

Who Gets Counted in the Digital State? A Sociological Review of Digital Inclusion in Census Systems

Baishakhi Nayak

Department of Sociology, Regional Centre, Bhubaneswar, Indira Gandhi National Open University, India.

*Corresponding author email ID: baishakhinayak7377@gmail.com

ARTICLE INFO

Article History:

Received: 17 April 2026

Accepted: 24 June 2026

Keywords:

Census Systems

Digital Inclusion

Digital Inequality

Digital State

State Legibility

ABSTRACT

Rapid digitisation is transforming census operations, enhancing speed and efficiency through digital self-enumeration, app-based field collection, administrative records, and linked databases. However, this shift also redistributes participation burdens and risks. This review uses a sociological lens to examine digital inclusion in census systems, identifying who is most likely to be counted, miscounted, or made administratively invisible as these infrastructures become increasingly digital. Drawing on various academic fields, the review argues that census inclusion relies not only on connectivity but also on digital capability, trust, language, gender, social position, disability, migration status, mediation, and bureaucratic recognition. While hybrid census systems can reduce nonresponse, they also raise concerns about representational accuracy, privacy, and unequal administrative traceability. These issues are particularly relevant for India's Census 2027, which combines nationwide digital operations and self-enumeration with significant regional and social inequalities in digital access and use. The article proposes a five-dimensional sociological framework that connects material access, functional capability, institutional trust, mediating support, and bureaucratic recognition to outcomes ranging from equitable inclusion to omission. It concludes that digital census modernisation improves population statistics most effectively when digital tools are integrated with robust field enumeration, accessible multilingual design, credible privacy safeguards, and targeted strategies for at-risk populations.

1. INTRODUCTION

Censuses have long been among the most important technologies of the modern state. They are not merely statistical exercises; they are institutional mechanisms through which populations become administratively visible, governable, and comparable. In classical and contemporary social theory, counting is tied to state capacity, legibility, welfare allocation,

territorial administration, and political representation. The transition from paper-based census operations to digital census systems, therefore, marks more than a technical modernisation. It changes the infrastructures through which states recognise persons, households, mobility, dwelling conditions, and social categories. As a result, questions of digital inclusion are now central to census sociology.

<https://doi.org/10.66132/mr2105>

© 2026 The Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CC BY 4.0).

Next Gen Multidisciplinary Research, 2(1), 2026

A large interdisciplinary literature has established that digital inequality is not reducible to whether people are connected to the internet. Rather, digital inequalities are layered across physical access, quality of access, affordability, skills, support networks, autonomy of use, trust, and the capacity to convert digital access into meaningful outcomes (DiMaggio et al., 2004; Helsper, 2012; van Deursen & van Dijk, 2011; van Deursen et al., 2017). This insight matters directly for contemporary census systems. When census participation involves online self-

enumeration, device-mediated field collection, digital verification, administrative linking, or app-based monitoring, digital exclusion can translate into statistical invisibility. Even where door-to-door enumeration remains in place, digital-first infrastructures may alter how omissions arise, how enumerators prioritise households, and how populations with weak documentation or weak technological familiarity are represented in the final statistical product.

Table 1. Empirical snapshots from the literature on digital inclusion and census systems

Study	Setting/data	Key quantitative detail	Why it matters for this review
Bycroft & Matheson-Dunning (2020)	New Zealand 2018 Census	The final dataset comprised 89% direct census responses and 11% admin enumerations.	Shows that digital-administrative supplementation can reduce nonresponse, but also shifts inclusion from direct contact to record-based reconstruction.
Graves et al. (2021)	283 Washington State school districts (91.0% response); 172 rural and 96 urban districts	Adequate access to internet-enabled devices averaged 80.0% in rural districts versus 90.1% in urban districts; reliable broadband access averaged 67.5% versus 84.2%.	Illustrates the size of infrastructure gaps that can shape participation in any digital-first state system.
Asrani (2022)	Nationally representative Indian household data	Income, education, and household demographics strongly predicted ICT adoption, while education, age, and gender strongly classified ICT-use capability.	Shows that digital inclusion in India is socially stratified even before census-specific barriers are taken into account.
Laskar (2023)	Assam fieldwork: villages, under-resourced urban areas, and affluent urban neighbourhoods	The study used 80 interviews, as well as case studies and participant observation.	Useful qualitative evidence that the digital divide in India is visible within cities as well as between rural and urban areas.
Arora & Sapre (2026)	18 Indian states; separate rural and urban Digital Infrastructure and Digital Skills indices	Constructed separate rural and urban Digital Infrastructure and Digital Skills indices across 18 Indian states.	Shows that national digital progress can mask substantial subnational and rural-urban inequalities in readiness.
Jain & Kaur (2023)	Forthcoming Census of India	Reviewed the planned application of digital census technologies in India, including mobile and geospatial tools.	Provides pre-implementation context for India's transition toward digitally enabled census operations.
PIB (2026a)	Official Census 2027 operational release	Self-enumeration scheduled for 1–15 April 2026 in the initial jurisdictions; secure web facility in 16 languages; more than 3 million census officials involved nationally.	Confirms that self-enumeration and app-based collection are operational components of Census 2027.
Singer et al. (2003); Johnson (2021)	Census participation and undercount literature	Privacy and perceived harm predicted lower census participation; undercount among children of immigrant families varied widely across U.S. states.	Supports the claim that trust and household vulnerability remain central determinants of who is counted.

Recent work on census transformation shows that many countries are moving toward hybrid models that combine direct enumeration, administrative records, and digital data management to reduce cost and improve timeliness (Bycroft & Matheson-Dunning, 2020; Abbott et al., 2020; Bernardini et al., 2022; Brown & Chipperfield, 2025). At the same time, the sociological literature on omission, state recognition, and administrative exclusion warns that counting practices are never socially neutral. Inclusion depends on whether populations are reachable, classifiable, trustworthy in the eyes of authorities, and legible within prevailing bureaucratic categories (Cheong, 2023, 2025; Soifer, 2017). This is why the question “who gets counted?” remains analytically before the question “how is counting made more efficient?”

The Indian case makes these tensions especially visible. India’s Census 2027 is officially described as the country’s first digital census, with a secure self-enumeration facility, smartphone-based field collection, multilingual interfaces, and app-supported management of field operations (Press Information Bureau [PIB], 2026a, 2026b; Jain & Kaur, 2023). Official information issued in March 2026 states that the exercise will involve more than 3 million enumerators, supervisors, and other officials and that self-enumeration is available in 16 languages (PIB, 2026a). The Union Government has approved an estimated expenditure of Rs. 11,718.24 crore for Census 2027 (PIB, 2026a). Yet India also exhibits deep inequalities in digital access and use across income, education, gender, age, geography, disability, and institutional location. Studies of the Indian digital divide show that these inequalities remain substantial and vary markedly across states and between rural and urban populations (Asrani, 2020, 2022; Laskar, 2023; Arora & Sapre, 2026). If these divides are not treated as census problems, digital innovation may relocate exclusion from the doorstep to the platform, device, or back-end data system.

This review, therefore, examines digital inclusion in census systems as a sociological issue rather than a narrow operational issue. It synthesises literature on digital inequality, digital state capacity, census modernisation, undercount and privacy, and India-specific patterns of digital exclusion. The central argument is that digital census inclusion depends on the interaction of infrastructure, skills, trust, mediation, and institutional recognition. A digital census can expand participation and improve quality, but only if it is designed around the social conditions under which marginalised populations encounter the state.

2. REVIEW SCOPE AND ANALYTICAL APPROACH

This article is a critical narrative review, and not a systematic review or meta-analysis. The literature was analysed first by six intersecting areas of scholarship: digital inequality; digital government and administrative inclusion; state legibility and omission; census transformation and administrative data use; census participation, undercount, and privacy; and empirical research on digital inequality in India. Peer-reviewed research, published scholarly books and book chapters, and official Census 27 releases (only when operational facts were needed) were prioritised. The cases from abroad are treated comparatively to identify potential mechanisms pertinent to digitally mediated counting, but do not imply a one-to-one correspondence with India. The synthesis focuses on conceptual integration and policy relevance and does not attempt to include all of the census or digital divide studies.

3. FROM COUNTING POPULATIONS TO GOVERNING LEGIBILITY: THE DIGITAL STATE AS A SOCIOLOGICAL PROBLEM

The strategy for census digitisation is to view it as part of a larger picture: the digital state. Database, interfaces, mobile devices, linked records and algorithmically controlled workflows are increasingly vital to administrative systems. Such systems involve more than just face-to-face interaction, and they create visibility. It is also created via forms, identifiers, metadata, geocodes, status flags, exception logs and back-end matching processes. Internet penetration is not the only criterion for measuring digital inclusion in public administration. It also involves how people are exposed to administrative systems, how administrative systems interpret missing or conflicting information, and how administrative systems do or do not recognise certain things.

According to Soifer (2017), the core of state capacity lies in their ability to be read, wherein legibility is foundational to state capacity. Census systems are a classic mechanism for such legibility. But sociological research on omission reveals that invisibility is not necessarily a coincidence. In a state strategy of omission, persons can be denied or delayed formal recognition, as demonstrated in Cheong’s (2025) early writing and in her later work, showing how racialised and subdominant populations can be made to ‘disappear’ through bureaucratic procedures and non-enumeration. These arguments are important as they take up more than just census forms; they take

up politics of recognition in counting infrastructures (Cheong, 2025).

The need for legibility may become greater in a digital context. Self-enumeration forces users to interpret questions and navigate interfaces, and present themselves in a format the computer can handle. Administrative data systems need records that comply with data requirements. App-based enumeration requires reliable, stable device use, consistent field practices, and syncing. Digital census systems can exacerbate the existing divide between those that are easy to count and those that are hard to manage. Those who lack literacy, people with disabilities, households who only have access to devices at irregular times, migrants, informal settlers, and homeless individuals are among those who fall into the latter category.

The same view is expressed from the other side, with little additional emphasis, by digital government research. While digital public systems are frequently described in terms of efficiency, convenience and modernisation, their outcomes in terms of inclusion depend on citizens' material and cognitive capacities to use them. In a study on e-government and digital inequality, De Marco (2021) demonstrates that digital inequalities are generated in the process of digital public service delivery when interaction relies on skills and confidence that are not equally shared. This insight is a generalisation of census systems. An open and formal digital interface could also be inaccessible to most users.

The sociological implication is straightforward, suggesting digital census systems should be analysed as layered infrastructures of recognition. They link the field practices, homes, categories, digital interfaces and administrative back-end systems. Omission as a result of any layer being exclusionary. But it is important to recognise that the transition to digital counting isn't just a move from paper to screen; it's also an organisational restructuring of how states view populations, how they allocate responsibility for participation, and what absences they will attempt to fix.

4. DIGITAL INEQUALITY BEYOND ACCESS: WHY INCLUSION IS SOCIALLY STRATIFIED

The literature that took the Digital Divide field beyond the first generation of "have versus have-not" conceptualisations is the most relevant theory for this review. DiMaggio et al. (2004) maintained that there are different facets of advantage and disadvantage associated with digital inequality, such as equipment quality, freedom of use, skill, social

support, and the capacity to derive positive benefits from it. Helsper's (2012) related fields model expanded on this finding, revealing a correlation between digital exclusion and social exclusion. Digital is not a separate level from class, gender, education, age or other structures—it is just a reflection and an enhancement of them. Subsequent research by van Deursen and others has shown that the digital inequality sequence is an iterative one, as access influences the acquisition of skills, which in turn affects the use of and the users' perception of risks and benefits of digital technologies (van Deursen & van Dijk, 2011, 2017, 2019).

This is evidence of a set of issues that are directly relevant to census systems, as participation in the census is increasingly mediated by factors such as access to devices, functional literacy, familiarity with electronic interfaces, problem-solving skills, and trust in navigating formal electronic forms. Evidence of household access to a smartphone does not necessarily indicate that the household is well equipped to self-enumerate, particularly if smartphones are shared, the household has limited data plans, there is gendered access to the smartphone, or the household does not know what happens to the data when it is submitted. That is, there is no automatic linkage between "connected" and "census-included."

Furthermore, the literature reveals that digital inequality is cumulative, meaning that disadvantages encountered at one level become disadvantages at the next (van Deursen et al., 2017). This is important for census systems because participation in the census is frequently one-stage visible but multi-stage. A household has to be aware of the process, understand why it is important, access the interface or meet the enumerator, understand questions, trust the system and correct any discrepancies or errors. At each of these points, barriers can impede inclusion. This leads not only to non-response but also to inadequate, selective, or indirect responses, or to reliance on intermediaries who may introduce their own biases.

Recent research has helped to advance the field of "adverse digital incorporation." It is not only about who is left out, but also about how people are included on unequal terms, as Heeks (2022) questions in the global South. This can be very helpful for comprehending digital census infrastructures. A digital state can be included in subordinate ways: through intermediation by local operators, under highly asymmetric information conditions, or through forced interfaces that users are not fully aware of. This is a better approach than total exclusion, but not the same as a fair playing field.

Digital inequality is also considered a multifaceted issue by Kuhn et al. (2023) and requires multiple theoretical perspectives. Their synthesis highlights the interrelatedness of digital inclusion and social and institutional organisation. In terms of census research, this translates into an understanding of participation as a product of household structure, neighbourhood infrastructure, local governance, linguistic context, and bureaucratic design – as well as the individual choice. In some areas where these conditions aren't strong, a digital census could be more effective at identifying populations that are easier to identify.

Another consistent line of disadvantage is age. Older adults who do not use the internet or use it very little are not only unable to use it but also lack confidence, experience, or support, and Internet use may seem irrelevant to them (van Deursen & Helsper, 2015). In censuses, this indicates the possible presence of hidden restrictions on elderly individuals living independently, on women with limited control over devices, and on people living in households with weaker social support. This census is thus a prime example of how social inequality gets into digital systems, not merely as connectivity, but as a lived capability.

One example is New Zealand's 2018 census. Bycroft and Matheson-Dunning (2020) demonstrate that administrative records have been employed to address non-response, highlighting the potential and legal-ethical challenges of combining administrative records with the census file. The final 2018 Census data consisted of 89 per cent direct census responses and 11 per cent admin enumerations; record-based reconstruction was not an ancillary component of the final count – it was a part of it (Bycroft & Matheson-Dunning, 2020). Such techniques, in principle, can minimise omission. In practice, they also raise questions about the accuracy of representation, privacy concerns, and the ease of reconstructing specific populations from available records. Administrative data is not a socially complete entity, but rather a product of previous contact with institutions. Some groups, such as those living in irregular housing, without legal documentation, or who are difficult to reach for services, may be less well represented in those records.

5. CENSUS TRANSFORMATION, ADMINISTRATIVE DATA, PRIVACY AND COVERAGE

Although the digital transition is a global pattern, as confirmed by the census literature, it is also experienced in different ways. The decennial model,

mostly paper questionnaires and manual processing, has increasingly been replaced by a hybrid model that integrates online responses, app-based enumeration, geospatial technologies and administrative data (MacDonald, 2020; Mrkić, 2020). The pandemic also led to a new surge in experimentation, and agencies had to consider the robustness of census processes, including administrative data and digital workflows, during disruption (Mrkić, 2021).

Abbott et al. (2020) follow this and inquire if population statistics can be generated without a traditional census or population register. In sociological terms, the volume of the analysis suggests a major shift in how population counts are conducted, with the counting of a single episode of direct contact replaced by the amalgamation of several data sources. The transformation of census and population-statistics systems is documented in comparative studies of New Zealand, the United Kingdom, Italy and Israel by Bernardini et al. (2022), and of the broader transformation of census and population-statistics systems by Brown and Chipperfield (2025). Countries are thus transitioning from a traditional enumeration approach to a more combined, administrative-data-intensive approach, with consequent implications for direct participation, nonresponse correction, and administrative visibility.

There's an extra layer of privacy literature. Singer et al (2003) found that privacy and confidentiality issues were associated with the actual return of census forms, with perceptions of risk and possible harm being negatively associated with returns. More recent studies have demonstrated that privacy-preserving statistical methods can also be problematic if they compromise the usefulness of the data or result in distrust of it (Ruggles, 2024; Muralidhar et al., 2025). Respondents in digital contexts may feel that submitting online, joining databases, and digital storage are more intrusive than the paper version, which heightens privacy concerns. That is not as important as whether it is technically correct, since that is what affects willingness to participate.

A similar analysis of participation by lifestyle segmentation was conducted by Mulry (2021), who also demonstrated that participation is not random, but socially patterned. Hard-to-survey populations differ systematically in communication channels, trust, housing, and mobility. This is a central sociological insight: census participation is a rooted behaviour determined by social position and institutional encounters. Even sophisticated imputation and coverage-adjustment techniques are not enough to ensure equitable enumeration if certain

populations are systematically more difficult to contact, classify, or re-create from the existing records.

6. DEFECTS, SAFETY, AND AUTHENTICITY

India is of great importance to this study, as it has grown into a force in its own right and is the most diverse country, with uneven infrastructure and rapidly changing digital governance. However, the literature on the digital divide in India establishes that access to and use of digital devices differ between rural and urban areas. Laskar (2023) does not consider the digital divide a techno-social issue in isolation but rather a techno-social expression of broader socioeconomic inequity in India. Importantly, his fieldwork was not impressionistic because he conducted 80 interviews in both villages and cities, carried out case studies in more under-resourced urban locations, and conducted participant observation in better-resourced urban residential locations (Laskar, 2023). This is a very useful framing for the sociology of population when studying the census, as it helps you avoid assuming that the rollout of technology will automatically spur digital participation.

Asrani gives more empirical evidence. Asrani (2020, 2022) demonstrates, using nationally representative household data, that there is a strong relationship between the adoption of household ICTs in India and household income, education, and demographic composition, and that basic ICT-use capabilities are strongly associated with education, age, and gender. In real life, a digital census interface can feel like the universal solution, but it can be more user-friendly for younger, wealthier, more educated and male citizens. Reducing costs and improving connectivity remain a constant and vital need, as highlighted in the same research. If a census process offers self-enumeration, these structural disparities become an explicit factor that can affect who can self-enumerate on the platform without outside help.

Regional differences are of significance as well. Arora and Sapre (2026) first create two Digital Infrastructure Index (DII) and Digital Skills Index (DSI) scores for rural and urban populations across 18 Indian states, and then demonstrate that the growth story of 'Digital India' is not level one for all. The difference is not only that there is a difference, but that policy attention needs to be significantly increased for low-income states and rural populations. The implications of this for planning the census are clear. The same digital strategy can have very different inclusion impacts across regions, as these four factors—network quality, device penetration, literacy, and institutional support—vary by region. India's

census machine should then be able to examine digital inclusion not just as an average issue for the country, but as a multi-layered issue in various regions.

These concerns are echoed in rural technology adoption studies. Research on digital uptake in rural India has highlighted age, education, occupation, language, and digital literacy as factors affecting the ability to make digital technologies available and meaningful (Sindakis et al., 2024). In the context of a census, a self-enumeration portal can't be seen as just an auxiliary feature. It becomes a pathway of participation, with a degree of usability determined by rural infrastructure and social mediation. The data from outside India are illustrative here: In their study of 283 public school districts across the country, Graves et al. (2021) reported that the average rate of having sufficient devices was 80.0 per cent in rural districts, compared with 90.1 per cent in urban districts. The average rate of having reliable broadband was 67.5 per cent in rural districts versus 84.2 per cent in urban districts. While the data do not apply to India, it is clear that participation gaps can be huge, even in a high-capacity administrative setting. If any such differences are observed, they can be considered a warning sign given India's large population and significant census inequality.

Things get complicated with gender and social hierarchy, too. The research by Nayak and Alam (2022) on the educational and gender aspects of digital exclusion among tribal youth in rural Jharkhand reveals the possibility of digital exclusion intersecting with education and gender, and being associated with a historically marginalised social position. Banerjee et al. (2024), regarding meaningful connectivity and women's digital literacy in West Bengal, also reach the same conclusion: nominal connectivity alone is not sufficient to constitute good digital inclusion. Census systems that rely on the assumption of individual autonomy with the device, or on confidence in use, time to use, or autonomy of use, risk failing to capture the actual persons in the household who can participate without support.

Notably, public-service access is also part of the digital divide in India. Studies on the use of ICT in India reveal that citizens' digital skills shape their experiences of governance and service delivery, particularly in education, welfare, and information systems (Asrani, 2022). This means that people do not take the census in isolation. People already marginalised in governance processes will encounter similar issues in digital census processes. The census is thus not a stand-alone phenomenon, but a part of the broader institutional networks.

The coming into effect of the new census in India is important, in part because of its ambition to be digital and in part because of its layered social inequalities. According to official releases, Census 2027 is the first digital census in the country and the first to provide self-enumeration to respondents in the initial rollout. They can use a secure web facility in 16 languages, and enumerators will collect data via the mobile application (PIB, 2026a, 2026b). It is expected

that over 3 million enumerators, supervisors, and other officials will participate throughout the country (PIB, 2026a). The features can be beneficial for timeliness, minimise transcription errors, and facilitate operational monitoring; however, their impact is contingent on how digital tools are implemented alongside field enumeration and support.

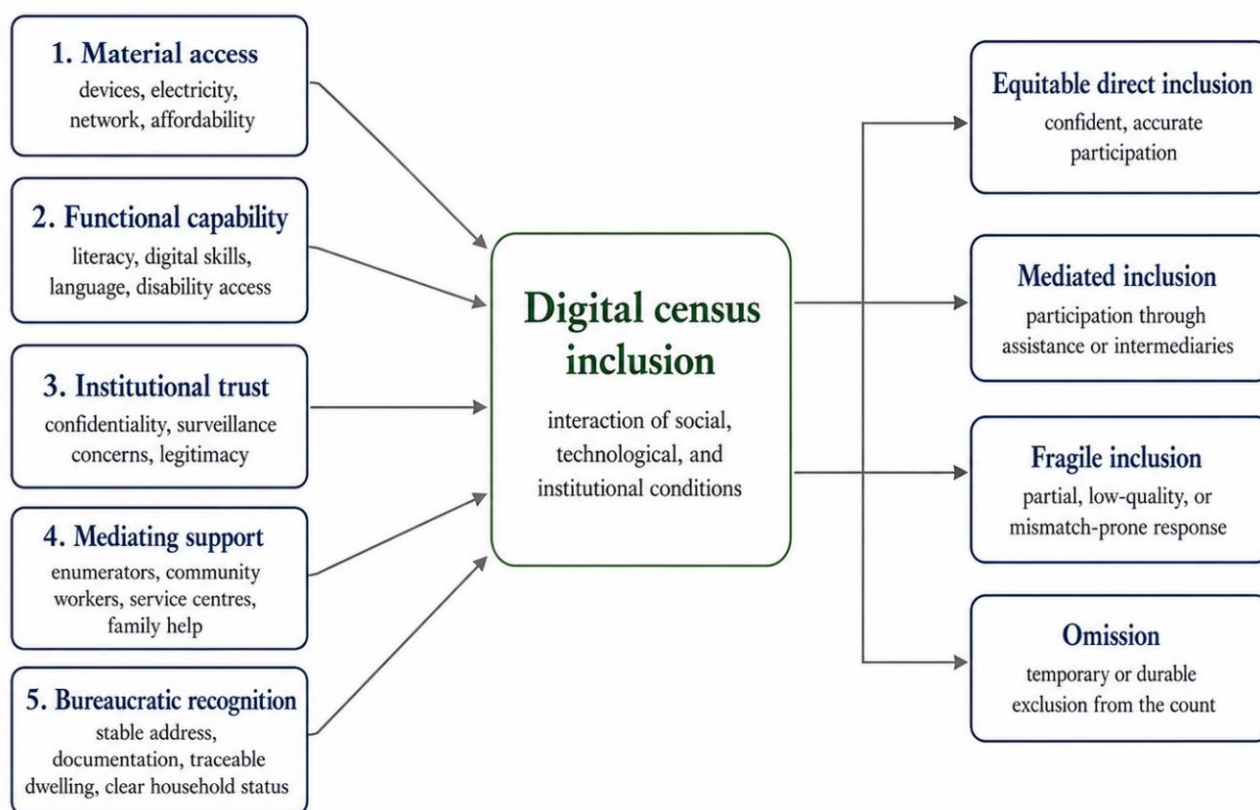


Figure 1. A sociological framework of digital census inclusion.

7. INDIA'S DIGITAL CENSUS TRANSITION: OPPORTUNITIES AND SOCIOLOGICAL RISKS

But the sociological issue is whether there is a level playing field for operational efficiency. An example is shifting some of the participation burden to households through digital self-enumeration. This could speed up the process for highly connected households, but could be detrimental for households with low literacy levels, precarious housing, intermittent connectivity, and low confidence in formal digital systems. In 2026, official guidance recommended that, in selected jurisdictions, self-enumeration be implemented within 15 days before door-to-door houselisting began, creating a real – not symbolic – “alternative” to the door-to-door approach (PIB, 2026a). What is at stake, then, is not the existence of (or absence of) enumerators, but whether households with digital advantages will be able to

navigate their way through the census process more easily, or whether the outcome will be households with different advantages who will navigate the process more easily, and households without such advantages who will have to navigate the process more slowly, with more errors, or through an alternative path.

These are no minor benefits. Digital maps can aid in more systematic identification of structures; field operations can be recorded via an application, reducing transcription issues; and supervisors can be alerted to coverage gaps more quickly during monitored field operations. What India needs are tools that can greatly enhance operational control for a nation of its size. Such possibilities are highlighted by Jain and Kaur (2023), who suggest that the census, as a whole, could be quicker, more efficient, and more accurate through the use of digital methods. It would be a lazy analytical exercise not to recognise these advances.

One risk is that of unequal participation. Digital self-enumeration takes some of the burden of counting from enumerators to households. The transition might be beneficial for home groups or communities with high levels of literacy, strong connections to technology, high trust in data systems, and familiarity with the census process. However, it might not be as effective for communities with low levels of trust, literacy, census awareness, and connection to technology. While self-enumeration is clearly an additional facility and door-to-door enumeration is still ongoing (PIB, 2026b), online participation should be strongly promoted. However, there is a risk of an implicit hierarchy of modes if the primary mode is seen as the primary mode. Assisted and field-based enumeration are thus fully valid ways of being counted, and this needs to be communicated.

The second risk concerns understanding the interface. While being available in multiple languages is crucial, being able to hear or read a language is not enough to address literacy or disability access needs or to make official categories comprehensible. Administrative differences in census questions may

be apparent to the state but not to respondents. If an individual who cannot be trained as an enumerator is asked one of these types of questions, the quality of the responses may be affected. This is particularly true when household members share devices, when older people need assistance from younger household members to fill in forms, and when women can participate through male household heads.

A third risk concerns trust. Public trust in the use and protection of census data is a key determinant of census participation. Privacy concerns have always been a factor in response behaviour (Singer et al., 2003), and such concerns can be magnified when data collection is conducted digitally, if subjects believe that databases could be linked, that they are being monitored, or that access is not limited. Hence, the Population Foundation of India (PFI, 2026) has called for an inclusive and safe method of conducting the digital census in India. The rhetoric is not campaign rhetoric; it's a sociological truth. Trust is an 'inclusionary condition'. Digital architecture can reduce participation or information, or lead to strategic infographics when trust is low.

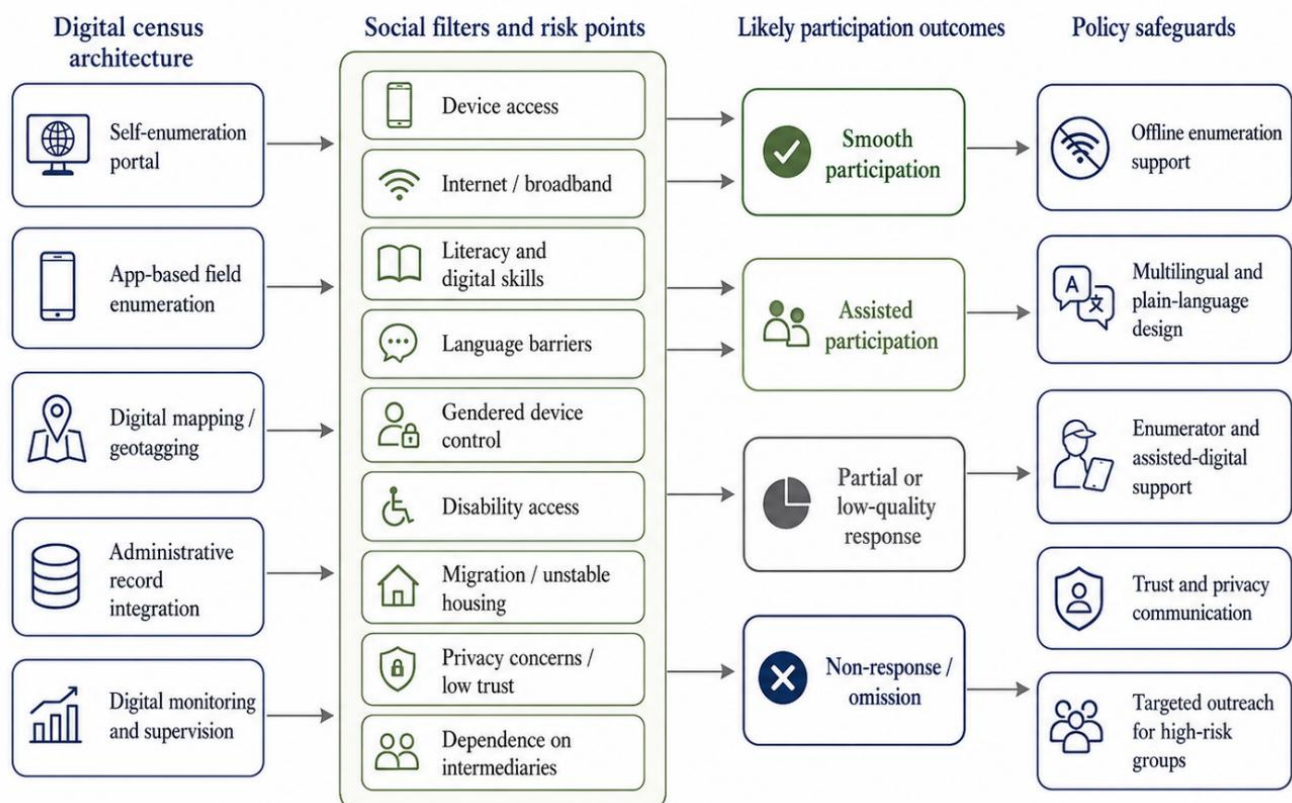


Figure 2. Pathways and exclusion risks in digital census systems.

A fourth concerns differential administrative traceability. In addition to providing direct responses, most hybrid digital census systems utilise auxiliary data, digital maps, and related administrative

processes. This can help reduce nonresponse rates for some populations, but it can also benefit well-documented, settled populations. Informal settlements, persons with circular migration, persons

with no stable address, and the homeless are difficult to count and measure, as it is not always clear who they are and how they connect with formal administrative structures. Households that are stable and dwellings that are traceable may continue to be at risk of omission in digital systems built on a stable household unit.

Last, but not least, there are intermediaries. In reality, digital inclusion in India relies on intermediaries (brokers), frontline workers, or a family member or partner who is digitally capable. This is evident across various e-governance scenarios and will likely significantly impact participation in the next census. It's not straight-down-the-middle bad practice if a child or young person participates in some way between full-time school and full-time university; in fact, it could be essential for their inclusion. It should, however, be acknowledged as a different form of involvement, one that carries its own dangers: a lack of privacy, reliance on others' interpretations, and a lack of uniformity in support services. Social science research on digital census systems, however, should not only examine the availability of a portal but also the direct users of a portal, those who use it via third parties, and those who are excluded from the peripheries of field enumeration.

8. ADVANTAGES, LIMITATIONS, AND PROSPECTS

From the literature above, it is inferred that the inclusion of digital census can be perceived in five (5) dimensions that interact with each other, namely material access, functional ability, institutional trust, mediating support and bureaucratic recognition.

The first dimension, material access, is defined by devices, access to electricity, network quality, cost, and physical reach. This is a first-level digital inequality, but it needs to be perceived in a broad sense rather than a narrow one. Households with a mobile telephone do not necessarily have individual phones. Households may not be able to affordably utilise self-enumeration due to the environment (shared), data plan (intermittent) or network stability (poor).

The next functional capability encompasses the ability to read and write, computer skills, confidence with computer interfaces, language understanding, disability access, and computer formal forms. This is where research on the second-level digital divide is needed. Census systems are 'process-centric' in that they involve the respondent/enumerator going through a sequence of pre-arranged

steps. As capability diminishes, errors, dependence, and abandonment grow.

The third dimension – institutional trust – refers to concerns about confidentiality, concerns about being monitored, expectations of state use, and overall political trust. Technical security is not the only way of guaranteeing participation. It depends on respondents' perceptions of the system's safety and authenticity. If trust is low, people in the household may choose not to participate digitally, may withhold information, or may opt for face-to-face communication as a more understandable option.

The fourth dimension, mediating support, involves human infrastructure that enables people to participate: enumerators, community workers, local institutions, schools, civil society groups, digital service centres, and digitally competent household members. Inclusion is more likely to happen via mediation, not autonomously. This perception enables census planners to appreciate the importance of support mechanisms as more than just ancillary components of the inclusion architecture.

The fifth dimension – bureaucratic recognition, relates to whether the persons and households are acceptable in the classificatory assumptions made in the system. Stable addresses, documented identities, and traceable dwellings and unambiguous household structures all support inclusion. Recognition is difficult when people are mobile, have irregular housing, are homeless, suffer from social stigma, and have multiple or ambiguous statuses. It is at this point that the sociology of omission is an absolute must. Some populations are not contacted not because they are unwilling to participate, but because the systems are based on more administratively legible social forms.

These dimensions interact. The migrant household may have a mobile phone, but they lack confidence and are not recognised stably. An older rural woman can have enumerator support, but has low literacy and low device autonomy. A tribal community can have a physical presence but lack the necessary linkages to electronic administrative processes. Considering these as overlapping dimensions will prevent the usual pitfall of describing inclusion in the census by a single dimension.

Thus, from this point of view, the participation in the digital census can have at least four general results. There is equitable direct inclusion, for households to participate with confidence, perhaps on their own, or supported through well-developed field processes. Secondly,

there is mediated inclusion, mediated by enumerators or local intermediaries. Third, fragile inclusion means that the household is counted but may be at high risk of being misunderstood, with only partial data recorded or an administrative mismatch. Fourthly, there is an absence, both temporary and permanent. The role of the policy is not just to increase uptake of the platform; it's to decrease direct or mediated inclusion into fragile inclusion and omission.

This review has several implications. First, it is important that digital self-enumeration in India is not presumed to be the primary option, but should be used in addition to the existing system until systematic evidence emerges that it does not exacerbate inequities in participation. As digital tools do not replace inclusive fieldwork, the safer approach to the design is to see the tools as layers of support for fieldwork, in a census that will mobilise over 3 million officials and operate amid huge regional inequalities (PIB, 2026a).

9. IMPLICATIONS FOR INDIA AND FUTURE CENSUS RESEARCH

There are several implications to be drawn from this review. The first one is that digital self-enumeration in India shouldn't be considered as an implicit norm. The online participation mode should not be presented as the better mode in public communication. Self-enumeration should go hand in hand with clear guarantees that offline enumeration is valid and fully supported.

Secondly, human support infrastructure is not a stepping stone to digital inclusion, but a permanent part of inclusion. In areas with low digital literacy awareness or low women's autonomy in device use, trusted mediating structures such as enumerators, local service centres, schools, panchayat-level institutions, and community organisations can be used. This is particularly the case for older people, people in isolated household situations, tribal populations, migrant workers and people with disabilities.

Thirdly, privacy communication needs to be considered a substantive inclusion strategy. Individuals are more open to involvement when confidentiality safeguards are comprehensible, believable and reinforced via trusted messaging systems. A lack of clear communication about technical safeguards does not build trust. Census authorities should have trust-building measures that are visible and culturally legible amidst growing public awareness of concerns surrounding data linkage and surveillance.

To reach the fourth step, provide more than just translation in many languages. With respect to accessibility, the design should be in plain language, be disability-aware, offer assistive digital solutions, and utilise question wording that minimises ambiguity for people not in formal bureaucratic settings. It is especially important in India, where literacy rates, literacy level of the script and familiarity with administrative vocabulary are extremely diverse.

Fifth, a digital inclusion lens needs to be added to the evaluation of census quality. Normal coverage evaluations are required, but not enough. Future India census operations should examine whether the three methods of self-enumeration, app-based collection, and digital monitoring have differential impacts by caste, gender, age, disability, region, settlement type, migration status, and other factors. It should also explore mediated participation – who is doing the forms, when and for what reasons, and what effects on privacy and accuracy.

Thirdly, in the research of census sociology has a more far-reaching role. Much of the methodological or administrative literature on census modernisation continues to dominate. There is a substantial body of literature on “census modernisation” that is methodological or administrative in nature. That work is invaluable, but needs to be supplemented by research on the experience of the administrative encounter: how individuals interpret digital census requests, how census takers cope with interface limitations, how trust is established, and how omissions are felt. The census provides a unique case for examining digital governance in India, where the rapid expansion of technology has occurred in the fields of welfare and public administration, and where the concepts of universality, classification, and state authority are merged.

10. CONCLUSIONS

Transitions to digital census systems present a new, important area of sociological study. Counting is no longer just about questionnaires, tabulation and coverage adjustments. It's also a question of interfaces, platforms, records of linkage, digital mapping and mediated participation. This review has emphasised that digital inclusion in census systems is much more than access to technology. Material resources, skills, trust, support and bureaucracy influence it. The major findings of this literature review are two. First, the transformation of census operations to a digital mode can increase the operational efficiency, enhance nonresponse management, and ensure the timely availability of population statistics. Hybrid and

digitally managed systems have real benefits, and paper isn't necessarily the inclusive mode it is often made out to be. Secondly, those benefits are dependent on social factors. Census modernisation can magnify inequalities if income, education, gender, age, geography, disability, migration, and institutional contact drive them. The drivers of digital inequality are income, education, gender, age, geography, disability, migration, and institutional contact; unless these are explicitly accounted for in digital and field operations, census modernisation can reproduce such inequalities. In reality, in India, it is the social embedding of digital tools, rather than their mere existence, that will determine the success of the digital census. While self-enumeration, smartphone data collection in the field, and digital back-end systems can expand the envelope of inclusion, robust offline support, multilingual and accessible design, trusted communication, and targeted approaches to populations vulnerable to exclusion can help ensure these methods succeed. The sociological, rather than statistical, question then becomes: in the digital state, who is "easy to count" and who is "hard to count," and what institutional decisions make the difference?

Conflicts of Interest: The author declares no conflict of interest.

Funding: This article received no external funding.

REFERENCES

- Abbott, O., Tinsley, B., Milner, S., Taylor, A. C., & Archer, R. (2020). Population statistics without a census or register. *Statistical Journal of the IAOS*, 36(1), 97-105. <https://doi.org/10.3233/SJI-190593>
- Arora, R., & Sapre, N. (2026). Rural-urban digital divide: Evidence from Indian states. *International Journal of Finance & Economics*, 31(2), 2912-2932. <https://doi.org/10.1002/ijfe.70045>
- Asrani, C. (2020). Bridging the digital divide in India: Barriers to adoption and usage. *Indian Council for Research on International Economic Relations*.
- Asrani, C. (2022). Spanning the digital divide in India: Barriers to ICT adoption and usage. *Public Administration and Development*, 42(2), 148-161. <https://doi.org/10.1002/pa.2598>
- Banerjee, R., Trappel, J., & Van Audenhove, L. (2024). Evaluating 'meaningful connectivity': Digital literacy and women in West Bengal, India. In S. Yates & E. Carmi (Eds.), *Digital inclusion: International policy and research* (pp. 225-248). Palgrave Macmillan. https://doi.org/10.1007/978-3-031-28930-9_11
- Bernardini, A., Brown, J. J., Chipperfield, J., Bycroft, C., Chieppa, A., Cibella, N., Dunnet, G., Hawkes, M. F., Hleihel, A., Law, E. C., Ward, D., & Zhang, L.-C. (2022). Evolution of the person census and the estimation of population counts in New Zealand, United Kingdom, Italy and Israel. *Statistical Journal of the IAOS*, 38(4), 1221-1237. <https://doi.org/10.3233/SJI-220018>
- Brown, J. J., & Chipperfield, J. (2025). Census transformation and the future of population statistics. *Journal of Official Statistics*, 41(3), 873-880. <https://doi.org/10.1177/0282423X251345608>
- Bycroft, C., & Matheson-Dunning, N. (2020). Use of administrative records for non-response in the New Zealand 2018 Census. *Statistical Journal of the IAOS*, 36(1), 107-116. <https://doi.org/10.3233/SJI-190591>
- Cheong, A. R. (2023). Theorizing omission: State strategies for withholding official recognition of personhood. *Sociological Theory*, 41(4), 377-402. <https://doi.org/10.1177/07352751231206838>
- Cheong, A. R. (2025). Racial exclusion by bureaucratic omission: Non-enumeration and the state. *Social Problems*, 72(2), 341-359.
- De Marco, A. (2021). E-government and digital inequality: The Spanish case study. *Technology in Society*, 64, 101531.
- DiMaggio, P., Hargittai, E., Celeste, C., & Shafer, S. (2004). Digital inequality: From unequal access to differentiated use. In K. M. Neckerman (Ed.), *Social inequality* (pp. 355-400). Russell Sage Foundation.
- Graves, J. M., Abshire, D. A., Amiri, S., & Mackelprang, J. L. (2021). Disparities in technology and broadband internet access across rurality: Implications for health and education. *Family & Community Health*, 44(4), 257-265. <https://doi.org/10.1097/FCH.00000000000000306>
- Heeks, R. (2022). Digital inequality beyond the digital divide: Conceptualizing adverse digital incorporation in the Global South. *Information Technology for Development*, 28(4), 688-704. <https://doi.org/10.1080/02681102.2022.2068492>
- Helsper, E. J. (2012). A corresponding fields model for the links between social and digital exclusion. *Communication Theory*, 22(4), 403-426. <https://doi.org/10.1111/j.1468-2885.2012.01416.x>
- Jain, A., & Kaur, V. (2023). Digital census and application of advanced technologies in census: Perspectives from the forthcoming census of India. In A. Prakash, A. Jain, P. Singh, & A.

- Sarkar (Eds.), Technology, policy, and inclusion: An intersection of ideas for public policy (pp. 43–74). Routledge India. <https://doi.org/10.4324/9781003433194-3>
- Johnson, K. M. (2021). Does the census miss the native-born children of immigrant families? *Demographic Research*, 44, 1127–1146.
- Kuhn, C., Khoo, S.-M., Czerniewicz, L., Lilley, W., Bute, S., Crean, A., Abegglen, S., Burns, T., Sinfield, S., Jandrić, P., Knox, J., & MacKenzie, A. (2023). Understanding digital inequality: A theoretical kaleidoscope. *Postdigital Science and Education*, 5(3), 894–932. <https://doi.org/10.1007/s42438-023-00395-8>
- Laskar, M. H. M. H. (2023). Examining the emergence of digital society and the digital divide in India: A comparative evaluation between urban and rural areas. *Frontiers in Sociology*, 8, 1145221. <https://doi.org/10.3389/fsoc.2023.1145221>
- MacDonald, H. (2020). Of science and statistics: The scientific basis of the census. *Statistical Journal of the IAOS*, 36(1), 1–9.
- Mrkić, S. (2020). The 2020 round of population and housing censuses: An overview. *Statistical Journal of the IAOS*, 36(1), 9–18.
- Mrkić, S. (2021). Conducting population and housing censuses during the pandemic: An overview. *Statistical Journal of the IAOS*, 37(4), 1085–1095.
- Mulry, M. H. (2021). Viewing participation in censuses and surveys through the lens of lifestyle segments. *Journal of Survey Statistics and Methodology*, 9(4), 764–793.
- Muralidhar, K., Domingo-Ferrer, J., Sánchez, D., & Ruggles, S. (2025). Protecting vulnerable respondents: A critical analysis of the privacy-preserving methods of the 2010 and 2020 decennial census. *Population Research and Policy Review*, 44, Article 8. <https://doi.org/10.1007/s11113-024-09931-1>
- Nayak, K. V., & Alam, S. (2022). The digital divide, gender and education: Challenges for tribal youth in rural Jharkhand during COVID-19. *Decision*, 49(2), 223–237. <https://doi.org/10.1007/s40622-022-00315-y>
- Population Foundation of India. (2026). Population Foundation of India calls for inclusive and secure approach to India's first digital census.
- Press Information Bureau. (2026a). Census 2027: Self-enumeration from 1st to 15th April and House Listing and Housing Census from 16th April to 15th May 2026 to be conducted in selected states and union territories. Government of India. <https://www.pib.gov.in/PressReleasePage.aspx?PRID=2246847&lang=1®=3>
- Press Information Bureau. (2026b). Census 2027: World's largest census exercise begins with Houselisting and Housing Census (HLO). Government of India. <https://www.pib.gov.in/PressReleasePage.aspx?PRID=2248021>
- Ruggles, S. (2024). When privacy protection goes wrong: How and why the 2020 Census data are more problematic than we were led to believe. *Population Research and Policy Review*, 43, Article 62.
- Sindakis, S., Aggarwal, S., & Sharma, A. (2024). The digital revolution in India: Bridging the gap in rural technology adoption. *Journal of Innovation and Entrepreneurship*, 13, Article 29. <https://doi.org/10.1186/s13731-024-00380-w>
- Singer, E., Van Hoewyk, J., & Neugebauer, R. J. (2003). Attitudes and behavior: The impact of privacy and confidentiality concerns on participation in the 2000 Census. *Public Opinion Quarterly*, 67(3), 368–384.
- Soifer, H. D. (2017). State building in Latin America? Legibility and the informational foundations of state capacity. *Comparative Politics*, 49(2), 171–190.
- van Deursen, A. J. A. M., & Helsper, E. J. (2015). A nuanced understanding of Internet use and non-use among the elderly. *European Journal of Communication*, 30(2), 171–187.
- van Deursen, A. J. A. M., Helsper, E. J., Eynon, R., & van Dijk, J. A. G. M. (2017). The compoundness and sequentiality of digital inequality. *International Journal of Communication*, 11, 452–473.
- van Deursen, A. J. A. M., & van Dijk, J. A. G. M. (2011). Internet skills and the digital divide. *New Media & Society*, 13(6), 893–911. <https://doi.org/10.1177/1461444810386774>
- van Deursen, A. J. A. M., & van Dijk, J. A. G. M. (2019). The first-level digital divide shifts from inequalities in physical access to inequalities in material access. *New Media & Society*, 21(2), 354–375. <https://doi.org/10.1177/1461444818797082>