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Monitoring for results: An evaluation of City Engineering Project Monitoring System (CEPMS) in Quezon City

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Abstract
Aim: This study evaluated the City Engineering Project Monitoring System (CEPMS) as a digital monitoring platform used by the Quezon City Department of Engineering. Specifically, it assessed users' evaluation of CEPMS in terms of outcome achievement, efficiency, service delivery quality, and trust and legitimacy, examined its observed strengths and weaknesses across the project monitoring process, and assessed the extent of challenges encountered in its implementation and utilization.
Methodology: A descriptive–quantitative research design was employed involving 148 respondents composed of internal personnel and external contractors. Data were collected using a validated survey questionnaire grounded in public value dimensions. Descriptive statistical tools, including frequency, percentage, and weighted mean, were used to analyze respondents' profiles, evaluations of CEPMS performance indicators, observed strengths and weaknesses, and implementation challenges.
Results: Findings revealed that CEPMS was evaluated positively across all four public value dimensions by both internal and external respondents, with internal users consistently reporting stronger agreement. The system was particularly rated high in supporting timely project tracking, improving documentation workflows, enhancing information accessibility, and promoting transparency and accountability in infrastructure monitoring. The core process components—data encoding and validation, field monitoring and updating, and report generation and utilization—were identified as strengths, with minimal perceived weaknesses. Identified challenges related to system access, data updating, digital literacy, and notification features were generally rated as manageable and did not significantly hinder system implementation or utilization.
Conclusion: The study concludes that CEPMS functions as an effective and reliable digital monitoring and governance tool that contributes to improved efficiency, transparency, and accountability in local government infrastructure projects. Continued system enhancement, targeted user support, and incremental feature improvements may further strengthen its performance and sustain its contribution to results-based infrastructure monitoring in Quezon City.
Keywords: *City Engineering Project Monitoring System, digital monitoring, public value, infrastructure, Quezon City*

INTRODUCTION

Digital transformation has become a defining feature of contemporary public administration, reshaping how governments plan, implement, and monitor infrastructure projects worldwide. As urban environments grow more complex, public sector organizations increasingly rely on digital monitoring systems to enhance accountability, transparency, and efficiency in service delivery (Flyvbjerg, 2021; Li & Sun, 2025). Scholars have noted that traditional manual monitoring approaches often struggled with fragmented information, delayed reporting, and limited coordination, particularly in large-scale engineering projects requiring real-time oversight and multi-stakeholder collaboration (Jelodar, 2021; Hall & Bonanomi, 2021). Consequently, digital project monitoring platforms have emerged as critical governance tools for ensuring that public infrastructure investments deliver measurable outcomes and public value.

Globally, governments have adopted results-based monitoring frameworks supported by digital technologies such as centralized databases, Geographic Information Systems (GIS), and standardized reporting dashboards to

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respond to increasing demands for transparency and performance accountability (Agbaxode et al., 2024; Iandolo et al., 2024). These systems were designed not only to track physical progress but also to improve documentation accuracy, support timely decision-making, and strengthen public trust in government institutions.

In the Philippine context, the adoption of digital monitoring tools is aligned with national reforms promoting transparency, accountability, and results-based management in local governance. Frameworks advanced by the Department of the Interior and Local Government (DILG) and the National Economic and Development Authority (NEDA) encouraged local government units to modernize monitoring mechanisms and strengthen evidence-based decision-making (NEDA, 2023; DILG, 2023). Despite these policy directions, several studies reported uneven implementation of digital systems across local governments, citing challenges related to data consistency, system utilization, digital literacy, and inter-organizational coordination (Kokogho et al., 2024). These findings suggested that the presence of a digital platform alone did not guarantee improved governance outcomes, underscoring the need for empirical evaluations at the local level.

Quezon City, as the largest and most infrastructure-intensive local government unit in Metro Manila, introduced the City Engineering Project Monitoring System (CEPMS) to modernize the monitoring of engineering projects and standardize reporting within the Quezon City Department of Engineering. While CEPMS demonstrated potential in consolidating project data and improving visibility over infrastructure activities, internal assessments and audit observations indicated persistent concerns such as delayed updates, inconsistent data entry, and gaps in user compliance. Despite the growing use of CEPMS, limited empirical research has examined its effectiveness as a governance tool using a results-based public value framework, particularly from the perspectives of both internal personnel and external contractors. Existing studies on digital monitoring systems often focused on technical features or user satisfaction in isolation, with few integrating outcome achievement, efficiency, service delivery quality, and trust and legitimacy into a unified city-level assessment.

This study addressed this gap by evaluating CEPMS as both a technological system and a governance mechanism within Quezon City. By examining user assessments of the system's performance, strengths, weaknesses, and implementation challenges, the study aimed to determine how CEPMS contributed to public value in infrastructure monitoring. Unlike prior works that emphasized system design alone, this research provided an integrated, user-centered evaluation grounded in public value dimensions. The findings offered evidence-based insights to support system enhancement, inform local policy decisions, and contribute to broader discourse on digital governance and performance-driven infrastructure monitoring in Philippine local governments.

Review of Related Literature and Studies

Engineering projects are widely recognized as complex undertakings that require the coordinated application of technical expertise, scientific principles, and structured project management to deliver infrastructure that meets societal needs (Evans et al., 2022; Alhosani & Alhashmi, 2024). Recent studies emphasize that engineering works, ranging from large-scale public infrastructure to localized community improvements, demand multidisciplinary collaboration to balance safety, functionality, cost, environmental sustainability, and regulatory compliance (Hamta et al., 2021; Iandolo et al., 2024). Because these projects typically follow a life cycle from planning and procurement to construction and commissioning, weaknesses in any stage may result in delays, cost overruns, and quality defects, especially in high-demand urban environments (Agbaxode et al., 2024; Kim, 2021). In this context, documentation integrity and transparent reporting are not only technical requirements but also governance necessities that shape public trust in infrastructure delivery (Flyvbjerg, 2021; Chen et al., 2024).

Monitoring has been identified as a critical governance function in engineering project delivery because it enables project teams to measure progress against planned schedules, budgets, and performance standards while detecting risks early (Agbaxode et al., 2024; Hamta et al., 2021). Studies highlight that monitoring increasingly relies on measurable indicators and milestone tracking, supported by regular site validation and structured reporting systems to ensure both quantity and quality of outputs (Panwar & Jha, 2021; Shah, 2023). Additionally, monitoring practices have expanded beyond physical accomplishment to include safety, environmental compliance, and stakeholder coordination, dimensions that directly influence project outcomes and institutional credibility (Chen et al., 2024; Rane, 2023). Because engineering projects involve multiple contractors and implementing units, research consistently notes that fragmented reporting and inconsistent updates remain persistent drivers of disputes, delays, and weak accountability (Purchase et al., 2021; Rudele et al., 2024).

In response to these monitoring challenges, the literature underscores the growing adoption of Engineering Project Monitoring Systems (EPMS) as integrated platforms that consolidate time, cost, quality, and resource data into a unified decision-support environment (Purchase et al., 2021; Piccardo & Hughes, 2022). Recent studies argue

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that modern EPMS implementations are strengthened by digital features such as cloud-based dashboards, GIS-enabled project visualization, and standardized reporting modules, which improve visibility and support evidence-based corrective action (Iandolo et al., 2024; Shah, 2023). EPMS platforms are also linked to improved contractor management, as performance tracking can strengthen enforcement of timelines, technical specifications, and compliance requirements using verifiable documentation and time-stamped monitoring evidence (Hamta et al., 2021; Kim, 2021). Overall, the literature suggests that EPMS effectiveness should be judged not only by technical capability but by how well the system improves outcomes, operational efficiency, service quality, and accountability in public infrastructure governance (Flyvbjerg, 2021; Iandolo et al., 2024).

Despite the recognized benefits, studies also identify recurring implementation constraints that can weaken EPMS performance in practice. The most frequently reported issue is the accuracy and timeliness of data input, as delayed, incomplete, or inconsistent reporting can undermine system reliability and distort decision-making (Amede et al., 2025; Hamta et al., 2021). Technology adoption barriers are also common, including resistance to shifting from manual processes, uneven digital literacy, limited technical support, and workflow noncompliance among users and stakeholders (Shah, 2023; Rudele et al., 2024). Interoperability limitations, cybersecurity risks, and communication gaps further complicate integrated monitoring, particularly when multiple contractors and offices operate with varying tools and reporting practices (Schafer et al., 2022; Rane, 2023). These findings imply that the success of EPMS depends not only on system design but also on governance alignment, capacity building, and sustained user adoption across internal and external stakeholders (Iandolo et al., 2024; Agbaxode et al., 2024).

The reviewed literature consistently affirms that engineering projects require rigorous monitoring due to their complexity, multi-stakeholder nature, and high public accountability demands. Research further supports EPMS as a promising approach for strengthening oversight through real-time reporting, integrated documentation, and improved coordination. However, the same literature also shows that monitoring systems are vulnerable to operational challenges, particularly delayed updates, inconsistent data entry, uneven digital capacity, and weak compliance, which can reduce reliability and weaken governance outcomes. While many studies discuss EPMS functions and implementation issues broadly, fewer works evaluate city-scale systems using governance-oriented dimensions that reflect public value, such as outcome achievement, efficiency, service delivery quality, and trust and legitimacy. Based on the perspectives of both internal personnel and external contractors, this gap supports the necessity of the present study, which evaluated the City Engineering Project Monitoring System (CEPMS) as both a technological platform and a governance tool, generating evidence to guide system enhancement and strengthen performance-driven infrastructure monitoring in local government settings.

Theoretical Framework

This study was anchored on Public Value Theory proposed by Moore (1995), which asserts that public sector programs and systems should be evaluated based on the value they create for society rather than solely on efficiency or outputs. Public value emphasizes the achievement of meaningful outcomes, effective use of public resources, quality of service delivery, and the maintenance of trust and legitimacy among stakeholders. In the context of this study, the City Engineering Project Monitoring System (CEPMS) was viewed as a governance tool intended to support transparent, accountable, and results-oriented infrastructure monitoring in local government.

While Moore provided the theoretical foundation of public value, the study adopted the measurement framework of Faulkner and Kaufman (2017) to operationalize the concept. Their framework translates public value into four measurable dimensions: outcome achievement, efficiency, service delivery quality, and trust and legitimacy. By integrating Moore's theory with Faulkner and Kaufman's evaluative dimensions, this study established a coherent basis for assessing CEPMS as both a technological system and a mechanism for public value creation in infrastructure governance.

Conceptual Framework

The conceptual framework illustrates the hypothesized relationship between the City Engineering Project Monitoring System (CEPMS) operational components and public value outcomes in infrastructure monitoring. The independent variable (IV) consists of the core CEPMS processes, Data Encoding and Validation, Field Monitoring and Updating, and Report Generation and Utilization, which represent how project information is captured, updated, and transformed within the system. The dependent variable (DV) comprises the public value dimensions of Outcome Achievement, Efficiency, Service Delivery Quality, and Trust and Legitimacy, reflecting users' evaluation of the system's governance performance.

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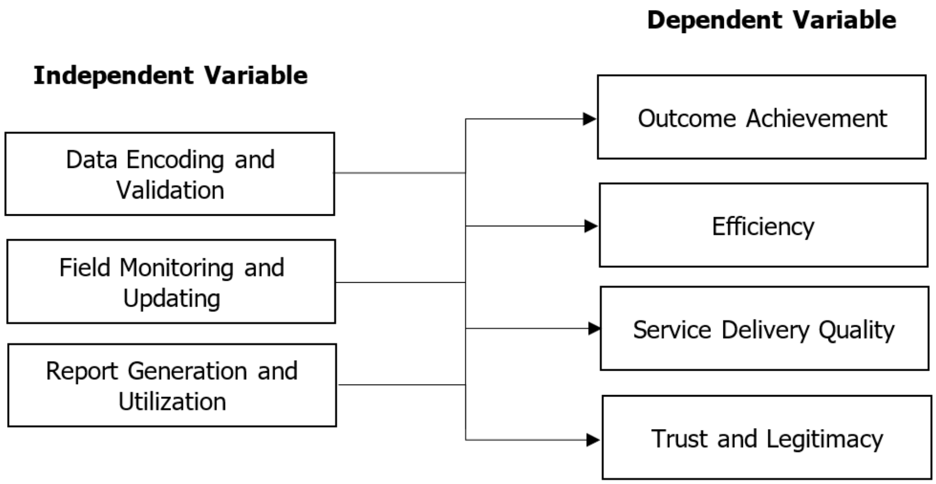
The framework assumes that effective implementation of CEPMS operational components leads to improved public value outcomes by enhancing project oversight, streamlining workflows, improving information quality, and strengthening transparency and accountability. This hypothesized relationship was examined using a descriptive–quantitative approach, providing an empirical basis for assessing CEPMS performance and identifying areas for system enhancement.



Statement of the Problem

The increasing use of digital monitoring systems in local government aims to improve transparency, efficiency, and accountability in infrastructure project implementation. In the Philippines, local government units are encouraged to adopt such systems to support results-based monitoring and evidence-based decision-making. However, despite the growing reliance on digital platforms, limited empirical studies have examined how these systems perform in actual governance contexts, particularly at the city level. In Quezon City, the City Engineering Project Monitoring System (CEPMS) was introduced to modernize infrastructure monitoring and standardize reporting within the Department of Engineering. While CEPMS has shown potential in improving project oversight, concerns remain regarding data consistency, system utilization, and workflow compliance. This study addressed this gap by evaluating the performance of CEPMS based on public value dimensions, including outcome achievement, efficiency, service delivery quality, and trust and legitimacy, to generate evidence that can inform system enhancement, strengthen accountability, and support results-based infrastructure governance in Quezon City.

Research Objectives

General Objective:

To evaluate the performance of the City Engineering Project Monitoring System (CEPMS) in Quezon City based on public value dimensions.

Specific Objectives:

1. To describe the demographic profile of internal personnel and external contractors using CEPMS.
2. To assess CEPMS performance in terms of outcome achievement, efficiency, service delivery quality, and trust and legitimacy.
3. To identify the observed strengths and weaknesses in the implementation and utilization of CEPMS.
4. To assess the specified challenges in the implementation and utilization of CEPMS.
5. To develop a SWOC-based strategic plan to enhance CEPMS implementation and performance.

Research Questions

1. What is the demographic profile of respondents in terms of their role and length of system use?

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2. How is CEPMS evaluated in terms of outcome achievement, efficiency, service delivery quality, and trust and legitimacy?
3. What are the observed strengths and weaknesses of CEPMS in its process flow from project registration to project completion?
4. How do the respondents assess the specified challenges in the implementation and utilization of CEPMS?
5. What strategic actions may be proposed to improve the performance of CEPMS based on the study findings?

METHODS

Research Design

This study employed a descriptive–quantitative research design to evaluate the performance of the City Engineering Project Monitoring System (CEPMS) in Quezon City. The design was appropriate because the study sought to describe and assess users' evaluations of CEPMS in terms of outcome achievement, efficiency, service delivery quality, and trust and legitimacy, without introducing interventions or manipulating system conditions. Because the inquiry focused on existing perceptions and experiences of system users, a non-experimental approach was deemed most suitable. The design was implemented through the administration of a structured survey questionnaire to internal personnel and external stakeholders who utilized CEPMS.

Population and Sampling

The study was conducted in Quezon City and involved users of the City Engineering Project Monitoring System (CEPMS). The respondents consisted of 148 participants, comprising internal personnel from the Quezon City Department of Engineering and external stakeholders, including accredited contractors and Quezon City residents who accessed or monitored infrastructure projects through CEPMS. A purposive sampling technique was employed, wherein respondents were selected based on the criterion that they had direct involvement in or exposure to CEPMS-related project monitoring activities. This approach ensured that both system implementers and external users with actual system interaction were represented, allowing the study to generate informed and balanced assessments of CEPMS performance from multiple stakeholder perspectives.

Instruments

A researcher-made survey questionnaire served as the primary instrument for evaluating the performance of the City Engineering Project Monitoring System (CEPMS). The instrument was developed based on Public Value Theory by Moore (1995) and the public value measurement dimensions proposed by Faulkner and Kaufman (2017). It consisted of items assessing CEPMS performance in terms of outcome achievement, efficiency, service delivery quality, and trust and legitimacy, measured using a 4-point Likert scale ranging from Strongly Disagree to Strongly Agree.

The questionnaire also included items assessing system strengths, weaknesses, and implementation challenges, focusing on system functionality, data consistency, workflow compliance, and coordination among stakeholders. To establish content validity, the instrument was reviewed by three experts: a public administration specialist, a licensed civil engineer with experience in public infrastructure projects, and a research methods expert holding a doctoral degree. Their feedback was used to refine and improve the questionnaire. Following content validation, the instrument underwent reliability testing, which yielded an overall Cronbach's Alpha coefficient of 0.839, indicating good internal consistency and confirming its suitability for the study.

Data Collection

Permission was secured from the Quezon City Department of Engineering to administer the survey instrument prior to data collection. Upon approval, the structured questionnaire was distributed to internal personnel and external stakeholders, including accredited contractors and Quezon City residents who were directly involved in or exposed to CEPMS-related project monitoring activities. Data collection was conducted within Quezon City over a designated period to allow respondents adequate time to complete the instrument. Completed questionnaires were subsequently retrieved and reviewed for completeness and consistency. All responses were then systematically encoded and organized to ensure data accuracy prior to statistical analysis.

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Treatment of Data

The data gathered were analyzed quantitatively using descriptive statistical techniques aligned with the objectives of the study. Frequency counts and percentages were used to describe the demographic profile of the respondents. To address the evaluation of CEPMS performance, weighted means were computed to determine respondents' assessments of the system in terms of outcome achievement, efficiency, service delivery quality, and trust and legitimacy. Weighted means were likewise used to analyze respondents' perceptions of system strengths and implementation challenges, while ranking was applied to identify the most and least frequently observed strengths and issues. These analytical procedures enabled a systematic interpretation of user evaluations and facilitated the identification of prevailing performance patterns and areas for improvement.

Ethical Considerations

This study adhered to established ethical standards in public administration and social research. All respondents were provided with a clear explanation of the study's purpose and procedures, and informed consent was obtained prior to participation. Participation was voluntary, and respondents were assured of confidentiality and anonymity, with no personally identifiable information collected. All data were securely stored, treated with strict confidentiality, and used solely for academic and research purposes. Findings were reported in aggregate form to protect participant identities.

RESULTS and DISCUSSION

This section presents an overview of the respondents' profiles related to their use of the City Engineering Project Monitoring System (CEPMS). It also summarizes respondents' assessments of CEPMS performance based on public value dimensions, as well as the identified strengths, weaknesses, and implementation challenges encountered in using the system.

Profile of the Respondents

This section presents the profile of the respondents, categorized as internal personnel and external stakeholders involved in the use of the City Engineering Project Monitoring System (CEPMS).

Table 1. Demographic Profile of Internal and External Respondents

Variable	Category	Internal (n = 103)	External (n = 45)
Age (years)	20–29	18 (12.16%)	7 (4.73%)
	30–39	36 (24.32%)	22 (14.86%)
	40–49	26 (17.57%)	8 (5.41%)
	50–59	16 (10.81%)	6 (4.05%)
	60 and above	7 (4.73%)	2 (1.35%)
Gender	Male	74 (50.00%)	34 (22.97%)
	Female	27 (18.24%)	11 (7.43%)
	LGBTQIA+	2 (1.35%)	0 (0.00%)
Position	Project Engineer	60 (40.54%)	–
	Technical Staff	37 (25.00%)	–
	Administrative Personnel	6 (4.05%)	–
	Contractor	–	42 (28.38%)
	Quezon City Resident	–	3 (2.03%)
Length of service	< 1 year	1 (0.68%)	0 (0.00%)
	1–5 years	22 (14.86%)	9 (6.08%)
	6–10 years	29 (19.59%)	16 (10.81%)
	11–15 years	30 (20.27%)	8 (5.41%)
	> 15 years	21 (14.19%)	12 (8.11%)
Frequency of CEPMS use	Daily	54 (36.49%)	18 (12.16%)
	Weekly	34 (22.97%)	24 (16.22%)
	Monthly	8 (5.41%)	2 (1.35%)
	Occasionally	6 (4.05%)	0 (0.00%)
	Never	1 (0.68%)	1 (0.68%)

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Table 1 presented the demographic profile of the respondents, classified into internal and external users of the City Engineering Project Monitoring System (CEPMS). The findings showed that CEPMS was primarily used by mid-career technical personnel, particularly internal engineers with moderate to long years of service, who accessed the system on a daily basis as part of their responsibilities in project monitoring, validation, and reporting within the Quezon City Department of Engineering (QCDE). External users, composed mainly of contractors and a smaller proportion of city residents, reported less frequent system use, consistent with their role in milestone-based coordination rather than continuous project oversight.

Evaluation of the Internal and External Respondents on CEPMS in terms of the four indicators of Public Value

This section presents the evaluation of the City Engineering Project Monitoring System (CEPMS) by internal and external respondents based on the four indicators of public value.

Table 2. Evaluation of the internal and external respondents on CEPMS in terms of Outcome Achievement

Outcome Achievement	Int Mean	Inter	Ext Mean	Inter
1. CEPMS enables the timely completion of engineering… approved schedules.	3.59	SA	3.47	A
2. The system contributes to the achievement of project… performance targets.	3.59	SA	3.42	A
3. CEPMS provides accurate and up-to-date tracking… informed decision-making.	3.52	SA	3.51	SA
4. The system helps detect project delays early… minimize impacts.	3.57	SA	3.42	A
5. CEPMS supports efficient allocation and utilization… planned results.	3.60	SA	3.44	A
6. The system improves the quality and durability… engineering outputs.	3.55	SA	3.27	A
7. CEPMS enhances compliance with technical standards… requirements.	3.63	SA	3.29	A
8. The system ensures short-term and long-term goals… infrastructure projects.	3.46	A	3.49	A
9. CEPMS facilitates alignment between planned deliverables… actual outcomes.	3.61	SA	3.33	A
10. The system increases the overall success… city engineering initiatives.	3.67	SA	3.47	A
Overall Mean	**3.58**	**SA**	**3.41**	**A**

Legend: *3.51–4.00 = SA - Strongly Agree · 2.51–3.50 = A - Agree · 1.51–2.50 = D -Disagree · 1.00–1.50 = SD -Strongly Disagree*

The results in Table 2 showed that both internal and external respondents evaluated CEPMS positively in terms of outcome achievement, with stronger agreement from internal users who directly engaged in data validation, progress verification, and coordination processes. External respondents likewise provided favorable but more cautious assessments due to their limited access to backend system functions, although both groups recognized CEPMS's contribution to accurate and timely project tracking and improved transparency. Compared with efficiency and service delivery quality, outcome achievement received a relatively higher mean because it reflected tangible and immediately observable results, such as completed projects and documented compliance, rather than process-based improvements. This pattern was consistent with Public Value Theory, which highlights visible outcomes and institutional credibility as core sources of public value (Moore, 1995; Faulkner & Kaufman, 2017), and supported by recent studies showing that monitoring systems are rated most favorably when results and accountability mechanisms are clearly demonstrated to stakeholders (Hamta et al., 2021; Rüdele et al., 2024).

Table 3. Evaluation of the internal and external respondents on CEPMS in terms of Efficiency

Efficiency	Int Mean	Inter	Ext Mean	Inter
1. CEPMS streamlines project monitoring processes… reducing procedural steps.	3.57	SA	3.36	A
2. The system reduces time spent on manual data collection… reporting tasks.	3.57	SA	3.47	A
3. CEPMS improves coordination and communication… project stakeholders.	3.50	A	3.58	SA
4. The system minimizes duplication of tracking … optimizing manpower use.	3.54	SA	3.47	A
5. CEPMS enables real-time data access… faster decision-making.	3.53	SA	3.53	SA
6. The system supports efficient allocation of human resources… monitoring	3.55	SA	3.31	A

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activities.				
7. CEPMS reduces operational costs… paperwork and manual processing.	3.54	SA	3.44	A
8. The system simplifies consolidation of project updates… comprehensive reports.	3.61	SA	3.49	A
9. CEPMS enhances workflow efficiency… organized monitoring procedures.	3.58	SA	3.27	A
10. The system allows better task prioritization… performance-based follow-ups.	3.63	SA	3.51	SA
Overall Mean	**3.56**	**SA**	**3.44**	**A**

Legend: *3.51–4.00 = SA - Strongly Agree · 2.51–3.50 = A - Agree · 1.51–2.50 = D -Disagree · 1.00–1.50 = SD -Strongly Disagree*

The results in Table 3 showed that efficiency was positively evaluated by both internal and external respondents, with stronger assessments from internal users who directly engaged in backend workflow management and reporting processes. Internal personnel experienced clear benefits in streamlining tasks, reducing manual work, and improving prioritization, resulting in efficiency ratings that were second only to outcome achievement among the public value dimensions. External respondents likewise reported notable efficiency gains, particularly in coordination and access to real-time project information, with efficiency rated higher than service delivery quality and comparable to trust and legitimacy. These patterns indicated that efficiency benefits were clearly recognized across user groups, although the nature of these benefits differed by role. Internal users encountered efficiency improvements through daily operational use, while external stakeholders experienced them indirectly through smoother coordination and information flow. This finding demonstrated that efficiency contributed substantially to public value by optimizing resource use and reducing administrative burden, consistent with recent studies on digital monitoring systems in the public sector (Purchase et al., 2022; Shah et al., 2023; Li & Sun, 2025).

Table 4. Evaluation of the internal and external respondents on CEPMS in terms of Service Delivery

Service Delivery Quality	**Int Mean**	**Inter**	**Ext Mean**	**Inter**
1. CEPMS ensures timely and accurate project updates… stakeholders.	3.54	SA	3.47	A
2. The system improves transparency in monitoring and reporting… engineering projects.	3.53	SA	3.42	A
3. CEPMS facilitates prompt identification and resolution… implementation issues.	3.59	SA	3.36	A
4. The system delivers reliable and verifiable data… project status validation.	3.53	SA	3.44	A
5. CEPMS improves communication between the engineering office and contractors… collaboration.	3.52	SA	3.60	SA
6. The system ensures complete, well-documented, standardized reports… projects.	3.50	A	3.24	A
7. CEPMS enables easy access to essential project … stakeholders and the public.	3.60	SA	3.38	A
8. The system increases responsiveness to citizen inquiries… project progress.	3.42	A	3.42	A
9. CEPMS ensures consistent application of monitoring guidelines… all projects.	3.49	A	3.40	A
10. The system contributes to higher beneficiary satisfaction… measurable results.	3.61	SA	3.36	A
Overall Mean	**3.53**	**SA**	**3.41**	**A**

Legend: *3.51–4.00 = SA - Strongly Agree · 2.51–3.50 = A - Agree · 1.51–2.50 = D -Disagree · 1.00–1.50 = SD -Strongly Disagree*

The results in Table 4 showed that both internal and external respondents evaluated CEPMS positively in terms of service delivery quality, with stronger agreement from internal users. Internal personnel perceived CEPMS as effective in enhancing transparency, ensuring data accuracy, improving coordination, and supporting responsive service delivery, a perception shaped by their direct involvement in report generation, validation, and issue resolution processes. External respondents likewise provided favorable but more cautious assessments, reflecting their limited interaction with internal reporting and standardization functions and their greater reliance on CEPMS for communication and information access. These role-based differences highlighted how internal users emphasized service execution and measurable outputs, while external stakeholders valued transparency and coordination benefits. When compared with the other public value dimensions, service delivery quality obtained the lowest mean rating for both internal and external respondents, indicating that although CEPMS improved communication and

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responsiveness, these service-related benefits were perceived as less immediate and less tangible than outcome achievement, efficiency, and trust and legitimacy. This pattern was consistent with evidence showing that users tend to prioritize observable project results and institutional credibility over interaction-based service improvements in digital monitoring systems (Chen et al., 2024; Rane, 2023; Li & Sun, 2025).

Table 5. Evaluation of the internal and external respondents on CEPMS in terms of Trust and Legitimacy

Trust and Legitimacy	Int Mean	Inter	Ext Mean	Inter
1. CEPMS strengthens public trust… projects implemented as planned and reported truthfully.	3.59	SA	3.40	A
2. The system promotes accountability among engineers, contractors… project delivery.	3.51	SA	3.56	SA
3. CEPMS enhances credibility of monitoring reports… decision-making.	3.59	SA	3.51	SA
4. The system fosters confidence in effective and transparent use… public funds.	3.60	SA	3.42	A
5. CEPMS ensures fair and consistent monitoring practices… free from bias.	3.55	SA	3.42	A
6. The system builds mutual trust between the city government… contractors.	3.56	SA	3.31	A
7. CEPMS demonstrates commitment to transparency and ethical governance… infrastructure management.	3.55	SA	3.53	SA
8. The system reduces suspicion of irregularities or corruption… verifiable data.	3.54	SA	3.44	A
9. CEPMS encourages citizen participation… project oversight.	3.54	SA	3.40	A
10. The system upholds ethical and professional standards… monitoring and reporting.	3.59	SA	3.42	A
Overall Mean	**3.56**	**SA**	**3.44**	**Agree**

Legend: *3.51–4.00 = SA - Strongly Agree · 2.51–3.50 = A - Agree · 1.51–2.50 = D -Disagree · 1.00–1.50 = SD -Strongly Disagree*

The results in Table 5 showed that both internal and external respondents regarded CEPMS as a trustworthy and legitimate system, with internal users expressing stronger agreement. Internal personnel demonstrated high confidence in the system's credibility, fairness, and ethical standards in project monitoring and reporting, a perception shaped by their direct involvement in verification, documentation, and compliance processes. External respondents also provided positive but more reserved assessments, reflecting their limited engagement with backend validation and reporting functions. Despite these differences, both groups agreed that CEPMS enhanced accountability and strengthened the credibility of monitoring reports, reinforcing its role in transparent infrastructure governance. In comparison with the other public value dimensions, trust and legitimacy ranked among the highest-rated indicators for both internal and external respondents, reflecting the importance placed on credible reporting, accountability mechanisms, and ethical compliance, which were more visible and widely experienced than service delivery-related benefits. These role-based variations were consistent with previous studies indicating that trust and legitimacy are rated more highly by internal users due to closer interaction with compliance mechanisms, while external stakeholders continue to recognize improvements in transparency and accountability through accessible reporting systems (Flyvbjerg, 2021; Chen et al., 2024).

Observed strengths and weaknesses of CEPMS in its process flow from project registration to completion

Table 6. Observed strengths and weaknesses of CEPMS in its process flow from project registration to completion

Strengths and weaknesses of CEPRM	Strength Overall Mean	Interpretation	Weaknesses Overall Mean	Interpretation
Data Encoding and Validation	**3.52**	Strongly Agree	1.46	Strongly Disagree
Field Monitoring and Updating	**3.52**	Strongly Agree	1.48	Strongly Disagree
Report Generation and Utilization	**3.51**	Strongly Agree	1.47	Strongly Disagree

Legend: *3.51–4.00 = Strongly Agree · 2.51–3.50 = Agree · 1.51–2.50 = Disagree · 1.00–1.50 = Strongly Disagree*

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The results in Table 6 showed that CEPMS performed strongly across all major stages of its process flow, from project registration to completion. Respondents consistently perceived the system as effective in supporting accurate data encoding and validation, timely field monitoring and updating, and reliable report generation and utilization. The minimal identification of weaknesses across these process areas indicated that users generally did not experience operational difficulties or functional gaps in the system. This pattern suggested that CEPMS's core processes were well-integrated and supported smooth information flow from project initiation to completion. Rather than isolated system components, the findings reflected a cohesive monitoring framework that enabled continuity, accuracy, and accountability throughout the project lifecycle. Such perceptions aligned with studies showing that integrated digital monitoring systems with strong validation, real-time updating, and reporting capabilities tend to demonstrate high operational reliability and low perceived deficiencies among users (Piccardo & Hughes, 2022; Shah, 2023).

Assessment of the specified Challenges Encountered in the Use of CEPMS

Table 7. Assessment of the specified Challenges Encountered in the Use of CEPMS

Challenges Encountered in CEPMS Use	Mean	Interpretation
1. Internal personnel experience difficulty navigating the CEPMS … limited user-friendliness.	2.11	Disagree
2. Accredited contractors face delays in securing system access… timely updates.	2.13	Disagree
3. The system experiences occasional technical glitches… incomplete or lost entries.	2.03	Disagree
4. Internet connectivity issues… hinder real-time system updating.	2.04	Disagree
5. Inconsistent compliance with data encoding protocols… record discrepancies.	1.99	Disagree
6. Contractors find uploading large documentation files… system size limits challenging.	2.07	Disagree
7. Internal staff lack sufficient training… advanced CEPMS functions.	2.02	Disagree
8. Absence of a mobile-friendly interface… on-site data entry.	2.03	Disagree
9. Overlapping responsibilities… confusion in data submission.	2.02	Disagree
10. Lack of integration with other government databases… redundant data entry.	2.02	Disagree
11. Contractors encounter difficulty interpreting required data formats… system entries.	2.05	Disagree
12. Project delays are not always reflected in real time… reporting misalignment.	2.05	Disagree
13. Internal personnel struggle with prioritizing CEPMS updates… workload demands.	1.95	Disagree
14. Time-consuming validation processes… multiple approval levels.	1.91	Disagree
15. Inadequate technical support availability… operational interruptions.	2.02	Disagree
16. Limited contractor awareness of timely and accurate updates… project tracking.	2.05	Disagree
17. System reports sometimes lack narrative detail… in-depth decision-making.	2.11	Disagree
18. Security protocols… slow down frequent data entry.	1.95	Disagree
19. Differences in digital literacy… inconsistent system utilization.	2.13	Disagree
20. Absence of automated alerts… missed deadlines or updates.	2.05	Disagree
Overall Mean	**2.04**	**Disagree**

Legend: *3.51–4.00 = Strongly Agree · 2.51–3.50 = Agree · 1.51–2.50 = Disagree · 1.00–1.50 = Strongly Disagree*

The results in Table 7 showed that respondents generally did not perceive the identified issues as significant challenges to the implementation of CEPMS. Concerns related to contractor access, variations in digital literacy, system navigation, report narration, connectivity, file uploads, and validation processes were viewed as occasional and manageable rather than as structural or systemic problems. The overall pattern indicated that these issues were treated as part of the normal adjustment process associated with the use of digital monitoring systems, rather than barriers that undermined system performance or effectiveness. Respondents' assessments suggested that CEPMS's core functions remained reliable and stable despite minor usability, coordination, and access-related concerns during regular system use. This finding was consistent with studies indicating that implementation challenges in digital monitoring platforms are often perceived as operational adjustments when system design, functionality, and data reliability are strong and well-integrated (Rüdele et al., 2024; Shah, 2023).

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Conclusions

The findings showed that both groups assessed CEPMS positively across all indicators, with internal respondents consistently expressing stronger agreement than external users. Results indicated that CEPMS effectively supported timely project completion, improved monitoring efficiency, enhanced transparency and communication, and strengthened accountability and credibility in infrastructure governance. The assessment of the system's process flow further revealed strong performance in data encoding and validation, field monitoring and updating, and report generation and utilization, with minimal perceived weaknesses. In addition, respondents generally disagreed with the identified challenges, suggesting that issues related to system access, usability, connectivity, and reporting were manageable and did not significantly hinder implementation. These findings demonstrate that CEPMS contributes to public value by enabling outcome achievement, operational efficiency, service delivery quality, and trust and legitimacy, thereby functioning as a results-based governance mechanism that strengthens infrastructure management in Quezon City.

Recommendations

Based on the findings and conclusions of the study, several recommendations are proposed. First, the Department of Public Works and Highways may consider developing national guidelines that promote interoperability among local government monitoring systems to reduce data redundancy and streamline project documentation. Second, the Quezon City Department of Engineering may prioritize system enhancements such as automated alerts, improved report customization, clearer narrative sections, and faster credential processing to address areas rated more moderately by external users. Third, engineers and contractors may benefit from targeted training on data encoding standards, report formats, and system navigation, as well as mobile-friendly tools to support real-time field updating. Fourth, community transparency may be strengthened through simplified public dashboards with clearer visual summaries and explanatory notes. Finally, future research is encouraged to adopt mixed-method designs to further examine usability, digital literacy, and workflow alignment issues, providing deeper insight into user experiences and system improvement strategies.

SWOC Strategic Plan

Table 8. SWOC Strategic Plan based on the results of the study

SWOC	Strategic Plan	Expected Outcome
STRENGTH	Expand CEPMS for planning, forecasting, and performance evaluation	Stronger results-based management
	Enhance geotagging, photo/video uploads, and evidence-based monitoring	Reliable, audit-ready documentation
	Develop advanced dashboards highlighting priority tasks and risks	Faster and smarter decision-making
WEAKNESSES	Improve report standardization + add narrative sections	Better comprehension and transparency
	Include quality metrics dashboards.	Stronger link to output quality
	Add visual summaries and simplified information sections	Improved accessibility for citizens
OPPORTUNITIES	Develop enhanced report templates and analytics tools	More credible, standardized reports
	Link CEPMS to QCDE quality assurance/inspection modules	Clearer quality monitoring
	Add variance analysis and deviation alerts.	Better project control
CHALLENGES	Automate credential processing within 24–48 hours	Faster participation & reporting
	Develop beginner and advanced training pathways.	More uniform system use.
	Redesign interface + add guided walkthroughs	Easier system learning

REFERENCES

Agbaxode, P. D. K., Saghatforoush, E., Dlamini, S., & Korsah, J. K. (2024). Integrated project delivery enablers to enhance conventional project delivery toward improving design documentation quality. *Built Environment Project and Asset Management, 14*(6), 817–834. https://doi.org/10.1108/BEPAM-09-2023-0158

Alhosani, K., & Alhashmi, S. M. (2024). Opportunities, challenges, and benefits of AI innovation in government services: A review. *Discover Artificial Intelligence, 4*, Article 18. https://doi.org/10.1007/s44163-024-00111-w

Amede, E. A., Woldesenbet, A. K., Bahiru, A. K., et al. (2025). Transforming construction in emerging economies: Overcoming barriers to the adoption of industrialized building systems. *Discover Applied Sciences, 7*, Article 765. https://doi.org/10.1007/s42452-025-06963-w

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Chen, L., Hu, Y., Wang, R., et al. (2024). Green building practices to integrate renewable energy in the construction sector: A review. *Environmental Chemistry Letters, 22*, 751–784. https://doi.org/10.1007/s10311-023-01675-2

Department of the Interior and Local Government. (2024). *Updated guidelines on the harmonization of local development planning, investment programming, resource mobilization, budgeting, expenditure management, and performance monitoring* (Joint Memorandum Circular No. 1, s. 2024). https://www.dilg.gov.ph/issuances/jc/Updated-Guidelines-on-the-Harmonization-of-Local-Development-Planning-Investment-Programming-Resource-Mobilization-Budgeting-Expenditure-Management-and-Performance-Monitoring-and-Coordination-in-Fiscal-Oversight-for-Enhanced-Local-Service-Delivery-in-line-with-the-Supreme-Court-Ruling-on-the-Mandanas-Garcia-Petitions

Evans, M., Farrell, P., Elbeltagi, E., & Dion, H. (2022). Competency framework to integrate lean construction and integrated project delivery on construction megaprojects. *Benchmarking: An International Journal*. https://doi.org/10.1108/BIJ-02-2021-0066

Faulkner, N., & Kaufman, S. (2017). Avoiding theoretical stagnation: A systematic review and framework for measuring public value. *Australian Journal of Public Administration, 77*(1), 69–86.

Flyvbjerg, B. (2021). Top ten behavioral biases in project management: An overview. *Project Management Journal,* 52(6), 531–546. https://doi.org/10.1177/87569728211049046

Hall, D., & Bonanomi, M. (2021). Governing collaborative project delivery as a common-pool resource scenario. *Project Management Journal*. https://doi.org/10.1177/8756972820982442

Hamta, N., Ehsanifar, M., & Sarikhani, J. (2021). Presenting a goal programming model in the time–cost–quality trade-off. *International Journal of Construction Management*. https://doi.org/10.1080/15623599.2018.1502930

Iandolo, F., La Sala, A., & Turriziani, A. (2024). Stakeholder engagement in managing systemic risk management. *Business Ethics: A European Review*. https://doi.org/10.1111/beer.12694

Jelodar, M. B. (2021). Integration of project management services for international engineering, procurement, and construction projects. *Built Environment Project and Asset Management, 11*(2), 330–347. https://doi.org/10.1108/BEPAM-06-2020-0106

Kim, S. (2021). Dynamic modeling for analyzing the impacts of skilled labor shortage on construction project management. *Journal of Management in Engineering*. https://doi.org/10.1061/(ASCE)ME.1943-5479.0000720

Kokogho, E., Odio, P., & Ogunsola, O. (2024). Transforming public sector accountability: The critical role of integrated financial and inventory management systems in ensuring transparency and efficiency. *The Management Journal*, *1(1), 15*. https://doi.org/10.54660/IJMOR.2024.3.6.84-107

Li, H., & Sun, Y. (2025). Digital transformation pathways and quality improvements in public sector project monitoring. *Technological Forecasting and Social Change, 208*, 121000. https://doi.org/10.1016/j.techfore.2025.124270

Moore, M. H. (1995). *Creating public value: Strategic management in government*. Harvard University Press.

National Economic and Development Authority. (2023). *Philippine Development Plan 2023–2028: Chapter 14 – Advancing digital transformation*. https://pdp.depdev.gov.ph/wp-content/uploads/2023/07/Chapter-14.pdf

Panwar, A., & Jha, K. (2021). Integrating quality and safety in construction scheduling time–cost trade-off model. *Journal of Construction Engineering and Management*. https://doi.org/10.1061/(ASCE)CO.1943-7862.0001979

Piccardo, C., & Hughes, M. (2022). Design strategies to increase the reuse of wood materials in buildings. *Journal of Cleaner Production*. https://doi.org/10.1016/j.jclepro.2022.133083

Purchase, C. K., Al Zulayq, D. M., O'Brien, B. T., et al. (2022). Circular economy of construction and demolition waste: Lessons, challenges, and benefits. *Materials, 15*(1), Article 76. https://doi.org/10.3390/ma15010076

Rane, N. (2023). Integrating building information modelling (BIM) and artificial intelligence (AI) for smart construction schedule, cost, quality, and safety management. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.4616055

Rüdele, K., Wolf, M., & Ramsauer, C. (2024). Synergies and trade-offs between ecological and productivity-enhancing measures in industrial production. *Management of Environmental Quality: An International Journal, 35*(6), 1315–1353. https://doi.org/10.1108/MEQ-07-2023-0195

Schäfer, F., Hirsch, B., & Nitzl, C. (2022). Stakeholder pressure as a driver of risk management practices in public administrations. *Journal of Accounting & Organizational Change, 18*(1), 33–56. https://doi.org/10.1108/JAOC-11-2020-0188

Shah, F. H., Bhatti, O. S., & Ahmed, S. (2023). Effects of project management practices on cost overrun in construction projects. In *Engineering Proceedings* (Vol. 44, No. 1, Article 1). MDPI. https://doi.org/10.3390/engproc2023044001