



DIGITAL INCLUSION AND ACCESS TO PUBLIC SERVICES AMONG SCHEDULED TRIBES AND MARGINALISED COMMUNITIES IN KARNATAKA: CHALLENGES IN THE DIGITAL ERA

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ABSTRACT

Digital inclusion has become essential for accessing government welfare schemes, education, healthcare, banking, employment, and social security. However, the expansion of digital public services does not automatically ensure equitable access among Scheduled Tribes and other marginalised communities in Karnataka. This article examines the structural, technological, educational, economic, and administrative barriers that influence their participation in the digital governance system. It adopts a mixed-method research framework combining secondary evidence from the Census of India, the National Family Health Survey, government reports, and a proposed household survey. Particular attention is given to internet connectivity, digital literacy, device ownership, language barriers, authentication difficulties, and dependence on intermediaries. The analysis highlights the distinction between the availability of digital services and people's practical ability to use them independently. It proposes community-based digital literacy, stronger rural service infrastructure, multilingual platforms, accessible grievance redressal, and targeted monitoring to make digital governance more inclusive, accountable, and responsive to vulnerable communities.

Key words: Digital inclusion, Scheduled Tribes, Karnataka, e-governance, public service delivery.

INTRODUCTION

Digital technologies have transformed the delivery of public services in India by enabling citizens to access welfare benefits, financial transactions, educational resources, healthcare information, and administrative services through electronic platforms. Initiatives such as Digital India, Aadhaar-enabled services, Direct Benefit Transfer (DBT), and Common Service Centres (CSCs) seek to improve accessibility, transparency, and administrative efficiency. Nevertheless, the benefits of digital transformation depend on citizens' ability to access devices, connect to reliable networks, understand digital interfaces, and complete online procedures independently.

For Scheduled Tribes and other marginalised communities in Karnataka, digitalisation presents both

opportunities and challenges. Communities residing in remote forest settlements, hilly regions, and geographically isolated villages may experience inadequate connectivity, limited access to digital devices, financial constraints, and difficulties in obtaining assistance. Women, elderly people, persons with disabilities, and individuals with limited formal education may face additional barriers. Consequently, the introduction of an online service does not necessarily mean that the service has become equally accessible to every citizen.

Warschauer (2003) argues that meaningful technology access involves more than the physical availability of computers and networks; it also requires literacy, institutional support, and social resources. Similarly, van Dijk (2020) explains digital inequality through differences in access, skills, usage, and the benefits people obtain from technology. These perspectives are particularly relevant to understanding unequal participation in Karnataka's digital governance system.

This article examines the relationship between digital inclusion and access to public services among Scheduled Tribes and marginalised communities in Karnataka. It investigates infrastructure, affordability, digital literacy, language, gender, and administrative accessibility. It also considers whether dependence on intermediaries limits independent access to government services. The central argument is that inclusive digital governance requires not only technological expansion but also social empowerment, accessible institutional support, and effective accountability mechanisms.

2. Background of the Study

Karnataka has experienced considerable expansion in digital governance, financial inclusion, electronic documentation, and online delivery of public services. Citizens increasingly encounter digital procedures when applying for scholarships, pensions, housing assistance, employment-related benefits, caste and income certificates, health services, and agricultural support. These developments can reduce travel, paperwork, and administrative delays when digital infrastructure and assistance are available.

However, Karnataka's social and geographical diversity creates significant differences in the ability to benefit from these developments. Tribal households in forested and remote settlements may encounter connectivity problems and longer distances to service centres. Other disadvantaged households may experience financial insecurity, limited digital literacy, irregular electricity, shared mobile devices, or insufficient confidence in online transactions. These difficulties can become especially serious when essential services require repeated authentication, document uploads, online applications, or digital payments.

The 2011 Census provides an important demographic baseline for understanding Karnataka's Scheduled Tribe population, including its district-wise distribution and rural–urban composition. The Census of India maintains separate statistical tables on Scheduled Tribe population, literacy, and demographic characteristics. Meanwhile, the National Family Health Survey (NFHS-5), conducted in 2019–2021, provides an indicator of internet use among adults aged 15–49. In Karnataka, 35% of women and 62% of men in this age group reported having ever used the internet. These figures demonstrate why digital inclusion must be examined as a social issue rather than solely as a technological achievement. State-level averages cannot reveal whether tribal women, remote households, or particular disadvantaged communities experience the same opportunities as the general population. Furthermore, having used the internet at least once does not establish whether a person can independently complete a scholarship application, access a health service, or resolve a failed benefit transaction.

The study therefore places digital access within the broader context of social justice and public administration. It distinguishes between infrastructure availability, effective access, independent usage, and successful service outcomes. This approach helps identify whether digital governance reduces existing inequalities or reproduces them through new technological and administrative barriers.

3. Government Records and Statistical Details

Government records provide the foundation for examining demographic inclusion and digital access.

Census 2011 supplies district-level Scheduled Tribe population data, while NFHS-5 reports internet-use indicators for women and men aged 15–49. The Ministry of Electronics and Information Technology documents the broader digital-governance framework, including Digital India and Common Service Centres. These sources must be interpreted according to their coverage and reference periods. Census data from 2011 and NFHS-5 data from 2019–2021 do not represent a current household-level assessment of tribal digital access in 2026. Moreover, state-level internet-use figures cannot be treated as tribal-specific estimates.

4. Literature Review

- **Warschauer (2003) — Technology and Social Inclusion: Rethinking the Digital Divide** Warschauer examines the relationship between information technology and social inequality. He challenges the assumption that providing computers and internet connections automatically creates meaningful digital participation. The book emphasises literacy, social resources, institutional support, and the ability to use technology for practical purposes. Its framework is relevant to Karnataka because tribal households may possess limited or shared access to devices without having the skills needed to navigate government platforms. The study draws on Warschauer's argument to distinguish basic connectivity from meaningful access to public services.
- **Sen (1999) — Development as Freedom** Sen conceptualises development as the expansion of people's substantive freedoms and capabilities. Poverty, exclusion, limited education, and inadequate access to institutions restrict individuals' ability to make meaningful choices. Although the book does not focus specifically on digital governance, its capability approach provides a useful framework for understanding digital exclusion. A public service cannot be considered fully accessible if citizens lack the practical resources to use it. This perspective supports the argument that digital governance must expand people's ability to obtain welfare entitlements independently and effectively.
- **Heeks (2006) — Implementing and Managing eGovernment: An International Text** Heeks examines the organisational and institutional dimensions of electronic government. His work highlights the importance of aligning information systems with administrative realities, organisational capacity, and users' needs. Digital platforms can fail to deliver expected benefits when their design does not correspond to the conditions in which people use them. This insight is relevant to rural Karnataka, where digital service delivery must account for connectivity constraints, documentation requirements, language diversity, and the availability of local assistance. The book helps frame digital exclusion as an institutional problem rather than simply an individual inability to use technology.
- **Castells (2010) — The Rise of the Network Society (Second Edition)** Castells analyses the growing significance of information networks in economic, social, and institutional life. His work explains how participation in networked systems influences access to opportunities and resources. For marginalised communities, exclusion from digital networks can deepen existing disadvantages in education, employment, communication, and public administration. The framework helps situate Karnataka's digital-governance initiatives within broader transformations in society. It also encourages attention to how geographical isolation and unequal access to information affect participation in network-based public services.
- **van Dijk (2020) — The Digital Divide** Van Dijk provides a comprehensive account of digital inequality, examining access to technology, motivation, material resources, skills, patterns of use, and resulting benefits. His approach is especially relevant because it recognises that digital inequality extends beyond internet availability. Individuals may have a mobile phone yet lack the confidence, knowledge, affordability, or institutional support required to use government services. This framework informs the present study's proposed investigation of device ownership, digital literacy, service accessibility, and user experiences among Scheduled Tribes and other marginalised groups in Karnataka.

5. Research Gap

Existing literature explains digital inequality through access, skills, social capabilities, and institutional arrangements. However, state-level internet indicators cannot establish how Scheduled Tribe households in Karnataka experience digital public services. Further district-level and household-level research is needed to examine independent service use, gender differences, intermediary dependence, application failures, and barriers affecting the successful receipt of welfare entitlements.

6. Research Objectives and Methodology

6.1 Objectives

- To examine digital access among Scheduled Tribes and other marginalised communities in Karnataka.
- To identify infrastructural, educational, economic, linguistic, and administrative barriers to digital public services.
- To assess the relationship between digital literacy and independent service usage.
- To investigate the role of Common Service Centres and other intermediaries.
- To suggest measures for equitable and accountable digital governance.

6.2 Research methodology

The study adopts a mixed-method research design combining secondary statistical analysis with proposed primary fieldwork. Secondary data include Census of India 2011, NFHS-5, government publications, policy documents, and scholarly literature. Primary data should be collected through a structured household questionnaire, supplemented by interviews with community members, Common Service Centre operators, local officials, and frontline workers.

A stratified sampling approach may include households from selected districts representing different geographical and socioeconomic conditions. The sample should distinguish Scheduled Tribe households from other marginalised groups, while accounting for gender, age, educational attainment, disability, and rural–urban residence where relevant.

For the tables below, the first two present published secondary indicators. The remaining three are primary-data collection and analysis templates. Their numerical entries must be completed from actual fieldwork before the article is presented as a completed empirical study.

7. Data Analysis, Tables and Interpretation

Table 1. Scheduled Tribe Population in Karnataka, 2011

Indicator	Statistical detail
Scheduled Tribe population	Approximately 42.5 lakh
Total state population	Approximately 6.11 crore
Scheduled Tribe share of population	Approximately 6.95%
Statistical reference year	2011
Official data source	Census of India, Table A-11

Source: Office of the Registrar General & Census Commissioner, India, Census 2011, State Primary Census Abstract for Individual Scheduled Tribes, Karnataka.

Scheduled Tribes constitute a significant population group in Karnataka, and their access to public services has implications for the state's wider social inclusion agenda. However, demographic size alone does not indicate the level of digital exclusion. District-level differences, settlement patterns, household income, education, and infrastructure must be examined to understand actual access. The Census provides a demographic baseline, but a separate survey is necessary to measure current digital access and service-use outcomes.

Table 2. Internet Use among Adults Aged 15–49 in Karnataka

Indicator	Women	Men
Ever used the internet	35.0%	62.0%
Gender gap	—	27 percentage points
Survey period	2019–2021	2019–2021

Source: National Family Health Survey-5, Karnataka, 2019–2021. Figures reproduced in the NFHS-5 state indicators compilation.

The data indicate a substantial gender gap in reported internet use among adults aged 15–49. The difference is relevant to digital public service delivery because women may depend on family members or intermediaries to access online applications, information, and transactions. Nevertheless, these figures cover the general population in the specified age group; they must not be interpreted as the internet-use rates of Scheduled Tribe women and men. The survey also measures whether respondents have ever used the internet, not whether they can independently access government services.

Table 3. Household Digital Access and Infrastructure among 100 Sample Households in Karnataka

Indicator	Number of households	Percentage
Household has a usable smartphone	72	72%
Household does not have a usable smartphone	28	28%
Respondent personally owns a digital device	58	58%
Respondent does not personally own a digital device	42	42%
Household has reliable internet access	55	55%
Household lacks reliable internet access	45	45%
Household has reliable electricity for digital use	81	81%
Household lacks reliable electricity for digital use	19	19%
Household has practical access to a nearby CSC or equivalent service centre	63	63%
Household lacks practical access to a nearby service centre	37	37%

Source: household survey of 100 Scheduled Tribe and marginalised households in Karnataka.

The illustrative results suggest that household smartphone access (72%) exceeds individual device ownership (58%), indicating that some respondents may depend on shared devices. Reliable internet access is reported by 55% of households, while 45% experience connectivity limitations. Although 81% report reliable electricity for digital use, electricity access alone does not guarantee effective internet connectivity. Similarly, 37% of households lack practical access to a nearby Common Service Centre or equivalent facility, potentially increasing the time and cost involved in accessing online public services. These figures illustrate how infrastructure, affordability, and personal device ownership can influence digital inclusion. Actual field data are necessary to establish the extent of these challenges among Scheduled Tribe and other marginalised communities.

Table 4. Access to Digital Public Services among 100 Sample Respondents in Karnataka

Public service	Respondents who accessed the service digitally	Respondents who completed the process successfully	Percentage with successful completion
Scholarships and educational benefits	40	32	32%
Pensions and social security	35	28	28%
Caste, income, and other certificates	60	48	48%
Healthcare services	30	24	24%
Banking and DBT-related services	65	52	52%

Source: survey of 100 Scheduled Tribe and marginalised respondents in Karnataka.

The illustrative results indicate that banking and Direct Benefit Transfer (DBT)-related services have the highest successful completion rate (52%), followed by caste, income, and other certificates (48%). Healthcare services show the lowest successful completion rate (24%), while scholarship and pension services record completion rates of 32% and 28%, respectively.

The difference between digital access and successful completion suggests that initiating an online application does not necessarily guarantee that the intended service is received. Documentation requirements, connectivity problems, authentication failures, limited digital literacy, and difficulties in tracking applications may contribute to incomplete processes. These possible explanations require verification through actual respondent interviews.

8. Major Findings and Analytical Discussion

The following findings represent conclusions supported by the secondary indicators and established digital-divide literature. They are not presented as measured outcomes from a completed Karnataka household survey.

8.1 Digital access extends beyond connectivity

The first major finding is that digital inclusion should not be measured only by the availability of smartphones, internet connections, or online portals. Warschauer (2003) emphasises the importance of literacy, social resources, and meaningful use. Van Dijk (2020) similarly distinguishes between material access, skills, patterns of usage, and the benefits obtained. Applied to Karnataka, this means that an online scholarship application or pension portal may exist without being practically accessible to every eligible person. Effective inclusion requires individuals to understand instructions, retrieve documents, complete applications, track progress, and resolve problems.

8.2 Gender inequality requires specific attention

The NFHS-5 indicators show that 35% of women and 62% of men aged 15–49 in Karnataka had ever used the internet, a difference of 27 percentage points. Although this is not a tribal-specific estimate, it identifies a broader gender-related concern. Digital inclusion programmes should investigate whether women have personal access to devices, control over their use, sufficient digital skills, and the confidence to conduct transactions. In tribal and economically disadvantaged households, these issues may intersect with education, income, mobility, and household responsibilities. Fieldwork is necessary to establish how these factors operate within particular communities.

8.3 Geographical inequalities may affect service access

The distribution of infrastructure and service centres is important for households located in remote settlements. Even where mobile connectivity exists, weak signals, interruptions, travel costs, and limited access to reliable devices may make online procedures difficult. The Digital India programme identifies Common Service Centres as important access points for delivering electronic services to rural communities. However, the existence of a national service network does not establish that every tribal settlement in Karnataka has a convenient, affordable, and functional service point. District-level mapping and household-level evidence are required to assess this issue.

8.4 Digital literacy influences independent participation

A further analytical finding is that access to technology and the ability to use it are separate dimensions of inclusion. Individuals may understand basic mobile-phone functions but remain unfamiliar with online forms, password management, document uploads, application tracking, or digital grievance systems. Limited literacy and unfamiliarity with administrative terminology can increase dependence on others. Such dependence is not automatically harmful, particularly when trained service providers offer legitimate assistance. However, it may create additional costs, reduce privacy, and weaken citizens' ability to monitor their applications independently.

8.5 Language and interface design affect accessibility

Digital platforms that do not provide clear instructions in languages understood by users can create barriers even when connectivity and devices are available. Karnataka's linguistic diversity makes multilingual access, simple terminology, readable instructions, and accessible help facilities important considerations. For some tribal communities, locally understandable explanations may be necessary in addition to standard-language interfaces. The study should examine whether respondents understand eligibility conditions, document requirements, error messages, and grievance procedures. Language-related exclusion must be established through field evidence rather than assumed to affect every tribal household in the same way.

8.6 Authentication and documentation can interrupt service delivery

Digital public services frequently require identity verification, accurate records, and supporting documents. When details do not match across records, documents are unavailable, or authentication repeatedly fails, applicants may experience delays. These difficulties become especially consequential when applications concern pensions, scholarships, healthcare, or other essential benefits. Digital systems can improve transparency, but their effectiveness depends on procedures for correcting errors and assisting citizens who cannot complete automated steps. The study should record both the type of failure and the eventual outcome rather than treating every unsuccessful attempt as a permanent denial of benefits.

8.7 Intermediaries can provide access but may also create dependence

Common Service Centres and other assisted-service providers can help citizens complete applications, obtain certificates, and navigate unfamiliar platforms. Such support can reduce the burden on individuals who lack digital skills or suitable devices. Nevertheless, dependence on intermediaries may create difficulties when fees are unclear, receipts are not provided, or applicants cannot independently check application status. The policy objective should not be to eliminate assisted access but to combine it with transparent charges, reliable receipts, data privacy, and opportunities for citizens to develop independent digital skills.

8.8 Digital inclusion requires outcome-based evaluation

The final finding is that the number of portals, registrations, service centres, or submitted applications cannot independently demonstrate inclusive governance. Evaluation must consider whether eligible citizens can access services, complete procedures, obtain benefits, and resolve complaints. It should also examine differences across gender, age, community, disability, and geographical location. This approach connects digital administration with substantive social inclusion and accountability, rather than equating technological expansion with successful public service delivery.

Overall, the available evidence establishes the relevance of gender-sensitive and socially grounded digital inclusion policies. The extent of tribal-specific disadvantage, however, remains an empirical

question that the proposed primary survey must answer.

9. Suggestions for Improving Digital Inclusion

9.1 Strengthen last-mile digital infrastructure

The Karnataka government should prioritise reliable internet connectivity, electricity, and affordable digital access in remote tribal settlements. Infrastructure planning should identify underserved villages and settlements through district-level mapping. Public institutions, gram panchayats, schools, and community centres can provide accessible locations for digital services. Performance assessments should examine network reliability and actual usability rather than merely recording infrastructure installation.

9.2 Establish community-based digital literacy programmes

Digital literacy programmes should focus on practical tasks, including completing online applications, uploading documents, checking scholarship status, accessing pension information, using digital banking services, and submitting grievances. Training should be delivered through local-language demonstrations and repeated hands-on practice. Tribal youth, trained community volunteers, teachers, and local service operators can support these programmes. Particular attention should be given to women, elderly people, and first-generation digital users.

9.3 Expand accessible and multilingual public service platforms

Government portals should provide clear instructions in Kannada and other relevant languages, with simplified forms, readable text, accessible design, and mobile-friendly interfaces. Where appropriate, local-language audio guidance and assisted application facilities should supplement written instructions. Application errors should be explained in understandable terms, and citizens should receive clear information about missing documents, eligibility requirements, and subsequent steps.

9.4 Strengthen Common Service Centres

Common Service Centres should function as reliable, accountable, and affordable access points. Authorities should monitor opening hours, service availability, displayed charges, receipt issuance, application tracking, and complaint resolution. Centres serving remote settlements should receive appropriate training and technical support. Citizens should be able to distinguish official government charges from legitimate assistance fees and report overcharging or misconduct without fear of losing access to services.

9.5 Introduce effective grievance redressal mechanisms

Digital public service systems should provide accessible complaint mechanisms for authentication failures, delayed applications, rejected claims, and unsuccessful benefit transactions. Citizens should receive acknowledgement numbers and information about resolution timelines. Offline complaint channels and in-person assistance must remain available for individuals unable to use online grievance systems. Repeated failures should trigger administrative review rather than leaving citizens to make repeated applications.

9.6 Protect privacy and strengthen digital security

Digital literacy initiatives should teach citizens how to identify fraudulent messages, protect passwords and one-time passwords, recognise suspicious payment requests, and report cybercrime. Service operators should follow appropriate privacy and data-protection practices. Personal information should not be collected or retained beyond legitimate requirements, and citizens should understand why their documents and identity details are being requested.

9.7 Monitor inclusion through measurable outcomes

The state should develop district-level digital inclusion indicators covering device access, internet reliability, independent service usage, application completion, benefit receipt, and grievance resolution. Data should be disaggregated by Scheduled Tribe status, gender, age, disability, and rural–urban residence where feasible and lawful. Periodic household surveys and community consultations should complement administrative records.

9.8 Maintain assisted and offline alternatives

Essential public services should not become inaccessible simply because a person lacks a

smartphone, connectivity, digital literacy, or successful authentication. Assisted applications, physical facilitation centres, and appropriate offline alternatives should remain available. This approach would allow digitalisation to improve administrative efficiency without transferring the burden of technological limitations entirely to vulnerable citizens.

10. Conclusion

Digital governance offers important opportunities to improve the accessibility, transparency, and efficiency of public services in Karnataka. Online platforms can reduce travel, simplify documentation, improve application tracking, and connect citizens with welfare programmes. However, these benefits depend on whether individuals possess the resources, skills, and institutional support required to use digital services effectively. For Scheduled Tribes and other marginalised communities, digital inclusion must therefore be understood as a question of social equity and administrative accessibility, rather than simply technological expansion.

The available secondary evidence illustrates the importance of this issue. Karnataka's 2011 Census provides a demographic baseline for its Scheduled Tribe population, while NFHS-5 identifies a substantial gender difference in reported internet use among adults aged 15–49. These indicators establish the need for further investigation, but they do not independently demonstrate the current extent of digital exclusion among tribal households. Reliable conclusions about community-specific barriers require contemporary household surveys and appropriately disaggregated administrative data.

The proposed research framework addresses this limitation by examining infrastructure, device ownership, digital literacy, language, service-centre accessibility, authentication difficulties, and the successful receipt of public benefits. It also recognises that intermediaries can enable access while creating potential concerns about affordability, privacy, and independent participation.

An inclusive digital governance strategy should combine infrastructure development with community-based training, multilingual platforms, accountable service centres, transparent grievance mechanisms, and appropriate offline alternatives. Government departments must evaluate not only how many services are available online but also whether eligible citizens can use them successfully and obtain the benefits to which they are entitled.

Ultimately, digital inclusion should strengthen citizens' capabilities, autonomy, and participation in public administration. By placing disadvantaged communities at the centre of policy design and evaluation, Karnataka can make digital transformation more equitable, responsive, and consistent with the principles of social justice.

References

1. Castells, M. (2010). *The rise of the network society* (2nd ed., with a new preface). Wiley-Blackwell.
2. Government of India, Ministry of Electronics and Information Technology. (n.d.). Digital India: Digital infrastructure and ecosystem. <https://www.digitalindia.gov.in/di-ecosystem/>
3. Heeks, R. (2006). *Implementing and managing eGovernment: An international text*. SAGE Publications.
4. International Institute for Population Sciences, & ICF. (2021). National Family Health Survey (NFHS-5), 2019–21: India. Ministry of Health and Family Welfare, Government of India. <https://dhsprogram.com/pubs/pdf/FR375/FR375.pdf>
5. Office of the Registrar General & Census Commissioner, India. (2011). Census of India 2011: Primary census abstract for individual Scheduled Tribes, Karnataka. Ministry of Home Affairs, Government of India. <https://censusindia.gov.in/nada/index.php/catalog/42968>
6. Office of the Registrar General & Census Commissioner, India. (2011). Census of India 2011: District-wise Scheduled Tribe population, Karnataka. Ministry of Home Affairs, Government of India. <https://censusindia.gov.in/nada/index.php/catalog/43028>
7. Sen, A. (1999). *Development as freedom*. Alfred A. Knopf.

8. van Dijk, J. (2020). The digital divide. Polity Press.
9. Warschauer, M. (2003). Technology and social inclusion: Rethinking the digital divide. MIT Press. <https://doi.org/10.7551/mitpress/6699.001.0001>