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Research Article

A Descriptive Study of E-Collection Systems and Municipal Revenue Efficiency: Evidence from Selected Municipalities in Iloilo Province, Philippines

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ABSTRACT

This study examines the effect of electronic collection (e-collection) systems on municipal revenue efficiency in selected municipalities of Iloilo Province, Philippines, within the context of ongoing digital governance reforms. While prior studies have established that electronic revenue systems generally enhance collection performance, empirical evidence at the municipal level in developing-country settings remains limited, particularly regarding how specific efficiency dimensions such as timeliness, accuracy, cost-effectiveness, and transparency are affected under partial system integration. Using a descriptive quantitative research design, data were collected through structured questionnaires administered to municipal treasurer and accountant offices in municipalities with operational e-collection systems. Revenue efficiency was assessed using a five-point Likert scale and analyzed through frequency distributions, weighted means, and standard deviations. Results indicate that e-collection systems have a high positive effect on revenue efficiency, particularly in transaction timeliness (WM = 3.74), cost-effectiveness (WM = 3.73), and transparency and accountability (WM = 3.96). Respondents reported faster payment processing, reduced manual encoding, clearer audit trails, and improved public trust. However, the impact on delinquency reduction and real-time reconciliation remained moderate, largely due to standalone system deployment, limited system integration with accounting platforms, and uneven staff capacity. Despite adoption growth in 2024 with 38.10% of sampled municipalities implementing e-collection, more than 90% of municipalities still process less than 10% of total transactions electronically. The study contributes localized empirical evidence showing that efficiency gains from e-collection are significant but constrained by institutional, technical, and administra-

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tive factors. Findings underscore the need for policy institutionalization, sustained budget allocation, system integration, and continuous capacity-building to fully realize the fiscal benefits of digital revenue collection in local governments.

Keywords: *E-collection systems, Municipal revenue efficiency, Digital governance, Iloilo Province, LGUs*

Background

Local government units (LGUs) play a central role in fiscal decentralization by mobilizing own-source revenues to finance public services and development programs. However, weak municipal revenue performance characterized by delayed collections, administrative inefficiencies, revenue leakages, and limited transparency continues to constrain local fiscal autonomy in many developing economies. In response, governments worldwide have increasingly turned to digital revenue collection technologies, such as electronic tax filing, mobile payments, and automated billing systems, as tools to modernize public financial management and improve revenue outcomes.

International evidence suggests that electronic revenue systems enhance tax compliance, reduce transaction costs, and minimize opportunities for corruption. Studies in both developed and developing contexts demonstrate that e-tax and e-payment platforms improve collection efficiency by accelerating payment processing, strengthening audit trails, and reducing human error (Gupta & Keen, 2015; Masunga et al., 2020; IMF, 2022). Mobile payment integration and electronic billing systems, in particular, have been shown to expand the tax base and improve voluntary compliance by lowering payment barriers (Li, 2018; World Bank, 2022). These findings position digital collection systems as a core component of contemporary digital governance and public sector modernization agendas.

Despite this growing body of literature, existing studies predominantly focus on national tax authorities, large taxpayers, or fully integrated systems, often relying on revenue growth or compliance rates as aggregate outcome measures. Far less empirical attention has been given to municipal-level implementations, especially in contexts where e-collection systems are partially adopted, unevenly integrated, or constrained by institutional capacity. As a result, there remains limited understanding of how e-collection systems affect specific dimensions of municipal revenue efficiency such as timeliness, accuracy, cost-effectiveness, and transparency under real-world administrative conditions.

From a theoretical standpoint, this study draws on public finance theory, which emphasizes efficiency, accountability, and equity in revenue mobilization, and digital governance theory, which views technology as an enabler of institutional performance through process automation, information transparency, and service accessibility. Within this framework, municipal revenue efficiency is conceptualized not solely as revenue growth, but as the ability of LGUs to collect revenues promptly, accurately, at lower administrative cost, and with greater accountability. An e-collection system, in turn, refers to a computer-based or electronically mediated platform that enables taxpayers to settle financial obligations to government entities through non-cash digital channels, including online banking, mobile wallets, and point-of-sale interfaces.

In the Philippines, national policies issued by the Commission on Audit, the Department of Finance, and the Department of Information and Communications Technology actively promote electronic collection as a mechanism to improve fiscal transparency and local revenue performance. Nevertheless, many municipalities operate e-collection systems as standalone platforms, with limited integration into treasury and accounting systems, uneven staff training, and low taxpayer adoption. These conditions raise important empirical questions about whether and to what extent e-collection systems actually deliver efficiency gains at the municipal level.

The present study examines the impact of e-collection systems on municipal revenue efficiency in selected municipalities of Iloilo Province. Specifically, it assesses the effects of e-collection on revenue collection timeliness, accuracy and reliability of records, cost-effectiveness of operations, and transparency and accountability, while also identifying operational, technical, and administrative constraints affecting system performance. By focusing on municipal-level implementation within a developing-country setting, this study contributes localized empirical evidence to global debates on digital public finance and provides policy-relevant insights for strengthening e-governance initiatives in local governments.

Methodology

Research Design

This study adopts a descriptive quantitative, cross-sectional research design to examine the association between the adoption of electronic collection (e-collection) systems and municipal revenue efficiency in selected municipalities of Iloilo Province, Philippines. The design is appropriate for assessing perceived and operational efficiency outcomes in settings where experimental or longitudinal administrative data are not readily available.

Given the cross-sectional nature of the data, the study does not claim causal inference. Instead, it focuses on identifying patterns, associations, and institutional conditions under which e-collection systems contribute to improvements in revenue collection processes. This approach is consistent with prior public finance and e-governance studies that evaluate early-stage or partial technology adoption in local governments.

Research Locale

The study covers selected municipalities within Iloilo Province that have implemented or are actively operating an e-collection system. From the 42 municipalities in the province, a purposive sampling technique was employed to select municipalities at varying stages of digital adoption, system integration, and institutional capacity. This ensured that the sample captured meaningful variation in implementation experiences while remaining aligned with the study objectives.

Within each sampled municipality, the primary respondents were personnel from the Municipal Treasurer's Office and Municipal Accountant's Office, as these units are directly responsible for revenue collection, financial reporting, and the operational management of e-collection systems. Two respondents per municipality were targeted to provide cross-validation of responses at the organizational level. While purposive sampling limits statistical generalizability, it strengthens analytical relevance by focusing on municipalities where e-collection systems are operational and policy-relevant.

Population and Sampling Technique

This research comprised all 42 municipalities in Iloilo Province. However, only some municipalities were chosen as samples, guided by specific criteria relative to the integration or active implementation of electronic collection (e-collection) systems. A purposive sampling approach was adopted, as it enabled the researcher to select municipalities at different stages of adopting e-collection systems. This approach allowed gathering of the most pertinent information relative to the study objectives and allowed the researcher to examine the relationship between the use of e-collection systems and the revenue efficiency of the municipalities in a more focused way (Babbie, 2021).

Within each of the chosen municipalities, the primary respondents were the notable staff of the Municipal Treasurer's Office and the Municipal Accountant's Office because of their leading roles in the revenue collection and the financial administration, as well as the implementation of integrated systems. Two respondents per municipality were requested; however, the number of survey participants relative to the intended sample determined the actual count.

Data Collection Procedure

Before data collection commenced, the necessary permissions and arrangements were made with the Local Chief Executive (LCE) or

the appointed focal person for each of the municipalities involved in the study. Participants were properly briefed concerning the aim, objectives, and purposes of the study, and they were informed about the voluntary basis of their participation.

For the descriptive quantitative research on e-collection systems and municipal revenue efficiency, data were obtained through an online survey questionnaire using the Google Forms application. The online survey was perceived by the study to be a budget-friendly and convenient approach to access the municipalities targeted in the study in the Province of Iloilo. Survey data relevant to the objectives of the study were e-collection system adoption and its impacts on municipal revenue performance, which were organized into four sections:

- Profile of the Municipalities in Iloilo Province- Name of Municipality, income classification, population size, and number of staff in local revenue collection office.
- E-collection details- including types and scope of e-collection platform, year of adoption and level of integration, training and technical support provided to LGU personnel and proportion of transactions currently processed electronically.
- The perceived efficiency of revenue collection was gauged using the Likert scale across the indicators of timely collection, accuracy, cost-effectiveness, transparency, and accountability.
- Using the Likert scale, the dimensions of the efficient collection of revenue, of which the attributes timely, accurate, economically efficient, transparent, and accountable, were evaluated.

Survey Design and Implementation: Respondents' perceptions and experiences of the e-collection system were evaluated using Likert-scaled and closed-ended questions. Prior to the full survey's distribution, a pre-test was conducted to the government auditors who have experience with auditing municipalities' e-collection systems. The pre-test aimed at identifying any ambiguous questions, estimating the time required to complete the questionnaire, and assessing the extent to which the survey covered necessary information to address the research questions. Consideration of respondents' varied levels of access to the internet was factored into the e-collection system, which was distributed via Gmail and social networking sites. To improve response frequency, we used monitored surveys with reminder messages. Participation was entirely voluntary, as stated in the study design, and participants consented to the survey at the start of the questionnaire. Data was gathered in real time to a Google Sheet and later exported to Excel for documentation and coding.

Instrument of the Study and Validation

In this study, the data was primarily captured using the E-collection Research Questionnaire, which was designed on Google Forms, and was tailored according to the study objectives. The instrument consists of four parts.

Part I – A.1 – Respondents' Profile - This asks the characteristics of the LGU, income class, population size, size of the local revenue collection office, type of e-collection platform, year of adoption, and level of system integration.

Part I – A. 2 – Extent of Implementation of E-Collection Systems - This assesses the type of e-collection platform(s) and implementation of e-collection systems across revenue streams such as real property tax, business permits, and market fees that were incorporated under the declared e-collection system, adoption year, integration level, training and technical support, and the share of e-collection transactions.

Part II – Perceived Impact of E-Collection- This consists of fourteen Likert scaled statements measuring the perception of the impact of e-collection on the system along the four constructs, Collection Timeliness, Accuracy and Reliability, Cost-Effectiveness of operations, and Transparency and Accountability.

A five-point scale was used for rating entries wherein 1 - Strongly Disagree to 5 - Strongly Agree.

Part III – Challenges and Recommendations – This includes a succession of operational, technical, and administrative challenges in the form of a checklist. This is succeeded by

The actions taken to improve the LGU's e-collection implementation emphasize the focus for improving efficiency.

To enhance content validity, the questionnaire was reviewed by specialists in public administration, government auditing, and local fiscal management. A pilot test was conducted with respondents outside the study area who had experience auditing or managing municipal e-collection systems. Feedback from the pilot test informed revisions to item clarity, redundancy, and alignment with the study objectives. The revenue efficiency indicators such as timeliness, accuracy and reliability, cost-effectiveness, and transparency and accountability were measured using a five-point Likert scale, consistent with established practices in public sector performance research.

Statistical Analysis

The received survey questionnaires and e-collection systems from Iloilo Province municipalities were used to conduct a quantitative evaluation of the efficiency of the revenue collection systems. For this analytics, the survey responses were encoded, organized, and computed statistically which directly linked to the objectives of the study to guarantee a precise outcome of the research. To guarantee the objectives of the study were met, the survey responses were computed systematically to attain the desired quality and neutrality of the findings.

The relationship and inconsistencies involving various pieces of data were examined using statistical methods for the purpose of addressing the quantitative survey questions. These in data assessment included the following:

- Frequency and Percentage Distribution

The demographic and operational profile of the municipalities was described with the aid of this statistical tool. Income classification, demographic profile in terms of population size, staffing of the offices, and the level of and scope of e-collection system were operationally defined and evaluated. The frequency and percentage distributions were also used to summarize the e-collection systems categorized by the collection instruments, training sources, and the operational, technical, and administrative constraints. This analysis helped in demonstrating the prevalence and distribution of varied collection system implementation features across the municipalities in the sample.

- Weighted Mean and Standard Deviation

In assessing levels of respondents' agreement on indicators of municipal revenue efficiency relative to revenue collection, the weighing of means and the standard deviation were employed to assess the means and the associated dispersion of responses concerning perceptions on the effectiveness of e-collection systems on the disparate attributes of revenue collection such as collection time, record accuracy, record reliability, operational cost, and transparency.

- Ranking

In the e-collection systems adoption and maintenance, the relative importance of challenges and the strategies used to overcome them were ordered according to the relative importance ascribed to them by the respondents. Ranking provided clarity on the relative importance of issues and the associated response measures available to aid the implementation of revenue collection systems and revenue efficiency.

Data generated from the above-listed analytical techniques were used to formulate appropriate recommendations and discussions to aid the improvement of digital collection systems and fiscal performance of the local government units in Iloilo Province.

Ethical Consideration

The researchers made sure to comply with ethical requirements and standards during the study, with every participant being treated with respect and their rights safeguarded during the research.

1. Informed Consent - Consent was voluntary. Each respondent received an information sheet outlining the purpose and scope of the study, the respondent's right to withdraw and the consequences of doing so, and the intended plans for information use.

2. Confidentiality and Anonymity - Summary reporting was used to mask sensitive respondent details and their municipality assignments. All collected data were secured and treated with respect and confidentiality. Only the researchers had access to the data collected, and it was used exclusively for academic/research purposes.
3. Data Protection - Data were kept in password-protected files for which only researchers had access. Data were also disposed of or erased to protect the privacy of participants after the research was completed.
4. Respect and Non-Maleficence - No participant was harmed and their pressure, or inconvenience was avoided. Their stand was always respected regardless of the negative consequences their professional or employment position might impose.
5. Honesty and Integrity - All phases of this study were conducted with respect to the principle of honesty. All references were properly credited, and no data, were fabricated, altered, or misrepresented. The Researchers believe that the study was ethically carried out, thus attaining the accuracy of the results in relation to the completeness and the trustworthiness of the entire research exercise. The study, in all credibility, maintained the integrity of the entire research exercise.

Limitations of the Study

This study analyzed only selected municipalities of Iloilo Province that adopted or started implementing electronic collection systems. Thus, the results might not be completely applicable to all Local Government Units of the Province, particularly those that use conventional manual collection systems.

Purposive sampling restricted the selection of respondents to key officials from the Municipal Treasurer's Office and the Municipal Accountant's Office. Their responses might be more biased in favor of personal or institutional perspectives.

Due to the use of online survey questionnaires, the overall internet access, the availability, and the willingness of the respondents to answer the survey might have been a contributing factor to a lower response rate or to incomplete information for a few municipalities. Furthermore, the study only focused on the quantitative aspects of the revenue efficiency indicators, thus the qualitative aspects such as organizational culture, leadership, and political factors that influence e-collection performance were left out.

Despite the above-mentioned limitations, the study provides valuable insights in the implementation and efficiency outcomes of e-collection systems in selected municipalities in Iloilo Province which is a great contribution to further research and policy formulation in the field of local fiscal digitalization.

Result and Discussion

This chapter presents the analyzed findings of the study, "E-Collection Systems and Municipal Revenue Efficiency: Evidence from Selected Municipalities of Iloilo Province." The data are drawn from the responses of selected Municipalities within Iloilo Province that have adopted e-collection systems as part of their digital governance initiatives. The results are discussed in relation to the study's four specific objectives.

The interpretation of quantitative results follows the scale below:

Table 1: Interpretation of quantitative results

Scale	Range of Mean Scores	Verbal Interpretation
5	4.21–5.00	Strongly Agree (Very High Effect)
4	3.41–4.20	Agree (High Effect)
3	2.61–3.40	Neutral (Moderate Effect)
2	1.81–2.60	Disagree (Low Effect)
1	1.00–1.80	Strongly Disagree (Very Low Effect)

When respondents perceive the strategies related to e-collection systems as highly effective to achieve the stated goal of enhancing the efficiency of revenue collection attained the stated goal of enhancing the efficiency of municipal revenue collection, the average score is higher. When respondents have a lower average score, it means there is a weaker agreement to the strategies aimed at improving the efficiency of revenue collection operations and thus respondents perceive the adopted strategies as having a lower impact on improving the operations.

1. **Profile of Municipalities that Adopted E-Collection Systems**

This part describes the e-collection profiles for selected municipalities in the province of Iloilo. This description will center on the year of adoption, integration of systems, training and technical support, and the proportion of e-collection transactions. These factors best characterize the municipalities' operational capacity, digital readiness, and the overall systems' progress in the electronic revenue collection system.

1.1. Type of e-collection platforms used

Payment systems offered to municipalities primarily combines online bank payment systems and mobile payment portals, for example, GCash and PayMaya, showing an increased preference for digital payment systems. There are municipalities that also built web-based payment portals, albeit simple and manual reconciliation of payment systems are still required.

The diversity of platforms demonstrates LGUs' effort to provide multiple payment options for taxpayers, though differences in functionality and integration levels may affect consistency and efficiency across municipalities.

Table 2: Type of e-collection platform used

Platform	Frequency	Percentage
Online payment portal	11	52.38%
Mobile wallet (GCash/PayMaya)	6	28.57%
Bank-based online payment	16	76.19%

1.2. Year of adoption and level of system integration

The results show a gradual but uneven increase in the adoption of e-collection systems among selected municipalities in Iloilo Province from 2020 to 2025. Adoption peaked in 2024, accounting for 38.10% of total implementations, following a notable increase from 28.57% in 2023. Earlier years recorded substantially lower adoption levels, with only 9.52% in 2021 and 4.76% in 2020, while a moderate decline is observed in 2025 (19.05%).

This pattern suggests that the expansion of e-collection systems is policy-driven rather than organic, aligning with national digital governance initiatives introduced after the COVID-19 pandemic. The concentration of adoption in 2023–2024 coincides with intensified government directives promoting cashless transactions, fiscal transparency, and digital service delivery. From a digital governance perspective, this supports the view that institutional mandates and regulatory pressure, rather than local fiscal innovation alone, play a critical role in accelerating technology uptake at the municipal level.

However, the observed decline in new implementations in 2025 and the absence of adoption in 2022 indicate that adoption momentum is not linear nor self-sustaining. This finding nuances prior international studies that portray digital revenue systems as rapidly diffusing once introduced. Instead, the results suggest that municipalities may face capacity ceilings, where initial adoption is feasible but sustained expansion is constrained by factors such as budget limitations, system maintenance costs, staff readiness, and competing administrative priorities.

Moreover, while the rising adoption trend reflects growing acceptance of electronic payments, adoption alone does not necessarily translate into effective utilization or revenue efficiency gains. As later results demonstrate, most municipalities continue to process only a

small proportion of total transactions electronically. This gap between system adoption and actual usage highlights a form of "symbolic digitalization," where compliance with national policy exists, but functional integration and behavioral change lag behind.

Table 3. Year of Adoption

Year	Frequency	Percentage
2020	1	4.76%
2021	2	9.52%
2022	0	0.00%
2023	6	28.57%
2024	8	38.10%
2025	4	19.05%
Total	21	100.00%

The findings reveal that system integration remains limited among the sampled municipalities. A substantial majority (71.43%) operate stand-alone e-collection payment portals, while only 33.33% have linked their systems to treasury or finance offices. Full integration with accounting and financial reporting systems is rare, observed in only 4.76% of municipalities.

This pattern indicates that most local government units are situated in a transitional stage of digitalization, where front-end payment processes have been digitized, but back-end financial management remains partially or fully manual. From a public financial management perspective, this partial integration constrains the potential efficiency gains of e-collection systems, particularly in areas requiring real-time reconciliation, internal controls, and timely financial reporting. While stand-alone systems may improve payment convenience for taxpayers, they often require manual verification, reconciliation, and posting, thereby reintroducing human intervention and increasing the risk of delays or inconsistencies in revenue records. This finding aligns with international evidence suggesting that technology adoption without system integration yields limited fiscal returns, as efficiency gains depend not only on digitized payment channels but also on the automation of accounting and reporting workflows.

Importantly, the very low incidence of full system integration helps explain the moderate effects observed in delinquency reduction and reconciliation speed reported in later results. The persistence of manual back-end processes weakens the ability of e-collection systems to support proactive revenue management, automated compliance monitoring, and real-time decision-making. The results also highlight an unintended consequence of partial digitalization: municipalities may incur additional administrative burdens by maintaining parallel digital and manual systems. Rather than reducing workload, fragmented systems can increase coordination demands on staff and limit the scalability of e-collection initiatives. This reinforces arguments in digital governance literature that interoperability and institutional alignment are as critical as technological adoption itself.

Table 4. Level of System Integration

Level of Integration	Frequency	Percentage
Stand-alone payment portal	15	71.43%
Linked to treasury/finance system	7	33.33%
Fully integrated with accounting and reporting	1	4.76%

1.3. Training and technical support provided to LGU personnel

The results indicate substantial disparities in capacity building among the sampled municipalities. One-third (33.33%) of municipalities reported receiving no formal training on e-collection system operations. Among those that did receive training, support was fragmented: 28.57% relied on vendor-led training, another 28.57% depended on in-house IT personnel, and only 19.05% participated in training programs organized by the Department of Finance or the Bureau of Local Government Finance.

These findings suggest that the implementation of e-collection systems is often technology-driven rather than capacity-driven, with insufficient institutional mechanisms to ensure sustained operational competence. From a digital governance perspective, the absence of standardized training frameworks weakens the institutionalization of e-collection systems and increases dependence on external vendors or a small number of technically skilled staff.

The lack of training has several potential unintended consequences. First, limited staff capacity constrains the ability of municipalities to diagnose system failures, manage downtimes, or respond to taxpayer concerns, thereby undermining user trust and discouraging system adoption. Second, overreliance on vendor-led support may expose municipalities to vendor lock-in, reducing flexibility and increasing long-term maintenance costs. Third, uneven capacity building may exacerbate inter-municipal inequality, as better-resourced municipalities are more likely to sustain system performance than those with limited technical personnel.

These results align with international empirical studies that identify human capital as a critical determinant of successful e-government and e-tax implementation. Prior research emphasizes that digital systems yield limited efficiency gains when staff lack the skills necessary to operate, integrate, and continuously improve them. In this context, training is not merely a supporting activity but a core enabling condition for realizing the fiscal benefits of digital revenue collection.

Table 5. Training and Technical Support Provided to LGU Personnel

Training	Frequency	Percentage
Vendor-led training	6	28.57%
DOF/BLGF training	4	19.05%
In-house IT support	6	28.57%
None	7	33.33%

1.4. Proportion of transactions currently processed electronically

Despite the growing adoption of e-collection platforms, the results reveal persistently low levels of actual utilization across most municipalities. An overwhelming majority (94.44%) reported that less than 10% of total revenue transactions are processed electronically. Only 16.67% of municipalities indicated that 10–25% of transactions were conducted through e-collection, and just one municipality reported electronic processing of more than 75% of total transactions.

This substantial gap between system availability and system use highlights a critical limitation of digital revenue reforms at the municipal level. From a digital governance perspective, the findings suggest that e-collection systems may function primarily as supplementary or symbolic mechanisms, rather than as dominant channels for revenue collection. This phenomenon echoes international evidence showing that digital adoption does not automatically translate into behavioral change among users or frontline staff.

Several interrelated factors may explain this low utilization. First, behavioral resistance and trust deficits among taxpayers, particularly older, rural, or digitally excluded populations can discourage the use of electronic payment channels. Second, infrastructure constraints, including unreliable internet connectivity and system downtimes, reduce the perceived reliability of digital systems. Third, limited taxpayer

education and awareness campaigns may prevent users from fully understanding the convenience and security benefits of e-collection platforms.

Importantly, low utilization also reflects organizational dynamics within LGUs. When staff continue to prioritize manual processing or lack confidence in digital systems, taxpayers may be implicitly encouraged to rely on traditional payment methods. This creates a self-reinforcing cycle in which low usage justifies limited investment in system enhancement, further constraining adoption.

The findings challenge the assumption common in e-taxation literature that digital payment systems inherently lead to higher compliance and efficiency. Instead, they reinforce emerging scholarship emphasizing that user acceptance, institutional incentives, and service reliability are decisive factors in determining utilization outcomes. Without deliberate strategies to address digital exclusion, system reliability, and behavioral change, e-collection systems risk remaining underutilized despite formal adoption.

Table 6. Transactions Currently Processed

% of E-Transactions	Frequency	Percentage
<10%	17	94.44%
10–25%	3	16.67%
>75%	1	5.88%

2. Effect of E-Collection on Municipal Revenue Efficiency (5 points Likert scale was used to gather the data, WM and SD was used in analyzing the result)

This section presents the findings of the study on the effectiveness of e-collection systems in improving municipal revenue efficiency among selected municipalities in Iloilo Province. The results are presented per efficiency criterion based on the Collection Timeliness, Accuracy and Reliability, Cost-Effectiveness of Operations, and Transparency and Accountability, using weighted mean and standard deviation to interpret the level and consistency of the respondents' perceptions.

2.1. Collection Timeliness

Table 7. Effect of E-Collection on Collection Timeliness

Indicator	WM	SD	Verbal Interpretation
E-collection has sped up taxpayer payment processing compared to manual methods.	4.33	0.66	Very High Effect
Payment posting to the LGU's revenue records is faster with e-collection.	3.76	1.04	High Effect
Delinquency rates in local revenue have decreased since e-collection adoption.	3.14	0.91	Moderate Effect
End-of-day settlement and bank reconciliation are faster and easier.	3.71	1.06	High Effect
Average	**3.74**	**0.92**	**High Effect**

The results indicate that e-collection systems have a high overall association with improved collection timeliness, as reflected in an average weighted mean of 3.74 and a standard deviation of 0.92. The strongest effect is observed in the indicator measuring the speed of taxpayer payment processing compared with manual methods (WM = 4.33), which was rated as a very high effect. This finding suggests that e-collection systems significantly enhance front-end transaction efficiency, primarily by reducing queuing time, simplifying payment procedures, and enabling remote transactions.

From a digital governance perspective, this outcome aligns with theoretical expectations that automation reduces procedural

bottlenecks at the point of service delivery. Faster payment processing also improves taxpayer convenience, which can indirectly support compliance by lowering the non-monetary costs of fulfilling tax obligations.

However, the benefits of improved timeliness appear to be uneven across the revenue collection process. Indicators related to delinquency reduction and end-of-day settlement or bank reconciliation registered only moderate effects, indicating that gains achieved at the transaction stage are not fully transmitted to back-end financial management functions. This divergence highlights a structural limitation in current e-collection implementations, where digital tools expedite payment intake but rely on manual or semi-manual procedures for reconciliation, posting, and compliance monitoring.

The relatively high standard deviation across indicators further suggests heterogeneity in municipal experiences, likely reflecting differences in system integration, staff capacity, transaction volumes, and institutional readiness. In municipalities operating stand-alone systems, delays in reconciliation may offset the time savings achieved at the payment stage, reducing the overall impact on revenue cycle efficiency.

These findings refine existing empirical claims that e-collection systems uniformly enhance revenue timeliness. Instead, the results demonstrate that timeliness improvements are conditional, with strong gains in front-end processes but weaker effects where system interoperability and automated reconciliation are absent. This supports emerging evidence in digital public finance literature emphasizing that process integration, rather than digital payment adoption alone, determines the depth of efficiency gains.

2.2. Accuracy and Reliability of Records

Table 8. Effect of E-Collection on Accuracy and Reliability of Records

Indicator	WM	SD	Verbal Interpretation
Errors in recording collections have been reduced through e-collection.	3.62	0.86	High Effect
E-collection data is reliable for generating timely financial reports.	3.71	0.96	High Effect
Duplicate or fraudulent receipts have decreased after automation.	3.57	0.75	High Effect
Average	**3.63**	**0.86**	**High Effect**

The findings indicate that e-collection systems are associated with a high level of improvement in record accuracy and reliability, as reflected by an average weighted mean of 3.63 and a standard deviation of 0.86. Among the indicators, the statement that e-collection data are reliable for generating timely financial reports recorded the highest mean score (WM = 3.71), suggesting that digital systems enhance the consistency and accessibility of revenue information used for financial reporting.

These results support the premise of public financial management theory that automation reduces human error by minimizing manual encoding, duplication, and transcription mistakes. By generating electronic transaction logs and standardized records, e-collection systems improve the reliability of data inputs used in municipal accounting and reporting processes. This finding is consistent with international evidence showing that digital revenue systems strengthen audit trails and facilitate faster preparation of financial statements.

However, the moderate dispersion of responses, as indicated by the standard deviation, points to variation in system performance across municipalities. This variation may stem from differences in the degree of system integration, the quality of staff training, and the extent to which electronic records are directly linked to accounting and reporting platforms. In municipalities where e-collection systems operate as stand-alone portals, electronic data may still require manual validation and

posting, partially offsetting the accuracy gains offered by automation.

Moreover, while respondents perceived improvements in record reliability, the findings do not eliminate concerns related to data integrity risks, such as system downtime, incomplete transaction capture, or dependence on external vendors for data management. Inadequate technical capacity or weak cybersecurity safeguards may also introduce new vulnerabilities that can affect data accuracy if not properly managed.

These findings contribute to broader debates on digital public finance by illustrating that accuracy improvements from e-collection systems are real but conditional. Digitalization enhances data quality at the transaction level, yet its full benefits depend on institutional capacity, system interoperability, and effective governance of digital records. Without these supporting conditions, gains in accuracy may remain incremental rather than transformative.

2.3. Cost-Effectiveness of Operations

Table 9. Effect of E-Collection on Cost-Effectiveness of Operations

Indicator	WM	SD	Verbal Interpretation
Operating costs of revenue collection have decreased (paper, manpower, logistics).	3.71	0.90	High Effect
Staff time spent on manual encoding and reconciliation has been reduced.	3.81	0.93	High Effect
Collection process requires fewer physical resources (forms, receipts, storage).	3.67	0.97	High Effect
Average	**3.73**	**0.93**	**High Effect**

The results indicate that e-collection systems are associated with a high level of cost-effectiveness, reflected in an average weighted mean of 3.73 and a standard deviation of 0.93. The strongest indicator which is the reduction in staff time spent on manual encoding and reconciliation (WM = 3.81) suggests that automation has meaningfully reduced clerical workload and improved operational efficiency within municipal revenue offices.

From a public finance perspective, these findings align with expectations that digitalization lowers administrative costs by reducing reliance on paper-based processes, physical storage, and repetitive manual tasks. Time savings among revenue personnel allow staff to be reallocated to higher-value functions such as compliance monitoring, taxpayer assistance, and financial analysis, potentially strengthening overall fiscal management capacity.

However, the relatively high standard deviation indicates considerable variation in perceived cost savings across municipalities. This variability suggests that the financial benefits of e-collection systems are not uniform and may depend on contextual factors such as transaction volume, level of system integration, and organizational readiness. Municipalities with low electronic transaction volumes may realize limited cost savings, as fixed costs related to system maintenance, vendor fees, and connectivity persist regardless of usage levels.

Moreover, the findings point to potential offsetting or hidden costs associated with e-collection implementation. While paper and labor costs may decline, new expenditures related to software licensing, cybersecurity, system upgrades, and staff training may partially erode net savings, particularly in smaller municipalities. In cases where systems operate in parallel with manual processes, administrative costs may temporarily increase rather than decrease.

These results refine optimistic narratives in the digital public finance literature by demonstrating that cost-effectiveness gains from e-collection systems are conditional rather than automatic. Efficiency improvements are most pronounced when digital systems reach sufficient scale, are fully integrated with financial management platforms, and are supported by skilled personnel.

2.4. Transparency and Accountability

Table 10. Effect of E-Collection on Transparency and Accountability

Indicator	WM	SD	Verbal Interpretation
E-collection provides clearer audit trails and transaction records.	3.95	1.02	High Effect
Public trust has improved because taxpayers can pay and track online.	4.14	0.65	High Effect
Revenue reports are more transparent and accessible to decision-makers.	3.95	1.02	High Effect
Instances of informal payments or leakage have declined.	3.81	0.81	High Effect
Average	**3.96**	**0.88**	**High Effect**

Among the four efficiency dimensions examined, Transparency and Accountability recorded the highest overall effect, with an average weighted mean of 3.96 and a standard deviation of 0.88. This suggests that respondents consistently perceive e-collection systems as enhancing the openness, traceability, and credibility of municipal revenue transactions. The strongest indicator, public trust has improved because taxpayers can pay and track transactions online, registered a mean score of 4.14, reflecting a high level of confidence in the transparency benefits of digital payment systems.

These findings align closely with digital governance theory, which posits that information visibility, traceability, and auditability are central mechanisms through which technology strengthens public sector accountability. By generating electronic records and real-time transaction logs, e-collection systems reduce information asymmetry between government and taxpayers, thereby improving trust and perceived legitimacy of revenue collection processes.

The availability of digital audit trails and accessible revenue data also enhances internal accountability within local government units. Automated transaction records support easier verification, monitoring, and auditing, reducing opportunities for informal payments, discretionary manipulation, or revenue leakage. This finding is consistent with international empirical studies that identify transparency gains as one of the most immediate and observable benefits of e-tax and e-payment systems, even when other efficiency outcomes remain uneven.

However, the relatively high standard deviation indicates variation in the extent to which transparency gains are realized across municipalities. Differences in system integration, reporting capabilities, and public access to information may influence how transparency is experienced by both administrators and taxpayers. In municipalities where e-collection platforms are not fully linked to accounting and reporting systems, transparency may be limited to payment confirmation rather than extending to comprehensive financial disclosure or performance monitoring.

Moreover, transparency gains through digitalization are not without risks. Increased reliance on electronic systems introduces concerns related to data privacy, cybersecurity, and system reliability. If not properly governed, these risks may undermine public trust, particularly in cases of system downtime or data breaches. Transparency, therefore, depends not only on access to information but also on the perceived security and integrity of digital platforms.

3. Challenges Faced by Municipalities in Implementing and Sustaining E-Collection Systems

In this part, the operational challenges, technical and administrative issues that the selected municipalities face in the implementation and sustainability of the e-collection systems are laid out. This discussion is illustrated with frequency data and the relevant bar graphs which depict the challenges respondents reported in relative proportions.

3.1. Operational Challenges

The findings indicate that operational challenges are primarily behavioral and communicational in nature, rather than purely technological. The most frequently reported issues include taxpayer reluctance to use electronic payment channels, a persistent preference for manual or cash-based transactions, and limited outreach or information dissemination regarding e-collection systems. These challenges are reflected in the continued dominance of walk-in payments, which undermines the efficiency gains expected from digital revenue collection. From a digital governance perspective, these results suggest that the effectiveness of e-collection systems is strongly conditioned by user acceptance and behavioral adaptation. Technology adoption alone does not guarantee utilization; rather, it must be accompanied by deliberate efforts to reshape taxpayer behavior, build trust, and normalize digital payment practices. This finding aligns with international evidence indicating that resistance to change and low digital literacy are major barriers to successful e-government implementation, particularly at the local level.

Infrastructure-related constraints further compound these behavioral challenges. Respondents cited unstable internet connectivity and difficulties in persuading taxpayers to complete digital transactions as major operational obstacles. Interruptions during real-time transaction processing not only delay payments but also erode user confidence in the reliability of e-collection platforms. In such contexts, taxpayers may revert to manual methods perceived as more dependable, reinforcing low utilization patterns.

Additional operational issues include limited system availability, poor digital literacy among taxpayers, and the absence of dedicated personnel to manage daily e-collection operations. These constraints reduce the responsiveness of local governments to user concerns and hinder timely troubleshooting, thereby weakening the overall service experience. Resistance among personnel, particularly those accustomed to traditional collection processes also contributes to operational inertia, as staff may be hesitant to fully transition to or promote digital systems.

Finally, coordination problems with external factors, such as banks and payment service providers, were identified as operational challenges, albeit less frequently. Weak system integration, transaction validation delays, and limited technical support from service providers can disrupt payment flows and introduce uncertainty into the revenue collection process.

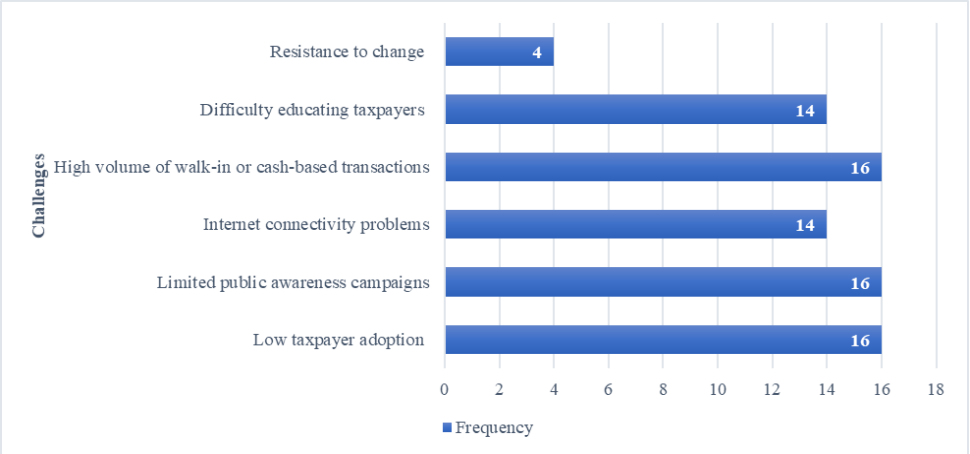

Figure 1. Operational Challenges Faced by LGUs in Implementing and Sustaining E-Collection Systems

To summarize, challenges faced while implementing e-collection systems operationally boil down to the systems coordination, communication, and adaptive behaviour of the people involved. E-collection systems operational issues infrastructure and technology are

of less importance when compared to user acceptance and user awareness. The operational strengthening of e-collection systems will be the result of improved public education campaigns, reinforced digital literacy, and more active partnerships with financial institutions. All of the above will increase the taxpayers' trust and willingness to participate. All these things will operationally strengthen systems, but more importantly, they will serve the e-collection systems' operational functionality e-collection systems of the municipality.

3.2. Technical Challenges

The findings reveal that technical challenges constitute a major constraint on the effective functioning of e-collection systems, particularly in terms of system integration, institutional capacity, and user confidence. A prominent issue identified is the limited connectivity between e-collection platforms and treasury or accounting systems, which often results in delayed posting of payments and inconsistencies in financial reports. This lack of interoperability weakens real-time revenue monitoring and constrains the ability of local governments to maintain accurate and timely financial records. The results further highlight capacity-related technical gaps within local government units. Limited expertise in system operation, maintenance, and troubleshooting increases dependence on external vendors for resolving technical issues. Such reliance can create delays in system recovery, exacerbate IT silos, and reduce institutional control over critical financial infrastructure. From a digital governance standpoint, this dependency undermines sustainability and increases vulnerability to service disruptions.

From the taxpayer perspective, technical instability has direct behavioral consequences. Respondents reported instances of incomplete or failed transactions, which generate frustration and discourage continued use of digital payment channels. Concerns regarding transaction security and data privacy further erode trust in e-collection systems, particularly in contexts where cybersecurity safeguards and communication about data protection measures are insufficient.

On the organizational side, inadequate vendor support and difficulties in producing reliable, real-time financial reports limit the capacity of municipalities to engage in data-driven decision-making. When systems cannot consistently generate accurate or timely reports, transparency and accountability objectives are compromised, reducing the strategic value of digital revenue systems.

These findings resonate with international empirical research emphasizing that the success of e-government and e-tax initiatives depends heavily on system reliability, interoperability, and cybersecurity assurance. Technical weaknesses not only reduce efficiency but also interact with behavioral and institutional factors to suppress utilization and trust.

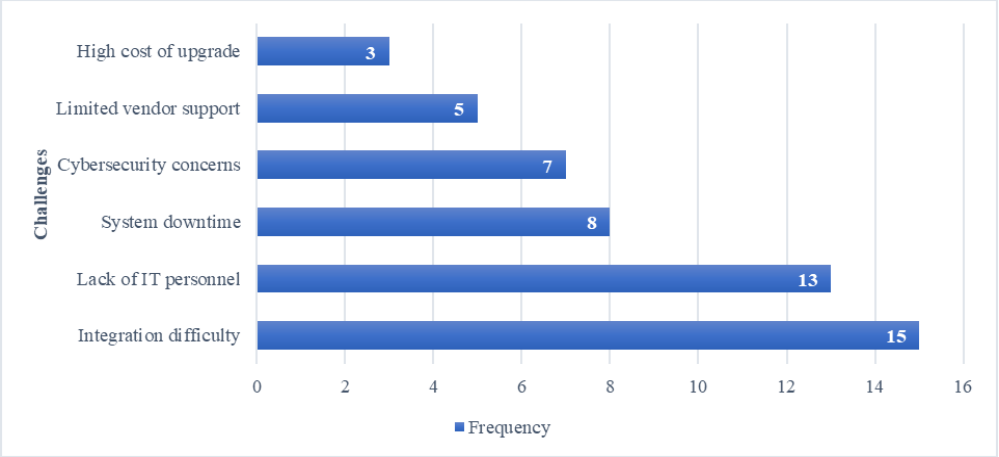

Figure 2. Technical Challenges Faced by LGUs in Implementing and Sustaining E-Collection Systems

These technical limitations underscore the need to improve system infrastructure, build local IT capacity and establish supportive partnerships with system vendors. Addressing integration gaps, strengthening system support, and improving investment in cybersecurity will allow the organization provide a more resilient and confident e-collection system.

3.3. Administrative Challenges

The findings indicate that the most persistent barriers to effective e-collection implementation are administrative and institutional rather than technological. The most frequently cited challenge is the absence of dedicated budget allocations for system maintenance and sustainability, reported by a large proportion of municipalities. Budgets that prioritize initial system acquisition but fail to account for recurring costs such as software updates, cybersecurity, training, and technical support, significantly limit the long-term viability of e-collection initiatives.

Closely related to this issue is the lack of formal local policies or ordinances institutionalizing e-collection systems. In many municipalities, the absence of clear regulatory frameworks results in fragmented implementation, weak enforcement, and unclear accountability across offices. Without formal policy mandates, e-collection systems risk being treated as optional or temporary initiatives rather than as integral components of local revenue administration. This finding reflects a broader governance problem in which digital reforms exist in practice but lack legal and institutional anchoring.

Respondents also identified weak monitoring and evaluation (M&E) mechanisms as a major administrative constraint. Without systematic performance tracking, local governments are unable to assess efficiency gains, identify bottlenecks, or justify further investment in digital systems. The absence of data-driven feedback loops limits organizational learning and undermines evidence-based decision-making, a core principle of modern public financial management.

Additional administrative barriers include overly complex procurement procedures, which delay system acquisition or upgrades, and high staff turnover, which disrupts institutional memory and continuity in system management. These challenges further weaken coordination among finance, treasury, and information technology units, resulting in slowed operations and inefficient use of digital infrastructure.

Leadership-related issues, although cited less frequently, remain significant. The lack of sustained top-level support for digital transformation reduces organizational commitment and weakens interdepartmental collaboration. In the absence of strong leadership advocacy, digital initiatives struggle to mobilize resources, align stakeholders, and maintain momentum.

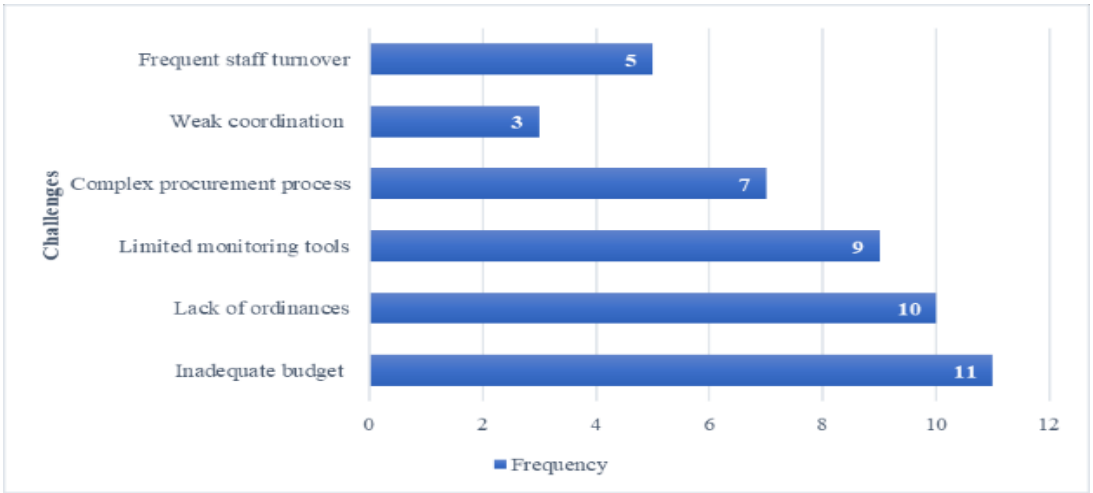

Figure 3. Administrative Challenges Faced by LGUs in Implementing and Sustaining E-Collection Systems

All of these administrative barriers reveal how essential it is to improve policy clarity, interdepartmental cooperation, and active participation of leadership. Improving these points will help fully integrate, operationalize, and financially sustain e-collection systems, thereby meeting efficient and open local governance targets.

4. Strategies and Policy Recommendations

From the frequency distribution analysed, respondents highlighted five key strategies as the most valuable actions regarding the feature and the sustainability of e-collection systems in selected Municipalities in Iloilo Province. This shows balance across the dimensions of policy, financing, capacity building, and citizen participation.

Table 11. Strategies to Optimize E-Collection Implementation

Strategy	Frequency
1. Enact or update local ordinances to institutionalize and regulate e-collection systems.	7
2. Allocate a dedicated annual budget for maintenance, upgrades, and expansion of digital payment platforms.	6
3. Integrate e-collection with treasury and accounting systems for seamless reporting and reconciliation.	6
4. Provide regular training for finance, treasury, and IT staff on system use and troubleshooting.	5
5. Conduct massive taxpayer information and awareness campaigns to promote e-payments.	5

a. Enact or Update Local Ordinances to Institutionalize and Regulate E-Collection Systems

Creating or updating local ordinances to formally institutionalize e-collection systems emerged as the most strongly supported policy recommendation among respondents. This finding reflects a recognition that, in the absence of a clear legal mandate, e-collection initiatives risk remaining ad hoc, experimental, or dependent on the discretion of incumbent local officials. Formal legislation provides the legal certainty necessary to embed e-collection systems within the routine administrative and financial operations of local government units (LGUs).

From a public financial management and digital governance perspective, legal institutionalization serves several critical functions. First, it clarifies roles, responsibilities, and accountability across municipal offices involved in revenue collection, reducing fragmentation and inconsistent enforcement. Second, it elevates e-collection from a pilot or optional practice to a core revenue-generating mechanism, ensuring continuity beyond political or leadership transitions. Third, it provides the legal basis for allocating budgets, enforcing compliance, and integrating digital systems into existing financial management frameworks.

National policy directives issued by the Department of Finance (DOF) and the Bureau of Local Government Finance (BLGF) already identify e-collection as a minimum standard for modern local revenue administration. However, the findings suggest that national guidance alone is insufficient without corresponding local ordinances that operationalize these standards within municipal contexts. Local legislation serves as the critical link between national digital governance objectives and day-to-day administrative practice at the municipal level.

Importantly, institutionalizing e-collection through legislation also reduces excessive administrative discretion in the adoption and use of digital systems. By codifying e-collection requirements, LGUs can minimize inconsistencies in implementation, limit the reversal of digital reforms, and strengthen transparency and accountability mechanisms. This is particularly relevant given earlier findings that uneven system integration, limited training, and weak monitoring frameworks constrain the effectiveness of e-collection systems.

The Department of Finance (DOF) along with the Bureau of Local Government Finance (BLGF) has integrated e-collection systems as the minimum standard practice. These legal provisions will diminish the administrative discretion of the management of the local government units with respect to e-collection systems.

b. Allocate a Dedicated Annual Budget for Maintenance, Upgrades, and Expansion of Digital Payment Platforms

The second most frequently cited strategy emphasizes the need for regular and dedicated budgetary allocations to support the maintenance, upgrading, and expansion of e-collection systems. Respondents consistently noted that while initial system setup costs are often subsidized through national programs or external grants, the long-term operational costs of e-collection systems remain the responsibility of local government units.

These recurring expenditures include server maintenance, software licensing and updates, cybersecurity measures, system integration with treasury and accounting platforms, and continuous staff training. Without predictable and sustained funding, e-collection systems risk becoming obsolete, unreliable, or underutilized, undermining their intended efficiency and transparency benefits.

From a public financial management perspective, this finding underscores the importance of treating e-collection systems as recurring fiscal investments rather than one-time capital expenditures. Sustainable digital revenue systems require life-cycle financing models that account for both technological and human resource costs. Failure to plan for these recurrent expenses contributes to system downtimes, weak cybersecurity, and inadequate technical support issues already identified in the study's operational and technical challenge findings.

The recognition by respondents that e-collection expenditures must be institutionalized within annual budgets represents a critical shift in administrative mindset. This transition reflects an emerging understanding that digital governance reforms demand ongoing financial commitment to remain effective and credible. Moreover, predictable budget allocations enable municipalities to plan strategically for system enhancements, scale electronic transaction volumes, and reduce reliance on ad hoc funding sources.

c. Integrate E-Collection with Treasury and Accounting Systems for Seamless Reporting and Reconciliation

The integration of e-collection systems with municipal treasury and accounting platforms emerged as one of the most critical strategic priorities identified by respondents. Participants emphasized that system integration is essential for achieving real-time reconciliation, minimizing human error, and strengthening internal control mechanisms within local government financial management.

Automated posting of collections directly into treasury and accounting systems enables immediate alignment between cash inflows and recorded revenues. This real-time reconciliation reduces discrepancies between actual collections and reported figures, enhances the reliability of financial statements, and strengthens audit trails. In contrast, municipalities that continue to operate stand-alone payment portals remain reliant on manual verification and reconciliation, increasing the risk of delays, errors, and data inconsistencies.

From a public financial management perspective, integrated systems improve fiscal transparency and internal accountability by enabling continuous monitoring of revenue performance and facilitating timely reporting. Enhanced interconnectivity among collection, treasury, and accounting systems also supports stronger internal controls by reducing discretionary handling of revenue data and limiting opportunities for manipulation or leakage.

The findings further indicate that system integration is a prerequisite for evidence-based management. When financial data are generated and consolidated automatically, local governments are better positioned to analyze revenue trends, assess policy impacts, and make informed budgetary and operational decisions. This capability is particularly important for municipalities seeking to improve revenue forecasting, compliance monitoring, and strategic resource allocation.

d. Provide Regular Training for Finance, Treasury, and IT Staff on System Use and Troubleshooting

The need for regular and structured training programs emerged as a recurring theme in respondents' feedback, underscoring the central role of human capacity in the effective use of e-collection systems. Training equips personnel not only with operational knowledge but also with the skills necessary to troubleshoot technical issues, manage system disruptions, and provide informed assistance to taxpayers using digital payment platforms.

The findings indicate that many local government units possess limited in-house technical capacity, resulting in heavy reliance on external vendors or contractors for system maintenance and problem resolution. While vendor support may be necessary during initial implementation, excessive dependence can delay responses to technical issues, increase operational costs, and weaken institutional control over digital revenue systems. Regular training helps mitigate these risks by developing internal competencies and reducing long-term dependency on external service providers.

From a digital governance perspective, continuous capacity building supports the institutionalization of digital reforms by strengthening organizational resilience and preserving institutional memory, particularly in environments characterized by staff turnover. Training also fosters closer collaboration among finance, treasury, and information technology units, helping to break down organizational silos that hinder system integration and coordinated revenue management.

Moreover, aligning training programs with the specific digital systems in use ensures that personnel can fully leverage system functionalities rather than using them in limited or suboptimal ways. This alignment is essential for advancing the broader digital transformation agenda in local governance, where technology-driven reforms must be matched by commensurate investments in human capital.

e. Conduct Massive Taxpayer Information and Awareness Campaigns to Promote E-Payments

Despite the availability of e-collection systems, respondents emphasized that low taxpayer adoption remains a critical barrier, largely due to limited understanding, trust deficits, and concerns over transaction security. These findings indicate that technological readiness alone is insufficient; behavioral acceptance and public confidence are decisive factors in determining the utilization of digital revenue systems.

Trust-building information and awareness campaigns were identified as essential interventions for demonstrating the convenience, safety, and reliability of e-collection platforms. Clear communication on how transactions are processed, secured, and recorded can help alleviate fears related to data privacy, failed payments, or financial loss. From a digital governance perspective, transparency in system operation enhances legitimacy and fosters citizen trust in digital public services.

Evidence from municipalities that invested in orientation sessions, instructional materials, and visible information campaigns suggests that these efforts are associated with higher transaction volumes and smoother system adoption. Such initiatives lower informational barriers, reduce resistance rooted in unfamiliarity, and normalize digital payment behavior among taxpayers. Positive dissemination of information also mitigates misinformation and reduces backlash against digital reforms.

These findings are consistent with behavioral public finance literature, which highlights the role of information, trust, and perceived ease of use in shaping compliance behavior. By framing e-collection as a secure and user-friendly option rather than a compulsory or opaque system, municipalities can cultivate a more cooperative and compliant taxpayer environment.

Conclusion

This study examined the relationship between e-collection system adoption and municipal revenue efficiency in selected municipalities of Iloilo Province, Philippines. Consistent with international evidence on digital public finance, the findings indicate that e-collection systems are associated with improvements in

key dimensions of revenue efficiency particularly collection timeliness, record accuracy, cost-effectiveness, and transparency and accountability. Among these, transparency and accountability emerged as the most pronounced benefit, reflecting the role of digital systems in strengthening audit trails, public trust, and revenue traceability.

However, the results also demonstrate that efficiency gains are uneven and conditional. While e-collection systems significantly improve front-end payment processing, their impact on delinquency reduction, real-time reconciliation, and overall utilization remains limited. Most municipalities continue to process only a small share of transactions electronically, and system integration with treasury and accounting platforms is largely incomplete. These findings indicate that technology adoption alone is insufficient to transform municipal revenue performance; institutional capacity, system interoperability, sustained financing, and user acceptance are decisive factors.

The study's conclusions should be interpreted with appropriate caution. The analysis is based on a descriptive, cross-sectional research design and relies primarily on perceptual data from key municipal officials, which limits causal inference and statistical generalizability. The sample is confined to selected municipalities within a single province, and the study does not control for external influences such as economic conditions, staffing levels, or concurrent policy reforms. As such, the findings highlight associations and implementation patterns rather than definitive causal effects.

Despite these limitations, the study yields actionable policy insights grounded in empirical evidence. Rather than broadly recommending the adoption of e-collection systems, the findings point to specific priorities for local governments:

1) institutionalizing e-collection through local ordinances to ensure continuity and accountability;
2) allocating dedicated annual budgets for system maintenance, cybersecurity, and training;
3) integrating e-collection platforms with treasury and accounting systems to enable real-time reconciliation and internal control;
4) investing in continuous capacity building to reduce vendor dependence and strengthen institutional resilience; and
5) implementing sustained taxpayer information and trust-building campaigns to close the gap between system availability and actual use.

Future research can build on this study by employing longitudinal or quasi-experimental designs, such as panel data or difference-in-differences approaches, to more rigorously estimate the causal impact of e-collection systems on revenue outcomes. Studies that integrate administrative revenue records with system usage data would allow for more precise measurement of efficiency gains, compliance behavior, and cost savings. Further research may also explore the role of organizational culture, leadership, and political incentives in shaping the success of digital revenue reforms at the local level.

In summary, this study contributes to the growing literature on digital public finance by demonstrating that e-collection systems can enhance municipal revenue efficiency, but only when embedded within robust institutional, administrative, and behavioral frameworks. E-collection should therefore be understood not as a stand-alone technological solution, but as part of a broader digital governance reform agenda aimed at strengthening fiscal capacity, accountability, and public trust in local government.

In order to maintain and enhance electronic collection (e-collection) services in specific municipalities, the following is suggested:

1. Each municipality should create or amend ordinances to solidify the integration of e-collection systems into the administrative and financial procedures of their operations. Given the varying maturity of systems and staff capabilities in different municipalities, the continuation of targeted technical support, supplemented by training, should be integrated to address these disparities. In terms of cost reduction and resource conservation, municipalities have

highlighted e-collection's value in streamlining operational processes, reducing the time employees spend on the burdensome tasks of manual data entry, encoding, and reconciliation, thus enabling a shift to more strategic and value-adding activities. The system's ability to provide transparency and accountability has been most exemplary. The ability of taxpayers to pay and monitor their transactions in real time has cemented trust and considerably reduced the likelihood of informal and noncompliant transactions.

2. Each year, municipalities are required to predict and allocate budget provisions for the installation and the provision of ongoing maintenance for systems, software, and cyber security, as well as the training of staff. Predictable systems and operations are funded ongoing, and services and operational continuity help to foster and sustain public confidence.
3. For e-collection systems to minimize mistakes and maximize efficiency, automated account reconciliation and real-time reporting should be made standard features. Overall, enhanced system integration improves transparency and supports proactive management of public funds. Greater integration of the systems increases transparency and fiscal management overall.
4. The integration of finance with IT systems requires sophisticated training and support, which should be offered to the general public as well. Educational and informational campaigns to promote the use of electronic payments should underscore their convenience and security.
5. There are many and varied important means to support the development of performance dashboards, secure partnerships with banks and fintech companies, and support targeted improvements of internet access in underserved areas.

The combination of sound policies, adequate funding, skilled personnel, and an educated citizenry, is what best supports the e-collection systems and boosts the governance efficiency, accountability, and public trust in local governments throughout the nation in full.

To put it simply, e-collection is an technological reform innovation driven towards the improvement of efficiency, accountability, and transparency in local governance, thus e-collection improves local fiscal administration. However, for e-collection to be sustainable, local ordinances, consistent budgets, and trained personnel and active citizenry around e-collection systems must be in place. Local governments enhance the expected e-collection, foundational to digital governance, to be interactively and effectively delivered to the community by the synergistic deployment of technology and social systems.

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