

Development of Electronic Business Permit and Licensing System (eBPLS)

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Abstract—E-government emerged as an important aspect in the delivery of public services. However, some local government e-services only offer interactive content such as application procedures and downloading of forms, and the process takes so long to complete. Hence, the main focus of the study is to develop a system, which will facilitate the application process of business permit and license into a streamlined electronic version using business permit and licensing system named eBPLS. This study adopted a modified Princeton Project Development Methodology (PPMP) as framework to structure the process of software development. The study used structured interview and survey questionnaires, which is designed in line with the ISO 9126 Software Quality Metrics, as data collection tools. In order to quantify the survey results the researchers used Five-Point likert scale and weighted mean to statistically analyze and interpret the general result. The survey focused on the perception of the respondents from the Business Permit Licensing Office of the two (2) municipalities in Camarines Sur, Philippines. Based on the findings, majority of the respondents perceived the proposed system as highly acceptable based on the average weighted mean of 4.61. Moreover, eBPLS was able to speed up the service delivery to one (1) day for both the new and renewal of business applications.

Keywords— *eBPLS, e-Governance, Electronic Business Permit, Business Permit, Electronic Government, Electronic Business Permit and Licensing System*

I. INTRODUCTION

E-governance plays a significant role in public administration reform worldwide. It is also used as an indicator to measure government service progress in terms of efficiency and effectiveness. Since 2001, the United Nations Department of Economic and Social Affairs (UNDESA) has published an E-Government Survey that assess e-government sufficiency and effectiveness in delivering public services through the use of internet [1]. In 2016, Philippines was included in High OSI Group among 193 UN Member States that provides e-participation tools and online services. This is the result of the country's efforts in establishing a National Government Portal (NGP) as a single gateway for ease of access on information, and e-services to provide brisk and effective delivery of public services.

The report suggests that the Philippines is moving towards automation in terms of e-Governance. However, the study of Siar [2] argues that the frontline e-services offered

in the country, particularly the websites are only interactive. She also added that almost all regions in Mindanao has no website while about 33% with websites in National Capital Region (NCR), Luzon are only used for frontline content such as viewing of application procedures and downloading of forms.

Business license registrations and taxes have been the primary revenue streams of the local government units (LGU) in particular the Philippines [3]. Yet, the process to file an application for new and renewal of business permits still remains difficult and time consuming as highlighted in [4]. According to the survey, the too many requirements and the processing time that takes about a month or more are the bottleneck points that caused the volume of business permit registrants to upsurge. In 2016, the Republic of the Philippines issued a Joint Memorandum Circular No. 1 (JMC 2016-1) to streamline the business permit and licensing application to reduce the processing time for business permit renewals and new applications to one or two days, respectively [5]. However, implementation of this policy has been poor to date.

Hence, the main focus of the study is to develop a system that streamlines the application process of business permits and licenses into an electronic version using a business permit and licensing system coined as eBPLS. This paper is structured as follows, viz, Related Work, Methodology, Results and Discussion, Conclusion and Acknowledgement.

II. RELATED WORK

A. E-Government

E-government has been about positioning the state to go global and reinventing the government in the digital age towards higher quality, cost-effective government services, and a better relationship between the government and its citizens [6]. The provision caused a marginal shift from street-level to system-level bureaucracies across multiple agencies. As explained in [7], the public sector benefits from e-government by reducing the discretion of street-level bureaucracies and in effect enhances bureaucratic accountability. On the other hand, the digital government also cuts the transaction costs by retaining only the skilled staff in the agency.

Governments worldwide are increasingly employing web-based business models to enhance their service delivery [8]. The study of Ndou [9], Bonson, Torres, Royo and Flores [10], and Chadwick [11] continue to emphasize that ICT offers considerable potential to sustain the national

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development priorities towards effective governance. However, the study of Layne et al. [12] argues that e-government initiatives without adequate institutional mechanism could only lead to unsuccessful implementation of e-government programs. Public leaders must learn to balance and coordinate across all e-government components to appropriately articulate their service priorities. According to Moon [13], local government unit population size and income class affects the aspects in the operation and development of e-government. He also suggests that human resources and financial capacities are the prime mover that influences the e-government utilization.

Alzahrani et al. [14] identified that the main determinant affecting the willingness to use e-government services is the citizens' perceived trust. Belanger [15] underlines that the lack of trust among citizens hinder adoption of e-government services. This relationship was also supported in the study of Lean et al. [16], and included perceived ease of use and perceived service quality as the main factors that positively influence citizens' trust, and intention to use e-government services while the perceived usefulness only show a low positive impact on the intention to use e-government services. Apart from these factors, Carter et al. [17] also identified compatibility, and trustworthiness as significant predictors of citizens' intention to use the e-government service. This implicates that the citizen welcomes the digital change in the government [18], however, several factors could adversely influence citizens' adoption of e-government, such as service dissatisfaction and perceived technology risks [19].

B. Business Registration

Every country has a standard procedure to regulate business applications for revenue generation. The program requires enterprises to secure a permit before starting and running a business, which is part of a broader policy of liberalizing the economy and encouraging enterprise development. The move to simplifying business licensing has been to some degree undermined by a number of parallel efforts to revitalize local authority finances. The study of Bruhn [20] provided evidence that simplifying business application regulation increases the number of registered businesses and encourages active participation.

Local governments in many countries are in dire need of revenue sources to finance local service provision, including the Philippines. However, according to the World Bank and International Finance Corporation [21], the country takes on 11 procedures and 48 days in securing a business permit, which impedes revenue generation. Taking action on this report, LGUs are directed to trim down requirements and business application process within two (2) days for new business permit applications and one (1) day for business permit renewals, with JMC 2016-1 as the legal basis jointly issued by the the Department of Interior and Local Government (DILG); Department of Trade and Industry (DTI); and Department of Information and Communications Technology (DICT) [5].

C. Electronic Business License

According to World Bank [22], In established governments, such as Canada, business registration takes the simplest and fastest business application procedures. Canada

has a website, Business Online Registration [23], wherein it provide steps on the registration process and a web application wherein the registrants can easily apply.

Another interesting approach successfully implemented in Clark County Department of Business License, Nevada, USA, is the concept of action workflow called the Image/Workflow system, which is presented in the study of Medina et al. [24]. The system reengineers a complicated licensing system into simple processes that are more customer-oriented, yield superior productivity, and tracks work progress. All applications are then archived permanently in the optical storage system.

However, in the Philippines, the implementation of e-government is still at the rudimentary stage. In fact, based on e-readiness survey conducted by DICT, out of 818 LGU respondents, only 10 cities and 10 municipalities from all over the country were recognized as e-ready or ready for e-government [25]. Moreover, the country's distance to frontier e-government slipped by 14 notches to 113th from last year's 99th place out of 190 economies in terms of ease of doing business [21].

D. One-Stop-Shop (OSS)

One Stop Shop (OSS) business licensing centers provide faster, simpler and less costly licensing services to small businesses by consolidating multiple services into one service center. These OSS facilitate higher rates of business formalization which in the long run can result in job creation, more government resources, and stronger economic growth [26]. The OSSs are physical offices established to reduce the number of contact points between applicants and officials [27], and eventually, address the inefficiencies in the licensing administration and lessen the burden on business. However, the realization of the full potential of one-stop government is a challenging task that requires integration effort on different levels [28].

In 2015, Star Project [29] developed a One Stop Shop Management Information System (OSS-MIS v1.0) which offers nine services. One of its major services is the local tax and duties, which focuses on the business registration and tax payment. The developer of the project stressed that the implementation of the system was difficult and strenuous. Nevertheless, the government of Albania still deemed the implementation of the program a success.

Blunt and Davidsen [30] concluded that the one-stop shop model in Vietnam has clearly contributed to reinforcing the rights of citizens by providing an efficient and easy-to-access portal to government administrative services with standardized, published, and transparent fees, charges, and timeframes.

Given the positive and supportive attitude of citizens on e-services, electronic business registration is likely to be more effective. The challenge now is how these proposed conceptual schemes, such as the Image or Workflow system and OSS, speed up the process of business registration to provide faster, simpler, and economical licensing services to small businesses. The scheme will also help reduce the number of contact point between applicants and officials [26] [27] to address the issue of corruption in the country.

III. METHODOLOGY

A. Modified Princeton Project Management Methodology

Figure 1 shows the modified Princeton Project Management Methodology (PPMM), which serves as a guide in system development. PPMM includes four (4) major phases: Initiation, Planning and Tracking, Delivery, and Close-Out.

The Initiation phase is the beginning of the PPMM cycle.

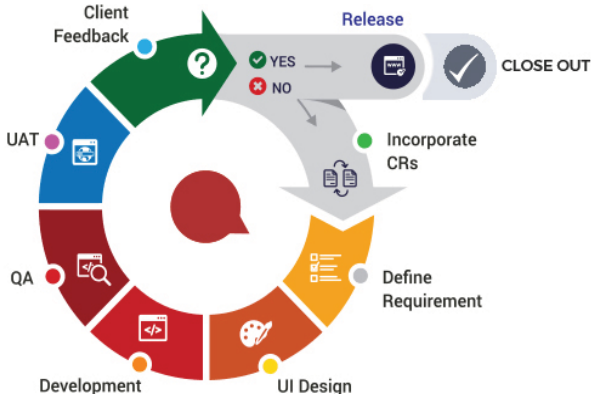


Fig. 1. Modified PPMM

Clients were interviewed to examine if the problems encountered are adequate base of support to carry out the project. The requirements collated from the first phase are used to design and construct the actual project in the Planning and Tracking phase, which is also considered as the “doing” phase. This phase includes subphases such as UI Design, Development, Quality Assurance, and Acceptance Testing. Here, the deliverables comprise of the project schedule, equipment specifications, network architectural design, and system design (DFD). The development of the project or the actual coding of the system, and planning of the test plan are also included in this phase. The Delivery phase involves the deployment of the system and implementation of the training plan for the end-users and finally, the Close-Out or the Follow-up phase involves activities with the client to review and evaluate the research undertakings.

B. Data Source

The Business Permit and Licensing Office (BPLO) of the Local Government of Bula and Nabua was the respondents of this study. LGU Bula and Nabua were both located in Rinconada or 5th District, Camarines Sur, Philippines. The respondents of this study were the employees from the Business Permit Licensing Office of the municipalities, who feed the researchers with the data on the prevailing issues on the existing processes in business permit application as well as the level of acceptability of the system as end-users and IT Experts who shall give feedback on the level of acceptability of the system in terms of the ISO 9126 Software Quality Metrics.

C. Research Approach

1) Research Design

Developmental -quantitative statistics are used for the analysis of this research. Since the data were gathered according to clients’ day-to-day perception and experience,

thus, this methodology was considered the most appropriate for this research.

2) Sampling Tools

Since the population size is relatively small, total population sampling was used as a sampling technique for data gathering procedures and system evaluation. The respondents include two (2) employees from the BPLO of the municipality of Bula and Nabua, and ten (10) IT Experts from the College of Information and Communications Technology.

3) Research Techniques

A questionnaire and a structured interview shall be utilized as data gathering tools. These tools shall elicit information in response to the research statement of the problem. This study uses two (2) questionnaires for BPLO Staff and IT Experts. The first questionnaire focuses on the first four sets of the ISO 9126 metrics namely, Functionality, Reliability, Usability, and Efficiency, while the second questionnaire focuses on the implementation of the system using Maintainability and Portability. The questionnaires reliability was tested in SPSS using Cronbach’s Alpha. Five-Point Likert Scale shown on Table I was used in order to quantify the survey questionnaire result and average weighted mean (AWM) to statistically analyze and interpret the general result.

TABLE I. FIVE-POINT LIKERT SCALE

Rate	Verbal Interpretation	Range
5	Highly Acceptable	4.6 - 5.0
4	Acceptable	3.6 - 4.5
3	Slightly Acceptable	2.6 - 3.5
2	Unacceptable	1.6 - 2.5
1	Highly Unacceptable	1.0 - 1.5

IV. RESULTS AND DISCUSSION

Since this study uses a Software Development Methodology, Results and Discussion were stipulated by following the phases of the Software Development Methodology, viz:

1) Initiation

The survey interview shows that the existing process in the application and renewal of Business Permit and License is very tedious and paper-based. It also shows that the retrieving of data is laborious. The BPLO Officer is having a difficult time in searching the document through the file cabinet. Other problems encountered are shown in Table II.

TABLE II. PROBLEMS ENCOUNTERED

Problems Encountered	Proposed Solution
Filling-up of Application and Renewal Form takes a lot of time	Online Forms and Account for easy tracking of Applications.
Manual Databanking and Retrieving of Applications are done tediously.	Electronic Databanking of Applications with ease-of-access features such as Searching and Sorting.
Processing of Applications and Checking of Requirements are done manually that leads to a slow transaction.	Electronic Processing and Checking of Documents using eBPLS System.
Generation of Business Permit once the application was approved is being done manually	Electronic Generation of Permit using eBPLS System.

The researchers and the client agreed to convert the conventional way of processing the application and renewal of Business Permit into a faster and easy way, which is to develop a web-based system.

2) *Planning and Tracking*

a) *Data Flow Diagram*

Data Flow Diagram maps out the flow of information in the system. It has two entities, viz. the administrator and business owner. The business owner (BO) needs to complete the requirements before an application is created. When the requirements are complete, the application is stored to the application storage. The BO can also view the application or assessment details saved in the application storage.

Approval of application depends on the assessment of submitted requirements of the BPL officer. Once the application is approved, the BO shall receive an assessment form. The assessment form clearly contains the breakdown of fees that requires up-front payment. After successful payment, BO may now receive the business permit.

b) *Network Architectural Design*

Figure 2 shows the Network Architectural Diagram of eBPLS that illustrate the connection between physical and logical components of the system, as well as the data format used. Since the system will be implemented locally, it shows that it is not intended to have an internet to run and access the web system however, the system is also capable for online implementation.

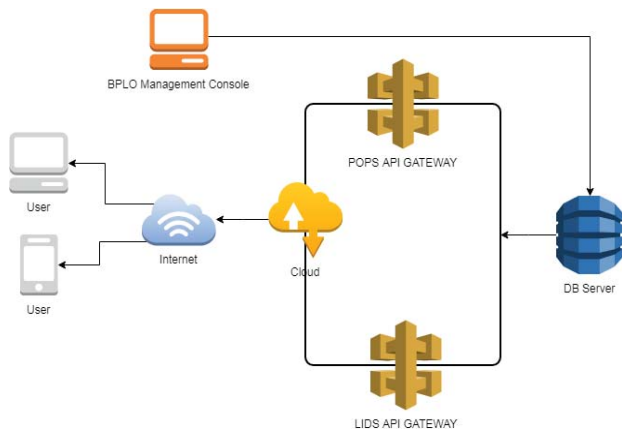


Fig. 2. Network Architectural Diagram of eBPLS

c) *UI Design and Development*

In developing the system, the researchers used front-end and back-end applications in order to achieve a more reliable, responsive, and efficient system. The front end used Web UI Kit Template in order to achieve a more presentable, unique, and uniform user interface built with a mix of HTML5, CSS3, and JavaScript. Native PHP version 7, and MySQL was the server-side back-end languages used for data manipulation and storage. Since the system needs to be connected through the Point of Payment System (POPS) and Local ID System (LIDS), an Application Programming Interface (API) gateway was also utilized. POPS and LIDS provided an API Gateway with authorization security for every management console device to ensure an easy and secure connection to eBPLS.

3) *Delivery*

The new eBPLS process delivered to the beneficiaries consisted of three (3) easy phases: application, verification and generation.

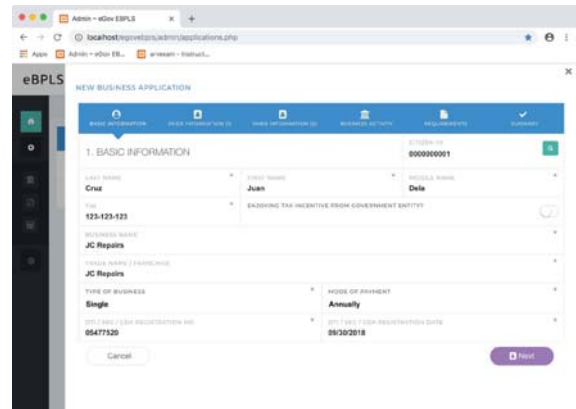


Fig. 3. Creating new business application

Figure 3 shows the electronic form to create new business application. The application is structured in tabular form to enable users to update multiple categories at once from a single page. These categories include the basic information, business activity, requirements, and summary.

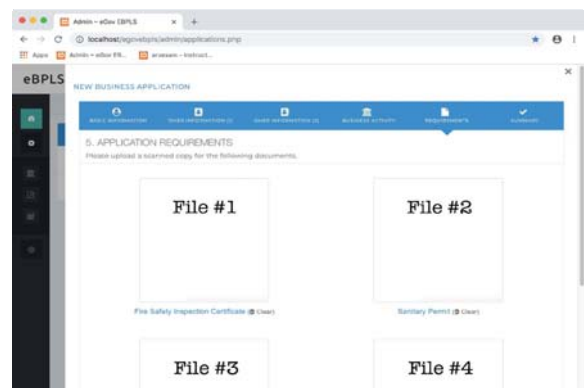


Fig. 4. Submission of application requirements

End-users can upload the application requirements identified by the BPLO Office in the requirements tab as shown in Figure 4. All required documents uploaded should

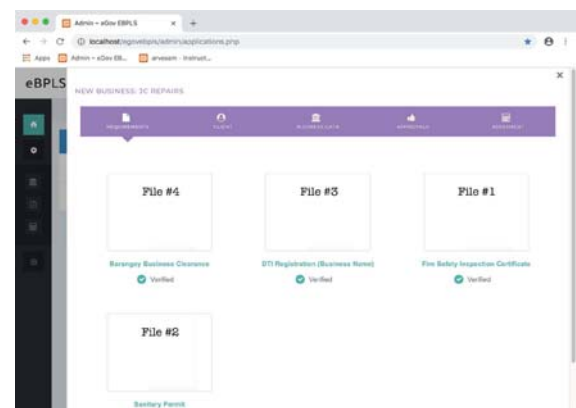


Fig. 5. Verification of application requirements

either be as a PDF file or PNG or JPEG image files. The system also displays notification when one of the application requirements is empty or null.

Once the details were submitted, a summary will be shown such as application name, application purpose and etc. The user can review and verify the summary information, then submit the business application or save it for later use.

Figure 5 presents the verification of application. Here the BPLO Office has the option to either approve or reject the application depending on the authenticity of documentation submitted. If the application is approved, assessment of fees follows.

Description	Amount
Building Inspection Fee	100.00
Business Plate	200.00
Business Police Clearance Fee	200.00
Certification Fee (Assessor)	40.00
Certification Fee (Business Office)	40.00
Certification Fee (MTO)	40.00
Electrical Inspection Fee	100.00
Garbage Fee	300.00
Gross Sales Tax	1000.00
Mayor's Permit Fee	100.00
Occupation Fee	100.00
Sanitary Fee	10.00
Signboard	40.00
TOTAL	2660.00

Fig. 6. Assessment of fees

Figure 6 exhibits the assessment of fees, which are itemized with corresponding description and amount. The assessment details are forwarded to POPs through an application program interface (API), which also automatically notifies eBPLS once the assessment fee has been paid.



Fig. 7. Generation and Printing of Business Permit

Figure 7 displays a sample of the Business Permit. The Business permit is only issued when the requirements are met and the assessment fee is settled. The permit includes information, such as the permit number and nature of the business.

4) Close-out

The end-users of the BPLO performed a beta test then consequently evaluated the proposed system based on the ISO 9126 Software Quality vis-à-vis Functionality, Reliability, Usability, and Efficiency of the system. Table

III generally shows the User Evaluation Result and it shows that the system acquired an average weighted mean of 4.34, which means that the users accepted that the system passed the ISO 9126 software quality metrics. Specifically, in terms of efficiency, majority of the respondents accepted that the system performs systematically, and responds timely and quickly having a weighted mean of 4.38. On the functionality of the system, majority of the respondents accepted that the system can perform the required task, can interact with other system and prevent unauthorized access having a weighted mean of 4.38. In terms of reliability, the respondents accepted that the system is capable in handling errors, resume the session and restore lost data after error having a weighted mean of 4.38. Lastly, in terms of usability, respondents agreed that the system is easily learned and used because of its user interface with a weighted mean of 4.25. This manifests that the system performs the expected action without exerting much effort from the part of the client. The new eBPLS system also resulted to speed-up and shortened application time to one (1) day only.

TABLE III. USER EVALUATION RESULT

ISO 9126 Classification	Weighted Mean	Interpretation
Efficiency	4.38	Acceptable
Functionality	4.38	Acceptable
Reliability	4.38	Acceptable
Usability	4.25	Acceptable
AWM	4.34	Acceptable

IT experts also evaluated eBPLS in terms of Maintainability and Portability as seen in Table IV. With regards to the portability metric, a good majority of the respondents indicated a highly accepted that the system is acceptable with a weighted mean of 4.90. The result indicates that IT experts appreciated that eBPLS is processor independent and multi-browser. In terms of Maintainability, most of the IT Experts accepted that eBPLS is highly acceptable with a weighted mean of 4.88. This suggests that eBPLS can be easily maintained impacted by the readability, object orientation and modularization of the code.

TABLE IV. IT EXPERTS EVALUATION RESULT

ISO 9126 Classification	Weighted Mean	Interpretation
Maintainability	4.90	Highly Acceptable
Portability	4.88	Highly Acceptable
AWM	4.89	Highly Acceptable

Wrapping up the overall result of the surveys on both the respondents, results suggest that majority of the respondents believe that the system is highly acceptable with an average weighted mean of 4.61. This implies that eBPLS met the standards of the respondents in terms of the six ISO 9126 metrics, which means the system is highly recommended for "live" implementation to the respective LGU beneficiaries.

V. CONCLUSION

The emergence of e-Governance invokes operational efficiency, transparency, and systematic government services to the citizen, government, and its stakeholders.

This paper investigates the advantages of ICT in e-government in the municipal business permit and licensing office of the Philippines. Data collection was conducted using unstructured interviews and survey questionnaires to determine the problems encountered by BPLOs and the citizens in securing business permits.

The result of the study shows that the BPLO faces day-to-day problems from storing and retrieving of application documents, processing the applications, down to the issuance of business permits. With these, the researchers developed eBPLs, a web-based system that handles the application and renewal of business permits from processing, storing to retrieving of applications. eBPLs sought to streamline and systematize the business permit and licensing process of the LGU. In order to evaluate the system's quality, the researchers initiated a survey to the end-users and IT Experts. The system was evaluated based on ISO 9126 Software Quality Metrics in terms of Functionality, Reliability, Usability, Efficiency, Maintainability, and Portability. Based on the findings, majority of the respondents accepted the proposed system with an average weighted mean of 4.61, which suggests that eBPLs is officially recommended for implementation in the BPLOs of the LGUs.

The next challenge on this primordial step is to integrate the system in the cloud, in order to provide more accessible services and will give more convenience to the people. However, another challenge is the security, such that the system will be available to the public and will be more vulnerable. This new challenge shall be the next step to attain the goal in providing more efficient and effective government services using e-Governance.

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