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Barangaytek: Digital Transformation of Community Records Designing a Comprehensive Household Management System for Barangays

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ABSTRACT: This study presents BARANGAYTEK, a web-based community records system designed to modernize barangay household management. Traditional paper-based record keeping often leads to data inaccuracy, slow processing, and limited accessibility. BARANGAYTEK integrates household profiles, resident records, and barangay transactions into a secure and user-friendly digital platform. The system features digital registration, automated updates, searchable databases, and document issuance, supporting efficient and accurate barangay administration. The study highlights the role of information technology in improving local governance and service delivery.

KEYWORDS: Barangay records management, Household management system, Web-based information system, Digital transformation, Community governance, E-government, Local government unit (LGU)

I. INTRODUCTION

Many barangays continue to manage household records and official documents using manual, paper-based methods, leading to errors, delays, and difficulty in accessing information. To address these challenges, this study proposes BARANGAYTEK, a digital household management system designed to centralize barangay records and improve service efficiency. The system enables barangay officials to store, update, and retrieve resident and household information through a single, organized platform, resulting in faster, more accurate, and transparent barangay services. Previous studies highlight the benefits of digital systems in local governance. Research by Carlo et al. (2024), Enaño (2025), Aliling et al. (2025), and Djatmiko et al. (2025) shows that computerized barangay systems reduce errors, enhance data security, and improve accessibility, demonstrating the positive impact of digital transformation on community administration.

II. LITERATURE REVIEW

These smallest administrative units are in charge of overseeing the needs of their communities since local administration starts at the barangay level (Carlo et al., 2024). Like many other organizations, barangays have been historically managed and recorded community data using paper-based systems. However, research indicates that a lack of centralized management systems and inadequate ICT (Information of Computer Technology) infrastructure continue to cause a digital divide in many barangays, particularly in urban areas. The effectiveness of barangay operations could be jeopardized without a customized digital system.

In a similar vein, Jamis et al. (2022) point out that barangays encounter severe difficulties in accurately storing, arranging, and retrieving both incoming and exiting data as local populations continue to increase. Currently, instead of utilizing a secure, centralized database designed for relational data management, the majority of community records are
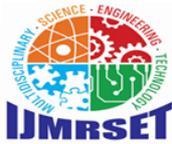
processed manually using general-purpose programs like Microsoft Word or Excel. While these tools are accessible, they lack the robust security features, audit trails, and automated validation necessary for official government record-keeping. This manual approach not only increases the likelihood of human error and data duplication but also results in a "digital divide" where the lack of adequate ICT infrastructure hinders the barangay's ability to provide transparent and efficient public service.

BarangayConnect, developed by Enaño (2025), is a web-based system designed to modernize and simplify barangay operations. Through this digital platform, residents can request services such as identification cards, certificates of residency, and barangay clearances without visiting the Barangay Hall. The system reduces the time and effort needed for document processing while helping barangay staff minimize manual paperwork and improve service efficiency. It features automated request handling, record management, and report generation, all accessible through an easy-to-use dashboard. Additionally, BarangayConnect uses a Linear Regression Algorithm to analyze community and demographic data, allowing barangay officials to make data-driven decisions, anticipate service demands, and plan for population changes.
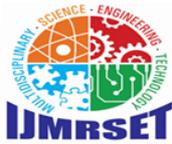
The study "Digitalizing Governance: A Transformation on the Processes of One Community in the Philippines" (Ballaran, 2023) examines the conversion of Barangay Trinidad's administrative operations from antiquated manual methods to an efficient digital system. The Electronic Barangay Information Management System (E-BIMS), a specialized digital system created to enhance the effectiveness, precision, and accessibility of barangay services and records management, is the foundation of this transition. In order to identify current problems with manual processes, such as delayed data retrieval, record mismanagement, and time-consuming transactions, information was gathered through questionnaires, interviews, and observations of barangay staff. E-BIMS was created based on the data collected to solve these issues by automating crucial procedures including resident profiling and certificate issuance (such as Barangay Clearance and Certificate of Indigency).

E-BIMS was created to address these issues by automating crucial procedures such resident profiling, certificate issuance and report production, according to the findings of the study by Aliling et al. (2025). The deployment system's outcomes demonstrated a significant improvement in the barangay's day-to-day operations. The public's general delivery service much improved, transactions became quicker, records were more structured and easier to access. Also, it increased productivity, less paperwork, and improved openness were emphasized in feedback from barangay officials and employees.

The study emphasizes the need for governments to embrace an inclusive, multi-stakeholder approach to e-government deployment in order to guarantee long-term investments in accessibility, cybersecurity, and user confidence. Future studies should examine mixed-method techniques and comparative evaluations across different socioeconomic conditions in order to enhance digital inclusion efforts (Djatmiko, 2025). Digital inclusion, which ensures that all citizens have equitable access to digital public services, is a crucial component of sustainable e-government. However, institutional barriers, infrastructure constraints, and limited digital literacy restrict widespread adoption, particularly among vulnerable communities.

Table 1. Summary of Relevant Literatures

No.	Paper Title	Author Name	Key Points	Remark
1	Local Governance and Barangay Administration	Carlo et al. (2024)	Barangays are the smallest administrative units responsible for addressing community needs; effective governance starts at the barangay level.	Supports the importance of improving barangay administrative systems.
2	Challenges of ICT Adoption in Barangays	Jamis et al. (2022)	Lack of centralized systems and ICT infrastructure leads to difficulties in managing increasing population data; most records are handled manually using Word or Excel.	Highlights the need for a centralized and secure digital barangay system.
3	BarangayConnect: A Web-Based Barangay System	Enaño (2025)	Provides online requests for barangay documents, automated record management, report generation, and data-driven decision-	Demonstrates how digital platforms improve efficiency and service

			making using linear regression.	delivery in barangays.
4	Digitalizing Governance: A Transformation of One Community	Ballaran (2023)	Introduced E-BIMS to automate resident profiling and certificate issuance; improved efficiency, accuracy, and accessibility of barangay services.	Validates the effectiveness of digital record management systems in barangays.
5	Implementation of E-BIMS in Barangay Operations	Aliling et al. (2025)	Automation of records and reports resulted in faster transactions, reduced paperwork, improved transparency, and higher productivity.	Supports the positive impact of digital systems on daily barangay operations.
6	Digital Transformation and Social Inclusion in Public Services	Djatmiko et al. (2025)	Emphasizes an inclusive, multi-stakeholder approach to ensure digital inclusion and equitable access to public services for all citizens.	Identifies barriers to adoption such as infrastructure constraints and limited digital literacy.

In summary, the reviewed literature confirms that the adoption of digital information systems significantly improves the efficiency, accuracy, and accessibility of barangay operations. Studies highlight the importance of centralized record management, automated document processing, and data-driven decision-making in addressing challenges associated with manual, paper-based systems. However, existing research also points out persistent issues such as limited ICT infrastructure, data security concerns, and digital inclusion barriers. These findings support the development of BARANGAYTEK as a secure, user-friendly, and community-centered digital household management system designed to enhance transparency, improve service delivery, and strengthen local governance at the barangay level.

III. METHODOLOGY

Research Design
This study employed a descriptive-developmental research design to design, develop, and evaluate BARANGAYTEK: A Web-Based Household and Community Records Management System for Barangays. The developmental component focused on the creation of a web-based system using the Agile Methodology, which enabled iterative planning, development, testing, and refinement based on user feedback. This approach ensured that the system addressed the actual operational needs of barangay officials and staff. The descriptive component of the study assessed the system's quality, usability, and overall performance through user evaluation, determining its effectiveness in improving record management, service delivery, and administrative efficiency within the barangay.

Instrument
The primary research instrument used was a structured survey questionnaire adapted from the ISO/IEC 25010 Software Quality Model. The questionnaire evaluated the system based on the following quality characteristics: Functional Suitability, Performance Efficiency, Compatibility, Usability, Reliability, Security, Maintainability, and Portability. Responses were measured using a four-point Likert scale ranging from 1 (Not Acceptable) to 4 (Very Highly Acceptable) to quantify user perceptions and satisfaction. The instrument was reviewed and validated by IT professionals and barangay practitioners to ensure clarity, relevance, and technical accuracy.

Data Collection and Participants
Data were collected from selected respondents within the barangay community. The participants included:
- Barangay Officials and Staff – to evaluate administrative functions, record management, and system usability.
- Residents – to assess accessibility, clarity, and efficiency of requesting barangay services and documents.
- IT Practitioners/Experts – to evaluate the system's technical design, security, and reliability.

Participants were provided with a guided demonstration of the BARANGAYTEK system, allowing them to explore features such as household registration, resident profiling, record updating, and document issuance before completing the evaluation questionnaire.

Data Analysis

The collected data were analyzed using the following statistical and analytical techniques:

1. Descriptive Statistics – Frequency and percentage distributions were used to summarize respondent profiles and evaluation results.

2. Weighted Mean Analysis – Used to compute the average ratings for each ISO/IEC 25010 quality attribute, indicating the system's level of performance.

3. Verbal Interpretation – Weighted mean scores were translated into descriptive ratings (3.26 – 4.00 = "Very Highly Acceptable", 2.51 – 3.25 = "Highly Acceptable", 1.76 – 2.50 = "Acceptable, 1.00 – 1.75 = "Not Acceptable") to aid interpretation.

4. Qualitative Feedback Analysis – Open-ended responses were analyzed to identify system strengths, usability issues, and areas for further improvement.

IV. RESULTS AND DISCUSSION

System Features

BARANGAYTEK successfully digitized and centralized essential barangay records and administrative services through a unified web-based household management system. The system provides secure user authentication with role-based access control for barangay officials, staff, and residents. Key functionalities include digital household and resident registration, automated record updating, searchable resident and demographic databases, and electronic issuance of barangay documents such as clearances and certificates. Additional features include case and summons record management, real-time demographic monitoring, automated notifications, and audit trails to ensure data accuracy and accountability. An administrative dashboard offers reporting and monitoring tools that support efficient data management, transparency, and informed decision-making. These features collectively reduce manual paperwork, minimize record duplication, and improve the accessibility and reliability of barangay information.

Performance Evaluation

BARANGAYTEK obtained an overall Highly Acceptable (HA) rating based on the ISO/IEC 25010 software quality model. Among the evaluated quality characteristics, Functional Suitability and Portability achieved the highest mean scores, indicating that the system effectively meets barangay operational requirements and is easy to use for both officials and residents. Other quality attributes, including Reliability, Performance Efficiency, Security, Maintainability, and Usability, also received high acceptability ratings. These results demonstrate that BARANGAYTEK is a stable, secure, and efficient digital solution that enhances administrative performance, supports accurate record management, and strengthens transparency and service delivery at the barangay level.

Table 2. Performance Evaluation System Tabulation

Table	Quality Characteristic	Mean	Verbal Interpretation
1	Functional Suitability	3.26	Very Highly Acceptable (VHA)
2	Reliability	3.13	Highly Acceptable (HA)
3	Performance Efficiency	3.01	Highly Acceptable (HA)
4	Security	3.15	Highly Acceptable (HA)
5	Maintainability	3.20	Highly Acceptable (HA)
6	Usability	3.04	Highly Acceptable (HA)
7	Portability	3.28	Very Highly Acceptable (VHA)
Over-all Mean		**3.15**	**Highly Acceptable (HA)**

V. CONCLUSION

The development and implementation of BARANGAYTEK successfully addressed the challenges of traditional barangay record management by providing an integrated, web-based platform that enhances accessibility, efficiency, and service delivery. By centralizing household registration, resident profiling, record updating, and document issuance into a single system, BARANGAYTEK streamlined administrative processes while promoting transparency, accuracy, and data-driven decision-making. The system supports barangay officials in managing community records effectively

and provides residents with faster, more convenient access to barangay services, demonstrating the benefits of digital transformation in local governance.

REFERENCES

[1] Castillo, E., D, Francisco, R., & Quiazon, J. (2021). Barangay Info System with Map. Integrates GIS maps with resident data. Link: https://www.scribd.com/document/540125727/Barangay-Information-System-With-Web-Bas e-Map

[2] Enaño, J.B Natividad,K.P (2025). BarangayConnect: A Web-Based Information Portal for Resident Data, Administrative Services, and Community Records Using Data Analytics and Linear Regression Algorithms. https://doi.org/10.47772/IJRISS.2025.910000127

[3] Ballaran,M.J et,al (2023). Development and evaluation of web-based barangay profiling and issuance system using regression analysis. World Journal of Advanced Research and Reviews, 20(3), 060–072. https://doi.org/10.5281/zenodo.12738879

[4] Del Pilar, C. G. E., et,al(2024, December). B-GIS: Modernizing Local Governance Through a Web-Based Barangay Geographic Information System for Barangay 99, Tondo, Manila. In 2024 International Conference on Intelligent Cybernetics Technology & Applications (ICICyTA) (pp. 161-166). IEEE. https://ieeexplore.ieee.org/abstract/document/10912845

[5] Aliling, J. T., Santa Ana, B. B., & Soberano, K. T. (2025). Digitalizing Governance: A Transformation on the Processes of One Community in the Philippines. International Journal of Multidisciplinary Research and Analysis, 8(6). https://doi.org/10.47191/ijmra/v8-i6-68

[6] Djatmiko, G. H., Sinaga, O., & Pawirosumarto, S. (2025). Digital Transformation and Social Inclusion in Public Services: A Qualitative Analysis of E-Government Adoption for Marginalized Communities in Sustainable Governance. Sustainability, 17(7), 2908.https://doi.org/10.3390/su17072908

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