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Research Article

Evaluating the Effectiveness of Barangay Management System for Local Governance using Software Quality Model of ISO 25010:2011

Dexter G. Dandan [a,*], Michael Marvin P. Cruz [b]
Alejandro P. Soriano II [c], Ken M. Balogo [d]

[a-d]Central Philippines State University San Carlos, San Carlos City, Philippines
*Correspondence: dexterdandan@cpsu.edu.ph

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Abstract

This study evaluated how well a Barangay Management System (BMS) worked for Barangay Macapso in Vallehermoso, Negros Oriental, Philippines. The BMS was made to fix problems with manual management tasks and make service delivery better. A descriptive–developmental research method was used, which combined developing the system with evaluating it empirically. End-users, such as the Barangay Chairman, Kagawad, Secretary, and staff, were surveyed and interviewed in an organized way to get information. IT experts used the ISO/IEC 25010:2011 software quality model to judge the technical quality. End-users gave the system high marks for functional suitability, usefulness, reliability, and performance efficiency. IT experts also gave the system high marks for maintainability, compatibility, and security, which shows that it meets important software quality standards. Implementing the BMS made operations more efficient and services better delivered. However, users had different levels of digital proficiency, and the system needed to be optimized all the time. The study suggests that specific training for users, ongoing upkeep, and possibly expanding to other barangays could help make the system more scalable and long-lasting. This would lead to better local government information systems and a more technology-driven government.

Keywords

Barangay Management System, barangays, E-Governance, ISO 25010, system quality, technology, Philippines

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This study was conducted in accordance with ethical standards and approved by the appropriate Institutional Review Board (IRB). Informed consent was obtained from all participants prior to data collection.

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Introduction

In this digital age, the government is not limited to old-fashioned administrative methods that used paper. All over the world, governments are slowly going digital to make public services more open, easy to access, and quick to respond to needs. Integrating electronic communication and information technologies into government processes is known as e-governance. It has become a revolutionary way to improve administrative efficiency and citizen participation (Akpan-Obong et al., 2022). Bautista et al. (2023) say that this change has changed how public organizations work with communities and provide important services. The idea of e-governance has grown beyond automation as information and communication technologies keep getting better (Grigalashvili, 2022). It now includes inclusive governance, citizen involvement, and better accountability. Local governments are also using digital tools more and more. This shows that the world is moving toward modern governance strategies that focus on providing better services and getting people involved more (David et al., 2023; Aleisa, 2024).

At the local level in the Philippines, barangays are the main way that the government talks to people. They are in charge of enforcing rules, keeping records, and providing community services. However, a lot of barangays still use old-fashioned systems that are done by hand and on paper. These systems are often inefficient, slow, and don't make the government process clear (Pulumbarit & Suarez, 2017). As communities grow and more people need services, barangay officials have to deal with more paperwork, which makes it harder for them to provide quick and good services. For example, barangay information systems, web-based document processing platforms, and emergency response technologies were used in previous projects to deal with these problems and make services run more smoothly (Carpio, 2020; Bautista et al., 2023; Samuel Reign & Centeno, 2024; Barroquillo et al., 2021). Similarly, the creation of web-based records management systems has shown how digital tools can strengthen organizational efficiency and improve accessibility of public records within local government offices (Libadia et al., 2025). These events show that good information resource management makes local government groups more efficient at making decisions, running their businesses, and providing services (Sarker et al., 2019).

Even with these improvements, we still do not fully understand how automatic Barangay Management Systems (BMS) work from the users' point of view and how software quality affects how well the system works, how reliable it is, and how well the service works overall. Several studies stress how important it is to test digital systems using well-known software quality models like ISO/IEC 25010, which check for features, usefulness, dependability, and performance effectiveness (Estdale & Georgiadou, 2018; Peters & Aggrey, 2020). Researchers have already used ISO/IEC 25010 in a number of different settings, such as academic systems, information systems, and organizational software solutions, to show that it is a useful tool for checking the quality and performance of systems (Manglapuz & Lacatan, 2019; Panduwiyasa et al., 2021; Nuzula & Rochimah, 2023; Anggraini et al., 2019). However, there have not been many studies that look at automated barangay management systems using this approach and taking user feedback into account in local government settings. This hole makes it clear that we need to look into how digital neighborhood systems work in the real world and how they can be made better to meet the needs of the community.

So, the goal of this study is to look into how an automatic Barangay Management System can be put into place and how well it works from the users' point of view. The goal of this study is to add to the body of knowledge about how technology can be used to improve local government by looking at system speed, usability, and service delivery. The study's results could help lawmakers, barangay officials, and system developers make tools for the government that are more responsive and focus on the needs of the people. The main goal of this study is to show how technology-driven government can give communities more power, make things more clear, and make public service delivery at the barangay level more inclusive and effective.

Methodology

Design

This study employed a descriptive–developmental research design integrating system development with empirical evaluation to address barangay-level administrative gaps. The descriptive phase examined the existing manual workflows of Barangay Macapso to identify operational limitations and service challenges, ensuring that system requirements reflected actual needs. The developmental phase involved designing and developing the Barangay Management System (BMS) aligned with established software quality standards. The system was evaluated using the ISO/IEC 25010:2011 quality model by technical experts and end-users to assess key attributes. This integrated approach enabled the development of a functional system while empirically validating its quality, suitability, and relevance for the barangay's operational environment.

Sampling

This study utilized a non-probability sampling technique, specifically purposive sampling, in selecting the respondents for the evaluation of the BMS using the ISO/IEC 25010:2011 Software Quality Model. The respondents were selected purposively based on their direct involvement in barangay operations and technical competence in information systems. The study was conducted in Barangay Macapso, Municipality of Vallehermoso in Negros Oriental. This barangay was selected as the locale of the study because its existing administrative processes and operational tasks served as the primary basis for the conceptualization, design, and development of the BMS.

Participants

A total of fifteen (15) participants were involved, consisting of ten (10) barangay officials and staff and five (5) IT experts, all of whom met the predefined inclusion criteria relevant to the evaluation of the BMS using the ISO/IEC 25010:2011 Software Quality Model. The barangay participants included the Barangay Chairman, Barangay Kagawad, Barangay Secretary, and designated barangay staff who are directly involved in the daily operations of the barangay and are active users of the implemented system. To be included in the study, these participants were required to have actual experience in using the BMS during regular barangay transactions and administrative processes. Their participation ensured that the evaluation of software quality characteristics such as functional suitability, usability, reliability, and performance efficiency was grounded in real-world system usage. The IT expert participants were selected based on their educational background and professional experience in information technology, software development, or system evaluation. The inclusion criteria for IT experts required prior involvement in system development, system analysis, or software quality assessment. These participants were tasked with evaluating the system's technical quality characteristics, including maintainability, compatibility, and security, which require specialized technical knowledge. The inclusion of both end-users and IT experts is consistent with prior system evaluation studies that utilized the ISO/IEC 25010 software quality framework, where user-based evaluation and expert-based assessment were employed to obtain a comprehensive and balanced analysis of system effectiveness. Similar studies in information systems research have adopted purposive sampling and expert evaluation to assess software quality attributes, particularly in government and organizational information systems.

Collection

Data were collected through a structured system evaluation involving the selected barangay officials, barangay staff, and IT experts. Prior to data gathering, permission to conduct the study was obtained from the barangay, and the purpose and procedures of the evaluation were explained to all participants. The respondents were given an opportunity to interact with and use the BMS based on their respective roles. After system use, the participants completed an evaluation questionnaire aligned with the ISO/IEC 25010:2011 Software Quality Model. Barangay officials and staff assessed user-related software quality characteristics, while IT experts evaluated the system's technical quality attributes.The data collection instrument used was adapted from the software quality characteristics and sub-characteristics defined in ISO/IEC 25010:2011, as the standard provides a quality framework rather than a ready-made questionnaire. ISO 25010:2011 is a widely recognized international standard for software quality evaluation. This approach provides a structured framework for assessing and improving software quality based on recognized industry standards. A paper of (Manglapuz & Lacatan, 2019)(Estdale & Georgiadou, 2018)(Anggraini et al., 2019) consider ISO 25010:2011 as their research instrument because they believe it provides a comprehensive framework for evaluating software quality. The accomplished questionnaires were collected, checked for completeness, and prepared for statistical analysis.

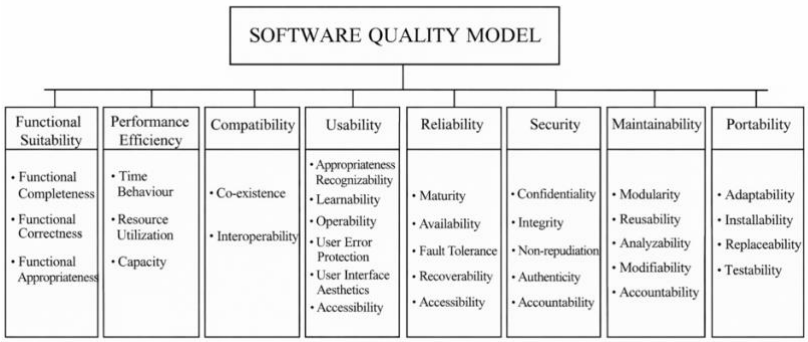

Figure 1
ISO 25010 Software Quality Model

Ethical considerations

Ethical standards were observed throughout the study. Permission to conduct the system evaluation was obtained from barangay officials prior to data collection. All participants were informed of the study's purpose and procedures, and their participation was voluntary. Informed consent was secured, and respondents were allowed to withdraw at any time without consequence. No personally identifiable information was collected, and all responses were treated with confidentiality. Data were used solely for academic purposes and reported in aggregated form to ensure anonymity and objectivity.

Analysis

The data collected from the testing and evaluation of the developed BMS were analyzed using descriptive statistical methods, specifically the mean percentage, to determine the system's level of effectiveness based on the ISO/IEC 25010:2011 Software Quality Model. The responses obtained from both barangay officials and staff

(end-users) and IT experts were encoded and analyzed using IBM SPSS Statistics version 25. The software was utilized to compute the total mean for each software quality characteristic and to consolidate the evaluation results from both respondent groups. The computed mean values were then interpreted using a five-point Likert scale, where the numerical results corresponded to descriptive indicators to determine the overall assessment of the software quality of the BMS.

Table 1
Likert Scale Method for BMS Evaluation

Rating	Mean Range	Interpretation
5	4.51–5.00	Outstanding
4	3.51–4.50	Very Satisfied
3	2.51–3.50	Satisfied
2	1.51–2.50	Poor
1	0–1.50	Unsatisfied

Note. Five-point Likert scale used in evaluating the effectiveness of the Barangay Management System.

Results and Discussion

The effectiveness of the developed BMS was evaluated using a five-point Likert scale grounded in the ISO/IEC 25010:2011 Software Quality Model. The evaluation focused on software quality characteristics relevant to the roles of the respondents. Specifically, end-users assessed user-oriented quality attributes, while IT experts evaluated technical software quality characteristics.

End-users, composed of barangay officials and staff, evaluated the BMS based on Functional Suitability, Usability, Reliability, and Performance Efficiency, as these attributes directly affect daily system use. The results revealed grand means of 4.17 for Functional Suitability, 4.07 for Performance Efficiency, 4.07 for Usability, and 4.05 for Reliability, resulting in an overall mean of 4.09, interpreted as Very Satisfied. The findings shown on Table 2 indicates that the system effectively supports barangay operations, is easy to use, performs efficiently, and operates reliably during actual transactions.

Table 2
Summary of Evaluation by the End-Users based on the Software Quality of BMS

Parameters	Mean	Interpretation
Functional Suitability	4.17	Very Satisfied
Performance Efficiency	4.07	Very Satisfied
Usability	4.07	Very Satisfied
Reliability	4.05	Very Satisfied
Grand Mean	4.09	Very Satisfied

Note. Evaluation conducted among barangay officials and staff using ISO/IEC 25010:2011 software quality model.

The results align with prior studies emphasizing that user experience, perceived usefulness, and satisfaction significantly influence system adoption and engagement in e-government platforms (Aleisa, 2024) (David et al., 2023). Evaluating functional suitability and usability provides insight into the advantages and limitations of the system from the user perspective, which is essential for ensuring system acceptance (Nuzula & Rochimah, 2023). On the other hand, IT experts evaluated the BMS based on Maintainability, Compatibility, and Security, which require specialized technical knowledge. The evaluation yielded grand means of 3.91 for Maintainability, 3.90 for Compatibility, and 3.98 for Security, with an overall mean of 3.96, also interpreted as Very Satisfied. These results indicate that the system demonstrates acceptable levels of modularity, interoperability, and data protection, which are critical for long-term system sustainability.

Table 3
Summary of Evaluation by IT Experts Based on Software Quality of BMS

Parameters	Mean	Interpretation
Maintainability	3.91	Very Satisfied
Compatibility	3.90	Very Satisfied
Security	3.98	Very Satisfied
Grand Mean	3.96	Very Satisfied

Note. Evaluation conducted by selected IT experts using ISO/IEC 25010:2011 software quality model.

These findings are consistent with research emphasizing the importance of ISO/IEC 25010 in evaluating software quality, particularly for assessing maintainability, compatibility, and security in organizational information systems (Peters & Aggrey, 2020) (Panduwiyasa et al., 2021). Technical evaluation prior to implementation helps reduce risks and ensures system reliability, performance, and compliance with quality standards. A comparison of end-user and IT expert results shows consistently positive assessments across all evaluated characteristics. End-users provided slightly higher ratings, reflecting their emphasis on operational benefits, ease of use, and perceived usefulness, whereas IT experts applied more conservative judgments based on technical standards. This divergence is expected, as expert evaluators typically adopt stricter criteria than end-users (Aleisa, 2024).

Despite these differences, both groups converged on a Very Satisfied rating, indicating that the BMS meets both operational and technical requirements. This dual validation strengthens the credibility of the results and supports the use of combined user- and expert-based evaluations for comprehensive software quality assessment (Peters & Aggrey, 2020) (Panduwiyasa et al., 2021). The evaluation confirms that the BMS effectively addresses the limitations of the barangay's manual processes, enhancing operational efficiency, usability, and data security. Positive feedback from end-users highlights the system's potential for adoption and long-term engagement, while favorable assessments from IT experts validate the technical quality and sustainability of the system. These findings reinforce the applicability of ISO/IEC 25010 as a robust framework for evaluating public-sector information systems and demonstrate that both functional and technical dimensions of software quality are essential for successful system implementation (Aleisa, 2024) (David et al., 2023) (Nuzula & Rochimah, 2023) (Peters & Aggrey, 2020) (Panduwiyasa et al., 2021).

Conclusion and Recommendations

This study evaluated the effectiveness of the BMS using the ISO/IEC 25010 software quality model and demonstrated that the system effectively supports barangay operations by improving efficiency, accuracy, and reliability over manual processes. The findings indicate high levels of user satisfaction in terms of functional suitability, usability, performance efficiency, and reliability, confirming that the system aligns well with operational needs and user workflows. Technical evaluation by IT experts further validated the system's maintainability, compatibility, and security, supporting its suitability for sustained deployment in a public-sector environment. However, minor variations in ratings between user groups suggest differences in technical expectations and digital proficiency, indicating areas where system optimization and user capacity-building may be necessary. Overall, the results show that the BMS addresses existing operational gaps and contributes positively to service delivery and information management. The study underscores the importance of combining technical quality with user adoption to maximize the impact of digital systems in local government setting.

While the developed BMS demonstrated strong performance across key software quality attributes, the findings indicate areas where further enhancements can increase inclusivity, sustainability, and long-term impact. Differences in evaluation between end-users and IT experts suggest the need for targeted user training and system refinements that account for varying levels of technical proficiency. Regular capacity-building activities, including hands-on training and simplified user guides, are recommended to improve adoption and effective system use among barangay personnel. To address technical limitations, future system development should focus on strengthening security controls, improving system scalability, and enhancing maintainability to support evolving administrative requirements. Periodic system audits and updates are recommended to ensure continued compliance with software quality standards and emerging cybersecurity risks. Collaboration with local government units, academic institutions, and technology partners is also encouraged to support infrastructure improvements, technical support, and system sustainability. Finally, future studies may expand the scope of evaluation by including additional barangays, longitudinal assessments, and integration with other government platforms to further validate system effectiveness and generalizability.

References

Akpan-Obong, P. I., Trinh, M. P., Ayo, C. K., & Oni, A. (2022). E-governance as good governance? Evidence from 15 West African countries. Information Technology for Development, 1–20. https://doi.org/10.1080/02681102.2022.2123770

Aleisa, N. (2024). Key factors influencing the e-government adoption: A systematic literature review. Journal of Innovative Digital Transformation, 1(1), 14–31. https://doi.org/10.1108/JIDT-09-2023-0016

Anggraini, N., Putra, M. J. D., & Hakiem, N. (2019). Development of an Islamic higher education institution tracer study information system and its performance analysis using ISO/IEC 25010. 2019 7th International Conference on Cyber and IT Service Management (CITSM), 1–6. https://doi.org/10.1109/CITSM47753.2019.8965356

Barroquillo, K. J., Bermudez, D. J., Busuego, C. J., Balagot, A. S., Manalang, M. A., & Villanueva, E. A. (2024, August). Optimizing Emergency Responses at Central Luzon State University through a Dual-Platform Alert System. In 2024 IEEE 6th Symposium on Computers & Informatics (ISCI) (pp. 152-157). IEEE. https://doi.org/10.1109/ISCI62787.2024.10668015

Bautista, M. T. T., Bolonos, A. K. B., Camba, U. J., De Guzman, L. M., Goh, M. L. I., Raguro, M. C. F., & Tolentino, L. S. (2023). BALANGAY: A web-based document request and incident reporting system with decision support for barangay

program development. In Intelligent sustainable systems: Selected papers of WorldS4 2022 (Vol. 2, pp. 127–136). Springer. https://doi.org/10.1007/978-981-19-7663-6_13

Carpio, C. O. (2020). Barangay management system. International Journal of Multidisciplinary Research and Publications, 3(2), 26–32.

David, A., Yigitcanlar, T., Li, R. Y. M., Corchado, J. M., Cheong, P. H., Mossberger, K., & Mehmood, R. (2023). Understanding local government digital technology adoption strategies: A PRISMA review. Sustainability, 15(12), 9645. https://doi.org/10.3390/su15129645

Estdale, J., & Georgiadou, E. (2018). Applying the ISO/IEC 25010 quality models to software product. Systems, Software and Services Process Improvement: 25th European Conference, EuroSPI 2018, 492–503. https://doi.org/10.1007/978-3-319-97925-0_42

Grigalashvili, V. (2022). E-government and e-governance: Various or multifarious concepts. International Journal of Scientific and Management Research, 5(1), 183–196. https://doi.org/10.37502/IJSMR.2022.5111

Libadia, M., Botangen, K. A., Lucero, P. J., & Tecson, J. (2025). Development of a Web-based records management system: an ERMS initiative for the Office of Senior Citizen Affairs in the Philippines. Records Management Journal, 35(2), 160-179. https://doi.org/10.1108/RMJ-06-2023-0031

Manglapuz, S. J. R., & Lacatan, L. L. (2019). Academic management android application for student performance analytics: A comprehensive evaluation using ISO 25010:2011. International Journal of Innovative Technology and Exploring Engineering, 8(12), 5085–5089. https://doi.org/10.35940/ijitee.L2735.1081219

Nuzula, M. I. F., & Rochimah, S. (2023). Evaluation of service quality in human resource information systems using ISO/IEC 25010. 2023 International Seminar on Application for Technology of Information and Communication (ISemantic), 215–220. https://doi.org/10.1109/iSemantic59612.2023.10295365

Panduwiyasa, H., Saputra, M., Azzahra, Z. F., & Aniko, A. R. (2021). Accounting and smart system: Functional evaluation of ISO/IEC 25010:2011 quality model (A case study). IOP Conference Series: Materials Science and Engineering, 1092(1), 012065. https://doi.org/10.1088/1757-899X/1092/1/012065

Peters, E., & Aggrey, G. K. (2020). An ISO 25010-based quality model for ERP systems. Advances in Science, Technology and Engineering Systems Journal, 5(2), 578–583. https://doi.org/10.25046/aj050272

Pulumbarit, J. P., & Suarez, J. K. G. (2017). Barangay office management system. International Journal of Mathematics & Computing, 2(1), 1–5.

Sarker, M. N. I., Wu, M., Liu, R., & Ma, C. (2019). Challenges and opportunities for information resource management for e-governance in Bangladesh. Proceedings of the Twelfth International Conference on Management Science and Engineering Management, 675–688. https://doi.org/10.1007/978-3-319-93351-1_53

Samuel Reign, O., & Centeno, C. J. (2024). Enhancing the Barangay Information System by Integrating Geolocation Technology and Tagalog Chatbot using NLP Algorithm for Efficient Community Engagement and Service. J. Electrical Systems, 20(5s), 1136-1149.