

Data-Driven Policy Interventions and Institutional Responses to Social Exclusion: A Study of India's Marginalized Communities

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Abstract

This paper investigates the transformative potential of data-driven policy interventions in addressing social exclusion and advancing equitable development among India's marginalized communities. By leveraging big data and digital infrastructure, policymakers can identify and target disparities in critical areas such as education, healthcare, financial inclusion, and social security. The analysis emphasizes the role of intersectionality in understanding complex inequalities, focusing on the compounded barriers faced by Dalits, Adivasis, women, and religious minorities. Case studies of successful initiatives highlight the impact of evidence-based policies in fostering inclusion. However, challenges such as data gaps, algorithmic biases, and technological disparities persist, hindering the equitable application of these strategies. The paper advocates for ethical data practices, including privacy safeguards and transparency, to ensure responsible and inclusive policymaking. Recommendations for bridging the digital divide, enhancing data literacy, and fostering trust in data systems underscore the potential of data-driven policies to bridge social exclusion gaps and promote inclusive growth.

Keywords: Social Exclusion, Marginalized Communities, Data-Driven Policies, Intersectionality, Digital Divide, Inclusive Development

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1. Introduction

Social exclusion remains a critical and persistent challenge in India, where deeply entrenched disparities rooted in caste, religion, gender, and geography continue to impede equitable economic development and social well-being. Despite India's notable economic growth in recent decades, the benefits have been unevenly distributed, often bypassing marginalized communities such as Dalits, Adivasis, Muslims, and women (Thorat & Newman, 2010). These groups face systemic disadvantages that manifest in restricted access to education, healthcare, employment, and social mobility, perpetuating cycles of poverty and marginalization.

Traditional policy approaches to addressing social exclusion have frequently been constrained by fragmented or incomplete data, limiting the ability to design and implement effective, targeted interventions. However, the advent of digital technology, big data, and advanced analytics offers a transformative opportunity for evidence-based policymaking. Granular datasets can now illuminate exclusionary trends and inform more precise interventions tailored to the needs of marginalized populations (Mukherjee, 2021). This paper seeks to address the central question: How can data-driven policies effectively bridge the gaps of social exclusion within India's complex and diverse social fabric?

By adopting an intersectional lens, this study highlights the compounded and unique barriers faced by marginalized groups and examines how data can be leveraged to design inclusive policies. The paper is structured as follows: Section 2 provides a conceptual framework and reviews relevant literature; Section 3 outlines the challenges of data collection and analysis; Section 4 presents case studies of successful data-driven interventions; and Section 5 proposes recommendations for an inclusive data-driven policy framework.

2. Conceptual Framework and Literature Review

2.1. Social Exclusion and Economic Development in India

Social exclusion in India extends beyond economic deprivation to encompass the denial of rights, opportunities, and access to essential resources such as education, healthcare, housing, and employment (Thorat & Sabharwal, 2015). These exclusions are often reinforced by identity-based hierarchies tied to caste, ethnicity, religion, and gender. For instance, despite constitutional safeguards

and affirmative action policies, Dalits and Adivasis continue to encounter systemic barriers in accessing social and economic opportunities (Desai & Dubey, 2012). Similarly, gender disparities remain stark, with women's labor force participation among the lowest globally, reflecting persistent socio-cultural and structural constraints (Chandrasekhar & Ghosh, 2021).

India's post-liberalization economic growth has lifted millions out of poverty, yet its benefits have been disproportionately concentrated among urban, upper-caste, and privileged sections of society (Corbridge et al., 2013). Marginalized communities continue to experience multi-dimensional exclusion, which reinforces cycles of disadvantage and limits social mobility. Addressing these inequities requires a nuanced, data-informed approach that recognizes the intersecting axes of discrimination and tailors' interventions accordingly (Kabeer, 2010).

2.2. Data and Policy Making in India

The proliferation of digital infrastructure and large-scale data systems in India has reshaped the landscape of policy formulation. Initiatives such as Digital India and the Aadhaar biometric identification system have enabled the collection of vast datasets on demographics, socio-economic conditions, and service delivery (Abraham et al., 2018). These platforms hold the potential to enhance governance, improve targeting, and promote evidence-based decision-making.

However, the effectiveness of data-driven policymaking is constrained by several challenges. Digital illiteracy remains widespread, particularly in rural and marginalized communities, limiting meaningful engagement with digital platforms (Thomas, 2019). Data privacy concerns persist in the absence of comprehensive legal safeguards, raising fears of surveillance and misuse (Sharma, 2020). Moreover, data quality issues—such as inconsistencies, underreporting, and outdated information—undermine the reliability of datasets (Singh & Kumar, 2021).

A critical limitation lies in the design of existing data collection mechanisms, which often fail to capture the intersectional nature of social exclusion. National surveys and censuses tend to aggregate data into broad categories, overlooking the nuanced disadvantages experienced by subgroups such as Dalit women, tribal Muslims, or persons with disabilities from marginalized communities (John & Kaur, 2022). This oversight restricts the capacity to design precisely targeted interventions.

2.3. Intersectionality and Data

The concept of intersectionality, pioneered by Kimberlé Crenshaw (1989), emphasizes how overlapping social identities—such as caste, gender, religion, class, and disability—create interdependent systems of discrimination and disadvantage. In India, intersectionality is especially pertinent given the deep-seated hierarchies of caste and gender, which intersect with other factors like religion, region, and economic status to produce unique forms of marginalization (Chakravarti, 2018).

For example, a Dalit woman in a rural area may face exclusion shaped simultaneously by caste-based discrimination, gender norms, and geographic isolation—experiences distinct from those of an urban Dalit man or an upper-caste rural woman (Guru, 2019). Recognizing these compounded identities is essential for crafting policies that move beyond one-size-fits-all approaches.

Integrating intersectionality into data systems involves collecting disaggregated data across multiple identity markers. This enables policymakers to uncover hidden inequities and design interventions that address root causes rather than symptoms (Kannan & Raveendran, 2021). Intersectional data align with global commitments such as the UN Sustainable Development Goals (SDGs), particularly the pledge to “leave no one behind,” and promote equity by prioritizing the most disadvantaged groups (United Nations, 2015).

3. Challenges in Data Collection and Analysis for Marginalized Communities

The collection and analysis of data for marginalized communities is a cornerstone of inclusive policy formulation. However, despite advancements in technology and growing recognition of the importance of data, several systemic and practical challenges persist, limiting the effectiveness of data-driven interventions for these groups.

3.1. Barriers to Comprehensive Data Collection

Several barriers undermine the accuracy, completeness, and inclusivity of data collection efforts, particularly for marginalized and underserved communities:

- **Lack of Representation:** Marginalized groups often remain underrepresented in national surveys and datasets due to a combination of socio-cultural, geographic, and institutional factors. For example, tribal populations residing in remote and inaccessible regions frequently face exclusion from data collection efforts. This underrepresentation may stem from logistical difficulties, language barriers, or cultural mistrust of authorities, particularly in communities with historical experiences of discrimination or neglect. Additionally, certain groups, such as informal laborers, transgender individuals, or undocumented migrants, may fall outside the purview of traditional data collection frameworks, further exacerbating their invisibility in policymaking (John & Kaur, 2022).
- **Inadequate Disaggregation:** Most datasets lack sufficient granularity, as they fail to disaggregate data by critical variables such as caste, religion, gender, disability, and region. This inadequacy obscures the unique and intersectional forms of exclusion faced by certain groups. For instance, aggregated data may show improvements in education levels, yet fail to highlight that Dalit women in rural areas continue to experience disproportionately low access to schooling. Without such disaggregation, policymakers risk crafting solutions that are too broad to effectively address the nuanced challenges faced by marginalized groups (Kannan & Raveendran, 2021).
- **Data Gaps in Remote Areas:** Rural and tribal regions, which often experience the most severe forms of exclusion, are frequently underrepresented in national datasets. Logistical challenges, such as difficult terrain, limited transportation infrastructure, and scarce resources, contribute to these gaps. Additionally, the reliance on digital tools and surveys for data collection can exclude communities with limited technological access, leaving out critical perspectives. This systemic underrepresentation perpetuates the invisibility of these regions in national and state-level policy discussions, deepening existing inequalities (Thomas, 2019).

3.2. Impact of Technological Disparities

The technological disparities that define the digital divide pose significant challenges for data collection and analysis. The following issues highlight how unequal access to technology affects marginalized communities:

- **Unequal Access to Digital Infrastructure:** Marginalized groups, particularly those in rural or low-income areas, often lack access to essential digital infrastructure such as reliable electricity, internet connectivity, and smartphones. This disparity limits their ability to participate in digital

surveys or other data collection initiatives. For example, rural areas with intermittent network connectivity or tribal regions without internet coverage are routinely excluded from large-scale digital surveys, creating gaps in datasets (Abraham et al., 2018).

- **Low Digital Literacy:** Even when digital infrastructure is available, low levels of digital literacy among marginalized populations hinder their ability to engage with digital tools and services. This is particularly pronounced among older adults, women, and individuals from economically disadvantaged backgrounds, who may lack the skills or confidence to navigate online platforms. As a result, data collection efforts that rely heavily on digital technologies risk systematically excluding these groups (Thomas, 2019).
- **Privacy Concerns and Trust Deficit:** Marginalized communities may also exhibit a lack of trust in digital data collection efforts, stemming from concerns about data privacy and potential misuse. This distrust can discourage participation, particularly among communities that have historically faced surveillance, discrimination, or exclusion from state institutions. Building trust through transparent and community-focused approaches is essential to overcoming this challenge (Sharma, 2020).
- **Disparities in Access to Digital Services:** Beyond data collection, the digital divide impacts marginalized groups' ability to access government services, social welfare programs, and other opportunities that increasingly rely on digital platforms. For instance, schemes that mandate digital registration, such as those linked to Aadhaar, may inadvertently exclude populations that lack access to the required technology or documentation. Addressing this issue is critical to ensuring that the benefits of digital innovation reach all segments of society (Singh & Kumar, 2021).

Addressing the challenges of data collection and technological disparities requires a multifaceted approach. Policymakers must invest in inclusive data collection frameworks that prioritize representation, disaggregation, and the integration of local knowledge. This can be achieved by strengthening partnerships with grassroots organizations and community leaders, who can act as trusted intermediaries in marginalized regions.

Simultaneously, efforts to bridge the digital divide—such as expanding affordable internet access, enhancing digital literacy programs, and ensuring the availability of user-friendly digital tools—are essential to empowering marginalized communities to participate in data systems. Finally, building trust through transparent data governance and robust privacy protections will encourage greater

participation and foster more equitable data-driven policymaking. By addressing these barriers and disparities, policymakers can ensure that the voices and experiences of marginalized communities are meaningfully reflected in development strategies, fostering a more inclusive and just society.

4. Data-Driven Policy Interventions: Case Studies and Evidence

Data-driven policy interventions have demonstrated significant potential to address structural inequalities and promote inclusive development in India. By leveraging data to design, implement, and evaluate programs, policymakers can ensure that resources are allocated effectively, and marginalized groups benefit equitably. This section highlights case studies illustrating the transformative role of data in addressing disparities in financial inclusion, healthcare, and education.

4.1. The Role of Data in Addressing Gender and Caste Disparities

The Pradhan Mantri Jan Dhan Yojana (PMJDY) is a landmark initiative aimed at promoting financial inclusion across India, with a particular focus on marginalized groups, including women and lower-caste populations. By leveraging Aadhaar-linked bank accounts, the program has successfully expanded access to formal banking services for millions of previously excluded individuals.

The availability of granular data on account holders has enabled the government to implement targeted outreach campaigns, ensuring that underserved groups are prioritized. For example, data analytics revealed that women and rural residents were less likely to have bank accounts, prompting focused interventions such as door-to-door campaigns and simplified account-opening procedures. As a result, the program has contributed to a significant reduction in financial exclusion, with women accounting for over 56% of PMJDY accounts as of 2022 (Government of India, 2022).

Despite these successes, challenges remain. Many accounts opened under PMJDY are dormant, with limited transactions or usage for savings and credit access. Additionally, low levels of financial literacy among account holders, particularly in rural areas, hinder the effective utilization of banking services. Addressing these challenges requires continuous data monitoring and adaptive policy design. For instance, tracking transaction data can help identify dormant accounts and inform targeted financial literacy initiatives to empower account holders (Duflo, 2012).

4.2. Data-Driven Healthcare Programs

Healthcare delivery in India has long struggled to reach marginalized communities, especially in rural and tribal areas. The advent of mobile health (mHealth) initiatives has provided innovative solutions to bridge these gaps. Programs like Mera Sahi Dawa exemplify the use of mobile data collection tools to improve healthcare delivery and ensure equitable access.

Mera Sahi Dawa, a program focused on maternal and child health, uses real-time data collection to monitor health outcomes, track the availability of medicines, and assess healthcare service delivery in rural areas. By analyzing data on maternal health indicators—such as antenatal care visits and institutional deliveries—the program has enabled policymakers to allocate resources more effectively. For instance, the program has informed the deployment of healthcare workers and the distribution of essential medicines in underserved regions, resulting in measurable improvements in maternal and child health outcomes (Sen et al., 2007).

Additionally, the integration of mHealth initiatives with data analytics platforms has allowed for early identification of health risks. For example, data trends indicating low vaccination coverage in certain regions have prompted targeted immunization drives, closing gaps in healthcare access. However, challenges such as technological disparities, limited digital literacy among rural healthcare workers, and privacy concerns must be addressed to scale such initiatives sustainably (Sharma, 2020).

4.3. Educational Data and Affirmative Action

Education remains a key arena where data-driven interventions have informed affirmative action policies and addressed long-standing disparities. The collection and analysis of caste-based data have been instrumental in shaping reservation policies for Scheduled Castes (SCs), Scheduled Tribes (STs), and Other Backward Classes (OBCs). These policies aim to enhance access to education for historically marginalized groups and reduce disparities in enrollment and attainment.

Data on enrollment rates, dropout rates, and academic performance have highlighted persistent inequalities in educational access and outcomes. For instance, dropout rates among SC and ST students remain disproportionately high due to factors such as economic hardship, social discrimination, and inadequate infrastructure in schools serving marginalized communities. Such data have informed the

design of targeted interventions, including scholarship programs, midday meal schemes, and initiatives to upgrade school infrastructure in underserved areas (National Sample Survey Office, 2018).

While these policies have improved access to education, significant challenges remain. Quality disparities in education persist, with schools in marginalized regions often lacking trained teachers, adequate facilities, and learning materials. Additionally, data on learning outcomes reveal a gap between enrollment rates and actual academic achievement among marginalized groups.

To address these challenges, data-driven monitoring and evaluation systems can play a transformative role. For example, real-time data on teacher attendance, student performance, and resource availability can help identify underperforming schools and prioritize them for intervention. Furthermore, disaggregated data on intersectional factors—such as gender and caste—can guide efforts to address compounded disadvantages, ensuring that affirmative action policies achieve their intended impact (Kannan & Raveendran, 2021).

The case studies of PMJDY, mHealth initiatives, and educational policies underscore the transformative potential of data-driven approaches in addressing systemic inequalities. However, the success of such interventions hinges on the availability of high-quality data, robust monitoring mechanisms, and the capacity to adapt policies based on evidence.

Key priorities for scaling data-driven interventions include:

1. **Enhancing Data Infrastructure:** Strengthening data collection systems and ensuring the availability of disaggregated, real-time data are essential for designing targeted interventions (Mukherjee, 2021).
2. **Building Local Capacity:** Investing in digital literacy and capacity-building programs for local stakeholders—such as healthcare workers, teachers, and community leaders—will enhance the effectiveness of data-driven policies (Thomas, 2019).
3. **Ensuring Equity in Technology Access:** Bridging the digital divide by expanding affordable internet access and digital tools is critical to ensuring inclusive data systems (Singh & Kumar, 2021).
4. **Safeguarding Privacy and Building Trust:** Implementing robust data protection frameworks and fostering community trust are vital for encouraging participation in data collection initiatives (Sharma, 2020).

5. Towards an Inclusive Data-Driven Policy Framework

In order to create equitable and effective policies, data-driven frameworks must be designed to address the needs of all communities, particularly marginalized ones. An inclusive data-driven policy framework ensures that the lived experiences and challenges of these communities are adequately represented in decision-making processes. This section outlines the critical components for creating such a framework, with a focus on inclusive data infrastructure and intersectional approaches.

5.1. Building an Inclusive Data Infrastructure

A robust and inclusive data infrastructure is foundational to ensuring that data-driven policies are reflective of the diverse needs of marginalized communities. Several key actions can help build such an infrastructure:

- **Ensuring Representation:** It is crucial that national surveys and data collection efforts actively prioritize the inclusion of marginalized groups, particularly those living in remote or underserved areas. This means going beyond urban-centric data collection models and investing in methods that can reach rural, tribal, and economically disadvantaged populations. To ensure inclusivity, data collection efforts must be designed to overcome socio-cultural barriers, such as language, illiteracy, and fear of discrimination. Additionally, marginalized groups such as women, persons with disabilities, and religious minorities must be actively engaged and consulted during the data-gathering process to avoid their exclusion (John & Kaur, 2022).
- **Improving Disaggregation:** One of the key weaknesses of current data collection efforts is the lack of disaggregation by crucial variables such as caste, gender, religion, and geographic location. Without this disaggregation, data often fails to capture the complexity of social exclusion. For example, aggregating data by gender alone may obscure the compounded disadvantage faced by Dalit women or tribal men in rural areas. Disaggregating data can provide a more nuanced understanding of inequalities and enable policymakers to design more targeted interventions that address the unique challenges faced by different subgroups within broader categories (Kannan & Raveendran, 2021).
- **Expanding Digital Literacy:** To ensure that marginalized populations can actively participate in data collection initiatives and benefit from digital services, it is essential to invest in digital literacy

programs. This includes training on using digital tools for accessing government services, participating in surveys, and utilizing data platforms. Bridging the digital divide is crucial for empowering communities and ensuring they have equal access to digital infrastructure, healthcare, education, and other services. Governments must focus on ensuring that digital literacy programs are accessible, culturally relevant, and designed to meet the specific needs of disadvantaged groups, particularly those in rural and remote areas (Thomas, 2019).

5.2. Intersectional Data Approaches

An intersectional data framework is essential for understanding the complex and overlapping forms of exclusion that marginalized groups experience. Traditional data collection often fails to account for the interconnected nature of identities, such as caste, gender, disability, and economic status. Adopting an intersectional approach allows for a deeper and more accurate understanding of social inequalities and ensures that policies are responsive to the distinct needs of these groups. Several strategies can be employed to incorporate intersectionality into data-driven policymaking:

- **Incorporate Intersectional Frameworks into Survey Design and Data Analysis:** Data collection methodologies must be redesigned to reflect the intersections of social identities. Surveys and censuses should allow for the collection of data across multiple variables simultaneously, rather than treating each category in isolation. For instance, rather than collecting data solely on gender or caste, surveys should enable an analysis of how caste and gender intersect to create unique forms of exclusion. Incorporating intersectional frameworks into survey design will ensure that the data reflects the complex realities of marginalized groups and can inform more precise and relevant policy responses (Crenshaw, 1989).
- **Use Advanced Analytics and Machine Learning Tools:** As data volumes increase and become more complex, advanced analytics and machine learning can be powerful tools for identifying patterns of exclusion and understanding the nuances of social inequality. By applying algorithms to large datasets, policymakers can uncover hidden trends—such as how caste, gender, and economic status combine to influence access to education or healthcare. These tools can also identify areas where existing policies may have unintended negative consequences or where additional interventions are needed. By harnessing the power of these technologies, policymakers can be more proactive in addressing disparities before they become entrenched (Mukherjee, 2021).

- **Collaborate with Civil Society Organizations and Community Leaders:** Ensuring that data collection efforts are culturally sensitive and inclusive requires strong collaboration with civil society organizations (CSOs), community leaders, and grassroots organizations. These groups often have deep knowledge of the local context, and their participation is crucial to ensuring that data collection methods are appropriate and effective. By working with these stakeholders, governments can improve the design of surveys and other data collection tools, ensuring that marginalized communities are not only included but are also actively engaged in the data process. These collaborations can also enhance trust-building, particularly in communities that may be wary of government initiatives due to past experiences of exclusion or discrimination (John & Kaur, 2022).

Creating an inclusive data-driven policy framework requires concerted efforts across several fronts, including improving data infrastructure, ensuring representation, and adopting intersectional approaches. To fully realize the potential of data-driven policies, the following steps are critical:

1. **Policy Integration:** Intersectional data must be integrated into national development plans and policy frameworks to ensure that all dimensions of exclusion are addressed at the structural level (United Nations, 2015).
2. **Stakeholder Engagement:** Ongoing collaboration with local communities, activists, and researchers will help ensure that data reflects ground-level realities and that policies are flexible enough to adapt to new challenges (Kabeer, 2010).
3. **Capacity Building:** Building capacity among government officials, local leaders, and civil society organizations to collect, analyze, and use data in an intersectional manner is essential for scaling effective data-driven interventions (Thomas, 2019).
4. **Ongoing Monitoring and Evaluation:** Real-time monitoring and evaluation mechanisms should be put in place to assess the effectiveness of data-driven policies and allow for adaptive policy reforms when required. Continuous feedback loops based on data will help policymakers stay responsive to emerging challenges and changing socio-economic conditions (Mukherjee, 2021).

6. Conclusion

Data-driven policy interventions have emerged as a transformative approach to addressing social exclusion and promoting equitable development in India. By leveraging advanced data collection and analysis techniques, policymakers can gain deeper insights into systemic inequalities that often go unnoticed. This study highlights the value of applying an intersectional lens, which accounts for the interplay of factors such as gender, caste, geography, and socioeconomic status. Such an approach not only identifies disparities but also guides the design of more precise, effective solutions tailored to the unique needs of diverse communities.

However, the journey toward implementing data-driven strategies is not without challenges. Significant barriers such as digital illiteracy, insufficient data disaggregation, and disparities in technological access persist. These limitations hinder the accurate representation of marginalized groups and may perpetuate exclusion if not addressed. Furthermore, ethical considerations like safeguarding data privacy and fostering community trust are crucial to ensure that such initiatives are sustainable and inclusive. Missteps in these areas can erode public confidence and undermine the potential of data-driven interventions.

To overcome these hurdles, a multi-pronged strategy is required. Enhancing digital literacy through education and outreach can empower communities to actively participate in data-driven programs. Simultaneously, investments in digital infrastructure can bridge gaps in connectivity, enabling broader access to technology. Collaboration among governments, non-governmental organizations, the private sector, and local communities is essential to foster innovation and ensure equitable resource distribution.

Ultimately, data-driven approaches offer a promising pathway to empower marginalized populations, reduce inequalities, and foster a more inclusive society. When implemented ethically and inclusively, these strategies have the potential to create a world where every individual, regardless of their background, can benefit from the fruits of economic and social progress. In this way, India can take significant strides toward achieving sustainable and equitable development for all.

Author Contributions

The author contributed substantially to this study. The author had full access to all data and information used in the research. The author independently conceptualized and designed the study, conducted a comprehensive review of the relevant literature, and led the analysis and discussion. The author is solely responsible for the content of the final manuscript and has reviewed and approved it in its entirety.

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Declaration of Interest

The author declares that there are no competing interests—financial, professional, or personal—that could influence the interpretation or presentation of the study findings.

Ethics Approval

This study is a systematic review based entirely on secondary data obtained from published sources. Therefore, formal ethics approval was not required. For any supplementary research involving primary data, appropriate institutional ethical clearance would have been obtained in accordance with standard research ethics guidelines.

Consent to Participate

Not applicable. The study did not involve the direct participation of human subjects; all analyzed data were publicly accessible or previously published.

Data Availability

All data used in this study are derived from publicly available sources, including peer-reviewed journals, academic dissertations, government reports, and NGO publications, as detailed in the References section. No new datasets were generated or analyzed for this study.

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