

Promoting Digital Empowerment through Implementation of Barangay Management System

Rosemarie M. Bautista

Bulacan State University, Philippines, rosemarie.m.bautista@gmail.com

Abstract—Politically speaking, the Philippines is composed of local government units (LGUs) classified as province, city, municipality and barangay where each is allowed to manage its own resources. The smallest administrative unit of the country, the barangay, serves as the foundation from which the country's success emanates. The more than forty two thousand barangays all over the country are the primary implementers of the different vision, projects and undertakings of the government for the community. Thus, empowerment of individual barangay may eventually lead to a stronger, more resilient and more prosperous society. The advent of modern technology opens wider opportunities for barangays to serve its constituents better through computerization of the documents it provides such as barangay clearance, certificate of indulgency, letter of recommendation, annual report and others. Motivated by the vision of empowering this self-governing political system digitally, the researcher aimed to determine the advantages of ICT and develop an office management system that will hasten the transactions performed and documents provided by the barangays. The developed system was designed to be accessed only by the authorized users to ensure the integrity of all transactions. The study determined the significant features, and the most appropriate method of system development used in the development of an effective and reliable barangay management system. The output of the study was evaluated based on the ISO 926 Software Quality Assurance Model by employees of selected barangays and was assessed with high level of acceptability.

Keywords—barangay office management system, local government unit, e-government, computerized system, Information Technology system, barangay system, digital society

INTRODUCTION

The Philippine archipelago is composed of three major islands: Luzon, Visayas and Mindanao. Politically speaking, the country is composed of local government units (LGUs) classified as province, city, municipality and barangay. The barangay is the smallest political unit of the government where the initial planning and implementation of the different vision, projects and undertakings in the community happens [1].

As the Philippine government intensifies its programs to strengthen the economy and decreases if not totally eradicate corruption, improving government transactions and promoting more transparent services prove vital. With this in consideration as well as the advancement in ICT, the government started investing in local government units' computerization. The establishment of the National Computer Center (NCC) on June 1971 marks the birth of early computerization in LGUs [2]. Its role became essential in ICT training and system conceptualization for public sector [3]. Eventually, the government gear towards attainment of higher aspiration and started to embark on electronic governance program.

The Philippine constitution allows LGU to manage its own resources to become more self-reliant and attain its fullest development [4]. To perform effectively, each barangay maintains database (most of the time using manual file-based system) holding different information about the barangay such as the barangay population, cases filed, apartments and houses constructed and even businesses running in the community. Since majority of the transactions operate manually several barriers such as difficulty in planning, tracking and monitoring of government transactions as well as the generation of up-to-date documents hinder barangay's success in the delivery of better public services.

In the advent of modern technology, grass root planning and transactions may be hastened and delivery of public services may be improved. Thus, the study of "Promoting Digital Empowerment through Implementation of Barangay Office Management System" was formulated with the following objectives:

1. To determine role of Information and Communications Technology (ICT) in country's empowerment and development.
2. To design a system that can be used to improve transactions of barangays with the following features:

- 2.1. user-friendly environment;
- 2.2. system security;
- 2.3. file manageability;
- 2.4. and report generation.
3. To evaluate the level of acceptability of the system in terms of :
 - 3.1. usability;
 - 3.2. security;
 - 3.3. accuracy;
 - 3.4. and user-friendliness.

Significance of the Study

The design and development of a barangay management system could help enhance the management of barangays' different transactions. With the system, the generation of effective, up-to-date documents and reports as well as the ease of administration of different barangay's projects, programs and activities will be possible.

The result of the study will be useful for the following:

General Public. Through the system, government operations will be transparent and government officials will have well-defined accountability. The documents needed by the public such as barangay clearance, certificate of indulgency, certificate of residency, occupancy permit, business permit could easily be provided by barangay personnel.

LGU Management. The developed system will be of help in the proper and reliable safe keeping of barangay's records. The system could also provide better control to barangay's transactions that could lead to a more effective use of the government resources.

Barangay Officials and Staff. The system will be an aid in a faster and more accurate processing of voluminous barangay transactions. Therefore, could save staff time in attending to different transactions. It will also ensure up-to-date delivery of different reports that could be used by barangay officials in creating sound decisions.

Future Researchers. The study will also benefit the future researchers who will have the same line of interest as this material could be used in conducting further study.

Literature Review, Theoretical Review and Conceptual Explanation

Technology such as computer and internet can be used to complete a task within an organization with greater ease, accuracy and consistency but with relatively cheaper cost [5]. The dominance of computer in our society drives the many changes in this world. Its existence is manifested in almost any place in the globe: in offices, government agencies, home, and schools [6].

It is evident that in the Philippine society, information technology has become and will continue to be an essential part of every Filipino's life. The government probably realized the importance of ICT in nation-building, bringing good governance, fighting corruption and providing better services to the public. This drives the government to develop strategies to prepare its citizens to live and survive in a digital world and to maximize the benefits brought about by the use of Information and Communication Technology (ICT) to further improve governance, economy and one's way of life [7]. Local government then, created development plans across sectors in the community to maximize public assets.

Since 1991 when the Local Government Code was implemented, several attempts were done to generate information at the local level. Barangay based information limited to population data were launched in some barangays by the National Information Statistics Office [8].

In 1997 the dawn of electronic governance in the Philippines took place. The RPWEB requiring the internet connectivity of all government agencies and local government units was also established [9].

The Republic Act 8792 otherwise known as the Electronic Commerce Act of 2000 that promotes the use electronic mode in all government dealings and transactions was passed in June 2000 [10]. In line with this, NCC undertook the e-LGU project in 2002 [11].

In June 2004, through the Executive Order No. 269 the Commission on Information and Communication Technologies (CICT) was created to be the agency that will be in charge of primary planning, coordinating and implementing IT programs and projects for the government, including the e-LGU program.

Conceptual Framework

The study came up with a prototype of the system which was analyzed and tested to determine its feasibility. This serves as basis of analysis, design and development of the proposed system.

The conceptual framework describes the overall structure, flow and procedure of the development of the barangay management system. The model consists of frames, each representing a stage and its requirements needed towards the achievement of goals.

The input frame shows all required by the system and its development. This includes relevant inputs and the various knowledge requirements needed by the researcher to perform the endeavor in the next frame. This frame also considers the system requirements and other sources of information.

The process frame shows the activities needed to perform to transform the inputs to desired output. This includes: requirements' analysis and system design conceptualization; system development; and system testing and evaluation.

The last frame shows the expected short term and long term outputs of the study as well as its impact. The immediate output of the study is the development a barangay management system which may lead to a long-term output – the enhancement of local government units' transaction management. This may eventually lead in a more resilient Philippine economy by having a government that is more transparent and citizen-centered.

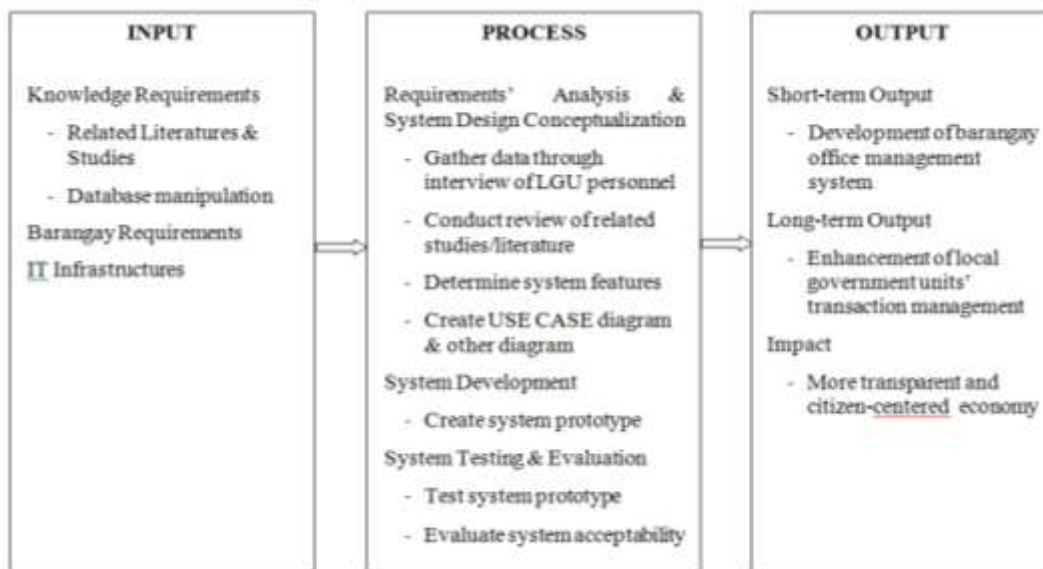


Figure 1. Conceptual paradigm: input, process and output.

Figure 1 shows the system development process used which was presented using the three dimensions of the conceptual paradigm: input, process and output.

Methodology

The researcher use the Unified Modeling Language (UML) particularly USE CASE in identifying, building and communicating the components and design of the developed system.

The functionality of the Barangay Management System was shown in Figure 2. The primary actors of the systems are the barangay captain, barangay secretary, barangay treasurer and the residents of the barangay. The barangay captain will act as the system administrator who will be in charge of maintaining the system and will be given full authority and responsibility over the information stored in the system. He will also be allowed to add and provide access level to all users of the system. The secretary, on the other hand, will be in charge of managing information on census, cases filed, house constructed and business established in the barangay. The secretary also prints the different barangay certificates and clearances. The treasurer will be responsible for managing all financial-related modules of the system. It manages the purchase request and order and creates different reports such as requisition, liquidation and accomplishment reports. Clearances, certificates and reports can be requested by residents of the barangay.



Figure 2. USE CASE diagram for the system.

RESULTS AND DISCUSSIONS

The term Information and Communication Technology or ICT is a broad term which generally referred to technologies used in accepting, saving, modifying and communicating information in various forms. If ICT is properly utilized, its maximum benefits to country's growth and development will be realized [12].

ICT may have three major effects that influence societal development. First, it simply substitutes the old technology with new one. Next is it leads to the improvement of the different processes enabled by the new technology. And, it can be used in the generation of new technology-related processes or development of different applications such as e-government which leads to societal change [13].

E-government applications were initially used to accelerate transaction processing for citizens. Over the past years, technology and information tools hold the promise of putting the community to the economic mainstream that can drive neighborhood change and progress [14].

ICT can be used in performing different transactions with greater ease, therefore, with ICT one can save time. Similarly, the little the amount of time spent in performing one's task will be equivalent to the bigger monetary savings of the organization. Another advantage brought about by ICT use is the improved security. In saving files in computer, for example, security codes can be applied to protect important information from being access by unauthorized users. Thus, file can be properly safeguarded and its integrity will be increased [15].

In developing a system that will be used in performing transactions, specifically in this case, of the barangay a well-structured database is required to handle the different files of the institution. A well-constructed database allows the proper addition, modification, deletion and retrieval of barangay information. With this, the quality of information saved can be ensured. Thus, the reports that will be generated by the system can be used in creating sound decisions of the decision making body.

In analyzing and developing the barangay system a systematic approach called System Development Life Cycle (SDLC) was used. SDLC phases include system planning, analysis, design, programming, testing and evaluation of the system. To communicate the functionality of the system, USE CASE diagram was used.

In order to create a Barangay Management System, a combination of interface software and database software was used. Java SE Programming Language is used in creating the front-end of the system supported by MySQL as repository of the different data and information pertinent in barangay management.

The researcher identified the most relevant features of the system as:

User-friendly Environment. The developed system was intended to be used by non-IT personnel such as the barangay captain, secretary and treasurer. To easily be understood by the users, the graphical user interface was designed to be simple and self-explanatory. The screen layouts were customized. Likewise, the forms and its components include buttons and menus that are easy-to-recognize. Aside from that, data entry has intuitive user interface and flowing navigation. Most importantly, the reports are well filtered.

System Security. The system was protected from unauthorized users. This can be done by allowing each system user to set user name and password which will be approved by the administrator. This should be used in gaining access to the system. In line with this, every user will have different level of access to the system which is dependent on the tasks assigned to the user. Moreover, to ensure data/information ownership, the system generates license key for every barangay that will be using the system.

File manageability. The system, having well-designed database, allows easy manipulation (adding, updating, deleting and searching) of barangay information. The integrity of data is maintained through implementation of entity integrity and referential integrity constraint in the database tables.

Report Generation. The system generates different certificates, clearances and reports of the barangay. Among the clearances and certificates that the system is capable of generating are: barangay clearance; business permit; indigence certificate; residency certificate; certificate of recommendation; occupancy permit; excavation permit; and building permit. Likewise, the following reports can be generated: purchase request and order report; inspection report; disbursement and requisition report; liquidation report; and accomplishment report.



Figure 3.a. Log in Menu

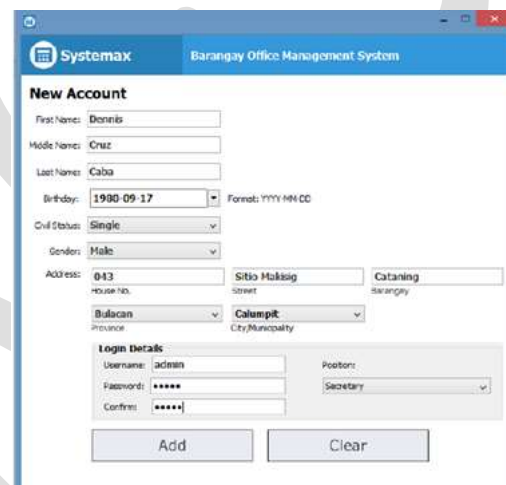


Figure 3.b. System User Management



Figure 4. Main Menu



Figure 5. Manage - Resident Information

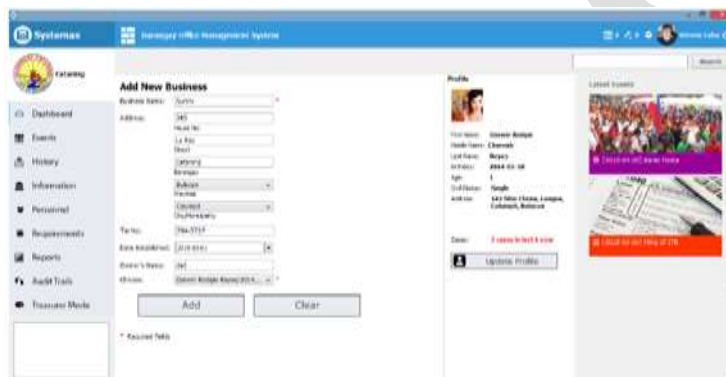


Figure 6. Manage – Business

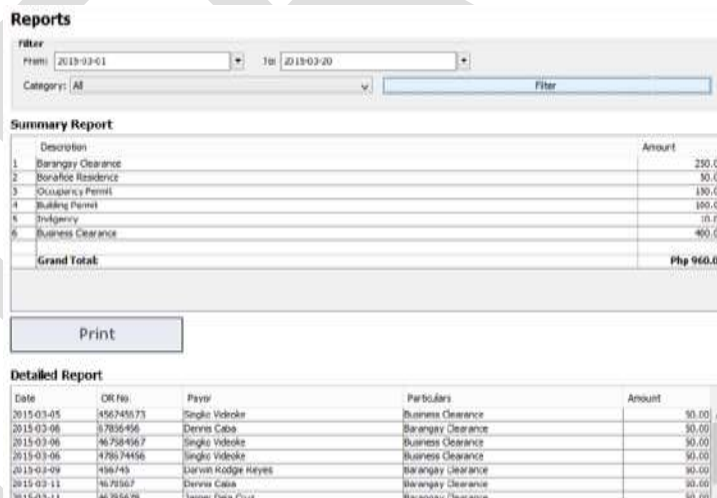


Figure 7. Barangay Reports

Figures 4 to 7 displays some of the significant features showing the major functionalities of the Barangay Management System.

The functionalities of the system were tested by the respondents from IT experts and barangay staff. To determine the respondent's perception on the developed system, data gathered from the evaluation were examined and summarized. Responses were interpreted using the mean value and the quantitative average of responses of the criterion in the evaluation sheet was determined. The acceptability of the system based on the evaluators' responses was quantified following the five points Likert Scale. The system was perceived to be acceptable in terms of usability, security, accuracy and user-friendliness. The over-all weighted mean is 4.23 which is interpreted as "Very Good".

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CONCLUSION

ICT can be used in performing government transactions reliably and with greater ease. Among the advantages of ICT use are upgraded security, improved data integrity, better data consistency and enhanced decision making. The use of ICT also saves time and money.

The system was perceived to be useful in increasing the efficiency and effectiveness of managing and performing barangay transactions. With technological breakthrough and advancement in ICT, the existing manual process would still be improved. Hence, the developed system would provide better alternative to the existing current process. The significant features of the system which are relevant to the functionality of the system include: the user-friendly environment; high system security; better manageability of files; and accurate and quick report generation.

The over-all interpretation for the acceptability of the developed software in terms of usability, security, accuracy and user-friendliness was very good. The result signifies that the developed system passed the level of acceptability.

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