Bridging the Digital Divide: Evaluating E-Governance Effectiveness in Citizen Participation Across Tier-2 and Tier-3 Maharashtra

Mahesh Medtiya, Mahesh Deshmukh, Mohammad Dhamaskar, Mohit Patil,

H.R. Kulkarni, Madhuri Pise*

*Corresponding Author: **madhuripise99@gmail.com**

G. H. Raisoni College of Arts, Commerce & Science, Pune, Maharashtra, India

Abstract

India's rapid digital transformation through initiatives such as *Digital India* and the *Smart Cities Mission* has accelerated the use of e-governance as a tool for transparent and efficient public service delivery. However, academic and policy attention has primarily focused on large metropolitan regions and officially designated Smart Cities. In contrast, Tier-2 and Tier-3 urban centers—which collectively house the majority of India's urban population—remain understudied in terms of digital governance capacity and citizen participation outcomes.

This study evaluates the effectiveness of e-governance platforms in four purposively selected non-Smart Cities of Maharashtra: Ahmednagar, Kolhapur, Sangli-Miraj-Kupwad, and Satara. A novel **Participation Effectiveness Index (PEI)** was constructed incorporating 35 indicators across five dimensions: accessibility, service delivery, transparency, citizen participation, and system reliability. Using secondary data from municipal websites, service portals, mobile applications, reports, and digital communication channels, each city was assigned a PEI score out of 70.

Results show substantial variation: Ahmednagar achieved the highest score (35/70), followed by Kolhapur (28/70), Sangli-Miraj-Kupwad (25/70), and Satara (20/70). Overall, cities demonstrate moderate progress in service delivery but perform poorly on citizen participation and system reliability. The study identifies structural barriers including limited multilingual support, inadequate grievance redressal systems, insufficient technical resources, and low digital literacy.

The paper concludes with recommendations for multilingual interfaces, mobile-first design, enhanced participation mechanisms, and regional capacity-building models. This research contributes to bridging the analytical gap on e-governance in non-metropolitan India and provides an actionable roadmap for improving citizen-centric digital governance.

1. Introduction

The last decade has witnessed an intensified focus on digital governance in India, driven by initiatives such as the *Digital India Programme* (2015) and the *Smart Cities Mission* (2015). These frameworks aim to integrate technology into public administration to enhance transparency, efficiency, and citizen engagement. E-governance systems enable online delivery of municipal services such as tax payments, certificates, licenses, and grievance redressal—reducing bureaucratic inefficiencies and expanding accessibility.

However, existing research and policy implementation tend to disproportionately prioritize large metropolitan centers and officially designated Smart Cities. These cities generally possess better financial resources, infrastructure, and administrative capacity to implement digital platforms effectively. In contrast, Tier-2 and Tier-3 cities—despite being home to over 40% of India's urban population—often face infrastructure limitations, constrained budgets, and uneven digital literacy levels.

Maharashtra provides a valuable context for this analysis. While it is one of India's most urbanized and economically advanced states, only five of its 27 large urban centers are Smart Cities. Most cities with populations between 100,000–600,000 fall outside flagship digital initiatives, making them susceptible to digital exclusion despite increasing citizen expectations for modern governance.

This study broadens the analytical focus by assessing e-governance performance in four such cities: Ahmednagar, Kolhapur, Sangli-Miraj-Kupwad, and Satara. Using a comprehensive Participation Effectiveness Index, it systematically evaluates the extent to which citizens can meaningfully access and utilize digital governance platforms in these non-metro settings.

1.1 Problem Statement

Despite significant growth in digital governance, Tier-2 and Tier-3 cities in India remain inadequately studied. Most existing research examines Smart Cities or large metros where digital infrastructure is already strong. This creates a major knowledge gap: **How effective are e-governance systems in smaller, resource-constrained cities?**

Key challenges include:

- Insufficient technological infrastructure
- Lower digital literacy rates
- Minimal local language support
- Weak integration of offline and online services
- Limited citizen participation features
- Lack of standardized evaluation tools for smaller cities

This study addresses these gaps by developing a specialized assessment framework tailored to the realities of non-Smart Cities.

1.2 Research Objectives

Primary Objective:

To evaluate the effectiveness of e-governance platforms in enhancing citizen participation in selected Tier-2 and Tier-3 urban centers of Maharashtra using a structured assessment index.

Secondary Objectives:

1. Develop and validate a **Participation Effectiveness Index (PEI)** for non-Smart City contexts.
2. Identify barriers and enablers affecting digital participation.

3. Provide policy-relevant recommendations for enhancing citizen-centric digital governance.

1.3 Research Questions & Hypotheses

Primary Research Question:

To what extent do e-governance platforms in non-Smart Cities of Maharashtra enable effective citizen participation?

Secondary Questions:

- How do cities differ across five key dimensions of digital governance?
- What limits citizens' ability to use digital municipal services?
- What design and implementation features improve participation outcomes?

Hypotheses:

- **H1:** Larger Tier-2 cities will outperform smaller Tier-3 cities in PEI scores.
- **H2:** Multilingual and user-friendly interfaces correlate with higher participation.
- **H3:** Robust grievance redressal systems improve overall e-governance effectiveness.

2. Literature Review

2.1 Theoretical Foundations

E-governance draws on public administration, information systems, and digital divide literature. Key theoretical frameworks:

- **Heeks' e-governance model (2003)**: Systems evolve from basic informational sites to fully integrated transformational platforms.
- **Van Dijk (2005)**: Digital engagement depends on motivation, physical access, skills, and usage.
- **Warschauer (2003)**: True digital inclusion requires not only access but relevance, skills, and institutional support.

These frameworks highlight that technology alone cannot ensure participation—citizens must have the capacity, motivation, and supportive systems to use digital services effectively.

2.2 E-Governance in India

India's digital governance journey began with the National e-Governance Plan (2006) and expanded significantly with Digital India. Studies show improved transparency and efficiency in major cities but point to persistent challenges in smaller centers:

- Limited infrastructure
- Fragmented service delivery
- Lack of standardization
- Minimal citizen engagement mechanisms

These gaps make Tier-2 and Tier-3 cities crucial yet understudied contexts.

2.3 Citizen Participation in the Digital Context

Citizen participation ranges from accessing information to actively co-creating policies. Digital platforms can enhance engagement through:

- Grievance systems
- Online surveys
- Feedback mechanisms
- Public consultations

However, participation remains low in many Indian cities due to usability challenges and weak responsiveness.

2.4 Assessment Frameworks

Most existing assessment frameworks—UN E-Government Survey, e-government maturity models—focus on national or state levels. Few frameworks center on **local urban contexts** or **citizen participation**, leaving a methodological gap this study fills through the PEI.

2.5 Research Gaps

Identified gaps include:

- Metro-centric research bias
- Lack of participation-focused frameworks
- Minimal evaluation of non-Smart Cities
- Overemphasis on technical features rather than citizen experience

This study contributes to closing these gaps comprehensively.

3. Methodology

3.1 Research Design

A mixed-methods design was adopted, combining:

- Quantitative scoring using the PEI
- Qualitative thematic analysis of platform features

Secondary data analysis enabled standardized evaluation without requiring primary surveys.

3.2 Case Selection

Four cities were selected based on:

- Population between 100,000–600,000
- District-headquarter status

- Regional diversity
- Availability of digital platforms

Selected Cities:

- **Ahmednagar**
- **Kolhapur**
- **Sangli-Miraj-Kupwad**
- **Satara**

3.3 Participation Effectiveness Index (PEI)

PEI consists of **35 indicators** across **five dimensions**:

1. Accessibility
2. Service Delivery
3. Transparency
4. Citizen Participation
5. System Reliability

Each indicator scored:
0 = absent, 1 = partial, 2 = fully functional.
Maximum score = 70.

3.4 Data Collection

Data sources included:

- Municipal websites
- Mobile apps
- Annual reports
- Citizen charters
- Social media channels

3.5 Data Analysis

Quantitative scoring + qualitative thematic review.
Inter-rater reliability achieved at 89%.

3.6 Limitations

- Snapshot of platforms in early 2024
- Secondary data only

- Limited generalizability beyond Maharashtra

4. Results

4.1 Overall PEI Scores

City	Score	%	Rank
Ahmednagar	35	50%	1
Kolhapur	28	40%	2
Sangli-Miraj-Kupwad	25	35.7%	3
Satara	20	28.6%	4

No city reached “high effectiveness.”

4.2 Dimension-wise Analysis

Service Delivery performed best; System Reliability performed worst.

- **Service Delivery:** Avg 6.75/14
- **Accessibility:** Avg 5.75/14
- **Transparency:** Avg 5.50/14
- **Participation:** Avg 4.75/14
- **Reliability:** Avg 4.25/14

4.3 City-wise Findings

Ahmednagar (Best Performer)

Strengths:

- Extensive online services
- Mobile app available
- Multilingual support (partial Marathi)

Weaknesses:

- Limited participation features
- Downtime during peak periods

Kolhapur

Strengths:Clean user-friendly website

- Strong social media engagement

Weaknesses:

- No mobile app
- English-only interface

Sangli-Miraj-Kupwad

Strengths:

- Basic online services
- Regular updates

Weaknesses:

- Many services require offline completion
- Complicated navigation

Satara (Lowest Performer)

Strengths:

- Basic information online

Weaknesses:

- No online transactions
- Poor mobile optimization
- Broken links and frequent errors

5. Discussion

5.1 Key Insights

- Digital infrastructure exists but functions mostly as informational, not participatory.
- Service delivery is progressing, but citizen participation is extremely weak.
- Technical reliability issues undermine user trust.

5.2 The Participation Divide

Beyond access, a new divide emerges: **citizens' ability to participate**.
Barriers include language, digital literacy, interface complexity, and institutional responsiveness.

5.3 Institutional Digital Divide

Smart Cities vs. non-Smart Cities show large disparities in:

- Funding
- Capacity

- Platform sophistication

This creates unequal access to digital rights.

6. Recommendations

6.1 Immediate (0–12 months)

1. **Full Marathi language support**
2. **Mobile-first Progressive Web Applications**
3. **Basic grievance and feedback systems**
4. **SMS-based updates**

6.2 Medium-term (1–3 years)

1. Regional e-governance support hubs
2. Staff training programs
3. Citizen digital literacy drives

6.3 Long-term (3–5 years)

1. Unified single-window platforms
2. Comprehensive municipal data analytics
3. Statewide e-governance learning networks

7. Conclusion

This study demonstrates that while Tier-2 and Tier-3 cities in Maharashtra have made progress in establishing basic e-governance systems, significant gaps persist in accessibility, participation, and reliability. The Participation Effectiveness Index provides a valuable tool for assessing these gaps and identifying priority areas for policy intervention.

Although Ahmednagar leads among the four, none of the cities achieve high effectiveness. This shows the need for stronger institutional support, multilingual and mobile-centric design, capacity building, and integrated citizen participation mechanisms.

As India advances digitally, ensuring that smaller cities are not left behind is essential for equitable growth and democratic inclusion.

8. References

[1] Government of India. (2015). Digital India Programme. Ministry of Electronics and Information Technology. https://www.digitalindia.gov.in/

[2] Ministry of Housing and Urban Affairs. (2015). Smart Cities Mission Statement and Guidelines. Government of India. https://smartcities.gov.in/

[3] Bhatnagar, S. (2004). E-government: From vision to implementation—A practical guide with case studies. Sage Publications.

[4] Census of India. (2011). Population enumeration data (final population). Office of the Registrar General & Census Commissioner, India.

[5] Ministry of Housing and Urban Affairs. (2020). Smart Cities Mission: Annual report 2019-20.Government of India.

[6] Directorate of Economics and Statistics. (2021). Economic survey of Maharashtra 2020-21.

Government of Maharashtra.

[7] Norris, P. (2001). Digital divide: Civic engagement, information poverty, and the Internet

worldwide. Cambridge University Press.

[8] Warschauer, M. (2003). Technology and social inclusion: Rethinking the digital divide. MIT Press.

[9] West, D. M. (2004). E-government and the transformation of service delivery and citizen

attitudes. Public Administration Review, 64(1), 15-27.

[10] Saxena, K. B. C. (2005). Towards excellence in e-governance. International Journal of Public Sector Management, 18(6), 498-513.

[11] Kumar, R., & Best, M. L. (2006). Impact and sustainability of e-government services in

developing countries: Lessons learned from Tamil Nadu, India. The Information Society, 22(1), 1-12.

[12] Sivarajah, U., Irani, Z., & Weerakkody, V. (2015). Evaluating the use and impact of Web 2.0 technologies in local government. Government Information Quarterly, 32(4), 473-487.

[13] Shareef, M. A., Kumar, V., Kumar, U., & Dwivedi, Y. K. (2011). e-Government Adoption Model (GAM): Differing service maturity levels. Government Information Quarterly, 28(1), 17-35.

[14] Alzahrani, L., Al-Karaghouli, W., & Weerakkody, V. (2017). Analysing the critical factors influencing trust in e-government adoption from citizens' perspective: A systematic review and a conceptual framework. International Business Review, 26(1), 164-175.

[15] Fountain, J. E. (2001). Building the virtual state: Information technology and institutional

change. Brookings Institution Press.

[16] Heeks, R. (2003). Most eGovernment-for-development projects fail: How can risks be

reduced? iGovernment Working Paper Series, University of Manchester.

[17] Van Dijk, J. A. (2005). The deepening divide: Inequality in the information society. Sage

Publications.

[18] Department of Electronics and Information Technology. (2006). National e-Governance Plan (NeGP). Government of India.

[19] Basu, S. (2004). E-government and developing countries: An overview. International Review of Law, Computers & Technology, 18(1), 109-132.

[20] Gaikwad, R., & Ahire, S. (2024). E-governance and transparency enhancement in Maharashtra:

A citizen satisfaction analysis. Journal of Public Administration and Governance, 14(2), 45-62.

[21] Singh, A., & Kumar, P. (2023). Digital governance challenges in Indian Tier-2 cities:

Infrastructure, capacity, and citizen engagement. Asian Journal of Public Administration, 45(3),

[22] Sharma, D., Gupta, R., & Patel, M. (2022). Language barriers in e-governance adoption:

Evidence from Rajasthan's non-metropolitan cities. International Journal of Digital Governance,8(4), 78-94.

[23] Chadwick, A. (2003). Bringing e-democracy back in: Why it matters for future research on e-governance. Social Science Computer Review, 21(4), 443-455.

[24] Nabatchi, T., & Leighninger, M. (2015). Public participation for 21st century democracy. Jossey-Bass.

[25] Bonsón, E., Torres, L., Royo, S., & Flores, F. (2012). Local e-government 2.0: Social media andcorporate transparency in municipalities. Government Information Quarterly, 29(2), 123-132.

[26] Tolbert, C. J., & Mossberger, K. (2006). The effects of e-government on trust and confidence in government. Public Administration Review, 66(3), 354-369.

[27] Rana, N. P., Dwivedi, Y. K., Williams, M. D., & Weerakkody, V. (2015). Investigating success of

an e-government initiative: Validation of an integrated IS success model. Information Systems

Frontiers, 17(1), 127-142.

[28] Layne, K., & Lee, J. (2001). Developing fully functional e-government: A four stage

model. Government Information Quarterly, 18(2), 122-136.

[29] United Nations Department of Economic and Social Affairs. (2022). E-Government Survey 2022: The Future of Digital Government. United Nations Publications.

[30] Alshawi, S., & Alalwany, H. (2009). E-government evaluation: Citizen's perspective in developing countries. Information Technology for Development, 15(3), 193-208.

[31] Kunstelj, M., & Vintar, M. (2004). Evaluating the progress of e-government development: A comparative study. Information Polity, 9(3-4), 131-148.

[32] Dwivedi, Y. K., Rana, N. P., Janssen, M., Lal, B., Williams, M. D., & Clement, M. (2017). An empirical validation of a unified model of electronic government adoption (UMEGA). Government Information Quarterly, 34(2), 211-230.

[33] Yin, R. K. (2018). Case study research and applications: Design and methods (6th ed.). Sage Publications.

[34] Johnston, M. P. (2017). Secondary data analysis: A method of which the time has come. Qualitative and Quantitative Methods in Libraries, 3(3), 619-626.

[35] Patton, M. Q. (2015). Qualitative research & evaluation methods: Integrating theory and practice (4th ed.). Sage Publications.

[36] Ahmednagar Municipal Corporation. (2023). Annual administrative report 2022-23. Municipal Corporation of Ahmednagar.

[37] Kolhapur Municipal Corporation. (2023). City development plan 2021-2031. Municipal Corporation of Kolhapur.

[38] Sangli-Miraj-Kupwad Municipal Corporation. (2023). Municipal performance assessment report 2022-23. SMKMC.

[39] Satara Municipal Council. (2023). Annual budget and performance report 2022-23. Satara Municipal Council.

[40] DeVellis, R. F. (2017). Scale development: Theory and applications (4th ed.). Sage Publications.

[41] Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. Qualitative Research in Psychology, 3(2), 77-101.

[42] Fung, A. (2015). Putting the public back into governance: The challenges of citizen participation and its future. Public Administration Review, 75(4), 513-522.

[43] Government of Maharashtra. (2020). Digital Maharashtra initiative: Strategy and implementation framework. Information Technology Department, Government of Maharashtra.

[44] Census of India. (2011). Language data: Maharashtra. Office of the Registrar General & Census Commissioner, India.

[45] Gaventa, J., & Barrett, G. (2012). Mapping the outcomes of citizen engagement. World Development, 40(12), 2399-2410.