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Representing the Unseen through Numbers: Data Journalism Practices in Indian Media

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Abstract

The growing relevance of data journalism in contemporary media landscapes has redefined how stories are constructed, interpreted, and disseminated, especially in contexts where marginalized voices often remain unheard. In India, where social inequalities and systemic exclusions continue to shape public discourse, data journalism offers both opportunities and challenges in representing the unseen. This research review critically examines how Indian media organizations have adopted and integrated data-driven practices to highlight issues affecting communities at the margins. By engaging with existing literature, case studies, and empirical analyses, the paper explores the capacity of data journalism to provide evidence-based narratives that foreground socio-economic disparities, gender inequalities, caste hierarchies, and regional imbalances. It further interrogates the structural, technological, and editorial limitations that constrain the democratizing potential of data journalism, including issues of access to reliable datasets, newsroom resources, and the dominance of elite-centric narratives. The review underscores the importance of transparency, inclusivity, and contextual sensitivity in data storytelling, while also identifying best practices and gaps within the Indian media ecosystem. Ultimately, the paper argues that data journalism, if critically integrated, has the potential to transform the role of media from passive chronicler to active enabler of social justice by making visible the lived realities of India's marginalized communities. In doing so, it contributes to ongoing debates on media representation, journalistic innovation, and the ethical responsibilities of news organizations in a diverse and unequal society.

Keywords: #DataJournalism #IndianMedia #MarginalRepresentation #SocialExclusion #EvidencebasedNarratives #MediaPractices #CriticalAnalysis

1. Introduction

In recent years, the prominence of data journalism has grown exponentially across global media landscapes, reshaping how news organizations produce and disseminate information. The integration of data-driven practices has not only diversified journalistic storytelling but has also strengthened the ability of media to engage with evidence-based narratives. By relying on large datasets, computational tools, and

visualizations, data journalism provides journalists with the ability to reveal hidden patterns and contextualize social realities that often remain overlooked in mainstream reporting. Such developments have contributed to establishing data journalism as a distinct and influential field of practice within contemporary journalism studies (Kashyap & Bhaskaran, 2020).

In India, the significance of data journalism is particularly critical given the deep-rooted socio-economic inequalities, caste hierarchies, and gendered exclusions that structure public discourse. While mainstream news often reflects elite-driven perspectives, data journalism offers an opportunity to amplify marginalized voices by presenting empirical insights into issues such as poverty, healthcare disparities, education gaps, and regional imbalances. Through its capacity to transform raw statistical information into meaningful narratives, data journalism positions itself as a powerful instrument for democratic accountability, allowing citizens to scrutinize government policies and corporate practices. However, its adoption in India has been uneven due to infrastructural constraints, lack of technical expertise, and the limited availability of reliable datasets (Wu, 2023).

At the same time, the emergence of independent digital platforms and data journalism start-ups has brought momentum to this practice, often functioning as alternative media spaces that challenge the dominance of legacy newsrooms. These initiatives frequently highlight issues of social justice and environmental accountability, thereby broadening the scope of journalistic inquiry in India. While their contribution is substantial, mainstream news organizations still struggle with integrating data journalism into their editorial routines due to cost considerations, editorial priorities, and resistance to cultural change within traditional newsrooms (Kashyap, Bhaskaran, & Mishra, 2020).

Consequently, this paper explores how Indian media has adopted data journalism practices in representing marginalized communities, assessing both the transformative potential and the persistent structural challenges. It critically situates data journalism within broader debates on inclusivity, democratization, and media ethics, underscoring its relevance to the contemporary Indian socio-political environment.

2. Conceptual Framework of Data Journalism

The conceptual framework of data journalism lies at the intersection of journalism, computer science, and social sciences, emphasizing the use of quantitative data as the foundation of storytelling. Unlike traditional reporting that relies largely on narrative accounts and anecdotal evidence, data journalism foregrounds the systematic collection, analysis, and interpretation of datasets to construct narratives that are both evidence-based and verifiable. This hybrid model integrates skills from statistics, coding, and visualization, enabling journalists to translate complex numerical information into accessible stories for broader audiences. In doing so, data journalism not only enhances transparency in reporting but also strengthens the epistemic credibility of journalism as a knowledge-producing profession (Baranova & Shnaider, 2022).

Central to this framework is the idea that data journalism is not merely a technical process but also a cultural practice that redefines journalistic norms. Scholars argue that data journalism reshapes notions of objectivity and verification, where datasets function as sources in their own right, demanding rigorous scrutiny of their origins, reliability, and biases. This approach challenges conventional news values by prioritizing long-term investigative projects that rely on databases and visualization over episodic event-driven coverage. Such a paradigm compels journalists to engage with issues of transparency, accessibility, and accountability, ensuring that data is not misused to reinforce dominant narratives but instead made available for public interpretation (Kashyap, Mishra, & Bhaskaran, 2022).

Moreover, the framework situates data journalism as a tool for democratizing public discourse. In contexts like India, where marginalized communities often lack visibility in mainstream media, the systematic representation of social disparities through datasets can challenge elite-driven narratives. By integrating empirical rigor with narrative storytelling, data journalism becomes an avenue for empowering citizens with factual insights, allowing them to question institutions and demand accountability. Thus, the conceptual grounding of data journalism underscores its dual role as both a methodological innovation and a socio-political intervention in contemporary journalism (Wu, 2023).

3. Media and the Margins: The Unseen in Indian Context

The Indian media landscape is deeply shaped by structural inequalities that mirror the broader socio-economic fabric of the nation. Mainstream media has historically been dominated by urban, upper-caste, and English-speaking elites, leaving marginalized communities—such as Dalits, Adivasis, religious minorities, women, and rural poor—either underrepresented or misrepresented in public discourse. Scholars argue that this skewed representation reinforces systemic exclusions, as the priorities of marginalized communities are rarely integrated into editorial agendas, leading to the invisibility of their lived experiences in national debates (Ramaprasad, Gudipaty, & Vemula, 2015).

This exclusionary trend has also been perpetuated by the commercialization of Indian media, where corporate ownership and political patronage drive coverage toward market-friendly issues rather than socially urgent concerns. As a result, stories on poverty, caste discrimination, rural underdevelopment, and gender-based violence often remain underreported, despite their critical importance to large segments of the population. Alternative forms of journalism, such as citizen journalism and participatory platforms, have emerged as responses to these silences, seeking to amplify grassroots voices that are otherwise neglected by mainstream narratives (Corsa, 2014).

Within this context, data journalism holds particular promise in bridging representational gaps by systematically documenting disparities and making them visible through empirical evidence. For example, datasets on literacy rates, employment inequality, or access to health care can highlight structural disadvantages faced by marginalized groups, thereby shifting the editorial focus from anecdotal coverage to evidence-based reporting. This approach not only democratizes access to knowledge but also challenges hegemonic narratives that often portray marginalized groups solely as victims, instead positioning them as central to national development concerns (Chaturvedi & Mehrotra, 2013).

Thus, the invisibility of the margins in Indian media is both a representational and structural problem. By providing platforms for voices that remain excluded, and by integrating quantitative data with narrative storytelling, Indian journalism can address longstanding democratic deficits. Data journalism, in particular, has the potential to reorient editorial priorities toward inclusivity, enabling a more equitable media environment that reflects the plurality of Indian society (Aimen, 2024).

4. Evolution of Data Journalism in Indian Media

The trajectory of data journalism in India has been relatively recent compared to Western counterparts, but its gradual evolution reflects broader transformations within the country's media ecosystem. Early attempts at integrating data into news primarily revolved around election coverage and economic reporting, where statistics were used to enhance credibility rather than to construct data-driven narratives. However, the rise of digital media and the availability of open government datasets in the late 2000s began shifting newsroom practices, laying the foundation for a more systematic adoption of data journalism (Murthy, 2011).

A significant turning point in the Indian context was the proliferation of digital-first news organizations and the emergence of specialized start-ups such as *IndiaSpend*, which positioned themselves as pioneers in using data for public-interest reporting. These platforms demonstrated the potential of data journalism to highlight issues like health disparities, environmental degradation, and governance failures, thereby challenging the dominance of event-driven, personality-centric journalism prevalent in mainstream outlets. Over time, these start-ups influenced legacy newsrooms to experiment with visualizations, interactive content, and open-source tools, although the scale of adoption remained uneven (Wu, 2023). The academic discourse around data journalism in India also expanded during this phase, with researchers emphasizing the need for journalism education to incorporate technical competencies such as coding, statistical analysis, and critical data literacy. These interventions sought to bridge the gap between industry needs and educational curricula, ensuring that future journalists are equipped with the skills necessary to navigate an increasingly data-centric media environment. Yet, the adoption process has been slow due to infrastructural bottlenecks, resource constraints, and editorial skepticism toward data-driven practices, particularly in legacy print and television organizations (Kumar & Sahu, 2022). Thus, the evolution of data journalism in Indian media reflects a hybrid model—where innovative digital platforms spearhead experimentation while traditional newsrooms cautiously adapt under competitive pressures. This dual trajectory highlights both the opportunities and challenges inherent in mainstreaming data-driven reporting, situating India within the larger global movement of journalistic innovation (Davies & Singh, 2019).

5. Methodological Approaches in Data Journalism

Methodological approaches in data journalism combine techniques from computational analysis, social science research, and narrative storytelling to produce evidence-based reporting. The process typically begins with the identification of a relevant issue and the collection of large datasets, often from government records, NGOs, or independent databases. Journalists then clean, verify, and analyze these datasets using statistical software and programming languages such as R or Python. This stage is critical as the quality and credibility of the data determine the strength of the final narrative. Visualization tools such as Tableau and Datawrapper are frequently employed to translate raw numbers into interactive formats, enabling audiences to better comprehend complex findings (Jia, Li, & Wang, 2017).

Beyond technical processes, methodological frameworks also emphasize the importance of contextualization. Data journalism is not limited to producing charts or graphs but requires embedding statistical patterns within social and political realities. For instance, when reporting on unemployment, it is not enough to visualize trends; journalists must interpret how structural inequalities such as caste or gender exacerbate joblessness. This integration of empirical rigor with human stories ensures that data journalism goes beyond abstraction and connects meaningfully with audiences. It also underscores the epistemological role of data journalism as a bridge between quantitative evidence and qualitative interpretation (Parasie, 2019).

Another key methodological element involves transparency and replicability. Ethical data journalism requires that journalists disclose their sources, methods of cleaning and analyzing data, and the limitations of datasets. This practice ensures credibility and allows others, including citizens and watchdog organizations, to scrutinize findings independently. In India, however, adherence to these standards has been inconsistent due to the absence of a strong culture of data sharing and institutional support in newsrooms. Despite these limitations, innovative Indian start-ups and digital platforms are increasingly

adopting international best practices, indicating a gradual methodological shift toward more systematic, accountable, and participatory data journalism (Kashyap, Mishra, & Bhaskaran, 2022).

6. Case Studies of Data Journalism in Representing the Margins

Several case studies from India demonstrate how data journalism has been mobilized to highlight marginalized voices and uncover systemic inequities. A notable example is *IndiaSpend*, one of the country's first data-driven journalism initiatives, which has published extensive reports on healthcare gaps, gender disparities, and air pollution. By combining government data with independent surveys, IndiaSpend has been able to expose the uneven distribution of healthcare resources across states, drawing attention to the vulnerability of rural populations. Its work illustrates how data journalism can transform abstract numbers into actionable insights that influence public discourse and policymaking (Wu, 2023). Similarly, *DataBaaz*, a digital platform focused on short-form data storytelling, has effectively used infographics and video explainers to communicate issues such as caste-based exclusion and women's workforce participation. By simplifying complex statistics for wider accessibility, it ensures that marginalized concerns reach not only policymakers but also younger, digitally savvy audiences. This represents a methodological shift in Indian media, where marginalized issues are presented in visually engaging formats that resonate across diverse demographics (Kumar & Gaur, 2020).

Grassroots-oriented platforms like *CGNet Swara* also reflect how citizen-driven data collection can function as a form of participatory journalism. Operating primarily through mobile phones, the platform enables tribal communities in central India to report local issues such as land disputes, water scarcity, and governance failures. Though more rudimentary compared to urban digital platforms, CGNet Swara exemplifies how data, even in voice-recorded form, can create new channels of representation for communities otherwise invisible in mainstream media (Corsa, 2014).

These case studies illustrate the pluralistic potential of data journalism in India. From urban digital start-ups to rural citizen-driven initiatives, the adoption of data practices has opened avenues for marginalized communities to gain visibility. Despite challenges of sustainability, these examples affirm that when grounded in evidence, data journalism can serve as a critical democratic tool to foreground social justice concerns (Kashyap & Bhaskaran, 2020).

7. Strengths of Data Journalism in Addressing Social Exclusion

One of the most significant strengths of data journalism in the Indian context lies in its ability to make invisible inequalities visible. By systematically collecting and analyzing data, journalists can highlight disparities in income, education, health, and access to public services that disproportionately affect marginalized communities. Unlike anecdotal reporting, data-driven stories provide verifiable evidence that strengthens claims of exclusion and counters elite narratives that often dominate public discourse. This capacity to transform abstract numbers into comprehensible stories makes data journalism particularly powerful in democratic societies where accountability relies on transparency (Parasie, 2019). Another strength of data journalism is its potential to enhance citizen engagement by making information accessible and interactive. Interactive data visualizations, for instance, empower readers to explore issues such as regional inequalities or caste-based exclusion for themselves. This participatory element allows citizens not only to consume information but also to engage critically with it, which in turn promotes a culture of informed debate and civic responsibility. In India, where media literacy levels are uneven, this ability to simplify complex issues through interactive formats helps broaden inclusivity in public conversations (Kumar & Gaur, 2020).

Furthermore, data journalism strengthens investigative reporting by providing tools for uncovering systemic corruption, governance failures, and corporate malpractices. Indian data journalists have increasingly used government databases and RTI (Right to Information) records to expose inefficiencies in welfare schemes and lapses in environmental regulation. By rooting these stories in datasets rather than isolated testimonies, data journalism enhances credibility and provides a stronger basis for advocacy and policy change. In contexts where marginalized groups lack political power, such investigations serve as vital instruments for amplifying their concerns in public discourse (Kashyap, Bhaskaran, & Mishra, 2020). In sum, the strength of data journalism lies in its dual function as a narrative and accountability tool. It not only ensures that marginalized concerns are made visible but also frames them in ways that demand systemic response, thereby reinforcing journalism's role as a democratic safeguard (Davies & Singh, 2019).

8. Limitations and Challenges in Indian Context

Despite its growing significance, data journalism in India faces substantial limitations that constrain its democratizing potential. One of the foremost challenges is the scarcity of reliable and accessible datasets. Government data is often released in fragmented, outdated, or non-machine-readable formats, making it difficult for journalists to conduct meaningful analysis. Moreover, selective release of data or outright suppression of politically sensitive statistics further undermines the independence of data journalism, restricting its ability to critically scrutinize governance. These constraints not only hinder investigative depth but also raise concerns about state control over information ecosystems (Kashyap, Bhaskaran, & Mishra, 2020).

Institutional limitations within newsrooms also impede the growth of data journalism. Traditional Indian media organizations often prioritize breaking news and event-driven coverage over long-form, data-driven investigations, which require considerable time, financial investment, and technical expertise. This results in reluctance to allocate resources for dedicated data teams, leaving data journalism practices to be driven largely by independent start-ups or small digital-first platforms. The absence of sustained institutional support contributes to uneven adoption, with data journalism remaining concentrated in a handful of urban-centered outlets rather than becoming a mainstream practice across the country (Kashyap, Mishra, & Bhaskaran, 2022).

Another limitation stems from infrastructural and cultural barriers. Many journalists in India lack adequate training in data analysis, coding, and visualization due to gaps in journalism education. While some universities have begun to integrate data journalism into curricula, the overall pedagogical approach remains fragmented. Additionally, digital divides persist, with rural journalists and smaller media houses lacking access to the technological infrastructure needed to effectively practice data journalism. These disparities exacerbate inequalities within the media industry itself, reinforcing elite dominance in data-driven storytelling (Kumar & Sahu, 2022).

Therefore, while data journalism in India offers immense potential for enhancing transparency and inclusivity, it remains constrained by systemic obstacles in data availability, newsroom culture, and infrastructural access. Overcoming these challenges will require not only institutional reforms but also stronger collaborations between academia, civil society, and media organizations (Rodrigues, 2019).

9. Ethical and Editorial Concerns

Ethical considerations form a central challenge in the practice of data journalism in India, particularly when dealing with sensitive issues of marginalized representation. One of the primary concerns is the risk

of misinterpretation or misuse of data. Numbers can often obscure social complexities, leading to reductive narratives that fail to capture the lived realities of vulnerable communities. This raises ethical questions about whether data journalism inadvertently reproduces the very exclusions it seeks to address. For instance, data sets on gender violence may highlight frequency but overlook qualitative experiences of survivors, thereby privileging quantification over contextual nuance (De Maeyer, Libert, Domingo, Heinderyckx, & Le Cam, 2015).

Another editorial concern lies in the lack of transparency in sourcing and methodology. Ethical data journalism requires journalists to disclose where data originates, how it is cleaned, and what limitations exist. However, studies suggest that Indian newsrooms often exhibit apathy toward transparency, especially in legacy organizations. This not only undermines credibility but also diminishes public trust in data-driven reporting. Conversely, digitally native platforms have shown greater willingness to adopt transparency and interactivity, reflecting a generational divide in editorial practices (Kashyap, Mishra, & Bhaskaran, 2022).

Editorial independence also emerges as a contested terrain. With increasing corporate ownership and political influence in Indian media, there is a danger that data journalism may be selectively deployed to serve elite interests rather than public accountability. The suppression of politically sensitive datasets, combined with pressures to frame stories in commercially viable ways, compromises ethical obligations toward inclusivity and fairness. In this sense, data journalism's democratizing promise is often curtailed by the structural realities of Indian media markets (Rodrigues, 2019).

Ultimately, ethical and editorial concerns in Indian data journalism highlight the need for stronger professional standards, transparency protocols, and training in critical data literacy. Without such safeguards, the risk remains that data journalism could reinforce inequalities instead of challenging them, undermining its transformative potential (Baranova & Shnaider, 2022).

10. Comparative Perspectives

When situated within a global context, the evolution of data journalism in India reflects both parallels and divergences with practices in other regions. In Western countries such as the United States and the United Kingdom, data journalism has become institutionalized within mainstream newsrooms, supported by dedicated teams of data scientists, coders, and visualization experts. This institutional support has enabled organizations like *The New York Times* and *The Guardian* to experiment with interactive storytelling and large-scale investigative projects, which in turn set benchmarks for the field. By contrast, in India, the adoption of data journalism has been slower and primarily led by smaller digital-first outlets, reflecting the constraints of limited resources and uneven technological infrastructure (Parasie, 2019).

Looking at regional comparisons, countries in Asia present a mixed picture. In Singapore and Thailand, data journalism start-ups have emerged as alternative media actors, often positioned to counter declining press freedoms and highlight social inequalities. These start-ups, while not always profit-driven, focus on creating socially relevant content and challenging government narratives, offering useful parallels for India where independent initiatives such as *IndiaSpend* and *DataBaaz* play similar roles. However, unlike these Southeast Asian cases, Indian data journalism operates within a relatively larger and more pluralistic media ecosystem, though it remains vulnerable to political and corporate pressures (Wu, 2023).

Another instructive comparison comes from the Pacific, where small island nations have struggled with incorporating data journalism due to infrastructural and educational barriers. Much like rural India, these contexts reveal how lack of technological access and insufficient training hinder the mainstreaming of data journalism practices. However, while Pacific journalism remains marginal in terms of global

visibility, India's large-scale democracy and expanding digital ecosystem provide greater opportunities for scaling data-driven practices, if institutional reforms are pursued (Davies & Singh, 2019).

Thus, comparative perspectives underscore that while India shares challenges with other developing regions, its scale, diversity, and vibrant civil society provide unique opportunities for data journalism to evolve into a mainstream practice. Bridging these global insights with local needs remains critical for realizing its transformative role (De Maeyer et al., 2015).

11. Future Directions for Data Journalism in India

The future of data journalism in India is closely tied to the broader transformations within its media ecosystem, where digitalization, technological innovation, and rising civic engagement converge. A key direction involves strengthening the culture of open data. While India has launched initiatives such as the *Open Government Data Platform*, access remains fragmented and inconsistent. Expanding open data policies and ensuring timely, machine-readable releases would provide journalists with more reliable resources for accountability reporting. This would also reduce reliance on leaks and unofficial sources, enhancing both credibility and independence of data journalism (Aimen, 2024).

Another crucial future pathway lies in journalism education. Current curricula remain inadequate in equipping students with data literacy, coding, and visualization skills. Embedding interdisciplinary approaches that integrate computer science, statistics, and critical social theory into journalism training can help build a new generation of journalists capable of innovating within data-rich environments. Universities and media organizations must collaborate to develop specialized modules, workshops, and hands-on projects that bridge the gap between academia and industry (Kumar & Sahu, 2022).

Technological innovation also promises to redefine the future trajectory of Indian data journalism. Advances in artificial intelligence, natural language processing, and automation can streamline data collection, fact-checking, and visualization processes, making them more efficient and accessible. However, this requires careful ethical frameworks to avoid algorithmic biases that may reinforce existing exclusions. If leveraged responsibly, these technologies can democratize data journalism further by enabling smaller organizations and local journalists to engage in impactful reporting (Baranova & Shnaider, 2022).

Ultimately, the future of data journalism in India will depend on its ability to balance technological advancements with contextual sensitivity. By embedding inclusivity, transparency, and collaboration at the core of its practices, Indian data journalism can move from being a niche practice to a mainstream force that not only informs but also empowers citizens (Wu, 2023).

12. Conclusion

The rise of data journalism in India signals a transformative shift in how the media engages with issues of inequality, representation, and accountability. Rooted in the intersection of technology, statistics, and storytelling, data journalism provides journalists with the tools to uncover hidden disparities and amplify voices traditionally excluded from mainstream narratives. While its evolution in India has been gradual, marked initially by election reporting and later consolidated through digital-first initiatives like *IndiaSpend* and *DataBaaz*, its trajectory underscores both the opportunities and obstacles inherent in embedding data-driven practices within a pluralistic but resource-constrained media environment. Case studies of urban start-ups and grassroots platforms such as *CGNet Swara* demonstrate how data can empower marginalized groups and broaden democratic participation by transforming abstract numbers into tangible evidence of lived inequalities. At the same time, the field faces formidable challenges,

including unreliable and inaccessible datasets, insufficient institutional support, infrastructural divides, and editorial cultures that prioritize speed over depth. Ethical concerns surrounding transparency, accuracy, and inclusivity also remain pressing, as poorly contextualized data risks reinforcing rather than dismantling social exclusions. Yet, comparative insights suggest that India, unlike many other developing regions, possesses unique opportunities to scale data journalism due to its expansive democracy, vibrant digital ecosystem, and growing civic engagement. Looking ahead, the consolidation of open data policies, investments in journalism education, and the responsible integration of emerging technologies such as AI and automation can significantly strengthen data journalism's capacity to deliver on its democratic promise. If guided by principles of inclusivity, accountability, and contextual sensitivity, data journalism in India has the potential not only to enhance media credibility but also to transform journalism from a passive chronicler of events into an active enabler of social justice, ensuring that the realities of the marginalized are no longer unseen but meaningfully represented in the national discourse.

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