From Manual to Digital: Investigating Reporting Barriers and Exploring Pathways to a Smart Digital Platform for Urban Infrastructure and Services

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RESEARCH ARTICLE INFORMATION	ABSTRACT
  	This study investigated the current reporting mechanisms for urban infrastructure and services in a municipality in the Philippines, while identifying barriers that hinder effective citizen engagement and exploring pathways toward digital transformation. With global urbanization projected to reach 70% by 2050, municipalities are under increasing pressure to develop efficient and sustainable infrastructure management systems. Using a descriptive research design and quantitative methods, the study surveyed 148 respondents across four selected barangays to assess existing reporting practices, their effectiveness, challenges encountered, levels of access and awareness, and community readiness for digital transition. Findings revealed a fragmented manual reporting system lacking centralized tracking mechanisms, which limits local government capacity to make data-driven decisions and promptly address infrastructure issues. The research defines the key barriers, including technological limitations, governance challenges, and gaps in digital literacy that impede the adoption of smart solutions. By understanding these gaps, such as limited accessibility, lack of transparency, and inefficient feedback mechanisms, the study provides a foundation for designing a user-centric digital platform tailored to the citizens' needs. This research contributes to ongoing smart city development efforts in the Philippines, where 70% of urban LGUs are preparing for smart city initiatives yet face

significant implementation challenges, offering insights for other municipalities embarking on similar digital transformation journeys.

Keywords: *urban infrastructure enhancement, smart platform for urban infrastructure, reporting barriers, issue reporting, digital transformation*

Introduction

With the global population continuing to rise, the United Nations (2018) projects that by 2050, almost 70% will reside in urban areas – including in the Philippines. Currently, the country's urban population stands at 55% of its total population, which is approximately 114.12 million, highlighting the urgent need for sustainable urban planning. Ogunkan and Ogunkan (2025) emphasized that as urbanization accelerates worldwide, cities face mounting pressure to develop efficient and sustainable infrastructure. This rapid urbanization will further intensify challenges in urban infrastructure.

Efficient urban infrastructure and services are essential in maintaining quality living conditions in any community. According to Amado and Poggi (2022), urban infrastructure refers to the physical systems in a city that support essential functions, such as streets, energy, water, sanitation, information networks, waste management, and green spaces, necessary for the city's functioning and development. It is a multi-dimensional concept that goes beyond a set of constructed public facilities, utilities, and systems (Chen et al., 2019).

Urbanization growth poses various challenges, such as congestion, pollution, and resource consumption, prompting city planners and governments to adopt smart systems to manage these issues more efficiently (Veloso et al., 2024). This would increase pressure on the part of the government to implement effective policies and allocate resources wisely to meet the growing demands of urban populations. Collaborative efforts between government, communities, and private entities will be crucial in creating resilient cities that can adapt to the demands of a growing population.

In response, Local Government Units (LGUs) are increasingly implementing smart city solutions or innovative approaches that leverage technology to enhance urban functionality, sustainability, and livability. Antos and Zhou (2024) claimed that in 2023, the Department of the Interior and Local Government (DILG) and the World Bank found out in their survey that 70% of urban LGUs are preparing for smart city development, 61% have ongoing smart city initiatives, and 56% have established policies to support the said development. However, challenges hinder progress, including difficulties in integrated planning, financial constraints (67% of LGUs cited funding issues), limited collaborations with academic institutions, and an uneven focus on critical areas like health and the environment. Additionally, inadequate digital infrastructure (59%) and technical expertise (57%) further impede progress. Addressing these issues requires diversified funding, stronger partnerships, and investments in technology and workforce development to ensure successful implementation (Antos & Zhou, 2024).

In the era of digital revolution and smart cities, citizens have become fundamental to the design, implementation, and governance of urban infrastructure (Hernàndez, 2021). In the Philippine context, a "smart city" is defined as an innovative urban area that uses technology and innovation to enhance the overall functionality, sustainability,

and livability of urban areas, making them more responsive to the needs of their inhabitants and the environment (Antos & Zhou, 2024). Pereira et al. (2017) emphasized that citizen participation has been unprecedentedly encouraged and promoted in the context of smart city initiatives. This involvement fosters a sense of community engagement and encourages individuals to collaborate for the common good. According to Okonta and Vukovic (2024), smart platforms such as citizen engagement platforms enable cities to engage with their citizens and involve them in decision-making processes such as online forums, social media platforms, and mobile apps. In connection, Domingo et al. (2021) proposed a framework for a citizen-centered smart city mobile application in Iloilo City aimed at promoting digital participation between residents and the local government.

Furthermore, Bacalso et al. (2025) highlighted that despite the availability of multiple communication channels, many LGUs still rely on manual, paper-based processes, resulting in delays, fragmented communication, and a lack of accountability. Ramos et al. (2022) stated that one of the challenges in smart city development is the lack of interoperability of data systems. Some LGUs even go through the process of collecting and comparing data from different offices for verification. The absence of policies and standards on data collection and management results in siloed data systems, preventing real-time analysis. Beyond these operational challenges, structural and technological limitations, including obsolete systems, insufficient training, lack of standardized protocols, and funding limitations, hinder effective service delivery (Santos et al., 2025). Moreover, the potential of open-source digital tools to improve local governance remains underutilized, with many LGUs struggling to scale or sustain such systems (Albano, 2024).

Despite the increasing recognition of smart city initiatives worldwide, many local municipalities have yet to implement digital reporting systems designed to enhance urban services. The limited adoption of smart reporting platforms highlights the need for further exploration into their potential benefits and challenges.

In the Local Government Unit (LGU) of Cabagan, Isabela, it has been observed that there is no dedicated reporting system for urban infrastructure and services. They continue to rely on the manual or fragmented reporting of issues. This makes it challenging to track and prioritize reported issues, leading to delays in resolution. Additionally, the lack of real-time monitoring prevents local authorities from making data-driven decisions and proactively addressing recurring problems. As a result, residents may experience prolonged service disruptions, while local government officials struggle with fragmented and uncoordinated information management. Implementing a digital reporting system for the LGU of Cabagan could significantly enhance efficiency, ensuring timely responses, improved transparency, and better overall service delivery for the community.

However, before such a system can be effectively designed and implemented, it is essential to understand the existing reporting landscape. Hence, this study aimed to investigate the current mechanisms used in the community, identify existing barriers of the current reporting mechanisms for urban infrastructure and service-related issues, focusing on the challenges faced by both citizens and local authorities, and assess the community's readiness for a digital transition. By identifying these pain points, such as lack of accessibility, limited transparency, and inefficient feedback loops, the study aimed to provide a foundation for designing a smart, user-centric digital platform tailored to local needs. Specifically, it sought to answer the following research questions:

1. What is the current mechanism of reporting or addressing urban infrastructure and service issues used in the community?
2. How effective is the current mechanism of reporting or addressing urban infrastructure and service issues used in the community?
3. What are the challenges encountered in the current mechanism of reporting or addressing urban infrastructure and service issues used in the community?
4. What is the level of access and awareness of the citizens of the community in the current mechanism of reporting or addressing urban infrastructure and service issues used in the community?
5. What is the level of readiness of the citizens in using a digital platform for reporting or addressing urban infrastructure and service issues?

The conceptual framework, presented in Figure 1, provides a structured guide for the direction and procedures of this study. It focuses on the current reporting mechanisms in the community and examines multiple interconnected aspects, including the challenges encountered, citizens' level of access and awareness, the effectiveness of the mechanisms, and the citizens' readiness to use a digital platform for reporting and addressing urban infrastructure and service issues. By examining these components together, the study aimed to capture a comprehensive overview of the strengths and weaknesses of the current reporting mechanisms. These would provide the foundation for designing a smart digital platform for urban infrastructure and services that is responsive to the needs of the community.
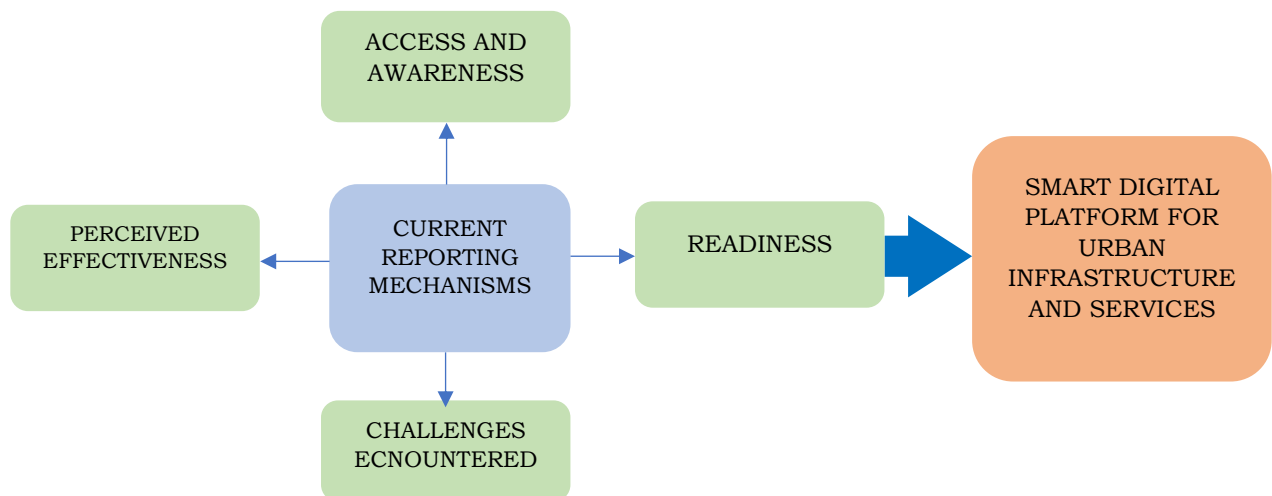
Figure 1. *Conceptual Framework*

Methods

Research Design

This study adopted a descriptive research design, integrating a quantitative approach to thoroughly examine the current reporting system for urban infrastructure and services. This approach ensures a comprehensive assessment of its effectiveness, challenges, and potential for digital transformation. The quantitative approach involved structured surveys to collect numerical data on the existing reporting mechanisms, their effectiveness, challenges encountered, access and awareness, and technology readiness. The study aimed to provide evidence-based recommendations for the development of a

responsive and efficient digital infrastructure reporting platform. Qualitative methods such as interviews, focus group discussions (FGDs), and triangulation were not employed due to the study's design and timeline. Hence, this study does not capture in-depth qualitative perspectives, which may be addressed in future mixed-methods research.

Respondents and Locale of the Study

A structured survey was designed and distributed to a diverse group of respondents to ensure a comprehensive analysis of the current reporting system for urban infrastructure and services. The respondents consisted of barangay officials, local government representatives, and citizens from selected barangays in Cabagan, Isabela, namely Centro, Catabayungan, Anao, and Ugad, as they represent key areas with varying levels of urban infrastructure concerns. There were 35 respondents for each barangay who were selected through purposive sampling, resulting in a total sample size of 140 responses from four barangays. In addition, 10 respondents from the LGU of Cabagan who are involved in the direct process and management of infrastructure-related reports were also included. A total of 150 questionnaires were distributed to the respondents, and after cleaning and validation, only 148 valid responses were included in the analysis.

Purposive sampling was used to select respondents who possess direct experience in infrastructure reporting, ensuring that the data came from individuals capable of providing accurate and relevant information. While this method limits generalizability, it is appropriate for studies requiring informed participants.

Data Analysis

The responses from the survey were organized and tabulated using a spreadsheet. Descriptive statistical tools were used to analyze the data, specifically frequency counts, percentages, mean scores, and standard deviation to determine the reporting mechanisms, their effectiveness, challenges encountered, access and awareness, and technology readiness. To identify patterns across different demographic groups, cross-tabulation was used. Chi-square test of independence was also used to further explore the relationships between selected variables.

Ethical Considerations

This study strictly adhered to ethical standards throughout the research process to ensure the protection, dignity, and rights of all participants. Approval from the appropriate institutional authorities was secured before data collection. Informed consent was obtained from all respondents, with clear communication regarding the study's objectives, procedures, voluntary participation, and the right to withdraw at any point without any repercussions.

In compliance with the Data Privacy Act of 2012, all personal and sensitive information collected from participants was treated with utmost confidentiality. Identifiable data were anonymized, securely stored, and used solely for academic and research purposes. Access to this data was strictly limited to the researchers, and appropriate safeguards were implemented to prevent unauthorized disclosure or misuse.

Participants were not subjected to any form of physical, psychological, or reputational harm. Cultural sensitivities and community norms were respected, especially in engagements involving local barangays in Cabagan, Isabela. The ethical

principles of respect, beneficence, and justice guided the entire study, ensuring that the research contributes positively to the community without exploitation or bias.

All findings were presented with honesty and integrity. No data was falsified or manipulated. The researchers declare no conflict of interest and affirm that this study was conducted with full transparency, accountability, and adherence to applicable ethical and legal standards.

Results and Discussion

Profile of the Respondents

A total of 148 respondents in the survey, composed of individuals from various groups, sexes, and roles in the community, and barangays. The majority of the respondents fall within the 36–45 age group (24.14%), followed by 26-35 years old (20.69%). The youngest group, aged 15–25, comprised 19.31% only. This age distribution indicates a wide representation across age groups, suggesting that the perspectives from different life stages were captured. It is noteworthy to mention that working-age individuals (26-45) have a relatively high participation, and they are typically the most active in reporting and engaging with urban services (Buffel et al., 2012), and are familiar with both traditional and digital communication channels (Hochstenbach, 2018), making them valuable contributors to this study.

As to the sex distribution of the respondents, 49.32% were female, while 48.65% were male, indicating an almost even gender representation. This balance enhances the reliability of the study's findings across genders. The majority of respondents were identified as citizens (64.43%), followed by barangay officials (28.86%) and LGU personnel (6.71%).

Table 1. Distribution of Respondents

Demographic Variable	Frequency	Percentage
Age Group		
15-25	28	19.31
26-35	30	20.69
36-45	35	24.14
46-55	23	15.86
56 and above	29	20.00
Sex		
Female	73	49.32
Male	72	48.65
Role		
Citizen	96	64.43
LGU Personnel	10	6.71
Barangay Officials	43	28.86
Barangay		
Centro	31	21.53
Ugad	35	24.31
Catabayungan	40	27.78
Anao	35	24.31

The respondents were dominated by the citizens, as this is important in understanding the reporting mechanisms from the user's perspective at the community level. The respondents were distributed across four selected barangays, with Catabayungan having the highest proportion (27.78%) and Centro the lowest (21.53%). Respondents are relatively even in distribution to allow for geographic comparability in analyzing the other effectiveness and awareness of the existing reporting mechanisms, challenges encountered, and technology readiness.

Existing Reporting Mechanisms

The survey reveals that the majority of respondents (62.84%) report urban infrastructure or service issues directly to local government or authorities, indicating a strong reliance on formal channels. A smaller proportion either discuss issues informally with friends or family (11.49%), or use social media to raise concerns (5.41%). A few take matters into their own hands (4.73%) or choose to ignore the issues altogether (4.73%). This also reflects a proactive stance among citizens as they prefer formal over passive approaches.

Among those who report issues, the most common method is through written complaints (35.81%), followed by in-person visits (31.76%) and phone calls (20.95%). This indicates a continued reliance on traditional, paper-based methods, which may pose delays and inefficiencies. This preference suggests a continued reliance on traditional bureaucratic procedures, reflecting both habit and perceived legitimacy of conventional reporting methods (Heeks, 2006).

Table 2. Perception on the Existing Reporting Mechanisms

Reporting Mechanisms	Frequency	Percentage
Typical Action Taken for Urban Issues		
1. Ignore the issue	7	4.73
2. I talk about the issue with friends/family	17	11.49
3. Post about it on social media	8	5.41
4. Fix the issue myself if possible	7	4.73
5. Report it to the local government or authorities	93	62.84
Methods Used for Reporting Issues		
1. In-person visits	47	31.76
2. Phone calls	31	20.95
3. Written complaints	53	35.81
Frequency of Reporting		
1. Daily	6	4.03
2. Weekly	19	12.75
3. Monthly	36	24.16
4. Rarely	73	48.99
5. Not at all	15	10.07
Length of Engagement in Reporting		
1. I don't engage at all	17	11.49
2. Less than 1 year	57	10.88
3. 1–3 years	26	10.96
4. 4–6 years	23	11.03
5. More than 6 years	25	11.11

Research on citizen engagement in public services suggests that many individuals continue to favor face-to-face or paper-based interactions due to familiarity, trust in existing channels, and concerns over the effectiveness or security of digital systems (Bélanger & Carter, 2008; Carter & Bélanger, 2005). On the other hand, the relatively low use of phone calls could be due to the lack of or unawareness of official hotlines.

Furthermore, most respondents report issues rarely (48.99%), while only a small number do so monthly (24.16%), weekly (12.75%, or daily (4.03%). A notable 10.07% do not report at all. The infrequent reporting suggests potential barriers such as a lack of access, trust, awareness, or responsiveness of the current mechanisms.

Engagement in reporting was generally low, with 11.49% stating they do not engage at all. Among active participants, the most common length of engagement was less than one year (10.88%), followed closely by those engaged for 1–6 years, each around 11%. This means that many are relatively new or inactive, which could imply two things. First is the need to build sustained awareness and engagement strategies, and second is the presence of growing citizen awareness and willingness to engage in community affairs.

Effectiveness of the Existing Reporting Mechanism

The effectiveness of the existing reporting mechanism was assessed using three indicators: ease of reporting issues (3.40), efficiency of the current process (3.43), and level of satisfaction (3.36). These three indicators yielded mean scores slightly above the midpoint (3.00), suggesting a moderate level of agreement among respondents that the current reporting mechanism is functional to some extent. Moderate satisfaction in public service delivery is common in traditional bureaucratic settings where processes are often structured but constrained by procedural rigidity, limited resources, and response delays (Heeks, 2006; Welch et al., 2005). Citizens' satisfaction can remain moderate due to factors such as limited feedback, slow resolution of complaints, and perceived lack of transparency (Bélanger & Carter, 2008). This aligns with the present findings, indicating that while the current reporting mechanism provides a baseline functionality, its full potential is not realized. While the system may not be ideal, it has foundational strengths that could be enhanced through a digital upgrade.

Table 3. Perceived Effectiveness on the Existing Reporting Mechanism

Effectiveness	Mean
1. Perceived ease of reporting issues	3.40
2. Efficiency of the current process	3.43
3. Level of satisfaction with the existing reporting mechanism	3.36

The data in Table 4 shows a wide range of experiences regarding how quickly the concerned unit receives responses after reporting urban infrastructure and service issues. It is encouraging that over 40% of respondents reported feedback or action within a week. This suggests that a significant portion of the community benefits from relatively responsive local authorities. However, there are 6.80% of the respondents who received no response at all, while others experienced delays of more than a week (>50%). It is important to consider that the variation in response time may be influenced by the complexity or severity of the reported issues. Still, the lack of a transparent system for communicating such delays may contribute to public frustration. Studies have shown

that unclear communication and a lack of feedback in public service delivery often lead to reduced citizen satisfaction and trust in institutions (Thomas, 2013).

Table 4. Response Time After Reporting Using the Existing Mechanisms

Response Time After Reporting	Frequency	Percentage
1. No response at all	10	6.80
2. Less than 1 week	60	40.82
3. 1–3 weeks	28	19.05
4. 1–3 months	22	14.97
5. More than 3 months	27	18.37

Challenges Encountered

Challenges were also identified during the survey, and the most frequently reported challenge was a lack of follow-up response (34.27%), followed by difficulty in tracking the status of reports (10.49%), and delays in response time (9.79%). These findings point to systemic issues in communication, accessibility, and feedback. These are critical areas where digital transformation could create significant improvements.

Notably, 40.54% of respondents admitted that they have avoided reporting issues due to the complexity of the process. This suggests that the existing reporting mechanisms may be perceived as tedious and confusing. On the other hand, the respondents largely attributed delays to insufficient communication between stakeholders (52.38%) and lack of resources (29.93%), with some also citing mismanagement of reports (12.93%). These could be another area for improvement that can be considered when introducing enhancements to the process to encourage broader participation, strengthen the trust and confidence of the citizens, and improve overall efficiency. Public engagement and transparent processes are known to significantly contribute to trust in government institutions, particularly when citizens feel heard and can see visible outcomes from their participation (OECD, 2017)

Positively, 92.57% of respondents believe that urgent issues are being responded to, suggesting that critical issues are still prioritized despite general inefficiencies. This is a valuable strength to build upon. A digital platform could embed prioritization logic to flag and expedite high-risk reports, ensuring that this responsiveness is retained or even enhanced. Integrating intelligent triaging systems into e-governance platforms has been shown to improve response times and resource allocation, especially in urban service delivery (United Nations E-Government Survey, 2022).

The most cited concern in reporting was lack of transparency (46.76%), followed by personal data privacy (27.34%) and fear of being ignored (17.27%). A small portion also expressed fear of retaliation (3.60%). These concerns emphasize the importance of designing a platform with clear reporting feedback, data protection measures, and possibly anonymous submission options. Building trust in the system is as important as improving technical efficiency.

Table 5. Challenges Encountered in the Existing Reporting Mechanisms

Challenges	Frequency	Percentage
Challenges encountered when reporting		
1. Delays in response time	14	9.79
2. Lack of response or follow-up	49	34.27
3. Limited access to reporting channels	12	8.39
4. Language barriers	7	4.90
5. Lack of anonymity	6	3.50
6. Difficulty in tracking the status of reports	15	10.49
7. Lack of acknowledgment of submitted reports	9	6.29
8. Repetition of the reporting process	10	6.99
Avoidance Due to Reporting Complexity		
1. Yes	60	40.54
2. No	88	59.46
Perceived Reasons for Issue Resolution Delays		
1. Insufficient communication between stakeholders	77	52.38
2. Lack of resources for resolution	44	29.93
3. Mismanagement of reports	19	12.93
Responsiveness to Urgent Matters		
4. Yes	137	92.57
5. No	11	7.43
Reporting-Related Concerns		
1. Fear of being ignored	24	17.27
2. Fear of retaliation	5	3.60
3. Personal data privacy	38	27.34
4. Lack of transparency	65	46.76

Access and Awareness

The data in Table 6 reveal that just over half of the respondents (51.01%) said they are aware of the proper procedures for reporting urban issues, while about 37.58% said they are only somewhat aware, and 11.41% admitted they are not aware at all. This suggests that although many people have a general understanding of how to report problems, a large portion still lacks full clarity, which could be affecting their willingness or ability to engage.

When it comes to accessing the actual reporting mechanisms, the numbers are similarly split. About 48% of respondents said they find it easy to access these systems, while 39.19% were unsure or found it somewhat accessible. A smaller group, around 13%, reported having difficulty accessing the system. This mixed response indicates that although the system is working for some, many still face obstacles, whether due to unclear processes, limited options, or other barriers. Research shows that barriers such as low digital literacy, lack of standardized processes, and insufficient user support can significantly affect citizen participation in public reporting systems (Misuraca et al., 2013).

The most concerning result, however, is related to access to information materials. Only 34.53% said they have access to materials that explain how to report issues, while a striking 65.47% said they do not. This lack of available information is

likely contributing to the confusion and inconsistency in awareness and access across the community.

Table 6. Levels of Awareness and Accessibility on the Existing Reporting Mechanisms

Access And Awareness	Frequency	Percentage
Awareness of the Proper Procedures for Reporting Issues		
1. Yes	76	51.01
2. No	17	11.41
3. Somewhat	56	37.58
Ease of Access to Reporting Mechanisms		
1. Yes	71	47.97
2. No	19	12.84
3. Somewhat	58	39.19
Access to Reporting Information Materials		
1. Yes	48	34.53
2. No	91	65.47

Technology Readiness

The readiness of the respondents was also assessed. The data in Table 7 shows that most of the respondents are open to using digital tools for reporting issues, with 57.43% saying "yes" to adopting digital reporting. However, nearly 28% are unsure, and 14.86% are not interested, which suggests that while many are on board, there are still some hesitations or uncertainty about fully embracing digital solutions. From the perspective of Institutional Trust Theory, citizens are more likely to use digital government services when they trust government institutions to be capable, honest, and dependable (Levi & Stoker, 2000). When public agencies are seen as slow, unresponsive, or lacking transparency, this skepticism often carries over to the digital systems they manage. As a result, citizens may view digital platforms not simply as helpful technological tools, but as extensions of the same bureaucratic processes they already find frustrating, which in turn discourages their participation (Welch et al., 2005).

When it comes to what features people want in a digital platform, the top request is real-time status updates on reported issues, with 36.49% of respondents prioritizing this. This highlights how important it is for people to stay in the loop and see progress on their reports. A simple, user-friendly interface is also key, with 33.11% emphasizing that the system should be easy for everyone to use. On the other hand, features like uploading photos/videos, anonymous reporting, and receiving notifications on progress were less popular, with only a few people expressing interest in them.

However, the transition to digital reporting is not without concerns. The biggest worry for nearly half of the respondents (46.98%) is the lack of access to technology. This points to a major hurdle in making the system accessible for everyone. Another 26.17% are concerned about the difficulty of using the system. As the Technology Acceptance Model (TAM) posits, technology adoption is driven by perceived usefulness and perceived ease of use (Davis, 1989). This means that these factors must be addressed to ensure the system works smoothly for all users.

On the other hand, 18.79% have reservations about data security. E-government research emphasizes that trust is multidimensional, encompassing trust in government,

trust in technology, and trust in administrative processes (Warkentin et al., 2002). Citizens may hesitate to use digital reporting systems due to concerns over data privacy, security, and the potential misuse of personal information.

Table 7. Technology Readiness on Digital Reporting Platform

Technology Readiness	Frequency	Percentage
Willingness to Adopt Digital Reporting Tools		
1. Yes	85	57.43
2. No	22	14.86
3. Maybe	41	27.70
Preferred Features in a Digital Reporting Platform		
4. Real-time status updates on reported issues	54	36.49
5. Ability to upload photos/videos	4	2.70
6. Notification on progress and resolution	11	7.43
7. Anonymous reporting option	4	2.70
8. User-friendly interface	49	33.11
9. Feedback mechanism on the service quality	6	4.05
Concerns About Transitioning to Digital Reporting		
1. Lack of access to technology	70	46.98
2. Difficulty using the system	39	26.17
3. Concerns about data security	28	18.79

Conclusion and Future Works

This study aimed to provide a foundation for designing a smart, user-centric digital platform for reporting issues on urban infrastructure and services by assessing first the current reporting mechanisms, their effectiveness, challenges encountered, level of access and awareness of the citizens, and their readiness in adopting a digital platform.

People are still more comfortable with the ways they have always reported issues, and this shapes how often and how confidently they participate. The community seems to be in a period of slow transition, where familiar habits remain strong, but interest in more active involvement is gradually growing. The local government unit may then consider modernizing its reporting systems to enable more accessible reporting options, clearer communication, and sustained efforts to encourage citizen participation. Future studies may employ a mixed-methods approach by integrating qualitative techniques such as interviews, focus group discussions, and triangulation to enrich the findings and provide deeper insights into citizens' experiences.

Furthermore, the current reporting system is moderately effective. Residents find it somewhat easy and efficient to use, and they are reasonably satisfied, suggesting that the system works but could benefit from improvements, especially through digital upgrades that can streamline the process. The mixed experiences with the reporting system suggest that it works reasonably well for some but feels uneven for others. These inconsistencies affect how people perceive the system's fairness and reliability. When responses are unpredictable, it naturally shapes how much trust residents place in the process and how confident they feel that their concerns are taken seriously. These point to the need for a more transparent and responsive reporting system to improve citizen experience and strengthen public confidence.

The challenges people encounter, whether related to communication, access, or privacy, reflect how personal and relational reporting can be. When residents feel unsure, unheard, or exposed, they are less likely to stay engaged. These experiences influence not only how comfortable they are with reporting but also how they view the responsiveness and care of local institutions as a whole. Creating a smart, secure, and transparent digital platform could solve these challenges, making it easier for citizens to participate, improving coordination between agencies, and ultimately making urban services more responsive and efficient.

In addition, citizen engagement is uneven, shaped largely by how well people understand the reporting process. Limited awareness and inconsistent access to reporting mechanisms mean that many residents participate only hesitantly or not at all. The lack of clear guidance and information appears to be a key factor behind this uneven participation, affecting confidence and consistency in reporting. Hence, how information is shared and understood plays a central role in shaping public involvement and trust in the system. Investigating the reasons behind hesitancy or low participation in more depth could also provide insights for making reporting mechanisms more inclusive and effective.

There is a general openness to adopting digital reporting. Varying levels of comfort and access could influence how widely and effectively such a system is embraced. Users value transparency and simplicity, showing that keeping people informed and making the process easy are central to engagement. At the same time, concerns about technology access, usability, and data security highlight that digital solutions must consider inclusivity and trust to be effective. This underscores the need for governments to strengthen transparency, accountability, and responsiveness alongside technological innovation. Readiness for digital adoption is promising but conditional, depending on addressing practical and security-related barriers.

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Conflict of Interest

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

Artificial Intelligence (AI) Declaration Statement

The researchers hereby declare that the following AI tools were used in the preparation of this study to ensure transparency and integrity: (1) ChatGPT, which was used to refine the clarity and grammar of the paper; and (2) Quillbot, which was used for plagiarism checking and citation generation.

The use of these tools was strictly limited to grammar enhancement, plagiarism detection, and citation support. They were not used to generate or fabricate research data, perform analysis, or produce results and conclusions. All intellectual contributions, interpretations, and findings of this study are solely the responsibility of the authors. All outputs with the aid of AI tools were thoroughly reviewed, verified, and edited by the authors. The content, originality, and validity of this thesis remain the sole responsibility of the authors.