CHAPTER II

REVIEW OF RELATED LITERATURE

Through the usage of Optical Character Recognition (OCR) with Integrated Full-text Search and Chatbot, this chapter examines research and literature on the development of the record-keeping system from paper-based techniques to cutting-edge technology. Maintaining barangay records is crucial to ensure efficient government and operational transparency at the local level, especially for ordinances, resolutions, and meeting minutes. The majority of barangay offices in the Philippines still use paper-based documentation today. Delays in the provision of public services, inefficiencies in document record-keeping, and the possibility of data loss or improper management are all consequences of this manual system.

According to Del Pilar et. al, (2024), In the Philippines, governance begins with Local Government Units, extending down to barangays as the smallest administrative division, responsible for managing small neighborhoods. Paper-based management has historically been the backbone of many industries, a practice still prevalent today. The eFIND system aims to digitize and optimize the record-keeping of local governance, particularly the BLGU Poblacion South.

Prior findings reveal that the existing manual paperwork processes are labor-intensive, prone to errors, and contribute to the office's space constraints (Tabuso et. al., 2024). The proposed eFIND system encountered issues similar to those of its paper-based record-keeping, such as manual procedures for document verification, record-keeping, tracking, which requires large amounts of labor, time, and is prone to errors.

The study of Carpio (2020), e-Barangay focuses on streamlining processes such as document requests, complaint filing, and generating local statistics. Similarly, eFIND likely aims to optimize various administrative tasks. Streamlining these processes reduces manual workloads and minimizes errors, leading to more efficient governance.

Olipas et. al, (2023) aimed to design and develop a web-based Barangay Information and Record Management System. The study focuses on a web-based system inherently improves record-keeping by digitizing records, which reduces the risk of data-loss, enhances data accuracy and facilitates easier retrieval and management of information. In line with this, Electronic Full-text Integrated Navigation for Documents (eFIND) made use of a web-based platform to improve record-keeping transition from manual to digital to reduce errors and increase efficiency of administrative tasks.

The developed Web-Based Resident Information Management System aimed to enhance the efficiency of record-keeping and service delivery in barangays, facilitating easier maintenance of residents' and providing hassle-free services. The system was developed using the Rapid Application Development (RAD) model, which focuses on quick design cycles and high-quality results. It underwent rigorous testing and evaluation based on six criteria from the ISO 25010 standard. The evaluation yielded average mean scores indicating satisfactory performance across various metrics: functional suitability (3.48), performance efficiency (3.62), compatibility (3.58), usability (3.42), reliability (3.44), and security (3.51). These results suggest that the system meets user requirements and is prepared for implementation. (Melendres & Aranda, 2024). In a similar manner, eFIND also utilized the Rapid Application Development (RAD) model to develop the system. The system emphasizes rapid prototyping, and constant feedback from users to ensure that the solution meets the client's specific needs. The eFIND

system uses ISO 25010 to evaluate functionality sustainability, performance efficiency, security, reliability, and interaction capability. ******

According to Optical Avyodri et. al, (2022), Character Recognition (OCR) makes it possible to do text recognition appearing in images. This makes the eFIND system to integrate OCR to convert pdf to text for easy to scan and convert physical paper documents into digital format. Additionally, once documents are digitized using OCR, the text within these documents become searchable.

Optical Character Recognition (OCR) has been widely discussed in various topics in the rise of robotics, artificial intelligence and computer vision. OCR has become a solution in extracting characters from the image into machine-encoded text. (Mursari & Wibowo, 2021) This research aims to discuss character recognition from digital handwritten images. However, character recognition problems using OCR have been more or less solved. OCR is mainly implemented in reading characters from scanned or printed documents. The ability to accurately recognize the process of handwritten text can enhance its user-friendliness and accessibility, allowing users to submit hand-written forms or documents that the system can interpret and process.

The study of Jain et. al., (2023) explores the development of an adaptive framework for Optical Character Recognition (OCR) models, focusing on a unique dataset of English language numerical digits. Despite decades of research, creating OCR with human-like abilities remains elusive due to differences in writing styles. Integrating an adaptive OCR framework for eFIND can enhance its ability to capture and process data from various documents such as ordinances, resolutions, and minutes of meetings, by that means, improving data management and service delivery.

Abubo et. al., (2024) introduces a Blockchain-Based barangay Document system enhanced with Optical Character Recognition (OCR) to address the challenges of manual documents handling in Philippine barangays while ensuring confidentiality. Similar to eFIND, blockchain technology offers transparency while maintaining document confidentiality through strong encryption methods ensuring only authorized individuals can access sensitive information. Additionally, the integration of OCR technology enhances document management efficiency by digitizing physical records with 96% accuracy, reducing processing times by 50% and minimizing manual errors.

In the study of Cuevas et. al., (2024), chatbot was integrated into the system to improve community engagement and service delivery. These insights are directly relevant to the eFIND, as the barangay secretary finds it much easier to find documents when the chatbot feature is included, especially when the information is hardly remembered and the documents are needed right away. ***

Sośnicki & Madeyski (2021) aimed to develop a tool called Automated Search Helper (ASH). ASH is designed to facilitate automated and full-text searches in the context of Systematic Literature Reviews (SLRs). ASH aims to provide higher search completeness by enabling users to download and search the full text of articles. This capability can significantly enhance the thoroughness of literature reviews, ensuring that more relevant studies are identified and included. Likewise, the eFIND also integrates a full-text search to improve the completeness and accuracy of data needed. By providing meta-search interphase, eFIND simplifies the process of searching, saving time and effort for the barangay officials.

In the study of Pulikowski (2022), the article aims to analyze the conditions and possibilities of full-text search in Polish digital libraries (DL), which is essential for users who

need to access specific information within large digital collections efficiently in relevant to eFIND, user can quickly locate specific information, reducing the time and effort required to access necessary data, thereby improving overall system efficiency and user satisfaction.

The Barangay Management System (BMS) facilitates data-driven decision-making by providing barangay officials with valuable insights derived from accurate and up-to-date data. This capability enables informed decision-making processes, fostering a governance approach based on evidence and real-time information. Such a data-driven approach can lead to more effective and responsive governance. (Maribao et. al, 2024). In the same way, the eFIND system improves data-driven decision making to have access to comprehensive data, officials can better understand community needs, allocate resources more efficiently, and implement policies and programs that are more likely to succeed.

The study of Libadia et. al., (January 2025), aims to design and develop a web-based Electronic Records Management System (ERMS) for the Office of Senior Citizen Affairs (OSCA) in the Philippines. The study sheets centralize record-keeping and streamline the collection, storage and processing of records and member information. This study is relevant to the development of eFIND because it emphasizes the challenges with manual record-keeping. Also the utilization of web and data gathering technologies to optimize record management workflows to enable quick and accurate data retrieval.

Jamis (2022) discussed their study titled “One Barangay: A Mobile and Web Barangay Managing System. The proposed system aims to provide a more systematic and secured way of managing community members' files and data. This systematic approach likely includes structured data handling procedures that inherently support confidentiality by ensuring that data is accessed and used in a controlled manner. For eFIND, adopting similar security measures

ensures that official barangay documents are safeguarded against unauthorized access and potential breaches, thereby enhancing trust and compliance with data protection regulations.*****

Synthesis

The Electronic Full-text Integrated Navigation for Documents (eFIND) system is a digital platform that archives and digitalizes paper-based methods in barangay record-keeping. It uses full-text search, optical character recognition and a chatbot assistant to manage documents quickly, accurately, and securely. This system increases operational efficiency, reduces human error, and supports data-driven governance. It also ensures secure access to confidential records, allowing barangays to deliver public services more rapidly while maintaining transparency and accountability.

The related studies and literature above provide strong theoretical and practical foundations for the development of Electronic Full-text Integrated Navigation for Documents (eFIND) in improving digital record-keeping for BLGU Poblacion South, Solano Nueva Vizcaya. It highlighted how eFIND can enhance the services for the barangay officials especially to the barangay secretary by easily uploading and retrieving documents while ensuring data privacy and improving document record management.