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Open Access Adoption in Sustainable Development Goals Research Among the Indian Leading Universities: A Computational Mapping

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ABSTRACT

The present study aims to analyze Open Access (OA) research on Sustainable Development Goals (SDGs) by the five leading central universities of India from 2015 to 2024. The data has been obtained from the Web of Science, and further analysis is carried out using bibliometric and Altmetric indicators. The study seeks to trace the decadal growth of research, identify prolific authors and sources, assess the impact of influential works, and determine the leading SDG goals with the highest research output. The results reveal that the University of Delhi has the highest OA contribution to SDG research, with Scientific Reports emerging as the most prolific journal. The growth rate of OA research has shown a decline in 2023 and 2024. The University Grants Commission (UGC) is identified as the top research funder in this field. The Green route is found to be the most preferred mode of OA publishing for SDG research, followed by the Gold route. Among the different areas of SDGs, SDG 9 (Industry, Innovation, and Infrastructure) has the highest research output, followed by SDG 3 (Good Health and Well-being). The study highlights the vital role of central universities in advancing OA research aligned with national SDG goals. The findings can guide institutions and policymakers to strengthen OA practices and support evidence-based sustainable development.

Keywords: Sustainable development goals (SDG); Open access (OA); Central universities; Bibliometrics; Altmetrics; OA route

1. INTRODUCTION

The ongoing challenges, including climate change, social injustice, and environmental degradation, led the United Nations to develop the Sustainable Development Goals (SDGs) in September 2015[1]. The SDGs comprises of 17 goals with 169 targets, aiming to eradicate poverty, protect the environment, and promote social justice while maintaining a peaceful society by 2030[2]. Research plays a crucial role in promoting and achieving these goals by providing evidence-based solutions and guiding policy decisions. It helps to assess the progress, identify challenges, and develop sustainable strategies for global impact.

In this context, unrestricted access to knowledge is essential for advancing research-led solutions. The emergence of the concept, Open Access (OA) has significantly transformed the scholarly publishing over the past two decades by removing accessibility barriers associated with traditional subscription-based journals[3,4]. Globally, OA enhances visibility, citation counts, and research dissemination[5]. Initiatives like the Budapest Open Access Initiative (BOAI) advocate for free, equitable access to scholarly work, promoting an inclusive, barrier-free model[6]. The shift to OA accelerates scientific progress, fosters collaboration, and boosts research impact. OA has different routes or model which represent various publishing approaches based on access. The Green model allows self-archiving, the Gold model requires authors to pay an Article Processing Charge (APC), the Hybrid model combines both closed and open access, and the Bronze model provides access through the publisher's website[7]. For developing nations, OA bridges gaps in knowledge dissemination, improving research quality and international collaboration[8]. Thus, given the importance of both SDGs and open access in the current scenario, the present study analyses the open access publications on SDGs by the five leading central universities of India between 2015-2024. The central universities have been selected according to NIRF (2024) ranking (see table 1) which is considered as prime hub of quality and clarity toward building world-class higher institutions in India[9]. The prime aim of the current study is to map the growth trend of OA research on SDGs, prolific sources, preferences of different OA routes, active funding agencies and identifying research impact

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through citation and Altmetric count. Altmetric is an advanced metric than citations, offering an immediate assessment of a research publication's impact by tracking its dissemination across various online platforms.

2. LITERATURE REVIEW

A review of previous metric-based studies on evaluating the growth of SDGs research provides a comprehensive background for the present study. Several studies have analyzed the global distribution and focus areas of SDG-related research. Mishra, *et al.* found that China, the USA, and the UK are the major origins of SDG research (up to 31 %), with key areas including climate change, Agenda 2030, the circular economy, poverty, and global health. Singh, *et al.* further highlighted that G20 nations contribute 57.75 % of global SDG research, with SDG 3 (Health), SDG 7 (Clean Energy), and SDG 4 (Education) receiving the most attention. The US, UK, and China also lead in international collaborations. At the institutional level, Sweileh identified WHO as the most active organization in SDG research, with SDG 17 (Partnerships) having the highest research output, while SDG 7 (Clean Energy) was the least studied. Regional trends indicated that SDG 3 (Health) dominated research in Africa, the Eastern Mediterranean and South-East Asia, whereas SDG 13 (Climate Action) was the top priority in the Americas, Europe, and the Western Pacific. However, collaboration between high- and low-income countries remained limited. Examining national and regional progress, Gehlot, *et al.* revealed that while India has embraced the SDGs, progress has been relatively slow due to weak policies and limited awareness programs. Indana & Pahlevi found that SDG research primarily addresses economic and social impacts, communication value, case studies, and a balanced approach across developed and developing nations. Higher education institutions (HEIs) also play a critical role in SDG research and implementation. Fauzi, *et al.* emphasized HEIs' contributions, particularly in curriculum development, addressing implementation challenges, and adapting to the impact of COVID-19. However, financial constraints and lack of awareness remain key barriers to effective SDG integration, underscoring the need for strategic planning and collaboration. A review of existing literature reveals a significant gap in research on OA publications on the Sustainable Development Goals (SDGs) by leading central universities in India. A review of existing literature reveals a significant gap in research on SDG related open access publications by leading central universities in India. Various studies have highlighted the global and national growth of Open Access (OA) publishing. Ali et al. analyzed OA research trends in the social sciences across central universities in India and found that 30.40 % of the total publications in this domain were available as open access. Pandita and Singh observed that while only 22 OA journals were indexed in the Directory of Open Access Journals (DOAJ) in 2002, the number had surged to 16,589 journals from 126 countries by 2021. Nazim et al. reported that India ranks 15th globally in terms of the number of OA journals and 17th for OA repositories, with 317 journals and 98 repositories. Additionally, Nazim and Zia (2019) studied OA adoption among researchers at the Indian Institutes of Technology (IITs) and found that 68.70 % of the 1,013 articles analyzed had OA versions freely accessible for download. Despite the growing global emphasis on open access as a means to enhance knowledge dissemination and collaboration, no study has specifically examined how India's top academic institutions contribute to SDG-related research through open access initiatives. To bridge this gap, the present study examines the extent and impact of open access research on SDGs within these institutions. The findings will provide valuable insights into their efforts, challenges, and strategies in promoting open access, fostering academic collaboration, and supporting sustainable development through knowledge sharing

3. OBJECTIVES

- To analyze the growth trajectory of Open Access (OA) publications related to Sustainable Development Goals (SDGs) across high-ranked central universities in India over the past decade.
- To examine the prevalence and adoption of different OA models (Gold, Green, Hybrid, and Bronze) among researchers publishing on SDG-related topics.
- To evaluate the influence of research funding agencies on OA publishing trends in SDG-related research.
- To identify the rate of citation count and Altmetrics Attention Score (AAS) of the highly influential papers on SDG.
- To identify the key subject areas in which the majority of Sustainable Development Goals (SDG)-

Table 1. : List of top five central universities

Rank	University	Year of establishment	Total output	OA output
1	Jawaharlal Nehru University (JNU)	1969	6,897	1,647
2	Jamia Millia Islamia	1920	5,916	1,121
3	Banaras Hindu University (BHU)	1916	13,905	2,547
4	University of Delhi (DU)	1922	16,035	2,717
5	Aligarh Muslim University	1920	8,300	1,508
Total			**51,053**	**9,540**

related research is published by India's leading central universities.

4. MATERIAL AND METHODS

The current study aims to evaluate the open access publications of five selected central universities related to Sustainable Development Goals (SDGs) during the period 2015–2024. Web of Science (WoS) database has been used to collect the primary dataset for this study. Web of Science (WoS) was chosen for its high-quality content, precise affiliation search, and advanced citation tracking. It also offers an SDG mapping feature, allowing researchers to specifically search, filter, and analyze publications related to Sustainable Development Goals (SDGs) for a systematic evaluation of research contributions. Since the data focuses on universities, the search was conducted using the 'affiliation' field, with university names as keywords. The selected universities include the 'University of Delhi,' 'Jamia Millia Islamia,' 'Aligarh Muslim University,' 'Jawaharlal Nehru University,' and 'Banaras Hindu University.' To ensure a comprehensive analysis, the search was limited to a ten-year period (2015–2024) and restricted to articles as the document type, yielding a total of 51,053 records across all five universities. To refine the dataset, only open access articles were selected, reducing the records to 15,711. Further, to align with the study's scope, the dataset was filtered based on Sustainable Development Goals (SDGs), resulting in a final dataset of 9,540 records. The extracted data was then saved in .csv format, and further analysis was conducted using MS Excel and Tableau to derive meaningful insights. Moreover, the Altmetric Attention Score was retrieved from Dimensions.ai (https://dimensions.altmetric.com/), a multidisciplinary research database that provides insights into research impact, trends, and collaborations[15]. The AAS is a weighted count of the amount of attention a research output receives from various sources, including news articles, policy documents, blogs, Twitter, and other social media platforms. The search process was initiated by entering the Digital Object Identifiers (DOIs) of the publications into the search box and selecting the "DOI" option in the Dimensions.ai interface. The Altmetric Attention Scores (AAS) were then retrieved as displayed in the database and documented in an Excel sheet for further analysis. The flowchart is shown in fig. 1.

5. DATA ANALYSIS AND INTERPRETATIONS

5.1 Growth Trend

The research growth on a specific subject reflects its emerging significance within the academic community. Fig. 2 illustrates the yearly growth of Open Access (OA) publications on Sustainable Development Goals (SDGs) from selected central universities, alongside their citation trends over the past decade. The number of OA publications steadily increased from 2015 with 587 publications to 1,546 in 2022, before declining to 1,278 in 2023 and 889 in 2024. In contrast, citation trends fluctuated significantly, with 2020 receiving the highest number of citations (69,118), followed by a sharp decline until 2024. While the initial growth in publications indicates rising research interest, the recent decline suggests a possible shift in research priorities or funding aspects. The citation pattern, with its peak in 2020 and subsequent decline, suggests that earlier OA research on SDGs had a strong impact but has not sustained long-term engagement. This trend highlights the need for further investigation into the factors influencing the decreasing output and impact of OA research on SDGs.

5.2 Share of OA Routes

Figure 3 displays the different OA publishing models preferred by central universities for publishing research on SDGs. It is found that most research publications

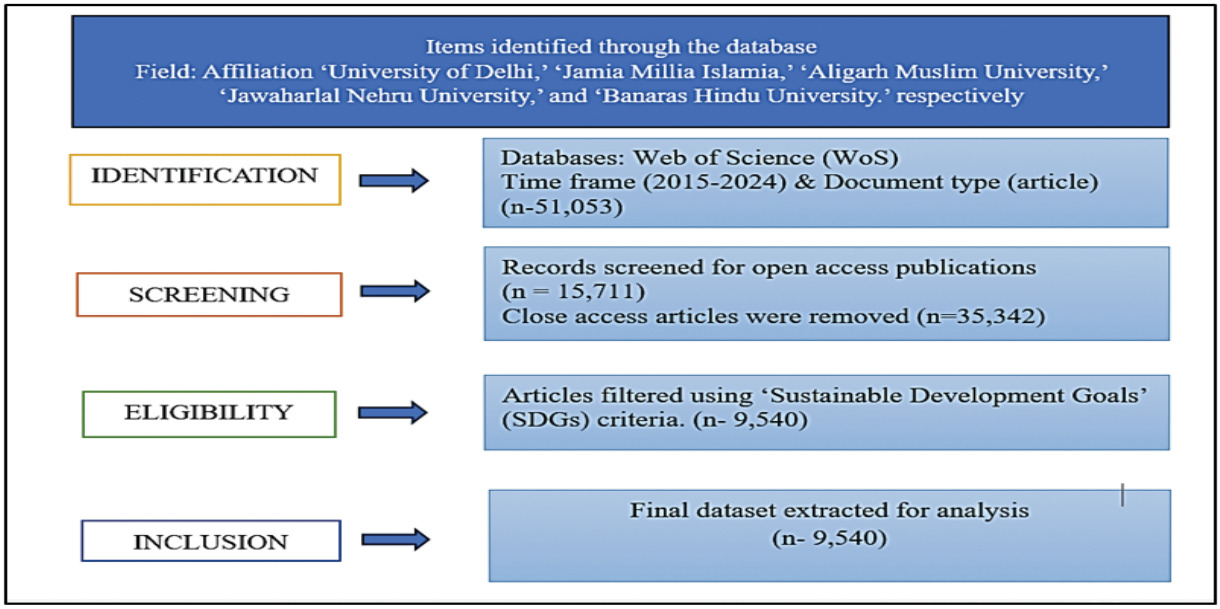

Figure 1. Flowchart of data collection process.

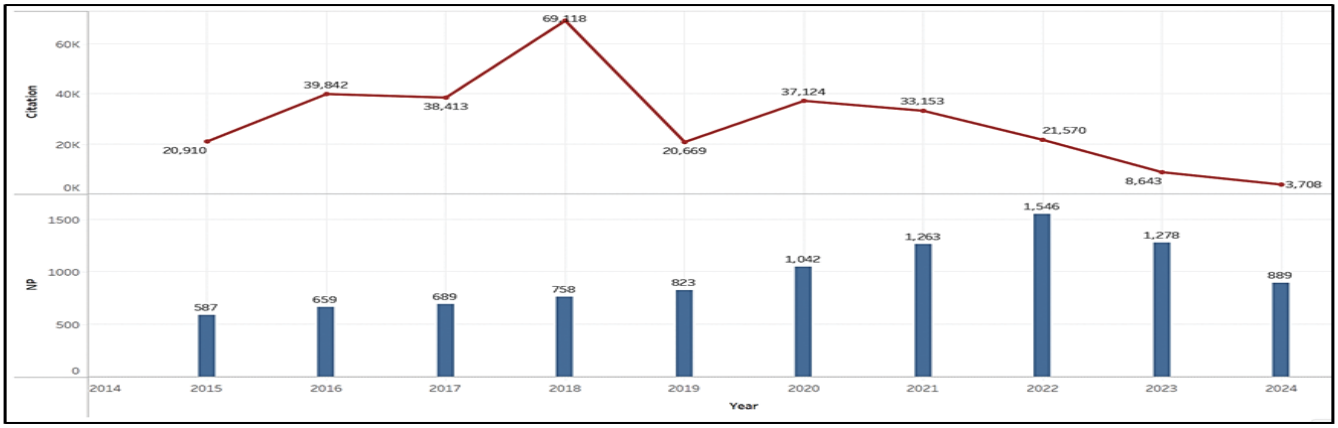

Figure 2. Yearly growth of OA publication (NP) and citations on SDGs.

are published under the Green route (45 %), followed by Gold (38 %), Bronze (12 %), and the least preferred Hybrid model (5 %). The distribution pattern of OA routes indicates that Indian leading universities highly prefer to self-archive their work in institutional or personal repositories. Secondly, they also opt to pay APCs due to financial support from various funding agencies. This trend highlights the growing awareness and adoption of OA practices among researchers.

5.3 Top Ten Active Funding Agencies

Funding is essential in driving research and academic advancements, particularly in SDG related Open Access (OA) research. Fig. 4 presents the top ten funding agencies that have significantly supportted OA research on SDGs by leading central universities in India. The analysis reveals that the University Grants Commission (UGC) has offered the highest funding support, contributing to 644 OA research publications on SDGs, followed by the Department of Biotechnology (DBT) with 620 publications. This highlights the pivotal role of UGC and DBT in fostering sustainability-focused research in Indian higher education institutions. Among the top ten funding agencies, the majority belong to the Science, Technology, and Medicine domains, including the Department of Science and Technology (DST), the Council of Scientific and Industrial Research (CSIR), the Indian Council of Medical Research (ICMR), and the Science and Engineering Research Board (SERB). These agencies play a crucial role in supporting research initiatives that align with India's commitment to achieving SDGs. Additionally, international funding agencies such as King Saud University, Taif University (Saudi Arabia), and the National Institutes of Health (NIH), USA have extended financial support to OA research in Indian central universities. This reflects the global interest in sustainability-related research and the growing collaborative efforts between Indian institutions and international organizations. The dominance of science and technology-focused funding agencies in OA research on SDGs indicates a strong inclination towards innovation-driven solutions for sustainability challenges. Moreover, the contributions from international institutions highlight the global recognition of Indian central universities as key players in advancing SDG-related research.

5.4 Prolific Authors

Table 2 presents the top ten most productive authors from selected central universities publishing Open

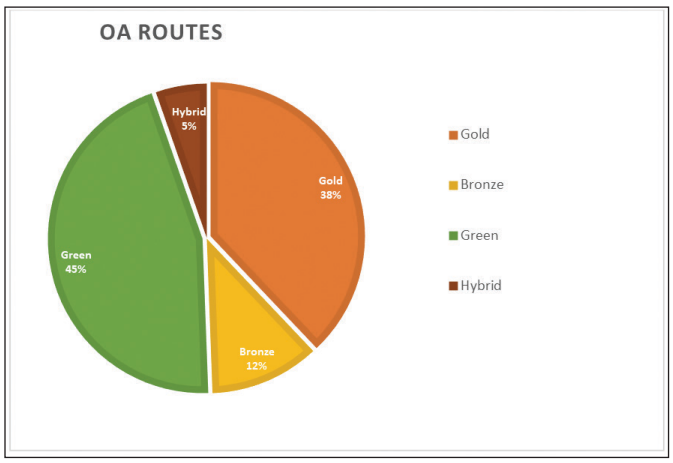

Figure 3. Distribution of OA route.

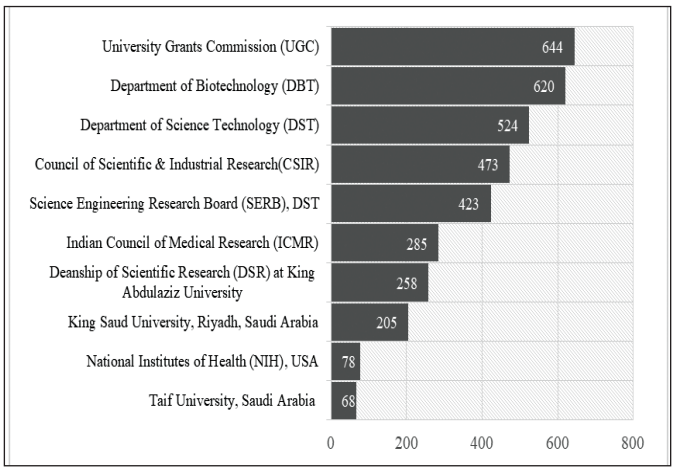

Figure 4. Top ten funding agencies supporting OA research on SDGs by leading central universities of india.

Access (OA) research on the Sustainable Development Goals (SDGs). The findings indicate that Iram Akhtar from the Department of Electrical Engineering, Jamia Millia Islamia, and Anuradha Chowdhary from the Department of Medical Mycology, University of Delhi, have made the highest contributions, each with 12 research papers in this field. Javed Ahmad, Upinder Kaur, and Anas Shamsi, each with 10 publications, follow closely behind, representing the fields of Biotechnology, Pharmacology, and Biochemistry, respectively. Mohammad Shahid from Aligarh Muslim University, specializing in Commerce, has contributed 8 papers, while Durgesh Kumar (Mathematics), Neelja Singhal (Microbiology), and Syed Ghazanfar Ali (Microbiology) have each published 7 papers. The data highlights a strong representation of authors from Life Sciences, particularly in Biotechnology, Microbiology, and Medical Mycology. It is also notable that Jamia Millia Islamia and the University of Delhi contribute the largest number of prolific authors in this domain. While the presence of researchers from Electrical Engineering, Commerce, and Mathematics demonstrates interdisciplinary engagement with SDG-related research, the dominance of Life Sciences scholars suggests a significant focus on health, medicine, and environmental sustainability within OA research on SDGs.

5.5 Prolific Journals

Table 3 presents the top ten most prolific journals publishing OA research on SDGs. The journal *Scientific Reports*, published by Nature Portfolio, leads the list with 600 OA publications on SDGs with an impact factor of 3.8. It is succeeded by *PLOS ONE*, which has published 357 papers with an impact factor of 2.9. Other high-ranking journals include *ACS Omega* (245 publications, IF: 4.1), *RSC Advances* (193 publications, IF: 3.9), and *Frontiers in Plant Science* (131 publications, IF: 6.6), which has the highest impact factor among the listed journals. Among the top journals, *Current Science*, published by the Indian Academy of Sciences, is the only Indian journal on the list, contributing 90 publications on SDGs. This reflects India's growing presence in global SDG-related research. Notably, all ten journals are fully Open Access, requiring Article Processing Charges (APCs) for publication. This suggests that researchers from selected central universities have received substantial funding support for getting their work published in high-impact OA journals, enabling greater visibility and accessibility of their findings.

5.6 Highly Influential Articles

Table 4 highlights the top ten influential Open Access (OA) publications from selected central universities, based

Table 2. Top ten prolific authors

Author	NP	Affiliation	Department
Iram Akhtar	12	Jamia Millia Islamia	Department of Electrical Engineering
Anuradha Chowdhary	12	University of Delhi	Department of Medical Mycology
Javed Ahmad	10	Jamia Millia Islamia	Department of Biotechnology
Upinder Kaur	10	Banaras Hindu University	Department of Pharmacology
Anas Shamsi	10	Jamia Millia Islamia	Department of Biochemistry
Mohammad Shahid	8	Aligarh Muslim University	Department of Commerce
Durgesh Kumar	7	University of Delhi	Department of Mathematics
Neelja Singhal	7	University of Delhi	Department of Microbiology
Syed Ghazanfar Ali	7	Aligarh Muslim University	Department of Microbiology

Table 3. Top ten prolific journals

Journal	NP	Publisher	Impact factor (2024)	ISSN	Journal status
Scientific reports	600	Nature portfolio	3.8	2045-2322	Open access
Plos one	357	PLOS	2.9	1932-6203	Open access
Acs omega	245	American chemical society	4.1	2470-1343	Open access
Rsc advances	193	Royal society of chemistry	3.9	2046-2069	Open access
Frontiers in plant science	131	Frontiers media sa	6.6	1664-462X	Open access
Frontiers in microbiology	130	Frontiers media sa	4	1664-302X	Open access
Sustainability	122	Mdpi	3.3	2071-1050	Open access
Heliyon	114	Cell press	3.4	2405-8440	Open access
Ieee access	104	Ieee	3.4	2169-3536	Open access
Current science	90	Indian academy of sciences	1.1	0011-3891	Open access

on citation counts and Altmetric Attention Scores (AAS) related to Sustainable Development Goals (SDGs). The most cited paper, "Green synthesis of silver nanoparticles using Azadirachta indica aqueous leaf extract," received 834 citations but a low AAS of 4, indicating strong academic influence but limited public engagement. In contrast, "Candida auris: A rapidly emerging cause of hospital-acquired multidrug-resistant fungal infections globally," with 473 citations, achieved the highest AAS (165), reflecting its significant public health relevance and broader societal impact. A key observation is that many highly cited papers, such as those on oxidative stress and nanotechnology, have low AAS, suggesting they are influential within academic circles but lack wider public outreach. Conversely, research on biomedical and healthcare topics, like COVID-19 detection and antifungal resistance, tends to have higher AAS, indicating greater media and public interest. This disparity underscores the need for researchers to enhance science communication, leveraging platforms like Twitter, LinkedIn, and ResearchGate to promote their work. By bridging the gap between academic impact and public engagement, researchers can amplify the societal relevance of their findings, particularly in advancing SDGs.

5.7 Subject Distribution of Sustainable Development Goals

Table 5 and Figure 5 highlight the major subject areas in which SDG-related Open Access (OA) research has been published by India's leading central universities.

Table 4. Top ten highly cited articles and their altmetric attention score (AAS)

S. No.	Title	Journal	Citation	AAS
1	"Green synthesis of silver nanoparticles using Azadirachta indica aqueous leaf extract" *Ahmed, Shakeel et a*l	"Journal of radiation research and applied sciences"	834	4
2	"Plasma Prolidase Activity and Oxidative Stress in Patients with Parkinson's Disease" *Verma, Akhilesh Kumar et al*	"Parkinsons disease"	734	2
3	"CoroNet: A deep neural network for detection and diagnosis of COVID-19 from chest x-ray images" *Khan, Asif Iqbal et al*	"Computer methods and programs in biomedicine"	680	20
4	"Bactericidal Activity of Curcumin I Is Associated with Damaging of Bacterial Membrane" *Tyagi, Poonam et al*	"Plos one"	491	14
5	"Candida auris: A rapidly emerging cause of hospital-acquired multidrug-resistant fungal infections globally" *Chowdhary, Anuradha et a*l	"Plos pathogens"	473	165
6	"Copper Cobalt Sulfide Nanosheets Realizing a Promising Electrocatalytic Oxygen Evolution Reaction" *Chauhan, Meenakshi et al*	"ACS catalysis"	460	NA
7	"Multidrug-Resistant Candida auris Misidentified as Candida haemulonii: Characterization by Matrix-Assisted Laser Desorption Ionization-Time of Flight Mass Spectrometry and DNA Sequencing and Its Antifungal Susceptibility Profile Variability by Vitek 2, CLSI Broth Microdilution, and Etest Method" *Kathuria, Shallu et al*	"Journal of clinical microbiology"	407	59
8	"A multicentre study of antifungal susceptibility patterns among 350 Candida auris isolates (2009-17) in India: role of the ERG11 and FKS1 genes in azole and echinocandin resistance" *Chowdhary, Anuradha et al*	"Journal of antimicrobial chemotherapy"	381	41
9	"Impact of lockdown on learning status of undergraduate and postgraduate students during COVID-19 pandemic in West Bengal, India" *Kapasia, Nanigopal et al*	"Children and youth services review"	350	11
10	"Targeting COVID-19 (SARS-CoV-2) main protease through active phytochemicals of ayurvedic medicinal plants -Withania so mnifera(Ashwagandha),Tinospora cordifolia(Giloy) andOcimum sanctum(Tulsi) - a molecular docking study" *Shree, Priya et al*	"Journal of biomolecular structure & dynamics"	184	68

Table 5. Division of subject areas of research papers related to sustainable development goals (SDG)

Discipline	Subject	Relevant SDGs
Life Sciences & Biomedicine (n-3,781)	"Biochemistry & Molecular Biology, Biotechnology & Applied Microbiology, Cell Biology, Developmental Biology, Endocrinology & Metabolism, Genetics & Heredity Immunology, Infectious Diseases, Life Sciences & Biomedicin,e Microbiology, Neurosciences & Neurology, Oncology, Pharmacology & Pharmacy, Physiology, Plant Sciences. Reproductive Biology Virology"	"SDG 3 (Good Health and Well-being), SDG 9 (Industry, Innovation, and Infrastructure), SDG 2 (Zero Hunger), SDG 15 (Life on Land), SDG 5 (Gender Equality), SDG 6 (Clean Water and Sanitation)"
Health Sciences (n-1,228)	"Anesthesiology, General, & Internal Medicine, Cardiovascular System, & Cardiology, Dermatology, Dentistry, Oral Surgery, & Medicine; Surgery, Emergency Medicine, Endocrinology, Gastroenterology, General, & Internal Medicine, Ophthalmology, Orthopedics, Pathology, Pediatrics, Psychiatry, Public, Environmental, & Occupational Health, Radiology, Research, & Experimental Medicine, Surgery, Tropical Medicine, Urology, & Nephrology."	"SDG 3 (Good Health and Well-being)"
Physical Sciences (n-992)	"Astronomy & Astrophysics, Chemistry, Electrochemistry, Geochemistry, Geology, Material Science, Materials science, Physics, Polymer science, Thermodynamics."	"SDG 7 (Affordable and Clean Energy), SDG 9 (Industry, Innovation, and Infrastructure),SDG 12 (Responsible Consumption and Production), SDG 15 (Life on Land), (Clean Water and Sanitation)"
Engineering & Technology (n-538)	"Automation & Control Systems, Computer science, Construction & building technology; Engineering, Engineering, Instruments & Instrumentation, Nuclear science & technology, Robotics, Telecommunications."	"SDG 9 (Industry, Innovation, and Infrastructure), SDG 4 (Quality Education), SDG 7 (Affordable and Clean Energy)"
Environmental Sciences (n-834)	"Biodiversity & Conservation, Environmental sciences & Ecology; Zoology, Fisheries, Forestry, Meteorology & Atmospheric sciences, Water resources."	"SDG 15 (Life on Land), SDG 13 (Climate Action), SDG 14 (Life Below Water), SDG 6 (Clean Water and Sanitation)"
Social Sciences & Humanities (n-591)	"Business & Economics, Education, Psychology, Sociology, Women's Studies."	"SDG 3 (Good Health and Well-being), SDG 4 (Quality Education), SDG 5 (Gender Equality), SDG 8 (Decent Work and Economic Growth), SDG 16 (Peace, Justice, and Strong Institutions)"
Agricultural Sciences (n-269)	"Agriculture, Food science & Technology; Toxicology."	"SDG 2 (Zero Hunger),SDG 3 (Good Health and Well-being) SDG 12 (Responsible Consumption and Production)"
Mathematics & Computer Science (592)	"Mathematics, Computer science"	"SDG 4 (Quality Education), SDG 9 (Industry, Innovation, and Infrastructure)"
Earth Sciences (n-294)	"Geochemistry, Geography, Geology, Mineralogy, Paleontology, Physical Geography."	"SDG 6 (Clean Water and Sanitation), SDG 9 (Industry, Innovation, and Infrastructure), SDG 15 (Life on Land)"
Other Disciplines (n-421)	"Transportation, Remote sensing, Allergy, Asian Studies, Emergency Medicine, Information Science & Library science, Medical informatics, Legal medicine,"	"SDG 9 (Industry, Innovation, and Infrastructure), SDG 7 (Affordable and Clean Energy), SDG 11 (Sustainable Cities and Communities), SDG 13 (Climate Action),"

To identify these subject areas, a thematic distribution was carried out manually by reviewing each article listed in the Excel sheet. Since the classification of the 17 Sustainable Development Goals (SDGs) is already available in the Web of Science database, the process primarily involved grouping the articles under similar or related SDG goals. This was done by carefully examining the content, keywords, and subject classifications of each publication to accurately categorize them into relevant SDG themes. The most researched SDG is SDG 9 (Industry, Innovation, and Infrastructure), accounting for 19 % of the studies, highlighting a significant focus on technological advancements, industrial growth, and digital transformation. This is followed by SDG 3 (Good Health and Well-being) at 16 %, indicating substantial contributions to medical sciences, public health, and disease prevention. Environmental concerns also feature prominently, with SDG 15 (Life on Land) and SDG 6 (Clean Water and Sanitation) each accounting for 13 %, suggesting active research in biodiversity conservation, ecosystem protection, and water resource management. Moreover, SDG 7 (Affordable and Clean Energy) and SDG 4 (Quality Education), each at 10 %, suggest active research in renewable energy solutions and educational reforms. Research on SDG 2 (Zero Hunger) at 7 % is centered on food security and sustainable agriculture, while SDG 5 (Gender Equality) and SDG 13 (Climate Action), each at 6 %, highlight engagement in gender studies and climate change mitigation. However, there is potential for expanding research efforts in climate resilience, gender equity, and social justice to create a more balanced and impactful contribution across all SDGs.

6. DISCUSSION

The study demonstrates the pivotal role of Open Access (OA) publishing in advancing Sustainable Development Goals (SDGs) research across top Indian central universities from 2015 to 2024. The University of Delhi emerged as the leading contributor, aligning with Singh, *et al.* who highlighted India's rising engagement with SDG-focused research. The overall growth in OA output until 2022 indicates a positive trend; however, the decline in 2023–2024 may point to shifting institutional priorities, limited funding, or increased publication costs. The preference for Green OA (45 %) suggests a cost-effective approach to scholarly communication, in line with Nazim and Zia (2019), who observed a growing culture of repository-based dissemination in Indian institutes. Gold OA (38 %) also plays a critical role, enabled by strong domestic funders like UGC and DBT. Notably, international partnerships-such as with NIH and King Saud University-highlight India's global research integration. Topic-wise, SDG 9 and SDG 3 received the most attention, reflecting India's national development agenda and public health concerns. This supports Singh, *et al.* who found similar SDG trends in Indian output. While citation counts affirmed academic influence, high Altmetric Attention Scores (AAS) in biomedical research (e.g., COVID-19, Candida auris) signal strong societal interest. In contrast, technically significant yet niche fields like nanotechnology lacked public engagement, pointing to gaps in science communication. This study reveals how OA enhances visibility and collaboration in SDG research but also uncovers limitations-such as uneven dissemination, funding disparities, and limited

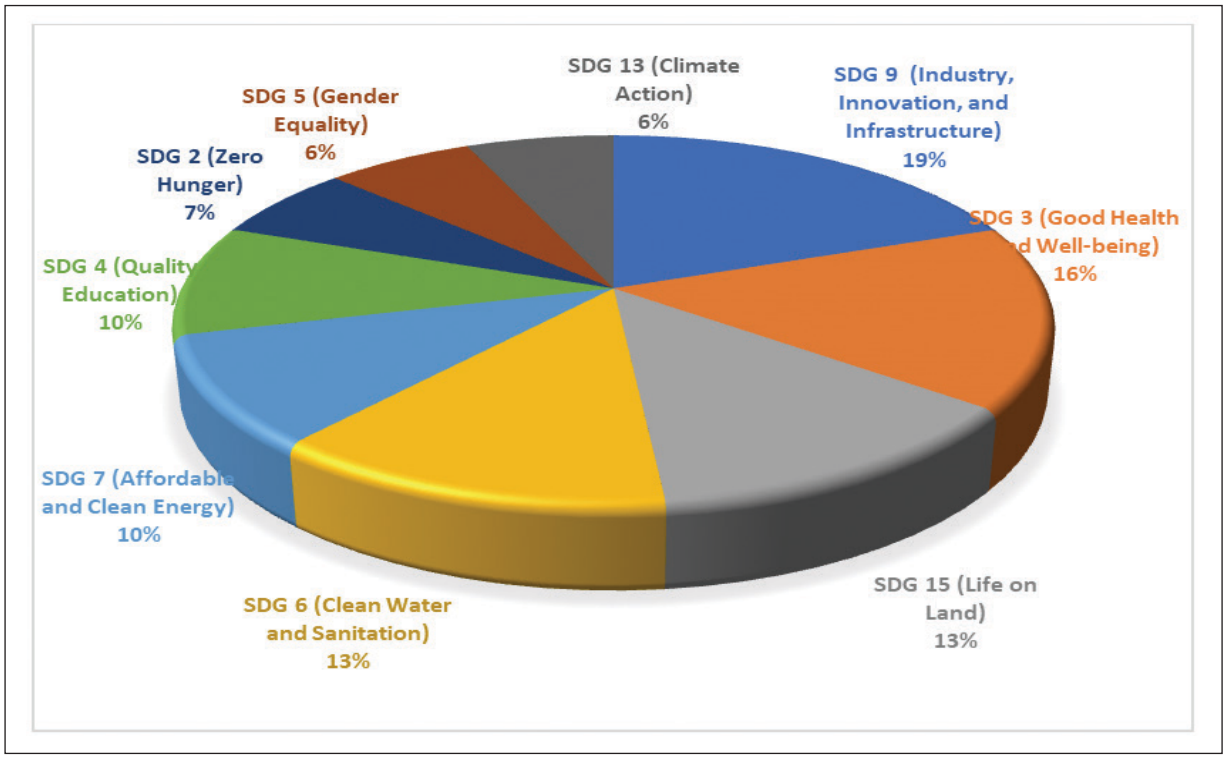

Figure 5. Distribution of SDG goals as per occurrence.

public reach of certain topics. Strategic OA policies, increased awareness, and outreach are essential to ensure broader impact and alignment with sustainable development efforts. However, the findings of this study cannot be generalized, as they are limited to the Web of Science database. For more comprehensive results, future studies should incorporate additional databases such as Google Scholar, Scopus, and Dimensions. Additionally, future research could explore qualitative assessments of OA adoption barriers and the impact of institutional policies on OA publishing trends, providing deeper insights into the evolving landscape of sustainable research dissemination.

7. CONCLUSION

This study emphasizes the vital role of Open Access (OA) in fostering research on Sustainable Development Goals (SDGs) within India's top central universities. These institutions, recognized for their academic excellence and diverse contributions, have demonstrated a strong commitment to advancing SDG-related research through OA publishing. As leading academic institutions, they are uniquely positioned to set an example for others in India by expanding their OA initiatives. By adopting more OA practices, they can ensure wider access to knowledge, fostering collaboration and innovation across institutions. This would not only enhance the visibility and impact of their research but also encourage other academic institutions to follow suit, creating a more inclusive and accessible research ecosystem. Policymakers can leverage OA research to develop evidence-based strategies for achieving SDGs, while industries can use it to drive innovation and technological advancements. Furthermore, broader public access to OA research fosters greater awareness, education, and community engagement, accelerating societal progress toward sustainability and inclusive development.

REFERENCES

1. Yumnam G, Gyanendra Y, Singh CI. A systematic bibliometric review of the global research dynamics of United nations sustainable development goals 2030. Sustain Futures. 2024;7:100192. doi: 10.1016/j.sftr.2024.100192
2. Hallinger P, Chatpinyakoop C. A bibliometric review of research on higher education for sustainable development, 1998-2018. Sustainability. 2019;11(8):2401. doi: 10.3390/su11082401
3. Sahoo J, Karadia A, Mohanty B. An empirical study on open access scholarly publications. Ann Libr Inf Stud. 2023;70(4). doi: 10.56042/alis.v70i4.5341
4. Ali A, Nazim M, Ahmad S. An empirical investigation of open access scholarly publishing trends in social sciences at high-ranked central universities of India. Glob Knowl Mem Commun. 2024. doi: 10.1108/gkmc-02-2024-0102
5. Mishra M, Desul S, Santos CaG, Mishra SK, Kamal AHM, Goswami S, *et al.,* A bibliometric analysis of sustainable development goals (SDGs): A review of progress, challenges, and opportunities. Environ Dev Sustain. 2023;26(5):11101-43. doi: 10.1007/s10668-023-03225-w
6. Nazim M, Zia S. Acceptance and adoption of open access publishing by researchers in India. Glob Knowl Mem Commun. 2019;68(1/2):148–58. doi: 10.1108/gkmc-09-2018-0077
7. Björk B. The hybrid model for open access publication of scholarly articles: A failed experiment? J Am Soc Inf Sci Technol. 2012;63(8):1496–504. doi: 10.1002/asi.22709
8. Chan L, Arunachalam S, Kirsop B. Open access archiving: The fast track to building research capacity in developing countries. Sci Dev Net. 2005.
9. Aithal PS, Shailashree VT, Kumar PM. The study of new national institutional ranking system using ABCD framework. Int J Curr Res Mod Educ. 2016;1(1):389-402.
10. Misra DP, Agarwal V. Open access publishing in India: coverage, relevance, and future perspectives. J Korean Med Sci. 2019;34(27):e180. doi: 10.3346/jkms.2019.34.e180
11. Singh A, Kanaujia A, Singh VK. A bibliometric analysis of research on sustainable development goals by the G20 countries. J Sci Ind Res. 2024;83(7). doi: 10.56042/jsir.v83i7.5366
12. Sweileh WM. Bibliometric analysis of scientific publications on "sustainable development goals" with emphasis on "good health and well-being" goal (2015-2019). Glob Health. 2020;16(1):1–11. doi:10.1186/s12992-020-00602-2
13. Gehlot V, Kaur M, Kaushik MB, Rajharia P, Chandrawat P. Bibliometric analysis of sustainable development goals (SDGs) research in India: Trends, contribution, and impact. Int J Sustain Dev Plan. 2024;19(5):1747–54. doi: 10.18280/ijsdp.190512
14. Indana F, Pahlevi RW. A bibliometric approach to sustainable development goals (SDGs) systematic analysis. Cogent Bus Manag. 2023;10(2). doi: 10.1080/23311975.2023.2224174
15. Fauzi MA, Abdul Rahman AR, Lee CK. A systematic bibliometric review of the United Nation's SDGs: Which are the most related to higher education institutions? Int J Sustain High Educ. 2023;24(3):637–59. doi: 10.1108/IJSHE-12-2021-0520
16. Saikia S, Gul S, Verma MK. Are libraries ready to serve gamification tools for teaching and learning? A review based on computational mapping. Glob Knowl Mem Commun. 2023. doi:10.1108/gkmc-04-2023-0114
17. Ali A, Nazim M, Ahmad S. An empirical investigation of open access scholarly publishing trends in social sciences at high-ranked central universities of India. Glob Knowl Mem Commun. 2024. doi:10.1108/gkmc-02-2024-0102
18. Nazim M, Bhardwaj RK, Agrawal A, Bano A. Open access publishing in India: trends and policy perspectives.

Glob Knowl Mem Commun. 2022;72(4/5):437–51. doi:10.1108/gkmc-09-2021-0158
19. Nazim M, Zia S. Acceptance and adoption of open access publishing by researchers in India. Glob Knowl Mem Commun. 2019;68(1/2):148–58. doi: 10.1108/gkmc-09-2018-0077
20. Pandita R, Singh S. A study of distribution and growth of open access research journals across the world. Publ Res Q. 2022;38(1):131–49. doi: 10.1007/s12109-022-09860-x
21. Singh A, Kanaujia A, Singh VK. Research on Sustainable Development Goals: How has Indian scientific community responded? J Sci Ind Res. 2022;81(11):1147–61. doi: 10.56042/jsir.v81i11.64456

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