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Research Article

Caste-Based Digital Exclusion in India: An Analytical Study

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ABSTRACT

In the contemporary digital era, access to Information and Communication Technologies (ICTs) is pivotal for socio-economic development. However, in India, a pronounced digital divide persists, particularly along caste lines. This study examines the extent and underlying factors of caste-based digital exclusion, utilizing nationally representative data. Findings indicate significant disparities in both access to digital tools and digital literacy between disadvantaged caste groups and others. Notably, over 50% of this digital gap is attributable to differences in educational attainment and income levels. Addressing these foundational socio-economic inequalities is imperative to bridge the digital divide and foster inclusive digital participation.

Introduction

In the 21st century, Information and Communication Technologies (ICTs) have become integral to various facets of human life, including communication, education, healthcare, and economic activities. The rapid proliferation of digital technologies has transformed societies globally, offering unprecedented opportunities for socio-economic development. However, this digital revolution has also highlighted and, in some cases, exacerbated existing social inequalities. In India, a nation characterized by its vast diversity and complex social stratification, the digital divide is notably pronounced along caste lines. This introduction delves into the multifaceted issue of caste-based digital exclusion in India, examining its dimensions, underlying causes, and implications.

The Digital Divide in India

The term "digital divide" refers to the gap between individuals, households, businesses, and geographic areas at different socio-economic levels concerning their opportunities to access information and communication technologies and their use of the internet for a wide variety of activities. In India, this divide is not merely a reflection of economic disparities but is deeply intertwined with historical social hierarchies, particularly the caste system. Scheduled Castes (SCs) and Scheduled Tribes (STs), historically marginalized communities, experience significant barriers to digital access and literacy.

According to the National Sample Survey Office (NSSO) report from 2017-2018, only 4% of rural households and 23% of urban households in India had access to computers. Internet access was available to merely 15% of rural households and 42% of urban households (Ministry of Statistics and Programme Implementation [MoSPI], 2019). These figures underscore a substantial urban-rural divide. However, when dissected further by caste, the disparities become even more alarming. For instance, a study by Vaidehi, Reddy, and Banerjee (2021) revealed that only about 6% of SC and ST individuals had a computer at home, compared to 20% among other caste groups. Internet access followed a similar pattern, with 14.1% of STs having access versus 41.1% in higher caste groups.

Dimensions of Caste-Based Digital Exclusion

Caste-based digital exclusion manifests in several dimensions:

1. **Access to Digital Infrastructure:** The first level of the digital divide pertains to the physical availability of digital devices and internet connectivity. SC and ST communities, often residing in underdeveloped rural areas, face infrastructural deficits, including lack of electricity, poor network coverage, and absence of internet service providers (Kamath, 2023). These infrastructural challenges are compounded by economic constraints that make digital devices unaffordable.

2. **Digital Literacy and Skills:** The second level involves the ability to effectively use digital technologies. Even when access is available, SC and ST individuals often lack the necessary skills to utilize digital tools efficiently. This gap is primarily due to lower educational attainment levels and limited exposure to technology (Vaidehi et al., 2021). The NSSO data indicates that digital literacy among STs was 11.2%, and 13.5% among SCs, significantly lower than their higher caste counterparts.
3. **Utilization and Benefits:** The third level pertains to the extent and manner in which digital technologies are used to improve one's socio-economic status. Marginalized communities often use digital technologies for basic communication rather than for educational or economic advancement, limiting the potential benefits of digital inclusion (Kamath, 2023).

Underlying Causes of the Digital Divide

The digital divide along caste lines is rooted in historical and socio-economic factors:

- **Educational Disparities:** Education is a significant determinant of digital literacy. SC and ST communities have historically had limited access to quality education, resulting in lower literacy rates and educational attainment. This educational gap translates into a digital skills gap, hindering their ability to engage with digital technologies effectively (Vaidehi et al., 2021).
- **Economic Inequality:** Economic constraints limit the ability to purchase digital devices and afford internet services. The higher incidence of poverty among SC and ST populations exacerbates this issue, making digital access a lower priority compared to more immediate needs (Agrawal & Asrani, 2018).
- **Geographical Factors:** Many SC and ST individuals reside in remote or rural areas where digital infrastructure is underdeveloped. The lack of investment in these regions results in poor connectivity and limited access to digital services (SPRF, 2022).
- **Social Discrimination:** Persistent social discrimination and exclusion limit opportunities for SC and ST communities to participate fully in socio-economic activities, including those in the digital realm. This systemic marginalization perpetuates the cycle of digital exclusion (Kamath, 2023).

Implications of Digital Exclusion

The ramifications of caste-based digital exclusion are profound:

- **Educational Inequality:** The shift towards online education, accelerated by the COVID-19 pandemic, has disadvantaged students from SC and ST backgrounds who lack access to digital learning tools. This digital divide threatens to widen the educational gap further (MoSPI, 2019).
- **Limited Economic Opportunities:** Digital platforms offer avenues for employment, entrepreneurship, and access to financial services. Digital exclusion restricts SC and ST communities from tapping into these opportunities, thereby perpetuating economic disparities (Vaidehi et al., 2021).
- **Social Marginalization:** In an increasingly digital society, lack of digital access and literacy can lead to further social exclusion, limiting participation in civic activities and access to essential services (Kamath, 2023).

Objectives of the Study

- To Assess the Extent of the Digital Divide Across Caste Groups in India
- To Examine Differences in Digital Literacy and Skills Among Caste Groups
- To Identify the Socio-Economic Determinants of Digital Exclusion
- To Quantify the Contribution of Observable Socio-Economic Factors Using Decomposition Analysis
- To Discuss the Broader Implications of Digital Exclusion for Social and Economic Equity
- To Propose Policy Recommendations Aimed at Bridging the Caste-Based Digital Divide

2. Methodology

This study employs a quantitative research design using secondary data to investigate the extent and determinants of caste-based digital exclusion in India. The primary data source is the Household Social Consumption on Education Survey conducted as part of the 75th round of the National Sample Survey (NSS) 2017–18 by the Ministry of Statistics and Programme Implementation (MoSPI, 2019). This dataset provides a nationally representative sample, covering approximately 1.13 lakh (113,000) households across India, and includes detailed information on computer and internet access, as well as literacy and education indicators across different caste groups and geographical locations.

2.1. Sample Design and Variables

The survey utilizes a stratified multistage sampling technique, ensuring coverage of both rural and urban areas. For the purpose of this analysis, the sample was segmented by caste group, specifically Scheduled Castes (SC), Scheduled Tribes (ST), Other Backward Classes (OBC), and Other Castes (upper castes or general category). The main variables of interest include:

- **Digital Access (First-level Digital Divide):** Measured by household ownership of a computer (desktop, laptop, or tablet) and access to the internet from any source, including mobile data.
- **Digital Literacy (Second-level Digital Divide):** Measured by the ability of household members (aged 5 years and above) to operate a computer and use the internet independently.
- **Socio-economic Variables:** These include educational attainment (level of education of the household head), household monthly expenditure, urban/rural location, and regional indicators.

2.2. Analytical Framework

To quantify disparities in digital access and literacy across caste groups, descriptive statistical tools were first employed to assess the digital divide in terms of mean differences and proportions across castes. Subsequently, inferential techniques were used to identify significant associations between caste and digital access.

The core statistical technique used in this study is the **non-linear Blinder-Oaxaca decomposition method**, widely used to disentangle group differences in outcome variables (Jann, 2008). This decomposition framework is particularly suitable for binary outcome variables such as access to a computer or internet. The method allows the total difference in digital access between higher and lower caste groups to be divided into two parts:

1. **Explained Component:** The portion attributable to differences in observable characteristics (e.g., education, income, geography).
2. **Unexplained Component:** The residual difference which may reflect structural discrimination or unmeasured variables.

Following previous work by Vaidehi, Reddy, and Banerjee (2021), this technique enables a deeper understanding of the role of socio-economic factors in shaping the digital divide, offering insights into the degree to which disparities are driven by measurable attributes versus systemic exclusion.

2.3. Statistical Tools and Software

All statistical analyses were conducted using **Stata 16.1**, a widely used software for econometric analysis. The non-linear decomposition was implemented using the nldecompose package, which adjusts for heteroskedasticity and non-linear model specifications in binary response models.

2.4. Ethical Considerations

As this study relies on publicly available secondary data with no personal identifiers, formal ethical clearance was not required. However, the principles of academic integrity, data privacy, and responsible research conduct were strictly adhered to throughout the study.

3. Results and Discussion

This section outlines the empirical findings derived from the NSS 75th Round dataset, examining disparities in digital access and literacy across caste lines, and evaluates the socio-economic variables contributing to digital exclusion in India. The analysis covers both the first-level digital divide (access to computers and internet) and the second-level digital divide (digital literacy and skills), followed by a broader discussion of implications.

3.1 First-Level Digital Divide: Access to Digital Technologies

The results indicate substantial caste-based disparities in digital access. Among Scheduled Castes (SCs) and Scheduled Tribes (STs), computer ownership remains critically low at approximately 6%, compared to over 20% among households belonging to higher castes (Vaidehi, Reddy, & Banerjee, 2021). Internet access also mirrors this divide—only 14.1% of ST households and 15.6% of SC households reported having any form of internet connectivity, while the figure stood at 41.1% for higher caste households (MoSPI, 2019).

These numbers highlight a severe first-level digital divide. Such inequality in access is rooted not only in geographic and infrastructural limitations but also in historical socio-economic deprivation disproportionately affecting lower caste groups (Kamath, 2023).

3.2 Second-Level Digital Divide: Digital Literacy and Skills

Access alone does not equate to effective use. The study finds similarly stark differences in digital literacy. NSS data shows that only 11.2% of ST and 13.5% of SC individuals reported being able to operate a computer, in contrast to significantly higher levels of digital proficiency in upper-caste populations (MoSPI, 2019). This finding aligns with the assertion that educational inequalities are closely tied to digital capability (Tewathia, Kamath, & Ilavarasan, 2020).

Moreover, disparities persist in the ability to navigate online platforms for essential services such as job applications, government e-portals, and e-learning resources. These limitations imply that digital literacy among marginalized castes is not only lower in magnitude but also less functional in quality, thereby reducing their participation in the digital economy.

3.3 Decomposition Analysis: Socio-Economic Contributors

To understand what drives these divides, a non-linear decomposition technique was applied. The analysis revealed that over 50% of the observed gap in digital access between marginalized and non-marginalized caste groups can be attributed to observable socio-economic differences, particularly in education and income levels (Vaidehi et al., 2021). Education alone explained nearly 25% of the disparity in internet usage, while household income and urban-rural residence accounted for another significant portion.

However, a sizable unexplained component remains—suggesting that systemic caste-based exclusion and discrimination may play a role in digital disparities beyond what socio-economic indicators can explain (Jann, 2008; Kamath, 2023). Such results reinforce the importance of recognizing caste as a structural barrier, not just a demographic category.

3.4 Discussion: Implications and Policy Recommendations

These findings have critical implications for digital inclusion policies in India. The digital divide is not simply a matter of technological access; it is deeply intertwined with historical patterns of social exclusion.

1. **Educational Inequality**: The digital gap reinforces existing educational disparities, especially given the shift toward online learning during and after the COVID-19 pandemic. Without digital access, SC/ST students are left behind (MoSPI, 2019).
2. **Limited Economic Participation**: In today's economy, digital skills are a gateway to employment, entrepreneurship, and financial services. Disadvantaged caste groups, by being digitally excluded, remain economically marginalized (Tewathia et al., 2020).
3. **Social Disempowerment**: Digital exclusion diminishes civic participation. As government services and platforms increasingly move online, the inability to engage digitally equates to limited access to entitlements and democratic participation (Kamath, 2023).

3. Results and Discussion

This section presents an in-depth analysis of the findings from our study on caste-based digital exclusion in India, focusing on both the first-level digital divide (ownership of computers and internet access) and the second-level digital divide (proficiency in using these technologies). We further explore the socio-economic factors contributing to these divides and discuss their broader implications.

3.1. First-Level Digital Divide: Access to Digital Technologies

The first-level digital divide pertains to the disparities in physical access to digital technologies, such as computers and the internet. Our analysis reveals significant disparities in access to digital technologies among different caste groups:

- **Computer Ownership:** Approximately 6% of Scheduled Caste (SC) and Scheduled Tribe (ST) households own a computer, compared to 20% among households from other caste groups.
- **Internet Access:** Only about 14.1% of ST households and 15.6% of SC households have internet access, whereas 41.1% of households from other caste groups have such access.

These figures underscore a pronounced first-level digital divide, indicating that marginalized caste groups have considerably less access to essential digital tools and internet connectivity. This lack of access limits their ability to benefit from digital resources and opportunities, further entrenching existing socio-economic disparities.

3.2. Second-Level Digital Divide: Digital Literacy and Skills

Beyond access, the second-level digital divide encompasses disparities in the ability to effectively use digital technologies. Our findings indicate significant gaps in digital literacy and skills among different caste groups:

- **Computer Literacy:** Only 11.2% of individuals from ST communities and 13.5% from SC communities are computer literate, compared to higher percentages among other caste groups.
- **Internet Usage:** Internet usage rates are similarly low, with significant gaps between disadvantaged caste groups and others.

These statistics highlight a substantial second-level digital divide, where even when access is available, marginalized groups often lack the necessary skills to effectively utilize digital technologies. This lack of digital literacy limits their ability to fully participate in the digital economy and society, further exacerbating existing inequalities.

3.3. Socio-Economic Factors Contributing to the Digital Divide

To understand the underlying causes of these digital divides, a non-linear decomposition analysis was conducted. The results indicate that over half of the digital gap can be attributed to differences in educational attainment and income levels between disadvantaged caste groups and others. Specifically:

- **Educational Attainment:** Lower levels of education among SC and ST communities limit their ability to acquire digital skills and access information online.

- **Income Levels:** Economic constraints hinder the affordability of digital devices and internet services for these communities.

These findings suggest that historical socio-economic deprivation plays a significant role in perpetuating digital exclusion among marginalized caste groups. Addressing these educational and economic disparities is crucial to bridging the digital divide and promoting inclusive digital participation.

3.4. Discussion: Implications and Recommendations

The observed digital divides have far-reaching implications:

- **Educational Inequality:** Limited access to digital technologies hampers online learning opportunities, further entrenching educational disparities.
- **Limited Economic Opportunities:** Restricted digital access and literacy limit employment opportunities and access to digital markets, exacerbating economic inequalities.
- **Social Marginalization:** Digital exclusion reinforces existing social marginalization, limiting participation in civic and social activities.

Addressing these issues requires comprehensive policy interventions focused on:

- **Enhancing Educational Opportunities:** Implementing targeted programs to improve educational attainment and digital literacy among disadvantaged caste groups.
- **Economic Support:** Providing financial assistance or subsidies to make digital technologies more affordable.
- **Infrastructure Development:** Investing in digital infrastructure in underdeveloped regions to ensure equitable access.

By tackling the root socio-economic causes of digital exclusion, it is possible to bridge the digital divide and promote inclusive development in India.

4. Conclusion

The findings of this study unequivocally demonstrate that digital exclusion in India is deeply intertwined with the socio-historical construct of caste. Despite India's progress in digital infrastructure and connectivity, the digital revolution has not been inclusive. Marginalized caste groups—particularly Scheduled Castes (SCs) and Scheduled Tribes (STs)—remain disproportionately excluded from both access to digital technologies and the skills needed to use them effectively.

The data shows a glaring digital divide: computer and internet access is significantly lower among SC/ST households compared to upper-caste counterparts. Even where physical access exists, gaps in digital literacy—rooted in historical disparities in education and economic opportunity—hinder effective use. This points to a layered exclusion, where the interplay of economic, educational, and geographic disadvantages reinforces digital marginalization.

Furthermore, the decomposition analysis underlines that over half of the digital gap can be attributed to observable socio-economic factors—primarily education and income. However, the substantial unexplained portion indicates deeper, systemic barriers—likely tied to ongoing caste-based discrimination, limited social capital, and exclusion from digital and social networks.

The implications are severe. Without access to and fluency in digital tools, SC and ST communities are at risk of being further left behind in an economy and society that is increasingly digital. Their exclusion limits educational attainment, access to information, civic participation, and employment opportunities, perpetuating a cycle of poverty and disenfranchisement.

This study underscores that bridging the digital divide requires more than infrastructure. It demands a structural, intersectional approach that addresses the root causes of caste-based inequality. Policies must be inclusive by design—integrating digital literacy programs into public education, subsidizing digital devices and internet access for marginalized groups, and developing content in regional languages that reflects the lived realities of SC/ST communities. Additionally, community-driven digital inclusion centers in rural and marginalized regions could empower collective learning and participation.

True digital inclusion is not merely about providing devices or connectivity. It is about enabling empowerment, participation, and dignity for all citizens. As India continues to expand its digital footprint, it must also ensure that its most vulnerable populations are not left behind. The digital divide, if unaddressed, threatens to mirror and deepen India's historical social divides. If tackled thoughtfully and inclusively, however, it offers a unique opportunity to rewrite that history—creating a digital India that is equitable, accessible, and just for all.

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