Journal Publication of International Research for Engineering and Management (JOIREM)
Volume: 04 Issue: 11 | Nov-2026
ISSN (O) 3107-6696

Civic Issue Reporter: A Web-Based Platform for Civic Complaint Management and Transparent Public Service Delivery

Dr. Shakunthala B S[1], Kavana Y P[2], Namratha B L[3], Parvathi T D[4], Sahana P[5]

[1]*Associate Professor, Department of Information Science and Engineering, Kalpataru Institute of Technology, Tiptur, Karnataka, India*

[2,3,4,]5*Students, Department of Information Science and Engineering, Kalpataru Institute of Technology, Tiptur, Karnataka, India*

Abstract - Many local civic problems, such as road damage, water-supply disruptions, waste accumulation, and street-light failures, require an organized process for reporting and resolution. This paper presents Civic Issue Reporter, a web-based application designed to manage civic complaints through separate citizen, department, and administrator workflows. Citizens can register, submit issues with optional images and location details, and track their reports. Department users can view issues associated with their service categories and update their status, while administrators oversee reported issues and department accounts. The application is implemented using Node.js, Express, EJS, and MongoDB through Mongoose. It also includes optional AI-assisted issue screening through the Gemini API, escalation-related fields, resolution-image handling, and email notification utilities. The system design incorporates issue data models, role-specific workflows, and mechanisms for managing complaint progress. The implementation was examined through static source-code inspection; the application was not independently executed for this manuscript. Therefore, no measured performance, user-study outcomes, or completed test results are reported. The prototype requires further functional testing, security assessment, and input-validation improvements before deployment.

Keywords—*Civic Issue Reporting, E-Governance, Complaint Management, Web Application, Role-Based Access Control, AI-Assisted Screening*

1. INTRODUCTION

Local authorities manage essential public services such as road maintenance, sanitation, street lighting, and water supply. Residents who report civic problems through traditional channels may find it difficult to track complaint progress, receive updates, or identify the department responsible for resolving an issue. Digital complaint management systems can help organize these reports and improve communication between citizens and local authorities.

However, managing civic complaints requires a centralized system that can categorize issues, assign them to relevant departments, track their status, and provide administrators with an overview of reported problems. Artificial intelligence can assist in preliminary complaint screening, but such functionality requires appropriate validation and oversight.

This paper presents Civic Issue Reporter, a web-based application that enables citizens to submit civic complaints, allows department users to manage issues related to their service categories, and provides administrators with tools to oversee complaints and department accounts.

2. LITERATURE SURVEY

2.1 E-Governance and Digital Civic Services

E-governance uses information and communication technologies to improve the delivery of public services and communication between citizens and government authorities. Digital government initiatives provide online channels for accessing services, submitting requests, and obtaining information about administrative processes. The United Nations [1] examines the development of digital government across countries and highlights the importance of accessible online services and citizen engagement. However, digital service availability alone does not guarantee that complaints will be resolved efficiently. Civic Issue Reporter addresses this issue by providing a structured platform through which citizens can submit civic complaints and review their status.

2.2 Civic Complaint Management Systems

Civic complaint management systems provide a digital channel for reporting public infrastructure problems, sanitation issues, water-supply disruptions, and other local service concerns. Such systems can organize complaints, maintain records, and support communication between residents and responsible authorities. The Government of India's CPGRAMS initiative [2] provides an online mechanism for submitting and tracking public grievances. However, a general grievance platform and a locally organized civic issue application may differ in their intended scope and workflow. Civic Issue Reporter focuses on civic issues

and provides separate interfaces for citizens, department users, and administrators.

2.3 Web-Based Application and Role-Based Access Control

Web-based applications support centralized data management and provide access to services through standard web browsers. Role-based access control (RBAC), introduced by Sandhu et al. [3], provides a framework for assigning permissions according to user roles. This approach is relevant to systems in which different users require different operations and information. Civic Issue Reporter follows a role-oriented workflow in which citizens submit and review complaints, department users manage issues associated with their

service categories, and administrators oversee complaints and department accounts. However, effective access control depends on server-side authorization and appropriate validation of each operation.

2.4 Artificial Intelligence for Civic Issue Screening

Artificial intelligence can assist in classifying submitted information, identifying relevant categories, and supporting preliminary analysis of user reports. Large language models (LLMs) can process natural-language descriptions, but their outputs may contain incorrect classifications or unsupported information. Ji et al. [4] survey hallucination in natural language generation and discuss the challenges associated with generated content. These concerns are relevant when AI is used to screen civic complaints, because incorrect categorization may affect subsequent handling. Civic Issue Reporter includes optional AI-assisted screening through the Gemini API, although the accuracy and practical effectiveness of this functionality have not been experimentally evaluated.

2.5 Complaint Tracking, Notifications, and System Reliability

Complaint tracking and status notifications help users understand the progress of submitted reports and provide a record of changes made during complaint handling. Email notifications can communicate status updates, while escalation-related fields can support workflows for issues requiring additional attention. OWASP [5] provides guidance on input validation, authentication, authorization, and secure file handling for web applications. These considerations are important for systems that accept user information, upload images, and manage multiple user roles. Civic Issue Reporter includes issue-status management, email notification utilities, optional image uploads, and resolution-image handling. The implementation therefore requires functional testing, security assessment, and validation before deployment in a live civic environment.

2.6 Related Reporting and Crowdsourcing Systems

Several further studies and systems address the reporting of urban issues by citizens, including crowdsourced reporting, crowdsensing, and grievance platforms for smart cities [6]–[15]. Broader work on mobile crowdsourcing, participatory sensing, and citizen participation in smart cities is reported in [16]–[20], and further studies cover urban crowdsourcing platforms, citizen reporting behavior, and crowdsourced public-safety reports [21]–[23]. Civic Issue Reporter combines role-based portals, department-category filtering, image evidence, optional AI-assisted screening, and notification utilities in one application; this comparison rests on the stated scope of the cited works and has not been validated by a feature-by-feature evaluation.

3. RESEARCH GAP

The reviewed work treats e-governance, digital grievance redressal, civic complaint management, and AI-assisted

issue screening as related but separate problems. The United Nations [1] discusses digital government and citizen-oriented public services, while India's CPGRAMS
[2] provides a platform for submitting and tracking public grievances, but these initiatives do not necessarily focus on localized civic issues through department-specific workflows. Sandhu et al. [3] describe role-based access control, which supports the separation of responsibilities among different user groups. Ji et al. [4] discuss the challenges of hallucination in AI-generated content, and OWASP [5] highlights security risks and validation requirements in web applications. However, these works do not establish the effectiveness of a single application that combines civic complaint reporting, department-level management, administrative oversight, and optional AI-assisted screening.

The problem addressed in this project is therefore the need for an integrated civic issue reporting and management platform. Such a platform must allow citizens to submit and track civic complaints, enable department users to manage issues associated with their service categories, provide administrators with tools to oversee complaints and department accounts, and support image uploads, status notifications, and escalation-related information within one system. Civic Issue Reporter brings these functions together in a web-based application, with optional AI-assisted screening through the Gemini API. The implementation is documented through static source-code inspection, and functional testing, security validation, and deployment evaluation remain necessary before its reliability and practical effectiveness can be established.

4. OBJECTIVES

1. **Citizen Registration and Issue Reporting:** Provide citizens with an online facility to register, submit civic issues with optional images and location details, and review their submitted reports.
2. **Civic Issue Categorization:** Organize reported issues into Road & Infrastructure, Water Supply, Waste Management, and Street Lighting categories for structured complaint management.
3. **Department-Level Issue Management:** Provide department users with a filtered view of issues associated with their service categories and allow them to update complaint statuses.
4. **Administrative Oversight and Account Management:** Enable administrators to oversee reported issues and manage department accounts through a centralized interface.
5. **AI-Assisted Issue Screening:** Support optional AI-assisted screening and department suggestions through the Gemini API when the external service is configured.
6. **Status Notifications and Resolution Management:**

Support email notifications for complaint status changes when valid SMTP settings are supplied, along with resolution-image handling and escalation-related information.

5. METHODOLOGY

5.1 Development Approach

The application is organized as an Express application with separate route modules for authentication, citizen functions, department functions, and administrator functions. EJS templates render the user interface, while CSS and client-side JavaScript support presentation and browser interactions. Mongoose schemas define the main data entities stored in MongoDB. This structure separates the main application responsibilities and supports the management of civic complaints through different user roles.

5.2 Citizen Registration and Issue Reporting

The registration route checks whether an email address already exists and hashes new passwords using bcryptjs with a cost parameter of 10. The login route compares submitted passwords with stored hashes and records session values used by citizen routes. Citizens can submit civic issues with details such as the title, description, category, optional images, and location information. They can also review their submitted reports. These observations are based on static source-code inspection; successful runtime behavior was not independently tested for this paper.

5.3 Department and Administrator Modules

Department users are associated with one of four service categories: Road & Infrastructure, Water Supply, Waste Management, and Street Lighting. The department dashboard filters issues according to the logged-in department and excludes issues carrying selected deletion, spam, or duplicate flags. Department routes check whether an issue belongs to the logged-in department before processing status updates. Administrator routes provide broader issue oversight and department-account creation or deletion, together with status and warning-related operations. These workflows are designed to separate complaint-handling responsibilities according to user roles.

5.4 AI-Assisted Issue Screening

The AI utility constructs a request using the issue title, description, selected department, and a summary of nearby reports. When an image is available, image data may also be included in the request. The utility is designed to return screening flags and a suggested department through the Gemini API. Its behavior depends on API configuration, network availability, model responses, and fallback logic. Since the application was not independently executed, no screening accuracy, classification performance, or fake-report detection rate is claimed.

5.5 Notifications and Configuration

The notification utility constructs status-specific email messages using Nodemailer. Email delivery depends on valid SMTP configuration, network availability, and an operational mail service. The supplied configuration contains placeholders for SMTP settings, so successful notification delivery cannot be assumed. The application also includes resolution-image handling and escalation-related fields for complaint management. Deployment instructions, production hosting, and a verified configuration were not supplied. Further functional testing, security assessment, and configuration validation are required before deployment.

6. SYSTEM DESIGN

6.1 System Architecture

Civic Issue Reporter has four main logical components, shown in Fig. 1. A web interface built with EJS, CSS, and client-side JavaScript provides separate workflows for citizens, department users, and administrators. A REST-style application layer built with Node.js and Express handles authentication, issue submission, department filtering, status updates, and administrative operations. The backend and application layer includes issue management, optional AI-assisted screening, image handling, escalation-related fields, and email notification utilities. MongoDB, accessed through Mongoose, stores user accounts, department accounts, and civic issue records. The Gemini API is used for AI-assisted

Journal Publication of International Research for Engineering and Management (JOIREM)
Volume: 04 Issue: 11 | Nov-2026
ISSN (O) 3107-6696

screening when configured, while Nodemailer supports status notifications when valid SMTP settings are supplied. The architecture is inferred from static source-code inspection and does not represent a verified production deployment.

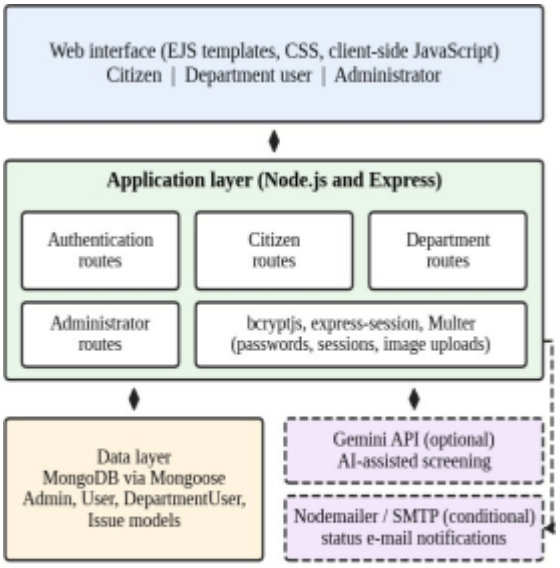


Fig. 1. System architecture of Civic Issue Reporter.

6.2 Data Model

The database defines four principal models: Admin, User, DepartmentUser, and Issue. User records store citizen details, including name, email, phone, password field, and creation time. DepartmentUser records store department details, including name, email, password field, service category, and creation time. Issue records associate a report with a user and contain the title, description, department, image path, latitude and longitude strings, address, status, resolution-image path, escalation and moderation flags, deletion metadata, and creation time. The schema defines unique email fields for account models where specified. Database indexing, retention policies, and production data volumes were not assessed.

6.3 Request Flow

The request flow is summarized in Fig. 2. When a citizen registers or logs in, the application checks account information and uses bcryptjs to hash or compare passwords. When the citizen submits a civic issue, the application processes the report details and optional image and location fields. If AI screening is configured, the screening utility sends the issue text, nearby-report context, and optional image data to the Gemini API and processes the returned screening flags and suggested department.

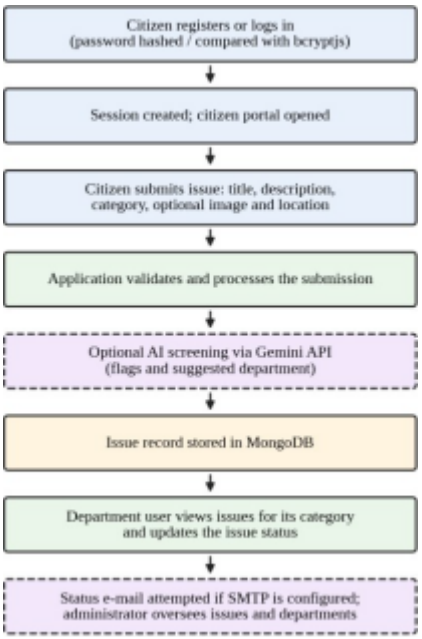


Fig. 2. Civic issue reporting and management workflow.

6.4 Reliability and Security

Passwords are hashed using bcryptjs with a cost parameter of 10. Session-based authentication maintains user login state, and citizen, department, and administrator routes provide separate access to application functions. Department users can access issues associated with their assigned service category, while administrators can oversee all issues and manage department accounts.

Citizens can submit and review their own civic reports. Issue submissions support optional image and location details, and resolved issues require a resolution image. Optional AI-assisted screening through the Gemini API can identify potential fake or duplicate reports and suggest a department when the service is configured. Email notifications are attempted through Nodemailer when valid SMTP settings are supplied. However, comprehensive authorization testing, request-rate limiting, session security hardening, and production configuration have not been independently verified. Further security testing and validation are required before deployment.

7. IMPLEMENTATION

Civic Issue Reporter is a web application built with Node.js and Express. The front end uses EJS templates, CSS, and client-side JavaScript to provide interfaces for citizens, department users, and administrators. The backend uses Express routes to handle authentication, issue submission, department-specific filtering, status updates, and administrative operations. MongoDB stores application data through the Mongoose ODM, including user accounts, department accounts, and civic issue records. Passwords are hashed using bcryptjs, and express-session supports session-based authentication. Multer handles optional image uploads for issue reports

and resolution evidence. The AI screening utility uses the Google Generative AI SDK to identify potential fake or duplicate reports and suggest a department when the Gemini API is configured. Nodemailer constructs status-specific email notifications when SMTP settings are supplied. Issue records include category, status, location information, image references, timestamps, and screening or escalation-related fields. The application relies on database queries and department-based filtering to retrieve relevant complaints. However, no measured response times, throughput, scalability results, or AI classification accuracy are reported because the application was not independently executed or benchmarked for this study.

8. RESULTS

The Civic Issue Reporter system includes functionality for citizen registration and authentication, civic issue submission, department-specific complaint management, administrator operations, AI-assisted issue screening, status updates, and resolution management. These functions were identified through static source-code inspection; automated unit, route, and browser tests have not been independently executed. The screenshots below show the application interface and are presented in the order in which a citizen uses it.

Fig. 3 shows the home page of the Smart City Tumakuru website, which allows citizens to report civic issues, track complaints, and helps authorities manage and resolve them.



Fig. 3. Home page of the Smart City Tumakuru website.

Fig. 4 shows the citizen login page, which allows registered users to log in using their email and password. Citizens can then access their complaint history, submit new issues, and track complaint updates.

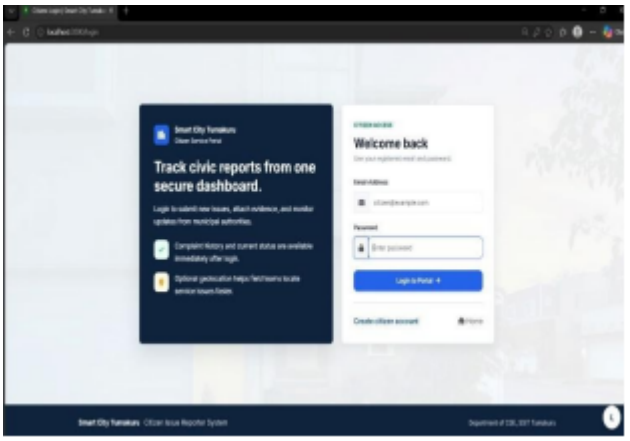


Fig. 4. Citizen login page.

Fig. 5 shows the citizen dashboard, which allows users to report civic issues by entering details, uploading evidence, adding location information, and submitting the complaint.

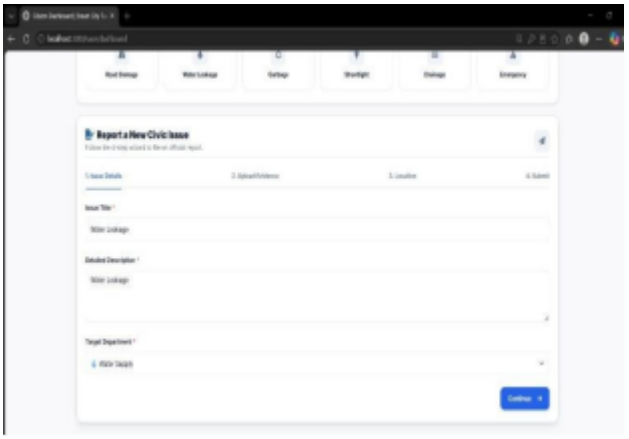


Fig. 5. Citizen dashboard for reporting a new civic issue.

Fig. 6 shows the citizen submission records section, which displays submitted complaints with their photos, issue details, submission date, department, and current status.

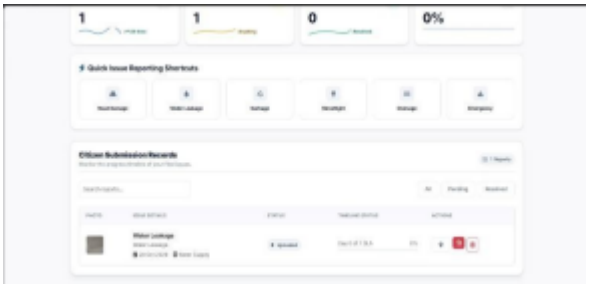


Fig. 6. Citizen submission records.

9. DISCUSSION

The Civic Issue Reporter provides a centralized platform for citizens to submit civic complaints, upload evidence, track issue status, and help authorities manage complaints through separate citizen, department, and administrator portals. The AI-assisted screening feature

can support issue checking and department suggestions, while status updates help citizens follow complaint progress.

The system has several limitations. Its effectiveness depends on correct user input, database availability, and external AI and email service configuration. AI screening results may vary depending on model responses and API availability. The application has not been evaluated through large-scale testing or real-world user studies, so no claims are made about faster complaint resolution or improved citizen satisfaction. Further work should include comprehensive functional and security testing, stronger input validation, production deployment configuration, and evaluation with citizens and municipal departments.

10. CONCLUSION

This paper presented Civic Issue Reporter, a web application that enables citizens to report civic issues, upload evidence, and track complaint status, and that helps authorities manage and resolve complaints. The system provides separate portals for citizens, department users, and administrators, along with AI-assisted issue screening and status notifications. The application offers a practical approach to digital civic complaint management, but further functional testing and real-world evaluation are required to assess its effectiveness and reliability.

11. FUTURE WORK

Future work will focus on improving Civic Issue Reporter with enhanced AI-based complaint classification, stronger security, and more reliable email notifications. Further testing with citizens and municipal departments will help evaluate the system's usability, reliability, and effectiveness in civic complaint management.

12. REFERENCES

[1] United Nations, Department of Economic and Social Affairs, *E-Government Survey*. New York, NY, USA: United Nations. [edition and year to be confirmed]

[2] Government of India, Department of Administrative Reforms and Public Grievances, "Centralized Public Grievance Redress and Monitoring System (CPGRAMS)." [Online]. Available: https://pgportal.gov.in [access date to be added]

[3] [1] R. S. Sandhu, E. J. Coyne, H. L. Feinstein, and C. E. Youman, "Role-based access control models," *Computer*, vol. 29, no. 2, pp. 38–47, Feb. 1996. [DOI to be confirmed]

[4] Z. Ji *et al.*, "Survey of hallucination in natural language generation," *ACM Comput. Surv.*, vol. 55, no. 12, pp. 248:1–248:38, Dec. 2023. [DOI to be confirmed]

[5] OWASP Foundation, "OWASP Top Ten." [Online]. Available: https://owasp.org/www-project-top-ten/ [confirm which OWASP document and version is cited; add access date]

[6] [authors to be added] "CityCare: Crowdsourcing daily life issue reports in smart cities," in *Proc. IEEE Symp. Comput. Commun. (ISCC)*, 2017, doi: 10.1109/ISCC.2017.8024540.

[7] J. Santos, F. Rodrigues, and L. Oliveira, "A web & mobile city maintenance reporting solution," *Procedia Technol.*, vol. 9, pp. 226–235, 2013, doi: 10.1016/j.protcy.2013.12.025.

[8] [authors to be added] "Duplicate report detection in urban crowdsensing applications for smart city," in *Proc. IEEE Int. Conf. Smart City/SocialCom/SustainCom*, 2015, doi: 10.1109/SmartCity.2015.54.

[9] [authors to be added] "Citizen reporting through mobile crowdsensing: A smart city case of Bekasi," in *Proc. Int. Conf. ICT Smart Society (ICISS)*, 2018, doi: 10.1109/ICTSS.2018.8549976.

[10] [authors to be added] "A crowdsourced hyperlocal alert platform for real-time civic issue reporting and information dissemination," in *Proc. IEEE 3rd Global Conf. Wireless Comput. Netw. (GCWCN)*, 2025, doi: 10.1109/GCWCN66157.2025.11447484.

[11][1] [authors to be added] "A web-based public grievance redressal system with image and geolocation support," in *Proc. IEEE Conf.*, 2025, doi: 10.1109/INCSST64791.2025.11210297. [conference name to be added]

[12] [authors to be added] "Ooru Alert—A crowdsourced urban issue reporting system for Bengaluru," in *Proc. 4th Int. Conf. Intell. Data Commun. Technol. Internet Things (IDCIoT)*, 2026, doi: 10.1109/IDCIoT67589.2026.11455709.

[13] [authors to be added] "Framework for civic issue resolution in smart city complaint systems," in *Proc. 5th Int. Conf. Sentiment Anal. Deep Learn. (ICSADL)*, 2026, doi: 10.1109/ICSADL67539.2026.11451821.

[14] [authors to be added] "An artificial intelligence-based framework for automated civic issue reporting and resolution," in *Proc. Int. Conf. Signal, Syst., Comput. Next-Gen Autom. (ICSSCNA)*, 2026, doi: 10.1109/ICSSCNA68616.2026.11546830.

[15] [authors to be added] "Smart Civic Issue Tracker: Proof-based digital system for effective municipal issue resolution," IEEE conference

publication, 2026. [venue, pages and DOI to be added]

[16] [authors to be added] "Mobile crowdsourcing in smart cities: Technologies, applications, and future challenges," *IEEE Internet Things J.*, vol. 6, no. 5, pp. 8095–8113, Oct. 2019, doi: 10.1109/JIOT.2019.2921879.

[17] [authors to be added] "Participatory sensing: Crowdsourcing data from mobile smartphones in urban spaces," in *Proc. IEEE 12th Int. Conf. Mobile Data Manage.*, 2011, doi: 10.1109/MDM.2011.16.

[18] [authors to be added] "Crowdsourcing: A building block for smart cities," in *Proc. IEEE Int. Conf. Pervasive Comput. Commun. Workshops (PerCom Workshops)*, 2016, doi: 10.1109/PERCOMW.2016.7457087.

[19] [authors to be added] "Participatory sensing for smart cities: A case study on transport trip quality measurement," *IEEE Trans. Ind. Informat.*, vol. 13, no. 2, pp. 759–770, 2017, doi: 10.1109/TII.2017.2678522

[20] [authors to be added] "Crowdsourcing technologies to promote citizens' participation in smart cities: A scoping review," *Procedia Comput. Sci.*, vol. 219, pp. 303–311, 2023, doi: 10.1016/j.procs.2023.01.294.

[21] A. Fornaroli and D. Gatica-Perez, "Urban crowdsourcing platforms across the world: A systematic review," *Digit. Gov.: Res. Pract.*, vol. 4, no. 3, 2023, doi: 10.1145/3603256.

[22] M. Lee, J. Wang, S. Janzen, S. Winter, and J. Harlow, "Crowdsourcing behavior in reporting civic issues: The case of Boston's 311 systems," in *Proc. Acad. Manage. Annu. Meeting*, 2021, doi: 10.5465/AMBPP.2021.16532abstract.

[23] [authors to be added] "A smart city qualitative data analysis model: Participatory crowdsourcing of public safety reports in South Africa," *Electron. J. Inf. Syst. Dev. Ctries.*, vol. 88, no. 6, Art. no. e12232, 2022, doi: 10.1002/isd2.12232.