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Science Journalism in the Digital Bharat: Envisioning Libraries as Vanguard in Empowering Science Knowledge among the Masses

Rajesh Singh
University Librarian
Delhi University Library System
University of Delhi. India

ABSTRACT

In India's rapidly expanding digital landscape, science journalism plays a vital role in connecting scientific advancements with the general public. This study examines the evolving role of libraries in enhancing science journalism within Digital Bharat, highlighting their potential to empower communities with scientific knowledge. Utilizing a qualitative approach, including literature reviews and analyses of both historical and current science journalism practices, the research identifies a significant gap: science journalism constitutes only 3% of content across print, TV, and radio.

The findings indicate that despite India's impressive scientific and technological progress, there is a notable deficiency in effective science communication. Libraries emerge as crucial institutions that can address this shortfall by leveraging their resources and digital capabilities to broaden the dissemination of science content. The study highlights libraries' role in combating misinformation and promoting accurate science journalism across various digital platforms, and advocates for their involvement in science education by providing accessible and reliable content.

This research is original in its focus on the intersection of libraries and science journalism within Digital Bharat, proposing a model for libraries to enhance science communication. It advocates for a collaborative approach, where libraries, supported by digital media, play a key role in advancing science journalism and supporting a scientifically informed society.

Keywords: Digital Bharat, Digital Media, Fake News, Government Initiatives, Information Dissemination, Libraries and Information Centers, Misinformation, Public Awareness, Science Communication, Science Journalism

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1. Introduction

Science journalism is becoming increasingly critical in providing the general public with an understanding of science in the age of Digital Bharat, where information and technology are developing rapidly. As Scientific and technological advancements continue in India, it is crucial to ensure that the general public is adequately informed. Libraries, as repositories of information and knowledge, can lead the way in this endeavour by facilitating communication between laypeople and the world of science. Science journalism in India has a long history, extending back to the early nineteenth century when the monthly Digdarshan was published in Hindi, Bengali, and English [1]. Science communication has grown in independent India, with the government and non-governmental organisations launching a variety of activities and programmes to promote science and technology through information transmission [2]. Currently, science coverage in the media is highly inadequate, accounting for only approximately 3% of overall content, well below the required threshold of 10-15% [1]. Science coverage accounts for approximately 3.4% of print media, 2.18% of television, and 5.84% of radio material, indicating a concerning gap in the distribution of science knowledge through mainstream media channels [3], [1]. This emphasises the need for a more coordinated effort to increase the quality and quantity of science journalism in the country. As India enters the digital age, it is critical to use digital media to democratise and decentralised Science knowledge [2]-[4]. On the other hand, social media has incredibly captured Indian society in terms of promotion, entertainment, and communication, among other aspects. However, it is also not free from criticism. A 2019 Microsoft study indicated that over 64% of Indians encounter fake news online, the highest rate among 22 countries surveyed [5]. During the recent 18th Indian Science Communication Congress (ISCC-2018), themed "200 Years of Science Journalism in India," hosted by the CSIR-National Institute of Science Communication and Information Resources, experts given stressed on how vital science news is to the incident and how fake and misleading science news must end [6].

Libraries, with their rich holdings and competence in managing information, could play a vital role in this phase of change. Libraries can ensure that scientific knowledge is accessible and engaging to the general public by collecting and sharing scientific content through various digital media formats. In addition, libraries and information centers can play an effective role in combating fake news, as they are centers of authenticity and accuracy. The paper examines the crucial role that libraries can play in promoting scientific knowledge and how they can utilise digital tools to disseminate scientific understanding to every corner of India.

1.1. Concept of Science Journalism

Journalism encompasses the collection, verification, and dissemination of information to the public, covering a wide range of subjects, including daily national and international news, science, technological advancements, and many more, through both electronic and print media. Journalism is a medium that facilitates understanding of complex issues and fosters critical thinking among the general public. Furthermore, it plays a crucial role in raising awareness of recent developments among the masses, which can make human day-to-day lives easier. Science Journalism is a specialised branch which assists in minimizing the gap between the Science community and the general public through various media. In other words, science journalism refers to the communication of Scientific and technological developments to the general public through multiple media channels, such as newspapers, radio, TV, and online platforms, empowering people to combat hunger, diseases, misinformation, social evils, and many other challenges by providing them with accurate and reliable information. Various forms of science journalism media, which include print media, audio and video

broadcasts, folk media, interactive platforms, and digital media. The proliferation of the internet and digital media has revolutionized all aspects of promotion, significantly impacting science journalism by enhancing its reach, engagement, and accessibility. However, this expansion has introduced numerous challenges, including the proliferation of misinformation.

Science journalism in Digital Bharat has a long-standing history, dating back to 1818, with the publication of the monthly magazine 'Digdarshan' from Srirampore, Bengal, in Bharat. It published a selection of articles in Hindi, Bengali, and English, covering various aspects of science and technological advancements in India [7]. It converts Science research findings into accessible language, enabling the general public to easily understand complex concepts and apply them in their daily lives. To better understand the concept of science journalism, consider the example of a recent application developed at IIT Mandi that uses artificial intelligence (AI) to detect diseases in potato crops automatically. Using images of potato leaves, this application demonstrates how agriculture and technology can collaborate to prevent plant diseases. The IIT Mandi team has highlighted the destructive effects of the potato blight epidemic, pointing out that millions of people in Ireland lost their lives to its horrors in the middle of the nineteenth century. In India, identifying potato blight diseases has required a lot of manual labour. However, the development of AI-based programs, such as this one, could help mitigate these issues. However, a critical question still needs to be answered: Are farmers in rural areas sufficiently aware of and equipped with these cutting-edge technologies? [7]. Hence, good Science journalism can help alleviate these types of difficulties by transforming knowledge in remote locations through the use of popular digital media platforms that are both highly effective and widely accessible. However, several persistent problems remain, including the spread of misinformation in society.

2. Purpose of the Study

Science journalism has been rapidly emerging worldwide, including in India. Several factors contribute to this rise in India, including the increasing integration of science into human life, the need to bridge the gap between science and society, combating misinformation, and improving socio-economic conditions in rural areas through the application of science and technology in farming. Compelling science journalism has the potential to eradicate poverty, superstition, and other societal issues. During the COVID-19 pandemic, many people died from consuming pesticides, highlighting the impact of poor health literacy. Therefore, for holistic development, there is a dire need for the implementation of science journalism in India. India is moving towards implementing digital culture, and henceforth, the Govt. of India has taken several initiatives like Digital India, Make in India, Atmanirbhar Bharat, and Connecting people through the Internet from every corner of Bharat. Therefore, it presents a bright opportunity for India to promote Science Journalism through digital media to every corner of India. With these factors in mind, this study aims to investigate the current state of science journalism in Digital Bharat, explore the challenges and opportunities for expanding Science journalism in the digital era, and examine how libraries can effectively and efficiently disseminate science journalism in Indian society.

3. Methodology

This study was conducted using a method of exploration. Three research topics were developed based on the current state of science journalism after conducting a literature review. To answer these questions, a range of relevant materials was examined, including articles, review papers, newspapers, magazines, and websites. Each document was analysed correctly and presented per the study questions.

4. Discussion

1. RQ. What is the current state of science journalism in Digital Bharat, and how well does it suit the needs of an educated and scientifically aware population?

India's Achievements in Science and Technology

India is ranked 40th out of 132 economies in the 2023 Global Innovation Index, according to data released by the World Intellectual Property Organisation. The country's ranking has consistently improved from 81st in 2015 to 40th in 2023. The Prime Minister of India emphasized during the Atma Nirbhar Bharat initiative that self-reliance is essential for the country to tackle unprecedented crises like COVID-19 [8] effectively. In the 104th Indian Science Congress meeting, the Prime Minister of India said that "By 2030, India will be among the top three countries in science and technology [9]". According to the QS World University Rankings, India ranks 4th globally in research output [9]. India has made significant advances in science and technology, setting essential records in a wide range of disciplines. The following are the key contributions and accomplishments that underscore India's growing prominence in the global scientific landscape. One of India's most significant achievements in the realm of space research was becoming the fourth nation in history to successfully land Chandrayaan-3 on the Moon [10]. The ₹1 lakh crore fund suggested in the interim Budget for 2024–2025 to boost the country's research and innovation ecosystem has left the Science community ecstatic. The previous slogans, such as "Jai Jawan Jai Kisan" (by Lal Bahadur Shastri), "Jai Jawan, Jai Kisan, Jai Vigyan" (by A.B. Vajpayee), and now "Jai Jawan, Jai Kisan, Jai Vigyan, Jai Anusandhan" (by PM Narendra Modi), have also been changed. These changes aim to strengthen the foundation for innovation and research for development [11]. India is a prominent player in the global pharmaceutical and vaccine industry. It ranks third in volume and fifteenth in value, and it is the world's largest supplier of generic medications, accounting for 20% of the global supply and roughly 60% of vaccinations [12]. Science and technological development are crucial for the growth and advancement of any country, but science journalism also deserves equal priority to communicate and support these advancements effectively. India has achieved tremendous gains in research production, innovation, public participation, and science communication, reflecting its strong scientific background and technical developments, yet obstacles still exist.

Science Journalism initiatives by the Government of India

India has undertaken various initiatives to enhance science journalism and improve science communication nationwide. These efforts aim to bridge the gap between the Science community and the general public, fostering a scientifically literate society. Here are some key initiatives and developments in this area:

1. National Council of Science Museums: The National Council of Science Museums (NCSM) was founded on April 4, 1978, and is housed under the Ministry of Culture, Government of India. It has established 26 science centers and museums across the country. To make science more accessible to both urban and rural communities, the National Council of Science Museums (NCSM) organizes exhibitions, seminars, mobile displays and science camps; it fosters a Science attitude and raises public awareness through a variety of initiatives; it preserves significant historical objects related to science and technology; it offers training to museum personnel and enhances science education; and it supports educational and technical institutions in their efforts to establish science museums and train museum personnel. Additionally, it runs 23 mobile Science exhibitions across the nation to raise awareness of science and technology in rural areas and give kids and science enthusiasts a hands-on learning experience [13].

2. Doordarshan and the Department of Science and Technology (DST): To increase public awareness of science, Doordarshan and the Department of Science and Technology (DST) established two platforms, India Science Channels and DD Science. DD Science is televised on Monday through Saturday, but India Science is accessible online around the clock. To make Science knowledge more accessible, both platforms provide speeches, films, interviews, and instructional materials [14].

3. Indian Science and Technology Innovation Web Portal: The India Science, Technology, and Innovation Portal (ISTI) is an online resource for learning about Science, technology, and innovation breakthroughs in India. It brings together stakeholders, showcases Science organizations, and offers information on grants, fellowships, and events. The web portal is designed and developed by VigyanPrasar. It was especially beneficial during the COVID-19 epidemic, as it provides a thorough reference to the disease, its symptoms, transmission, and prevention strategies. It includes R&D updates, infographics for easier comprehension, and solutions to frequently asked questions and prevalent rumors [15].

4. Bilingual e-Newsletter (Hindi, English and Urdu): During the COVID-19 epidemic, Vigyan Prasar launched special issues and effective e-newsletters. The "Weekly e-Newsletter on COVID-19" delivers timely updates and vital information. The monthly journal "Dream 2047 on COVID-19" offers in-depth research and insights into the pandemic's consequences and responses. Furthermore, the creative "Storytelling through Comic Character" program employs compelling tales to educate and inform the audience about COVID-19 in a way that is both understandable and sympathetic. In addition, Vigyan Prasar has released a new VIPNET Newsletter, titled 'CURIOSITY'. This publication provides a forum for science clubs to exchange ideas, thoughts, and stay current on various scientific and technological breakthroughs. The Department of Science and Technology has also introduced an interactive multimedia guide called "COVID-KATHA". The primary objective of this initiative is to equip the general public with the essential knowledge needed to address the pandemic effectively. Science Reporter, one of NISCPR's oldest publications, focuses on global developments in science and technology. During the COVID-19 pandemic, it published a special edition that addressed various issues related to pandemic mitigation. Similarly, STRIDES (Science Technology Research Innovations and Developments) launched an e-newsletter emphasizing current achievements in India, with the 2020 edition focusing on the COVID-19 pandemic [15].

India, the world's largest democracy, relies heavily on its media to support democratic processes. As of March 31, 2022, the country had 146,045 registered print publications, including newspapers and periodicals, according to "The Press in India 2021-22" report. This underscores the critical role of journalism in India's democratic and developmental landscape. With India's vast linguistic diversity, where languages shift every few kilometres, effective communication in journalism could be challenging. Nevertheless, the report suggests that language is increasingly less of a barrier to compelling journalism. In the 2021-22 period, the majority of publications were in Hindi (16,793), followed by Marathi (2,807), English (2,485), Telugu (2,248), Gujarati (2,028), Urdu (1,701), Kannada (1,300), Tamil (869), Bengali (531), Odia (446), and Malayalam (346) [16].

Despite the expansive reach of print media, science and technology coverage in Indian newspapers is insufficient. A 2015 study found science news constituted only 3.4% of print media, 2.18% of TV, and 5.84% of radio content, whereas experts suggest it should represent 10% to 15% of news coverage. In comparison, science news in the U.S. made up 12% to 18% of daily media in 2005 [19]. Currently, only one newspaper, *Vaigyanik

Drishtikon*, exclusively focuses on science communication [20][21].

All India Radio (AIR), one of the largest media organizations globally, has expanded significantly and now reaches nearly the entire Indian population through 262 radio stations, covering 92% of the country. AIR broadcasts in 23 languages and 146 dialects, serving a diverse audience from various socioeconomic and cultural backgrounds [22]. Since 2008, "Science & Technology through Radio," a flagship program of Vigyan Prasar, has been produced in 19 languages and broadcast across 121 All India Radio (AIR) stations [23].

However, TV ownership has surged, with approximately 210 million sets in households as of the latest estimates, up from 197 million in 2018. TV viewership has also increased by 6.7%, from 836 million to 892 million [24]. Recent studies indicate that 78% of Indians prefer streaming TV shows, with comedy being the most popular genre, reflecting a shift towards digital entertainment [25]. Despite government efforts to disseminate information about science and technology, the effectiveness of these initiatives remains uncertain.

2. RQ. What are the opportunities and challenges in expanding science journalism in Digital Bharat?

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Science journalism in Digital Bharat presents remarkable opportunities to expand its reach nationwide through digital media, yet it faces significant challenges.

The National Education Policy (NEP) 2020, heralded as a transformative measure for India's education system after 34 years, is founded on five pillars: access, equity, quality, affordability, and accountability. The policy promotes interdisciplinary and holistic educational approaches, aiming to cultivate critical thinking and problem-solving skills among students. This framework could potentially integrate science journalism into the curriculum, bridging the gap between science and society and enhancing public understanding of scientific advancements.

Despite its ambitious goals, NEP 2020 encounters substantial obstacles. India's education system, the third-largest globally, comprises over 1.5 million schools, 9.6 million teachers, and 264 million students, according to UDISEPlus data from the Department of School Education and Literacy [27]. The All India Survey on Higher Education (AISHE) 2020-2021 reports 1,113 universities, 43,796 colleges, and 11,296 standalone institutions, with a faculty of 1,551,070 [28]. Integrating science journalism into existing curricula could pose challenges for educators, who may need additional training to grasp new scientific concepts and terminology.

This training could be both costly and time-consuming.

Launched in 2015, the Digital India initiative aims to create a digitally empowered society and knowledge-based economy by expanding high-speed internet access to rural areas [29][30]. This initiative provides a significant opportunity for the Indian science community to enhance science education in remote areas and improve living standards. However, digital literacy remains a contentious issue. The Ministry of Labour & Employment reports that while 38% of Indian households are literate, only 61% of urban residents are digitally literate compared to 25% in rural areas [31]. Additionally, the NSS 78th report reveals that only 24.7% of Indians aged 15 and above are computer literate, with 18.1% residing in rural regions [32]. These figures highlight the challenges facing the Digital India initiative.

The rise of social media has significantly impacted global information consumption. According to Pew Re- barriers continue to pose challenges [35].

search Center, social media now surpasses print media among young people for news consumption [33]. By 2023, there were 4.9 billion social media users globally, with projections to reach 5.85 billion by 2027 [34]. Leveraging social media for science journalism could be crucial, as noted by Sisanda Nkoala (2024), who highlighted social media's potential for dynamic and inclusive science communication. However, language India has over 820 million active internet users, with 442 million of these users residing in rural areas. On average, users spend 1.5 hours online daily [36]. A 2024 Reuters Institute study found that 71% of Indians prefer online news, with 49% relying on social media. Specifically, 54% of news consumption is via YouTube, 48% through WhatsApp, and 35% on Facebook [37]. In response, the Council of Scientific and Industrial Research (CSIR) and the National Institute of Science, Communication, and Policy Research (NIScPR) established the Science Media Communication (SMCC) to bridge the gap between science and society. As of 2023, SMCC has launched social media accounts on Facebook, X, Instagram, and YouTube to enhance science communication, although its outreach is still in its early stages. As of July 21, 2024, SMCC's YouTube channel has 55 subscribers, its Facebook page has 37 likes and 55 followers, and its Instagram account has 47 followers [38].

SMCC Youtube Channel **SMCC Facebook Page**

Source: [39][40]

Source: [41]

Social media is not without its criticisms. One major issue is the predominance of English content, which limits access to science information for many in India, a country with over 1,000 languages. The ten most spoken languages include Hindi (528 million speakers), Bengali (97 million), Marathi (83 million), Telugu (81 million), Tamil (69 million), Gujarati (55 million), Urdu (50 million), Kannada (43 million), Odia (37 million), and Malayalam (34 million) [42]. To address linguistic barriers, the science community must produce content in multiple regional languages.

The rise of misinformation, also known as an "infodemic," has been a significant concern since the COVID-19 pandemic. Tedros Adhanom Ghebreyesus, WHO Director-General, highlighted this issue, noting that false information exacerbates the crisis [43]. A literature review revealed that misleading COVID-19 information from social media contributed to over 5,800 hospitalizations and more than 800 deaths worldwide [44]. Misinformation often originates from clickbait sources, politically motivated entities, and fake profiles and is amplified through mobile messaging apps [45]. The spread of pseudoscience complicates the distinction between credible science and false claims.

Additionally, science content on platforms like Instagram is often created by non-experts, including influencers and fitness trainers, who may lack the qualifications to produce reliable science information [46]. MIT's 2018 report found that false news spreads more rapidly on Twitter compared to accurate news [47]. To counter misinformation, Meta has launched the "Know What's Real" campaign [48].

3. RQ. How can libraries and information centres in India encourage and improve science journalism while also functioning as important hubs for the transfer of scientific knowledge?

Library and Information Science and Journalism

Library and Information Science (LIS) and journalism are both interdisciplinary fields significantly influenced by technological advancements [49]-[51]. The rise of technology presents both opportunities and challenges for these professions. Historically, libraries and information centers were primarily repositories of physical books, periodicals, journals, magazines, and newspapers. Access to these resources was limited to in-person visits [52]. However, with the advent of digital technology, libraries have evolved into dynamic hubs offering a diverse range of services and resources online [53]. Libraries now acquire, process, organize, store, and provide information in various digital formats, making their services accessible from virtually anywhere [54].

Similarly, journalism has undergone a dramatic shift due to the rise of digital media. Surveys indicate that many people now prefer digital platforms for news consumption over traditional print media. Social media, in particular, has become a popular and accessible medium for news [55]. This shift poses common challenges for both fields, notably a lack of media literacy. The UNESCO media and information literacy handbook emphasizes that Media and Information Literacy (MIL) is crucial for addressing the global surge in disinformation [56]. The importance of MIL has increased with the proliferation of false news, particularly following events like the 2016 US presidential election. This has sparked an interest in news literacy among librarians, who are integrating media literacy and information literacy into their roles. Academic librarians in the U.S. are actively involved in promoting MIL [57].

Despite their differences, LIS and journalism share several similarities. Libraries aim to collect, organize,

evaluate, and preserve materials to provide centralized access for users. In contrast, journalism involves gathering information from diverse sources, organizing it, and disseminating it to the public through various channels. While journalism employs research, interviews, content creation, and editing, library operations focus on classifying, cataloging, and indexing materials, often using integrated library management software. Both professions require strong information-gathering skills, critical literacy to assess the credibility of sources, and effective communication to connect information with users. Additionally, ethics play a crucial role in both fields, influencing how professionals deliver services and information.

Alireza Noruzi's work explores various adaptations of SR Ranganathan's five laws of librarianship. For example, Michael Gorman's "Five New Laws of Librarianship" (1995), Sanjaya Mishra's "Principles of Distance Education" (1998), Mentor Cana's "Five Laws of the Software Library" (2003), Virginia A. Walter's "Five Laws of Children's Librarianship" (2004), Lennart Björneborn's "Five Laws of Web Connectivity" (2004), and Tracie D. Hall's "Five Laws of Diversity/Affirmative Action" (2004) [58]. These laws demonstrate how LIS principles can be applied to diverse contexts, including journalism. Thus, the intersection of LIS and journalism reflects a convergence of methodologies and practices shaped by technological advancements and the need for effective information dissemination and management.

Relevance of SR Ranganathan's Five Laws of Library and Information Science in Journalism

News is for use: Just as books, periodicals, magazines, and other media are intended for use, so too is news meant to be accessed and utilized. To ensure that Indian citizens are thoroughly informed, news must be disseminated through all available channels, transcending language and technical barriers.

Every audience his/her news: Libraries and information science must diligently curate their collections to ensure that every reader can access all pertinent information. Similarly, journalists should tailor their content to address the diverse needs and preferences of different audiences. India's rich diversity encompasses people from varied backgrounds with a wide array of interests. Consequently, journalists have the opportunity to cover a broad spectrum of topics—from politics and health to technology, science communication, sports, and the environment—to cater to this varied audience.

Every news its audience: In libraries, every book must be matched with the right reader, maximizing the utility of resources. This involves considerations such as open access, selection, arrangement, and the application of information and communication technology (ICT). Similarly, in journalism, each news story needs to reach and resonate with its intended audience. Journalists must analyze demographic factors like age, occupation, gender, and geography to craft content that deeply engages their audience. For instance, local government policies may be more relevant to local residents than to those elsewhere. Villagers, athletes, healthcare professionals, and other specialists seek content that aligns with their specific interests. Thus, journalists should aim to produce content that is broadly appealing and accessible, rather than focusing solely on niche topics. Despite the rise of digital media, many in India still prefer print, suggesting a hybrid approach to news distribution could be beneficial.

Save the time of the audience: Experts in library and information science use specialized classification systems such as DDC, UDC, CC, and AACR II to catalog and organize documents, facilitating easy access and saving users' time. In journalism, news articles should be concise, precise, informative, and clear, avoiding

technical jargon. This allows readers to grasp the essential points without feeling overwhelmed. In science communication, journalists often need to create engaging, animated videos using 3D technology to make complex information more comprehensible. This is crucial to prevent the dissemination of inaccurate information due to misinterpretation of scientific terminology.

The newsroom is a growing organism: Libraries are continually expanding in terms of resources, readership, and staff, driven by evolving technology and rising user expectations. This transition from traditional to modern library services involves adopting cutting-edge technologies. Similarly, journalism must adapt to the rapid pace of current events and technological advancements. Managing and acquiring information in traditional ways can be challenging; therefore, journalists must adopt modern technologies to reach and engage a broad audience effectively.

Science Journalism and Libraries:

Library and Information Centres may play an imperative role in promoting science journalism in Digital Bharat. India boasts a staggering number of over 1000 Universities and 42,000 colleges that provide higher education [59]. India possesses the most significant number of libraries in the world, totaling over 1.5 million. Among them, around 1.3 million are school libraries [60]. Library and Information Centres are currently involved in acquiring materials in different formats, promoting library resources and services through activities such as orientation programs and book talks, and utilizing advanced technology to connect with library users from their homes. Regarding science journalism, the library is one of the best platforms for promoting science breakthroughs among the academic community through various means. While India has numerous science communication centers, none of the libraries have established their science communication centers. The visibility of science communication centers is minimal. The reason may vary. Michigan State University Library has created a Research Guide specifically focused on science communication. The guide aims to provide resources that will assist the MSU science community in effectively sharing their research with the academic, scientific, and general public [61]. Therefore, it is recommended that visibility and open science communication be improved by making it accessible through the academic library system.

5. Conclusion

As India advances in the digital era, the role of science journalism becomes increasingly crucial in bridging the gap between rapid scientific advancements and public understanding. Despite the country's remarkable strides in science and technology, the effective dissemination of this knowledge remains insufficient, as evidenced by the minimal science coverage in mainstream media. The rise of digital platforms offers a unique opportunity to democratize science communication, yet it also presents challenges such as the proliferation of misinformation and varying levels of digital literacy.

Libraries, with their deep-rooted tradition of knowledge preservation and dissemination, are well-positioned to become vanguards in empowering scientific knowledge among the masses. Their ability to curate, verify, and share information through various digital channels enables them to counteract the spread of false information and foster a scientifically literate society. By integrating science journalism into their services and leveraging digital tools, libraries can make scientific knowledge more accessible and engaging, especially in underserved and remote areas.

The convergence of library and information science with journalism, particularly in the context of digital transformation, underscores the importance of a collaborative approach to science communication. Libraries can serve as crucial hubs for science journalism by offering resources, creating specialized content, and facilitating public engagement with scientific topics. Initiatives such as developing science communication centers within libraries and enhancing digital literacy programs can significantly contribute to this effort.

In summary, the future of science journalism in Digital Bharat relies on a concerted effort to leverage digital advancements while addressing existing challenges. Libraries play a pivotal role in this landscape, not only as repositories of knowledge but also as active participants in shaping and sharing science narratives. By embracing their evolving role, libraries can help bridge the knowledge gap, combat misinformation, and promote a more informed and scientifically aware society.

References

[1] Patairiya, M. *Science journalism in India – Pantaneto Press*. Retrieved from http://pantaneto.co.uk/science-journalism-in-india-manoj-patairiya/

[2] Malik, P. S., Dhiman, B. (2022). *Science communication in India: Current trends and future vision*. Retrieved from https://www.onlinescienceresearch.com/articles/science-communication-in-india-current-trends-and-future-vision.html

[3] Naik, P. K. (2022). Science journalism in India: Strengths, weaknesses, opportunities, and threats. *Science Communication, 44*, 656–664. Retrieved from https://www.researchgate.net/publication/365055226_science_journalism_in_india_strengths_weaknesses_opportunities_and_threats

[4] Singh, P., Dhiman, B. (2022). *Science communication in India: Current trends and future vision*. Retrieved from https://www.researchgate.net/publication/363022879_science_communication _in_india_current_trends_and_future_vision

[5] Microsoft survey: Indians are more likely to encounter online fake news. (2019). Retrieved from https://www.business-standard.com/article/pti-stories/microsoft-survey-india-topping-fake-news-menace-globally-119020501427_1.html

[6] Mahesh, G. (2019). Curbing fake and false science news is vital: Indian science communication congress. *Science Reporter*, 48–50. Retrieved from http://surl.li/sujnr

[7] Patairiya, M. (2007). *Science journalism in India*. Retrieved from https://ln.run/yLIoP

[8] Press Information Bureau GOI. (2023). *India retains 40th rank in the global innovation index 2023*. Retrieved from https://pib.gov.in/pressreleasepage.aspx?prid=1961576

[9] Pulakkat, H. (2017). Will India be among the top 3 nations in science output by 2030? *The Economic Times*. Retrieved from https://economictimes.indiatimes.com/news/science/will-india-be-among-the-top-3-nations-in-science-output-by-2030/articleshow/56429161.cms

[10] Panday, B. G. (2023). *Chandrayaan-3: India's historic moon mission lifts off successfully*. Retrieved from https://www.bbc.com/news/world-asia-india-66185565

[11] Jain, A., Anand, A. (2024). India's R&D funding, breaking down the numbers. *The Hindu*. Retrieved from https://www.thehindu.com/opinion/lead/indias-rd-funding-breaking-down-the-numbers/article67947662.ece

[12] Pharmaceutical industry. (2024). *Pharmaceutical exports from India – IBEF*. India Brand Equity Foundation. Retrieved from https://www.ibef.org/exports/pharmaceutical-exports-from-india

[13] Ministry of Culture GOI. (2024). *Who we are*. NCSM. Retrieved from https://ncsm.gov.in/about/who-we-are

[14] Press Information Bureau GOI. (2019). *Govt. launches two national level initiatives in the field of science communication*. Retrieved from https://pib.gov.in/newsite/printrelease.aspx?relid=187500

[15] Science and Technology GOI. (2024). *Science outreach & popularisation | India science, technology & innovation - ISTI portal*. Retrieved from https://www.indiascienceandtechnology.gov.in/covid-19-the-pandemic/awareness-material/science-outreach-popularisation

[16] Registrar of Newspaper for India GOI. Retrieved from https://rni.nic.in/all_page/press_india.aspx

[17] Narayan, H. (2021). India, a multicultural nation, is a land of many languages, among which standardised Hindi is just one. *The Hindu*. Retrieved from https://www.thehindu.com/thread/arts-culture-society/india-a-land-of-many-tongues/article19445187.ece

[18] Sathyaprakash, M. R. (2022). Coverage of science and technological issues in two leading Kannada newspapers: An overview. *Journal of Scientific Temper (JST), 10*(4). Retrieved from http://op.niscair.res.in/index.php/JST/article/view/68074

[19] Naik, P. (2022). Science journalism in India: Strengths, weaknesses, opportunities, and threats. *Science Communication, 44*, 656–664. Retrieved from https://journals.sagepub.com/doi/10.1177/10755470221134253

[20] Jain, T. K., Choudhary, S., Kumar, P. (2023). *Print media effective medium of science communication*. Retrieved from https://or.niscpr.res.in/index.php/BVAAP/article/view/2728/1200

[21] Jain, T. K., Choudhary, S., Kumar, P. (2022). Effectiveness of science newspaper 'Vaigyanik Drishtikon' in science communication: A case study. *Journal of Scientific Temper, 10*(4), 253–256. Retrieved from https://nopr.niscpr.res.in/bitstream/123456789/61023/1/JST%2010%284%29%20253-256.pdf

[22] GOI. *Growth and development AIR*. Retrieved from https://prasarbharati.gov.in/growth-development-air/

[23] Vigyan Prasar GOI. (2024). Retrieved from https://vigyanprasar.gov.in/#:~:text=science%20%26%20

technology%20through%20 radio%20is, and%20mw%20stations%20of%20air

[24] Jha, L. (2021). TV-owning households grew 6.9% in 2018–2020, says BARC. *Mint*. Retrieved from https://www.livemint.com/news/india/households-owning-tv-sets-grow-7-during-2018-20-barc-11618476297643.html

[25] Anand, N. (2024). 78% Indians prefer streaming shows on TV, comedy most watched: Study. Retrieved from https://www.business-standard.com/india-news/78-indians-prefer-streaming-shows-on-tv-comedy-most-watched-study-124011700349_1.html

[26] GOI. *Indian higher education system – Legacy of millenniums*. Retrieved from https://educationindia.gov.in/education-system

[27] UDISE GOI. Retrieved from https://udiseplus.gov.in/#/en/page/udise

[28] Ministry of Education GOI. (2023). *Ministry of Education releases All India Survey on Higher Education (AISHE) 2020–2021*. Retrieved from https://pib.gov.in/pressreleasepage.aspx?prid=1894517

[29] Press Information Bureau GOI. (2022). *Achievements made under Digital India programme*. Retrieved from https://pib.gov.in/pressreleaseiframepage.aspx?prid=1885962

[30] IBEF GOI. (2023). *The Digital India programme transforming nation | IBEF*. India Brand Equity Foundation. Retrieved from https://www.ibef.org/government-schemes/digital-india

[31] GOI. (n.d.). *Digital literacy*. Retrieved from https://dtnbwed.cbwe.gov.in/images/upload/digital-literacy_3ZNK.pdf

[32] Shukla, V., Dash, S. K. (2024). Computer literacy in India needs a reboot. *The Hindu*. Retrieved from https://www.thehindu.com/opinion/lead/computer-literacy-in-india-needs-a-reboot/article68367762.ece#:~:text=The%20recently%20released%20NSS%2078th,aged%2015%20years%20and%20above

[33] Shearer, E. (2018). Social media outpaces print newspapers in the U.S. as a news source. *Pew Research Center*. Retrieved from https://www.pewresearch.org/short-reads/2018/12/10/social-media-outpaces-print-newspapers-in-the-u-s-as-a-news-source/

[34] Wong, B. (2024). Top social media statistics and trends. *Forbes Advisor India*. Retrieved from https://www.forbes.com/advisor/in/business/social-media-statistics/#sources

[35] Nkoala, S. (2024). Science journalism: Social media can help to reach audiences. *University World News*. Retrieved from https://www.universityworldnews.com/post.php?story=20240515195555864

[36] Roy, A. (2024). How India is using the internet. *The Economic Times*. Retrieved from https://economictimes.indiatimes.com/tech/technology/how-india-is-using-the-internet/articleshow/108354854.cms

[37] TOI. (2024). Over 70% Indians rely on online media for news; majority on social media: Report. *The Times of India*. Retrieved from https://timesofindia.indiatimes.com/india/over-70-indians-rely-on-online-media-for-news-majority-on-social-media-report/articleshow/111146576.cms

[38] NISCPR. (2024). Retrieved from https://niscpr.res.in/nationalmission/smcc

[39] Facebook. (2024). Retrieved from https://www.facebook.com/SMCC.NIScPR/

[40] YouTube. (2024). Retrieved from https://www.youtube.com/channel/UCsTxhxDJDYc4srbZokxdFrg/video

[41] Instagram. (2024). Retrieved from https://www.instagram.com/smcc_niscpr/?fbclid =IwZXhobgNhZW0CMTAAAR30-8g_dMqhjr9G_NImcRsHt_hXSLeSbVaOt CFC5I_lhyJ_LvCnG 0WAf5Q_aem_-03qJ_qO50AxdfeiU4-P3Q

[42] Rongmei, P. (2024). Top 10 most spoken languages in India. *Times of India Travel*. Retrieved from https://timesofindia.indiatimes.com/travel/destinations/top-10-most-spoken-languages-in-india/photostory/111900431.cms

[43] Covid-19. (2020). The covid-19 infodemic. *The Lancet, 20*(8). Retrieved from https://www.thelancet.com/journals/laninf/article/PIIS1473-3099(20)30565-X/fulltext

[44] AIU. (2017). Retrieved from https://www.aiu.ac.in/documents/aiu_publications/university_news/university%20news%20vol-60,%20no-03,%20january%2017-23,%202022.pdf

[45] Gupta, et al. (2022). Combating fake news: Stakeholder interventions and potential solutions. *IEEE Journals & Magazine | IEEE Xplore*. Retrieved from https://ieeexplore.ieee.org/abstract/document/9839605

[46] Vrabec, N., Pies, L. (2023). Popularisation of science and science journalism on social media in Slovakia. *Media Literacy and Academic Research, 6*(1), 206–226. Retrieved from https://www.researchgate.net/publication/371901197

[47] Dizikes, P. (2018). Study: On Twitter, false news travels faster than true stories. Retrieved from https://news.mit.edu/2018/study-twitter-false-news-travels-faster-true-stories-0308

[48] ETtech. (2024). Meta launches 'know what's real' campaign to combat misinformation. *The Economic Times*. Retrieved from https://economictimes.indiatimes.com/tech/technology/meta-launches-know-whats-real-campaign-to-create-awareness-against-the-spread-of-misinformation/articleshow/108066341.cms?from=mdr

[49] Higgins, S. (2017). Library and Information Science as a Discipline. In *Elsevier eBooks* (pp. 19–28). Retrieved from https://www.sciencedirect.com/topics/social-sciences/library-and-information-science

[50] Hampton, M. (2012). Journalists' histories of journalism. *Media History, 18*, 327–340. Retrieved from

https://www.tandfonline.com/doi/abs/10.1080/13688804.2012.722272

[51] Kyriakidou, M., Garcia-Blanco, I. (2021). Introduction: Innovations, transformations and the future of journalism. *Journalism Practice, 15*, 723–727. Retrieved from https://www.tandfonline.com/doi/full/10.1080/17512786.2021.1935301

[52] Momoh, E. O., Folorunso, A. L. (2019). The evolving roles of libraries and librarians in the 21st century. *Library Philosophy and Practice*. Retrieved from https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=6243&context=libphilprac

[53] Khan, S. A., Bhatti, R. (2017). Technological advances in libraries and possibilities of ubiquitous library services: An analysis. Retrieved from https://www.researchgate.net/publication/282847102

[54] Tyonum, N. M., Amarachi Ezeogu, P. (2015). Library and education: Panacea for sustainable development in Nigeria. *Asian Journal of Information Science and Technology, 5*(2), 28–31. Retrieved from https://www.trp.org.in/wp-content/uploads/2015/12/ajist-vol.5-no.2-july-december-2015-pp.28-31.pdf

[55] Karambelkar, N. (2019). Impact of digital media on print media. *International Research Journal of Engineering and Technology (IRJET), 6*(12). Retrieved from https://www.irjet.net/archives/v6/i12/irjet-v6i12283.pdf

[56] UNESCO. (2019). *Media and information literacy in journalism: A handbook for journalists and journalism educators*. Retrieved from https://unesdoc.unesco.org/ark:/48223/pf0000374920/PDF/374920eng.pdf.multi

[57] Kozlowska-Barrios, A. (2023). Media and information literacy (MIL) in library classrooms: Content analysis of news evaluative criteria in instructional worksheets and checklists. *The Journal of Academic Librarianship, 49*(3). Retrieved from https://www.sciencedirect.com/science/article/abs/pii/S0099133323000198

[58] Noruzi, A. (2004). Application of Ranganathan's laws to the web: The five laws of the web. *Webology, 1*(2). Retrieved from https://www.webology.org/2004/v1n2/a8.html

[59] Ministry of Education GOI. *Indian higher education system*. Retrieved from https://studyinindia.gov.in/about-indian-higher-education-#:~:text=indian%20higher%20education%20system&text=the%20entire%20higher%20education%20ecosystem,42%2c000%2b%20colleges%20imparting%20exceptional%20education

[60] IFLA. (2019). *India's Libraries and Access to Information: A Data Sheet*. Retrieved from https://www.ifla.org/wp-content/uploads/2019/05/assets/hq/topics/libraries-development/documents/india.pdf

[61] Michigan State University (MSU). *LibGuides: Science communication guide*. Retrieved from https://libguides.lib.msu.edu/scicomm , https://libguides.lib.msu.edu/scicomm