Promoting Productivity of Local Government Units in Bulacan through the Development of Automated Modular System

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ABSTRACT: One of the greatest reasons of the unceasing emergence of various technologies is the human's desire to continuously promote our quality of living. We want advancement because we want easier life, we want to be more efficient, we want to be more productive. And with this concept, it's just proper to make our Local Government Units as one of the major beneficiaries of technologies since lot of transactions valuable to its constituents are being done on their offices each day. As the researcher conducted a system need analysis among the Local Government Unit in Bulacan, it was found out that its municipalities are still using manual system in most of its daily operations. In particular, this study addressed the needs of the Municipal Business Permit and Licensing Inspection Office - an office in charge for the inspection of all registered businesses under the municipality. Unfortunately, the office is still implementing a manual way of scheduling their inspections and other transactions. This study aims to improve their system of performing business processes. The system can generate all the reports needed by the Business Permit officers. Rapid Application Development method was used in developing this module which allows quick development of the software in combination with methods of iterative process and rapid prototyping. The researcher conducted an evaluation and through ISO 9126, it was found out that the developed system is highly acceptable for its respondents and of course to its intended users. The implications of the results yields better scheduling, tracking, recording and accessing of business inspections which deem important in promoting office productivity.

KEYWORDS: modular system, local government unit, business permit system, business licensing system, inspection scheduling system, rapid application development, ISO 9126.

1   INTRODUCTION

The world today is a highly-advanced technological arena, where rapid development, inventions and innovations of computing devices are part of the game. Amidst this advancement, lots of organizations and institutions are continuously taking the advantages brought by information and communications technology (ICT). Computerization and automation became and is still becoming a requirement in performing business [1]. The countless advantages brought by the ICT into human lives specifically the roles it plays in promoting good governance was already proven and established by extensive researches and studies by various people and organization few decades ago [2]. And in fact computerization in Local Government Unit (LGU) has long been included in the Philippine Government Information Systems Plan aiming to break geographical barriers and to enhance local governance [3].

At present, there are around eighty provinces in the Philippines, one hundred fifteen cities, almost one thousand five hundred municipalities and more than forty thousand barangays which comprises the country's Local Government Unit [4]. With this great statistics, LGU which is at direct contact to the residents must really be highly effective and productive in order to serve its local constituents efficiently. There are no doubts that national government, at its best, is extending resources and paramount effort to promote the current state of our LGU to its fullest capacity. The concepts of "deconcentration" and "devolution" which brought the paradigm shift from "national to local" aiming to "bring the

government closer to people" by transferring the national power, authority and responsibility to plan, decide and manage to local level further promotes the role of LGU [5].

Being true to its mission of providing the best service to people, the national government developed though not yet fully implemented several IT projects which will promote its current system of operations and means of handling transactions such as the National Government Accounting System, National Identification System and Tax Mapping System and Electronic Tax Information System to name a few. However, those systems only captured major transactions involved in the business processes, thus, some parts of the operations are still being done manually, and due to the large scale of units involve in the LGU, we cannot expect that the national government can develop systems for every division of LGU right away, further, implementation or rolling out of those system aren't really expected to be completed in just a short period of time. Thus, the researcher came up with the idea of using the power of technology to develop a system that will be beneficial for the Local Government Units in Municipality level. It is a technological innovation that optimizes the different roles and functions of ICT in the society which might be of great help in achieving a fully-computerized business transaction systems in local level. At this phase, the Business Permit and Licensing Office (BPLO) of the twenty-four municipalities of Bulacan will specifically benefit as the primary beneficiary of this study while other systems identified by the researcher from the result of a need-analysis will be covered on its second leg.

This Business Permit and Licensing System (BPLS) is expected to further promote the productivity and efficiency of the BPLO by having an automated schedules of business itineraries and transactions of each inspector for each specific date. This will be the answer to their current problems regarding monitoring and recording of business statuses, history and as well as tracking of different violations of each registered business within the municipality.

1.1   SIGNIFICANCE OF THE STUDY

Economic Significance. The increased standardization of the system improves cost control by improving efficiency. There will be maximum efficiency in terms of transaction processing as well as in data storage and retrieval. The data will be stored properly in databases, which will facilitate easier maintenance. No information will be repeated anywhere, enhancing data integrity and at the same time saving expenses for storage infrastructures [6].

Social Significance. The developed system will help the municipalities of Bulacan to serve the fast growing number of applicants in cost-effective manner and improved customer satisfaction, Employees will have more productive time over clerical activities. Also it insists, standardization of the workflow, and varies activities which enhance overall performance of the organization.

Technological Significance. The develop system is technologically significant since it primarily uses the Web 2.0 technologies together with other network infrastructures. It further contributes in developing framework for automated-modular systems.

Significance for the Stakeholders. The developed system helps the employees lessen the time consumed in searching, checking and monitoring of various records and transactions. This system will streamline the business processes involved every transaction, thus, customers will be benefited too.

1.2   OBJECTIVE OF THE STUDY

The main objective of the project is to help the Local Government Unit in promoting productivity through the development of an Automated Modular System for the Business Permit and Licensing Office.

The proposed project specifically aims to:

1. Deliver an application module that gathers and records information regarding the inspection of business establishments using modern web technology.
2. Provide a web based application that enables faster processing and storage of data.
3. Store information in a database that can be easily accessed by authorized personnel.
4. Create a module that generates and calculates results and reports that can be used by the organization.
5. Log and keep track of each visit, automatically generating benchmarks and timelines of different business establishment.

2 SYSTEM DEVELOPMENT

This part presents the theoretical consideration in developing the system.

2.1 CONCEPTUAL FRAMEWORK

Figure 1 presents the process of the system development. The study was presented using the three dimensions of conceptual paradigm: input, process and output.

The first stage includes the gathering of primary inputs for the Automated Modular System in order to develop the application. On this stage, the researcher conducted a need analysis among the Local Government Units in Bulacan, and when the need for an application system among the municipalities was established, i.e., under the Business Permit Division, a thorough study was done regarding the business permit and licensing inspection processes such as the creation and scheduling of the inspection per se, inspection of business permit requirements, monitoring of violations, and more. System requirements were also considered which basically include the infrastructures needed for the development. For the IT infrastructure, the researcher used Bootstrap, Code Igniter frameworks, and WAMP (Windows Apache MySQL PHP) for the graphical design and back-end of the system. Hardware and network infrastructures were also considered on this phase.

The second frame is the Process stage. In this study, the researcher adopted the Rapid Application Development (RAD) Model which allows quick development of the software in combination with methods of iterative process and rapid prototyping [7].

Lastly, for the Output stage, this is the developed system, the Automated Modular System for Business Permit and Licensing Inspection Office.
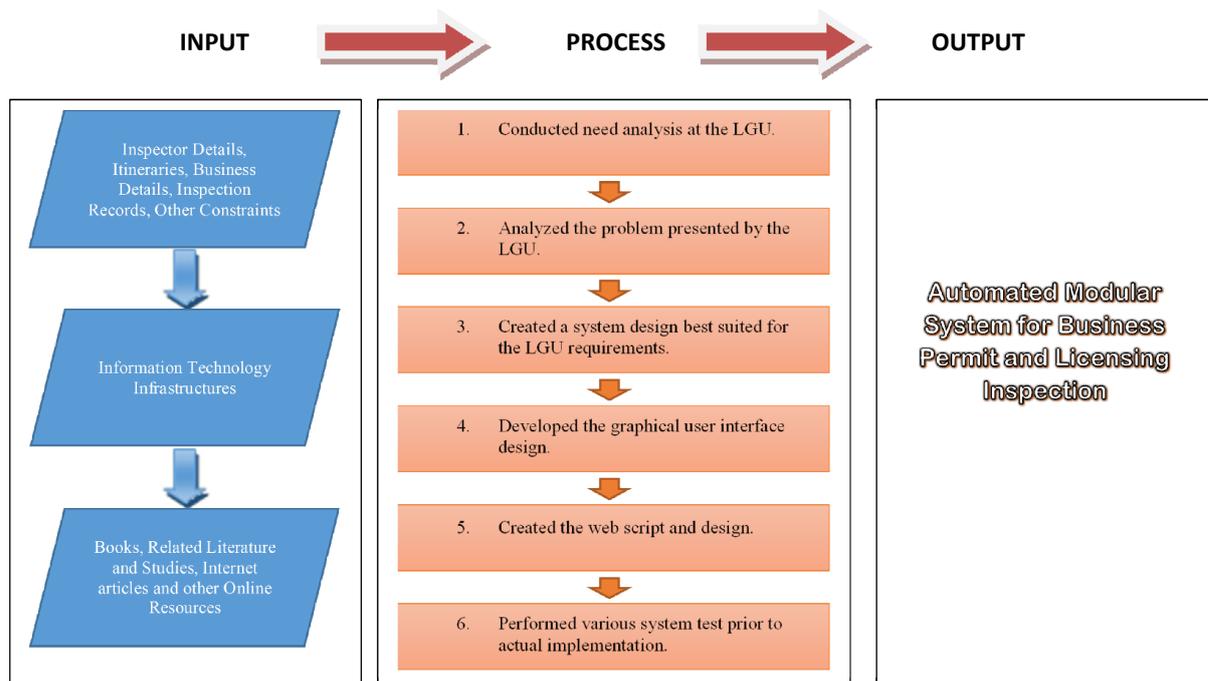

Figure 1.Rapid Application Development Conceptual Framework

2.2 PROJECT METHODOLOGY

The researcher used the Unified Modeling Language (UML) in specifying, constructing and communicating the design of the system. Among the different UML diagrams, the researcher used the Use Case Diagram and Sequence Diagram. Figure 2 shows the functionality of the system. The system administrator is responsible for identification and classification of valid users according to their access level as well as for the maintenance of the whole system. The power user is in-charge for the implementation and management of all the important modules responsible for the issuance of business permit and licensing inspection per se. Execution of all rules and constraints in designing schedules or itineraries is one of his major functions.

Technically, the power user must be granted access to all system modules, thus he is also allowed to log in on the System Maintenance and User Access Details Module. Limited access was given too to some office staff who would be performing data entry. Lastly, external users are allowed to view the inspectors' itineraries generated by the system.
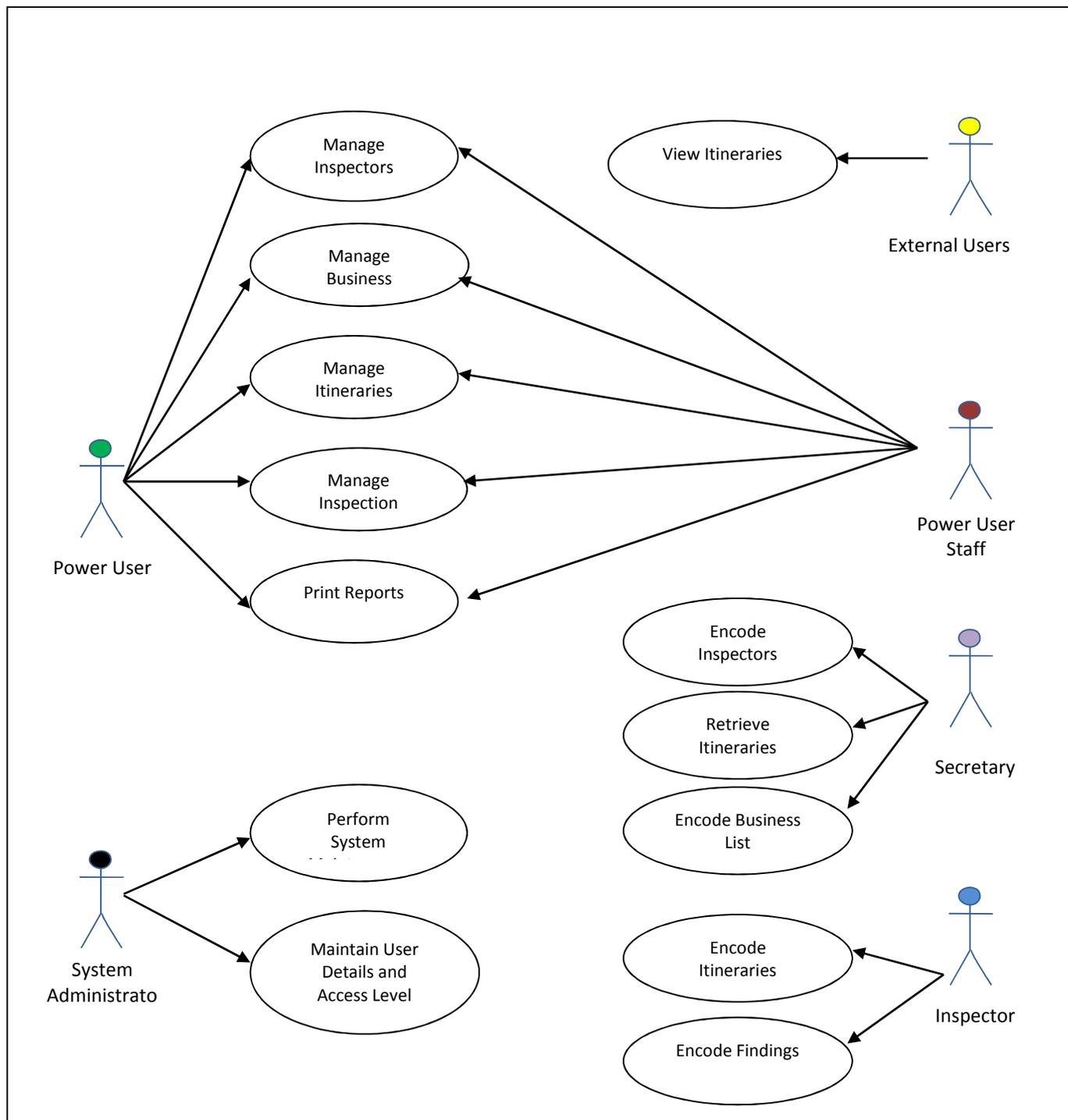

Figure 2. Use – CASE Diagram of the Automated Modular System for Business Permit and Licensing Inspection

To show the interaction between the objects: Power User, Secretary, Inspectors, and Server Computer via local area network over the progression of time, a sequence diagram as shown in figure 3 was developed. The Secretary is provided with user name and password that will be used in encoding inspectors' profile while the Inspector is also provided with user

name and password so as to be able to encode all the approved itineraries and inspection results or findings per registered business. Encoding or business list and retrieval of itineraries are functions too of the Secretary. After all those required entities are entered into the system, the power user could now manage those inputs using the appropriate system module for the generation of itineraries, permit and other pertinent reports.

Figure 3. Sequence Diagram of the Automated Modular System for Business Permit and Licensing Inspection

2.3   TESTING AND EVALUATION

After the development process, the system was tested and evaluated using ISO 9126 Software Quality Assurance Model. Prototype testing was conducted to observe the behavior of the modular system in terms of its functionality, usability, reliability, maintainability, and portability using the Likert Scale. Since the system is to be implemented on the municipal level where the presence of non-technical personnel is expected, the user manual or documentation provided by the researcher was also evaluated. Thirty-two percent of the evaluator came from the IT expert groups specifically application programmers and web developer, ten percent are network specialists, and fifty-eight percent are the actual end-users of the system from the business permit and licensing office such as the inspectors and office staff [please refer to Table 1.0 for the break down]. The evaluation resulted to an overall mean of 4.60 interpreted as excellent as perceived by the group of evaluators.

Table 1.0 Frequency of the Respondents

RESPONDENTS	FREQUENCY	PERCENTAGE
Application Programmer	8	16%
Web developer	8	16%
Network specialist	5	10%
Inspectors	23	47%
Office staff	5	11%
TOTAL	**49**	**100%**

3   RESULTS AND DISCUSSION

With an aim of promoting the productivity of the Local Government Units in Bulacan, the researcher developed an Automated Modular System specifically a Business Permit and Licensing Inspection Module for its twenty-four municipalities which offers an effective way of creating inspection results and itineraries for business inspections. It has the main feature of creating and scheduling the itineraries for a specific business inspector. This module logs the history of an inspector's visit in a particular establishment. It lists the number of visits and remarks noted by the Inspector based on its ocular inspection. This provides the division a tool in reviewing the improvement or diminishment of behaviour or practices of the business establishment. It also incorporates the generation of reports for the inspections results.

The creation of itineraries includes entering of the assigned inspector and choosing the business to be included in the itinerary. A data table is provided in order to give the users an easy way to add businesses in the list. The itinerary is scheduled manually upon user's discretion. The itinerary may be scheduled from the current date of usage to future dates. The itinerary can be altered by the user like adding and removing of businesses in a specific inspection date, cancellation and rescheduling of an itinerary

The inspection records are created upon the creation of an itinerary and may be altered like changing the status of the inspection and adding of findings and remarks.

The researcher chose not to include a delete function for the inspection and itinerary records in order to prevent conflicts in the database and avoid data discrepancies.

This system is modular in nature, meaning it could be easily linked or fused to whatever computerized system is currently being used at the municipal office. Another distinct feature is its state of being generic – it could be adopted by different municipalities even outside Bulacan since it was provided with a system tools which can tailor the system based on the users' needs in terms of specifications, functions, design and environment.

Figures 4, 5, 6, 7 and 8 show some sample screen shots of the system featuring its major functionalities.
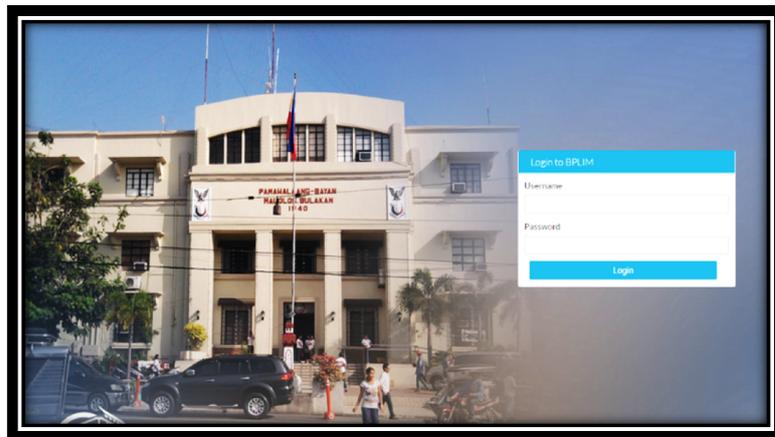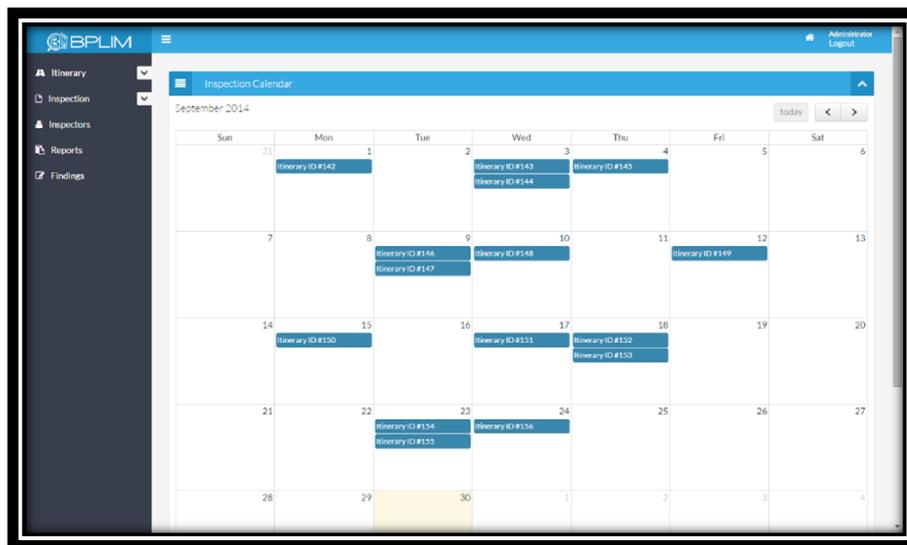

Figure 4. Security Access
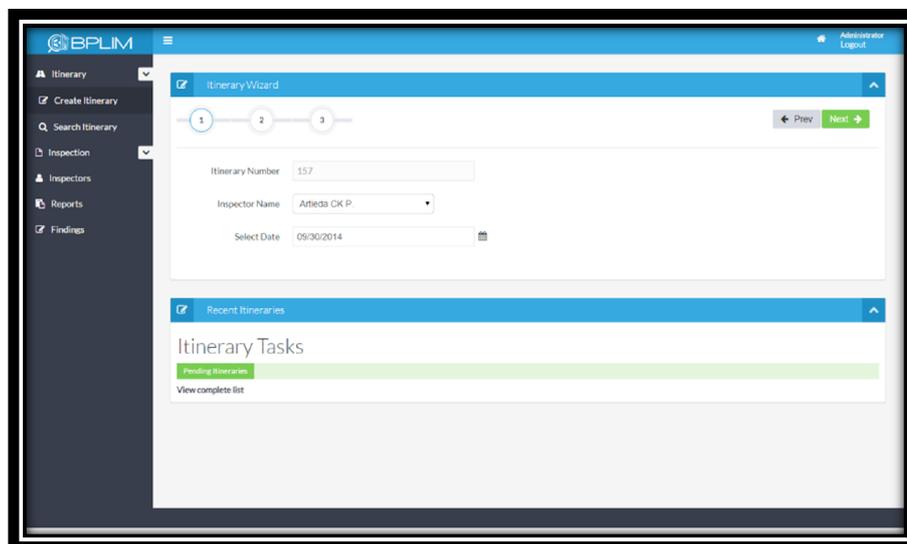
Figure 5. Main Module

Figure 6. Module for Creating Inspectors Itineraries

Figure 7. Inspection Logs
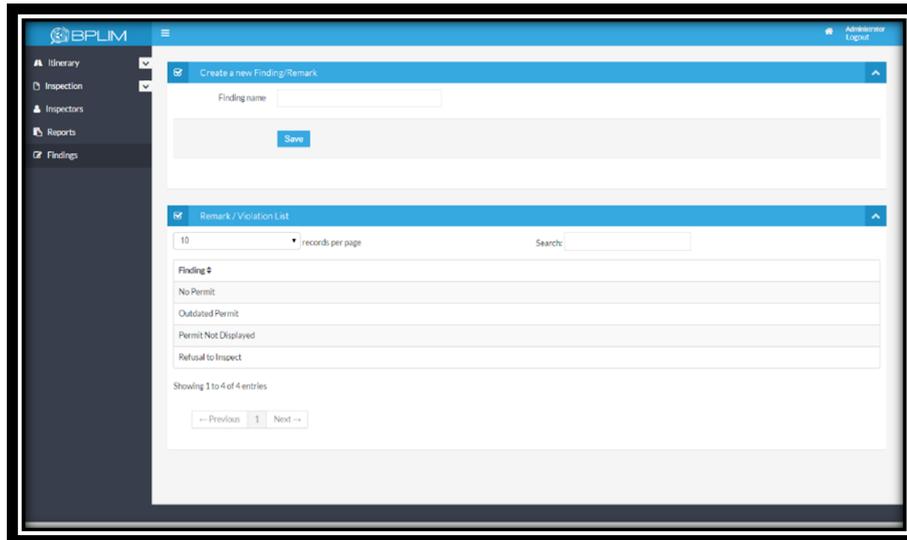

Figure 8. Sample Report

Figure 9. Encoding of Inspection Findings and Results

4   CONCLUSION

The researcher developed an application system which in terms of promoting productivity can be of great help to the Local Government Units of Bulacan specifically to the Business Permit and Licensing Inspection Office at the Municipality level. The system is equipped with powerful features that offer numerous advantages in terms of gathering and recording of information regarding the inspection of business establishments using Bootstrap 2 under the SimpliQ Bootstrap framework, JavaScript together with the JQuery plugin, and by PHP using the CodeIgniter framework.

The system serves as a web based application which enables faster and reliable processing and storage of data since the scheduling of itineraries can now be easily created by just following the inspection wizard, the business status can now be monitored thoroughly, and the generation of different reports will be produced automatically.

To further improve the transaction processing, the system can log and keep track of each visit or inspection, automatically generating benchmarks and timelines of different business establishment. And of course, to ensure the integrity of database, various access level are provided for each authorized user.

In terms of acceptability to the end users - using the ISO 9126 Software Quality Evaluation Guidelines - an Excellent or Highly Acceptable rating was given by the respondents.

The researcher therefore conclude that the requirements and specifications needed by the client are met and resolved. The client is satisfied on the features of the current system.

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