LOCAL GOVERNMENT-ACADEME PROJECT PLAN: AUTOMATION OF VARIOUS OFFICES FOR THE CITY GOVERNMENT OF MALOLOS, PUBLIC MARKET MODULE

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Abstract - The development of automated systems for various offices of City Government of Malolosin partnership with the academe will create a mutual benefit in developing a stable and reliable automated system for the local government unit.
The project will be using the Open Source Initiatives approved licenses widely utilized by the IT industry. Local Government Unit automation was divided into modules which correspond to various offices that require or must have an automated system installed. With Public Market Module (PMM), public markets can become viable economic enterprises. PMM automates and systematizes the assessment and billing of charges to stallholders and other market occupants. To increase efficiency in collections and monitoring patterns of payment or non-payment, PMM includes a digital physical layout of the market, and provides the corresponding information for each stall and stallholder. PMM allows supervision of collection activities, and also handles cash ticket implementation and monitoring. Local Government Unit automation was divided into modules which correspond to various offices that require or must have an automated system installed. Systems such as Real Property Tax Assessment System (RPTAS), Business Permit and Licensing System (BPLS) and Treasury Collection already exists in the Local Government Unit. Thus, these were not included. The project will be developed per module distribution and integrated in a centralized local and remote server. The local government automated system used the widely open source software architecture, commonly known as LAMP (Linux, Apache, MySQL, and PHP).

Keywords - Automated Systems, Local Government Unit, Market Occupants, Public Market Module, Stallholders,

I. INTRODUCTION

The City Mayor of Malolos, Bulacan recognizes the essential role of the academe as the main source of productive citizen for country's growth and development. In order to stimulate the academe resources for the purpose of supporting the area of research, systems design and development of automated systems for various offices of City Government of Malolos the local government is willing, to impart and guide the students and faculty of the College of Information and Communications Technology of Bulacan State Universityin the need of automating the various offices of the local government. Thus, the partnership between the local government and the academe will create a mutual benefit in developing a stable and reliable automated system for the local government unit.
The project will be using the Open Source Initiatives approved licenses widely utilized by the IT industry. Local Government Unit automation was divided into modules which correspond to various offices that require or must have an automated system installed. Systems such as Real Property Tax Assessment System (RPTAS), Business Permit and Licensing System (BPLS) and Treasury Collection already exists in the Local Government Unit. Thus, these were not included. The project will be developed per module distribution and integrated in a centralized local and remote server.
The City Government of Malolos belongs to Metro Bulacan, which is composed of Baliuag, Calumpit, Marilao, and Meycauayan City, which is considered as one of the next wave cities program established by DOST identified as ICT hubs beyond Manila. Aligned with the goal of electronic government or e-Government utilization of Information and Communications Technology (ICT) and other web-based technologies to enhance access of information and improve delivery, efficiency and effectiveness of service to the public. The Local Government of Malolos is persistent in promoting transparency of data especially in the City Economic and Enterprise Development Office, Public Market.
The City Government of Malolos Public Market currently performed their daily activities such as: (1) Daily collection for ambulant (those who have small spaces in the market, commonly vendors with their ―Bilao or Baskets) and then the Collecting officers disbursed tickets for both ambulant and stall holders. (2) Remittances of collected tickets are being transferred to the assigned officer for tallying tickets. (3) Remittances are being reported to the Market Master (daily report) for signatory and then the remittances will be deposited to the Landbank of the Philippines.

In this current time, people are intensely attached to technology. Information Technology has grown rapidly as an influential catalyst and a game changer for business, government, and education.It even paved the way for government modernization and as a primary means of promoting transparency of data and brought improvement in every sector of the economy. Through IT, software application had been developed and contributed on the industry and government in terms of efficiency as it enables the

industry and the city government —to do more with less.

II. RESEARCH MODEL

The research method lists and discusses the specific steps and activities that will be performed by the researcher to accomplish the theories and concepts to be used in the course of designing or developing the project. This section presents the intermediate theory that have the potential to connect to all aspects of inquiry like problem definition, purpose, literature review, methodology, data collection and analysis.

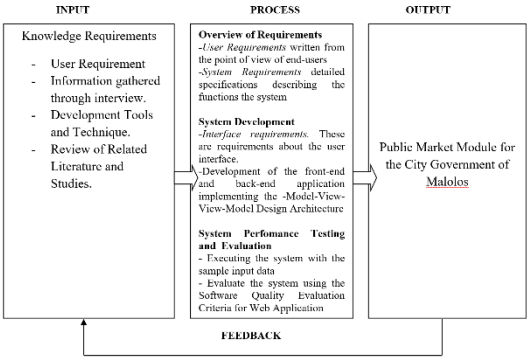

Figure 1 Conceptual Framework

The study Public Market Module for the City Government of Malolos follows the process called IPO that stands for Input-Process-Output. The IPO model is a general system model and used to convey systems overview and it is a preliminary investigation tool in systems processes as shown in Fig. 1 the first frame of the diagram is the input which refers to all raw materials required in the development and producing output. The most common input includes the user requirement, research done by the researcher, data gathered through interview, development tools and techniques, and the review of the related studies and literature that will define the system process.

The second frame is the processing side which involves different stages. The first stage includes planning and analysis which discusses the overview of the requirements such as: User Requirements, System Requirements and converting into technical aspect resulting of programming and development. During this activity the researcher discovers ambiguities and inconsistencies in the transaction management particularly in Public Market Module for the City Government of Malolos. The result of the analysis is a system model annotated with attributes, operations, and associations. Interface of the system is properly lay-out as what has been planned during theOverview of Requirements stage. Development stage includes the programming side such as the development of the front-end application and back-end application. For better quality, System Performance Testing and Evaluation is being applied under this stage, the differences between the system and its model are found by executing the system with the sample input data.

During the implementation stage the developed Public Market Module for the City Government of Malolos becomes operational. This includes user training and software installation. The maintenance part will accommodate all necessary enhancements to the system as well as correction of any error encountered. Upon completing all the stages in the process, the final output will be a fully functional Public Market Module for the City Government of Malolos.

2.1 Hardware Architecture

The hardware architecture of the local government automated system presents a configuration based on existing hardware of the city government offices and new hardware required. It was built on the Intel® Xeon® E3-1200v2 product family architecture, using one physical server. Additionally, the logical perspective was provided as well. Finally, estimates of the system's throughput regarding hardware resources/load are provided.

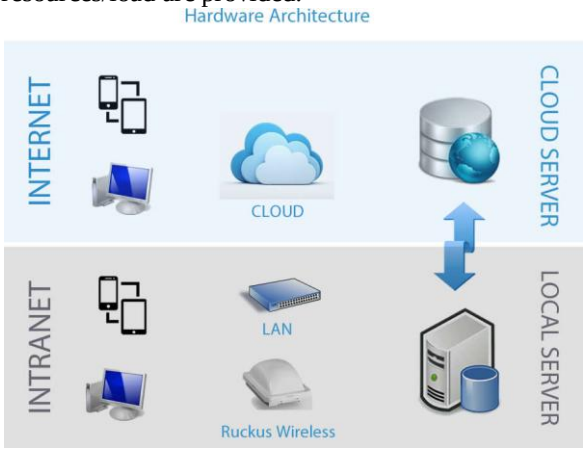

Figure 2 Hardware Architecture

2.2 Software Framework

The local government automated system used the widely open source software architecture, commonly known as LAMP (Linux, Apache, MySQL, and PHP). Building the web application that will run seamlessly in both local and cloud. Moreover, maintaining source codes will be much easier for the project. The project utilized an online source version repository (SVN) which provides easy access in terms of uploading and testing the work. Also, downloading libraries created by another group can be done to maximize the core of the system.

Laravel is a web application framework used in the majority of web projects with expressive, elegant syntax. It attempts to take the pain out of development by easing common tasks such as authentication, routing, sessions, and caching.

Twitter's Bootstrap is an excellent set of carefully crafted user interface elements, layouts, and

javascript tools, freely available for web design project.

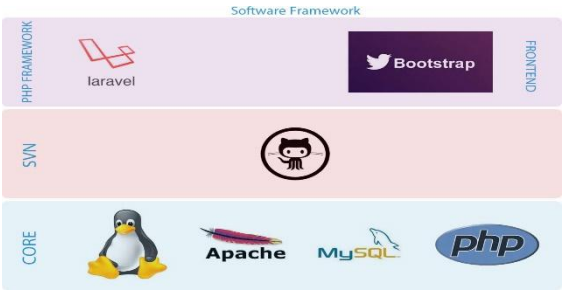

Figure 3 Software Framework

Bootstrap is a free collection of tools for creating websites and web applications. It contains HTML and CSS-based design templates for typography, forms, buttons, navigation and other interface components, as well as optional JavaScript extensions.

No.	LGAS017
Department	City Economic & Enterprise Development Office
Module	PMM – Public Market Module
Description	With Public Market Module (PMM), public markets can become viable economic enterprises. PMM automates and systematizes the assessment and billing of charges to stallholders and other market occupants. To increase efficiency in collections and monitoring patterns of payment or non-payment, PMM includes a digital physical layout of the market, and provides the corresponding information for each stall and stallholder. PMM allows supervision of collection activities, and also handles cash ticket implementation and monitoring.

Table 1: Module Definition

III. RESEARCH RESULTS

This section presents the analysis, interpretation and implication of the summarized test results, as well as the observation on the limits of the system capabilities. It also discusses the results and evaluation of the data. To determine the summarized results, the researcher gathered all the data through the evaluation of the system.

The respondents of the study consisting of six IT Experts (3), City Economic and Enterprise Development Employees (2) and IT Students (29). The analysis and presentation of the tables discuss the overall mean distribution in each of the criteria. It also shows the description that rangesfrom Poor, Fair, Good, Very Good and Excellent as the highest interpretation of the mean distributions.

Respondents	Frequency	Percentage
IT Experts	3	9%
City Economic & Enterprise Development Employees	2	6%
IT Students	29	85%
TOTAL	34	100%

Table 2: Respondents of the Evaluation

An instrument used to assess the operational feasibility of the system. The following criteria was provided to evaluate the developed system: (a) Functionality, (b) Reliability, (c) Usability, (d) Maintainability and (e) Portability, (f) Training and Documentation.

The researcher used several tools in gathering data needed for the study. During the evaluation, the researcher distributed questionnaires to the respondents from the pool of three experts: an Information Technology Developer / Consultant with three years of experience with system development and an Associate Software Engineer with two years of experience in the IT Industry, and from the target client the developed system was evaluated by the City Economic & Enterprise Development Office Employees.

Criteria	Experts Response	
	Weighted Mean	Description
Functionality	4.60	Excellent
Reliability	4.37	Very Good
Usability	4.43	Very Good
Maintainability	4.66	Excellent
Portability	4.60	Excellent
Training and Documentation	5.00	Excellent
Overall weighted mean	**4.61**	**Excellent**

Table 3: Summary of the Weighted Mean for Public Market Module

The data reveal that the proposed system was rated —Excellent in terms of Functionality (4.6); Reliability (4.37); Usability (4.43); Maintainability (4.66); Portability (4.6); and Training and Documentation (5.00). Comparatively lower ratings were given to the system in terms of Functionality and Portability (4.6). As a whole, the obtained mean value of 4.61 indicates the proposed system was —Excellent, and was recommended for use by the City Economic & Enterprise Development Office

In terms of functionality, respondents rated the developed system as —Excellent in terms of Suitability with a weighted mean of (4.75) which indicates that functions are appropriate to specifications. In terms of Accurateness, the respondents mark as —excellent with a mean performance of (5.00) which means Functions are correct. In terms of Interoperability, software can interact with other components or systems the respondents gave a —Very Good remark with a mean performance of (4.25). The compliance indicator that define adherence to standards recorded a mean value of (4.75). The Security indicator that measures provision for security requirements the respondents mark as —Excellent with a mean value of (4.5). As a whole, the proposed system recorded a mean value of (4.60) which means that the proposed system is excellent in terms of Functionality.

The respondents of the evaluation rated Reliability of the Public Market Module as ―Excellent: Absence of failures of the system was (4.75) excellent and Fault Tolerance (4.75) was excellent. In terms of the ability to produce correct computations, output or reports the respondents gave ―Excellent remark with a mean performance of (5.00).
It may be safely concluded that the system has the capability to withstand client breakdown and hold independent running application.

Usability of the Public Market Module was rated ―Very Good. Among the four items presented item (1) Understandability (2) Learnability (3) Operability got the highest mean rating of (5.00) which is ―Excellent as perceived by the respondents. The Provision for comfort and convenience got a mean rating of (4.75). It may be safely agreed that the system is visually appealing and at the same time easy to learn.

Maintainability of the Public Market Module was rated ―Very Good: the ability to identify the root cause of a failure within the software got a weighted mean of (4.75) Excellent. Software adjusts well to different screen dimensions, color depths, and font sizes. Different interfaces can be chosen to suit beginners and more advanced users got a weighted mean of (4.33) Very Good; and ability of the software to be easily stability. Characterizes the sensitivity to change of a given system (4.25) Very Good. It may be safely concluded that the system exhibits robust maintainability measures and presented a user-friendly interface of the system.

Portability of the Public Market Module was rated ―Excellent: the application has the ability to change to new specifications or operating environments (5.00) Excellent; the application provides different options available for installation and the software is easy to install (4.75) Excellent; and the ease of exchanging a given software component within a specified environment and system coupling (4.25) Very Good. In terms of provision for portability of operating system used the system got a weighted mean of (4.75), absence of other software requirements such as runtime system or standard database management engine got a weighted mean of (4.75).

Training and Documentation of the Public Management Module as ―Excellent: every data inserted is correct was rated (4.75) Excellent; Documentation content is organized in a logical manner and the provision for help component got a weighted mean (4.75) were excellent.

It may be securely concluded that the system‘s provides guides and printed documentation and all information is readily accessible for reference.

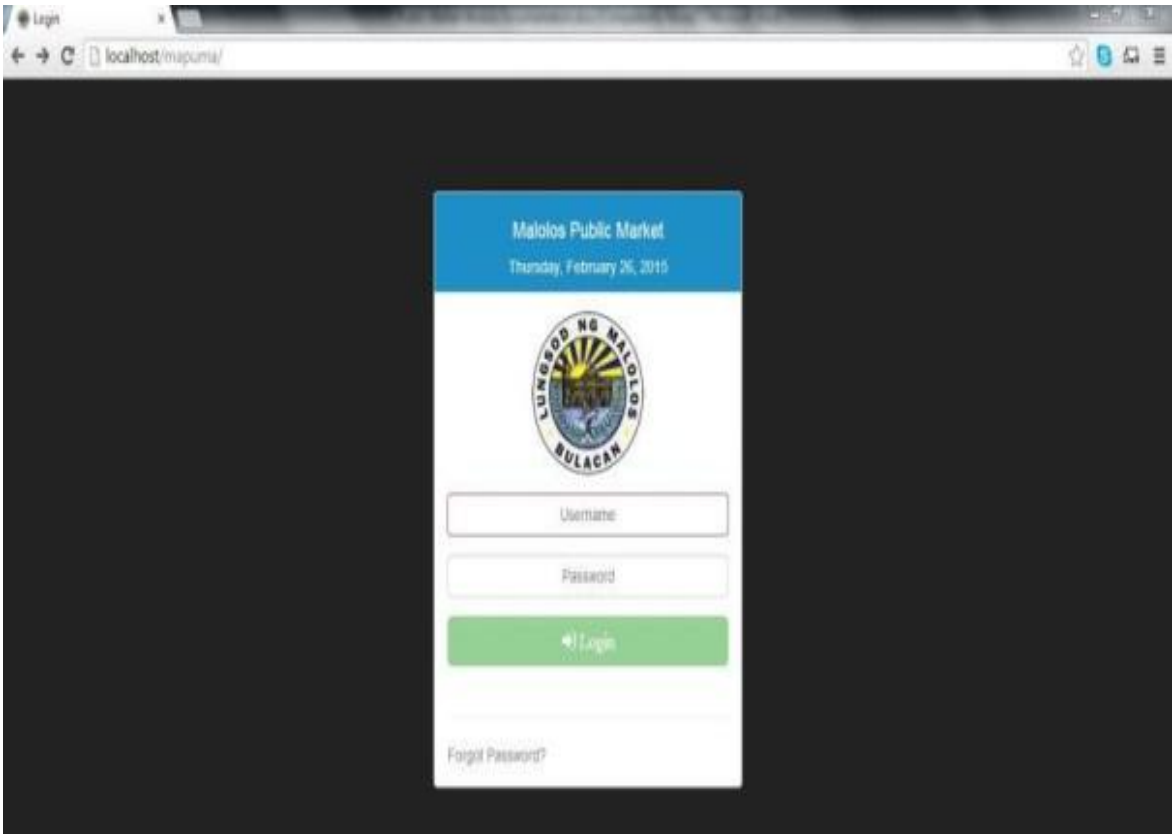

Figure 4 Log-in Page

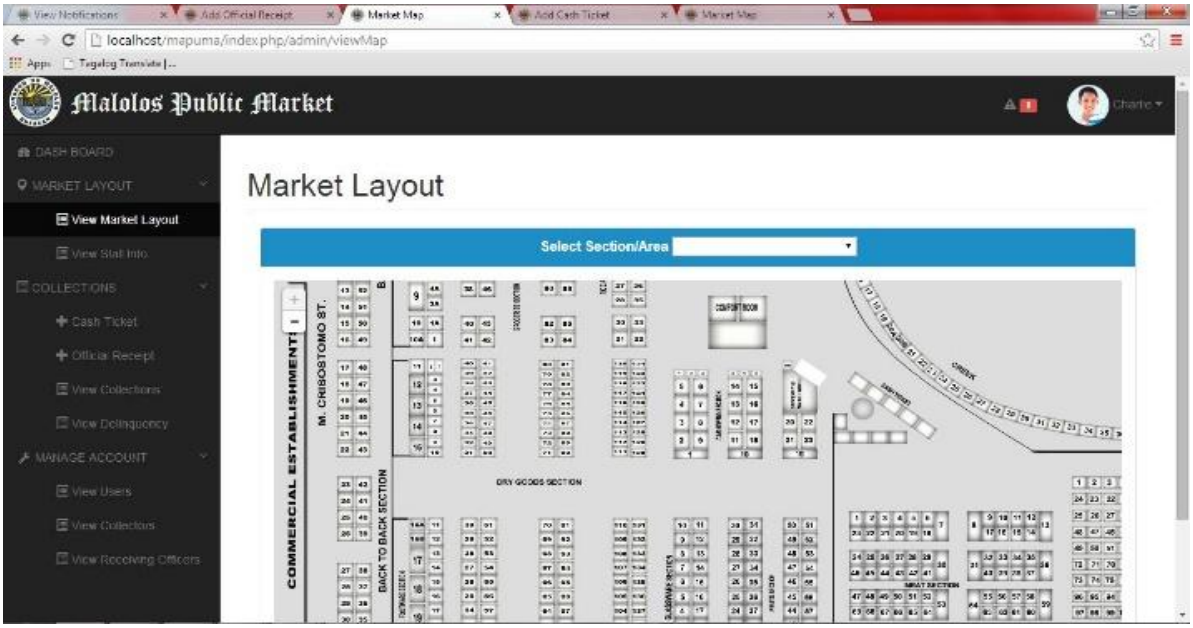

Figure 5 Market Map Page

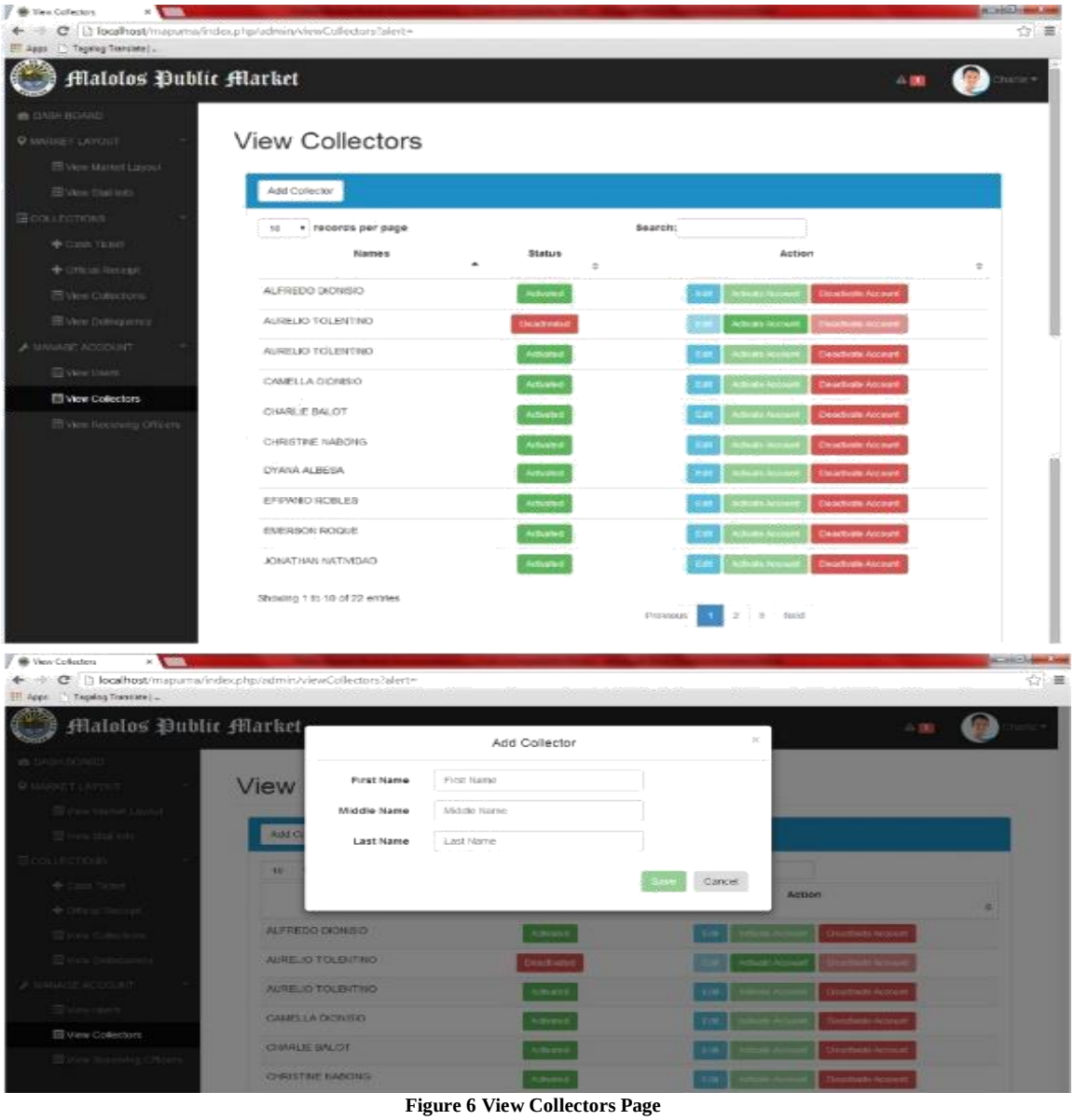

Figure 6 View Collectors Page

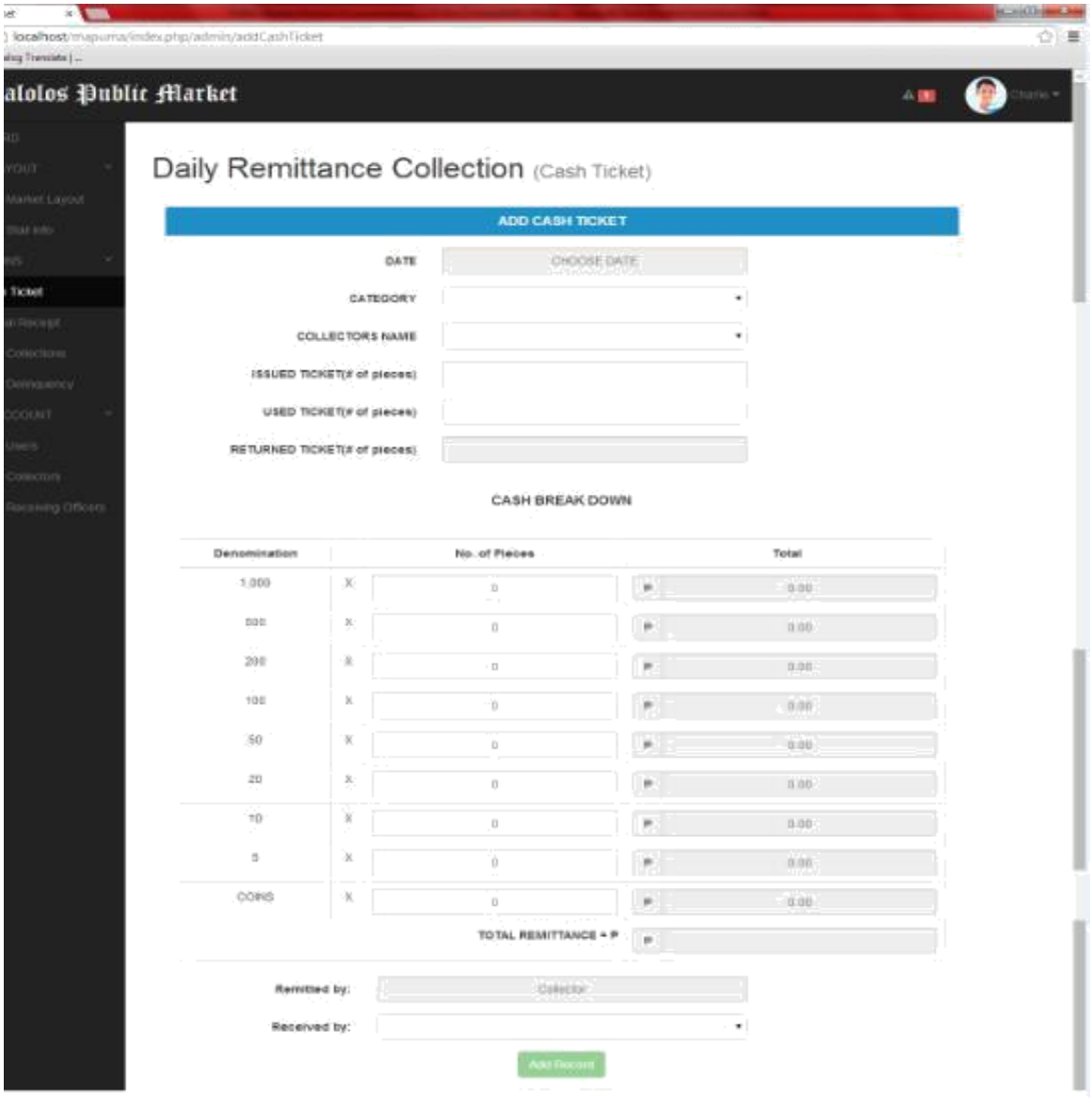

Figure 7 Daily Remittance Collection Page

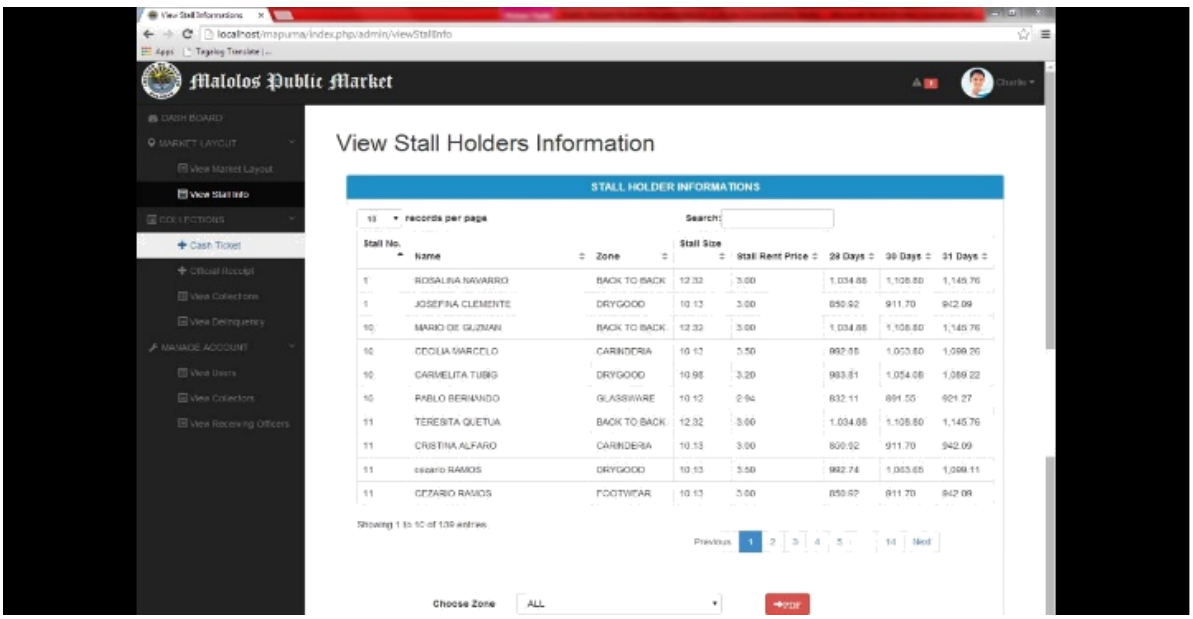

Figure 8 View Stall Holders Information Page

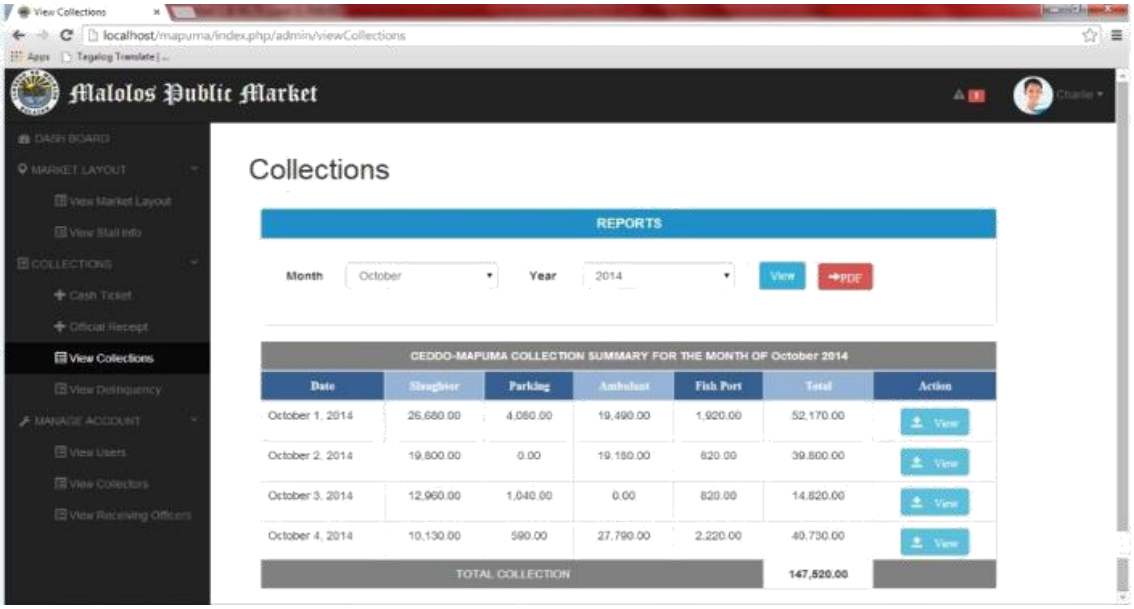

Figure 9 Collections Page

CONCLUSIONS

The researcher has assessed that the tasks and functions that have been automated such as the assessment and billing of charges to stallholders and other market occupants. To increase efficiency in collections and monitoring patterns of payment or non-payment, Public Market Module (PMM) includes a digital physical layout of the market, and provides the corresponding information for each stall and stallholder. PMM allows supervision of collection activities, and also handles cash ticket implementation and monitoring. The City Economic and Enterprise Development Office, can greatly benefit using the developed Public Market Module that is specifically configured for the Malolos Public Market.

The module has an over-all descriptive rating of Excellent in terms of the following Software Quality Evaluation criteria such as: Functionality; Reliability; Usability; Maintainability; Portability and Training and Documentation. The Public Market Module used web development tools such as; the widely open source software architecture, commonly known as LAMP (Linux, Apache, MySQL, and PHP).

ACKNOWLEDGEMENT

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