, customers willingness to pay for water services will be boosted.
- Sensitizing customers to report faults in time can also lead to reduced inadequate water supply. Due to the fact that BWB takes long to fix a problem, some customers find it not important to report at all as such considering those customers there is a need to sensitize the customers to report earlier as this contribute to increased water pressure since the faults will be corrected in time. So once pressure is improved, customers will be willing to pay more.

References

Adekunle IM, Adetunji MT, Gbadebo AM, B. O. (2007). *Assessment of Groundwater quality in a typical rural settlement in southeast Nigeria. International Journal of Environvironmental Research and Public Health*.

Bhardwaj, A. (2016). *Importance of Education in Human Life : a Holistic Approach*. *2*(2), 23–28.

Boru, T. (2018). *CHAPTER FIVE RESEARCH DESIGN AND METHODOLOGY 5 . 1 . Introduction Citation : Lelissa TB (2018); Research Methodology ; University of South Africa , PHD Thesis*. (December). https://doi.org/10.13140/RG.2.2.21467.62242

Breidert, C., Hahsler, M., & Reutterer, T. (2006). *WILLINGNESS-TO-PAY*. 1–32.

BWB. (2018). *CUSTOMER SERVICE CHARTER*. Retrieved from http//:www.bwb.mw/

GoM. (1995). *Waterworks Act*. Zomba, Malawi.

GoM. (2014). *Education Statistics 2014*.

Gowela, J. J. (2017). *Customer satisfaction assessment to improvw domestic water supply service quality in Lilongwe, Malawi*. TONGJI UNIVERSITY.

Gowela, J. J., Alleyne, T., & Chinopfukutwa, G. L. (2017). *Service quality gap analysis to improve public water service delivery in Lilongwe city : tapping customer ' s voice*. *7*(4).

Hejase, H. (2001). *Customer Care Service Definition*.

Joseph, M. (2020). *An Assessment of Willingness to Pay for Improved Water Services in Tanzania : A Case Study of Igunga Town AN ASSESSMENT OF WILLINGNESS TO PAY FOR IMPROVED WATER SERVICES IN TANZANIA A Case Study of Igunga Town M . A . (Economics) Dissertation University*. (August 2014). https://doi.org/10.13140/RG.2.2.24354.68806

Kagan, J. (2021). Personal Income. Retrieved January 22, 2021, from http://www.investopedia.com/

Kalulu, K., & Hoko, Z. (2010). Assessment of the performance of a public water utility: A case study of Blantyre Water Board in Malawi. *Physics and Chemistry of the Earth*, *35*(13–14), 806–810. https://doi.org/10.1016/j.pce.2010.07.017

Kamaludin, M. (2015). *Consumer Willingness to Pay for Domestic Water Services in*

Kelantan SOCIAL SCIENCES & HUMANITIES Consumer Willingness to Pay for Domestic Water Services in Kelantan. (March).

Kayaga, S., Calvert, J., & Sansom, K. (2003). Paying for water services: Effects of household characteristics. *Utilities Policy*, *11*(3), 123–132. https://doi.org/10.1016/S0957-1787(03)00034-1

Manda, M. A. Z. (2014). *Water and sanitation in urban Malawi : Can the Millennium Development Goals be met ? A study of informal settlements in three cities Theme : Water - 7 Water and sanitation in urban Malawi : Can the Millennium Development Goals be met ? A study of informal*.

Mawenda, J., Watanabe, T., & Avtar, R. (2020). An analysis of urban land use/land cover changes in Blantyre City, Southern Malawi (1994-2018). *Sustainability (Switzerland)*, *12*(6), 1–18. https://doi.org/10.3390/su12062377

Moffat, B., Motlaleng, G. R., & Thukuza, A. (2011). *HOUSEHOLDS WILLINGNESS TO PAY FOR IMPROVED WATER QUALITY AND RELIABILITY OF SUPPLY IN CHOBE WARD , MAUN*. 45–61.

Mugabi, J., Kayaga, S., Smout, I., & Njiru, C. (2010). Determinants of customer decisions to pay utility water bills promptly. *Water Policy*, *12*(2), 220–236. https://doi.org/10.2166/wp.2009.096

Mukokoma, M. M. N., & Dijk, M. P. Van. (2011). *An assessment of the urban water service delivery quality gap in Uganda and Tanzania : taping the customer ' s voice in water service delivery*. *145*, 349–359. https://doi.org/10.2495/WRM11

NSO. (2019). *Malawi Population and Housing*.

Ohwo, O., & Agusomu, T. (2018). *Residential Customers Satisfaction with Public Water Provision in Ojota , Nigeria*. (December 2019). https://doi.org/10.19044/esj.2018.v14n23p117

Ojo, V. olanrewaju. (2011). *Customer satisfaction : a framework for assessing the service quality of urban water service providers in Abuja , Nigeria*. Loughborough.

Phiri, G. (2020, August). Poor revenue collection chokes water sector — Jica. *National Newspaper*.

Roy, J. (2015). *Willingness to Pay Studies : A Policy Tool*. (October). https://doi.org/10.13140/RG.2.1.5087.0485

Roy, R. (2019). *HYDRO-INFORMATICS ENGINEERING (CE) WATER QUALITY ANALYSIS : AN INTRODUCTION*. (January).

Shamir, U. (2015). *Water supply reliability*. (December). https://doi.org/10.1002/j.1551-8833.1981.tb04736.x

Sualihu, M. A., & Rahman, M. A. (2017). *The Payment Behavior of Water Utility Customers in the Greater Accra Region of Ghana : An Empirical Analysis*. https://doi.org/10.1177/2158244017731494

Sualihu, M. A., Rahman, M. A., & Tofik-Abu, Z. (2017). The Payment Behavior of Water Utility Customers in the Greater Accra Region of Ghana: An Empirical Analysis. *SAGE Open*, *7*(3), 1–12. https://doi.org/10.1177/2158244017731494

Wertenbroch, K., & Skiera, B. (2002). Measuring consumers' willingness to pay at the point of purchase. *Journal of Marketing Research*, *39*(2), 228–241. https://doi.org/10.1509/jmkr.39.2.228.19086

Wondimu, S., & Bekele, W. (2011). *Determinants o f individual willingness to pay for quality water supply : the case of Wonji Shoa Sugar Estate , Ethiopia*. *153*, 59–70. https://doi.org/10.2495/WS110061

Appendix

Appendix 1: Sample of customers willingness to pay for water services questionnaire

CUSTOMERS WILLINGNESS TO PAY FOR WATER SERVICES IN BLANTYRE, MALAWI

QUESTIONNAIRE

My name is ……

I am a student at Malawi University of Science and Technology (MUST) conducting a research concerning customers willingness to pay for water services in your location. The information collected will be very useful for identification of your perception and concern so as to propose ways of improving customers willingness to pay for water services through service improvement. The survey will usually take 6-10 minutes.

Location: _____

House number: _____

Date: _____ Time: _____

Language of interview: 1. English 2. Chichewa 3. Others (specify)

A. Demographic details

1. What is your position in the house?	Head of house	1
	Spouse	2
	Other (specify) …… …… …… …… ……	3
2. What is your age group?	18-24	1
	25-29	2
	30-34	3
	35-30	4
	40-44	5
	45 and above	6
3. How many people live in the household?		
	No formal education	1

4. What is your highest educational qualification?	Primary	2
	Secondary	3
	Tertiary (diploma)	4
	Tertiary (degree)	5
	Post-graduate	6
5. How long have you lived in the apartment?	Less than 1 year	1
	1-3 years	2
	Over 5 years	3
6. Do you own the house or it is rented?	Own the house	1
	Rented	2
7. Gender of respondent	Male	1
	Female	2
8. What is your estimated total household income per month?	Less than K25,000	1
	K25,000 – 100,000	2
	K101,000 – 250,000	3
	Above K250,000	4
	Don't know	5

B. Willingness to pay for improved water service

9. Where do you access domestic water?	Piped water in the unit	1
	Water kiosk	2
	Piped water (neighbours)	3
	Borehole	4
	Others (specify) ……. ……. ……. …….	5
10. If Piped: How often do you get water from Blantyre Water board?	Every 24 hours	1
	Less than once / 24 hrs	2
	Never	3
11. On average how much do you spend on water every month?	Below K2,000	1
	K2,000 – K5,000	2
	K5,000 – K10,000	3
	K10,000 – K20,000	4
	K20,000 and above	5
	Improve reliability	1
	Improve billing accuracy	2

12. If you are willing to pay more, what would you like to improve?	Improve water pressure	3
	Improve customer service	4
	Improve communication with customer	5

C. Billing

13. How long has your house been connected to the Blantyre Water Board main?	Less than 6 months	1
	Above 6 months	2
	Not connected	3
14. What is the type of your water connection?	Domestic	1
	Commercial	2
	Industrial	3
15. Are you on post-paid or pre-paid?	Post paid	1
	Prepaid	2
16. Whether pre-paid or post-paid, how much do you pay for water services every month?	Below K2,000	1
	K2,000 – K5,000	2
	K5,000 – K10,000	3
	K10,000 – K20,000	4
	K20,000 and above	5
17. If Pre-paid: What problems do you face with prepaid meters?	Network	1
	Difficult to operate	2
	Does not give warning	3
18. If Post-paid: Do you receive water bills at this house?	Yes	1
	No	2
19. If Yes: How frequently do you receive water bills?	Monthly	1
	Quarterly	2
	Twice a year	3
	Other	4
20. If Post-paid: Has your house been disconnected before?	Yes	1
	No	2
21. If Yes: What was the reason?	Indebted	1
	Wrong disconnection	2
	Inherited bill	3
	Other (specify) …… …… …… …… ……	4

22. Did you receive a notice before disconnection?	Yes	1
	No	2
23. If No: Did you lodge a complaint to the BWB officials?	Yes	1
	No	2
24. If Yes: How did you make your complaint?	Letter	1
	In person	2
	Telephone	3
	E-mail	4
	Other (specify) ……. ……. ……. …….	5
25. Have your ever visited BWB to enquire anything?	Yes No	1 2

D. Customers' perception

26. Using a 5point scale, rate the following customers' perception attributes where 1 means "not satisfied," and 5 means "very satisfied." How satisfied or dissatisfied are you with the following?

i. The colour/appearance of the water supplied?	1	2	3	4	5	0
ii. The smell of water of the water supplied?	1	2	3	4	5	0
iii. The taste of the water supplied?	1	2	3	4	5	0
iv. The courtesy of the staff at BWB?	1	2	3	4	5	0
v. The interest and helpfulness that the staff show you as a valued customer?	1	2	3	4	5	0
vi. How long they take to maintain a leakage/breakage?	1	2	3	4	5	0
vii. What is your perception towards current water rates compared to electricity?	1	2	3	4	5	0

E. Importance score

26. Please rate the following service quality expectations based on their importance using a 5point scale where 1 represent "not important at all" and 5 represents "most important."

i. Reliability of water supply	1	2	3	4	5	0
ii. Adequate water pressure	1	2	3	4	5	0

iii. Taste of drinking water	1	2	3	4	5	0
iv. Accuracy in billing	1	2	3	4	5	0
v. Satisfaction with the services offered by BWB	1	2	3	4	5	0