CITY COLLEGE OF CALAMBA

DEPARTMENT OF COMPUTING AND INFORMATICS
Bachelor of Science in Information Technology

Barangay Mapagong Management Information System with Online Application Feature.

A Thesis Presented to the Faculty of Department of Computingand Informatics of the City College of Calamba, City Laguna

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Chapter 1

INTRODUCTION

This chapter presents the introduction, background of the study, project context, conceptual framework, objectives of the study, significance of the study, and definitionof terms used in the study.

The administration has been under pressure for years to satisfy the demands and keep up with the evolving complexity of the global environment and to enhance their role in public administration and the provision of services. The reforms demanded not only better public service through increased responsiveness, promotion of openness, and efficiency and effectiveness improvements. They have also emphasized the need to change from traditional, top-down methods to more decentralized and participatory systems. Barangay is the basic local government or political unit in the Philippines. The empowerment of the nation's local governments is greatly aided by barangay governance. Contiguous areas with at least 2,000 people, or at least 5,000 in densely populated cities, constitute barangays.

Barangay is the smallest political unit in the Philippines. They ought to offer services, projects, initiatives, and activities that will assist their people. So it requires a lot of information, to perform effectively, each barangay should keep a database containing

several pieces of information on the barangay, including its population, financial transaction records, complaints lodged, houses built in the neighborhood, and socioeconomic profiles of its residents. It is the responsibility of Baranggay secretary and barangay treasurer to deal with administrative works and fiscal relations. Though some barangays already use computers and other electronic devices to carry out transaction, most are still using manual based operations.

Notably in work environments. Information and communication technology (ICT) is being used in other nations to improve the effectiveness, efficiency, and transparency of their governments. ICT not only assists in improving governments but also gives citizens more details about their governments. Government can be considerably more successful and responsive to citizens by fusing technology with new ways of doing things.

E-governance, or "electronic governance," is the use of information and communication technologies (ICTs) at various levels of the government, the public sector, and elsewhere to improve governance. ICTs include things like Wide Area Networks, the Internet, and mobile computing.

Utilizing software solutions to organize the management of barangay system has several advantages, but the biggest one is that it may save the administrator a lot of time. Using property management technology can help them save time on a variety of manual duties from simple ones like online approval of request for issuance of documents needed

by residents without more interaction, filing blotters in database on the system can reduce time and papers of filing a lot of report papers on their storage.

Project Context

Barangay Mapagong is a barangay in the city of Calamba, Laguna Province. As of the 2020 Census, there were 7,254 people residing there. This represented 1.34% of Calamba's total population. It consists of four districts/puroks and one sitio. This local government unit has one secretary who keeps records, lists members of the barangay assembly, assists and submits reports on the actual number of barangay residents as often as required by the Sangguniang Barangay, and performs other duties; and one treasurer who keeps custody of Barangay Mapagong's funds and properties and must also comply with reports. The barangay has employed three extra office workers to assist the secretary and treasurer.

Despite the fact that the barangay secretary, treasurer, and other Mapagong staff members now use computers, they still file paper reports manually. Because reliable barangay data statistics are not readily available, the barangay is where the initial planning and implementation of initiatives and programs takes place. Yet, it has the least amount of information available that serves as a baseline for planning and policy implementation. Secretary must still prepare if they have updated census or information from Mapagong locals. Aside from that, the barangay office is responsible for providing residents with

necessary paperwork such as certificates, clearance, and permits. The most often requested documents in the barangay are barangay clearance, certificate of indigency, and business permit. All documents granted to residents are processed by barangay personnel or the secretary. The process of distributing these documents is also carried out manually. The information is manually entered into the template of the documents, and a photograph of the resident is taken to attach to the documents before printing. This manual document processing consumes additional time. Both time and effort are necessary. Furthermore, the issuance of these documents has comparable payment, and because they don't know how many certificates they issue per day, they don't keep track of their commission. Barangay also keeps a record of blotter reports in a report book and stores the books in their drawer, which may sometimes be a difficulty when it comes to finding blotter quickly.

The researcher aims to develop a Barangay Management Information System with Online Feature. The system will help barangay for administrative works, it will provide information that is necessary for assembly or meeting for barangay officials. Helps the secretary to manage public services such as faster issuance of barangay clearance, certificate of indigency and business permit. Also provide online request for the said documents. In addition, the system keep track of their commission for the payment of processed documents. A system that accepts online blotter reports for residents and stores

the records in the system as active, settled, and scheduled to make it easier to identify and manage blotter cases.

To present graphically the problems encountered Figure 1-1 presents the fishbone diagram:

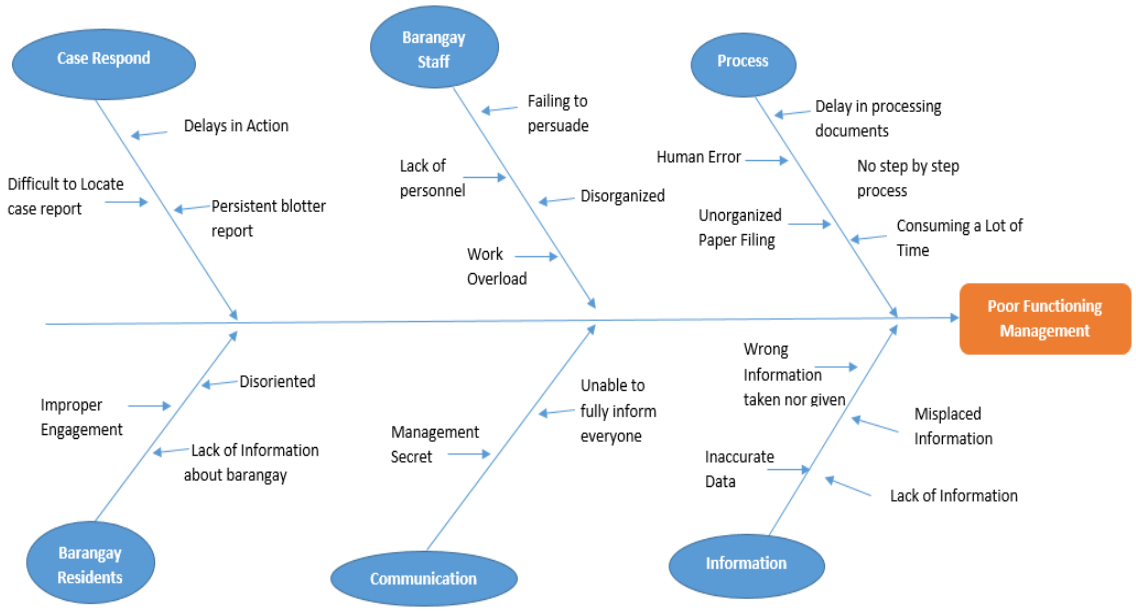

Figure 1-1. Fishbone Diagram of Barangay Mapagong Management Information System with online application feature

Figure 1 shows a fishbone diagram which was a guide on how the researcher conducted an interview discussing the poor functioning management of Barangay Mapagong in terms of theirprocess, how they manage information gather from the residents, how they inform the locals and build trust from them, and how they respond to cases.

Specifically, this research aimed to answer the following questions:

1. How the barangay manage the information gather from the residents?
2. What procedures do they follow while providing documents and obtaining blotter reports from residents?

3. What approach was utilized in the proposed system to analyze the system's efficiency in terms of:

    3.1. Usability;

    3.2. Functionality;

    3.3. Efficiency;

    3.4. Reliability and;

    3.5. Maintainability

Therefore, the researcher intended to aid the problems of Barangay Mapagong Management System in order to improve their process in terms of document issuance, managing resident information, and keeping blotter records to ensure that the management provide a well-functioning management system.

Objectives of the Study

The system's general goal is to provide a web-based Barangay Management Information System to assist the barangay's functionality and operations. It specifically aims to:

1. Create a system that records accurately and securely the profile of

residents;

2. Create a system that lessens the time consume in requesting documents such as barangay clearance, certificate of indigency and business permit and compute the total revenue for the transaction payment of the said documents;
3. Generate report for significant data such as; Total of population, list of residents, number of requested documents, Total complaints, total of non-voters and voters, and revenue for requested documents; and
4. Assess the effectiveness of the proposed system according to ISO/IEC 25010 in terms of:

   4.1 Usability;

   4.2 Functionality;

   4.3 Efficiency

   4.4 Reliability; and

   4.5 Maintainability.

Conceptual Framework

In this study, the researcher made a conceptual framework that illustrates the process of input and output that occurs in the system and served as a guide and provided a quick overview of the whole research work.

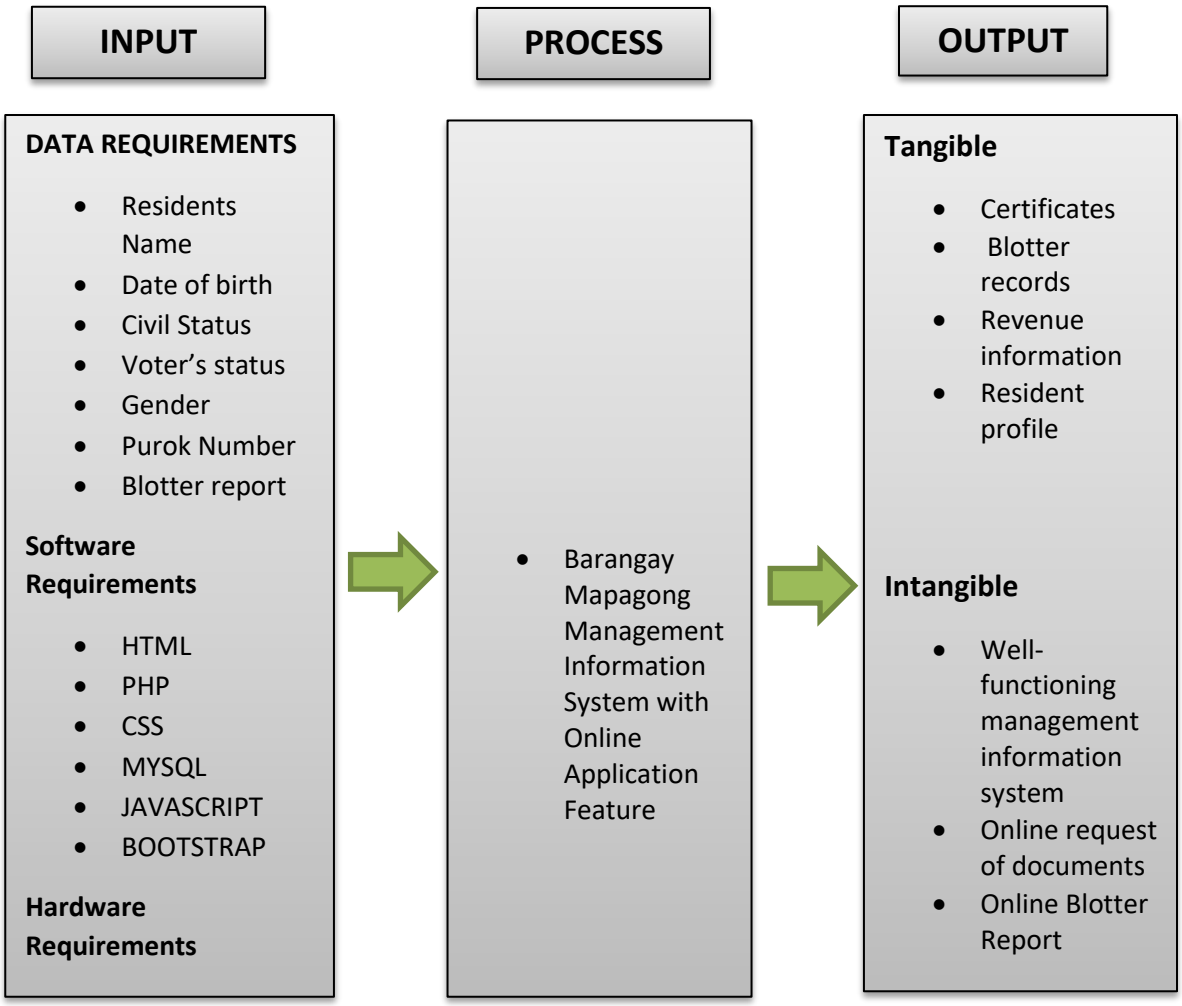

Figure 1-2. Conceptual framework of the study

Figure 1 shows the conceptual Framework of the study. It illustrates the flow of input, process, and output of the system. The Input includes the data requirements and software and hardware requirements. Data requirements are residents name, date of birth, civil status, voters' status, gender, purok number and blotter report. Software includes HTML, PHP, CSS, MySQL, Javascript and Bootstrap. Online registration of the residents and also their online request for documents and blotter report will be process by the barangay management information system creates output of tangible things which are certificates, hard copy of blotter record, resident's profile and also revenue information for every transaction. And for Intangible outputs of the system provides well-functioning Online management information system, online request of documents and online blotter reports.

Significance of the Study

The proposed system entitled "Barangay Mapagong Management Information System with Online Feature" aimed to improve the traditional management used by this local government unit to deliver effective and efficient public services using management information system. The system aims to eliminate the problems encountered by the administrator or the secretary and treasurer in every day process of transaction and manual reports.The research will benefit the following;

Residents of Barangay Mapagong. The system allows for speedier transactions for the issuance of documents required by residents. Furthermore, the system offers correct information to the barangay office that is required for assembly or meeting for barangay authorities, allowing them to better prepare for providing good services to the citizens of the Barangay Mapagong.

Barangay Mapagong Secretary and Treasurer. Through the system, the barangay secretary makes it simpler to locate barangay records and quickly prepares the relevant paperwork and meeting agenda. Additionally, the Barangay Treasurer can view the barangay's revenues more quickly. Therefore, the barangay secretary and treasurer may easily track residents' information using this method.

Baranggay Captain and Officials. The system will help process the numerous barangay transactions more quickly and accurately. Consequently, it can free up the barangay captain's time to attend other meetings or transactions. Additionally, it will guarantee the timely transmission of various reports that the barangay officials might use to make informed decisions.

Local Government Unit of Calamba. A well-managed information system with an online application will be an excellent foundation for establishing a system for each barangay that would assist the local government unit in providing effective and efficient public services to the residents.

Researchers. The project will encourage the current researcher to learn more about developing a system. This study will provide them the learning experience to be used for their future career as professional IT workers

Future Researchers. This study will serve as an additional source or reference to the future researchers to come up with new ideas that can enhance the system who will conduct the same study.

Scope and Limitations

The study aims to develop online management information system for Barangay Mapagong. Out of 8186 residents of Barangay Mapagong, only 160 residents were used, including barangay office staff, treasurer and the secretary as the respondents in conducting the survey. 40 people are the maximum number of respondents per district.

Residents of Barangay Mapagong must do online registration first so they can send request of documents or report a blotter online to barangay system. Residents profile limits to name, age, civil status, gender, birthday, birth place, and voters status. The Barangay Management System will automate the barangay's current manual procedures and business operations by processing online request for faster issuance of documents and generating reports of total population, total voters and non-voters, total female and male, total blotter reports and revenue for the issuance of documents.

Request documents are limited only for Barangay clearance, certificate of indigency and Business Permit. As for complaints or blotter, resident must register to the system for full details of complaints and wait for secretary' s approval if the complainants want to meet barangay captain or officials and wait for a schedule. For major issue that needs immediate action from barangay, residents must go to barangay hall and seeks assistance to barangay official and as for recording blotter residents must still use the system for report.

Definition of Terms

The following terms are described with regards to their specific application in thestudy and are used operationally.

Administrator. A person who manages and organizes the proposed system, organization, or process. It is in charge of managing the system's security, performance, and operation and has privileged access to its settings and controls. Setting up user accounts, selecting security options, updating software, observing system performance, and troubleshooting issues are some of the duties that may be involved.

Barangay clearance. The system Create online request for this document. It is one of the documents thatcan obtain as legal identification verification by the residents of Barangay Mapagong. It's a piece of writing that has a person's name, address,

thumbprint, and signature on it. The date it was issued and the purpose for which it was issued are also included. The barangay captain's signature and the official seal of the barangay are both on it.

Blotter. it allows for the recording of all information given to the authorities, especially alleged criminal acts prior to the start of investigations. It is also be a complaints and concerns from the residents of Barangay Mapagong. The system needs a request for residents for blotter so the system have records and generate total number of blotter in barangay.

Bootstrap. Bootstrap is a free front-end framework that makes web development of the propose system faster and easier. It offers design templates based on HTML and CSS for typography, forms, buttons, tables, navigation, modals, image carousels, and many other things, as well as optional JavaScript plugins. It also gives the ability to easily create responsive designs.

Certificate of indigency. it is given to Residents who are in need of assistance, such as scholarships, medical care, free legal counsel from the Public Attorney's Office (PAO), and the like. The system also create online request for getting a certificate of indigency. The system also accepting online request for the issuance of this document.

E-governance. Electronic governance is the application of information technology through the use of a management information system ensures the security of the private data of the citizenry. Furthermore, Electronic governance is providing a good service and facilitate thousands of people web base using the internet. The researcher intends to create a management system similar to an e-governance system for local government units or barangays.

Hypertext Markup Language. HTML is used to create user interfaces for web applications. In our system, HTML may be used to display a web-based project management application's user interface or provide users with access to a database via a web browser.

Javascript. JavaScript is a scripting or programming language that allows the system to implement complex features on web pages whenever a web page does more than just sit there and display static information. It is the programming language used in the proposed system.

Management Information System. This system is good for management information of barangay's administrative duty or service. The study will be using a management information system for barangay of Mapagong.

MySQL. It is a relational database used in proposed system, in particular, it is a digital storage that collects and organizes data using the relational model.

Chapter 2

Review of Related Literature and Studies

This chapter shows the related literature and studies that contribute to the proposed system entitled Barangay Mapagong Management Information System with Online Application Feature. The information that comes from this chapter will be used by the researchers to have betterunderstanding and knowledge of developing the system.

Electronic Governance (e-Governance)

According to Subhajit et al. (2020), "E-governance is more than just a government website on the Internet. The strategic objective of e-governance is to support and simplify governance for all parties; government, citizens and businesses. The use of ICTs can connect all three parties and support processes and activities". In other words, electronic means in e-governance encourage and support effective governance. Because of this, the goals of e-governance and good governance are identical. A country's affairs can be better managed at all levels through the exercise of economic, political, and administrative authority. People in sophisticated nations do not have a hard time imagining a scenario in which all interactions with the government might be completed at a single counter, 24 hours a day, seven days a week, without having to stand in line.

E-government can be referred to as the use and application of information technologies in public administration to streamline and integrate workflows and processes, to effectively manage data and information, enhance public service delivery, as well as expand communication channels for engagement and empowerment of people. e-Government still includes electronic interactions, namely government-to-government, government-to-business, and government-to-citizen, while a more holistic and multi-stakeholder approach is taking shape. The creation of e-government is proving to be a winding process, far from the pattern of linear progress, since the use of ICTs in government bears the dialectical influence of strong incentives and significant hurdles. The United Nations Department of Economic and Social Affairs (UNDESA) provides snapshots with relative rankings of the e-government development in these states using the composite indicator "the e-government development index (EGDI)" to measure the willingness and capacity of national administrations to utilize ICTs to deliver public services (Stoica et al., 2022).

Al-Rzoky et al, (2019) claim that e-government integrates the use and deployment of technology-based suites and modules for public use so that the general public can use this section without being harassed in public offices. The e-governance strategy links internet services so that real-time analytics and implementation of public services can be done immediately and with a greater level of accuracy. The usage of e-

governance is fairly prevalent in a variety of fields where it is necessary to link citizen identity to government services in order to achieve higher performance and cumulative recital.

The information and hyper-connectivity revolutions have caused significant disruptions in citizens' interactions with governments all over the world. Failures in implementing e-government interventions suggest the lack of an integrated approach in understanding e-government as a discipline. In this study, we present an overarching and integrated conceptual framework of e-government grounded in robust qualitative research to describe the factors that must be integrated to implement e-government successfully (Malodia et al., 2021)

Management Information System

According to Shaqiri (2014) Management Information System is flow-processing procedures based on computer data, and integrated with other procedures in order to provide information in a timely and effective manner to support decision-making and other management functions. This finding is also present when we consider that the number of contemporary business data and information exponential grow, and efficient business decision-making is possible only if the necessary information is fast, accurate and qualitative and managed by adequate staff but for the most cases not appropriate efficiency is the result of a lack of good management information systems.

The rapid development of information technology coupled with the development of telecommunications technology has streamlined every area of life and human activity. Through good organization of this technology to achieve quality decision making at all levels of management from the top level to the lowest. Information technology in organizing the best and optimal database offers great opportunities for a quick and qualitative manipulation to raise the quality of preparation of decisions.

In the manner of Sahoo et al. (2018), management information systems are designed for providing information to the key functionaries in an organisation. These systems make use of the already processed of the already processed transaction data which is outputted from TPS and generate information reports after processing data. The output of an MIS takes the form of summary reports and exception reports. A summary report accumulates data from several transactions and presents the results in condensed form. For example, a bank manager may get a summary report listing the total amount of deposits and withdrawals made the previous day. An exception report outlines any deviations from expected output. Its main purpose is to draw the attention of middle managers to any significant differences between actual performance and expected performance. For example, a sales manager may study an exception report that lists all sales personnel who sold less then RS. 10000 or more then RS 50000 in the preceding month.

Local governments also have used computers to process data, but local governments lack comprehensive management information systems-for several reasons: they have not had or have not allocated resources to develop such systems; the nature of local governments make such development difficult; interstate differences in local governments make it difficult to design systems that can be used nationally; local governments lack incentives to acquire such a system; and private vendors have not developed and marketed such systems as they have for private businesses (Arlo B. et al.,2021). For some time, private firms have used computer-based comprehensive management information systems. To develop management information systems, constraints that keep them from adopting such systems, and how adoption might affect local governments' capacity. Local Governments Need Assistance System development and implementation is complex and time consuming. Such a system consists of a management organization description that specifies flows and uses of management information, software to handle the data described above, and a computer to process the data.

According to Bhalerao, et al., (2015) is an organized, diverse and automated information system that is concerned with the process of gathering, storing and transferring relevant information to support the management operations in an organization. The data is distributed among the various departments in an organization.

The processing of data takes place in various forms such as graphs, diagrams, charts, reports to generate accurate and relevant information for the management. MIS provides central storage of all the business information. MIS is used across all levels in an organization. There are different types of management information systems. A system that focuses on decision making information system. MIS plays a vital role in not only collecting and man-aging information, but also representing it in various formats useful for the management to make important organizational decisions.

Furthermore, in accordance of Pastor B. (2018), management Information System is important in the organization’ s success. Management Information System in every organization should work according to the plan and vision of every organization. The purpose of their study is to underscore the importance of the Management Information System through a literature review and to determine the level of implementation in private universities in Pangasinan. A literature search and survey questionnaire were used in order to satisfy the requirement of the study. The result of the study shows that schools in Pangasinan are implementing the process and practice of Management Information System. The literature review shows the big importance of industries and organizations to maximize the utilization of the unit. It is recommended that all institutions should revisit and include the Management Information System unit as a priority unit for improvement for organizational effectiveness and innovation.

Web- based System

According to Hussein and Abbas (2022) A program built specifically for use in the www-style is known a web-based application. Online inventory management systems, customer relationship management systems, online registration systems, and so on are examples of such systems. After the web-based application has been successfully put on the web server, users can access and utilize the program utilizing any web browser. This facilitates easy access and has a much-reduced cost of preparation because of its web-based format. The design of programming languages can lead to the creation of programs like Perl that are utilized in web application development. It is necessary to establish a connection between the database system and applications such as PHP, ASP, JavaScript, Visual Basic script, JSP, and Java especially well-suited for the building of websites and can be incorporated into HTML. The server is the one that really runs PHP code.

In proportion to Byrne, Heavey, Byrne (2010) The Internet and its multimedia front-end, the World-Wide-Web (WWW), has experienced tremendous growth since its development by Tim Berners-Lee of CERN (Centre for European Nuclear Research) in the early 1990s, achieving world-wide acceptance. Many disciplines are re-evaluating their strategies and techniques in view of the services

offered by the Internet. Simulation is no less affected by this technology than any other technique, as it represents a fertile area in which to perform computer simulation research. Kuljis and Paul go so far as to state that the pressure imposed by the proliferation of Web uses has forced the simulation community to migrate to the Web in order to stay “alive”. Whether the Web has enabled, caused or forced the simulation community to move to the Web is open for debate (see), but one thing is clear, it has resulted in the emergence of the area of Web-based simulation (WBS).

According to the study conducted by Rui Duan & Mingsheng Zhang (2007), For every organization, the management information system is not only a computer-based human-machine system that can support and help the administrative supervisor but also an open technology system for society. It should supply the interaction function that face the organization and environment, besides gather, transmit and save the information.

The advancement of internet technology and applications provide an ideal environment for the establishment of a scientific research management information system. Various companies and countries have conducted research on the impact of web-based management information systems on service development. As stated by Eny Setyawati and Hasan Hariri (2021), there is a positive and significant influence of web-based management information systems for services development and future research

will help organizations evaluate the quality of their web-based services, design improvements and ultimately embed their websites into future services.

Web based Management information system WBMIS as a type of information systems has widely spread and becomes one of the most important resources in providing the key organizational activities such as automation of everyday tasks and decision making process (Piccoli, 2012). Therefore, such system has a significant contribution to organization effectiveness at several levels including organization, groups and individuals (Love and Irani, 2004; Wang et al., 2007; Chien and Barthorpe, 2010). The implementation of Web-based management information systems WBMIS within institutions is one of the most important issues for every firm as it has a significant influence on the organization productivity, effectiveness as well as its image.

Cascading Style Sheet

According to Dave Wolf and A. J. Henley (2017) Cascading Style Sheets (CSS) allow you to specify the visual style and presentation your web application. CSS allows you to separate the style from the structure. This means you are looking through less code when working with your page. The separation of style from structure and content also increases maintainability. Cascading Style Sheets are a set of programmable rules to define how your web pages display content. The styles described by CSS include the colors, fonts, layout, and other presentation aspects of a document, including variations

in display for different devices and screen sizes. A single CSS file can describe a common style applicable to many documents.

Cascading Style Sheets (CSS) express the visual design of a website through code and remain an understudied area of web history. Although CSS was proposed as a method of adding a design layer to HTML documents early on in the development of the web, they only crossed from a marginal position to mainstream usage after a long period of proselytizing by web designers working towards “web standards”. Derren W, Saeed-Ul H (2021)

PHP

In accordance with Saroni, Mulyanti, (2020) This writing paper aims to determine the Hypertext Preprocessor (PHP) framework that is widely used and analyze the benefits of the framework in making a web application. A review systematically through a review article about a PHP framework. Article search is accessed from an internet database search. articles are taken from 2014 to 2019. The PHP framework can simplify the process of developing web applications because the concept has already been determined. Whereas if you use regular PHP, a programmer makes coding, folder structure or configuration is made as he wishes.

Usually, the PHP framework uses the concept of Model-View-Controller (MVC), its function model is for database queries, its View function is for displaying HTML (Hypertext Markup Language), the controller functions for calculations or logic. The result is that PHP Laravel and CodeIgniter frameworks are the most widely used in building a web application. PHP Framework makes the development of applications web becomes much faster and more stable. The selection of a PHP framework that is appropriate for the project of making the application web also can affect the outcome performance was obtained after the application of the web was completed.

Synthesis

Barangay is the smallest political unit in the Philippines. Barangay handles residents' information, issuance of documents needed by the residents, and filing blotter reports and other documents. Performing this type of responsibility necessitates a proper management system that will assist them in providing excellent and efficient public service.

Related literature and studies gathered by the researcher serve as the foundation for determining the benefits of the suggested system. The similarities between the study and the aforementioned studies where that they have the same goal of providing local governments a management information system that will be a great help for the barangays public services.

However, unlike other previous research, the researcher's study was all about a system that can be advantageous to the barangay in terms of document generation and increasing the barangay's efficiency in document search. This study also focuses on online services for resident document requests, online blotter reports, and online registration of residents, all of which create accurate reports required for barangay information management.

In conclusion, the researcher devised a system to automate the process of Barangay administration through the use of a management information system with an online application function. A system for receiving and processing papers online, as well as the filing of blotter reports from citizens. system will help them to be updated in some resident’ s information and data in terms of population growth, total of complaints every year, request for documents and other feature. Saving time on these crucial tasks can increase the efficiency of their service and free up more time to provide the citizen of the barangay with better service.

Chapter 3
Research Methodology

This chapter discussed the methodology that will be used in the proposed system. The chapter contains research design, research locale, data gathering tools, data gathering procedure, data analysis plan and system development life cycle. The information that are presented in this chapter will be used to the development of the proposed system

Research Design

To attain the objectives of the study, the researcher will employ a descriptive qualitative and quantitative research approach. In this study, information for the barangay management information system was gathered through a combination of survey, and interview. The survey will be given to the residents and barangay staff of Barangay Mapagong which will mostly affect this study. The researcher aims to develop a web-based Management information system with online features that will store and manage information from the residents and also monitors documents request online.

Through descriptive study, a population, situation, or phenomena is intended to be precisely and methodically described. A descriptive research plan might use a variety of research methods to study one or more variables.

With this method, researcher is able to gather necessary information from the residents and barangay staff including barangay secretary and treasurer regarding barangays public services and barangay' s current processes.

The researcher will then implement the system in Barangay' s office to test its effectiveness and functionality in generating reports and process transaction for online request that will replace the old manual administrative process inside the barangay.

Research Locale

The study will be conducted at local government unit in Barangay Mapagong Calamba City.

Figure 3-1 Map of Barangay Mapagong Residential

Figure 1 shows the borderline of Barangay Mapagong. It has four ditrict calledPurok uno, Purok dos, Labak, and Sitio Latian. Where eight thousand one hundred eighty six of residents are living.

Population of the Study

The population of the study is where the researcher will find a participant for the survey questionnaire.

Table 3-1 Population and sample of the study

Population		
	Residents	**Sample size**
Purok 1 residents	3083	50
Purok 2 residents	2026	53
Residents from sitio latian.	3054	53
Office Staff	3	3
Barangay secretary and treasurer.	2	2
Total:	**8186**	**161**

The table 3-1 presents the resident and the sample size of the population. Column two shows the total residents to each district while the next column shows the participants to each district. Barangay Mapagong have total population of 8186 including the office staff and the barangay secretary and treasurer. Sample size presents the total number of participants which is 161 residents of Barangay mapagong including also the staff, barangay secretary and the treasurer.

Sampling

The researcher use convenient sampling method for getting participants from the population of Barangay Mapagong. Participants are chosen usingconvenience sampling, a non-probability sampling strategy, based on their ease of accessible and closeness to the researcher. Using this technique, the researchers survey and intervew individuals who were knowledgeable about and actively participated in the process.

Sample size is a number of participants responses to survey. It represent part of the population in residency of barangay mapagong. The sample size is calculated using the following formula:

$$\text{Sample Size} = \frac{n}{1+\frac{z^2 \times \hat{p}(1-\hat{p})}{\varepsilon^2 N}}$$

Where;

z = z score

ε = margin of error

N = population size

$\hat{p}$ = population proportion

Data Gathering Tools

The researchers employ various data collection tools to be able to obtain information that is pertinent to the study in order to identify the answers to the questions and challenges. To acquire the data, they will use an interview and a survey questionnaire.

Interview. An interview is a qualitative research method that relies on asking questions in order to collect data. Interviews involve two or more people, one of whom is the interviewer asking the questions. (Tegan George, 2022). The barangay secretary and treasurer together with other office clerk was asked by the researcher during an interview regarding the issues and data related to their current problem in traditional management of barangay system. Researcher created important question that were essential for the study prior to the interview. In order to promote the automated system as a replacement and understand more about the problems they were experiencing with their current services and management technique, interviews were conducted. This tool

aids researchers in collecting ideas and suggestions for conceptualizing the system's evolution.

Survey questionnaire. According to International Encyclopedia of Human Geography (2009), Questionnaire surveys are a technique for gathering statistical information about the attributes, attitudes, or actions of a population by a structured set of questions. This tool helps the researcher to measure the level of user satisfaction, evaluation methods were used to determine how satisfied users were with system usability and functioning.

Document Review. Document review is a way of collecting data by reviewing existing documents. The documents may be internal to a program or organization such as records of what components of an asthma management program were implemented in schools or may be external such as records of emergency room visits by students served by an asthma management program. Documents may be hard copy or electronic and may include reports, program logs, performance ratings, funding proposals, meeting minutes, newsletters, and marketing materials.

Data Gathering Procedure

The researcher discovered that Barangay Mapagong still process their service or other administrative duties in manual filing documents, getting information through census and record data to books or papers only that can be a problem for getting accurate

data or information process. To organize an interview the researcher gets confirmation first to barangay captain if they can conduct an interview to barangay secretary inside the barangay office together with the treasurer. The researcher are seeking to accomplish two aims when they compile all the questionnaires: acquire a broad knowledge of the problems the barangay is facing, and develop a approach which is online management information system for administrative works of barangay secretary and treasurer.

Researcher asked a number of questions and took notes about the barangays' current service process. During the interview, the staff member, specifically the barangay secretary, gave the proponents all the information they required. The researcher gathered the data after the interview so they could assess whether the responses were relevant.

Data Analysis Plan

The data analysis plan outlines the location of the processing of all the gathered data. Research is conducted using a descriptive methodology that combines qualitative and quantitative methods. In order to create and develop the suggested system, these technologies will be employed to gather specific/important data.

Table 3.2 Data Analysis Plan

Statement of the problem	Source of data	Procedures	Statistical analysis
1. How the barangay manages the information gather from the residents?	Interview	Information gathered from the barangay secretary, treasurer, and other three staff members	Qualitative Analysis
2. What procedures do they follow while providing documents and obtaining blotter reports from residents?	Interview	Information gathered from the barangay secretary, treasurer, and other three staff members	Qualitative Analysis
3. What approach was utilized in the proposed system to analyze the system's efficiency in terms of: 3.1. Usability; 3.2. Functionality; 3.3. Efficiency; 3.4. Reliability and; 3.5. Maintainability	Survey questionnaire	Information gathered from the barangay secretary, treasurer and residents that will take the survey.	Quantitative Analysis

Statistical Treatment

In order to categorize and better comprehend the responses to research survey questionnaires, researchers employed a Likert scale to gather respondents' thoughts.

Additionally, it acts as an evaluation of the outcomes utilizing the weighted mean computation. A formula that computes the weighted mean and the Likert scale conversion table for further interpretation of the computed weighted mean in each item of the survey questionnaire was used to compute the results.

The weighted mean is used to determine or estimate an evaluation's outcome. The weighted mean scale is calculated using the following formula:

Weighted mean= [SA (5)] + [A (4)] + [N (3)] + [D (2)] + [SD (1)]/n.

Where: n=number of populations;

SA= Strongly Agree;

A = Agree;

N = Neutral;

D= Disagree; and

SD= Strongly Disagree

Table 3.3 Likert scale' s conversion table.

Rating Scale	Intervals	Verbal Interpretation
5	4.50-5.00	Strongly Agree
4	3.50-4.49	Agree
3	2.50-3.49	Neutral
2	1.50-2.49	Disagree

1	1.00- 1.49	Strongly Disagree

The weighted mean average of the answers in each survey question would likewise be calculated using the Likert scale. Strongly Agree, Agree, Neutral, Disagree,and Strongly Disagree would be the five possibilities on the Likert scale

When conducting surveys, it is desirable to make things as simple as possible for respondents, and the 5-point Likert scale achieves just that. With descriptions ranging from "strongly disagree" to "strongly agree," the options are numbered one through five.

Software Development Methodology

Rapid Application Development (RAD), a software development process that requires less planning, was adopted by the researchers. In this strategy, rapid prototyping is preferred. According to the "SDL-RAD model," n.d., it emphasizes gathering client needs through workshops or focus groups, early prototype testing using the iterative approach, continuous integration, and quick delivery. During the system's development,

the researchers assess the client's needs and enhance the system. The system flow was also developed using the end-users' inputs.

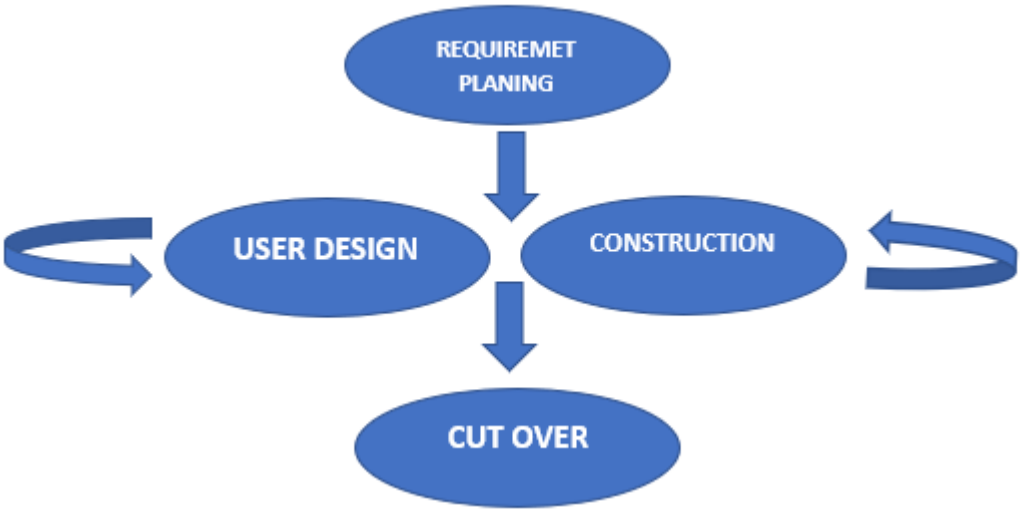

Figure 3-2. Rapid Application Development Model.

Phase I - Requirement planning phase. In this stage, the researcher assessed the demands of potential applications. The researcher first gathered information from the client to know their needs for the development of the system. The problem starts with the resident' s information needed by the barangay for reports which they lack as they don' t have the list of all the residents of barangay, and also slow issuance of requested documents by the residents. The researchers then come up with developing Online Management information system. For the system to operate effectively, the researchers generated lists of the required hardware and software resources. Software resources are the applications

required to run the system, while hardware resources are made up of actual physical stuff.

Phase I.1 Hardware Requirements. Hardware resources are made up of actual physical stuff that is needed for the development and implementation of the system.

Table 3.4 Hardware Requirements

Hardware Resources	SPECIFICATION
Processor	2.3 GHZ or Higher
RAM	4 GB minimum
Hard Disk Drive	At least 320GB
Standard input/output devices	Generic
Printer	Generic
Internet	Any internet connection

Table 5 show the hardware requirements and its recommended specification for the system to work effectively. The researchers provided a list of the minimum requirements for each piece of hardware that would be required to implement the system.

Phase I.2 Software Requirements. Software resources are the applications required to run the system.

Table 3.5 Software Requirements

SOFTWARE	SPECIFICATION
Operating System	Windows 10 and higher
Web Browser	Mozilla Firefox, Google Chrome or anypreferred web browser
Database	XAMPP
Software Language	PHP, HTML, CSS, JavaScript, bootstrap

Table 6 shows the software requirements and its recommended Application for the system to work properly. Before deploying the system, the client should have access to all of the hardware and software resources outlined above. It will be possible to implement the system successfully if all of those resources are used together.

Phase I.3 Flow Chart Diagram

Flowchart A flowchart is the perfect way to visualize a complex process. It is a diagram that illustrates the steps, sequences, and decisions of a process or workflow, Asana (2023). The researcher creates a flowchart to show the system' s actual process.

Admin Panel

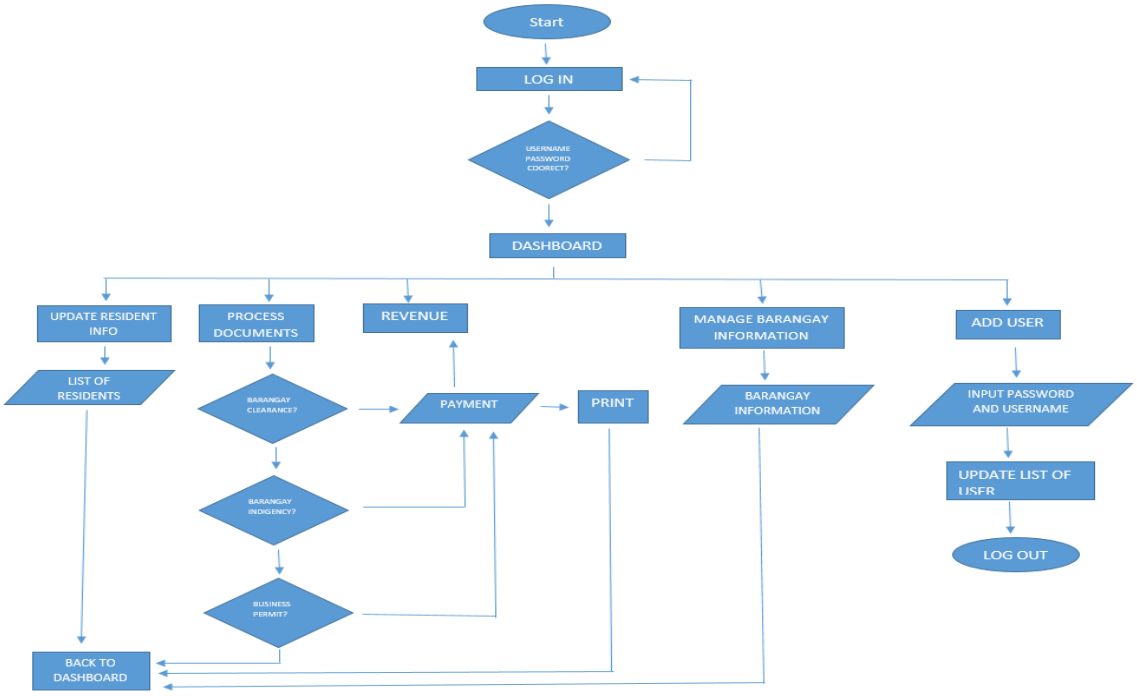

Figure 3.3. Flowchart diagram for admin panel.

Figure 2 show the flowchart diagram of admin panel where it starts with log in process. Then system verifies the account. If the username and password did not match the admin' s details account, it goes back to log in modules. If match it will proceed to admin' s dashboard where there are categories of process such as updating residents' information, process documents, revenue, barangay information and add user. After updating list of residents' admins can view the list and go back to dashboard. System has three documents process, which is barangay clearance, certificate of indigency, and business permit. If they proceed on each documents the system proceeds for payment and update revenue. Admin also have the process of updating barangay information and

view the information and then go back to dashboard. Also, admin can add, edit and delete user.

User Panel

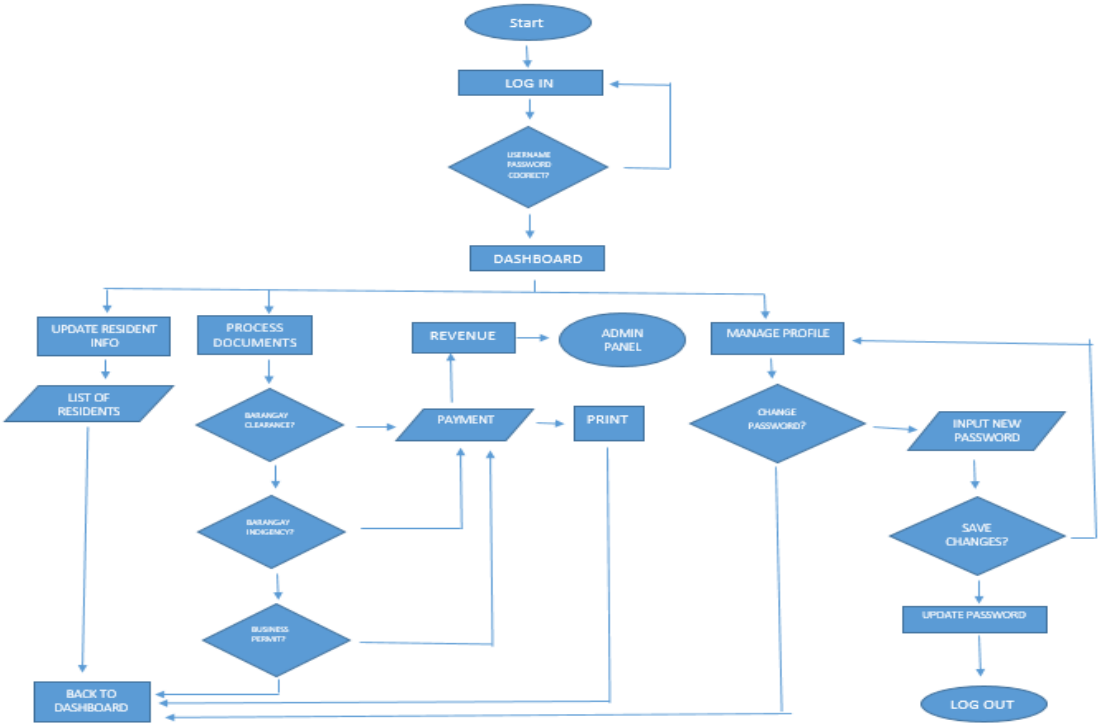

Figure 3. Flowchart of User Panel

Figure 3 shows the user panel where it starts with the log in process then proceed to dashboard. User dashboard is limited only to the process of updating resident' s info, process request of documents, each documents proceed payment and update revenue for the admins panel and print. User can also manage their profile or change password if not save, process go back to dashboard if change they the process proceed to log out.

Resident' s panel

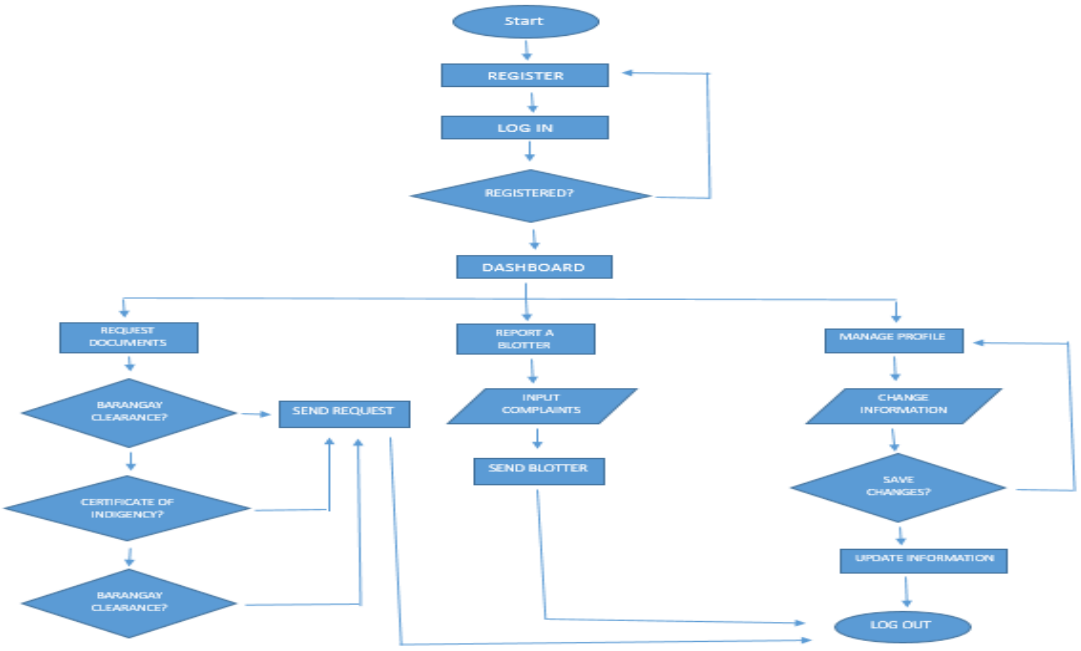

Figure 4. Flowchart of resident' s panel

Figure 4 shows the resident' s panel. Resident must register first then log in and proceed to dashboard. Residents have three process which are request documents, report blotter and manage profile. The documents that are available for request are barangay clearance, certificate of indigency and business permit then process send request. For report a blotter residents input complaints and send blotter. Resident can also update their information. Change information and save changes then log out.

Phase II - User design phase. In construction phase, the major objective of the proponents at this phase is to comprehend, complete, and ultimately accept a functioning model of the proposed system that satisfies the clients' needs

Phase II.1 Context Diagram

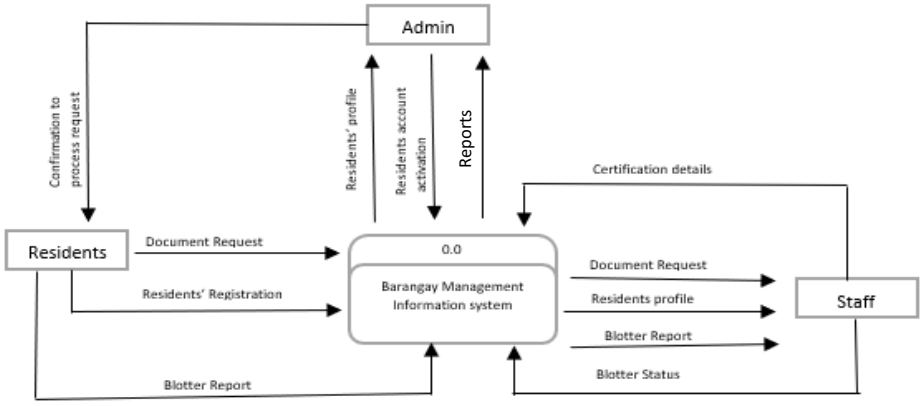

Figure3.3 Context diagram of Barangay Mapagong Management Information System with Online Application Feature Level- 0

The figure 3.3 shows the context diagram of Management Information System for Barangay Mapagong. It represents the internal design of a system. The data being gathered by the administrator from the residents will be stored into the system. Residents must obtain admin approval before proceeding to the dashboard and having the ability to seek online documents and report a blotter using the system.

Phase II.4 Data Flow Diagram

The steps in a process are depicted in a flowchart (visual paradigm.com, 2021). It began as a tool for computer scientists to communicate algorithms and programming logic, but it has now expanded to include a variety of tasks. Researchers

used data flow diagrams to visualize the information flow via any process or system.Predefined symbols like squares and arrows as well as brief text descriptions are used to show data inputs, outputs, storage places, and pathways between each destination.

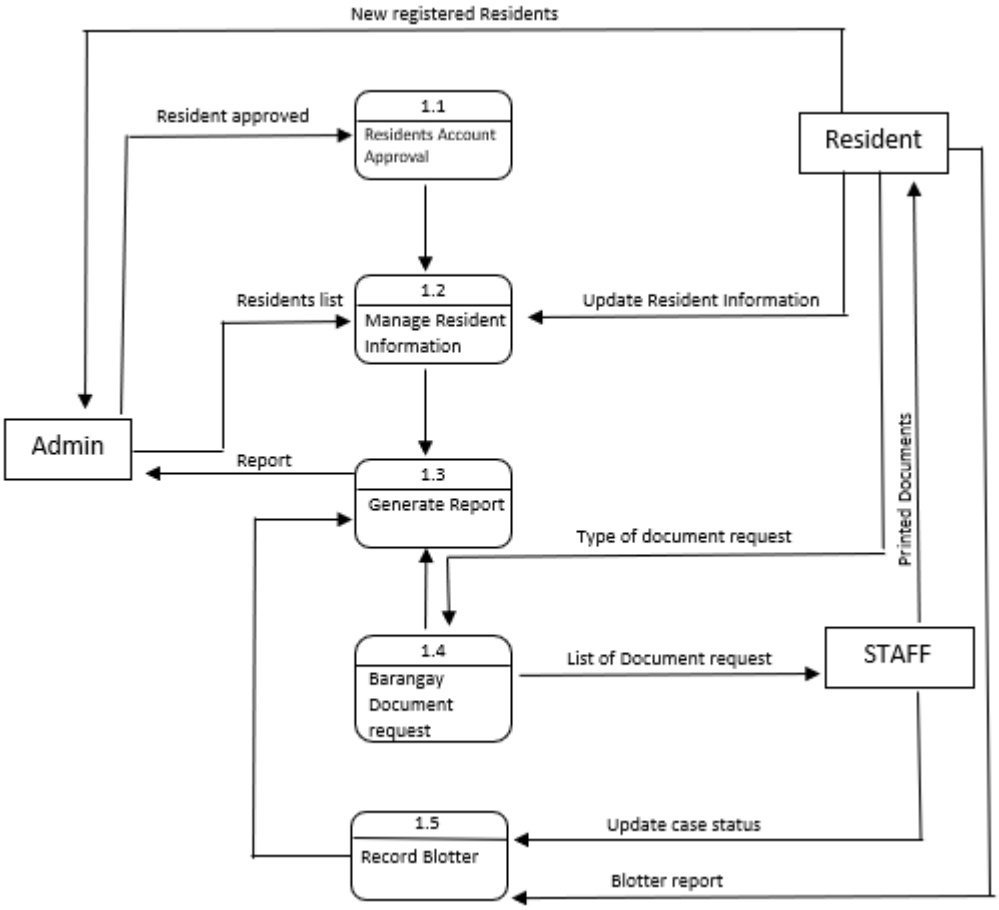

Figure 6. Barangay Mapagong Management Information System level 1 Data flow Diagram.

Figure 6 illustrates the data flow diagram level 1 of the Barangay Mapagong Management Information System, which demonstrates that residents must first register.

Admin then approves the resident's registration for account validation. Authorized residents are directed to the resident dashboard, where they can process online requests for documents and use the online blotter. Staff will review and approve the request and online blotter. Handling resident information, then producing report for admin. In addition, each document request has an associated payment, which is used to generate a report for the administrator. The resident's online blotter will be entered in the system, and staff will then determine if the case report is current, settled, or planned.

Phase II.3 Hierarchical Input-Process-Output

A method for organizing and describing the computer program is the hierarchical input process output diagram (HIPO). It includes a hierarchy diagram that graphically displays the program's input-process-output hierarchy. The HIPO diagram, a top-down visual representation of the system's primary process, was employed by the researchers. The users of HIPO can quickly understand the organizational structure of a program.

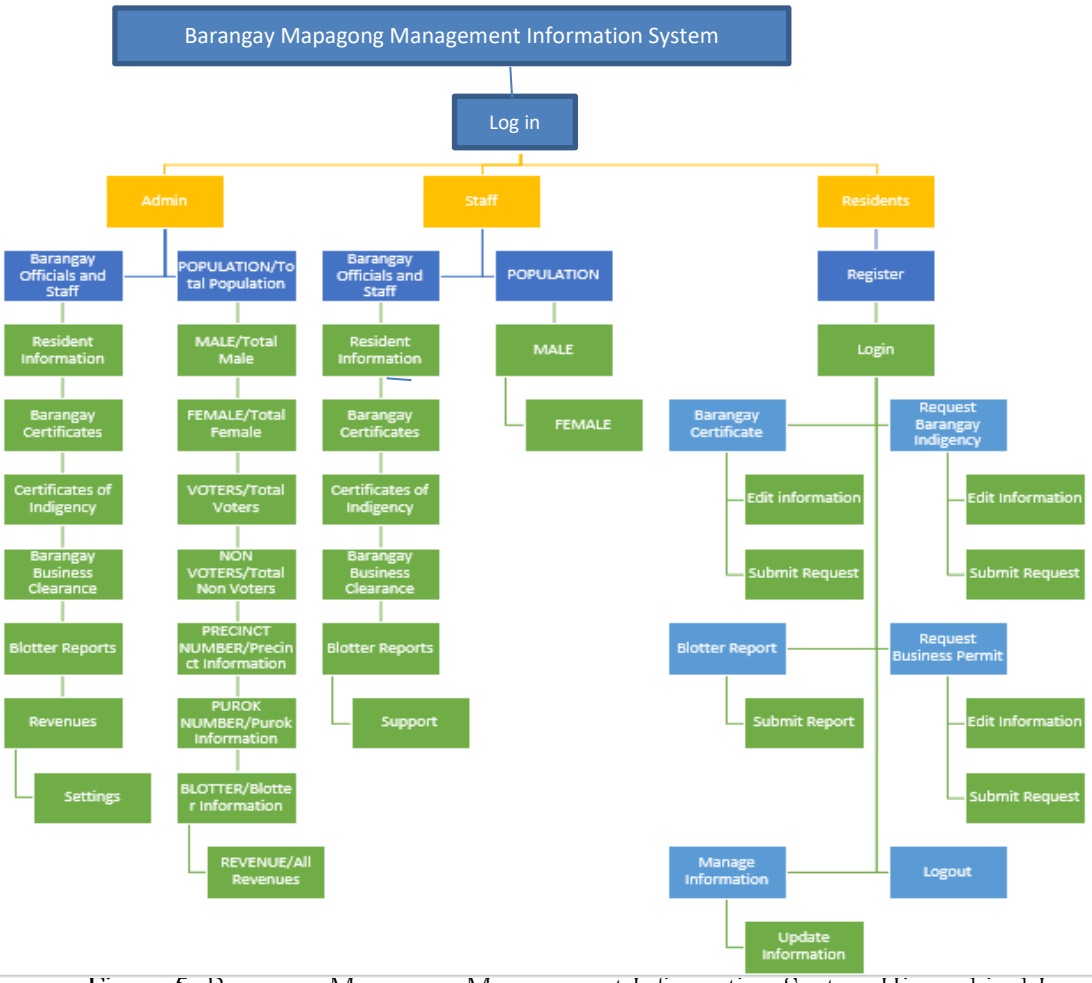

Figure 5. Barangay Mapagong Management Information System Hierarchical Input Process Output

Figure 5 depicts the barangay management information system's hierarchical input process output. The process starts with logging in and then moves on to the admin dashboard. Every resident and employee information is accessible to administration. Staff dashboard and admin have equal access to processing requested papers and blotter reports, as well as maintaining the resident information list. The staff dashboard simply allows you to see the total population and the total male and female. While the admin

dashboard has access to all processes. The revenue, total population, total voters, total male and female, and blotter status can all be viewed by the administrator. Admin can also add users or employees. Residents, on the other hand, have only four processes: registration, document request, report a blotter, and update resident information.

Graphical User Interface

The system's performance and all of its features are covered in this section. The system's graphical user interface is displayed below, and the process definition will follow.

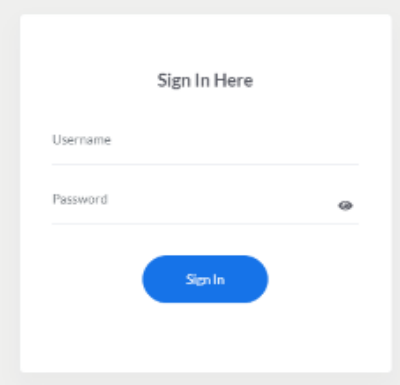

Figure 3.5. User' s Login Page.

This section displays the admin and user login portals. To gain access to the system, the user must enter the permitted username and password. Only the administrator has the ability to create new accounts for system login.

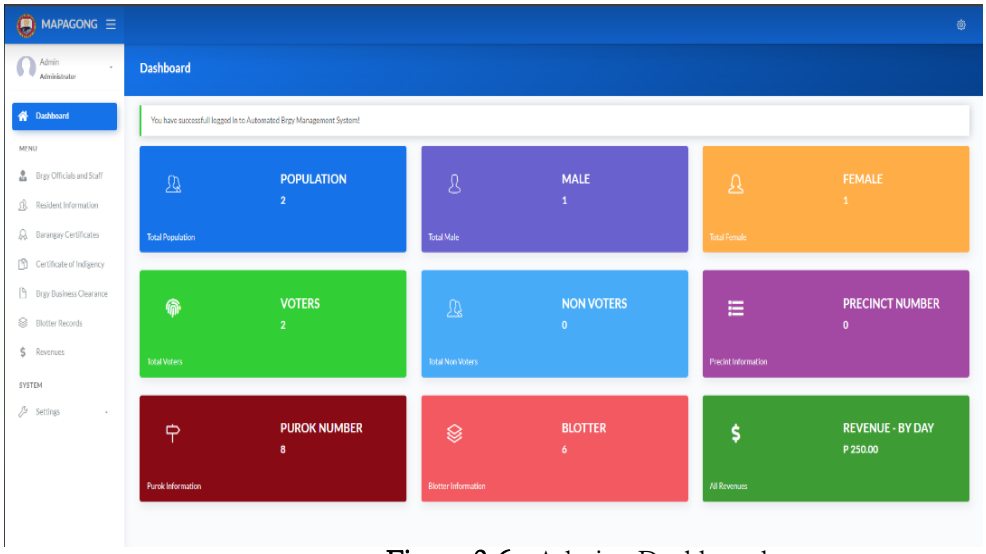

Figure 3.6 . Admins Dashboard.

The figure above shows the dashboard of the system. On this part, the user/ admin can view the total number of population, total number of Male and Female, total number of Voters and Non Voters, Purok, Total blotter, Revenue, and the Settings.

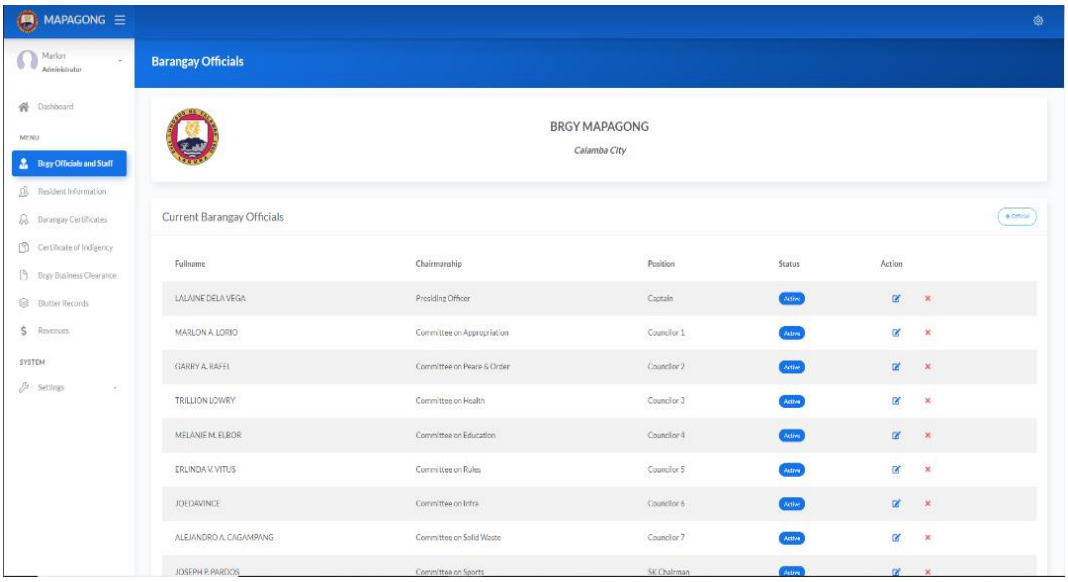

Figure 3.7 . Brgy Officials and Staff.

In this Category, You can see the List of the barangay officials and staff where the admin and other user can add, edit and delete information

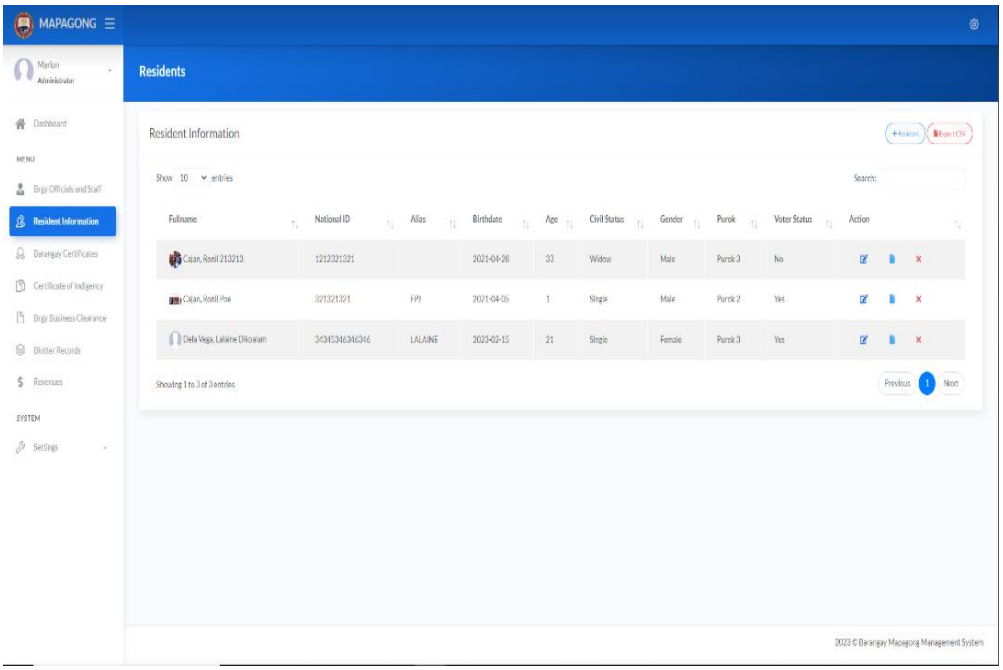

Figure 3.8. Residents Information

In this module, You can see the List of the Residents of Barangay mapagong, where the admin and other user can add resident, delete and print information.

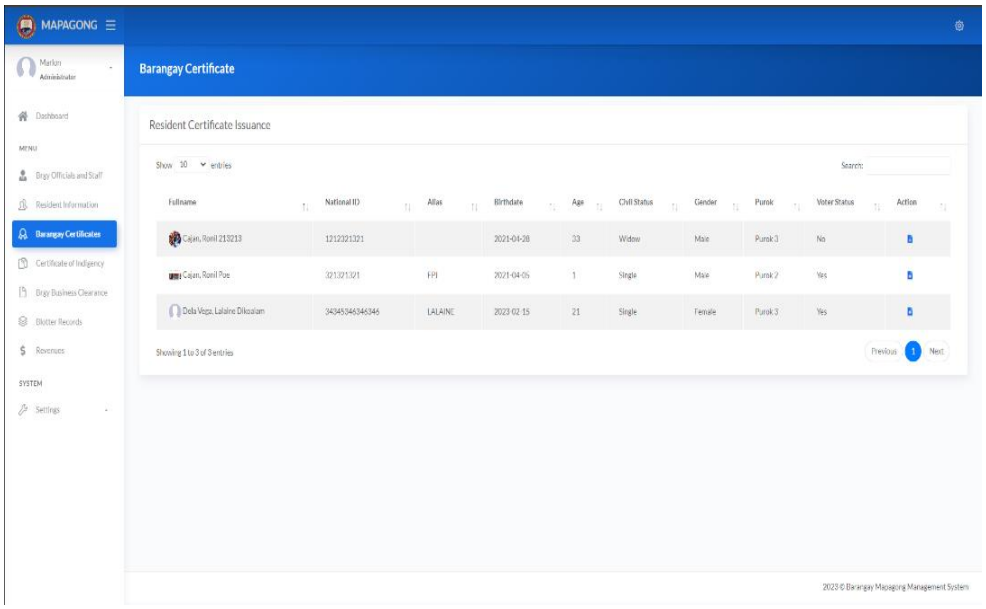

Figure 3.9. Barangay Certificate.

In this section, admin and staff can edit information needed for barangay clearance for document request of the residents of barangay mapagong. But before proceeding to the process, other forms will appear asking for amount of the transaction. It is for the revenue category of the system where all payment for every transaction of issuance of documents where automatically computed.

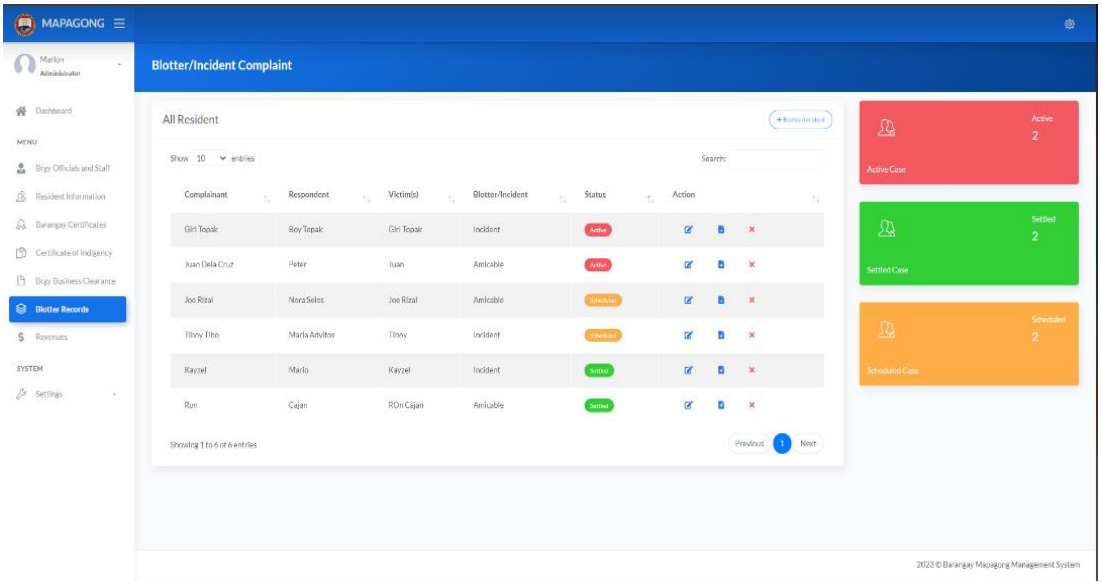

Figure 3.10. Blotter Report

In this section, blotter reports admin and staff records complaints and add action

If the case are still active, setteled or scheduled.

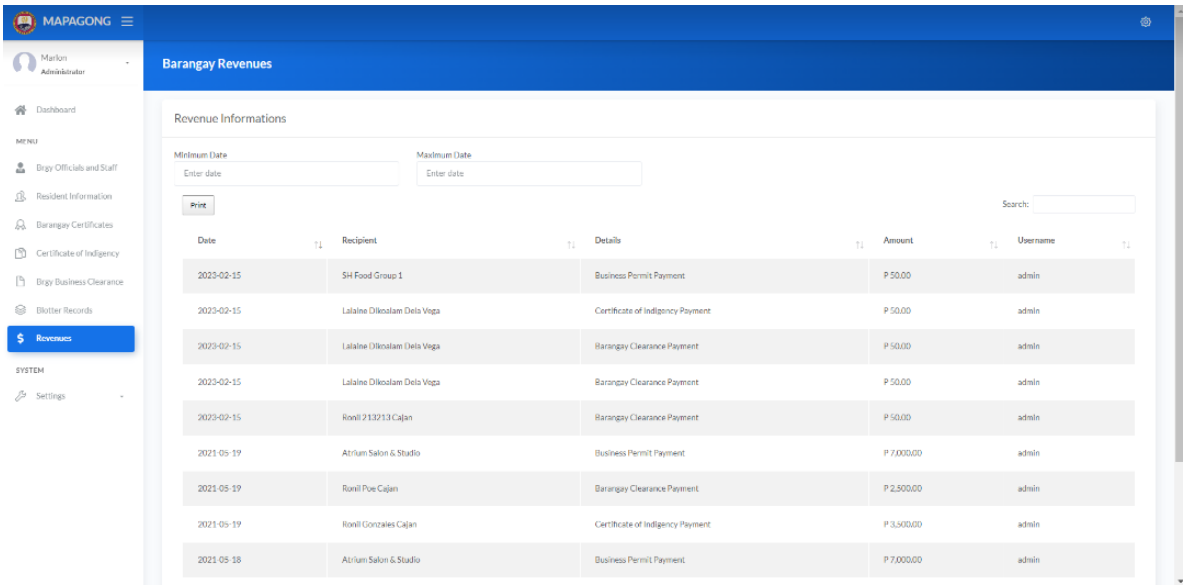

Figure 3.11. Revenue

In this section, all transaction that have payment are recorded. Staff and Admin can print all the transaction . Also this module have print, can maximize and minimize transactions from limiting the date and also search bar.

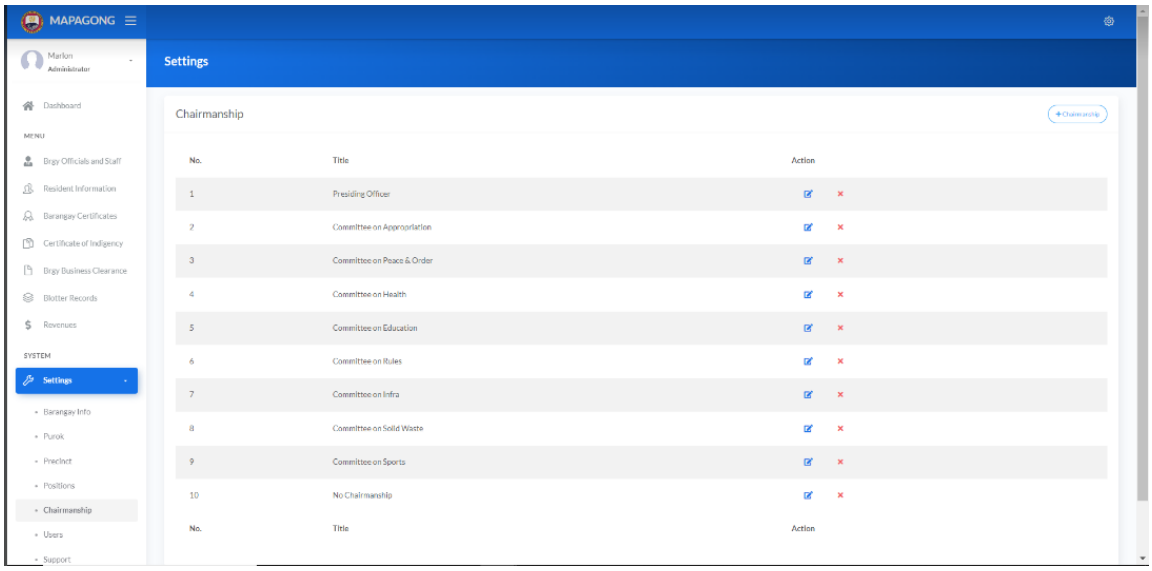

Figure 3.11. Settings

In this page, the system have additional settings which includes, Barangay Information that can be edited by the admin or staff, Purok, Precinct , Prosition , Chairmanship, User and Support.

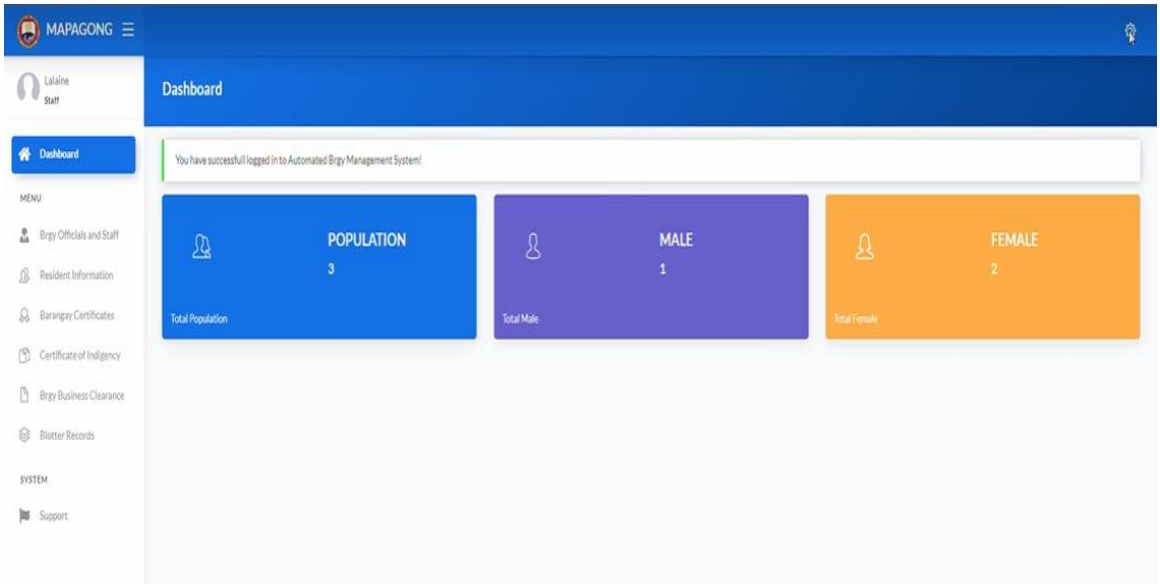

Figure 3.12. User Dassboard

User dashboards limit the user processes, User can only access residents information but can also perform add, edit, and delete for the residents information, also user can process documents; barangay clearance, certificate of indigency, and business permit. And lastly record a blotter report.

Phase III- Construction Phase. As the system was being created during this phase, the researchers made changes or advancements here. The client's main goal is to ensure that the system works.

Phase III.1. Testing Plan

Each section has gone through a testing step to discover any operational or functionality bugs and address them as soon as possible. To measure the level of user

satisfaction, evaluation methods were used to determine how satisfied users were with system usability and functioning. The Management information system process would first be carried out by the secretary by using the proposed system, called the Barangay Mapagong Management Information System, and comparing the old methods or procedures by using survey questionnaire.

To comprehend the variations between the old process without management information system and the developed system. At this point, the researcher would be able to distinguish between the practicesof the old and new systems. The outputs of the new system are then compared to those of the old practices. At this stage, the researcher and the client would be able to decide whether the proposed system delivers the desired outcome for the client. Researcherwill provide manual and training for end users for the system to be properly used.

Lastly, developerswill investigate any problems discovered in the system. Proponents will be told of the system's fault, which will then be resolved.

Implementation Plan

The researcher set out to create a solution for barangay Mapagong administration to use management information system online. Once they have completed the concept of this aim. The researcher conducted an interview to gather information from the residents

and barangay officials of Mapagong in order to propose a system that will assist them in providing better service to their people and assisting the barangay assembly in having a better system that will provide the data they actually needed. Once the required information for developing the proposed system has been gathered, the researcher begins to outline how the system will be completed. Researcher set up a schedule for planning process to help them track the progress of the system.

Table 3.6 Gant Chart

Phase	MONTHS											
	FEBRUARY				MARCH				APRIL			
	WEEKS											
	1	2	3	4	1	2	3	4	1	2	3	4
REQUIREMENTS ELICITATION												
REQUIREMENTS ANALYSIS												
DESIGN PLAN												
DETAILED DESIGN												
CODING AND TESTING												
DEPLOYMENT AND IMPLEMENTATION												

The Gant chart for the system's development is shown in Table 6. The table depicts the stages of development as well as the time line, allowing the researcher to track their progress and identify potential delays or deviations from the original plan.

Phase IV - Cutover Phase. This stage is similar to the final tasks in the implementation stage. Following the building of the system, the proponents will undertake testing to demonstrate the consistency of the proposed system, identify flaws in the system, and eliminate it from the debugging process.

System Functions

The barangay management system enables barangay officials and people to manage and handle their everyday activities and transactions effectively. The following Module shows the functions that the system has:

Barangay officials and staff Module. The system allows the admin and staff to add, edit and delete information on the list of Barangay officials and staff.

Residents' information module. The system let the admin add residents' information, print and delete. Data from residents' information is collected to generate report for the admin's dashboard.

Issuance of Barangay clearance, Certificate of indigency and business permit module. The system accepts online request of this documents. System provides formats of this documents and also have print for issuance. Also, the system automated the revenue for the transaction of this documents.

Records of Blotter. The system updates the admin' s dashboard the number of blotter records, that is active, settled and scheduled.

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