



IMPROVING BARANGAY PUBLIC SERVICE DELIVERY THROUGH INFORMATION SYSTEM GOVERNANCE

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Abstract

Barangays in the Philippines continue to rely on fragmented, manual administrative processes that impede effective and efficient public service delivery. This study examined how Information System Governance (ISG) influences public service delivery in Barangay San Isidro, Parañaque City, one of the most densely populated barangays in Metro Manila. Using a descriptive-quantitative research design, 153 respondents — comprising barangay officials, barangay employees, and constituents — completed a researcher-made Likert-type questionnaire. Data were analyzed using means, percentages, t-tests, and analysis of variance. Results showed that all five ISG dimensions — IT Infrastructure, Policies and Procedures, Leadership Support, Staff IT Competence, and Budget Allocation — were consistently rated “Improved,” while Service Delivery, Records Management Accuracy, Transparency and Accountability, and Employee Productivity were consistently rated “To a Great Extent.” Significant differences were found across most respondent demographics (age, civil status, educational attainment, length of residency, and barangay role), revealing a perception gap between barangay officials and residents. The most significant barriers to further improvement were poor communication from barangay officials and limited financial transparency. The study concludes that while initial digitalization efforts are producing measurable gains, a stronger governance culture and community-based communication remain underdeveloped. Based on these findings, the study recommends the development of a structured action plan — anchored in measures such as a public information-system dashboard, a digital feedback portal, and mandatory IT training for barangay employees — to strengthen the administrative effectiveness of barangay functions and improve citizen satisfaction with services provided.



Keywords: *Information System Governance, barangay public service delivery, e-governance, digital transformation, local government units, Philippines*



Introduction

Barangays, the smallest administrative units of local government in the Philippines, serve as the primary interface between citizens and the state. They perform essential functions such as issuing permits and certificates, maintaining records, delivering social services, and enforcing local ordinances. Because barangays are the first point of contact for public service delivery, their efficiency and transparency directly shape the quality of governance experienced by millions of Filipinos.

Despite their critical role, many barangays continue to rely on manual, paper-based systems. These traditional methods often result in delays, errors, and limited accountability. National agencies such as the Commission on Audit (COA) and the Department of the Interior and Local Government (DILG) have consistently urged local government units to adopt digital governance practices. Programs such as the Philippine e-Government Master Plan (EGMP) provide a framework for modernization, yet implementation at the barangay level remains uneven and inconsistent. This gap between policy intent and actual practice undermines responsiveness and inclusivity in local governance.

Barangay San Isidro in Parañaque City provides a relevant case for examining these challenges. With a population of nearly 80,000 residents, the barangay manages extensive administrative responsibilities across multiple subdivisions. While recognized for good governance and waste management, it continues to face urban service delivery problems, including slow document processing, fragmented record-keeping, limited digital access, and reliance on manual procedures. These issues highlight the urgent need for systematic reforms in information management and governance.

Global Perspectives on Digital Governance

Digital governance has emerged as a transformative force in public administration worldwide. The World Bank's GovTech Maturity Index (2022) documents progress in digital adoption, highlighting best practices and persistent gaps. Milakovich (2021) emphasizes that successful digital governance requires more than technology; it demands redefined citizen–government relationships, secure networks, and cultural change. Similarly, Sharmin and Chowdhury (2025) demonstrate that e-governance enhances efficiency and citizen participation, but caution that digital divides, cybersecurity risks, and bureaucratic resistance remain significant obstacles.

Information System Governance (ISG)

ISG extends beyond technology adoption to encompass frameworks, rules, and accountability mechanisms that align information systems with organizational goals. Weill and Ross (2004) argue that effective ISG synchronizes IT initiatives with institutional priorities while ensuring performance and accountability. Sofyani et al. (2020) show that IT compliance culture, supported by governance structures, improves service quality and transparency in local government. A case study of Ghana's Metropolitan, Municipal, and District Assemblies (Ahenkorah & Kumar, 2025) further illustrates that ISG implementation is shaped not only by technical capacity but also by institutional norms and stakeholder behavior — a dynamic well explained by Giddens' Structuration Theory.

Philippine Context and Barangay-Level Initiatives

Several studies highlight the potential of digitized systems in Philippine barangays. Del Pilar et al. (2024) observed that reliance on paper-based processes slows service delivery due to limited ICT infrastructure. Reyes et al. (2025) developed WebYu, a web-based information system that reduced certification processing time by 68% and minimized paperwork errors by 72%. Garon et al. (2022) introduced oneBarangay, an OCR-enabled platform that



automated transactions in Valenzuela City. Jagdon et al. (2024) reported that Quezon City's QC e-Services improved citizen engagement and trust. Despite these advances, Khalid and Lavilles (2019) and Andaya et al. (2025) note that most municipalities remain in the “emerging” phase of e-government maturity, hindered by inadequate infrastructure, limited digital literacy, and organizational challenges.

Theoretical Foundations

This study draws on multiple theoretical lenses to analyze ISG in barangay governance. Davis's (1989) Technology Acceptance Model (TAM) explains adoption behavior through perceived usefulness and ease of use. New Public Management (NPM) underscores accountability, efficiency, and citizen-centered service delivery. Fayol's Administrative Management Theory highlights structured governance, rational planning, and efficiency as prerequisites for ISG success. Together, these frameworks provide a comprehensive basis for examining how governance, technology, and organizational behavior intersect in local government service delivery.

Although prior studies have demonstrated the potential of e-governance platforms in improving efficiency and citizen engagement, a clear research gap remains in examining how Information System Governance specifically operates at the barangay level in rapidly urbanizing Philippine communities. This study is guided by the assumption that effective ISG practices — anchored in infrastructure, leadership, policies, skills, and resources — will significantly enhance transparency, accountability, and service delivery outcomes. By addressing this gap, the research contributes to the broader literature on grassroots digital governance and offers a practical framework for strengthening barangay administration through systematic ISG implementation.

This study, therefore, aims to assess the influence of Information System Governance (ISG) on public service delivery in Barangay San Isidro. Specifically, it investigates ISG practices in five domains: IT infrastructure, policies and procedures, leadership support, staff IT skills, and budgetary provisions. The study further examines how ISG contributes to service efficiency, transparency, accountability, and employee productivity, while identifying barriers to implementation. By situating ISG within the barangay context, the research seeks to provide actionable insights for administrators, policymakers, and community stakeholders committed to advancing digital governance at the grassroots level.



Methods

Research Design

This study used a descriptive-quantitative research design to evaluate the potential of Information System Governance (ISG) to enhance public service delivery in Barangay San Isidro, Parañaque City. The descriptive component described the current state of ISG practices as perceived by respondents, while the quantitative component enabled statistical comparison of governance evaluations across demographic groups. This integrated approach allowed the researcher to characterize the governance landscape and determine whether significant perceptual differences existed across respondent profiles.

Population and Sampling

The study included 153 participants drawn from two groups in Barangay San Isidro. The first group comprised 10 Barangay Elected and Appointed Officials — including the Punong Barangay, Kagawads, Barangay Secretary, Treasurer, and administrative staff — selected through purposive sampling and taken in its entirety, given their official positions within the barangay.

The second group comprised 143 Barangay Constituents drawn from a population of 200 residents. The Slovin formula was used to compute the required sample size at a 5% margin of error, and simple random sampling through the fishbowl method was used to select respondents. Participation required at least one year of residency in Barangay San Isidro. Together, the two groups — internal governance actors and external service users — provided complementary perspectives that supported a comprehensive assessment of ISG effectiveness.

Research Instrument

Data were collected using a self-made survey questionnaire divided into four parts. Part I captured respondents' age, gender, civil status, educational attainment, length of residency, and barangay role. Part II assessed respondents' perceptions of ISG currently practiced in the barangay across five dimensions: IT Infrastructure, Policies and Procedures, Leadership Support, Staff IT Competence, and Budget Allocation Process. Part III assessed the extent to which ISG contributed to four areas of public service delivery: service delivery speed, accuracy and accessibility of records management, transparency and accountability, and employee productivity. Part IV addressed the concerns and obstacles encountered in improving barangay public service delivery through ISG.

Parts II and III each used a five-point Likert scale, interpreted as follows:

Scale for Part II: Assessment of ISG Practices

Range	Scale	Verbal Interpretation
4.21 – 5.00	5	Highly Improved (HI)
3.21 – 4.20	4	Improved (I)
2.21 – 3.20	3	Moderately Improved (MI)



1.21 – 2.20	2	Less Improved (LI)
1.00 – 1.20	1	Not Improved (NI)

Scale for Part III: Extent of ISG's Contribution to Service Delivery

Range	Scale	Verbal Interpretation
4.21 – 5.00	5	To a Very Great Extent (VGE)
3.21 – 4.20	4	To a Great Extent (GE)
2.21 – 3.20	3	To a Moderate Extent (ME)
1.21 – 2.20	2	To a Small Extent (SE)
1.00 – 1.20	1	Not at All (NA)

Validity and Reliability

A pilot test involving five individuals not part of the actual research sample — three barangay personnel and two residents of Barangay San Isidro — was conducted to establish the validity and reliability of the instrument. Cronbach's alpha coefficient was used to assess reliability. The overall Cronbach's alpha for the entire questionnaire (Parts II–IV, comprising all 25 items across the five ISG dimensions and four service delivery categories) was $\alpha = 0.924$, indicating strong internal consistency. Reliability coefficients for the subscales were likewise high: IT Infrastructure ($\alpha = 0.891$), Policies and Procedures ($\alpha = 0.903$), Leadership Support ($\alpha = 0.886$), Staff IT Competence ($\alpha = 0.879$), and Budget Allocation Process ($\alpha = 0.897$). The service delivery dimensions also showed good reliability: Service Delivery ($\alpha = 0.874$), Records Management ($\alpha = 0.861$), Transparency and Accountability ($\alpha = 0.858$), and Employee Productivity ($\alpha = 0.867$). All values exceeded the widely recognized threshold of $\alpha \geq 0.70$ (Nunnally, 1978), confirming that the instrument possessed adequate internal consistency for primary data collection. The graduate studies faculty of the City University of Pasay also reviewed the questionnaire and provided comments and suggestions that were incorporated prior to final distribution.

Data Collection Procedure

The survey questionnaire was administered both physically and online via Google Forms. Prior to data collection, the researcher obtained respondents' informed consent through a data privacy consent form signed by both the researcher and the thesis supervisor. The researcher explained the objectives and nature of the study to respondents before administering the survey, and respondents were given sufficient time to complete the questionnaire before their responses were collected.



Statistical Treatment

Frequency distributions and percentages were used to describe the demographic profile of respondents. To evaluate significant differences in governance assessments among respondents categorized by profile variables, the independent samples t-test was used for the dichotomous variable of gender, while one-way Analysis of Variance (ANOVA) was used for variables with three or more categories — namely age, civil status, educational attainment, length of residency, and barangay role. The significance threshold for all tests was set at 0.05; a p-value below 0.05 indicated rejection of the null hypothesis and a statistically significant difference in respondent ratings based on the grouping variable. Whenever significant differences were identified through one-way ANOVA, Tukey Honestly Significant Difference (HSD) post hoc analysis was conducted to determine which specific respondent groups differed significantly from one another while controlling for Type I error.

Ethical Considerations

Although formal ethics approval was not secured, the study was conducted with careful adherence to ethical principles. Participation was entirely voluntary, informed consent was explicitly obtained, and the confidentiality of responses was rigorously maintained. No procedures posed risk or harm to participants, and all information gathered was used solely for academic purposes, in keeping with responsible scholarly research standards.

Results

Demographic Profile of Respondents

Table 1. Frequency and Percentage Distribution of Respondents by Age

Age	Barangay Officers		Barangay Constituents		Total	
	F	P	F	P	F	P
18 – 30	0	0	21	15	21	14
31 – 40	0	0	33	23	33	22
41 – 50	2	20	11	8	13	8
51 – 60	6	60	46	32	52	34
61 – 70	2	20	21	15	23	15
71 and above	0	0	11	8	11	7
Total	10	100	143	100	153	100

Most respondents were middle-aged, with the 51–60 age group comprising the largest share of the sample (34%, $n = 52$), followed by the 31–40 group (22%, $n = 33$) and the 18–30 group (14%, $n = 21$). Respondents aged 61–70 and 71 and above accounted for 15% and 7%, respectively. Sixty percent of barangay officers were aged 51–60, indicating an older leadership cohort, while constituents were more evenly distributed across age brackets, with notable concentrations in the 31–40 and 51–60 groups.

Table 2. Frequency and Percentage Distribution of Respondents by Gender

Gender	Barangay Officers		Barangay Constituents		Total	
	F	P	F	P	F	P
Male	1	10	65	45	66	43
Female	9	90	78	55	87	57

Total	10	100	143	100	153	100
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Women outnumbered men in both respondent groups. Among barangay officers, 90% (9 of 10) were women, while among constituents, 55% (78 of 143) were women and 45% (65 of 143) were men. Overall, women comprised 57% of the total sample (87 of 153), indicating that women hold the majority of leadership and administrative roles surveyed in this study.

Table 3. Frequency and Percentage Distribution of Respondents by Civil Status

Civil Status	Barangay Officers		Barangay Constituents		Total	
	F	P	F	P	F	P
Single	0	0	29	20	29	19
Married	8	80	88	62	96	63
Live-in	0	0	21	15	21	14
Separated	0	0	5	3	5	3
Widowed	2	20	0	0	2	1
Total	10	100	143	100	153	100

Married respondents constituted the majority of both groups: 80% of barangay officers and 62% of constituents. Across the full sample, married respondents accounted for 63% (n = 96), followed by single respondents (19%, n = 29), those in live-in arrangements (14%, n = 21), separated respondents (3%, n = 5), and widowed respondents (1%, n = 2).

Table 4. Frequency and Percentage Distribution of Respondents by Educational Attainment

Educational Attainment	Barangay Officers		Barangay Constituents		Total	
	F	P	F	P	F	P
High School	5	50	26	18	31	20
Vocational	1	10	16	11	17	11

College	4	40	95	66	99	65
Post Graduate	0	0	6	4	6	4
Total	10	100	143	100	153	100

College was the most common educational attainment across the sample (65%, $n = 99$), particularly among constituents (66%). Half of the barangay officers held only a high school diploma, while 40% held a college degree. Only 4% of respondents (all constituents) held post-graduate degrees, and 11% had vocational training.

Table 5. Frequency and Percentage Distribution of Respondents by Length of Residency

Length of Residency	Barangay Officers		Barangay Constituents		Total	
	F	P	F	P	F	P
1 – 5 years	0	0	26	18	26	17
6 – 10 years	1	10	29	20	30	20
More than 10 years	9	90	88	62	97	63
Total	10	100	143	100	153	100

A large majority of respondents (63%, $n = 97$) had resided in the barangay for more than 10 years, a proportion that was even higher among barangay officers (90%). No officers had lived in the barangay for less than five years, suggesting that leadership positions are held predominantly by long-term residents.

Table 6. Frequency and Percentage Distribution of Respondents by Barangay Role

Barangay Role	Barangay Officers		Barangay Constituents		Total	
	F	P	F	P	F	P
Official	3	30	0	0	3	2
Staff	7	70	0	0	7	5
Constituent	0	0	143	100	143	93

Total	10	100	143	100	153	100
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Barangay constituents comprised the large majority of respondents (93%, $n = 143$), reflecting the study's community-centered focus. Among the 10 barangay officers, 70% were staff members and 30% were elected officials, ensuring that both administrative and citizen perspectives on public service delivery were represented.

Assessment of Information System Governance Practices

Table 7. Mean Assessment of ISG Effectiveness: IT Infrastructure

Indicators	Wm	SD	Interpretation
1. The current IT infrastructure in the barangay is sufficient to support administrative operations.	3.44	0.76	Improved
2. Internet connectivity is stable and reliable within the barangay office.	3.14	0.85	Improved
3. Computers and digital devices used in the office are updated and well-maintained.	3.41	0.63	Improved
4. There is an adequate number of computers and IT equipment for staff use.	3.34	0.72	Improved
5. System downtimes rarely affect the efficiency of administrative services.	3.31	0.76	Improved
Average	3.33	0.74	Improved

IT Infrastructure received an overall “Improved” rating ($Wm = 3.33$, $SD = 0.74$). The adequacy of current infrastructure to support administrative operations received the highest mean (3.44), followed by the maintenance of computers and digital devices (3.41). Internet connectivity (3.14) and system downtime (3.31) received comparatively lower, though still positive, ratings.

Table 8. Mean Assessment of ISG Effectiveness: Policies and Procedures

Indicators	Wm	SD	Interpretation
1. The barangay has clear policies and procedures for IT use in administrative tasks.	3.41	1.13	Improved
2. Guidelines on data privacy and security are consistently followed.	3.49	1.02	Improved

3. Procedures for handling digital records and files are efficient and standardized.	3.52	0.99	Improved
4. There are established protocols for maintaining and troubleshooting IT systems.	3.33	0.90	Improved
5. Staff are aware of and follow IT-related policies in their daily work.	3.37	0.78	Improved
Average	3.42	0.97	Improved

Policies and Procedures also received an overall “Improved” rating ($W_m = 3.42$, $SD = 0.97$). The efficiency and standardization of procedures for handling digital records received the highest mean (3.52), followed by adherence to data privacy and security guidelines (3.49). Established troubleshooting protocols (3.33) and staff awareness of IT policies (3.37) received comparatively lower ratings, suggesting some variability in consistent application.

Table 9. Mean Assessment of ISG Effectiveness: Leadership Support

Indicators	Wm	SD	Interpretation
1. Barangay leaders prioritize the improvement of public service delivery through digital systems.	3.40	0.92	Improved
2. Leadership supports the allocation of resources for IT improvements.	3.31	0.86	Improved
3. Leaders actively encourage the use of technology in office operations.	3.37	0.88	Improved
4. Staff are confident in using computers and digital tools for work.	3.50	0.70	Improved
5. Leadership demonstrates understanding of the benefits of information system governance.	3.43	0.73	Improved
Average	3.40	0.82	Improved

Leadership Support was rated “Improved” overall ($W_m = 3.40$, $SD = 0.82$). Staff confidence in using digital tools received the highest mean (3.50), followed by leadership's understanding of ISG benefits (3.43). Resource allocation for IT improvements received the lowest, though still positive, mean (3.31). The relatively low standard deviation indicates broad agreement among respondents.

Table 10. Mean Assessment of ISG Effectiveness: Staff IT Competence

Indicators	Wm	SD	Interpretation
1. Staff are confident in using computers and digital tools for work.	3.43	0.76	Improved
2. Regular training on IT systems is provided to staff.	3.35	1.06	Improved
3. Employees can troubleshoot basic IT problems independently.	3.22	0.96	Improved
4. Staff are knowledgeable in using digital platforms for document management.	3.37	0.74	Improved
5. There is a need for more training to improve staff IT skills.	3.50	0.81	Improved
Average	3.37	0.87	Improved

Staff IT Competence was rated “Improved” overall ($Wm = 3.37$, $SD = 0.87$). The perceived need for additional training received the highest mean (3.50), followed by staff confidence in using digital tools (3.43). Independent troubleshooting of basic IT problems received the lowest mean (3.22). Regular training provision (3.35) showed the highest variability among items ($SD = 1.06$), suggesting differing perceptions of training frequency or consistency.

Table 11. Mean Assessment of ISG Effectiveness: Budget Allocation Process

Indicators	Wm	SD	Interpretation
1. An adequate budget is allocated for improving the IT infrastructure in the barangay.	3.46	0.88	Improved
2. An adequate budget is allocated to support digital governance initiatives.	3.34	0.96	Improved
3. Funds are consistently available for IT maintenance and upgrades.	3.41	0.86	Improved
4. Budget for staff IT training is regularly allocated.	3.31	0.84	Improved
5. The process of budgeting for IT-related needs is transparent and well-planned.	3.33	0.82	Improved
Average	3.37	0.87	Improved

Budget Allocation Process received an overall “Improved” rating ($W_m = 3.37$, $SD = 0.87$). Adequacy of budget for IT infrastructure received the highest mean (3.46), while regular allocation of budget for staff IT training received the lowest (3.31), suggesting relatively less emphasis on funding for skills development compared to infrastructure.

Contribution of ISG to Public Service Delivery

Table 12. Mean Assessment of ISG's Contribution to Service Delivery

Indicators	Wm	SD	Interpretation
1. ISG has helped reduce delays in delivering basic barangay services.	3.53	0.86	To a Great Extent
2. Digital systems implemented through ISG have improved citizen satisfaction.	3.38	0.72	To a Great Extent
3. Service requests (e.g., barangay clearance, certificates) are processed faster with the help of ISG.	3.52	0.84	To a Great Extent
4. ISG contributes to better coordination among barangay departments in delivering services.	3.40	0.81	To a Great Extent
5. Online or digital service platforms introduced through ISG have improved public access to barangay services.	3.29	0.87	To a Great Extent
Average	3.42	0.872	To a Great Extent

ISG's contribution to service delivery was rated “To a Great Extent” overall ($W_m = 3.42$, $SD = 0.872$). The reduction of delays in basic services received the highest mean (3.53), followed closely by faster processing of service requests (3.52). Improved public access through online platforms received the lowest, though still positive, mean (3.29).

Table 13. Mean Assessment of ISG's Contribution to the Accuracy and Accessibility of Records Management

Indicators	Wm	SD	Interpretation
1. ISG has improved the accuracy of maintaining resident and administrative records.	3.35	0.77	To a Great Extent

2. Staff can access necessary records more efficiently due to digital systems.	3.41	0.75	To a Great Extent
3. Errors in official documents have decreased with the implementation of information systems.	3.42	0.77	To a Great Extent
4. Records are easier to retrieve and update using the current digital system.	3.43	0.84	To a Great Extent
5. Information System Governance ensures data integrity and security in the barangay.	3.27	0.85	To a Great Extent
Average	3.38	0.80	To a Great Extent

Records management improvements were rated “To a Great Extent” overall ($W_m = 3.38$, $SD = 0.80$). Ease of retrieving and updating records received the highest mean (3.43), followed by reductions in document errors (3.42). Data integrity and security received the lowest mean, though still positive (3.27).

Table 14. Mean Assessment of ISG's Contribution to Transparency and Accountability

Indicators	Wm	SD	Interpretation
1. ISG enables better tracking of transactions and activities in the barangay office.	3.44	0.79	To a Great Extent
2. Information systems support the transparent handling of barangay funds and documents.	3.35	0.72	To a Great Extent
3. Residents are more informed about barangay operations due to digital information-sharing platforms.	3.35	0.88	To a Great Extent
4. ISG has reduced opportunities for manual errors and manipulation in barangay public service delivery.	3.35	0.84	To a Great Extent
5. The barangay is more accountable to its constituents due to digital record-keeping and monitoring systems.	3.36	0.73	To a Great Extent
Average	3.37	0.79	To a Great Extent

Transparency and accountability outcomes were rated “To a Great Extent” overall ($W_m = 3.37$, $SD = 0.79$). Improved tracking of transactions and activities received the highest mean (3.44), while the remaining indicators clustered closely around 3.35–3.36, indicating consistent perceptions across this dimension.

Table 15. Mean Assessment of ISG's Contribution to Employee Productivity

Indicators	Wm	SD	Interpretation
1. ISG has simplified routine tasks, allowing employees to work more efficiently.	3.40	0.75	To a Great Extent
2. The digital tools provided through ISG reduce the time spent on repetitive manual processes.	3.29	0.78	To a Great Extent
3. Employees can focus on more strategic tasks thanks to the automation of basic administrative functions.	3.33	0.69	To a Great Extent
4. Employee productivity increases due to automated and streamlined processes.	3.37	0.68	To a Great Extent
5. System-related training has improved employee performance.	3.44	0.70	To a Great Extent
Average	3.37	0.72	To a Great Extent

Employee productivity gains attributed to ISG were rated “To a Great Extent” overall ($W_m = 3.37$, $SD = 0.72$). System-related training showed the highest mean (3.44), followed by the simplification of routine tasks (3.40). Reduction in time spent on repetitive manual processes received the lowest mean (3.29).

Differences in Assessment According to Respondent Profile

Table 16. ANOVA Results: Assessment of ISG Effectiveness by Age

Factors	f-ratio	p-Value	df1	df2	Alpha Level	Critical Value	Decision
IT Infrastructure	27.544	<0.001	5	147	0.05	2.276	Significant – Reject Ho
Policies and Procedures	35.692	<0.001	5	147	0.05	2.276	Significant – Reject Ho

Leadership Support	30.755	<0.001	5	147	0.05	2.276	Significant – Reject Ho
Staff IT Competence	31.081	<0.001	5	147	0.05	2.276	Significant – Reject Ho
Budget Allocation Process	52.550	<0.001	5	147	0.05	2.276	Significant – Reject Ho

Age produced statistically significant differences across all five ISG dimensions ($df_1 = 5$, $df_2 = 147$, $\alpha = 0.05$, critical value = 2.276), with all f-ratios exceeding the critical value and all p-values below 0.001. The Budget Allocation Process showed the largest f-ratio (52.550), indicating the widest divergence in perception across age groups.

Table 17. t-Test Results: Assessment of ISG Effectiveness by Gender

Factors	t-Test value	p-Value	df	Alpha Level	Critical Value	Decision
IT Infrastructure	-7.47	<0.001	151	0.05	1.976	Significant – Reject Ho
Policies and Procedures	-6.65	<0.001	151	0.05	1.976	Significant – Reject Ho
Leadership Support	-8.35	<0.001	151	0.05	1.976	Significant – Reject Ho
Staff IT Competence	-4.63	<0.001	151	0.05	1.976	Significant – Reject Ho
Budget Allocation Process	-1.56	0.120	151	0.05	1.976	Not Significant – Accept Ho

Gender produced statistically significant differences in four of five dimensions — Leadership Support ($t = -8.35$), IT Infrastructure ($t = -7.47$), Policies and Procedure ($t = -6.65$), and Staff IT Competence ($t = -4.63$) — all with $p < 0.001$. The Budget Allocation Process showed no significant difference between genders ($t = -1.56$, $p = 0.120$), indicating similar perceptions of budgeting practices regardless of gender.

Table 18. ANOVA Results: Assessment of ISG Effectiveness by Civil Status

Factors	f-ratio	p-Value	df1	df2	Alpha Level	Critical Value	Decision
IT Infrastructure	8.989	<0.001	4	148	0.05	2.433	Significant – Reject Ho
Policies and Procedures	12.763	<0.001	4	148	0.05	2.433	Significant – Reject Ho
Leadership Support	15.413	<0.001	4	148	0.05	2.433	Significant – Reject Ho
Staff IT Competence	2.756	0.027	4	148	0.05	2.433	Significant – Reject Ho
Budget Allocation Process	4.390	<0.001	4	148	0.05	2.433	Significant – Reject Ho

Civil status produced statistically significant differences across all five dimensions ($df1 = 4$, $df2 = 148$, critical value = 2.433). Leadership Support showed the largest f-ratio (15.413), while Staff IT Competence showed the smallest, though still significant, f-ratio (2.756, $p = 0.027$).

Table 19. ANOVA Results: Assessment of ISG Effectiveness by Educational Attainment

Factors	f-ratio	p-Value	df1	df2	Alpha Level	Critical Value	Decision
IT Infrastructure	17.443	<0.001	3	149	0.05	2.665	Significant – Reject Ho
Policies and Procedures	16.680	<0.001	3	149	0.05	2.665	Significant – Reject Ho
Leadership Support	13.718	<0.001	3	149	0.05	2.665	Significant – Reject Ho
Staff IT Competence	7.243	<0.001	3	149	0.05	2.665	Significant – Reject Ho

Budget Process	Allocation	3.078	0.027	3	149	0.05	2.665	Significant – Reject Ho
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Educational attainment produced statistically significant differences across all five dimensions ($df1 = 3$, $df2 = 149$, critical value = 2.665), with f-ratios ranging from 3.078 to 17.443 and all p-values below 0.05.

Table 20. ANOVA Results: Assessment of ISG Effectiveness by Length of Residency

Factors	f-ratio	p-Value	df1	df2	Alpha Level	Critical Value	Decision
IT Infrastructure	1.332	0.265	2	150	0.05	3.056	Not Significant – Accept Ho
Policies and Procedures	3.610	0.028	2	150	0.05	3.056	Significant – Reject Ho
Leadership Support	2.031	0.132	2	150	0.05	3.056	Not Significant – Accept Ho
Staff IT Competence	9.154	<0.001	2	150	0.05	3.056	Significant – Reject Ho
Budget Process	Allocation	20.076	<0.001	2	150	0.05	Significant – Reject Ho

Length of residency produced a mixed pattern of significance ($df1 = 2$, $df2 = 150$, critical value = 3.056). Significant differences were found for Policies and Procedure ($p = 0.028$), Staff IT Competence ($p < 0.001$), and Budget Allocation Process ($f = 20.076$, $p < 0.001$), while IT Infrastructure ($p = 0.265$) and Leadership Support ($p = 0.132$) showed no significant differences across residency groups.

Table 21. ANOVA Results: Assessment of ISG Effectiveness by Barangay Role

Factors	f-ratio	p-Value	df1	df2	Alpha Level	Critical Value	Decision
IT Infrastructure	19.143	<0.001	2	150	0.05	3.056	Significant – Reject Ho
Policies and Procedures	20.026	<0.001	2	150	0.05	3.056	Significant – Reject Ho

Leadership Support	20.156	<0.001	2	150	0.05	3.056	Significant – Reject Ho
Staff IT Competence	20.777	<0.001	2	150	0.05	3.056	Significant – Reject Ho
Budget Allocation Process	8.926	<0.001	2	150	0.05	3.056	Significant – Reject Ho

Barangay role produced statistically significant differences across all five dimensions ($df_1 = 2$, $df_2 = 150$, critical value = 3.056), with f-ratios ranging from 8.926 to 20.777 and all p-values below 0.001, indicating that officials, staff, and residents perceive ISG effectiveness differently depending on their position within barangay governance.

Post Hoc Analysis of Differences by Barangay Role

Table 22. Tukey HSD Post Hoc Comparisons by Barangay Role

Comparison Group	Mean Difference	Std. Error	Adjusted p-value	Decision
Officials vs. Residents	0.532	0.118	0.001	Significant
Officials vs. Staff	0.214	0.126	0.084	Not Significant
Staff vs. Residents	0.487	0.109	0.003	Significant

Following the significant ANOVA result in Table 21, Tukey HSD post hoc analysis was conducted to identify which specific barangay-role groups differed significantly in their assessment of ISG effectiveness. Officials rated ISG effectiveness significantly higher than residents (mean difference = 0.532, adjusted $p = 0.001$), and staff also differed significantly from residents (mean difference = 0.487, adjusted $p = 0.003$). No statistically significant difference was found between officials and staff (mean difference = 0.214, adjusted $p = 0.084$).

Challenges to ISG Implementation

Table 23. Mean Perception of Challenges to Improving Barangay Public Service Delivery through ISG

Challenges	Wm	SD	Rank
Information from barangay officials does not always reach all residents effectively.	4.000	0.754	1

Not all financial or project-related information is openly shared with the community.	3.843	0.753	2
Projects and programs are not consistently monitored or assessed for effectiveness.	3.765	0.714	3
Manual processes remain dominant, leading to slower transactions and errors.	3.752	0.599	4
Some staff or officials are hesitant to adopt new systems or processes.	3.712	0.825	5
Some services take longer to process, causing inconvenience to residents.	3.680	0.655	6
Errors or missing data in barangay records create confusion and slow transactions.	3.660	0.718	7
Budget and resources are not always distributed fairly or according to urgent needs.	3.654	0.861	8
Some staff are overloaded with work while others lack training in using technology.	3.595	0.854	9
Residents find it difficult to access the documents or updates they need for projects.	3.425	0.695	10

Table 23 presents the challenges to improving barangay public service delivery through ISG, ranked from most to least significant (overall $W_m = 3.708$, $SD = 0.743$). The most significant challenge identified was that information from barangay officials does not consistently reach all residents ($W_m = 4.000$), followed by insufficient openness regarding financial or project-related information ($W_m = 3.843$) and inconsistent monitoring or assessment of projects and programs ($W_m = 3.765$). The least significant, though still notable, challenge was residents' difficulty in accessing needed documents or project updates ($W_m = 3.425$).

Discussion

Progress and Persistent Gaps in ISG Dimensions

Consistent with Weill and Ross's (2004) view that effective ISG synchronizes IT initiatives with institutional priorities, all five governance dimensions in Barangay San Isidro — IT Infrastructure, Policies and Procedures, Leadership Support, Staff IT Competence, and Budget Allocation — were rated “Improved,” suggesting that the barangay has made genuine progress in its digital transformation. However, the comparatively lower ratings for internet connectivity ($W_m = 3.14$) and independent staff troubleshooting ($W_m = 3.22$) indicate that, as Sofyani et al. (2020) note, IT compliance culture and governance structures must be matched by consistent technical capacity. This suggests that while the front-end elements of governance — leadership intent and policy formulation — are relatively well established, the back-end technical infrastructure and human capital development still require further investment.

ISG's Contribution to Service Delivery Outcomes

The consistently positive “To a Great Extent” ratings across service delivery, records management, transparency, and productivity echo findings from other Philippine barangay-level digitalization initiatives. Reyes et al.'s (2025) WebYu system and Garon et al.'s (2022) oneBarangay platform similarly demonstrated measurable reductions in processing time and error rates through digital systems, which aligns with the faster processing of barangay clearances and certificates ($W_m = 3.52$ – 3.53) and improved record retrieval ($W_m = 3.43$) observed in this study. These outcomes support Davis's (1989) Technology Acceptance Model in that perceived usefulness of ISG — evidenced by faster, more accurate services — appears to be driving continued adoption at the barangay level.

Demographic and Role-Based Differences in Perception

The finding that age is a statistically significant factor across all ISG dimensions, with the least favorable perceptions among respondents aged 71 and above, is consistent with Waara's (2025) argument that digital government maturity models often fail to translate policy into “actionable frameworks” that meaningfully include all citizens. This suggests that older residents may perceive themselves as excluded from the barangay's ongoing digital transformation, a dynamic that warrants targeted outreach in future ISG initiatives.

The significant gender-based differences in Leadership Support ($t = -8.35$) and Staff IT Competence ($t = -4.63$) are consistent with Bellini, Leonori, and Murè's (2024) bibliometric review, which emphasizes that digital transformation in public service delivery is shaped substantially by the user's perspective. This suggests that perceptions of leadership support and staff competence are not gender-neutral, and that male and female respondents may experience these interactions differently, even though both groups held similar views on budget allocation.

Civil status was likewise a significant factor across all governance dimensions, echoing Sundberg and Holmström's (2024) argument that digital governance must evolve from a service-provider role toward a genuinely “transformative” relationship with a diverse citizenry. The pronounced differences in Leadership Support ($f = 15.413$) and Policies and Procedure ($f = 12.763$) suggest that the barangay's digital transformation is not yet experienced uniformly across different household structures.

Educational attainment also produced significant differences across all dimensions, most notably in Staff IT Competence ($f = 7.243$). This is consistent with Bellini et al.'s (2024) observation that the perceived quality of digital transformation depends on the cognitive and cultural distance between users and public-facing staff:



respondents with vocational or high-school-level education rated staff competence more favorably than those with higher educational attainment, suggesting that more educated users may be more attuned to identifying technical or procedural shortcomings.

Length of residency produced a mixed pattern of significance that aligns with Sundberg and Holmström's (2024) distinction between “hygiene factors” and “transformative” elements of digital governance. The absence of significant differences for IT Infrastructure ($p = 0.265$) and Leadership Support ($p = 0.132$) suggests that these are perceived as baseline, tenure-neutral requirements, whereas significant differences in Policies and Procedure ($p = 0.028$), Staff IT Competence, and Budget Allocation Process suggest that appreciation of these more procedural elements builds with longer engagement with the barangay.

The most consequential finding may be the perception gap by barangay role. Officials rated ISG effectiveness significantly higher than both staff and residents, with no significant difference between officials and staff themselves. This pattern is consistent with the Administrative Insider–Outsider Hypothesis of Gomez and Sanchez (2024), which holds that organizational position shapes governance perceptions independently of the underlying quality of governance itself. It also reinforces Bellini et al.'s (2024) argument that digital governance must be evaluated from the citizen's standpoint rather than solely from the administrator's perspective, since residents — the actual end users of barangay services — consistently rated Staff IT Competence and Leadership Support lower than officials did. As Field (2018) notes, post hoc procedures such as Tukey HSD are essential for isolating exactly where such group differences occur once an omnibus ANOVA result is significant, which is precisely the value this analysis added to the present study.

Barriers to Institutionalizing ISG

Despite the overall positive assessment of ISG, the leading barriers identified — ineffective communication from barangay officials ($W_m = 4.000$) and limited financial transparency ($W_m = 3.843$) — are governance-culture issues rather than technical deficiencies. This is consistent with the study's theoretical foundations: New Public Management emphasizes accountability and citizen-centered service delivery as outcomes that technology alone cannot guarantee, while Fayol's Administrative Management Theory frames structured governance and rational planning as prerequisites for ISG success. The continued dominance of manual processes ($W_m = 3.752$) and staff resistance to new systems ($W_m = 3.712$) further indicate that the barangay's governance culture has not yet fully caught up with the digital tools already in place, reinforcing Milakovich's (2021) observation that successful digital governance requires cultural change alongside technological investment.



Conclusion

The demographic profile of respondents — predominantly women, married, over 50 years of age, college-educated, and long-term residents — reflects a mature, civically engaged community capable of critically assessing local governance. With 90% of barangay officers being women, the findings underscore that women are the primary stakeholders and drivers of local governance in this barangay, a consideration that should inform the design of inclusive digital governance initiatives.

The consistent “Improved” ratings across all five ISG dimensions indicate that Barangay San Isidro has made real progress along its digital transformation path, though the comparatively lower ratings for internet reliability and independent staff troubleshooting show that back-end technical infrastructure and human capital development still require further investment relative to front-end leadership intent and policy formulation.

Respondents consistently rated ISG's contribution to service delivery, records management, transparency and accountability, and employee productivity as “To a Great Extent,” with the most significant gains in the faster processing of barangay clearances and certificates, more accurate and accessible digital records, better transaction tracking, and improved employee performance through system-related training. These results indicate that ISG functions not merely as an administrative upgrade but as a substantive driver of the barangay's operational efficiency and public service quality.

The hypothesis that ISG assessment would not differ across respondent profiles was largely refuted: age, gender, civil status, educational attainment, length of residency, and barangay role were all associated with statistically significant differences across most governance dimensions. The most consequential of these is the perception hierarchy by barangay role, in which officials and staff rated governance considerably more favorably than residents, the actual end users of barangay services. This insider–outsider divide represents the most pressing governance concern identified in this study, as it suggests that the benefits of ISG have not yet been experienced uniformly across the community.

Finally, despite the overall positive assessment of ISG, the leading barriers to further improvement — ineffective communication from barangay officials and limited financial transparency — are governance-culture issues rather than technical deficiencies. The persistence of manual processes and staff resistance to new systems further indicates that the barangay's culture of governance has not yet fully caught up with the digital tools already in place. This study, therefore, concludes that technology alone cannot guarantee good governance: sustained improvement will require a genuine institutional commitment to transparency, communication, and cultural change, operationalized through a concrete action plan addressing the specific barriers identified in this study.



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