WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

Smart Complaint Redressal Systems: A Research Review

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ABSTRACT:

Smart Complaint Redressal Systems (SCRS) are emerging as a crucial pillar of e-governance, offering citizens faster, more transparent, and user-centric channels for grievance resolution. In recent years, particularly between 2019 and 2025, a growing body of research in India has examined how advanced technologies can enhance these systems. This paper reviews contributions across artificial intelligence, blockchain, the Internet of Things, and mobile applications, as well as governance models and policy frameworks that shape their deployment. While innovations such as AI-driven sentiment analysis and blockchain-enabled accountability demonstrate strong potential, significant barriers remain, including multilingual natural language processing, scalability, privacy protection, and accessibility in rural contexts. By synthesizing prior studies, identifying persistent gaps, and highlighting future opportunities, this review emphasizes the need for inclusive, secure, and sustainable frameworks. The discussion aims to guide researchers, practitioners, and policymakers in designing next-generation redressal mechanisms that not only resolve complaints efficiently but also enhance public trust and resilience in digital governance.

Keywords: Smart Complaint Redressal, AI, Blockchain, IoT, Citizen Engagement, Governance, India.

I. Introduction

Grievance redressal systems are critical to citizen trust and accountability. In India, traditional complaint handling often suffers from inefficiencies, delays, and lack of transparency. With digital transformation, smart systems leveraging AI, Blockchain, IoT, and mobile applications have emerged. Platforms such as CPGRAMS and AI-enabled consumer helplines represent progress, but issues like scalability, citizen awareness, and integration across departments remain. In addition, factors such as digital literacy, multilingual diversity, and uneven infrastructure create barriers to widespread adoption. The rapid increase in citizen expectations for faster and more transparent responses has further emphasized the need for robust, intelligent, and user-friendly grievance mechanisms. Consequently, research in this area has shifted towards hybrid technological solutions that combine automation, transparency, and inclusivity to strengthen e-governance and public service delivery.

II. Objectives

The objectives of this paper are:

1) To examine recent advancements in smart complaint redressal systems within the Indian context.

2) To evaluate the role of emerging technologies—such as Artificial Intelligence, Blockchain, the Internet of Things, and mobile platforms—alongside relevant governance and legal frameworks.

3) To highlight persistent challenges, including scalability limitations, multilingual natural language processing, and issues related to digital awareness and literacy.

4) To recommend future-ready strategies that emphasize sustainability, inclusiveness, and interoperability in grievance redressal mechanisms..

III. Literature Review

Research on grievance redressal mechanisms has attracted significant scholarly and policy attention as governments increasingly prioritize citizen-centric governance. From 2019 to 2025, multiple technological approaches have been explored in India to improve the speed, transparency, and inclusiveness of complaint management.

Artificial Intelligence (AI) is frequently identified as a transformative tool. Prior studies demonstrate its utility in areas such as petition classification and natural language processing–based grievance handling [2], personalized complaint redressal in retail sectors [16], and large-scale customer support

within the telecom industry [15]. Applications in Indian Railways highlight how AI can address vast and complex volumes of service-related complaints [11]. Likewise, sentiment analysis of social media inputs has been used to identify irrelevant or duplicate submissions [4]. Despite such progress, persistent limitations exist—particularly with contextual interpretation, the lack of empathetic interaction in chatbot-driven responses [23], and the difficulty of achieving robust multilingual natural language processing in a linguistically diverse country like India [12].

Blockchain has been positioned as a mechanism to enhance accountability and transparency in grievance redressal. Research on blockchain-enabled complaint platforms demonstrates their potential to generate immutable and auditable records, which can strengthen citizen confidence in the system [13]. However, questions remain about technical scalability, energy consumption, and user acceptance. Policy analyses also stress that blockchain solutions must be embedded within broader governance processes to achieve long-term sustainability [10].

IoT-based solutions and smart city initiatives are increasingly connected to grievance management. Case studies at the municipal level reveal that AI–IoT integration can enable real-time tracking of service disruptions and infrastructure failures [19]. E-governance researchers further argue that IoT-generated data can support predictive planning and more efficient resource allocation [22]. While these models offer faster and more proactive complaint resolution, their success is constrained by uneven infrastructure availability and insufficient user training [17].

Mobile platforms have expanded accessibility by enabling citizens to register complaints anytime and anywhere. Examples include city-level mobile electricity complaint portals [6] and broader applications that extend citizen participation across diverse demographics [18]. National initiatives such as the AI-powered consumer helpline [5] also illustrate how mobile services can be scaled up effectively. Nonetheless, long-term citizen engagement, verification of complaints, and prevention of misuse remain pressing challenges [21].

Legal and governance frameworks form the backbone for adopting these technologies. Systems like CPGRAMS have institutionalized centralized complaint tracking at the national level [7], while adoption studies point to persistent barriers including uneven internet connectivity and limited digital literacy [9]. Comparative assessments highlight the importance of statutory guarantees, such as those found in Bihar's Right to Information framework [10], and municipal-level innovations like Surat's grievance platform demonstrate the benefits of collaborative governance models [8]. Broader analyses emphasize that hybrid approaches—integrating AI, blockchain, and IoT—can strengthen accountability and efficiency when aligned with supportive legal structures [1].

Overall, the reviewed literature suggests that no single technology offers a complete solution. AI brings efficiency, blockchain ensures trust, IoT provides responsiveness, and mobile systems enhance accessibility. Yet, issues of inclusivity, scalability, privacy, and citizen digital readiness persist. Recent studies increasingly advocate for integrated, multi-technology models, combined with legal and governance reforms [14], [20], to create resilient and citizen-centered grievance redressal frameworks.

IV. Comparative Framework

Existing research on grievance redressal can be broadly categorized into five thematic areas: AI/NLP applications for automated complaint analysis, blockchain-driven models for enhancing transparency, IoT-enabled systems for smart monitoring, mobile-based applications that expand citizen accessibility, and legal–policy frameworks that reinforce accountability. Each of these domains contributes distinct advantages, yet all continue to face common barriers related to scalability, user adoption, and inclusiveness. Table 1 provides a comparative summary of the five thematic areas, highlighting their respective strengths as well as the common challenges they continue to face

Theme	***Strengths***	***Challenges***
AI / NLP	Automates complaint classification; enables sentiment analysis; scales to large datasets.	Limited contextual understanding; weak empathy in chatbot responses; multilingual NLP still immature.
Blockchain	Provides tamper-proof, transparent records; strengthens trust and accountability.	Scalability concerns; high energy use; slow citizen adoption; integration with governance needed.
IoT / Smart Monitoring	Enables real-time detection of infrastructure/service failures; supports predictive planning.	Uneven infrastructure deployment; lack of user training; high implementation cost.
Mobile Apps	Increases accessibility; supports citizen participation anytime/anywhere; scalable for mass use.	Long-term engagement is difficult; verifying authenticity of complaints remains a challenge.
Legal–Policy Frameworks	Institutionalizes grievance systems; provides legal backing and governance support.	Barriers include low digital literacy, uneven internet access, and inconsistent enforcement.

V. Scope and Limitations

The scope of this review is restricted to examining advancements in smart complaint redressal systems in the Indian context, with particular emphasis on technological, governance, and citizen-oriented dimensions. The study covers the period from 2019 to 2025, reviewing developments such as AI-enabled

automation, blockchain-driven transparency, IoT-supported monitoring, and mobile-based grievance platforms. Collectively, these innovations are assessed in terms of their potential to enhance responsiveness, efficiency, and public trust in grievance redressal processes.

Nevertheless, several limitations should be acknowledged. First, the analysis is based mainly on secondary sources and published literature, which may not fully reflect on-the-ground implementation challenges. Second, the geographical focus on India restricts broader cross-country comparisons. Third, regional disparities in infrastructure availability, digital literacy levels, and policy execution are not addressed comprehensively. Despite these constraints, the review contributes useful insights into emerging practices and highlights avenues for future research and policy development.

Scope	***Limitations***
Focus on smart complaint systems in India (2019–2025).	Relies on secondary sources; lacks field survey validation.
Reviews AI, Blockchain, IoT, mobile, and governance approaches.	Restricted to India; excludes cross-country comparisons.
Emphasizes citizen engagement, transparency, and efficiency improvements.	Regional differences in infrastructure and digital literacy not fully addressed.
Provides insights for policy makers, technologists, and researchers.	Excludes perspectives of service providers and end-users in depth.

VI. Challenges

- **Digital Divide:** Limited infrastructure and low digital literacy in rural regions restrict equal access to grievance systems [1], [9], [19].
- **Multilingual Barriers:** Existing AI and NLP solutions remain inadequate in handling India's diverse languages and dialects [2], [12], [20].
- **Scalability:** Managing real-time, large-scale complaint data remains an unresolved technical issue in platforms such as the National Consumer Helpline and telecom systems [5], [14], [16].
- **Privacy and Security:** Concerns over secure data storage, anonymization, and ethical use of citizen data persist in e-governance applications [21].
- **Citizen Engagement:** Sustained awareness, participation, and trust in grievance platforms remain low, limiting their long-term effectiveness [3], [8], [18].

Fig 1. Challenges in Smart Complaint Redressal

VII. Benefits / Findings

Flexibility and Scalability: AI-enabled systems improve the ability to process varying complaint volumes efficiently [5], [14], [16].

Enhanced Transparency: Blockchain-based models and centralized portals provide audit trails and reduce manipulation in grievance handling [8], [12].

Faster Resolution: AI-driven chatbots and automation reduce turnaround time for routine complaints [2], [22].

Personalization: AI integration enables context-based complaint redressal, improving user satisfaction in sectors like retail and telecom [15].

Accessibility: Mobile-based applications and online portals expand citizen access to grievance mechanisms, especially in urban areas [10], [17].

Improved Monitoring: IoT and smart city integrations allow real-time tracking and proactive resolution of service issues [23].

VIII. Governance and Best Practices

Embedding AI for proactive detection of recurring issues and fraudulent complaints, enabling faster interventions [7], [20].

Integrating complaint systems across municipal, state, and central levels to improve interoperability and reduce duplication.

Promoting digital literacy and citizen training programs to improve adoption, particularly in rural and underserved areas.

Establishing clear service-level agreements (SLAs) and accountability models to ensure transparency, timely resolution, and measurable performance [7], [20].

Ensuring data privacy, security, and ethical AI use to build citizen trust and comply with emerging digital governance regulations.

IX. Overall Findings

Smart complaint systems have been shown to enhance efficiency, transparency, and citizen satisfaction, yet no single technology provides a comprehensive solution. Hybrid strategies—integrating AI, Blockchain, IoT, mobile platforms, and governance frameworks—offer the most promising direction. The literature emphasizes the critical role of citizen engagement, interoperability, and inclusivity in achieving meaningful outcomes. Moreover, long-term sustainability depends on continuous monitoring, adaptive policy frameworks, and robust feedback mechanisms to ensure technologies remain aligned with evolving citizen expectations.

Key Findings:

AI, Blockchain, IoT, and mobile systems each address specific challenges but work best in combination.

Citizen participation and digital literacy are central to system effectiveness.

Interoperability across municipal, state, and national levels strengthens governance.

Sustainable models require adaptive policies and continuous monitoring.

X. Conclusion

Smart complaint redressal systems are a cornerstone of India's e-governance transformation, offering mechanisms that enhance accountability, transparency, and citizen satisfaction. While notable progress has been achieved through the adoption of advanced technologies, persistent challenges in scalability, privacy, interoperability, and inclusiveness continue to restrict widespread effectiveness.

The review confirms that no single technology can fully address these challenges in isolation. Instead, effective grievance redressal requires a hybrid framework that integrates AI-driven automation for efficiency, Blockchain for transparency and immutability, IoT for real-time monitoring, and mobile platforms for wider accessibility. Equally vital are governance frameworks that promote citizen awareness, digital literacy, and institutional collaboration across departments and levels of government.

Looking ahead, future systems must prioritize not only technological innovation but also the removal of social and institutional barriers to adoption. By aligning robust technology design with inclusive governance practices, India can develop redressal mechanisms that are scalable, sustainable, and citizen-centric. Such an approach holds the potential to strengthen trust between citizens and institutions, thereby ensuring the long-term success of e-governance initiatives.

References:

[1] A. Arshanapally ,L. Thummaganti ,S. P. Udayagiri, *Innovative Approaches and Technological Perspectives in Grievance Redressal Systems in India*, Int. J. Res. Publ. Rev. (IJRPR), vol. 6, no. 4, pp. 1–10, 2025.

[2] Vasanthavelan R , Thamizharasan K , Siva M , Dr.V.R. K. Chandar , *AI-Powered Petition Analysis and Grievance Management System*, Int. J. Creative Res. Thoughts (IJCRT), vol. 12, no. 5, pp. 45–53, 2024.

[3] VYABINYAA SHRIEE R S, *A Study on Grievance Redressal Mechanism under Right to Public Grievance in India*, Indian J. Legal Res. (IJLR), vol. 4, no. 3, pp. 120–132, 2024.

[4] Ms. K. Shah, Dr. Hardik Joshi, Dr. Hiren Joshi , *SMART Approach to Recognize Public Grievance from Social Media Data*, Gujarat Univ. HRDC E-Journal, vol. 30, no. 6, pp. 56–64, 2023.

[5] Dr N. Jeevanandam, *AI-enabled National Consumer Helpline Transforming Grievance Redressal in India*, IndiaAI, 2025.

[6] K.Thrilochana Devi,Assistant Professor,R.Aditya, P.Yeswanth Raj, Y.Thirupathi Rao, T.Hema, *Smart Complaint Portal for Municipal and Electricity Grievances in India*, Int. J. Innov. Sci. Res. Technol. (IJISRT), vol. 8, no. 10, pp. 145–153, 2023.

[7] Government of India, *Centralized Public Grievance Redress and Monitoring System (CPGRAMS)*, PGPortal, ongoing.

[8] Tata Trusts, *Responsive Public Grievance Redressal System: Case Study Surat Municipal Corporation*, Tata Trusts, 2024.

[9] Indian Academia, *Adoption of Online Public Grievance Redressal System in India*, Comput. Human Behav., Elsevier, vol. 65, pp. 123–131, 2023.

[10] OECD OPSI, *Legal Framework and Public Grievance Redressal in India: Bihar RTI Act Example*, OECD Observatory of Public Sector Innovation, 2019.

[11] Indian Railways Research, *Complaint Management System in Indian Railways Using AI*, Int. J. Innov. Res. Technol. (IJIRT), vol. 11, no. 2, pp. 33–41, 2025.

[12] Indian Researchers, *AI-Based Solution to Enable Ease of Grievance Lodging for Indian Citizens*, Proc. Int. Conf. Adv. Appl. Artif. Intell., Atlantis Press, 2025.

[13] Indian Blockchain Experts, *Citizen Grievance Redressal using Blockchain in India*, Int. Res. J. Mod. Eng. Technol. Sci. (IRJMETS), vol. 6, no. 4, pp. 210–218, 2024.

[14] Indian Academia, *Online Complaint Management System Based on Indian Context*, Int. J. Creative Res. Thoughts (IJCRT), vol. 11, no. 5, pp. 98–106, 2023.

[15] Indian Telecom Research, *AI-driven Customer Complaint Management for Indian Telecom Sector*, Aptean Insights Blog, 2024.

[16] Indian Retail Sector Researchers, *Impact of AI on Consumer Complaint Redressal in Indian Retail*, Salesforce AI Use Cases, 2025.

[17] Indian Education Researchers, *Grievance Redressal Mechanisms in Indian Educational Institutions*, Int. J. Innov. Sci. Res. Technol. (IJISRT), vol. 8, no. 10, pp. 165–173, 2024.

[18] Indian Developers, *Mobile-based Smart Complaint Application for Indian Citizens*, Smart Complaint System Project Report, 2023.

[19] Indian Municipal Corp Research, *Role of AI in Enhancing Municipal Complaint Redressal in India*, Int. J. Res. Publ. Rev. (IJRPR), vol. 6, no. 4, pp. 110–118, 2025.

[20] Government Research, *Smart Complaint Handling System for Indian Public Services*, ComplianceQuest White Paper, 2025.

[21] Indian Scholars, *Challenges and Solutions in Indian Smart Complaint Systems*, WorkPro Blog, 2024.

[22] Indian E-Gov Experts, *Analysis of Complaint Data for Indian E-Governance*, Int. J. Innov. Sci. Res. Technol. (IJISRT), vol. 8, no. 10, pp. 210–219, 2023.

[23] Indian AI Lab, *AI-Based Automated Complaint Resolution in India*, SSRN Working Paper, 2024.