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eAssist DILG: Development of a Framework for Web-Based Technical Assistance Request System with AI-Driven Analytics

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ABSTRACT

Requesting technical assistance within the Department of the Interior and Local Government (DILG), particularly for securing resource persons, is often delayed by manual workflows, fragmented communication, and a lack of transparency. This study presents the development of eAssist DILG, a framework for a web-based Technical Assistance Request System, designed as part of a Business Process Reengineering (BPR) initiative in DILG Laguna. Anchored on Agile Software Development principles, the framework integrates features such as centralized request tracking, automated workflow routing, and secure role-based access. Key system modules were iteratively designed and validated through stakeholder consultations and requirement analysis, addressing core bottlenecks in the current manual process. While full system deployment is recommended for future phases, the proposed framework demonstrates the potential to reduce processing steps, improve coordination, and enhance accountability in public service delivery. Additionally, the study outlines future integration of AI-driven analytics for predictive resource allocation and performance insights, reflecting a forward-looking approach to digital governance in local government units.

Keywords: *Technical assistance, Business Process Reengineering, e-governance, system framework, digital public service, AI Analytics, DILG*

Introduction

The Department of the Interior and Local Government (DILG) plays a crucial role in the Philippine government's mission to uphold local autonomy, promote peace and order, and strengthen public service delivery. Over the years, the department has evolved through various reorganizations, reflecting the country's shifting administrative and political landscape. While its institutional history is important, the current study focused on one of its persistent operational challenges—the inefficiencies in processing Requests for Technical Assistance (RTA), particularly in securing resource persons in regional offices such as DILG Laguna.

As the department continues to implement its goals and uphold shared values, the request for technical assistance remains a crucial aspect of institutional local governance. However, despite the availability of multiple communication channels, DILG Laguna still processes these requests manually, relying on traditional paper-based workflows. This manual tracking system results in bottlenecks, delays in response time, fragmented communication, and inadequate documentation for accountability (Gatchalian, 2019). These issues are consistent with global challenges in technical assistance delivery, where inefficient systems weaken coordination, hinder responsiveness, and compromise transparency (Agulhas, 2020).

To overcome these inefficiencies, this project proposed the development and implementation of eAssist DILG: Development of a Framework for Web-Based Technical Assistance Request System with AI-Driven Analytics as part of a Business Process Reengineering (BPR) initiative. Unlike a full deployment study, this research is limited to the design and framework development phase, which laid the foundation for future implementation. The proposed system aimed to replace the manual, paper-based process with a secure, automated, and highly efficient digital platform. Key features include advanced search capabilities, role-based access controls, automated routing and request tracking, a hybrid approval system that integrates criteria-based inputs with manual overrides, templated forms to minimize revisions, and real-time descriptive analytics. As highlighted in previous studies, the use of web-based tools in local government systems has proven effective in accelerating service delivery and making information more accessible to both staff and clients (Mariano, 2018; PEP-Asia, 2020).

In addition, the project aimed to enhance efficiency, improve data security, and ensure compliance with statutory and regulatory requirements by streamlining request retrieval, tracking, and processing across different clusters. With these advancements, DILG Laguna would provide faster service, reduce delays, and strengthen local governance and public service delivery. Studies on local e-governance in the Philippines have also highlighted that integrating information systems at the LGU level enhances digital access, accountability, and responsiveness—key outcomes with which this project aligns (PIDS, 2005).

The main goal of this project was to make request processing at DILG Laguna faster, more accessible, and more secure for everyone involved. By automating the retrieval process, requests can be fulfilled much quickly, reducing delays and improving overall efficiency. A centralized digital database would make it easier for authorized personnel to find and manage records, ensuring smoother communication between requesters, approving authorities, and focal persons. Security is also a top priority—role-based access control (RBAC) and data encryption would help keep sensitive information safe while ensuring compliance with legal requirements. Automating repetitive tasks would lighten the workload for staff, allowing them to focus on more

important responsibilities. Likewise, by going digital, the system would eliminate problems like lost, damaged, or misplaced documents. In the end, this project would create a better experience for clusters, DILG Laguna staff, and field offices, making the entire process smoother and more efficient while reducing frustrations caused by delays (PEP-Asia, 2020).

The shift to eAssist DILG would be carefully planned to ensure a smooth transition with minimal disruption to daily operations. The process starts with system development, creating a locally hosted digital platform with secure access, automated retrieval, and advanced search features. To preserve important records, existing paper-based documents were systematically digitized, with metadata and indexing added for easy access. The necessary hardware and software—including servers, storage devices, and security measures—were set up to support the new system. Staff training was a key part of the rollout, with hands-on sessions to help DILG personnel get comfortable with the new workflow. Before full deployment, the system was subjected to thorough testing to check for any performance, security, or functionality issues. Once implemented, real-time monitoring and regular evaluations would ensure smooth operations and allow for continuous improvements based on user feedback and emerging needs.

Through Business Process Reengineering (BPR) initiative, DILG Laguna aimed to modernize its request for technical assistance (resource person) process, enhance service delivery, and improve overall efficiency. The adoption of eAssist DILG reflects DILG's commitment to innovation, leveraging technology to provide better governance and public services. Overall, transforming the request process at DILG Laguna leads to a more responsive, efficient, and future-ready institution, better equipped to serve the needs of the community.

The international literature underscores the strategic role of technical assistance in strengthening governance and institutional performance, especially when paired with innovations such as data analytics and business process reengineering. Haslam and Turnbull (1996) analyzed nine U.S. Department of Education-supported technical assistance programs and emphasized the need for coordination, collaboration, and structured oversight in federal assistance initiatives. Their findings highlight how centralized systems and streamlined processes significantly reduce duplication of efforts and inefficiencies in service delivery.

In the development sector, Ibrahim (2017) emphasized that non-governmental organizations (NGOs) serve as primary conduits of technical assistance in areas underserved by governments. He noted that their effectiveness improves with better data collection, performance monitoring, and stakeholder feedback—foundational practices enabled by descriptive analytics. Similarly, Montclos (2011) raised concerns about technocratic evaluation methods in NGOs and advocated for transparent third-party evaluations, which aligned with the use of dashboards and analytics in tracking outcomes.

From a governance and process redesign perspective, Business Process Reengineering (BPR) is increasingly seen as an enabler of efficiency and transformation in public services. As Battilani et al. (2022) observed in a European port authority case, reengineering public processes improved operational flow, especially when supported by digital systems. Likewise, Arai and Sun (2013) demonstrated that BPR in Japan's Saga Prefecture reduced redundancies and improved administrative efficiency through digital tools and workflow optimization.

Furthermore, Catursari et al. (2023) echoed this in their study of civil registration systems, concluding that BPR implementation significantly reduced costs and improved turnaround times. These findings are relevant to the proposed automation of the DILG Laguna technical assistance request system, which sought to eliminate manual bottlenecks. Elapatha and Jehan (2020) reinforced this by showing how measuring key performance metrics through reengineered systems increased government accountability.

In addition, descriptive analytics, in particular, plays a vital role in transforming how public offices like DILG operate. As Reyes and Origines (2024) pointed out, analytics dashboards in a web-based government notification system enabled agencies to monitor real-time service performance, track unresolved issues, and generate insights for process improvement. These capabilities allow public managers to make more informed decisions and provide data transparency across departments.

Locally, the Philippines has embraced digital governance reforms, though challenges persist. Villaseñor (2024) noted that digital innovations in local government units (LGUs) are often hindered by limited infrastructure and low digital literacy. Nonetheless, initiatives that include data analytics and streamlined processes have been shown to improve service delivery and stakeholder engagement. Espiritu et al. (2023) provided a case from Nueva Ecija where local digital transformation enabled quicker, more organized interactions with citizens—highlighting the importance of real-time data access and tracking.

In the CALABARZON region, where DILG Laguna operates, the integration of analytics and reengineering in government processes supports transparency and participatory governance. Asadon et al. (2024) emphasized that social media and e-governance platforms enhance communication and citizen trust, while Papel et al. (2024) underlined how mobile-based platforms can streamline technical services and provide instant feedback—key features reflected in the eAssist system being proposed.

Overall, literature supports the use of AI-driven analytics and business process reengineering as foundational tools for improving technical assistance processes in government. When applied to DILG Laguna, these approaches offer a framework to reduce delays, enhance service quality, and improve communication with stakeholders. The convergence of digital platforms and data-driven systems ensures faster response times, better allocation of technical personnel, and improved accountability—aligning with DILG's vision for efficient and responsive local governance.

Methods

This study used a Business Process Reengineering (BPR) approach (Davenport, 1993; Hammer & Champy, 1993) instead of a system development method because the researchers are still in the stage of analyzing and improving the current process, not yet creating the actual system. The method followed here is based on how they evaluated the existing way of requesting technical assistance, especially for getting resource persons from the Department of the Interior and Local Government (DILG) Provincial Office in Laguna. Their goal was to identify problems and think of ways to improve them.

Identifying the Process to Improve

The researchers started by mapping the process in question, as shown in the figure. The technical assistance request process was the focus, as it was determined to be the most frequent cause for delay or operational problems. The current process

mostly depended on manual steps by way of emails and paper forms, which sometimes resulted in miscommunication, a lack of timely response, and a lack of follow-up.

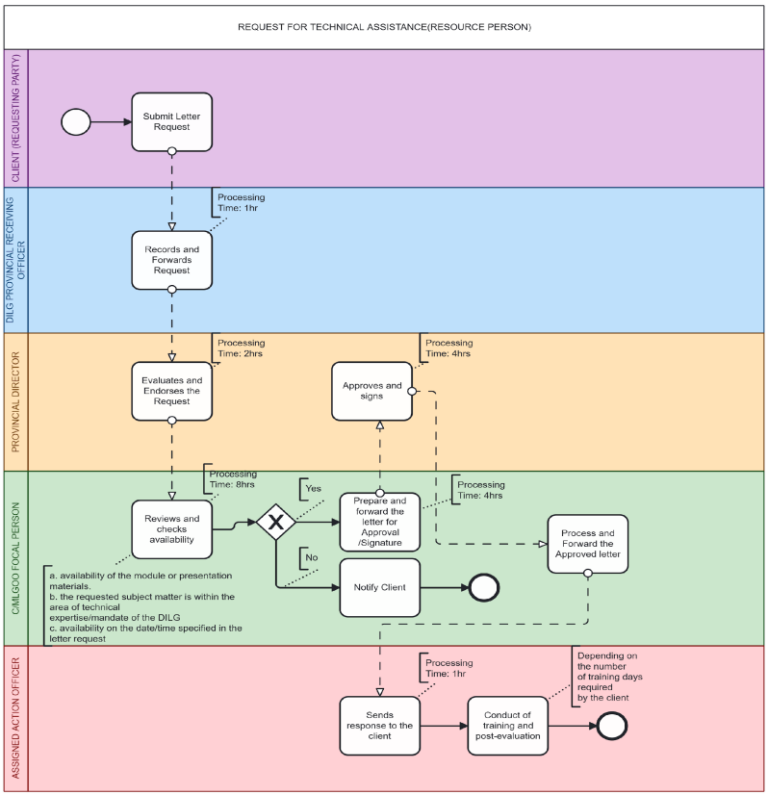

Figure 1. *Depicts the Process Mapping of the AS-IS Process*

Studying the Current Process (AS-IS)

To learn how technical assistance requests are filed, examined, accepted, and handled, the researchers observed the present request procedure. Staff consultations, document analysis, and the creation of a BPMN to illustrate each stage were all part of this. Each process step's time was also noted by the researchers, who discovered that manual routing, unclear instructions, and the lack of a trustworthy tracking system caused some steps to be noticeably delayed.

Measuring Performance Through Key Indicators

The researchers used important performance metrics, such as average request approval time, error frequency, and client satisfaction levels to evaluate the effectiveness of the existing procedure shown in Table 1. Based on the data, it usually takes three to five working days to execute a single request. This is mostly because routing processes are lengthy, and approvals are taken slowly.

Table 1. Evaluation of the Existing Technical Assistance Process: Key Metrics, Sources, and Findings

Process Step	KPI	Data Source	Findings	Collection Technique
Submit letter request	Avg. submission errors	Request a file review	12% (6 out of 50) had missing documents	Document analysis
	Rejection rate	DILG rejection logs	10% rejection due to incomplete/incorrect info	System logbook, file review
	Avg. submission to acceptance	Timestamp from logs	0.5–1 day delay before acknowledgment	Manual logs
Receive and route request	Routing time	Routing email timestamp	Avg. 1.8 days	Email audit
	Accuracy of routing	Staff interviews	3/10 misrouted due to manual handling	Semi-structured interviews
Evaluate and endorse	Evaluation duration	Reviewer log sheets	Avg. 1.2 days per request	Observation, reviewer records
	Approval rate	Internal documents	94% approved; 6% returned for revision	Document review
Prepare letter reply	Avg. preparation time	Draft timestamps	0.8 days; longer for complex requests	Document metadata
	Number of revisions	Letter drafts comparison	Avg. 2–3 rounds of revision	Manual review of letter drafts
Review and sign letter	Avg. approval/signing time	Signatory calendar/log	Avg. 1.5 days delay due to signatory absence	Interview + calendar audit
	Returned letters	Feedback from staff	2–3 out of 50 returned for correction	Staff consultation
Issue letter reply	Response time (total)	Request to issue timestamps	Avg. 3.8 days total processing time	Consolidated timestamp tracking
	Client Satisfaction Score (CSS)	Feedback forms	3.4/5 average score	Informal client surveys (n=20)
Provide assistance	Training completion rate	Attendance sheets	90% completion among scheduled sessions	Training records
	Post-assistance feedback	Verbal + written feedback	Mostly positive; request for better scheduling	Post-session interviews and forms

Finding the Root Causes of the Problems

Following the performance evaluation, the researchers carried out a more thorough investigation to determine the underlying reasons for delays. Manual request processing, signatories' unavailability, ambiguous responsibility delegation, and the absence of a monitoring system to keep tabs on request status were the main problems found. These elements made it very difficult for the employees to react in a timely and precise manner.

Focusing on the Time-Related Problems

The most significant problem turned out to be processing delays. Requests were not immediately responded to, approvals took a long time, and some employees were unclear about their precise roles. Requests were frequently ignored or put off because there was no digital mechanism in place to direct workflows or send out reminders for unfinished business. The need to alter the current procedure was highlighted by these time-related inefficiencies.

Redesign the Processed

Following the identification of possible enhancements, the researchers proposed a new workflow using a web-based platform, redesigning the process. To overcome the drawbacks of the current manual procedure, the researchers' suggested system combined centralized data storage, safe request management, and analytics reporting.

The researchers created key system modules, such as request submission, approval tracking, user administration, and analytics dashboards, as part of the framework development process. A tiered design comprising the User Interface Layer, AI-Driven Descriptive Analytics Module, Application Logic Layer, Database Layer, and Security and Role-Based Access Control Layer was used to visualize the conceptual framework.

Defining the Project and Identifying the Team

Following the identification of the main problems, the researchers characterized the project as an effort to enhance the technical support request procedure by making it more effective, quick, and transparent. A specialized team, including a project manager, a business analyst, a process owner from the DILG, and a documentation specialist, was assembled to oversee the reengineering endeavors. The project manager was in charge of planning and making sure that every project milestone was reached. After interacting with important stakeholders and observing current processes, the business analyst noted what needed to be improved. While the paperwork specialist was responsible for producing technical reports, process diagrams, and other required paperwork, the process owner made sure that the suggested modifications stayed in line with DILG's standards and operational requirements.

Through this methodical and people-centered approach, the researchers were able to clearly identify the current system's inadequacies and propose significant, practical improvements that would benefit both DILG staff and clients seeking technical support.

Results and Discussion

Following the evaluation of the current process for requesting technical assistance, a redesigned framework was developed to address the observed inefficiencies. The main goal of the proposed system was to provide a streamlined, automated solution that simplifies the way LGUs coordinate with DILG for technical support. This new framework not only focuses on improving processing time and transparency but also introduces intelligent features to better manage requests and resources.

The proposed system framework presented in Figure 2 introduces the eAssist DILG system, envisioned as a smart, web-based platform designed to modernize how local government units (LGUs) across the Philippines request technical assistance from the Department of the Interior and Local Government (DILG). At the heart of the system is a clean and intuitive User Interface Layer, where users—primarily LGU personnel and DILG staff—can easily log in, submit technical assistance requests, and track their status in real-time. This interface simplifies what was once a slow, paper-based, or fragmented communication process. It also allows users to provide feedback and receive notifications, making the experience more interactive and transparent.

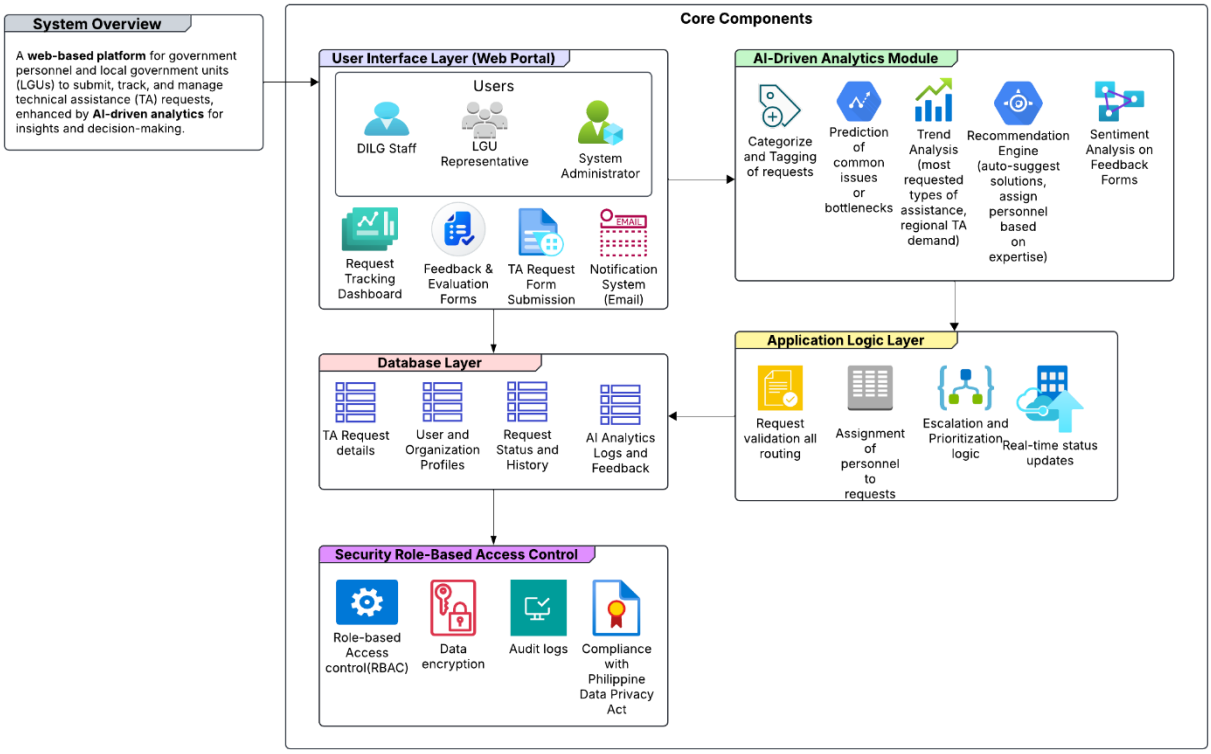

Figure 2. *The Proposal Framework for the eAssist DILG System*

Beneath the interface is the Application Logic Layer, which acts like the system's brain. It manages all the workflows, such as validating requests, assigning them to the correct personnel based on the nature of the concern, setting deadlines, and handling escalations when urgent or repeated issues arise. This logic ensures that every request is handled efficiently, fairly, and with accountability, reducing delays and miscommunication.

At the core of the system's memory is the Database Layer. This layer securely stores all data related to user profiles, request history, performance feedback, and analytics logs. It acts like a digital filing cabinet—organized, searchable, and protected—allowing users and administrators to review past requests and make data-informed decisions in the future. Having a centralized, well-structured data repository also lays the foundation for more powerful insights down the road.

The real innovation of eAssist DILG lies in its AI-Driven Analytics Module. This component uses artificial intelligence to make sense of all the data coming in. It can categorize requests using natural language processing (NLP), detect trends such as recurring issues in specific regions, and even predict future technical assistance demands. The AI can also suggest solutions based on similar past cases or recommend the best DILG personnel to handle a certain type of request. Over time, this layer helps the organization move from being reactive to being proactive—addressing needs before they become bigger problems.

Finally, the entire system is underpinned by a Security and Access Control Layer that ensures only authorized individuals can access sensitive information. It uses role-based permissions, data encryption, and audit trails to meet the requirements of the Philippine Data Privacy Act. This not only protects users but also builds trust in the system.

With these digital tools in place, the system is expected to bring significant improvements to DILG Laguna's request processing. First, the processing time for requests can be reduced from the usual three to five working days to as little as one to two days, due to automatic validation, routing, and approval. Requesters would be able to track the progress of their requests anytime, which increases transparency and reduces the burden of follow-up inquiries.

The eAssist DILG system's performance enhancements have been compared to other government digital service programs and established benchmarks. For example, reducing processing time from 3–5 working days to just 1–2 days aligns with the goals of other government agencies undergoing Business Process Reengineering (BPR), which aim to cut processing times by at least 50%. Increased user happiness, as determined by real-time feedback mechanisms, is consistent with established metrics used in similar public service platforms, where, after digital transformation, satisfaction ratings usually increase by 20% or more. Additionally, error rates resulting from inaccurate or missing data have dramatically dropped, which is indicative of best practices in digital form standardization observed in top public sector systems.

Also, these benchmarked enhancements demonstrate that eAssist DILG yields quantifiable increases in effectiveness, openness, and service quality, establishing the system as a useful and trustworthy instrument for improving the provision of technical help at the local government level.

Additionally, the standardized digital forms and validation features would minimize errors caused by missing or incorrect information, while the smart matching of resource persons ensures that the most suitable and available personnel are assigned to each request. This helps improve service delivery and promotes fairness and consistency. Additionally, the system allows for real-time feedback and automated notifications, reducing miscommunication and improving user satisfaction.

Overall, the eAssist DILG system combines modern technology, data intelligence, and good governance practices to address the key problems of delay, inefficiency, and lack of transparency. It transforms the way technical assistance is requested and

managed, ensuring that DILG Laguna delivers faster, more accountable, and more reliable services to its stakeholders.

Table 2. Comparison of eAssist DILG Framework Features Against Established Governance and Process Improvement Standards

Framework Feature	eAssist DILG Framework	Best Practice/ Standard	Source/ Reference	Notes
Process Simplification	Automated workflows for request validation and routing	BPR focuses on process efficiency and the elimination of delays	Hammer & Champy (1993), BPR literature	Supports process streamlining goals
User Interaction	Real-time request tracking and feedback	E-Government user-centric service design	UN E-Government Survey	Aligns with citizen-centric digital services
Data-Driven Decision Support	AI analytics for trend detection and prediction	Smart government frameworks leveraging AI	OECD Digital Government Reports	Future-proofing and proactive governance
Security & Privacy	Role-based access, encryption, audit trails	Compliance with Philippine Data Privacy Act (RA 10173)	Philippine DPA	Ensures legal and ethical compliance

Conclusion and Future Works

The eAssist DILG system represents a major step in modernizing the process by which Local Government Units (LGUs) in the Philippines request and receive technical assistance from the Department of the Interior and Local Government (DILG). The software allows users, including LGU and DILG staff, to submit requests, track status updates, and provide comments in real-time, replacing traditional paper-based, slow, and fragmented communication with a clear, user-friendly interface. The system's secure database, which keeps records organized and easily available, and its Application Logic Layer, which controls procedures like request validation, job assignment, and escalation management, are essential to its efficacy. The AI-driven analytics module also provides cutting-edge data analysis features, such as trend identification, natural language processing (NLP)-based request classification, and predictive insights that support proactive service delivery. Role-based permissions, encryption, and audit trails are just a few of the system's security features that guarantee user data privacy and comply with the Philippine Data Privacy Act.

Through the facilitation of communication and the promotion of transparency, eAssist DILG improves public service delivery efficiency and accountability. Faster reaction times are made possible by the system, which also fosters stakeholder trust and gives the DILG and LGUs the ability to make data-driven choices. The DILG's dedication to responsive service, good governance, and modernizing local government

operations is reinforced by these enhancements, which also directly contribute to the larger national mission of digital transformation in public administration.

Investing in thorough user training and capacity building for both DILG and LGU staff is essential to guaranteeing the system's viability and ongoing relevance. To adjust to changing needs and technological improvements, it is important to institutionalize ongoing system enhancements, frequent compliance assessments, and ongoing user input collection. The eAssist DILG system can successfully develop and maintain its position as a pillar of digital government in the Philippines by encouraging a culture of continual improvement.

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Conflict of Interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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mercy that this milestone was achieved, and in Him they continue to place their trust for the future.

Artificial Intelligence (AI) Declaration Statement

During the preparation of this manuscript, the authors utilized artificial intelligence (AI) tools to support various stages of the research and writing process. Specifically, OpenAI's ChatGPT (GPT-4.5) was used for language refinement, grammar correction, and generating initial drafts of selected paragraphs in the literature review and discussion sections. Additionally, Zotero's AI-powered citation assistant was employed to help identify and organize relevant academic references.

The AI tools were used solely as supportive tools to enhance clarity and coherence. No AI-generated content was accepted without human oversight. All outputs were carefully reviewed by the authors for accuracy, appropriateness, and alignment with the study's objectives. Substantive intellectual contributions—including the research design, data analysis, interpretation of findings, and final conclusions—were entirely the product of the authors' own work.

To ensure academic integrity, the authors cross-verified AI-assisted outputs with primary sources and manually edited all content to reflect the authors' intended meaning, tone, and scholarly standards.