WATER MANAGEMENT SYSTEM PROPOSAL

FOR THIWASCO COMPANY

NGUGI CATHERINE WACUKA

EDV2/07223/22

SUPERVISOR'S NAME

FRANCIS KAIRARIA

PROJECT PROPOSAL SUBMITTED TO BE SUBMITTED TO THE FACULTY OF PHYSICAL SCIENCES, ENGINEERING AND TECHNOLOGY IN PARTIAL FULFULLMENT OF THE REQUIREMENT OF THE AWARD OF DIPLOMA IN INFORMATION TECHNOLOGY AT THARAKA UNIVERSITY

JULY 2024

DECLARATION

I Catherine Wacuka hereby declare that's this project is based on my original work except work except for quotations which have been duly acknowledged. I also declare that it has not been previously and concurrently submitted for a diploma or any other award in any other educational institution.

Student name

……………………………………………………………………………………………

Signature

…………………………………………………………………………………………..

Date

……………………………………………………………………………………………

APPROVAL

This project was conducted under our supervision and is submitted with our approval as university supervision.

Supervisor name

…………………………………………………………………………………………

Signature

…………………………………………………………………………………………..

Date

………………………………………………………………………………………

DEDICATION

I dedicate this project to Almighty God my creator, my source of inspiration wisdom, knowledge and understanding. He has been my source of strength and wisdom throughout this program and his wings only have I endured.

I also dedicate this to my parents Mr. and Mrs. Maina for their outpouring financial support and for teaching me that when carrying out a task, one should just go step by step without omitting others. Their steadfast commitment, love will never be taken for granted.

ACKNOWLEDGEMENT

Words cannot express my gratitude to my supervisor that Mr. Francis for his invaluable patience and feedback. He taught me various ways of carry out the research and how to present in a clear manner. I really thank him for he acted like a mentor, a friend, who provided me with technical advice during my research. It was a great privilege and honor to work and study under his guidance.

ABSTRACT

This proposal clearly outlines the Introduction, background study of the project work, problem statement which shows the problem the system is addressing as well as the objectives of the online water management system. It provides a comprehensive online platform whose objectives are to streamline customer registration, provide easy access to water connection requirement details, improve the online billing process and enhance the management of customer requests and complaints.

It elaborates on how new customers will be registered by signing up. Through registration made the water supplier can address the needs of a certain customer as well as sending notification to them. It provides a guide step to step guide for the water connection details such customers address, connection date, connection details as well as mode of billing process and payment. The system also allows the customer to send requests or complaints and later on the customers get immediate response to request or complaints sent.

This proposal indicates the research questions that guide the direction of the area of study. Significance of studies is well explained. It also shows the scope which clearly Indicates the limits and constraints of the online water management system project. Citation by other people using references as well as the summary of the whole system is clearly indicated in the literature review. System Methodology, data collection methods, sampling techniques used, system analysis and design are illustrated at the end of this proposal

Contents

CHAPTER ONE: INTRODUCTION

1.0 Introduction

This chapter presents background study, problem statement, objectives, significance of study, research question and scope.

1.1 Background of Study

In ancient times, water companies used manual processes and paper-based systems to manage user connections requirement details, paper-based requests and complaint forms and handle water billing processes. However, with the advance technology and growing efficient water management, there was demand of an integrated IT system to streamline operations and enhance customer services and enhance customer satisfaction.

Companies and water industries kept a record of their new customers on a piece of paper. At times data recorded concerning new customers could have errors, inaccurately recorded or it would get lost. An Integrated online water management system makes work easier by creating a user-friendly platform which will, a user -friendly online platform would aid in registering for aid new customers in registering for water services. This simplifies the registration process, reducing errors that may occur manually and ensures the accurate data is collected.

Customers may find it challenging to visit the water offices so as to get understand the water application process. The water management system is working towards creating a step -by- step guide that has all the customer requirement details. The online management system aims at providing an easy online access to detailed information on water requirement details and process. This will do away with the manual application which will save on time and paperwork cost. It will also help the customers to understand the process in an efficient manner.

Earlier on water companies really faced a lot of challenges such as user water connections were managed manually involving time –consuming paperwork and long waiting periods for new connections. Billing was often inaccurate leading to disputes and delayed payments among the customers and water supply providers. Later on, Industries and water companies started to use IT solutions which included a basic billing software, a basic data management system that captured data on billing process. The integrated Water system aimed at providing a platform that would that

major mainly on user management, supply monitoring billing and reporting which was more effective than the manual process.

1.2 Problem Statement

Many people also know how to get reach of water billing system. Some do not have the know-how on the water is paying system. Some people are illiterate and find it hard to understand how the system operates. The system will a create awareness to those illiterate and also will give a clear illustration of how the billing system will be carried out.

At times users may find it difficult to reach to the water management system due to lack of connectivity between the users and the water Management system. Having a customer complaint system such as a helpline or online portal enables the users to raise issues and give new ideas of how the water management system would run.

1.3 Objectives

1.3.1 General Objectives

The general objective is to develop online water management system for THIWASCO.

1.3.2 Specific Objectives

i.   To provide room for user registration for new customers.
ii.   To provide easier access to water connection requirement details to customers
iii. To improve on online billing process
iv.   To enhance customer request and complaints platform

1.4 Research Questions

i.   To what extent will the online water management system register new customers without leaving others out?
ii.   How will the online water management system provide users the required details on water connection requirements?
iii. To what extent does the online water management system give feedback to the users after paying their bills?
iv.   How will the online water management system attend receive complaints from users?

1.5 Significance of Studies

It shows the importance of the online water management and gives an outline of the context based on the whole system.

User registration allows the system to create interfaces for different users therefore it will make easier to address specific needs or complaints of a specific user when they arise. It will also help the water supply administrators in sending notification such as billing remainders to the registered users.

The online water management system gives a guide to customers concerning the water connection details which they can use anywhere and at any time. This will save customers time and effort since they longer need to visit the water offices so as to get an explanation for application process, submitting their applications and getting water connection approval.

It aids customers with the online payment options such as online banking or use of credit cards which enables customers pay bills quickly and reduce the likelihood of late payments. The online system also provides customers with clear and accurate billing information thus reducing billing disputes that occur if bills are calculated manually.

It provides a platform that is accessible to submit requests and complaints from anywhere and at any time as long as the customers have internet connection. The online water management system has reduced the need paper-based requests and phone calls thus make it conveniently for customers to use the platform and easily convey their requests and complaints online and receiving feedback.

1.6 Scope
It explains more on water management systems and addressing water related challenges.

The system will clearly reduce cost that customers incur when they travel to THIWASCO for registration. This will be done away with by creating an interface and customer's profile where by the customers will registering online. water connection details such connection date, address of the user, meter reading method such as manual readings or automatic reading are at times paper-based work which are very costly. The system makes this process easier by conducting it online to avoid errors that occur when done on a piece of paper

Manual water reading and water billing gives inaccurate and inconsistent information leading to disputes among water supply headquarters and customers. The system explains on how automatic

meter readings mechanisms and later on uploading meter readings online have accurate and correct information leading solving the disputes that arose.

Customers may send requests and complaints and encounter delays in getting feedback or they not receive feedback concerning their issues. The system offers an online platform were requests and complaints will be responded quickly reducing response time and improving customer satisfaction.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter gives an outline literature review, related works and conceptual frameworks.

2.2 Review of Related Work

Traditionally things were done manually that is billing which more often was inaccurate, which really led to dispute and delayed payment[1] .User connections details and user's water connection process as well as user registration was also done manually which used a lot of papers and time. Users could wait for a long time for new connections.   Later use it systems dealt away with basic billing software since it gives inaccurate details. The user registration was well established and using advanced technology, water companies can now register their new users and attend to customer complaints online.

Use of Integrated online water management system in registering new customers has really created a huge impact to both THIWASCO and also to consumers. Customers details are accurate, well stored and are well secured. Through the registration customers can view their profiles and perform tasks application for new water connection, paying their bills and submitting their requests or complaints. Through the user registration, THIWASCO can send notifications to their customers concerning water updates or sending reminders to customers for have not paid their bills [2].

Online water management system helps consumers in easily accessing water connection details to users. These details help the customers in water connection requirement process. Details such as connection date, user address, fee payment, payment method, connection type that whether the customer will use the water for [3].

Used of manual process for sending complaints from customers ways highly used. It was very costly[4].Interaction between the water companies and the users has led to reduction of customer complaints and faster response time. This is after implementing a customer complaints management system integrated into Water Company's infrastructure. Through the complaint system the users are able to raise their issues that they come across with.

2.3 Conclusion

Nowadays companies use the IT systems which are have a friendly interface for user registration, online billing and payment options, and real –time monitoring of water supply infrastructure and

advanced to identify usage patterns and detect the challenges that may occur. The increasing demand for water and the need for sustainable management practices necessitate the adoption of digital solutions. An online water management system can streamline operations, enhance customer service, and ensure better resource management.
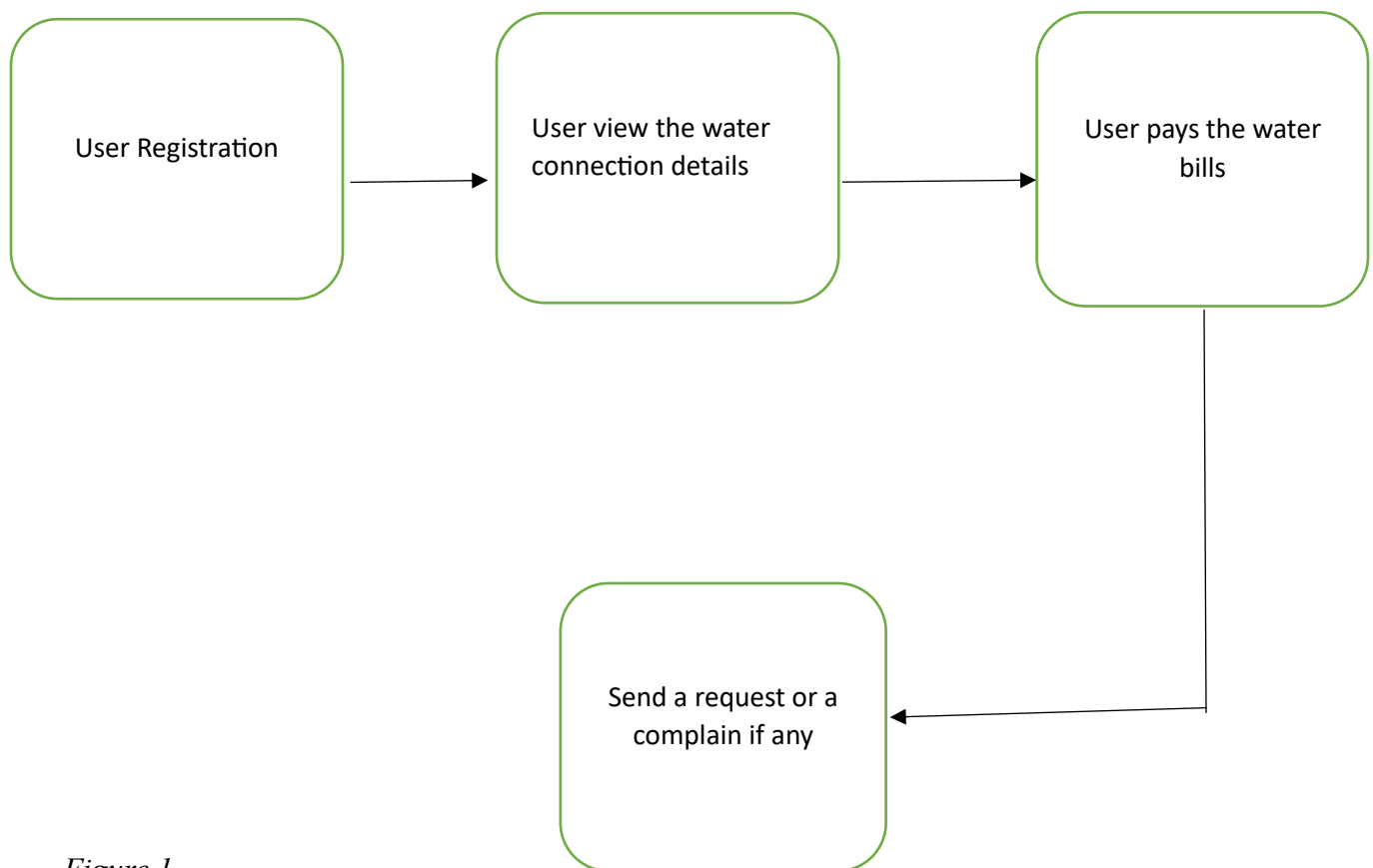
2.4 Conceptual Framework

Figure 1

Source: author (2024)

The user starts off by registering and creating an account. Then views water connection details. After viewing the bills, the user pays the water bills as per the water connection details. The user pay send the request or complain online.

CHAPTER 3: SYSTEM METHODOLOGY

3.0 Introduction

In this chapter we will be looking at the research methods that were employed in the study in order to achieve the objectives of the study. This chapter will cover the system design, system methodology Target population and sampling techniques.

3.1 System Design

The system will have a user interface for all users to access the system. Through the interface the user will be to view his account details and also perform tasks such as paying bills, submitting complaints and applying for new water connection.

The programming languages to be used will be JavaScript, Java and PHP which be used to create the user interface, water billing interface as well as the online customer complaint platform. The database that will be used to store data will be MySQL. It will store all customer's billing data, complaints data, user registration and all water application data.

3.2 System Methodology

The researcher decided to select 'Iterative model' because this model is the following advantage

- Generate working software quickly and early during the software life cycle.
- This model is more flexible that is less costly to change scope and requirements.
- It is easier to test and debug during a smaller iteration.
- In this model customer can respond to each built.
- Lowers initial delivery cost.

3.3 Target Population

The targeted population for these objectives is some users who use the THIWASCO water. These people were invited to participate through interviews and questionnaires, then give their opinions and opinions on impact of the system to people.

3.4 Data Collection Methods

Interviews

The system developer interviewed THIWASCO stakeholders and some THIWASCO users asked questions concerning their current system they are using. Through the interview the researcher got

to understand the organization background, their work activities through structured and unstructured questions from the management and workers. They exchanged ideas and opinion concerning changing their manual system and implementation of the new online system.

Questionnaire

This is a research instrument that consists of a mix of close-ended questions and open-ended questions. The purpose of the questionnaires was to compare the respondents' views with the researcher's views on the impact of the system. They also focused on meeting the objectives and the research questions.

The required information in this study was analyzed using appropriate data analysis techniques. Data was then edited, entered into a data analysis software application, cleaned and coded using a chosen programming language in order to make it ready for the analysis process.

Observation

The researcher visited the THIWASCO offices and observed how workers carried out their work in their natural setting. Observation allows us to collect data in real time where activities are being performed.

REFERENCES

[1]   K. Acharya, "INTERNSHIP REPORT ON PROJECT BY (Tribhuvan University)," no. March, 2024, doi: 10.13140/RG.2.2.34599.36007.

[2]   T. Robles *et al.*, "An internet of things-based model for smart water management," *Proc. - 2014 IEEE 28th Int. Conf. Adv. Inf. Netw. Appl. Work. IEEE WAINA 2014*, no. May, pp. 821–826, 2014, doi: 10.1109/WAINA.2014.129.

[3]   É. Soares Ascenção, F. Melo Marinangelo, C. F. Meschini Almeida, N. Kagan, and E. M. Dias, "Applications of Smart Water Management Systems: A Literature Review," *Water (Switzerland)*, vol. 15, no. 19, 2023, doi: 10.3390/w15193492.

[4]   S. B. Kaç, "Customer Complaints-Based Water Quality Analysis," 2023.

APPENDICES

APPENDIX I: Questionnaire

SECTION A

PERSONAL INFORMATION

1) Full name

First name ……………………………………………………….

Last Name …………………………………………………

2) Email Address…………………………………………………

3) Phone number …………………………………………………

4) Date of birth……………………………………………………

CONNECTION TYPE

Domestic

Commercial

Industrial

Institution

CONNECTION ADDRESS

House/flat number ……………………….

Street…………………………………….

City……………………………………

CONNECTION DATE……………………………………………

FEES AND PAYMENT

Payment method

Credit /debit card

Bank Transfer

Digital wallet

APPENDIX II: Budget And Cost

NO	Item	quantity	Price per item (Ksh)	Total price (Ksh)
1	paper	7	10	70
2	pen	3	25	75
3	Binding	1	80	80
4	Printing	20	10	200
5	Travelling cost	2	1000	2000
6	laptop	1	25000	25000
	Total			Total=27,425

APPENDIX III: Gannt Chart

No.	Activity	April	May	June	July
1	choosing the research area and the topic	██████			
2	Developing the literature review		██████		
3	Research methodology and conducting interviews			██████	
4	Writing the research document				██████