Development of an Integrated Information System for Community Population Administration Services

Yoana Nabilah Putri [1], Mushfi Abdulloh Kafa [2], Yusadiningrat Muhammad Dinar [3], Dzikri Ahmad Fauzi [4], Muhammad Evan Maulana [5], Bambang Irawan [6]

[1,2,3,4,5,6]Fakultas Ilmu Komputer, Universitas Esa Unggul, Indonesia

ABSTRACT

The demand for transparent and responsive public services drives the adoption of information technology in government administration processes. This research aims to develop a web-based public complaints information system that allows citizens to report environmental issues directly to relevant agencies. The system was designed using a prototype approach involving user needs analysis, interface design, and functionality testing through black box methods and limited trials (beta testing). Key features include real-time report status tracking, a public monitoring dashboard, and citizen service ratings. Test results showed that all features functioned as designed and received positive feedback from users, with an average satisfaction score of 4.5 out of 5. These findings indicate that the system is able to increase citizen participation, strengthen agency accountability, and facilitate inter-agency coordination. The development of a community-centered system is considered effective in promoting transparency in public services and expanding the adoption of e-Government systems at the local level.

Corresponding Author:

Bambang Irawan
Fakultas Ilmu Komputer
Universitas Esa Unggul
Jawa Barat, Indonesia
Email: bambang.irawan@esaunggul.ac.id

1. Introduction

Environmental order and comfort are essential components in creating a safe and productive community life. However, public issues such as damaged public facilities, piles of garbage, or broken streetlights are often not promptly addressed due to a weak public reporting system. The slow handling of public complaints is caused by the lack of a responsive, transparent, and integrated reporting system. Manual reporting procedures, which tend to be bureaucratic, also exacerbate the situation because they are poorly documented and difficult for the public to monitor [1], [2].

Digital transformation has opened up significant opportunities for improving public complaint governance. The use of information technology in government, particularly through web-based complaint information systems, can be a solution to increase citizen participation and efficiency in problem handling. Previous studies have shown that complaint systems that prioritize User Experience (UX) and a clear interface can encourage public adoption [3], [4]. The multidimensional service design of e-Government systems has been shown to significantly influence citizen satisfaction, as explained in previous research [5].

However, many digital complaint systems are one-way and do not accommodate the principle of data transparency or real-time complaint progress tracking. Several studies have found that approaches such

662

as Customer Relationship Management (CRM) in e-Government systems are still unable to create optimal cross-agency collaboration [1], [6]. Previous research has shown that integrating complaint tracking and user feedback features into web-based complaint systems can increase transparency and build more effective two-way communication between complainants and system administrators [7]. Furthermore, not all systems provide a platform for the public to assess the services they receive [8].

On the other hand, the complaint system developed by Jakarta Smart City through CRM is considered a good example of government transparency practices, although recent evaluation results indicate a gap between citizen expectations and the actual performance of the web-based service [9]. This system evaluation used the E-GovQual and Importance Performance Analysis methods, finding that indicators such as service speed, information accuracy, and ease of use still need improvement [10].

Research shows that e-Government, with its transparency principles in public procurement, has become a key driver in achieving sustainable development goals [11]. This finding reinforces the importance of integrating technology and accountability values in the design of digital public service systems.

This research responds to these limitations by offering a public complaints information system model that not only supports rapid complaint reporting but also status tracking, citizen feedback, and open public monitoring. This system was designed using a user-needs-based prototype approach and adopts citizen-centric principles that place the public at the center of the service process [6], [12].

Not all citizens have the same level of digital literacy, so the user interface was designed to be as simple as possible to be usable by a wide range of groups, including the elderly, people with disabilities, or residents living in areas with limited internet connectivity. Therefore, the system was developed with universal design principles in mind and functionality tested through simulations that reflect real-world conditions [10].

Overall, the development of this digital reporting information system is expected to serve as an initial model for building a more participatory, transparent, and efficient public service ecosystem. In the long term, this system can be integrated into the local government's integrated service platform as part of the transformation process towards a smart city [9]. Based on this background, this research aims to design and develop an integrated, responsive, and transparent web-based reporting information system. Contributions of this research include strengthening citizen participation, efficient coordination between agencies, and systematic digital documentation. The findings of this study have the potential to broaden theoretical understanding of the development of digital public complaint systems in the e-Government era [13], [14]. However, the effectiveness of citizen reporting systems remains dependent on regulatory support and the institutional readiness of local governments [2]. User behavior has been found to significantly influence the effectiveness of public complaint applications, particularly in smart city-based systems [15].

The development of public complaint systems in the context of e-Government has been widely discussed in both global and national literature. Previous studies have shown that digital public service systems require a strong foundation in the form of regulations, infrastructure readiness, and citizen engagement to be fully successful [16]. In Indonesia, several regions such as Surabaya and Banyuwangi have begun adopting digital reporting systems, but limitations in system interoperability between agencies and low digital literacy remain obstacles.

The Ministry of Administrative and Bureaucratic Reform (PAN-RB) in its SP4N-LAPOR guidelines also emphasizes that the public complaints system must be responsive, open, easily accessible, and provide clear feedback on public reports. This means that the system design must not only be technically user-friendly but also supported by informative communication channels integrated with actual follow-up processes in the field.

Beyond technological and policy aspects, cultural aspects and community habits in conveying criticism and reports are also highly influential. Research in developing countries shows that citizens tend to be reluctant to report openly due to fear of reprisal or lack of confidence that their reports will be followed up [17]. Therefore, the system design must also consider the confidentiality of the reporter and provide a sense of security during the reporting process.

In this context, this research focuses on designing a reporting system that is not only technically reliable but also inclusive and sensitive to the social needs of local communities. The system is expected to build a two-way communication bridge between citizens and the government through an adaptive and participatory approach.

2. Research Methodology

This research uses a prototype-based system development approach with iterative stages and is oriented towards user needs. The prototype model was chosen because it allows development to be carried

out in stages through direct feedback from potential users, so that the system can be quickly adjusted to meet real needs in the field [6].

1.1. Research Location and Object

The research was conducted in the Pusaka Rakyat neighborhood of Bekasi Regency, West Java, as a case study area. This area was chosen because it lacked an integrated digital reporting system between residents and village officials. The research was conducted from March to May 2024.

The object of this study was the public complaint reporting process, which involved residents as reporters, village officials as system administrators, and technical officers from relevant agencies as follow-up implementers..

1.2. Data Collection Techniques

Data was collected through three main techniques:
- Direct observation of the manual complaint reporting process currently carried out by the public.
- Structured interviews with village officials, technical service personnel, and residents as potential system users.
- Literature review from scientific journals and best practices related to digital public complaint systems [1], [3], [6].

Data triangulation was conducted to ensure the validity of the information and formulate system requirements more accurately. The results were used to develop functional and non-functional requirements..

1.3. System Development Model

The development process follows a prototyping model consisting of five stages:
1. Identifying user needs, by formulating key features such as reporting forms, complaint tracking, admin validation, officer assignments, and citizen assessments.
2. User Interface (UI) design based on the principles of easy navigation and informative displays [18].
3. Creating an initial prototype, using HTML, PHP, and a MySQL database.
4. Initial user evaluation, including feature revisions based on feedback.
5. Final implementation and thorough testing.

The prototyping model was chosen because it aligns with the characteristics of the system, which requires direct user participation and rapid feedback during development. Compared to the linear waterfall method, prototyping provides greater flexibility in dynamically adapting to user needs.

During this iterative process, a user-centered design approach was used, which places citizens as the primary actors in feature design. Previous results have shown that involving citizens from the outset in the design of digital public service systems will increase the success of the system's adoption [3].

1.4. System Architecture

The system is designed with a three-tier architecture:
- Presentation Layer: user interface (frontend).
- Application Layer: application logic processing, complaint verification, and status tracking.
- Data Layer: storage of report, status, and user data.

The entire data communication process uses the HTTP protocol with a POST/GET data delivery format secured by server-side validation. The system is also designed with a modular approach, allowing each component, such as reporting, validation, tracking, and assessment, to stand alone and be developed separately. A service-oriented architecture is used to allow future development, such as integration with an SMS gateway notification system or mobile application, without requiring changes to the core structure.

The database used is MySQL, which has a relational structure for managing key tables such as users, reports, assignments, and feedback. The Create, Read, Update, and Delete (CRUD) process is monitored with Role-Based Access Control (RBAC) security that differentiates between residents, village administrators, and technical staff.

Furthermore, this system's implementation follows the principle of fail-safe design, where users still receive notifications in the event of network disruptions or unsuccessful input processing. Error messages are designed to be informative but non-technical, to maintain a positive user experience.

1.5. System Testing

Testing was conducted using two approaches:
- Black Box Testing: to ensure each feature operates as expected. Testing was conducted on login functions, complaint submission, admin validation, assignments, and progress tracking.

664

• User Evaluation (Beta Testing): involving 10 respondents from diverse backgrounds (residents, village administrators, and field officers). The evaluation instrument was a Likert-scale questionnaire to assess aspects of ease of use, information clarity, and service satisfaction.

This research was conducted with ethical principles of social research in mind. Each participant involved in the interviews and system testing was explained the purpose of the research and provided voluntary consent. Respondents' personal data was kept confidential and used only for academic purposes [19].

During the testing phase, in addition to the Black Box approach, a heuristic evaluation was also conducted based on Nielsen's 10 usability principles. This evaluation was conducted by three independent observers who assessed aspects of navigation, display consistency, error prevention, and usability. The results showed that the system had a feasibility score of 85%, with the highest-scoring aspects being "simplicity" and "recognition rather than recall."

In addition, the user satisfaction questionnaire was developed using the System Usability Scale (SUS) approach to ensure that respondents' ratings reflected their true perceptions of the system's quality. The average SUS score was 76.5, which falls within the "good usability" category and is suitable for public implementation.

To test the system's scalability, a simulation was conducted by randomly inputting 100 reports through an automated script, and the system remained stable without significant performance degradation. This demonstrates the system's readiness for use in real-world environments with a larger number of users.

1.6. Tools and Technology Used

The following are the tools and technologies used in the system development process:
• Programming languages: HTML, CSS, PHP
• Database: MySQL
• Development tools: XAMPP, Visual Studio Code
• Reference management: Zotero

1.7. System Supporting Diagrams and Tables

To provide a comprehensive understanding of the process and structure of the information system being developed, this section presents several key diagrams reflecting the development stages, user interactions, activity flows, and the system's data flow logic.

Each diagram is accompanied by a descriptive explanation to outline its function and relevance to the overall system architecture.
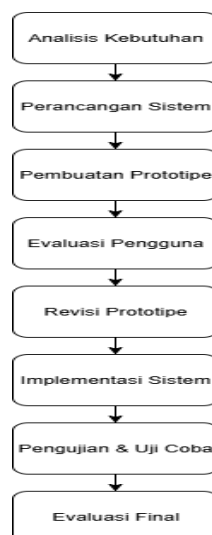

Figure 1. System Development Flowchart

Figure 1 shows the development stages of a prototype-based public complaints information system. The process begins with identifying user needs and analyzing existing problems in the field, followed by system design, including data structure, functional logic, and user interface. This is followed by initial

665

prototype development, user evaluation testing, and system implementation and comprehensive testing. This diagram's iterative approach allows for continuous adjustments based on user feedback, resulting in a system that better fits the context of real-world use.
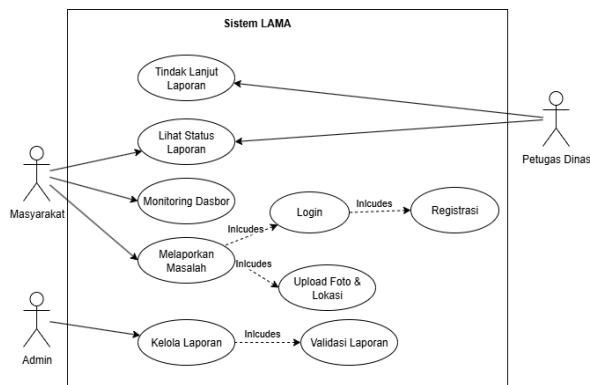

Figure 2. Use Case Diagram of the Public Complaints System

Figure 2 displays a use case diagram depicting the relationships and interactions between the main actors in the system: the community, sub-district administrators, and service officers. The diagram shows that the community plays a role in completing complaint reports, monitoring status, and providing service assessments. Admins are responsible for validating reports and assigning tasks to officers. Meanwhile, service officers play a role in updating the status of complaint handling. This diagram maps the system's overall usage scenarios and serves as the basis for formulating functional requirements during the system design stage.
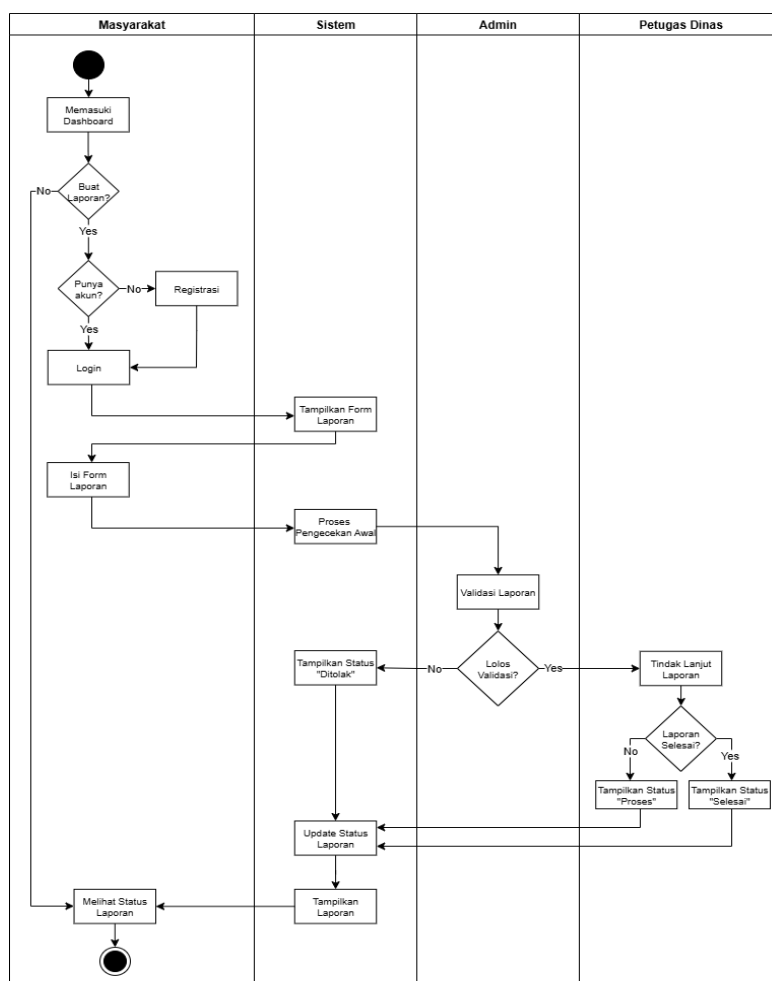

Figure 3. Activity Diagram of the Complaint Reporting and Handling Process

666

Figure 3 presents an activity diagram that illustrates in detail the workflow of reporting and handling public complaints, viewed from both the system's perspective and the users involved. At the initial stage, the process begins when community members submit a complaint by completing the available form, providing essential information such as the type of issue, location, and supporting evidence. Once submitted, the system records the data and forwards it to the administrator for verification. This validation stage is crucial to ensure that the reported complaint is accurate, relevant, and falls within the scope of services that can be addressed by the responsible authorities.

After validation, the complaint is assigned to service officers who are tasked with conducting follow-up actions. These officers review the complaint details, plan the appropriate response, and carry out necessary field operations to address the reported problem. Their activities may include inspections, repairs, coordination with related departments, or direct communication with the complainant. Upon completing the follow-up, officers provide status updates that the system documents to ensure transparency and traceability.
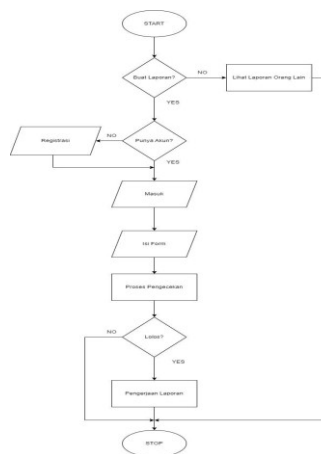

Figure 4. Main System Flowchart

Figure 4 shows the main logical flow of the system from the perspective of a user who is about to submit a complaint. The flow begins with the user deciding whether to create a report or simply view an existing report. If the user wishes to create a report, the system verifies whether they already have an account. If not, they are directed to complete the registration process. Users who already have an account can log in directly, fill out the complaint form, and proceed to the initial review of the submitted report. If the report passes the review, it will be further processed by the system. This diagram emphasizes the initial stages of user engagement in the system and reflects how the system manages the initial validation before a report can be formally processed.

3. Results and Discussion

This section presents the results of the development process for a web-based public complaints information system and an analysis of its functionality and user experience. The system was developed using a prototype approach with direct user involvement, allowing all features to be tested incrementally and adapted to field needs.

3.1. System Feature Implementation

Based on the development results, the system successfully built six main features, namely:

1. A complaint reporting form that residents can fill out with input such as problem category, location, description, and supporting photos.

2. A sub-district admin dashboard to verify reports and assign tasks to field officers.

3. A technical officer page to receive reports and change job status.

4. A publicly accessible complaint progress tracking feature for real-time status viewing.

5. Automatic notifications sent to relevant parties through the system.

6. A feature for citizen service assessments after a report has been handled.

These features are built into a single web system with a simple and responsive interface. Previous research has shown that the use of mobile-based e-reporting applications can significantly increase the speed

of agency responses to citizen reports [20]. This provides empirical evidence that integrating mobile communication technology into digital complaint systems is a strategic development direction.

To enhance system functionality, an additional feature, a report handling history, was designed. This feature allows reporters to view not only the final status of their report but also the stages completed, such as verification time, assignment time to officers, and estimated completion time. This information is displayed in an easy-to-understand timeline format, aiming to increase transparency and reduce uncertainty for citizens.

For users with technological limitations or those of advanced age, the system provides a simple access mode with a high-contrast display and large buttons. This design adheres to the accessibility-first principle to reach users from all walks of life. Furthermore, tooltips have been added to each important element within the forms and dashboard to provide quick guidance to new users.

On the backend, report management utilizes an automatic numbering system based on dates and categories, simplifying administrative search and grouping of report data. Admins can also periodically export reports in PDF or Excel format for documentation or reporting to higher-level agencies.

Figure 7 shows the user interface for the complaint form page intended for the general public. This form is designed with a simple and intuitive layout, containing several input fields such as report category, complaint description, incident location, and the option to upload photos as visual evidence. The form components utilize dropdown and text area elements to facilitate citizens from various educational backgrounds in submitting complaints. This interface serves as the starting point for the reporting process within the system and is designed to be compatible with various screen sizes, including mobile devices.
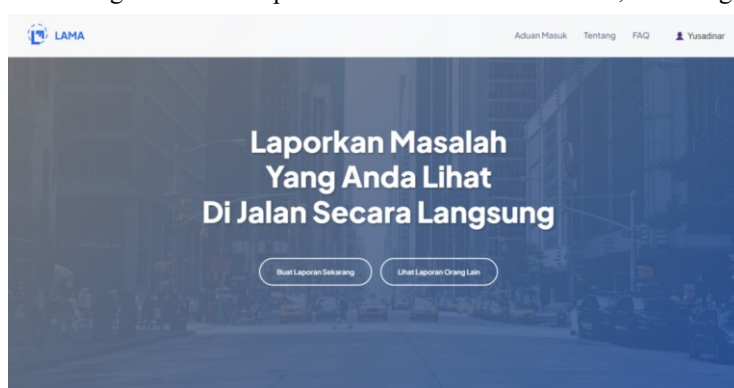

Figure 7. Shows the interface of the complaint form page designed for the general public.

Figure 8 displays the dashboard page used by the sub-district administrator to verify incoming reports and distribute them to field officers. Admins can view a list of complaints by time of receipt, status (pending, verified, processed, completed), as well as information about the reporter and report content. Features are also available for assigning officers, updating report status, and providing internal notes. The dashboard design focuses on readability and navigation efficiency, ensuring fast and accurate report management, even with a high volume of reports.
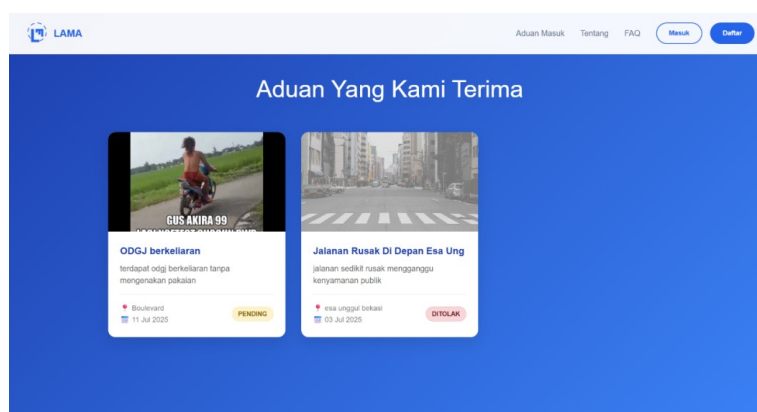

Figure 8. Public Complaints Page Display

Figure 9 displays the login page interface, which serves as the main entry point for system users, including residents, administrators, and technical staff. The login form consists of two main fields: "Username" and "Password," and a login button that processes authentication based on the user's role.

668

This system implements session security and server-side validation to ensure that only authorized users can access services according to their respective access rights. The login page design is minimalist, mobile-friendly, and uses high-contrast colors to ensure readability for users with visual impairments.
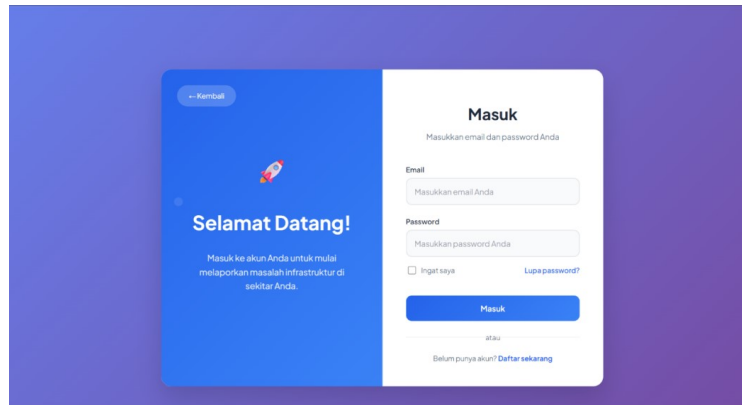

Figure 9. Login Page View

Figure 10 depicts the reporting history page accessible to users after logging in. On this page, citizens can monitor the progress of each report they have submitted, from its initial status to the completion stage. Each entry includes the reporting date, current status, and the name of the officer handling it. This feature increases service transparency and gives citizens a sense of control over their complaints, in line with the principles of good governance and public information transparency.
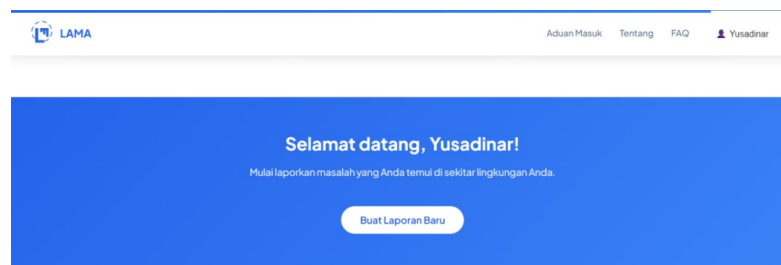

Figure 10. User Dashboard After Logging in to Create a Report

Figure 11 shows the service rating feature available to citizens after their report is completed. Users can provide a star rating (1–5) and include comments or testimonials regarding the service they received. The purpose of this feature is to collect feedback that can be used by government agencies to evaluate the performance of field officers and the effectiveness of internal processes. This feature strengthens the interactivity element within the system and opens up opportunities for ongoing public participation..
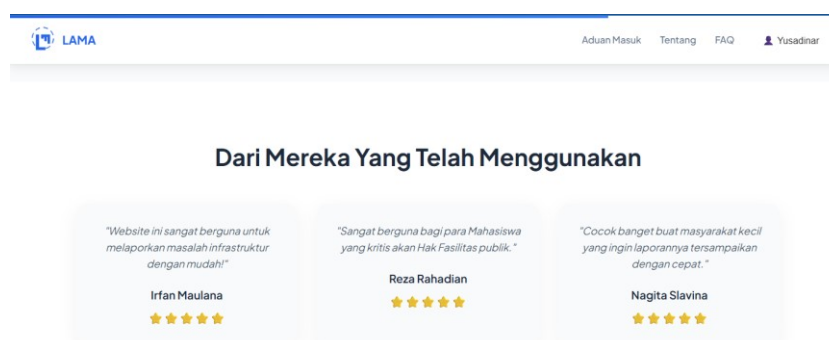

Figure 11. Citizen Assessment Page

3.2. Black Box Test Results

Testing was conducted using the Black Box method on all key features. The test results showed that all features performed according to specifications, as shown in Table 1. No critical errors were found that could impede system functionality.

For example, in the reporting feature, data was successfully saved to the database, and a confirmation message was displayed to the user. In the progress tracking feature, residents could view the status of each stage, from "Verified," "Processing," to "Completed."

Table 1. System Functionality Test Results (Black Box Test)

Variable	Test Scenario	Input	Target	Test Results	Information
Login	The user enters a valid username and password.	user1, password123	Masuk ke dashboard sesuai role	Berhasil	Sesuai ekspektasi
Complaint Form	The reporter completes the entire form and clicks submit.	Title, description, location, photo	Data tersimpan & konfirmasi muncul	Berhasil	Tidak ada error
Validation by Admin	The administrator verifies the incoming report.	Click the 'Validate' button	Status laporan berubah jadi 'Terverifikasi'	Berhasil	Berfungsi
Assignment to Officer	The administrator assigns the report to an officer.	Select an officer → click 'Assign'	Laporan masuk ke daftar petugas	Berhasil	Sesuai alur
Status Update by Officer	The officer marks the report as complete.	Click the 'Finish' button	Status laporan menjadi 'Selesai'	Berhasil	OK
Progress Tracking by Residents	The resident views the status of the submitted report.	Click the 'Report History' menu	Informasi progres tampil lengkap	Berhasil	Sudah tampil real-time
Assessment by Residents	The resident provides a rating and comments after the report is completed.	Stars + comments	Rating tersimpan & tampil di laporan	Berhasil	Komponen aktif

3.3. User Evaluation Results

A total of 10 users were tested in the beta testing phase, consisting of general citizens, village staff, and field officers. The evaluation was conducted using a Likert-scale questionnaire. The results are shown in Table 2, which shows high scores for ease of use, clarity of information, and effectiveness of complaint tracking.

Most users rated the system as very easy to use and informative. They also stated that the tracking and assessment features increased transparency in the service process. This finding aligns with previous literature that citizen involvement in service assessments leads to increased trust in public institutions [6], [1]. This finding is consistent with [21], which indicates that a simple interface and clear reporting flow can increase user trust and comfort in using digital public services.

670

Table 2. User Evaluation Results of the System (Likert Scale)

Aspect	1 (STS)	2 (TS)	3 (N)	4 (S)	5 (SS)
System Ease of Use	0	0	0	5	5
Clarity of Information Displayed	0	0	0	7	3
Speed of System Access and Response	0	0	2	5	3
Ease of Complaint Progress Monitoring	0	0	2	7	1
Satisfaction with Assessment Features	0	0	0	8	2
System Reliability (minimal disruptions/errors)	0	0	2	3	5
Notification Effectiveness (report status, assignments, etc.)	0	0	2	5	3

3.4. Comparative Analysis with Similar Systems

Compared to the Jakarta CRM system [1], this system shares similarities in providing digital reporting and tracking. However, the advantages of the system developed in this study lie in its simplicity of design, clarity of flow, and direct user involvement in development. Furthermore, score-based and comment-based service evaluation features are not yet publicly available in many other local government systems.

A drawback of the developed system is the lack of direct integration with email- or WhatsApp-based notification systems, and the lack of a mobile app. This presents an opportunity for future development. Previous studies suggest that SMS Gateway integration could expand notification reach and ensure timely receipt of important information, especially for users who are not always connected to the internet [22]. Findings [23] also highlight that most e-Government applications still face accessibility challenges, particularly on mobile devices. Therefore, developing mobile-friendly applications should be a top priority in the next phase.

As with other public reporting systems in Indonesia, such as SP4N-LAPOR and the Qlue application in Jakarta, the system developed in this study has several technical and operational advantages. Among these are its simplicity of design and shorter reporting flow structure. While Qlue requires users to go through several stages before a report is submitted to the government system, this system sends reports directly to the relevant agency's administrator without a third-party intermediary.

Furthermore, SP4N-LAPOR tends to be used at the national level and still has a time lag in report processing due to the central and regional bureaucracies involved. This system, however, is designed for local implementation (sub-districts/villages), allowing for faster follow-up and closer contact with residents.

However, this system still has several shortcomings, such as the lack of integration with official WhatsApp numbers or geospatial-based services like GPS for automatic reporting. This will be a focus of development in future versions, including the possibility of adding a chatbot as an automated initial response service feature.

AI integration into the e-complaint system is possible to improve the quality of complaint processing. Using text-embedding-based algorithms (e.g., BERT), the system can recognize common phrases in reports, such as "garbage piling up" or "street lights out," and automatically categorize complaints. Local administrations can directly assign complaints based on problem categories, such as cleanliness or street lights, thereby expediting handling. Furthermore, this automatic classification reduces the administrative burden of manually sorting reports, even when complaint volumes are high. Implementing this method can increase public trust in the system, as it appears more responsive and structured.

3.5. Impact on Public Services and Citizen Participation

This web-based complaint system has the potential to increase efficiency and transparency in public services, while strengthening active citizen participation in environmental monitoring. This aligns with the citizen-centric and open principles of digital government [12], [15]. With open tracking and assessment features, citizens have stronger social control over service quality.

In addition to accelerating the reporting process and increasing transparency, the developed digital complaint system also impacts changes in interaction patterns between citizens and the government. Citizens are no longer merely recipients of services, but actively participate in monitoring agency performance. This creates a service ecosystem based on participation (co-governance), where citizens can influence micro-policies such as prioritizing complaint follow-up [4], [6].

The success of this system also depends on local social and cultural factors. Previous research has shown that e-government adoption is influenced by trust in technology, perceived efficiency, and collective values within the community [12]. Therefore, basic digital training and outreach campaigns are needed to ensure the system can be used equitably by all levels of society.

671

Data security and privacy are also key considerations in the development of this system. The use of a role-based login system, session validation, and protection of input data from injection attacks are measures implemented to maintain the integrity and confidentiality of reports. This protection is crucial because reports often include sensitive location data or legal violations that could have negative consequences if leaked to external parties [13]. [5] in their study emphasized that system credibility and ease of use are key factors in shaping citizens' intention to continue using digital government services.

One tangible impact of implementing this system is increased public engagement in reporting environmental issues. By providing accessible and transparent digital channels, citizens feel more heard and are motivated to participate. This aligns with findings [24], which state that the availability of digital channels actively encourages public participation as a form of democratic engagement in the digital age.

The presence of tracking and assessment features also strengthens service accountability. Citizens not only submit reports but also see how their reports are followed up. Citizens can even evaluate officer performance. This fosters trust and serves as a form of social control.

From a government perspective, this system helps reduce manual administrative burdens, increase response time efficiency, and improve report documentation. Digitally collected data can also be used as a basis for public policy development, for example, by identifying recurring complaint patterns in specific locations.

The use of this system also opens up opportunities to create public transparency dashboards. The government can display monthly report statistics, resolution rates, and average response times to the public, as Jakarta Smart City does [25]. This transparency can increase positive public perception of local institutions and strengthen their social legitimacy.

The impact of this system is not only evident in the technical convenience it provides citizens, but also in the changing patterns of interaction between the community and the local government. Before this system was implemented, the reporting process relied heavily on physical visits to the sub-district office or through undocumented instant messaging groups. With the introduction of this system, the reporting process has become more formal, documented, and can be monitored collaboratively.

This increased transparency has also impacted changes in citizen behavior, as they have become more aware of their rights and roles in protecting the environment. Some residents have even begun using this system, having previously been reluctant to do so due to the lack of adequate reporting channels.

From the perspective of officials, this system helps them manage work priorities and clarify responsibilities. The digitally recorded assignment process minimizes the risk of negligence, and citizen feedback helps drive optimal performance. In the long term, this can foster a more professional, responsive, and accountable service culture at the sub-district level.

3.5.1. Benefits of Automatic Complaint Simulation and Classification

Research from Intelligent Complaint Management (MDPI) in 2023 introduced an AI-based system (BERT and semantic clustering) capable of automatically grouping complaint reports and predicting problem categories [26]. In the context of this research, integrating similar technologies can improve the efficiency of complaint classification. When installed on the admin dashboard, this system can group reports based on text patterns, facilitate automatic prioritization, and expedite task assignment to officers based on their domain of expertise.

3.5.2. Village Readiness and Initiative

The "e-AduMas" study (2023) showed that an SMS gateway-based system in villages successfully increased public participation, but was still plagued by technology readiness issues and limited digitalization processes [27]. This opens up opportunities for analogy in system implementation at the sub-district or village level.

The e-AduMas study revealed that although SMS gateway technology proved successful in the village context, ICT implementation at the local level was often hampered by technical readiness, employee training, and network infrastructure. For this system, ongoing training and simulations based on the local context should be conducted to avoid simply transferring technology. A hybrid approach (web + SMS fallback) is a strategic recommendation to ensure the system remains inclusive despite low connectivity.

3.5.3. The Impact of Transparency on Public Trust

Research [25] emphasizes a strong correlation between the implementation of open government and public complaint management in increasing accountability and citizen participation. This implementation is relevant to strengthening the transparency narrative in your article.

672

By providing a public dashboard showing the number of complaints, the percentage of complaints resolved, and responsiveness metrics, the e-complaint system adopts open government principles. Open data and information transparency enable the public to understand agency performance, enhancing social control. For example, Jakarta Smart City uses a real-time online complaint radar, allowing citizens to view reports within a specific radius. Applying a similar model to this system would strengthen legitimacy and build public trust in agencies.

3.5.4. Strategy for Strengthening the Continuity of System Adoption

Research on continued e-Government use intentions in Indonesia (2024) shows that the main factors are 'satisfaction' and 'perceived ease of use' [28]. This is very much in line with the results of the user evaluation in your article and serves as a reference for future technical strategies.

4. Conclusion

This research has successfully designed and developed a web-based public complaints information system that supports rapid reporting, real-time tracking of complaint status, and citizen feedback. The prototype approach allowed the system to be developed incrementally with user involvement, ensuring that the resulting features are more aligned with field needs.

Black box testing results indicated that all system features functioned well and met specifications. User evaluations using questionnaires indicated that the system received positive feedback, particularly regarding ease of use, information clarity, and the effectiveness of complaint tracking. Furthermore, the service assessment feature was deemed effective in increasing transparency and accountability in the public service process. These findings also demonstrate that developing an information system that focuses on local needs and user experience has a positive impact on building public trust in digital institutions. With a participatory and transparent approach, local governments can more easily manage complaints, respond to issues efficiently, and strengthen the image of adaptive public services.

This system has the potential for widespread implementation at the sub-district or village level, particularly in areas lacking a digital complaints platform. Future system development can focus on integration with real-time notifications via instant messaging, as well as the development of a mobile version to reach a wider user base.

Overall, the web-based public complaint information system developed in this research meets the basic functional, usability, and accountability requirements of digital public services. The system has proven capable of accommodating reporting needs quickly, simplifying task distribution through the admin dashboard, and establishing a two-way communication channel through citizen tracking and assessment features.

The system's main strengths lie in its lightweight design, easy-to-understand interface, and reporting flow tailored to local user needs. Furthermore, the use of a prototype approach allows the system to adapt based on direct user feedback, increasing development efficiency and overall user satisfaction.

However, this research has limitations, such as the lack of integration with third-party systems such as SMS Gateways or mobile platforms. In actual implementation, the system will also face technical and non-technical challenges, such as network infrastructure, user digital literacy, and institutional capacity to handle reports responsively.

For further research and development, it is recommended that this system be further developed into a lightweight mobile application that can be used temporarily offline. Furthermore, it is important to design training modules or digital guides for residents and village officials on how to optimally use the system. The security and confidentiality of citizen data must also be improved, especially if the system is developed at the city or provincial level.

It is hoped that this system can be replicated and adopted by other local government agencies as part of the agenda of digitizing public services and strengthening transparent, responsive, and participatory governance.

The findings of this study indicate that the success of a public complaint information system is determined not only by the availability of technology, but also by the extent to which the system can address the local context and citizens' habits in submitting complaints. A simple user interface, a fast reporting process, and transparent tracking have been proven to increase citizen trust in public service delivery agencies.

Furthermore, this system also shows potential as a strategic instrument for massively collecting citizen complaint data, which can then be used as material for data-driven policy needs analysis. When integrated with digital maps or spatial analytics, public report data can help the government map hotspots for

public problems, such as areas with broken streetlights, illegal polling stations (TPS), or damaged infrastructure.

From an institutional perspective, this system has the potential to drive bureaucratic reform at the village level by encouraging more transparent, measurable, and digitally documented work mechanisms. Therefore, system development is not limited to software alone; it must also be accompanied by increased human resource capacity, digital administration training, and regulatory support that protects whistleblowers and strengthens the accountability of field officers.

Considering the initial successes and ongoing challenges, this system can serve as a starting point for digital public service transformation at the sub-district and village levels, which can then be replicated.

Acknowledgement

References

[1]   S. Alim, H. Akbar, G. Firmansyah, N. S. Fatonah, and B. Tjahjono, "Evaluation of E-Government Implementation in Managing Public Service Complaints Using E-GovQual and Importance Performance Analysis (Case Study: CRM - Cepat Respon Masyarakat – of the Jakarta Provincial Government)," *CCIT J.*, vol. 17, no. 1, pp. 34–46, Feb. 2024, doi: 10.33050/CCIT.V17I1.2922.

[2]   A. R. Hidayat, A. Burhanuddin, A. A. Yani, and A. Hans, "Can Citizen Reporting System Be Effectively Constructed? A Study of Smart City Implementation in Indonesia," *JKAP (Jurnal Kebijak. dan Adm. Publik)*, vol. 25, no. 2, pp. 112–130, Nov. 2021, doi: 10.22146/JKAP.61114.

[3]   AldreesAsma and GračaninDenis, "UX in E-Government Services for Citizens: A Systematic Literature Review," *J. User Exp.*, May 2023, doi: 10.5555/3605526.3605529.

[4]   R. Nadhira, H. Hamdi, S. A. E. Putri, and T. S. Ervi, "Enhancing citizen satisfaction and loyalty in e-government: Lessons learned from Jakarta COVID-19 website," *Inf. Serv. Use*, vol. 44, no. 2, pp. 121–138, Jun. 2024, doi: 10.3233/ISU-240229.

[5]   T. H. Cheng, S. C. Chen, and T. Hariguna, "The Empirical Study of Usability and Credibility on Intention Usage of Government-to-Citizen Services," *J. Appl. Data Sci.*, vol. 2, no. 2, pp. 36–44, May 2021, doi: 10.47738/JADS.V2I2.30.

[6]   B. Prasetyo, E. Sumartono, E. Kusnadi, S. Tinggi Ilmu Administrasi Lancang Kuning Dumai, U. Garut, and S. Widyapuri Mandiri Sukabumi, "Citizen-Centric Approaches to E-Government for Improving Public Service Delivery," *J. Acad. Sci.*, vol. 1, no. 7, pp. 858–867, Nov. 2024, doi: 10.59613/VPSGA281.

[7]   R. I. K. Sitanggang, J. Jamaluddin, and R. J. Simamora, "Perancangan Sistem Informasi Pengaduan Mahasiswa Universitas Methodist Indonesia Berbasis Web," *TAMIKA J. Tugas Akhir Manaj. Inform. Komputerisasi Akunt.*, vol. 4, no. 2(SEMNASTIK), pp. 136–142, Dec. 2024, doi: 10.46880/TAMIKA.VOL4NO2(SEMNASTIK).PP136-142.

[8]   F. D. Agustyar, A. Aditya, S. Aminah, and A. Tirtana, "Design and Development an e-Lapor Application to Support Public Complaint Services in Tunjungtirto Village," *J. INFORMATICS Telecommun. Eng.*, vol. 7, no. 1, pp. 164–173, Jul. 2023, doi: 10.31289/JITE.V7I1.9762.

[9]   G. V. Pereira, P. Parycek, E. Falco, and R. Kleinhans, "Smart governance in the context of smart cities: A literature review," *Inf. Polity*, vol. 23, no. 2, pp. 143–162, 2018, doi: 10.3233/IP-170067.

[10]   H. Koeswara, R. E. Putera, K. Kusdarini, and ..., "Digital Inclusion and Accessibility E-Government in the Padang City," *Iapa Proc. ...*, no. 3, pp. 1071–1079, 2024, [Online]. Available: https://www.jurnal.iapa.or.id/proceedings/article/view/1184%0Ahttps://www.jurnal.iapa.or.id/proceedings/article/download/1184/567

[11]   J. Hochstetter, F. Vásquez, M. Diéguez, A. Bustamante, and J. Arango-López, "Transparency and E-Government in Electronic Public Procurement as Sustainable Development," *Sustain. 2023, Vol. 15, Page 4672*, vol. 15, no. 5, p. 4672, Mar. 2023, doi: 10.3390/SU15054672.

[12]   N. Aleisa, "Key factors influencing the e-government adoption: a systematic literature review," *J. Innov. Digit. Transform.*, vol. 1, no. 1, pp. 14–31, Aug. 2024, doi: 10.1108/JIDT-09-2023-0016.

[13]   I. Riady and L. P. Hasugian, "Sistem Informasi Pelayanan Masyarakat pada Kantor Desa Tanimulya Kabupaten Bandung Barat," *J. Manaj. Inform.*, vol. 10, no. 1, pp. 67–83, Mar. 2020, doi: 10.34010/JAMIKA.V10I1.2885.

[14]   M. Benaida, "Usability Evaluation of North African E-Government Services in the Context of Optimizing User Experience when Using Mobile Phones," *Int. J. Interact. Mob. Technol.*, vol. 18, no. 08, pp. 102–115, Apr. 2024, doi: 10.3991/IJIM.V18I08.46329.

[15]   E. D. Madyatmadja, H. Nindito, and D. Pristinella, "Citizen behavior: The evaluation of complaint application that connected to smart city," *Adv. Sci. Technol. Eng. Syst.*, vol. 5, no. 4, pp. 24–29, 2020, doi: 10.25046/AJ050403.

[16]   Y. K. Dwivedi *et al.*, "Climate change and COP26: Are digital technologies and information management part of

674

the problem or the solution? An editorial reflection and call to action," *Int. J. Inf. Manage.*, vol. 63, p. 102456, Apr. 2022, doi: 10.1016/J.IJINFOMGT.2021.102456.

[17]   G. Grossman and T. Slough, "Government Responsiveness in Developing Countries," *Annu. Rev. Polit. Sci.*, vol. 25, no. Volume 25, 2022, pp. 131–153, Feb. 2022, doi: 10.1146/ANNUREV-POLISCI-051120-112501/CITE/REFWORKS.

[18]   F. K. Y. Chan, J. Y. L. Thong, S. A. Brown, and V. Venkatesh, "Service Design and Citizen Satisfaction with E-Government Services: A Multidimensional Perspective," *SSRN Electron. J.*, Dec. 2020, doi: 10.2139/SSRN.3719710.

[19]   G. Gainau, P. C., Bintari, W. C., Putri, I. S., & Sembiring, "Etika Penelitian Multidisiplin: Kajian Teori dan Praktik.," no. January, 2023.

[20]   S. D. Purnamasari and F. Panjaitan, "Pengembangan Aplikasi E-Reporting Kerusakan Lampu Jalan Berbasis Mobile," *Jusikom J. Sist. Komput. Musirawas*, vol. 5, no. 1, pp. 59–69, 2020, doi: 10.32767/jusikom.v5i1.764.

[21]   T. A. Novitasari, S. P. Kristanto, and L. Hakim, "Evaluasi User Experience Aplikasi Prospect Dengan Menggunakan Usability Testing dan User Experience Questionnaire (UEQ)," *Explor. J. Sist. Inf. dan Telemat.*, vol. 15, no. 1, p. 113, Jun. 2024, doi: 10.36448/JSIT.V15I1.3635.

[22]   F. M. Firdaus and H. Hidayat, "Perancangan dan Implementasi Sistem Absensi Siswa Berbasis Web Menggunakan Face Recognition dan SMS Gateway," *J. Manaj. Inform.*, vol. 15, no. 1, pp. 32–46, Apr. 2025, doi: 10.34010/JAMIKA.V15I1.13601.

[23]   M. Bakhsh, M. Ali, S. Arsalan Ali, M. Taimur Ali, and S. Ahmed, "Accessibility Evaluation of E-government Mobile Apps Services in Pakistan," *J. Comput. Biomed. Informatics*, vol. 04, no. 01, 2022, [Online]. Available: https://doi.org/10.56979/401/2023/70

[24]   H. Wahyuni, T. Purwaningsih, and N. Herlina, "IMPLEMENTATION OF THE SMART CITY PROGRAM TO IMPROVE PUBLIC SERVICES IN SEMARANG CITY," *Natapraja*, vol. 9, no. 2, Dec. 2021, doi: 10.21831/NATAPRAJA.V9I2.44162.

[25]   I. R. Hardini, R. S. Nandika, H. Hamdi, and S. A. Eka Putri, "Open government through public complaint management: Success stories from the Jakarta Provincial government," *JeDEM - eJournal eDemocracy Open Gov.*, vol. 16, no. 1, pp. 130–167, Sep. 2024, doi: 10.29379/JEDEM.V16I1.882.

[26]   M. Esperança, D. Freitas, P. V. Paixão, T. A. Marcos, R. A. Martins, and J. C. Ferreira, "Proactive Complaint Management in Public Sector Informatics Using AI: A Semantic Pattern Recognition Framework," *Appl. Sci. 2025, Vol. 15, Page 6673*, vol. 15, no. 12, p. 6673, Jun. 2025, doi: 10.3390/APP15126673.

[27]   D. Ferdiansyah, S. A. Majapahit, and M. F. Muttaqin, "Assessment of Village Readiness for Electronic Citizen Complaint Services (e-AduMas) Using COBIT 4.1," *J. Inf. Syst. Informatics*, vol. 5, no. 4, pp. 1301–1311, 2023, doi: 10.51519/journalisi.v5i4.578.

[28]   D. Napitupulu *et al.*, "Understanding the key driver of e-government services continuance usage intention: An integrated model of Expectation Confirmation Model and Technology Acceptance Model," *J. Infrastructure, Policy Dev.*, vol. 8, no. 12, p. 7957, Oct. 2024, doi: 10.24294/JIPD.V8I12.7957.