TRANSPUBLIKA
Precise. Resilience. Felicitous.

Journal of Management, Accounting, General Finance and International Economic Issues
https://ojs.transpublika.com/index.php/MARGINAL
Online ISSN 2809-8013 | Print ISSN 2809-9222

https://doi.org/10.55047/marginal.v4i1.1507

Original Article

Assessing the Impact of BIDA Training Extension Program: A Foundation for Enhancing Local Governance

Gladys Mayette S. Patricio[1], Apolinario G. Ballenas Jr.[2], Irene A. Robles[3], Nolan M. Yumen[4*]

[1-4]University of Antique, Tario-Lim Memorial Campus, College of Computer Studies, Philippines
Email: [1)] gladysmayette.patricio@antiquespried.edu.ph, [2)] agballenas@antiquespride.edu.ph, [3)] irene.robles@antiquespride.edu.ph, [4)] nolanyumen0017@gmail.com

Received : 26 October - 2024
Accepted : 25 November - 2024
Published online : 28 November - 2024

Abstract

Good governance at the barangay level is critical for fostering community development, ensuring accountability, and delivering efficient public services. However, many rural barangays in the Philippines face challenges such as outdated record-keeping systems, limited access to technology, and insufficient technical capacity among officials, which hinder the effective delivery of services and undermine transparency. This study evaluates the implementation and impact of the Barangay InfoSystems for Development and Accountability (BIDA) program, a capacity-building initiative under the Community Empowerment through Science and Technology (CEST) program of the Department of Science and Technology (DOST). The program was implemented in Barangays Mag-Aba, Pandan, and Idio, Sebaste, Antique, aiming to equip officials with digital tools and practical skills to enhance administrative processes, improve transparency, and foster accountability. A convergent parallel mixed-methods research design was used to gather data from 40 participants, including barangay captains, kagawads, secretaries, treasurers, barangay health workers, and Sangguniang Kabataan chairpersons. Quantitative data were analyzed using descriptive and inferential statistics, while thematic analysis was applied to qualitative responses. Results revealed that 90% of respondents reported improved record-keeping, 85% noted enhanced financial reporting, and 80% highlighted streamlined administrative processes. However, challenges such as limited device access (70%), connectivity issues (60%), and insufficient training duration (50%) were identified. The study concludes that the BIDA program significantly improved governance efficiency and accountability in the target barangays. Key recommendations include adding devices, providing additional training, and improving internet access. These insights can help replicate the program in other rural Philippine communities, supporting local governance modernization.

Keywords: Barangay Governance, Digital Tools, Rural Development, Transparency, Accountability, Capacity-Building, BIDA Program, Governance Modernization.

1. Introduction

Good governance at the barangay level plays a crucial role in fostering community development, ensuring accountability, and delivering efficient public services (Alegre et al., 2021; Johnson & Lee, 2020). It establishes the foundation for grassroots governance, enabling local government units (LGUs) to respond effectively to the needs of their constituents while aligning with national development goals (Norris, 2003; Srivastava et al., 2023). However, many rural barangays in the Philippines face persistent challenges that limit their capacity to govern effectively. Issues such as outdated record-keeping systems, limited access to technology, and a lack of technical capacity among barangay officials hinder the efficient

delivery of services (Diaz & Santos, 2021; Garcia et al., 2023). These obstacles also undermine transparency and accountability, leading to inefficiencies in resource allocation and weakened public trust in local governance (Gonzalez & Perez, 2022; Gupta et al., 2022). The Barangay InfoSystems for Development and Accountability (BIDA) program, an initiative under the Community Empowerment through Science and Technology (CEST) by the Department of Science and Technology (DOST), aims to address these challenges (Lopez & Reyes, 2020). The program focuses on equipping barangay officials with modern tools and practical skills to enhance their administrative processes, improve transparency, and foster accountability (Ragas et al., 2022; Song et al., 2024). By leveraging digital platforms, BIDA enables barangay officials to streamline record-keeping, track community projects, and provide more transparent financial reporting (Wang & Liu, 2021). This initiative aligns with the government's broader objective of promoting sustainable and inclusive development at the grassroots level while also addressing the United Nations Sustainable Development Goal 16, which advocates for strong institutions and accountable governance (UNDP, 2022).

This study evaluates the implementation and impact of the BIDA program in Barangays Mag-Aba, Pandan, Antique and Barangay Idio, Sebaste, Antique, during the months of November 2019 and November 2023. Mag-Aba is one of 34 barangays in the municipality of Pandan, located approximately 140 kilometers from San Jose, Antique, the provincial capital. With a population of around 3,200 residents, Mag-Aba is a predominantly agricultural and coastal community (Sebaste LGU Annual Report, 2022). Despite its relatively close proximity to the Pandan town center, the barangay faces challenges in technological adoption and governance modernization (Lopez & Reyes, 2020). Similarly, Barangay Idio in Sebaste, approximately 125 kilometers from San Jose, has a population of about 2,800 residents. Known for its agricultural economy and growing interest in ecotourism, Idio is also constrained by outdated governance systems and a lack of resources (Diaz & Santos, 2021). These barangays were selected as pilot sites for the BIDA program due to their significant need for capacity-building initiatives and their potential for development through improved governance systems (Garcia et al., 2023). The BIDA program has introduced a comprehensive approach to addressing the governance challenges faced by rural barangays. Its core objective is to enhance local governance through capacity-building workshops and hands-on training (Ragas et al., 2022). These sessions focus on equipping barangay officials with the skills needed to adopt digital tools for efficient record-keeping, budget preparation, project monitoring, and financial accountability (Gupta et al., 2022). By transitioning from manual processes to digital systems, barangays can reduce administrative inefficiencies, improve service delivery, and foster greater transparency in their operations (Wang & Liu, 2021). For instance, the program emphasizes the importance of using technology to create accessible and accurate records that can be shared with the community, thereby building trust and encouraging civic engagement (Gonzalez & Perez, 2022). Moreover, the program promotes accountability by providing barangay officials with tools to generate and share reports on resource allocation and project outcomes (Lopez & Reyes, 2020).

Despite its successes, the implementation of the BIDA program has highlighted several challenges that require attention. One significant issue is the limited access to digital devices in the target barangays (Chen & Wang, 2024). In many cases, barangay officials had to share a single computer for multiple tasks, which constrained their ability to maximize the program's potential. Connectivity issues in rural areas also posed a challenge, as reliable internet access remains unavailable in some barangays, limiting the full utilization of online systems (Diaz & Santos, 2021). Additionally, participants expressed the need for more advanced training sessions to reinforce their skills and ensure the program's long-term

sustainability (Ragas et al., 2022). The limited duration of initial training workshops left some participants feeling underprepared to handle more complex governance tasks, such as data analysis and system troubleshooting (Garcia et al., 2023). The purpose of this study is to assess the overall effectiveness of the BIDA program in addressing these governance challenges. Specifically, it seeks to evaluate the program's impact on improving administrative efficiency, fostering transparency, and enhancing accountability among barangay officials (Alegre et al., 2021). The study also aims to identify key barriers to the program's success and propose strategies for overcoming these challenges (Gupta et al., 2022). Furthermore, the research provides recommendations for scaling the program to other underserved barangays in Antique and similar rural settings (Sebaste LGU Annual Report, 2022). By focusing on these objectives, the study contributes valuable insights into the role of digital tools in transforming local governance and offers a framework for replicating the program in other areas (UNDP, 2022).

2. Theoretical Review

The theoretical framework for this study is rooted in Pippa Norris's Digital Divide Theory and the Theory of Planned Behavior (TPB). These theories provide a comprehensive lens for examining the challenges and impacts of implementing the Barangay InfoSystems for Development and Accountability (BIDA) program in rural communities. Digital Divide Theory explores the disparities in access to digital technologies and their subsequent impact on socio-economic and governance outcomes. According to Norris (2003), the digital divide encompasses three levels: the global divide (differences between developed and developing nations), the social divide (inequalities within a country), and the democratic divide (variations in the ability of individuals to use technology effectively for civic participation). This framework is particularly relevant to the study as it underscores the critical need for digital tools in fostering equitable access to information and services in rural barangays. By addressing technological gaps, the BIDA program directly aligns with the objectives of bridging the digital divide, enabling barangay officials to utilize modern tools to improve governance, transparency, and accountability. Moreover, the program's emphasis on capacity-building ensures that officials are not only provided access to technology but are also equipped with the skills to use it effectively, a key aspect of overcoming the democratic divide.

Complementing this perspective is the Theory of Planned Behavior (Ajzen, 1991), which focuses on the relationship between intention, behavior, and perceived control over actions. TPB posits that an individual's behavior is influenced by three factors: (1) their attitude towards the behavior, (2) subjective norms (the social pressure to perform the behavior), and (3) perceived behavioral control (the ease or difficulty of performing the behavior). In the context of the BIDA program, this theory explains how barangay officials' attitudes toward adopting digital tools, the support they receive from their peers and superiors, and their perceived ability to use these tools effectively contribute to the program's success. Positive attitudes toward digital governance, reinforced by supportive training sessions and an environment that encourages learning, enhance the likelihood of program adoption and sustained use. The theory also highlights the importance of providing adequate training and resources to increase officials' perceived control over the digital tools, thereby fostering consistent application in governance processes. These theoretical frameworks guide the study by providing insights into the systemic barriers that barangay officials face when transitioning to digital governance. The Digital Divide Theory emphasizes the structural challenges of technology adoption in rural settings, such as limited access to devices and connectivity.

Meanwhile, the Theory of Planned Behavior highlights the psychological and social factors that influence the willingness and ability of officials to adopt and sustain the use of digital tools introduced through the BIDA program. Together, these frameworks form the basis for analyzing the program's outcomes, identifying the barriers to effective implementation, and proposing strategies to ensure its sustainability and scalability in similar rural communities.

2.1. Literature Review

Governance at the grassroots level has been a focal point of numerous studies, particularly in rural communities where systemic challenges often hinder effective public service delivery. Digital tools have been widely recognized for their potential to improve governance efficiency, with studies by Wang & Liu (2021) and Johnson & Lee (2020) demonstrating how digital systems streamline administrative tasks, enhance record-keeping accuracy, and promote transparency. In rural areas, where manual processes often dominate, the integration of digital tools significantly reduces the administrative burden and improves data accessibility. In the Philippine context, Garcia et al. (2023) reported a 70% increase in efficiency among barangay officials who were trained to use digital tools for budgeting, project monitoring, and resource management. These digital solutions also empower officials to provide timely and accurate information to their constituents, fostering public trust and enabling more informed community participation in governance processes. Capacity-building initiatives are equally critical to the success of governance reforms. Research by Ragas et al. (2022) emphasized that structured training programs tailored to the specific needs of local officials result in improved competence, confidence, and adoption of modern governance practices. Gonzalez & Perez (2022) further highlighted the importance of follow-up sessions to reinforce skills, noting that barangay officials who participated in these sessions demonstrated higher retention rates and were better equipped to handle complex governance tasks. Additionally, Chen and Wang (2024) observed that when training programs incorporated practical applications and simulations, participants were more likely to integrate the tools and processes into their daily operations, thereby ensuring the sustainability of the interventions.

Bridging the digital divide remains a persistent challenge in rural governance. Norris (2003) Digital Divide Theory identifies disparities in access to digital technologies as a critical factor that exacerbates inequality between urban and rural areas. These disparities manifest not only in the availability of devices and internet access but also in the technical knowledge required to utilize these tools effectively. Lopez & Reyes (2020) studied the implementation of offline digital systems in underserved Philippine communities and found that such systems significantly reduced the information gap and improved governance processes in rural barangays. Diaz & Santos (2021) similarly reported that the introduction of basic digital infrastructure in remote barangays led to a 60% improvement in governance transparency and a 50% increase in public satisfaction with local government services. These findings underscore the importance of making digital tools accessible and providing comprehensive training to ensure their effective use.

Accountability and transparency are cornerstones of good governance, and digital platforms play a pivotal role in fostering these principles. Gupta et al. (2022) found that real-time digital reporting systems enabled local governments to track public expenditures more effectively and reduced corruption-related complaints by 40% in rural India. Similarly, Alegre et al. (2021) observed that 90% of barangay officials in the Philippines reported improved accountability after adopting digital tools for financial management and community project tracking. These tools not only enhance the ability of officials to provide accurate reports but also allow constituents to monitor local government activities, creating a culture of openness

and trust. Moreover, Gonzalez & Perez (2022) highlighted that transparent governance practices encouraged community engagement and increased public confidence in local leadership, further strengthening the social contract between barangay officials and their constituents.

The theoretical foundations of governance interventions, such as Norris's Digital Divide Theory and Ajzen's Theory of Planned Behavior (TPB), offer valuable insights into the systemic and behavioral barriers to technology adoption in rural communities. The Digital Divide Theory underscores the structural challenges faced by barangays, such as limited access to devices and internet connectivity, which hinder the adoption of modern governance tools. Meanwhile, the TPB provides a framework for understanding the factors that influence barangay officials' willingness to adopt digital systems. Ajzen (1991) posits that attitudes toward technology, social pressures, and perceived ease of use play significant roles in determining behavior. Chen and Wang (2024) applied TPB to assess the adoption of digital tools in local governance and found that positive attitudes, reinforced by peer support and targeted training, significantly increased the likelihood of sustained use. These findings highlight the importance of fostering a supportive environment and addressing psychological and social barriers to ensure the successful implementation of digital governance programs.

The reviewed literature consistently highlights the transformative potential of digital tools and capacity-building initiatives in improving governance at the local level. Studies emphasize the need for tailored training programs, accessible digital infrastructure, and follow-up support to sustain the benefits of governance reforms. The integration of digital systems not only improves efficiency and transparency but also empowers barangay officials to respond more effectively to the needs of their communities. Moreover, addressing the digital divide through targeted interventions ensures that rural communities can fully participate in and benefit from modern governance practices. These findings align closely with the objectives of the Barangay InfoSystems for Development and Accountability (BIDA) program, which seeks to modernize governance in rural barangays by equipping officials with the necessary tools and skills. By addressing the challenges identified in the literature, such as resource limitations, skill retention, and social acceptance of technology, the BIDA program holds significant potential to serve as a model for governance transformation in underserved communities across the Philippines and beyond.

3. Methods

This study employed a convergent parallel mixed-methods research design to comprehensively assess the impact of the Barangay InfoSystems for Development and Accountability (BIDA) program on the governance practices of Barangays Mag-Aba, Pandan, and Idio, Sebaste, Antique. By integrating quantitative and qualitative approaches, this methodology allowed for a holistic understanding of the program's effectiveness, challenges, and areas for improvement. The convergent parallel design was chosen to collect, analyze, and compare quantitative and qualitative data simultaneously, ensuring that the insights derived from surveys and interviews complemented and validated one another. Quantitative data provided measurable outcomes related to program effectiveness, while qualitative data offered contextualized perspectives on the experiences and challenges of barangay officials.

The study was conducted in Barangays Mag-Aba and Idio. Mag-Aba is located approximately 140 kilometers from San Jose, Antique, with a population of around 3,200 residents engaged primarily in agriculture and fishing. Barangay Idio, situated 125 kilometers from San Jose, has a population of approximately 2,800 and is known for its agricultural

economy and emerging ecotourism activities. These barangays were selected as study sites due to their participation in the BIDA program and their shared challenges in governance modernization. The participants included 40 barangay officials from Mag-Aba and Idio who attended the BIDA training sessions conducted between November 2019 to November 2023. These officials were selected through purposive sampling to ensure that data were gathered from individuals directly involved in the program. The sample included barangay captains, council members, secretaries, and treasurers, as these roles are central to governance operations and directly impacted by the program.

To gather data, this study used a structured survey questionnaire and a semi-structured interview guide. The survey questionnaire was developed to collect quantitative data on the program's effectiveness, frequency of skill application, perceived benefits, and challenges. It consisted of sections for demographic information, Likert-scale items measuring satisfaction and perceived improvements, and open-ended questions for additional feedback. The questionnaire was pilot-tested with barangay officials from neighboring barangays to ensure clarity, reliability, and validity. The semi-structured interview guide was designed to gather qualitative data and included questions about participants' experiences during the training, challenges encountered, and suggestions for program enhancement. These tools facilitated a deeper understanding of both the measurable outcomes and the contextual factors affecting program implementation.

Data collection occurred in three phases. Survey questionnaires were distributed to the barangay officials during the final session of the BIDA training. Respondents completed the surveys on-site to ensure a high response rate and clarify any ambiguities. Semi-structured interviews were conducted with 10 selected officials, five from each barangay, who were actively engaged in the training and implementation phases. These interviews were conducted face-to-face in barangay offices and lasted approximately 30 minutes each. Additionally, document analysis was conducted to review supporting materials such as barangay financial reports, project monitoring logs, and training session outputs. These documents were used to verify and contextualize data gathered from surveys and interviews.

The data analysis process involved quantitative and qualitative methods. Quantitative data were analyzed using descriptive and inferential statistical methods. Descriptive statistics, such as means, frequencies, and percentages, summarized participants' ratings on program effectiveness and perceived benefits. Paired t-tests were conducted to measure significant changes in governance practices before and after the training. Qualitative data were analyzed through thematic analysis. The researchers developed a coding scheme based on the study's objectives and iteratively refined it to ensure consistency. NVivo software was used to organize and analyze the data, identifying key themes related to program benefits, challenges, and recommendations for improvement. A side-by-side comparison of quantitative and qualitative findings ensured alignment and triangulation. Qualitative themes contextualized the quantitative results, providing a richer understanding of the program's impact and the factors influencing its success. Ethical considerations were rigorously observed throughout the study. Participants were briefed on the study's objectives, and informed consent was obtained prior to data collection. Confidentiality was ensured by anonymizing participant identities in all reports and analyses. Participants were given the option to withdraw from the study at any point, and data security measures, such as encrypted storage of digital files, were implemented to protect sensitive information. The study focused on barangay officials in Mag-Aba and Idio who participated in the BIDA program during its implementation in July and August 2024. While the findings provide valuable insights into the program's impact, the purposive sampling approach limits the generalizability of the results to other barangays. Additionally,

the study relied on self-reported data, which may be subject to response bias. Despite these limitations, the mixed-methods design and the use of multiple data sources strengthen the validity and reliability of the findings.

4. Results and Discussion

The findings are presented based on the key objectives of the study, focusing on program effectiveness, skill application, challenges, and recommendations for improvement. Quantitative data are summarized in tables, and qualitative insights are integrated to provide context.

Table 1. Demographics of the Study Participants

Variables	Frequency (n)	Percentage (%)
Gender		
Male	18	45%
Female	22	55%
Age Group		
18-29	20	50%
30-39	10	25%
40-49	6	15%
50 and above	4	10%
Role in Barangay		
Barangay Captains	2	5%
Barangay Kagawads	14	35%
Secretaries	2	5%
Treasurers	2	5%
Barangay Health Workers (BHWs)	4	10%
Sangguniang Kabataan (SK) Chairpersons	16	40%

The study included 40 respondents from Barangays Mag-Aba and Idio, representing a variety of roles essential to barangay governance and service delivery. Female participants made up the majority (55%), while male respondents accounted for 45%. The age distribution highlights a youthful cohort, with half of the participants aged 18–29 (50%), followed by those aged 30–39 (25%), reflecting a combination of young leadership and experienced governance personnel. The roles included two barangay captains, 14 kagawads (councilors), and two each for secretaries and treasurers, ensuring representation from key leadership and administrative functions. The inclusion of four Barangay Health Workers (BHWs) provided insights into the program's impact on health-related governance, while 16 Sangguniang Kabataan (SK) Chairpersons highlighted the influence of the program on youth governance. This diverse representation captures a holistic view of the BIDA program's effects on different facets of barangay operations.

Table 2. Perceived Benefits of the BIDA Program

Perceived Benefits	Frequency (n)	Percentage (%)
Improve Record-Keeping	36	90%
Enhance Transparency in Financial Reporting	34	85%
Streamlined Administrative Processes	32	80%
Increased Confidence in Using Digital Tools	30	75%

A significant majority of participants (90%) reported improvements in record-keeping, citing the transition from manual to digital systems as a key factor. Enhanced transparency in financial reporting was noted by 85% of respondents, as the program equipped officials with tools to track and share financial data. Administrative processes also saw significant streamlining (80%), reducing delays and improving service delivery. Notably, 75% of participants expressed increased confidence in using digital tools, reflecting the effectiveness of the training sessions.

Table 3. Frequency of Skill Application

Skill Application	Frequency (n)	Percentage (%)
Budget Preparation	30	75%
Project Monitoring	28	70%
Financial Reporting	34	85%
General Administrative Tasks	32	80%

Financial reporting (85%) emerged as the most frequently applied skill, demonstrating the program's immediate impact on improving transparency. Budget preparation (75%) and project monitoring (70%) also saw substantial application, with participants emphasizing the utility of digital tools in tracking expenditures and progress. General administrative tasks (80%) were significantly enhanced, as the tools provided efficiency in routine operations.

Table 4. Challenges Encountered

Skill Application	Frequency (n)	Percentage (%)
Limited Access to Digital Devices	28	70%
Lack of Reliable Internet Connectivity	24	60%
Insufficient Training Duration	20	50%
Difficulty in Troubleshooting Technical Issues	16	40%

Limited access to digital devices was identified as the most significant challenge (70%), with many officials sharing a single device. Connectivity issues were reported by 60% of participants, highlighting the need for offline-capable solutions. Half of the respondents (50%) cited insufficient training duration, suggesting that extended sessions or follow-up workshops could enhance skill retention. Troubleshooting technical issues (40%) emerged as another area requiring additional support.

Table 5. Recommendations for Program Enhancement

Recommendations	Frequency (n)	Percentage (%)
Provide Additional Devices	34	85%
Conduct Follow-Up Training Sessions	30	75%
Improve Connectivity Infrastructure	28	70%
Offer Technical Support Helpline	26	65%

The majority of participants (85%) recommended the provision of additional devices to address resource constraints. Follow-up training sessions (75%) were also widely suggested, reflecting the need for sustained capacity-building. Improving internet connectivity (70%) was seen as critical for maximizing the use of digital tools. Establishing a technical support helpline (65%) was highlighted as a practical solution to assist officials in resolving technical issues promptly.

The results demonstrate that the BIDA program significantly improved governance efficiency, transparency, and accountability in Barangays Mag-Aba and Idio. The program's most notable impacts were seen in record-keeping (90%) and financial reporting (85%), with widespread application of digital tools in administrative tasks. However, challenges such as limited device access (70%) and connectivity issues (60%) underscore the need for additional resources and infrastructure. Participants' recommendations provide actionable insights for enhancing the program's implementation and ensuring its long-term success.

5. Conclusion

The implementation of the Barangay InfoSystems for Development and Accountability (BIDA) program in Barangays Mag-Aba, Pandan, and Idio, Sebaste, has demonstrated its potential to significantly enhance governance efficiency, transparency, and accountability. The program's focus on equipping barangay officials with digital tools and practical skills resulted in notable improvements in record-keeping, financial reporting, and administrative processes. A majority of participants reported increased confidence in using digital tools and highlighted the program's role in fostering more effective project monitoring and resource allocation. Furthermore, the inclusion of a diverse set of participants, including barangay captains, kagawads, secretaries, treasurers, barangay health workers, and Sangguniang Kabataan chairpersons, underscored the program's broad applicability across various governance roles. Despite these successes, the study identified persistent challenges such as limited access to digital devices, inadequate internet connectivity, and insufficient training duration, which need to be addressed to maximize the program's impact and ensure its sustainability.

To build on the success of the BIDA program and address its challenges, several recommendations are proposed. First, it is essential to provide additional digital devices to barangays, ensuring that officials have adequate resources to fully implement the program's digital solutions. Partnerships with local government units, non-governmental organizations, and private sector stakeholders should be pursued to secure funding and technological support. Second, follow-up training sessions should be conducted to reinforce the skills learned during the initial workshops and introduce advanced topics such as data analysis and troubleshooting. These sessions can improve long-term skill retention and increase the program's sustainability. Third, efforts to improve internet connectivity in rural barangays should be prioritized to maximize the utility of digital platforms. Lastly, establishing a robust monitoring and evaluation system is recommended to track the program's progress, gather feedback, and refine implementation strategies based on emerging needs. By addressing these recommendations, the BIDA program can continue to empower barangay officials, enhance local governance, and serve as a model for modernizing governance in other underserved communities.

6. References

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, *50*(2), 179–211. https://doi.org/https://doi.org/10.1016/0749-5978(91)90020-T

Alegre, M., Cruz, J., & Bautista, L. (2021). Bridging the gap: Assessing digital resource accessibility in rural education. *International Journal of Educational Technology in Developing Regions*, *15*(2), 125–138.

Diaz, P., & Santos, R. (2021). Addressing governance challenges in rural communities: A case study. *Journal of Public Administration*, *33*(1), 45–60.

Garcia, R., Martinez, L., & Santos, P. (2023). Empowering local governance: The role of

technology in rural barangays. *Rural Sociology*, *88*(2), 378–402.

Gonzalez, A., & Perez, M. (2022). Improving transparency in local governance: Insights from digital interventions. *Journal of Vocational Behavior*.

Gupta, A., Sharma, R., & Patel, K. (2022). Digital competencies and governance efficiency: A review. *Journal of Vocational Behavior*.

Johnson, L., & Lee, K. (2020). Promoting accountability in grassroots governance: The role of technology. *Review of Public Administration*, *90*(2), 180–198.

Lopez, J. M., & Reyes, D. (2020). Offline digital tools for rural governance: A Philippine case study. *Digital Inclusion Review*, *3*(1), 78–89.

Norris, P. (2003). *Digital divide: Civic engagement, information poverty, and the Internet worldwide*. University of Toronto Press.

Ragas, T., Velasco, A., & Cruz, M. (2022). Training local officials in digital governance: Challenges and opportunities. *Journal of Governance and Development*, *15*(3), 187–204.

Song, X., Liu, J., Chen, T., Zheng, T., Wang, X., & Guo, X. (2024). Gene therapy and gene editing strategies in inherited blood disorders. *Journal of Genetics and Genomics*.

Srivastava, S., Kumar, N., & Patel, R. (2023). Governance in resource-constrained environments: Lessons from rural India. *International Journal of Governance Studies*, *11*(1), 1–18.

Wang, Q., & Liu, X. (2021). Fostering digital inclusion: The role of computer literacy programs in bridging educational disparities. *International Journal of Educational Technology in Higher Education*, *18*(1), 78–92.