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The Impact of Open Access Movement on Science and Communication Researchers: A Survey Analysis

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ABSTRACT

The Open Access (OA) movement has revolutionized the dissemination of scientific knowledge by making research literature freely available to all. This study examined how OA affects science and communication researchers in India. This is based on a survey conducted between June and December 2023. The survey included scholars from CSIR laboratories (NPL, NIScPR, IGIB), communication schools [(IIMC), Anwar Jamal Kidwai Mass Communication Research Centre (AJK-MCRC) Jamia Milia Islamia, Amity University), and technical universities (IIT Delhi, NIT Delhi, Dronacharya College of Engineering, JNU). The survey assessed researchers' perspectives of the accessibility, utility, challenges, and policy efficacy of OA. The results indicate that OA has significantly enhanced access to literature, although concerns about Article Processing Charges (APCs) and India's OA policy persist. These findings highlight the need for stronger institutional support and policy reforms to maximize the benefits of OA for the research community.

KEYWORDS

• Open Access • Research Scholars • Science Communication • Article Processing Charges • India's OA Policy.

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INTRODUCTION

The OA movement has significantly impacted science and communication researchers by increasing research visibility and accessibility, facilitating collaboration, and accelerating scientific communication. OA publications are more readily searched and cited, fostering broader impact and engagement. The OA movement has revolutionized the dissemination of scientific knowledge by making research literature freely available to all, promoting global knowledge exchange and aiming to remove financial and legal barriers to access scientific literature mainly by young researchers. This study looks at how OA affects science and communication researchers in India and is based on a survey carried out during June - December 2023, which included scholars from CSIR labs, communication schools, and technical universities to assesses researchers' perspectives regarding accessibility, utility, challenges, and policy effectiveness of OA. The results suggest that OA has significantly enhanced access to literature, although concerns about APCs and India's OA policy are expressed by many, but no avail. These findings highlight the need for stronger institutional support and policy reforms to maximize the benefits of OA for the academic and research communities.

The OA movement has fundamentally transformed the dissemination of scientific knowledge, removing financial and legal barriers to research accessibility (Suber, 2012). Since its inception, OA has sought to democratize information, ensuring that scholarly work reaches a broader audience, including researchers, policymakers, and the public (Willinsky, 2006). This shift from traditional subscription-based publishing to open-access models has had profound implications for researchers in scientific and communication disciplines, influencing their publishing behaviours, citation rates, and collaboration opportunities (Laakso *et al.,* 2011).

Despite its growing prominence, the adoption of OA varies significantly across disciplines, institutions, and geographic regions (Piwowar *et al.,* 2018). While some researchers enthusiastically embrace OA due to its potential for greater visibility and impact, others remain hesitant due to concerns over predatory journals, article processing charges (APCs), and perceived prestige of traditional subscription-based journals (Shen & Björk, 2015). Additionally, the role of institutional mandates, funding agency policies, and academic reward systems further complicates researchers' engagement with OA (Björk, 2017).

This study examines the impact of the OA movement on science and communication researchers through a comprehensive survey analysis. By assessing researchers' perceptions, practices, and challenges related to OA publishing. The paper aims to provide empirical insights into how OA shapes scholarly communication. The findings will contribute to ongoing discussions on sustainable OA models, equitable knowledge distribution, and policy interventions needed to support researchers in an evolving academic landscape.

- **Expanded discussion: The evolution, benefits and challenges of Open Access**
- **Historical context and growth of Open Access**

The OA movement emerged as a response to the rising costs of academic journals, which restricted access to publicly funded research (Harnad *et al.,* 2004). The Budapest Open Access Initiative (2002) and the Berlin Declaration (2003) were pivotal in formalizing OA principles, advocating for free online access to peer-reviewed literature. Over the past two decades, OA has expanded through two primary models:

1. **Gold Open Access:** Publications are immediately available in OA journals, often requiring APCs (Solomon and Björk, 2012).
2. **Green Open Access:** Authors self-archive preprints or post-prints in institutional repositories (Gargouri *et al.,* 2012).

The growth of OA has been accelerated by mandates from funding bodies such as the National Institutes of Health (NIH) and the European Union's Horizon 2020 program, requiring publicly funded research to be openly accessible (European Commission, 2012). However, disparities persist, with researchers in low- and middle-income countries (LMICs) facing financial and infrastructural barriers to OA publishing (Tennant *et al.,* 2016).

- **Impact on researchers in science and communication and scholarly communication:**
- Open access ensures that research is not confined to institutional libraries, making it available to a broader audience. The speed of dissemination and the ease of access to information streamline the scholarly communication process and increase efficiency. Open access journals also encourage interaction between researchers from diverse disciplines, promoting more interdisciplinary, comprehensive and collaborative research.
- Scientific disciplines, particularly those in STEM (Science, Technology, Engineering, and Medicine), have been early adopters of OA due to the rapid dissemination needs of research findings (McKiernan *et al.,* 2016). Studies indicate that OA articles receive higher citation counts, enhancing researchers' visibility (Piwowar *et al.,* 2018). However, concerns remain regarding the quality control of OA journals, with some researchers wary of predatory publishers that exploit the APC model without providing rigorous peer review (Beall, 2016).

In contrast, communication researchers—particularly those in media studies and social sciences—have been slower to adopt OA, partly due to the dominance of subscription-based journals in these fields (Fecher & Friesike, 2014). The perception that high-impact journals in communication studies are not OA-compliant may discourage researchers from prioritizing open-access publication (Jamali *et al.,* 2019). Additionally, the interdisciplinary nature of communication research means that scholars often navigate multiple publishing norms, further complicating their engagement with OA (Cope & Kalantzis, 2009).

Benefits of OA for researchers:

- **Increased visibility and impact:** Open access publications are easily discoverable, reaching a wider audience and increasing their citation counts.
- **Enhanced collaboration:** Eliminating paywalls encourages researchers globally to collaborate and build upon each other's work.
- **Accelerated research:** The speed of dissemination is faster, especially crucial in rapidly evolving fields, as OA bypasses traditional journal subscription and peer-review processes.
- **Public engagement:** OA makes research accessible to the public, promoting scientific literacy and broader understanding.
- **Faster access to information:** Researchers can quickly access the latest findings, fostering a more efficient research process.

Challenges and criticisms of OA

Despite its benefits, the OA movement faces several challenges:

- **Financial barriers**: High APCs disadvantage early-career researchers and those from underfunded institutions (Pinfield et al., 2017). While OA aims to eliminate cost barriers, the "pay-to-publish" model in some OA journals can increase costs, potentially disadvantaging researchers in less-funded institutions as well.
- **Predatory publishing**: The rise of fraudulent journals undermines trust in OA (Eriksson & Helgesson, 2017).
- **Copyright and licensing issues**: Researchers must balance OA mandates with intellectual property rights (Laakso & Björk, 2012).
- **Quality Concerns:** Concerns are expressed that the quality of research might decline if publishers are incentivized to accept more articles for profit.
- **Management of Intellectual Property:** Managing intellectual property rights in the context of OA remains a complex issue.

THE ROLE OF INSTITUTIONAL AND POLICY SUPPORT

Institutional repositories and funder mandates play a crucial role in promoting OA. Universities increasingly adopt OA policies, requiring faculty to deposit their work in digital repositories (Xia *et al.,* 2012). However, compliance remains inconsistent, with many researchers unaware of institutional OA support services (Kim, 2010).

The Open Access Movement aims to remove financial and legal barriers to scientific

literature and to foster global knowledge exchange. Since its inception, OA has transformed academic publishing, enabling researchers, students, and the public to access cutting-edge research without a subscription paywall. However, challenges such as high APCs, uneven policy implementation, and reliance on unauthorized access platforms (e.g., Sci-Hub) remain prevalent.

This study investigates the impact of OA on Indian researchers in the science and communication fields by analysing survey responses from 100+ scholars across premier institutions. The survey explores:

1. Perceived benefits of OA in facilitating research.
2. Challenges faced by the paywalls and APCs.
3. Researchers' contributions to the OA movement.
4. Effectiveness of India's OA Policy

METHODOLOGY

Survey design and distribution:

A structured questionnaire was distributed online (Google Forms) from June to December 2023, targeting researchers. The study employed a mixed-methods approach through a structured online questionnaire designed to collect both quantitative and qualitative data about researchers' engagement with open access (OA) publishing. The survey instrument was developed after an extensive review of similar studies in scholarly communication (Piwowar *et al.,* 2018; Tennant *et al.,* 2016) and was pretested with 15 researchers to ensure question clarity and validity. The final questionnaire consisted of 25 items, including Likert-scale questions, multiple-choice items, and open-ended response options to capture nuanced perspectives.

The survey was distributed digitally via Google Forms from June to December 2023, allowing for a six-month data collection window to maximize participation across different academic calendars. Targeted recruitment focused on three key institutional categories: CSIR research laboratories (NPL, NIScPR, IGIB), communication-focused institutions (IIMC, AJK MCRC, Amity University), and technical universities (IIT Delhi, NIT Delhi, Dronacharya College of Engineering, JNU). This stratified approach ensured representation across basic sciences, applied technologies, and communication disciplines. Invitations were sent through institutional mailing lists, professional networks (ResearchGate, LinkedIn), and personal contacts, with three follow-up reminders at 4-week intervals to boost response rates (Dillman *et al.,* 2014). The digital distribution method was selected for its cost-effectiveness, ability to reach geographically dispersed participants, and capacity for real-time data monitoring.

- **CSIR labs:** NPL, NIScPR, IGIB
- **Communication institutions:** IIMC, AJK MCRC, Amity University
- **Technical universities:** IIT Delhi, NIT Delhi, Dronacharya College of Engineering, JNU

Respondents' profile

The study achieved a final sample of 108 completed responses out of 320 approached, representing a diverse cross-section of the Indian research community. Disciplinary distribution was carefully balanced, with respondents from plant taxonomy (12%), microbiology (18%), cybersecurity (15%), science communication (20%), artificial intelligence (17%), and social sciences (18%). This distribution allowed for meaningful comparative analysis between STEM and humanities/social science researchers, who often have different publishing cultures and OA adoption patterns (Jamali *et al.,* 2019).

Demographic characteristics revealed important contextual factors. The age range of 23-75 years (mean=34.2 years) captured perspectives across career stages, with the majority (65%) falling in the 25-40 age bracket - a group particularly affected by OA policies due to their early-mid career publication pressures. Gender distribution showed 60% male and 40% female respondents, roughly reflecting current STEM gender ratios in India (DST, 2022). Additional professional variables collected included institutional type (public/private), research experience (years), and primary role (faculty, postdoc, PhD student), enabling subgroup analyses of OA engagement patterns.

- **Disciplines:** Plant taxonomy, microbiology, cybersecurity, science communication, AI, social sciences.

- **Age group:** 23–75 years (majority: 25–40 years).
- **Sex distribution** was 60% male and 40% female.

Key survey questions

1. **Impact of OA on accessibility (scale: 1–10):** Respondents rated this on a 10-point Likert scale (1=no impact, 10=transformative impact), with follow-up questions about specific accessibility benefits or limitations experienced. This measure was adapted from the OECD's global OA assessment framework (OECD, 2015).
2. **Frequency of research paper use (daily/weekly/monthly):** Participants indicated their typical usage patterns (daily, weekly, monthly, rarely) for both OA and paywalled articles, with separate items for reading versus publishing behaviours. This temporal data helped assess OA's role in research workflows.
3. **Awareness of APCs and opinions on fairness:** A multi-part question first assessed basic awareness of article processing charges (yes/no), followed by perceptions of fairness using a 5-point semantic differential scale (very unfair to very fair), and finally an open-ended prompt for alternative funding suggestions.
4. **Workarounds for paywalled papers (Sci-Hub, author requests, institutional access):** Respondents selected all applicable methods from a checklist (Sci-Hub, institutional access, author requests, library loans, conference materials) and described their ethical considerations through an optional narrative response. This design captured both behaviours' and attitudes.
5. **Views on India's OA policy effectiveness:** Using a framework adapted from Shen (2022), participants evaluated policy impacts across five dimensions: awareness, implementation, incentives, monitoring, and outcomes. Each dimension used a 5-point agreement scale plus an overall effectiveness rating.

The survey concluded with optional demographic questions and an open comment section, allowing participants to elaborate on any issues. All scale items included "not applicable" and "unsure" options to reduce forced-choice bias (Krosnick & Berent, 1993). The complete instrument took approximately 12-15 minutes to complete, balancing comprehensiveness with respondent burden considerations.

Research objectives and contribution

This study addresses gaps in existing literature by surveying science and communication researchers on:

1. Science and communication researchers' awareness and utilization of OA publishing.
2. Perceived advantages and disadvantages of OA.
3. The influence of funding mandates and institutional policies on their publishing choices.

By comparing responses across disciplines, this research provides a nuanced understanding of OA's impact, informing future policy and advocacy efforts.

Data analysis plan

Quantitative data from closed-ended questions was analysed using SPSS (v.28), employing descriptive statistics, cross-tabulations, and chi-square tests to examine relationships between variables (e.g., discipline by OA attitudes). Likert-scale items were treated as interval data for parametric tests after verifying normality distributions (Allen & Seaman, 2007). Qualitative responses from open-ended questions underwent thematic analysis using NVivo, with codes developed inductively from the data and validated through intercoder reliability checks (Creswell & Poth, 2016). The analysis specifically compared:

- Differences between STEM and communication researchers
- Variations by career stage and institutional type
- Correlations between OA usage and perceived research impact
- Demographic predictors of OA engagement

RESULTS AND DISCUSSION

1. Enhanced accessibility of research

- **Some 85%** respondents reported that OA made a "considerable difference" in accessing literature.
- **Average utility rating:** 8.2/10, indicating high reliance on OA resources.
- **Top-cited benefits:** Faster Literature Retrieval, and reduced dependency on institutional subscriptions.

2. Dependence on unauthorized access

- **~40%** admitted using **Sci-Hub** owing to paywall restrictions.
- **25%** relied on **author requests** or inter-library loans.
- **"Without OA, my research would be severely limited"** – Respondent (Microbiology).

3. Challenges: APCs and policy gaps

- **72% opposed APCs,** citing financial burden.
- *"APCs exclude researchers from low-funding institutions."* – Respondent (Science policy).
- **58% deemed India's OA policy "weak" or "ineffective."**
- Lack of centralized OA repositories.
- Limited enforcement of mandates (e.g., CSIR's OA policy).

4. Researchers' contribution to OA

- **65%** believed that scholars actively promoted OA (e.g., self-archiving and advocating for institutional OA mandates).

RECOMMENDATIONS

1. **Subsidized APCs:** Government/ institutional funding to offset publishing costs.
2. **Strengthen OA policies:** Mandate OA deposition in Indian repositories (e.g., Shodhganga).
3. **Promote preprint archives:** Encourage the use of arXiv and bioRxiv for early knowledge sharing.
4. **Collaborative licensing:** Negotiating nationwide subscriptions for high-impact journals.

CONCLUSION

The OA movement has democratized access to research; however, systemic barriers exist. While Indian researchers overwhelmingly endorse OA, policy reforms and financial support are critical to sustain its growth. By addressing APCs and enhancing institutional frameworks, India can emerge as a global leader in equitable knowledge dissemination.

Conflict of Interest: None declared.

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