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Integration of Process Monitoring in Procurement Management System for Bureau of Fire Protection CALABARZON

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ABSTRACT

Document tracking systems improve the efficiency of retrieving documents online at any time, moving documents in and out of the office, and tracking the organization's processes developed as a tracking solution system. The study aimed to develop a process monitoring in the Procurement Management System in the Bureau of Fire Protection CALABARZON using a web platform. The developed system can monitor the process of every procurement made in the system by the users. Also, the head of the procuring entity and Bids and Award Committee of BFP CALABARZON can manage and track the entire procurement process requests using the procurement management system. The researchers used the Agile Model for the development of the proposed system and used descriptive and developmental research design. The researchers evaluated the system using user acceptability. Consequently, the developed system attained its objectives and goals of providing and developing a process monitoring in the Procurement Management System incorporated with descriptive analytics. The study is beneficial to the procurement management of BFP CALABARZON who struggle to track and analyze where the procurement process is stranded.

Keywords: *document tracking, procurement, procurement process, descriptive analytics, procurement management*

Introduction

As technology changes rapidly and proper management of information becomes increasingly important, document tracking systems improve the efficiency of retrieving documents online at any time, moving documents in and out of the office, and tracking organization's processes developed as a tracking solution system (The UP Document Tracking System, 2022).

Organizations must shift from using traditional paper files and storage to more cutting-edge electronic methods as a result of the global trend toward online service delivery (Adam, 2007; Alshibly et al., 2016). In addition, practicing recording management has tremendous benefits for any organization. The administrative recordkeeping perspective views recordkeeping as a crucial administrative function, deserving the same level of attention and management as other core administrative tasks such as auditing and risk management. A system that disregards recordkeeping may

not satisfy the association's targets successfully (Phiri, 2016). It shows that there is a need to guarantee proper records management, which includes transparency throughout a record's lifecycle (De Mingo & Martinez, 2018). Information and Communications Technology (ICT) plays a vital role in local governance. Modern technologies and ICT applications were used to facilitate government transactions and enhance the delivery and quality of government services (De Castro et al., 2020).

Moreover, the Department of Information and Communications Technology (DICT) shall be the primary policy, planning, coordinating, implementing, and administrative entity of the Executive Branch of the government that will plan, develop, and promote the national ICT development agenda (RA 10844). Monitoring and documentation are a must in a government body like the Bureau of Fire Protection that particularly handles procurement processes. The procurement process requires the organization to manage a significant portion of the organization's resources. The Republic Act. 9184 or "Government Procurement Reform Act", Section 3. Declaration of Policy is the declared policy of the State to promote the ideals of good governance in all its branches, departments, agencies, subdivisions, and instrumentalities, including government-owned and/or -controlled corporations, and local government units.

Procurement records, which are documents created or received during administrative and executive transactions, serve as both a record of the government's history and an audit trail for its financial transactions, as well as evidence of its policies and activities for those accountable (Obura et al., 2021). Project Procurement Management (PPM) in the past was consistent as things changed only on extremely rare occasions and were completely obvious (Rane et al., 2020). The delivery and quality of government services were improved through the utilization of innovative technologies and information and communication technology (ICT) applications. An electronic document management system, also known as an EDMS, frequently emerges as one of the management tools that are absolutely necessary for integrated data collection within a facility or organization (Ismael & Okumus, 2017).

Thus, the public sector has only recently recognized the potential value of process monitoring in the Procurement Management System in enhancing the quality and timeliness of services provided. This is in contrast to the process of adopting new technology and reinventing one's organization. In this study, the integration of process monitoring into a procurement management system would be crucial for the user of the Bureau of Fire Protection CALABARZON's Procurement Management System in order to improve, accelerate, and effectively monitor processes in its procurement system.

Methods

Research Design

Descriptive and developmental research designs were utilized by the developers. In order to improve BFP CALABARZON's procurement system, the descriptive method utilized quantitative methods to collect additional data and information about the monitoring of the procurement process. The researchers used a quantitative research approach to evaluate and dissect factors to obtain results. It included the usage and investigation of mathematical information utilizing explicit measurable procedures. It likewise depicts the strategy for making sense of an issue or peculiarity through social occasion mathematical structure (Apuke, 2017).

Population of the Study

The developers' study's target population included designated staff assigned to procurement management within the division of different sections such as the Admin Division, Financial Management Division, Logistic Division, Fire Safety and Enforcement Division, and Operation Division.

Data Collection Instruments

Based on monitoring the procurement process in BFP CALABARZON, the developers conducted interviews at the conference meeting of LSPU Siniloan and BFP CALABARZON to learn more about how the procurement management system would be improved. The researchers collected data regarding the implications of the procurement process for a web-based monitoring system. The obtained data was crucial for the researchers' ability to propose new concepts and innovations for BFP CALABARZON.

To determine the level of acceptability evaluation, the researchers used a questionnaire. They evaluated the potential users' behavioral intention and usability. It consists of different parts such as external variables, perceived usefulness for monitoring the process of the procurement management system, ease of use, user satisfaction for monitoring the process of the procurement management system, and usability. Table 1 depicts the Likert scale ranging from one to five with their corresponding descriptive ratings which was utilized in this research.

Table 1: Likert Scale for Level of Acceptability

Scale	Range	Descriptive Rating
5	4.21-5.00	Highly Acceptable
4	3.41-4.20	Acceptable
3	2.61-3.40	Slightly Acceptable
2	1.81-2.60	Slightly Unacceptable
1	1.00-1.80	Unacceptable

Project Design

Figure 1. *Stages of Agile Development*

There are such an enormous number of interesting points in illustrating and developing a structure. The imperative data and sensible model were made to have an insight of what the construction would resemble. The researchers utilized the agile development methodology to satisfy the requirements of the clients. This was accomplished by managing the tasks and their coordination through a particular set of values and principles. Agile software development is a lightweight approach that was proposed to overcome the limitations of convolutional development methods and to reduce overhead and costs while providing flexibility to adopt changes in requirements at any stage (Al-Saqqa et al., 2020).

Furthermore, improvement design is the technique for structure expected in sorting out, portraying, and finishing a system. The change plan consolidates the strategies, gadgets, and documentation that are utilized by system specialists, designers, makers, and clients to make and execute an information structure satisfactorily. It is essential for an expert to consider time dissemination and quality affirmation parts of the design while picking an improvement frame.

Results and Discussion

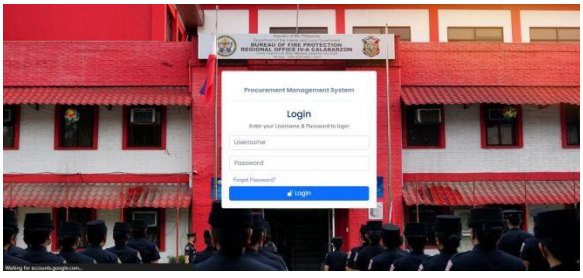

Figure 2. *Login Page of Procurement Management System*

Figure 2 shows the home page of the created web-based system for procurement management of BFP CALABARZON. The system will be mainly used as a monitoring and tracking system of the procurement process of BFP CALABARZON offices handled by the BAC Office. Implementing an online system is the easier mode for controlling document management in an organization (Salleh, 2020). The system was utilized for the real-time tracking of created requests in the procurement system and to allocate all movement of procurement process of every section in a division. It resulted in locating where the procurement request was stranded.

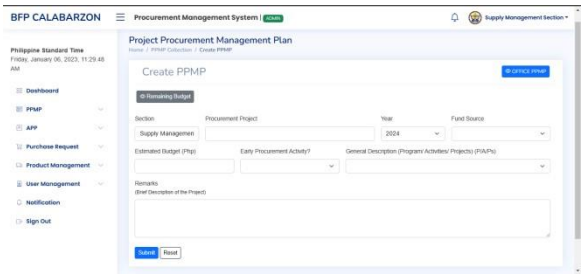

Figure 3. *PMS Creating Project Procurement Management Plan*

The system presented in Figure 3 aims to facilitate the creation of a Project Procurement Management Plan (PPMP) by offices under different sections of the BFP CALABARZON Division. This is done by completing a form that includes information such as the type of procurement project, the year of the project, the source of funds, and a general description of the PPMP. The estimated budget was determined based on the allotted budget given by the Bids and Award Committee Section (BAC), and a brief description of the project was included in the remarks.

Once the PPMP is created and approved by the head of the procuring entity, a Purchase Request (PR) can be created. The PR is then sent to the Budget section for the issuance of a Certificate Availability of Fund (CAF) and forwarded to the BAC for the facilitation of a canvas form. If the appropriate mode of procurement is chosen by the BAC, the canvas form is posted on the PHILGEPS website, and the BAC waits for the request for a quotation before preparing the Abstract of Bids, Resolution, and Notice of Award. After selecting the winning bidder, the BAC provides a Contract of Agreement, Purchase Order, and Notice to Proceed. The request then passes through the Budget section for obligation, and the BAC oversees the signing of the contract by the winning bidder and waits for delivery.

After the submitted PPMP is approved, products are added based on their category, specification, unit, unit cost per peso, quarterly requirements, total quantity, and generated total cost. The products added to the PPMP can be viewed in the "View Listing" section. After the product list that has been added to PPMP, choose the product that has been listed as the finalized item needed in the procurement project by clicking “Select”. Creating of Purchase Request (PR) form depends on the procurement project from the PPMP.

Creating the request will require inserting the respective division of the requesting section following the purpose of the request. Before submitting the request, the PR form must be completed with the head of the section's signature in the "Requested by" field and the head of the procuring entity's signature in the "Approved by" field. The request collection and management system contain the created PR. To validate the PR, it is needs to be submitted by clicking the send icon and if the created PR has been approved, the PR is ready to add the product request by clicking the PR tracking ID. The Purchase Request Content shows the PR detail. The list of requested items is empty because it is needed to list again the requested items corresponding to the PPMP-listed products to finalize the need for a certain PR.

Furthermore, listing the items can be found in “Add Product”. The system generates the creation of an Annual Procurement Plan to show the consolidated PPMP for summarizing the schedule of proposal amount and timeline of the schedule for each procurement activity. Office APP presents the consolidated procurement project of every section in a division. Moreover, all APP presents the consolidated procurement project in all divisions in BFP CALABARZON.

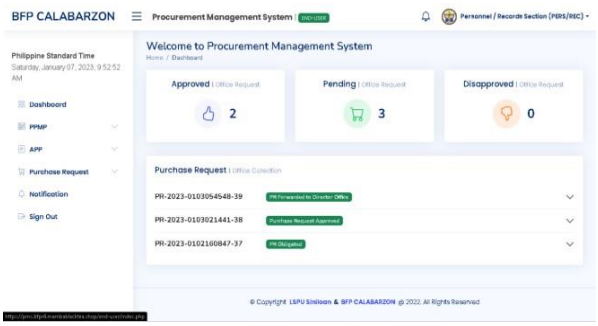

Figure 4. *PMS Process Monitoring of Head Section*

Figure 4 depicts the monitoring of PR collection details of the head of a certain section. The tracking visualization presents the PR tracking ID along with the process of stages it forwarded and the status it updates. It integrates a visual list of requests to notice the status of different requests of section. The section head can visualize the total of approved, disapproved, and pending purchase requests. The BAC Section also has the privilege to track down all PR process movements since their section manages the procurement process of the BFP CALABARZON. It presents the visual record of tracking information, with a PR code in every purchase request of different sections that have been recorded. It clearly shows the tracking detail of every movement of progress of the PR with the date and time that has been processed and in which destination it must be designated. The green circle represents that the PR is updated to its next stage.

In addition, the proponents implement a notification module to notify different sections in every division for every request process created in the procurement system. In addition, the BAC Section and Regional Director will get a notification as the admin of the system for verifying the procurement request that was being processed, and to notify users and automate this monitoring procedure of webpage variations (Mallawaarachchi et al., 2020). The system notification module will keep the end-user notified about the status of every purchase request.

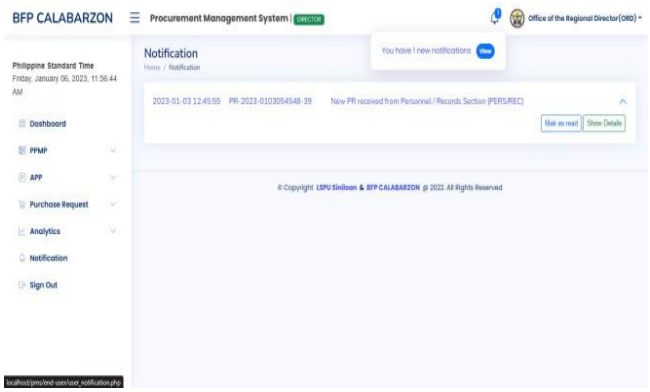

Figure 5. *PMS Notification Module*

Figure 5 shows the notification center of the system. Clicking the view notification will navigate the users to the notification center. In this part, it will show the purchase request update in the notification bar if it is approved and disapproved or updated to move on designated process.

The proponent integrated printing hardcopies of the report of the PPMP, PR, and APP for records presentation of different sections. Also, BAC will have the records for managing and organizing all of the reports although it was imparted in the system. Thus, it will maintain a good practice of keeping records both software and hardware recording. Also, the signing of the signatories in PPMP, PR, and APP is only available in hard copies.

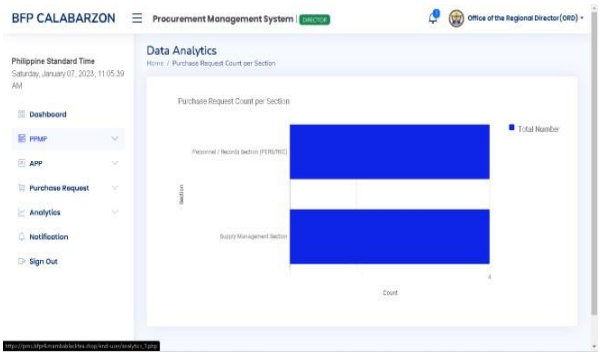

Figure 6. *Data Analytics of PR Count per Section*

The proponent generated a system module that generates a graphical presentation for the summarization of reports using descriptive analytics. According to Manikyam and Kumar (2017), descriptive analytics is used by businesses and organizations to monitor day-to-day operations. The data visualization shows the purchase request count per section, yearly tender summary, approved request and disapproved request summary, and also the request performance report. BAC and the head of the procuring entity can view the data analytics of the system. Figure 6 depicts the presentation of data analytics of purchase request that has been created by different sections in every division. It shows the total number of PR counts per section. The yearly tender summary shows the allocated budget per section in a year. The system also can show the previous year's allotted budget per section as shown in Figure 6.

Result of User Acceptability

The User Acceptability Evaluation Form had been answered by the different section end-users in BFP CALABARZON in terms of the system's suitability. As to results, the perceived of usefulness obtained the best grade possible with a 4.78 weighted mean which is interpreted as highly acceptable. This shows that the Procurement Management System has been able to build adjustments to the procurement because it provides a procurement process database that was attentively checked by the users as well as the tracking process on the procurement management system. The user's assumption has met the procurement management system.

On the other hand, the attribute of usability of the Procurement Management System obtained the lowest rating with a 4.58 weighted mean according to the category but interpreted as highly acceptable. The Procurement Management System was able to meet the user's assumption when it comes to the system being easy to interact with, having clear procedures of the system, and integrating well various functions of the system. Nevertheless, some functions and features of the system need to be improved in order to meet the attribute usability for the user.

Additionally, the result on the perceived ease of use according to the Procurement Management System end-user was in the rate of 4.64 as weighted mean with a descriptive rating of highly acceptable, proving that they can easily operate the system. The users had a highly acceptable rating in the Procurement Management System gaining a lowest score of 4.58 based on weighted mean ranking. According to the evaluation gathered from the end-users, the weighted mean was calculated with an overall average of 4.65. These findings will be used for the enhancement of the system.

Conclusion and Future Works

The Procurement Management System was capable of monitoring the request processes in the procurement section. Tracking information in the system provides real-time monitoring of every request created by the sections in a division. It also provides a presentation of the different stages of the procurement processes that the request undergoes. The system was capable of notifying the assigned office that is involved in the process for verification and approval.

Likewise, the system was capable of generating report summaries and visualization of data processed and stored while using the system. This provides a visualization of data presentation for analyzing the average time of request undergoes, and a summary of the total number of approved and disapproved requests. Also, the system

generates the visualization of the tender summary per year. Moreover, the report summary provides an analysis of requests using tracking numbers to calculate the average number of days it takes.

Most government organizations today have difficulties managing and tracking documents. That is why it can be concluded that to resolve the gap in managing and tracking documents, organizations need to innovate the current document management to be web-based with the integration of process monitoring to easily track the document process.

Moreover, because of the time constraints and wide scope of the study, some features that may enhance the research were not included so the proponents recommend addition of some features. In this section, a message module for a real-time messaging platform among the different offices of BFP CALABARZON can be imparted to the system. For the enhancement of after report in Excel files, future developers can integrate live signatory in after report of PPMP and APP through a mobile platform and also notifying the unit if there is pending approval. In the system's product management, future developers can add an upload of Excel product file product list management and add a specification of automatic synching of data for easy automation of integrating other products in product management. In terms of analytics, the proponents recommend adding a display of a reason or remarks in the disapproved summary and also in the part of pending request.

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