EXPLORING THE APPLICABILITY OF ARTIFICIAL INTELLIGENCE IN LOCAL GOVERNMENT UNITS IN THE ZAMBOANGA PENINSULA, PHILIPPINES

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Abstract

Local government units (LGUs) in the Philippines are under pressure to deliver faster, more transparent, and citizen-responsive services under constrained fiscal and human-resource conditions. Artificial intelligence (AI) has been promoted internationally as a tool for administrative automation, decision support, and citizen-facing service interfaces, yet empirical evidence on feasibility in non-metropolitan LGUs remains limited. This study examines the applicability of AI in LGUs in the Zamboanga Peninsula (Region IX), Philippines. Using a mixed-methods design, the research integrates a survey of LGU employees (n=200), key informant interviews (n=10), and focus group discussions (10 groups) to assess current adoption patterns, perceived benefits, readiness conditions, and barriers. Findings suggest that AI adoption is emerging but uneven. Reported use is largely concentrated in back-office functions such as data processing, document management, and basic analytics, with limited deployment in higher-risk applications such as predictive analytics and automated citizen engagement. Participants perceive potential gains in operational efficiency, data-driven decision making, and service accessibility, but emphasize persistent constraints in data infrastructure, digital skills, procurement and financing, and governance safeguards related to privacy, cybersecurity, and accountability. The paper proposes a staged implementation pathway for Region IX LGUs that prioritizes data governance foundations, capacity development, and responsible AI controls before scaling complex use-cases, and recommends regional partnerships with universities and technology providers to address capability gaps and reduce duplication across LGUs.

Keywords: *artificial intelligence; local government units; digital government; service delivery; public sector innovation; Philippines*

1. INTRODUCTION

Governments worldwide are experimenting with artificial intelligence (AI) to increase efficiency, strengthen operational decision making, and expand access to public services. AI systems—including machine learning, natural language processing, and rule-based automation—can support a range of government tasks, from document classification and workflow routing to risk scoring, resource allocation, and automated service interfaces. In local government, these functions are attractive because LGUs often manage high transaction volumes with limited staffing, fragmented records, and uneven digital infrastructure.

At the same time, AI introduces governance risks: opaque decision rules, biased outcomes, cybersecurity vulnerabilities, and privacy threats can undermine legitimacy and trust if deployments are not properly governed.

In the Philippines, decentralization assigns LGUs substantial responsibilities for basic services, local development planning, and frontline administrative functions under the Local Government Code. Yet LGUs differ widely in fiscal space, administrative capacity, and ICT maturity. These differences are particularly salient outside major metropolitan areas where connectivity and system integration may be weaker. Region IX (Zamboanga Peninsula) offers a relevant setting because it includes LGUs with diverse capability profiles—urban and rural, coastal and inland—and faces persistent service delivery challenges that could plausibly benefit from digital transformation.

This study examines the applicability of AI in LGUs in the Zamboanga Peninsula. It addresses three questions: (1) What AI-related applications are currently used or piloted in Region IX LGUs? (2) What benefits do LGU personnel and stakeholders associate with AI integration? and (3) What organizational, infrastructural, and governance constraints shape AI applicability and scalability? By answering these questions, the study provides evidence to inform policy design, administrative capacity building, and responsible AI governance in Philippine local government.

2. Related Literature and Local Evidence

The literature on AI in government highlights both transformational potential and institutional constraints. In local government, AI is commonly framed as an enabler of process efficiency, information quality, and citizen experience. Empirical studies also emphasize implementation barriers in public organizations, including procurement rigidity, workforce skill gaps, legacy system fragmentation, and risk-averse administrative cultures. These constraints can be magnified in developing contexts where data infrastructures are incomplete and governance safeguards are inconsistently enforced.

2.1 AI functions and use-cases in local governance

Across jurisdictions, the most frequently documented AI use-cases in local government include: (a) administrative automation (document intake, routing, records management, and workflow optimization); (b) analytic decision support (dashboards, anomaly detection, and evidence synthesis for planning and budgeting); (c) citizen-facing engagement (chatbots, automated FAQ systems, and language-enabled service portals); and (d) predictive and risk analytics (forecasting service demand, identifying vulnerable populations, and anticipating compliance or hazard risks). Adoption tends to begin with low-risk workflow and information management improvements, then expands toward citizen interfaces and predictive tools such as data maturity, institutional competence, and safeguards improve.

Recent work emphasizes that the organizational locus of benefit is often mundane but meaningful: document turnaround times, backlog reduction, and faster production of management reports. For LGUs, these improvements can translate into shorter queues, clearer transaction tracking, and a greater ability to meet mandated reporting requirements.

2.2 Organizational and governance challenges

AI adoption in public organizations is mediated by institutional rules and public accountability requirements. Common barriers include the rigidity of public procurement, limited ability to attract specialized talent, and fragmented data ownership across offices. AI also creates distinctive accountability challenges because public decisions implicate rights, entitlements, and distributive outcomes. Key risks include privacy failures, biased model outputs, and weakened due process when automated recommendations are treated as determinations. The literature emphasizes governance mechanisms such as privacy impact assessments, model documentation, audit trails, human-in-the-loop decision making, and accessible grievance procedures—controls that are often weak in smaller local government.

These issues are amplified when AI systems are sourced from vendors without adequate documentation or when staff lack the capacity to validate model behavior. Responsible AI implementation therefore requires institutional routines for monitoring, documentation, and escalation—not only technical fixes.

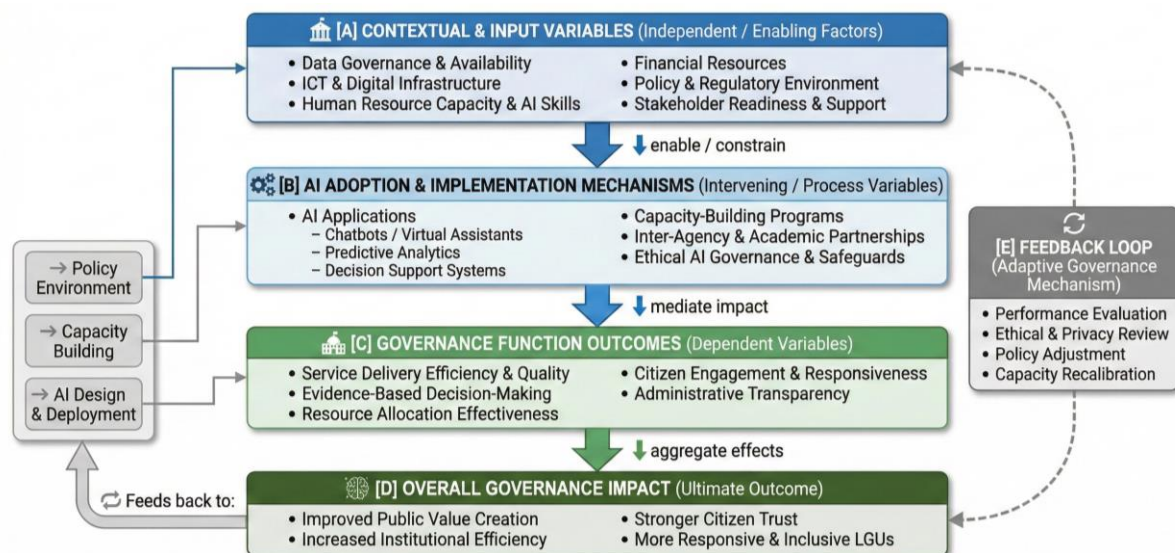## 2.3 Philippine and Zamboanga Peninsula context

Philippine studies on digital government point to uneven adoption across LGUs, where urban centers typically lead in ICT investments while smaller municipalities face constraints in hardware, connectivity, and specialized staff. In Zamboanga City and the broader peninsula, local studies have examined AI-related initiatives such as chatbot-based citizen information services, analytics for public safety or service monitoring, and exploratory readiness assessments. These studies underline that benefits are plausible, but scaling requires sustained investment, capacity building, and clearer policies on data governance and ethical use.

Within Region IX, the diversity of LGUs means that a one-size-fits-all model is unlikely to work. Larger cities can potentially develop in-house analytic functions, whereas smaller municipalities may need shared services, pooled procurement, and external technical assistance.

2.4. Conceptual Framework

The study uses an organizational readiness and governance framework that treats AI adoption as a socio-technical change process rather than a purely technological upgrade. AI applicability is defined as the extent to which an LGU can (i) deploy AI tools that demonstrably improve governance performance and (ii) manage the attendant risks in ways consistent with public accountability.

Figure 1
Conceptual Framework for the Applicability of AI in LGUs

Enabling conditions include: (1) data readiness (availability, quality, standardization, and accessibility across offices); (2) infrastructure readiness (connectivity, hardware, software platforms, and interoperability); (3) human capacity (digital literacy, analytic skills, and change management competence); and (4) institutional alignment (leadership support, budgeting and procurement, and cross-office coordination). Risk management capacity includes privacy compliance, cybersecurity controls, transparency and auditability, and mechanisms for accountability and citizen redress.

This framework is used to interpret adoption patterns observed in the study and to structure recommendations as staged interventions that build both capability and safeguards.

3. METHODOLOGY

The research uses a mixed-methods approach to triangulate adoption patterns, perceptions, and contextual constraints in Region IX LGUs.

Design and participants. A survey instrument (10 items) was administered to 200 LGU employees to capture perceived AI adoption, perceived usefulness, and perceived constraints. Qualitative data were collected through ten semi-structured interviews with key stakeholders (LGU officials, ICT personnel, and related stakeholders) and ten focus group discussions (FGDs) with mixed participants from LGUs, AI-related organizations, and community stakeholders.

Data collection and analysis. Survey responses were summarized using descriptive statistics to describe adoption patterns and perceived feasibility. Interview and FGD data were analyzed using thematic analysis, with codes developed inductively around reported use-cases, benefits, barriers, and governance requirements. Quantitative and qualitative findings were integrated during interpretation to identify convergent patterns and explanatory themes.

Trustworthiness. Triangulation across methods was used to validate recurring patterns. Divergent responses were retained to capture heterogeneity in LGU contexts and to avoid overgeneralization.

Ethics. Participation was voluntary and based on informed consent. Responses were treated confidentially and reported in aggregate. Given the topic's sensitivity (data privacy and cybersecurity), the study treats governance safeguards as integral components of AI applicability.

Table 1
Data sources and participants

Component	Instrument	Participants	Core focus
Quantitative	Survey (10 items)	LGU employees (n=200)	Perceived adoption, use-cases, benefits, constraints
Qualitative	Key informant interviews	Stakeholders (n=10)	Implementation experience; readiness; governance risks
Qualitative	Focus group discussions	10 groups (mixed)	Validate themes; surface divergent perceptions

4. RESULTS

Findings indicate emerging but uneven AI adoption across Region IX LGUs. Respondents frequently described AI use as partial and task-specific rather than system-wide transformation. Where AI is present, it is often embedded within existing software platforms (analytics

modules, automated sorting and classification features, or rule-based workflow tools) rather than stand-alone machine learning systems. This matters because perceived "AI adoption" can refer to varying levels of sophistication—from simple automation to more advanced learning-based systems.

Across respondents, the overall pattern suggests that AI is currently understood and used primarily as an operational tool rather than as a strategic governance capability.

4.1 Areas of reported AI application

Participants most commonly associated AI with administrative and managerial functions. Reported applications include automation of clerical processes (routing, templates, and repetitive encoding tasks), basic analytics for reporting and monitoring, and decision-support functions that help managers synthesize information for routine operational decisions. Where discussed, AI-supported public safety applications and citizen-facing engagement tools (e.g., chatbots) were viewed as promising but less widely institutionalized. Predictive analytics applications were least common, reflecting both data maturity constraints and the governance sensitivity of predictive outputs.

Respondents also emphasized that AI-related applications are often confined to specific offices or projects, and cross-office interoperability remains limited. This restricts the value of AI tools that rely on integrated datasets (e.g., social services, health, permits, and local finance).

4.2 Perceived benefits

Across data sources, perceived benefits clustered into four themes. First, operational efficiency: participants emphasized faster processing, reduced paperwork, and fewer repetitive manual tasks when automation is used. Second, decision quality: analytics was perceived to support evidence-informed planning, performance monitoring, and more systematic prioritization. Third, service accessibility: citizen-facing tools were perceived to reduce bottlenecks and extend service information beyond office hours. Fourth, transparency and accountability: improved data processing was viewed as a potential basis for more transparent reporting and reduced discretionary handling of transactions, although participants stressed that transparency ultimately depends on institutional rules and audit mechanisms.

In interviews, stakeholders also framed AI as a mechanism to professionalize administrative routines by standardizing output and strengthening documentation practices.

4.3 Readiness constraints and barriers

Barriers were substantial and provide the clearest explanation for uneven applicability. Resource constraints are foundational: many LGUs reported limited budgets for digital infrastructure, software licensing, and skilled positions. Capacity constraints are also acute, especially shortages of staff with data management, analytics, and AI-related competencies. Participants described fragmented data ecosystems (multiple unintegrated databases), inconsistent data standards across offices, and uneven connectivity that complicate system integration and real-time analytics.

Governance risks further constrain adoption. Participants raised concerns over data privacy, cybersecurity, and accountability for AI-supported recommendations. These concerns were tied to uncertainty about policies, insufficient security controls, and limited institutional experience in documenting and auditing automated systems. In practical terms, LGUs were

reluctant to deploy higher-stakes AI functions when they could not clearly specify who is accountable for errors, how data is protected, and how citizens can contest outcomes.

Finally, organizational change was itself cited as a barrier. Some participants anticipated resistance due to fear of job displacement, uncertainty about new workflows, and skepticism about technology reliability.

Table 2
Summary of perceived benefits and barriers (synthesized themes)

Theme	Illustrative perceived benefit	Corresponding barrier / constraint
Efficiency and workflow	Faster processing and reduced manual work	Low digitization baseline; fragmented workflows; limited automation tools
Decision support	Improved monitoring and planning using data	Data quality issues; lack of analytics skills; inconsistent standards
Citizen access	Information services beyond office hours; fewer queues	Limited system integration; UX and language issues; trust and uptake constraints
Accountability and risk	Potential for consistent, trackable processes	Privacy and cybersecurity concerns; unclear accountability for AI outputs

5. DISCUSSIONS

The evidence suggests that AI applicability in Region IX LGUs is best framed as an incremental capability-building agenda rather than a rapid transformation initiative. Most reported use-cases correspond to low-to-moderate complexity tasks where AI augments existing administrative processes and where performance gains can be quickly observed. This pattern is consistent with innovation diffusion accounts: organizations adopt technologies first in areas with clear relative advantage and lower implementation risk.

The limited uptake of predictive analytics and advanced citizen-facing systems reflects a data maturity and governance constraint. Predictive tools require consistent, high-quality, and sufficiently granular data over time; they also require governance safeguards because outputs can influence distributive decisions. Where these prerequisites are weak, AI adoption remains exploratory. Importantly, participants' emphasis on privacy, cybersecurity, and accountability indicates that governance risk is not a secondary consideration but a central determinant of applicability.

From a public value perspective, AI adoption should be assessed not only by efficiency, but also by equity, transparency, and procedural fairness. An AI system that accelerates processing but introduces bias, weakens privacy, or obscures accountability may undermine public trust and ultimately reduce governance performance.

Region IX LGUs therefore need to treat AI as a governance program: a coordinated set of investments in data, infrastructure, people, rules, and monitoring mechanisms.

6. POLICY AND PRACTICE RECOMMENDATIONS

Based on the study, four policy directions are recommended for Region IX LGUs and regional stakeholders:

a. Build data governance foundations. LGUs should develop data inventories, assign data stewardship roles, adopt basic data standards, and conduct privacy impact assessments before deploying AI tools. Data governance is the enabling layer for analytics and protects against privacy and integrity failures.

b. Invest in people and institutional routines. Capacity building should cover both technical skills (data management, analytics, and system administration) and governance skills (risk assessment, procurement, and performance evaluation). AI task forces or designated focal units can coordinate pilots, documentation, and cross-office alignment.

c. Pilot low-risk use-cases with measurable service metrics. Early pilots should prioritize administrative automation and decision support where benefits can be measured (processing time, error rates, backlog reduction) and where human oversight is straightforward. Scaling to predictive analytics and automated citizen interfaces should occur only after baseline infrastructure and safeguards are in place.

d. Strengthen partnerships and shared services. Regional collaboration among LGUs can reduce duplication through shared templates, procurement learning, and interoperable data standards. Partnerships with universities and technology providers can supply technical assistance and training, while also supporting evaluation and ethical oversight.

Operationally, LGUs can embed these recommendations into annual investment plans and capacity development plans, with clear indicators (e.g., percent of offices with digitized records, percent of staff trained in data governance, and completion of privacy impact assessments for AI pilots).

Table 3
Proposed staged roadmap for responsible AI adoption in LGUs

Stage	Primary objective	Typical AI-enabled activities	Minimum safeguards
Stage 1: Foundations	Establish readiness and governance baseline	Digitization; data inventories; standard reporting dashboards	Privacy compliance; basic cybersecurity; data stewardship roles
Stage 2: Controlled pilots	Demonstrate value in low-risk functions	Workflow automation; document classification; basic analytics decision support	Human-in-the-loop; audit logs; pilot evaluation metrics

Stage 3: Scaling and integration	Expand to citizen-facing and inter-office processes	Chatbots/virtual assistants; integrated case management; service portals	Security hardening; transparency notices; grievance channels
Stage 4: Advanced analytics	Use predictive tools for proactive governance	Forecasting; risk scoring; resource optimization models	Model documentation; bias testing; independent review; periodic audits

7. Limitations and Future Research

The study's findings should be interpreted in light of limitations. Adoption measures are primarily self-reported and may reflect varying understandings of what qualifies as "AI," especially when embedded features in software are involved. The research focuses on perceptions and reported practices rather than direct system audits; future studies could incorporate administrative datasets, procurement records, and technical assessments of deployed systems. While the study triangulates perspectives through multiple qualitative sources, results are not designed to be statistically generalizable beyond Region IX.

Future research should examine distributional impacts of AI in local governance, including whether AI-enabled systems differentially benefit or burden marginalized communities. Comparative case studies across Philippine regions can identify institutional configurations that best support responsible scaling. Evaluation research can quantify impacts on processing time, error reduction, citizen satisfaction, and trust, and can test which governance safeguards most effectively mitigate risk.

8. CONCLUSION

AI presents actionable opportunities for LGUs in the Zamboanga Peninsula to improve administrative efficiency, strengthen decision support, and expand access to service information. However, applicability is constrained by uneven digital infrastructure, limited technical capacity, fragmented data environments, and unresolved governance risks related to privacy, cybersecurity, and accountability. A realistic pathway for AI-enabled local governance in Region IX is incremental and safeguard-driven: establish data and governance foundations, build human capacity, pilot low-risk use-cases with measurable outcomes, and scale only when transparency and accountability mechanisms are credible. With staged implementation and strategic partnerships, LGUs can harness AI as a tool for more responsive and citizen-centric governance while protecting public trust.

9. RECOMMENDATIONS

This study recommends a five-part roadmap to strengthen Artificial Intelligence (AI) adoption in Local Government Units (LGUs) across the Zamboanga Peninsula.

    a. **Establish an AI Task Force in each LGU** composed of professionals from technology, policy, and public administration. The Task Force should (a) assess high-impact AI use cases for service delivery, analytics, and decision support; (b) craft an LGU-specific AI strategy and implementation roadmap with targets, timelines, and resource requirements; (c) coordinate AI initiatives across departments; (d) broker partnerships with external institutions and providers; (e) identify workforce training needs; and (f) monitor and evaluate AI projects using clear performance indicators and feedback for improvement.

b. **Invest in capacity building for government personnel.** LGUs should implement structured training programs on AI fundamentals (e.g., data literacy, machine learning concepts, and AI-enabled decision-making) using blended modalities such as workshops, seminars, online courses, and hands-on exercises. Training should be role-based and tiered to match job functions and existing competency levels. Capacity building must also include ethical and social dimensions—privacy protection, bias mitigation, and responsible use—to ensure accountability and public trust. Sustained learning can be supported through internal communities of practice and knowledge-sharing platforms.

c. **Develop an AI Ethics Framework tailored to local governance.** The framework should set enforceable principles and procedures for transparency/explainability, fairness and bias mitigation, privacy and consent, human-centric design, accountability and oversight, and continuous monitoring. Regular audits, impact assessments, and citizen feedback mechanisms should be institutionalized to detect unintended harms and guide corrective action.

d. **Strengthen partnerships with academe and industry.** Formal collaboration agreements can support joint research, technology transfer, internships, specialized training, and access to funding streams. These partnerships can help co-develop AI applications aligned with local needs and enable LGUs to keep pace with evolving best practices.

e. **Institutionalize public participation in AI initiatives.** LGUs should use consultations, advisory bodies, open-data platforms, awareness campaigns, participatory design processes, and accessible feedback channels to ensure inclusivity, transparency, and citizen empowerment in AI-enabled governance.

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