

From Smart Cities to Smart Panchayats: A Responsible AI Management Framework for Transparent, Inclusive and Accountable Local Governance

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Abstract—Artificial Intelligence (AI) is rapidly transforming public administration, but its governance potential is often discussed through the lens of smart cities while the equally important transformation of rural local governance receives comparatively less attention. This study shifts the focus from “Smart Cities” to “Smart Panchayats” and examines how AI can strengthen the management of grassroots governance through faster information processing, transparent monitoring, evidence-based decision-making and improved citizen-oriented service delivery. The study comparatively examines emerging urban and rural applications of AI, with particular attention to India’s Panchayati Raj ecosystem and recent initiatives such as SabhaSaar and PRAMAN. SabhaSaar demonstrates how AI-enabled voice-to-text processing and summarisation can convert Gram Sabha proceedings into structured records, while PRAMAN applies image analytics to support the verification and monitoring of rural development assets. The central management challenge, however, is not merely technological adoption but responsible institutional integration. AI systems operating at the Panchayat level must address data quality, privacy, cybersecurity, algorithmic bias, explainability, human accountability, digital capacity and data ownership. The study therefore proposes a Responsible AI Management Framework for Smart Panchayats built around five interdependent principles: Purpose, People, Data, Process and Accountability. The framework places elected representatives, Panchayat officials and citizens at the centre of AI-supported decision-making rather than treating AI as a substitute for institutional responsibility. The paper argues that the future of local governance should not be defined by technology alone. A genuinely Smart Panchayat is one in which AI strengthens human judgement, improves administrative efficiency, expands transparency and

enables inclusive participation while preserving democratic oversight. The proposed management approach provides a practical foundation for scaling AI from technology-enabled villages to accountable, citizen-centric and data-informed grassroots governance.

Index Terms—Artificial Intelligence; Smart Panchayats; Local Governance; Responsible AI; Algorithmic Accountability; Rural Digital Transformation

I. INTRODUCTION

Artificial Intelligence is no longer a distant prospect for public administration. Governments across income levels are experimenting with AI for service delivery, monitoring, and decision support, and international bodies now track this shift systematically. The OECD’s 2024 assessment of AI readiness across its member governments found that while adoption for internal operations is advancing, only 30 percent of countries had used AI for policymaking itself, indicating that most public-sector AI use remains operational rather than strategic [1]. A parallel global assessment by UN-Habitat, drawing on more than seventy case studies and a global survey of cities, reached a similar conclusion for urban contexts: AI adoption is uneven, benefits are real but unevenly distributed, and responsible governance depends on institutional capacity as much as on the technology itself [2].

This literature, however, is written overwhelmingly from an urban vantage point. Smart-city research has spent roughly a decade building its case for AI around large-scale monitoring, service optimisation, and

infrastructure management [3]. Rural and decentralised local governance, by contrast, has received comparatively little sustained attention, despite governing a much larger share of the population in countries such as India. India's Panchayati Raj Institutions administer roads, water supply, and welfare records under conditions that differ sharply from municipal administration: thinner technical staffing and more constrained connectivity than most urban local bodies [4].

Two recent developments make this an appropriate moment to examine AI in rural Indian governance specifically. First, functioning AI tools are now operating inside the Panchayati Raj system rather than existing only as pilots or proposals. SabhaSaar, an AI-enabled meeting-transcription tool, and PRAMAN, an image-analytics asset-verification tool, were both launched by the Ministry of Panchayati Raj and are in active use across a growing number of Gram Panchayats [5], [6]. Second, the broader public-administration literature on AI increasingly frames governance outcomes as a function of organisational and institutional transformation rather than of model capability alone [7]. This paper follows that framing: it treats responsible AI adoption in Panchayati Raj institutions as fundamentally a management and institutional-design problem, for which the technology is a necessary but insufficient condition.

The remainder of this paper proceeds as follows. Section 2 reviews the literature on AI in urban and rural public administration, drawing out the distinct assumptions each strand makes. Section 3 examines SabhaSaar and PRAMAN as the two AI tools currently operating inside India's Panchayati Raj system. Section 4 sets out the management challenges that responsible institutional integration of AI must address. Section 5 proposes a five-pillar Responsible AI Management Framework built on Purpose, People, Data, Process, and Accountability. Section 6 discusses systemic challenges and directions for future research, and Section 7 concludes.

II. LITERATURE REVIEW

This review is a narrative synthesis rather than a systematic review in the PRISMA sense. It draws on peer-reviewed public-administration literature, recent government documentation, and international policy assessments to characterise how AI governance is

currently framed in urban and rural contexts respectively, and to identify the gap this paper addresses. Sources were selected for direct relevance to AI adoption in public administration, with particular weight given to studies set in India given the paper's empirical focus on the Panchayati Raj system.

2.1. AI in Smart Cities: The Efficiency-First Paradigm
Systematic reviews of AI adoption inside public administration have consistently found that efficiency and service-speed gains dominate the early literature, with governance safeguards such as fairness, transparency, and accountability entering the discussion later and less consistently [3]. This ordering shapes what gets measured and funded: systems designed around throughput tend to treat rights and equity questions as secondary considerations to be addressed once a system is already operating. A quantitative survey of 152 public-sector chief information officers across South and Southeast Asia confirmed this pattern empirically: AI tools improved perceived service quality and operational speed, but the gains were strongly moderated by data governance maturity and organisational readiness, reinforcing the view that institutional conditions shape AI outcomes more than model sophistication does [8].

More recent work reframes this pattern in organisational rather than purely technical terms. Tangi, Rodriguez Müller, and Janssen's concept of "AI-augmented government transformation" argues that integrating AI into public administration requires a fundamental transformation of social and technical structures together, and that the benefits of AI adoption are only realised when organisational structure, governance, and culture change alongside the technology [7]. This view is consistent with a broader shift in the literature away from asking whether AI improves government performance and toward asking what institutional conditions make that improvement possible.

2.2. AI in Rural and Decentralised Governance

Rural and smart-village research proceeds from different starting assumptions than the smart-city literature. A systematic review of the smart-village literature by Junaidi and colleagues, screening 1,598 papers against PRISMA criteria and retaining 54 for detailed analysis, found that most smart-village models are built around a multidimensional

combination of technological, economic, social, and environmental dimensions rather than around efficiency metrics alone [9]. This suggests that a Smart Panchayat cannot simply be a scaled-down Smart City; its evaluation criteria need to differ from the outset.

Work specific to smart-village strategy identifies funding constraints and limited institutional capacity to sustain a technology once initial rollout support ends as recurring barriers to rural digital transformation [10]. A related empirical study of AI-enabled ecotourism ventures in Jhargram and Purulia, West Bengal, surveying 250 respondents and applying structural equation modelling, found that digital literacy, community participation, and entrepreneurial orientation all predict AI adoption positively, with entrepreneurial orientation the strongest driver, and that AI adoption partially mediates the relationship between entrepreneurial orientation and local socio-economic development [11]. Although this study is set in community tourism rather than panchayat administration, its structural finding is directly relevant: digital literacy and active community participation among local functionaries plausibly shape whether an AI tool such as SabhaSaar or PRAMAN is used well once deployed, rather than installed and left unused.

2.3 Theoretical Foundations: Accountability and Trustworthy AI

The public-accountability tradition in administrative theory holds that accountability is fundamentally relational: an actor owes an explanation of conduct to a forum with the standing to question, judge, and act on that explanation [12]. Applied to AI-assisted governance, this means accountability cannot be located inside the software itself; it must trace to a named person or office. Hirvonen's analysis of automated decision-making regulation in the Finnish and EU legal context develops this point in detail, arguing that the central purpose of accountability structures for automated decision-making is to ensure there remain identifiable individuals who can be held responsible when something goes wrong, rather than allowing responsibility to diffuse into the system itself [13].

A separate but related literature on trustworthy and sustainable AI in the public sector adds that decision-makers should weigh social, environmental, and

institutional costs jointly rather than allowing efficiency metrics to settle questions of adoption on their own [14]. Read together with the accountability literature, this points toward a consistent conclusion: the trustworthiness of an AI system depends on the accountability and institutional structure built around it, not on the sophistication of the underlying model.

2.4 Institutional Risk: Evidence from Urban AI Deployments

Before turning to specific Indian case evidence, it is worth noting that a broader administrative-science literature has begun to document the negative impacts of AI in government settings systematically. Valle-Cruz, García-Contreras, and Gil-García identify algorithmic opacity, loss of human discretion, and the reinforcement of existing institutional biases as recurring dark-side risks that accompany AI adoption in public organisations, even where the stated purpose of adoption is to improve fairness or efficiency [15]. These risks are not hypothetical: the Indian case evidence discussed next illustrates several of them concretely.

Case-study evidence from urban India illustrates how AI-enabled monitoring infrastructure can shift institutional authority in ways not visible from the technology alone. A detailed ethnographic case study of Kochi's Integrated Command and Control Centre, based on fieldwork conducted between January 2022 and September 2023, including 17 site visits and 37 semi-structured interviews, found that the facility's construction was centrally mandated across all Smart Cities Mission cities from 2018 onward regardless of local readiness, that it was run by a state-owned Special Purpose Vehicle sitting outside the elected Kochi Municipal Corporation's normal reporting lines, and that a third of elected representatives surveyed felt the Corporation had no meaningful say over the vehicle's decisions [16]. The same study documented instances of synthetic or manually corrected data being displayed on control-room screens for visiting officials and prospective vendors. None of this made the project a failure in the ordinary sense the facility served its purpose of demonstrating technological capability but it illustrates that AI infrastructure can restructure who holds governance authority independently of whether the underlying systems function as advertised [16]. A separate qualitative study of officers in charge of surveillance in Indian

smart cities similarly found that AI-enabled monitoring can empower citizens, but only where a sufficiently strong regulatory and institutional structure surrounds it; without that structure, the same technology risks becoming an instrument of unaccountable control [17].

These findings carry a direct implication for rural AI governance: Panchayats share the same dependence on centrally provided AI infrastructure and the same reliance on external technical support that characterised the Kochi case, but typically have less administrative capacity than an urban municipal corporation to contest or renegotiate that arrangement if concerns arise.

2.5 Structural Barriers to AI Adoption in Indian Public Services

Barriers to AI adoption in Indian public administration have been mapped empirically in adjacent domains. A study of India's Public Distribution System identified eighteen critical barriers to AI adoption, spanning supply-chain fragmentation, weak data infrastructure, and institutional inertia, and used Interpretive Structural Modelling to rank them; corruption in beneficiary identification and grain diversion emerged as the highest-priority barrier to resolve before AI adoption could meaningfully help [18]. The clearest implication of this finding is that introducing AI into an administrative process already compromised by weak data integrity does not correct that weakness; it risks encoding it into an automated system unless the underlying process is addressed first.

A separate conceptual framework developed by Misra, Mellouli, and Noel proposes a Rural Local Online Services Index (Rural-LOSI) to extend the United Nations' municipal Local Online Service Index framework into rural contexts, arguing that AI-supported service discovery could help rural citizens navigate government digital services in low-connectivity settings [19].

As a conceptual contribution rather than a completed field trial, this framework identifies the analytical dimensions along which rural digital-service AI should be evaluated, without yet providing empirical performance figures; it is cited here for that conceptual contribution rather than for any specific outcome measure.

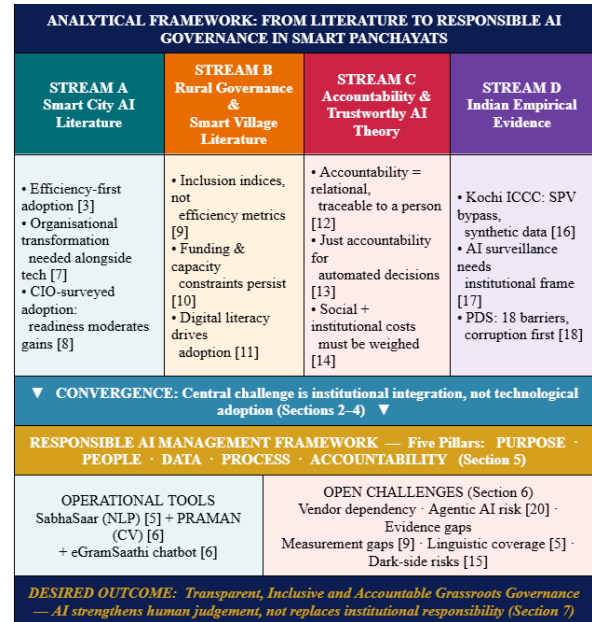


Fig. 1. Analytical Mind Map: How four literature streams (Sections 2.1–2.5) converge into the Responsible AI Management Framework (Section 5), its operational tools (Section 3), and open challenges (Section 6). Every node corresponds to a specific manuscript section and reference.

III. AI IN INDIA'S PANCHAYATI RAJ SYSTEM: SABHASAAR AND PRAMAN

Two AI tools currently operate inside India's Panchayati Raj system, both launched by the Ministry of Panchayati Raj and both demonstrated publicly at the India AI Impact Expo 2026 in New Delhi [6].

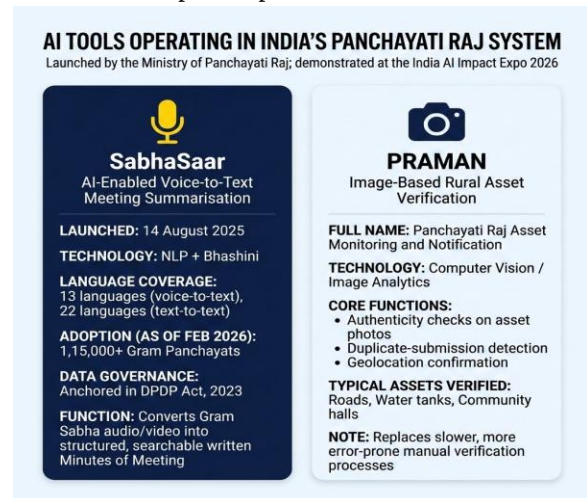


Fig. 2. AI Tools Operating in India's Panchayati Raj System: SabhaSaar and PRAMAN. References [5], [6].

3.1 SabhaSaar: AI-Enabled Voice-to-Text Meeting Summarisation

SabhaSaar, launched on 14 August 2025, is an AI-powered tool that converts audio and video recordings of Gram Sabha and other Panchayat meetings into structured, written Minutes of Meeting [5]. It uses Natural Language Processing and is integrated with Bhashini, the Government of India's National Language Translation Mission, supporting transcription in 13 Indian languages and text-to-text translation in 22 [6].

As of early February 2026, official figures reported more than 1,15,000 Gram Panchayats had used the tool for meeting summarisation across States and Union Territories [5]. The Ministry has stated that all data privacy and storage practices connected to the tool are governed under India's Digital Personal Data Protection Act, 2023 [5]. Beyond its stated documentation function, structured automatic minute-generation makes it structurally more difficult for a meeting's decisions to go unrecorded or to be recalled selectively after the fact as a direct response to a long-standing, officially recognised weakness in Gram Sabha documentation practice.

3.2 PRAMAN: Image-Based Asset Verification

PRAMAN (Panchayati Raj Asset Monitoring and Notification) is an image-analytics system that validates photographs of rural development assets such as roads, water tanks, and community halls [6]. It performs automated quality assessment, authenticity checks, and duplicate-submission detection, and confirms the geolocation of uploaded images, replacing a slower and more error-prone manual verification process [6]. Alongside SabhaSaar and a third tool, eGramSaathi, an AI chatbot for citizen and official queries, PRAMAN was presented at the India AI Impact Expo 2026 as part of the Ministry's broader effort to embed AI directly into Panchayat-level administrative workflows [6].

Both tools are still recent deployments, and independent, peer-reviewed evaluation of their performance does not yet exist in the literature; the description above reflects official government documentation rather than independent verification. This is itself a methodological point worth stating plainly: claims about rural AI tools in India currently

rest almost entirely on government self-reporting, and the field would benefit from independent research as adoption scales.

IV. THE MANAGEMENT CHALLENGE: RESPONSIBLE INSTITUTIONAL INTEGRATION

The literature and case evidence reviewed above converge on a single point: the central challenge in extending AI to Panchayat-level governance is not technological adoption but institutional integration. Several interconnected concerns need to be addressed for that integration to be responsible.

Data quality and ownership

Panchayat-level records, particularly those tied to land and welfare entitlement, can encode long-standing administrative inconsistencies or social inequities. Training or calibrating an AI system on this data without review risks reproducing those inconsistencies in automated form.

Indian government AI adoption more broadly has been found to face unclear data-ownership arrangements as a structural obstacle [21], and this ambiguity needs explicit resolution before AI tools scale further within Panchayati Raj institutions.

Privacy and cybersecurity

Local government cybersecurity has been shown, in systematic review, to trail behind other levels of government in most jurisdictions studied, owing to constrained technical budgets and specialist staffing [4]. Panchayats, which typically have less technical capacity than even smaller municipal bodies, face this constraint more acutely. SabhaSaar's stated grounding in the Digital Personal Data Protection Act, 2023 is a relevant regulatory anchor here [5], but a legal framework is not a substitute for the operational security capacity needed to implement it at the Panchayat level.

Algorithmic bias and explainability

Trustworthy-AI frameworks converge on transparency, human oversight, fairness, and technical robustness as preconditions for responsible deployment [22]. For image-analytics tools such as PRAMAN, explainability means Panchayat officials and citizens need a comprehensible basis for understanding why a submitted asset photograph was

flagged as a duplicate or as failing an authenticity check, not merely a binary system output.

Human accountability

As established in Section 2.3, accountability must trace to a named person or office rather than to the system itself [12], [13]. The Kochi case demonstrates concretely what happens when this principle is not observed: authority migrated toward a Special Purpose Vehicle and its private technology partners, with

diminished practical accountability to the elected body nominally responsible for the facility [16].

Digital capacity. Digital literacy among Panchayat staff and active citizen participation through the Gram Sabha are plausible determinants of whether an AI tool is used effectively once deployed, based on the structural pattern found in comparable rural-technology-adoption research [11]. Capacity-building therefore needs to be treated as integral to AI rollout, not as a follow-up activity.

FIVE MANAGEMENT CHALLENGES FOR RESPONSIBLE INTEGRATION

Institutional concerns that must be addressed alongside AI adoption at the Panchayat level

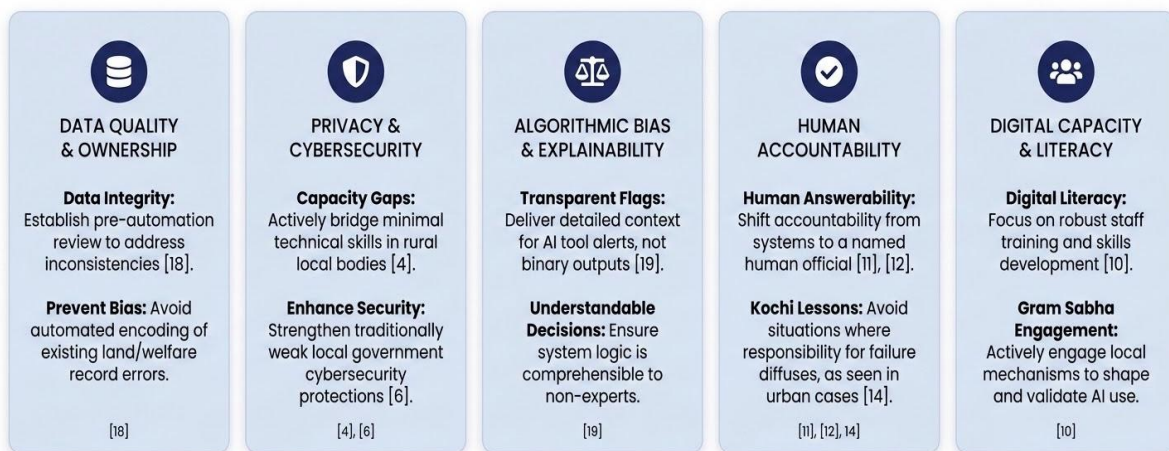


Fig. 3. The Five Management Challenges for Responsible AI Integration at the Panchayat level (Section 4).
References [4], [5], [11], [12], [13], [16], [21], [22].

V. PROPOSED RESPONSIBLE AI MANAGEMENT FRAMEWORK FOR SMART PANCHAYATS

Building on the concerns identified in Section 4, this paper proposes a Responsible AI Management Framework organised around five interdependent principles: Purpose, People, Data, Process, and Accountability. The framework is intended as a management orientation for Panchayat-level AI adoption rather than as a technical specification, and it is offered as a conceptual contribution to be tested empirically as SabhaSaar, PRAMAN, and future tools accumulate a longer operating history. Table I summarises the five principles and the concern each address.

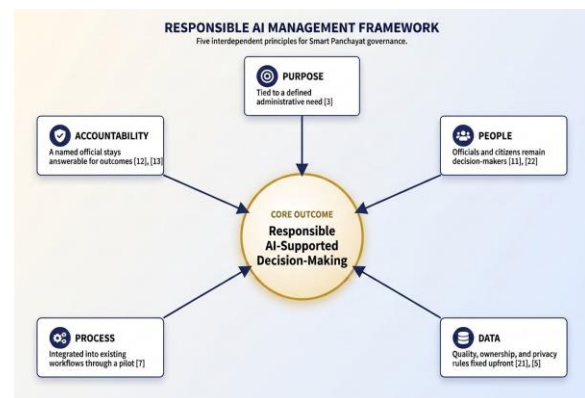


Fig. 4. Conceptual Framework: Responsible AI Management Framework for Smart Panchayats mapping five governance pillars to operational AI tools and management challenges. All elements drawn from Sections 3–5 and references [3], [5]–[7], [9], [11]–[13], [16], [21], [22].

TABLE I. THE FIVE PRINCIPLES OF THE PROPOSED RESPONSIBLE AI MANAGEMENT FRAMEWORK

Principle	Core Concern Addressed	Illustrative Application
Purpose	Every AI deployment should have a specific, documented administrative rationale rather than adoption for its own sake [3]	SabhaSaar's stated purpose is producing an accurate, structured meeting record [5]
People	Elected representatives, Panchayat officials, and citizens remain the decision-makers; AI supports judgement, it does not replace it [22]	Gram Sabha participation and staff digital literacy shape how well a tool is actually used [11]
Data	Data quality, ownership, and privacy require explicit rules, given documented ambiguity in Indian government AI adoption generally [21]	SabhaSaar's data handling is anchored in the DPDP Act, 2023 [5]
Process	AI tools should be integrated into existing administrative workflows through a phased approach, not a one-time rollout [7]	Gradual expansion of SabhaSaar and PRAMAN across States/UTs since August 2025 [5], [6]
Accountability	A named official, not the system itself, must remain answerable for AI-informed decisions [12], [13]	Contrasts with the Kochi case, where authority diffused toward an unaccountable Special Purpose Vehicle [16]

This framework shares its core concerns with established responsible-AI approaches, including the OECD's public-sector AI guidance [1] and general trustworthy-AI principles [22], but is specifically calibrated to the resource and governance constraints of Indian rural local bodies rather than assuming the technical capacity typical of national ministries or large municipal corporations. A fuller comparison against India's own national AI governance guidance and against the Digital Personal Data Protection Act, 2023 as the binding legal framework for the Data principle is an important next step for future work, and is noted as a limitation of the present conceptual treatment.

VI. DISCUSSION: SYSTEMIC CHALLENGES AND FUTURE RESEARCH

Several challenges remain open and are not resolved by the framework proposed above.

Vendor and central dependency

Because Panchayats generally lack in-house technical staff, they depend on centrally built and centrally maintained platforms rather than independently procured or audited systems [21]. The Kochi case shows what this dependency can produce even where far greater administrative resources exist than at the Panchayat level [16]; Panchayats face a comparable structural dependency with less capacity to contest it.

Agentic AI and autonomous governance workflows

A related challenge is the emergence of agentic AI systems that act on behalf of an official without waiting for a step-by-step prompt. India's Gov.in Secure Intranet Platform already deploys agentic modules for document summarisation and automated minutes-of-meeting generation across central ministries [20]. If similar autonomous capabilities reach panchayat-level platforms, the Accountability principle of the framework proposed in Section 5 faces a direct stress test: a named official must still review and own every output, even when the system no longer pauses to ask. Early operational evidence from the Gov.in deployment suggests that agentic workflows reduce drafting time substantially, but the question of who is answerable for an AI-generated official record remains institutionally unresolved [20].

Evidence base and independent verification

As noted in Section 3, current knowledge of SabhaSaar and PRAMAN's real-world performance rests on government documentation rather than independent, peer-reviewed evaluation. This is an appropriate starting point for a new deployment but should not be treated as an adequate long-term evidentiary basis. Independent field research, ideally comparative across States, given the federal structure of implementation, would substantially strengthen confidence in claims about these tools' effects on transparency and efficiency.

Measurement gaps

The smart-village literature does not yet offer an agreed set of indicators for judging whether a rural AI deployment has improved participation and equity, as distinct from simply improving processing speed [9]. Any future empirical test of the framework proposed in Section 5 will need to address this measurement gap directly, most likely by adapting indicators from the broader smart-village and digital-government literatures rather than starting from a blank page.

Linguistic coverage

SabhaSaar's coverage of 13 languages for voice-to-text and 22 for text-to-text translation is a substantial achievement, but India's linguistic diversity extends well beyond this range, particularly for tribal and regional dialects not yet included in Bhashini's training corpus [5]. Extending genuine linguistic coverage is likely to remain an incremental, multi-year undertaking rather than a solved problem. Future research should prioritise three directions: independent, field-based evaluation of SabhaSaar and PRAMAN as adoption scales; development of participation- and equity-sensitive indicators for rural AI deployment, building on the smart-village metrics literature [9]; and comparative study of how the proposed five-pillar framework performs across States with differing administrative capacity, given that Panchayati Raj implementation varies considerably by state government.

VII. CONCLUSION

This paper has argued that the shift from Smart Cities to Smart Panchayats is best understood as a management and institutional-design problem rather than a purely technical one. SabhaSaar and PRAMAN demonstrate that functioning AI tools can now operate within India's Panchayati Raj system, addressing long-standing documentation and verification weaknesses. Whether this becomes a durable and genuinely accountable transformation, however, depends on the institutional structure built around these tools: on data governance, on human accountability, on digital capacity among Panchayat staff and citizens, and on independent evidence of what these tools actually achieve once deployed at scale. The five-pillar Responsible AI Management Framework proposed here Purpose, People, Data, Process, and

Accountability offers one starting point for that institutional work. It is offered as a conceptual contribution for further empirical testing, not as a finished or validated model.

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AI DECLARATION

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