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Open Access Mandates and Policies Adopted by the Indian Research Organisations: An Assessment of the Status and Effectiveness of Selected Indian Research Funders

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ABSTRACT

Open access is a broad term that refers to information and knowledge that are freely available in the public domain for public use or distribution on a massive level, without the need for a subscription or access fee. The open access policies and mandates compel and encourage academics and scientists to publish their scholarly content in open access, considering it a societal duty since they receive research grants from the government. The present study evaluates the funded scholarly communication and availability of their funded research communication in OA platform from four major Indian research funders (i.e., CSIR, DBT, DST, and ICAR) that have mandated open access policies by discussing the policies induced by each organisation in last five years (2017-21) indexed in the Scopus database. The OA-funded or affiliated scientific literature is indexed to a very minimum number in comparison to total publications mainly for each funder which mostly adopted green and gold OA routes of publications. The average citation of OA-funded publications is more than non-OA-funded publications. The funder also initiates awareness campaigns and workshops on open access to encourage and motivate researchers by engraving free publications with worldwide exposure and visibility.

Keywords: Open access mandate; OA policies; ROARMAP; Funding organisations; Funder

1. INTRODUCTION

Research funding is the procedure of obtaining grants for conducting scientific research by applying to various government and non-government funders through the research proposal submission. The research funding is an additional step to cover the monetary cost and expense encompassed for the smooth accomplishment of a research project from various national and international funding agencies.[1] Public research funding refers to the provision of monetary grants by the government's innovation budget. However, the funding agencies and research organisations withstand certain criteria and terms to grant capital to the research to produce outstanding productivity.[2]

Researchers who want to publish their scholarly content via Open Access (OA) platforms benefit from research funding. Therefore, many prominent funding agencies (profit and non-profit organisations), research organisations and academic institutions in many countries have signed a bond to mandate and adopt OA publishing policies to engross the benefits linked with it. According to the Registry of Open Access Repositories Mandatory Archiving Policies (ROARMAP), 85 funders, 57 funders and research organisations, 12 multiple research organisations, 877 university or research institutions and 82 sub-unit of research organisations have adopted OA mandates across the globe.[3] The OA policy of these funders and organisations mainly focuses on depositing their scientific productivity in an institutional repository i.e., following the green OA (self-archiving) approach.

Each country is currently working to become more dynamic and globally integrated in terms of information infrastructure, research and innovation, skills and financial principles. India also invests in fundamental structural inventions and research and developments (R&D) for global scientific advancements. Various scientists, researchers, and academicians affiliated with universities, institutions, and research organisations have observed the benefits of OA publishing. The research institutions and organisations, specifically the non-profit research organisations, have mandated the OA publishing.

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Some government agencies, research institutions and academic institutions in India created portals and digital repositories for making scientific research openly accessible. Some of these initiatives include the Listing of Open Access Databases (LOADB) by CSIR-URDIP, Shodhganga by INFLIBNERT Centre, National Digital Library (NDL) by IIT Kharagpur, and Traditional Knowledge Digital Library (TKDL) by CSIR. Some funding bodies and research and academic institutions in India such as CSIR, DBT, DST and ICAR have adopted OA mandates and policies.[4] According to ROARMAP data as of 24 May 2022, 18 academic institutions 8 funder/subunit of research organisation one journals and an institutional repository in India have adopted OA mandates policies.[3]

The Department of Biotechnology (DBT) and Department of Science and Technology (DST) under the Ministry of Science and Technology, Government of India, took the initiative in 2014 to make all publicly funded research freely available to the public by adopting OA policies.[5] The OA policies of DBT and DST recommend uploading the funded scientific publications to the affiliated IR or the DBT/DST central harvester (www.sciencecentral.in), mostly via the green OA route.[6] Council of Scientific and Industrial Research (CSIR) led all the funded research articles to be deposited in an IR[7], while research output of CSIR laboratories such as research papers, e-theses, and dissertations should also be deposited in the central harvester[20] (http://csircentral.net/) set up and maintained by CSIR-URDIP (Unit for Research and Development of Information Products). ICAR-funded research is encouraged for self-archiving.[8] To enhance the benefit of open access publishing, ICAR affiliated institutes have mandate the authors to deposit the final version of their research publication in specific IR.

2. REVIEW OF LITERATURE

Several studies have been carried out vending the mandate OA publishing by various funders, institutions/ universities, and organisations. Mering (2020) discussed the basic need for OA mandates since universities could only afford a small portion of scholarly journals and also highlighted that among the registered list in ROARMAP; 86 % belong to universities and research institutions. Only 14 % belong to funders to mandate OA availability of research literature.[9] Shamseer et al. (2021) evaluated whether the selected 44 research funders provide any information regarding the selection and submission of scholarly literature, specifically in health science research. About 86 % of funders provided information regarding disseminating funded scientific research, and few have instructed about certain guidelines in selecting the journals creating a benchmark for implementing Plan S.[10]

Rabesandratana described the idea of OA mandates by narrating the landscape of Plan S specifically by European funders. The huge supporter of Plan S is China since it attains 18.6 % of scientific literature termed as a paper player, and Funder of Africa and the USA are possible to follow by accepting the initiative.[11] Agustini and Berk, in their editorial section, conferred the bold and controversial initiative Plan S, which was to mandate all the researchers that receive benefits from funders must publish their work in OA journals to make it available to the public by 2021. They also stressed-out certain key points such as cost, reproducibility crisis, peer review maintenance of quality/quantity of scholarly literature, and why the initiative fails to undertake possible outcomes.[12]

Bryan & Ozcan examined the impact of NIH mandates on the free online availability of funded research in 2008 which led to a 50 % increase in free access to articles and a 12.27 % increase in citations.[13] Björk and Solomon highlighted the funding scenario of European SOAP, where 12 % of researchers paid for APCs by themselves, whereas 39 % of researchers from developing countries provided grants for paying for APCs.[14] Xia, *et al.* described the history of OA mandates and policies and investigated the scenario of OA mandates and their implementation by evaluating 349 OA mandates and policies from the ROARMAP and other sources. The finding indicated a significant impact of these mandates on OA publishing.[15] Vincent-Lamarre, *et al.* estimated the effectiveness and strength of the OA mandates through the MELIBEA score.[16] MELIBEA serves as a platform for both registries for the OA policies and an estimator of those policies in institutions.[17] Deori,[18] *et al.* assessed the status of funded OA availability of India's research publication by national and international agencies. The paper highlights that only 26.41 % of the total publication during 2016-2020 were financially supported by various funding organisation. However, only 29.32 % of the funded publications have been deposited in different open access platforms.[18]

OA mandates and policies of funders and research organisations mainly initiate to make all scientific publications available and accessible freely to the public. However, with the effort to adopt OA mandates policies, it becomes important to evaluate the status and effectiveness of the OA mandates and policies of funding bodies and research organisations. Therefore, the present study is an attempt to investigate OA availability of funded research and the impact of OA mandates and policies of government research funding bodies/research organisations (CSIR, DBT, DST, and ICAR) in India on OA mandate publishing.

3. SCOPE OF THE STUDY

The present study investigates the status of OA mandates and policies of four funding organisations in India (Table 1) and highlights to what extent these funding bodies fund the scientific research available via OA modes.

4. RESEARCH QUESTIONS

1. What is the status of funding research in India?
2. To what extent, funded research is openly accessible in India?
3. Is there any relation between OA availability to funded and non-funded research?

Table 1. OA mandates and policies of major funding bodies in India

S. No.	Name of the funding agency	OA policy (Year)
1.	Council of Scientific and Industrial Research (CSIR), India	2009
2.	Department of Science and Technology (DST), India	2014
3.	Department of Biotechnology (DBT), India	2014
4.	Indian Council of Agricultural Research (ICAR)	2013

4. What is the status of OA mandates and policies of major funding bodies in India?
5. Which OA route do researchers prefer for making their funded research OA?

5. METHODOLOGY

5.1 Data Collection

The dataset for examining the status of OA availability of research funded by the selected funding organisations in India i.e., CSIR, India; DBT, India; DST, India, and ICAR is collected from the Scopus database by befitting certain search queries and filtration as mentioned in the flowchart (Figure 1).

- AFFILCOUNTRY: "India"
- Refined filtration
  - DOCTYPE: "Article"
  - PUBYEAR: "2017-2021"
  - FUND-SPONSOR: "Each Funding Organisation name"
  - OPEN ACCESS: "Open access"

5.2 Data Analysis Tools and Procedure

The dataset was retrieved from the Scopus database on 20 April 2022. The extracted dataset is arranged in standard sequence manually and analysed the total funded publication of each funding organisation is in MS-Excel while the open access data are analysed by using Biblioshiny (Bibliometrix R package). The statistical method adopted to evaluate the dataset is the Scientometrics method. The analysed data are organised and presented in the form of tables, charts, and graphs by using Google Spreadsheets and Tableau.

6. DATA ANALYSIS

6.1 Status of Overall Research and Funded Research in India

The Scopus Refine Results panel offers an option to filter a set of search results to show only funded

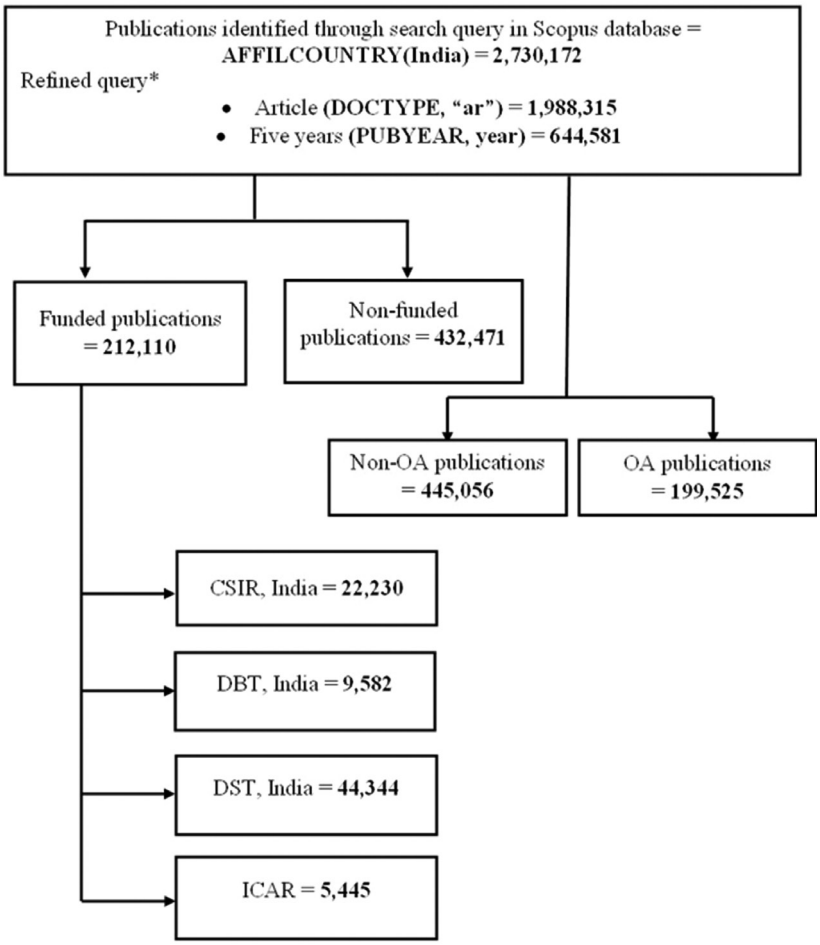

Figure 1. Flowchart for data extraction.

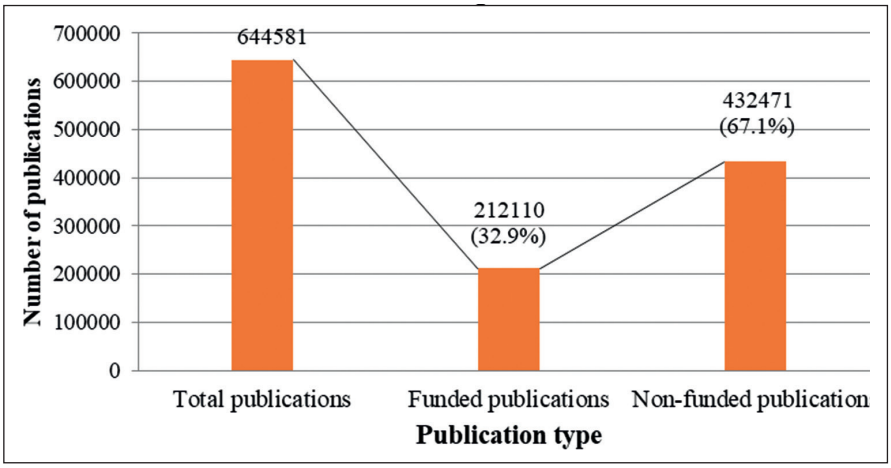

Figure 2. Distribution of total publications by funded and non-funded publications.

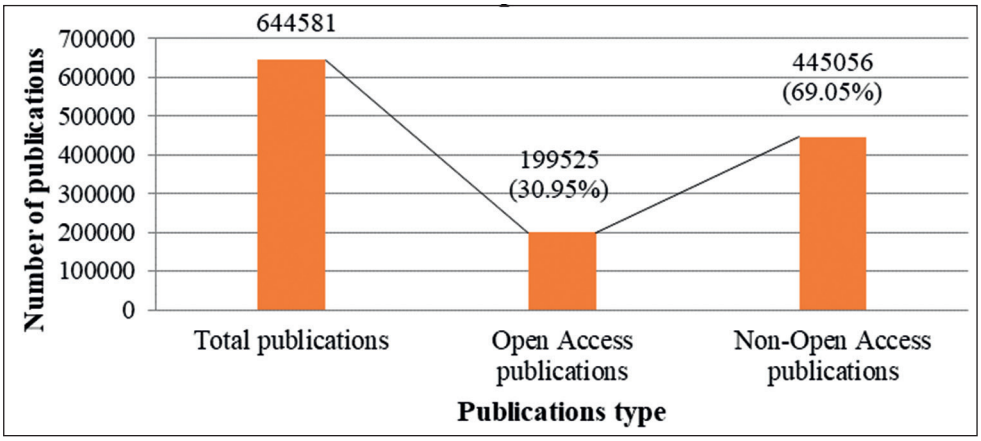

Figure 3. Distribution of total publications by OA and non-OA publications.

publications. From the total results, funded publications were refined using the Funded Publications search refine option. Figure 2 shows the funding scenario of scientific publications in India during 2017-2021. Of the total publications (644,581) published in India during 2017-2021, 212,110 (32.9 %) publications are identified as funded publications, while 432,471 (67.1 %) are identified as non-funded publications, which means the authors of these particular articles haven't received any grants from any organisations for research sampling and analysis. The ratio of non-funded publications is much higher than that of the funded publications in India as shown in Figure 3.

6.2 Status of Overall Publications and OA Publications in India

The Scopus Refine Results panel offers an option to filter a set of search results to show only Open Access publications. From the total results (644,581), OA publications were refined using the Open Access search refine option. Figure 2 displays the status of scientific publications in India by authors affiliated with various educational institutions, and research organisations along with the ratio of OA publications published during 2017-2021. Of the total publications (644,581) published in India during 2017-2021, 199525 (30.95 %) were identified as OA publications.

6.3 Distribution of Funded Publications by Non-OA Publications of the Funded Publications

Figure 3 depicts the variation of OA publications and non-OA publications amongst the funded publications. Within the total number of funded publications (644581), only 30.95 % of the scholarly articles are published under OA publishing whereas the other 69.05 % of the articles are under non-OA publishing. This portrays that more than half of the funded publications have not accepted the benefits of open access policies.

6.4 Distribution of Funded Publications by Prominent Funding Organisations

Table 2 shows the distribution of funded publications by prominent funding organisations. Of the total funded publications (212,110) in India during 2017-2021, 81,601 (29.04 %) publications were funded by the four prominent funding organisations (CSIR, DBT, DST and ICAR). Of the total funded publications (81601), by four prominent funding organisations in India, a large number of publications

(54.34 %) were funded by DST, followed by CSIR (27.24 %), DBT (11.74 %) and ICAR (6.67 %).

6.5 Open Access Availability of Funded Publications by Prominent Funding Organisations

Table 2 also shows the OA availability of funded publications by prominent funding organisations. It may be observed in Table 2 that 21185 of the total funded publications (81,501) by prominent funding bodies are OA publications with an OA ratio of 25.95. Although DST has funded maximum publications, the ratio of OA availability of its funded publications is only 24.28 %. It is interesting to note that DBT funded around 12 % of the total funded publications, but OA availability of its funded publications is 38.3 %. The OA ratio of ICAR and CSIR is 25.96 and 23.94 respectively.

Table 2. OA publication share of the funding organisations

Funding agencies	Total publications	OA publications	OA ratio (%)
CSIR, India	22230	5321	23.94
DBT, India	9582	3675	38.35
DST, India	44344	10765	24.28
ICAR	5445	1424	26.15
Total	81601	21185	25.96

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6.6 Trendline of Funded Publications of the Selected Funding Organisations

Figure 4 denotes the funded publication trends of the government funding organisations in total and open access publications within five years. The publication trend for both total and open access is seen to be continuously increasing from the initial to the end year. However, in terms of open access publications, there is not much difference in the number of open access funded publications. There is a massive gap between the total funded and open access funded publications, which is a great reason to worry about the open access mandate policies funders.

6.7 OA Routes Distribution

Figure 5 depicts the various routes of open access publication associated with the contributors of the undertaken funding organisations. The data for open access routes were retrieved from the Scopus database. The contributors of CSIR, India (1753); DBT, India (1713), and ICAR (464) have adopted the combination of Gold & Green to a maximum extent focusing mainly on publishing the scientific literature into OA journals and depositing in any institutional repository after the peer-review process. Whereas for DST, India, the Green (3387) route is the most accepted route, followed by the Gold & Green (2713) route and Gold (1727) route. The Hybrid gold and Hybrid gold & green are the least accepted open access routes for all the open access publications. Undefined is the section where open access routes are not mentioned. The analysis depicts that the contributors of open access publications mainly accepted and adopted gold and green OA approaches to distribute and attain quality exposure to scholarly communications.

6.8 Subject-wise Distribution of OA Publication Share

Table 3 represents the subject diversification of the number of total publications, open access publications,

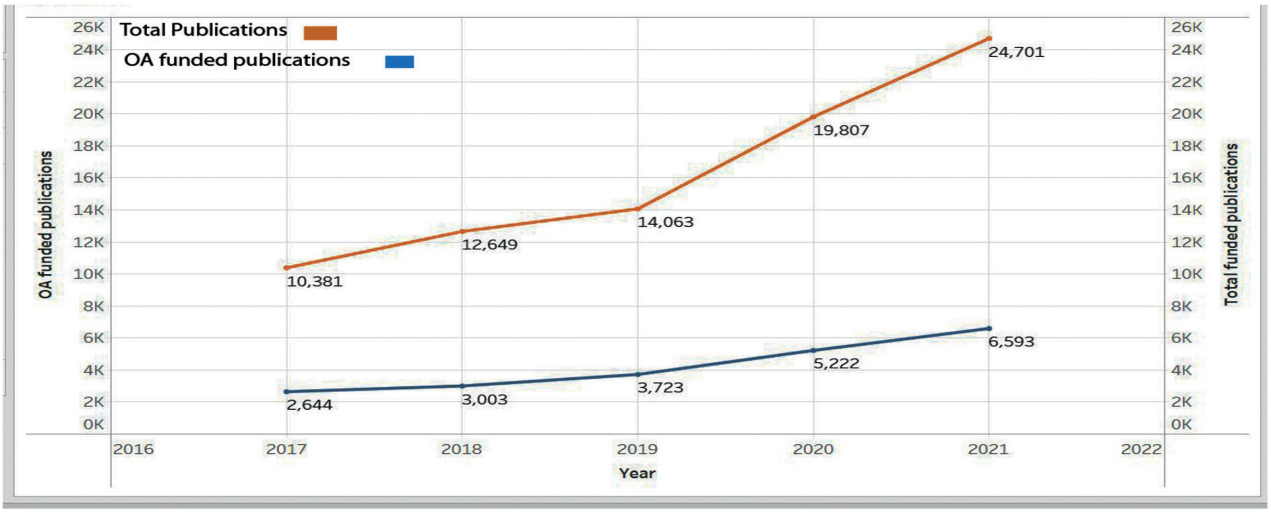


Figure 4. Comparative growth trend of total and OA publications of the funding organisations.

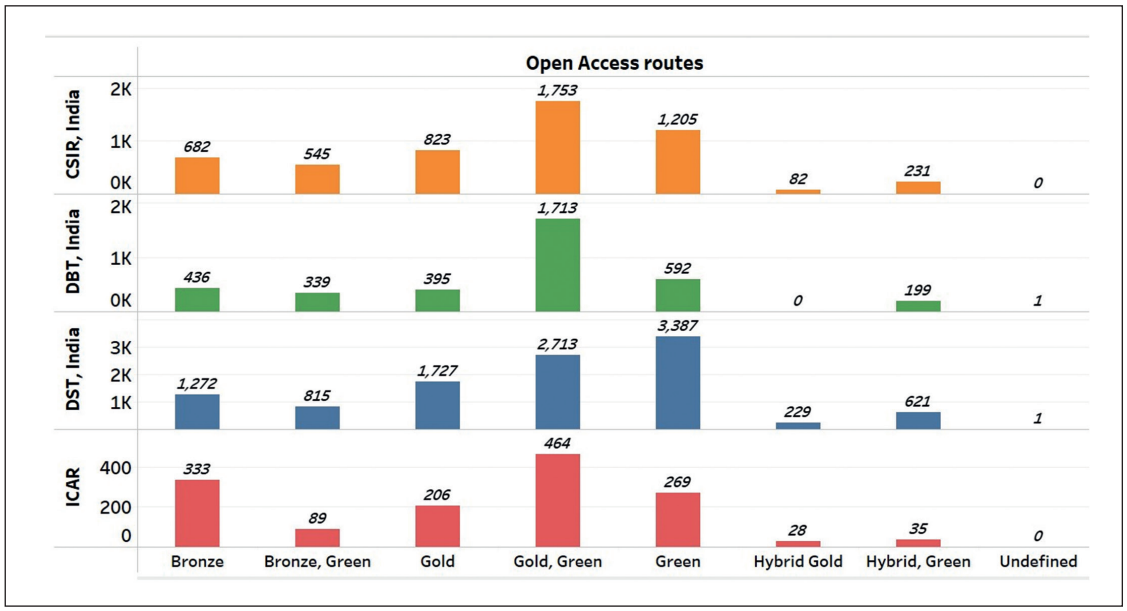


Figure 5. Variation of OA routes approached by the funding organisation.

Table 3. Ranking of OA publications (according to publication share) per subject

Subject distribution	Total funded publication	O.A. funded publications	OA- funded publication share (%)
Multidisciplinary	1686	1433	84.99
Dentistry	25	13	52.00
Medicine	4896	2052	41.91
Immunology and Microbiology	3281	1297	39.53
Neuroscience	965	352	36.48
Mathematics	3850	1380	35.84
Psychology	147	43	29.25
Earth and Planetary Sciences	3403	970	28.50
Physics and Astronomy	15725	4463	28.38
Computer Science	3038	846	27.85
Biochemistry, Genetics and Molecular Biology	14520	3937	27.11
Agricultural and Biological Sciences	9766	2496	25.56
Environmental Science	6618	1633	24.68
Decision Sciences	402	96	23.88
Chemical Engineering	9687	2246	23.19
Social Sciences	806	182	22.58
Pharmacology, Toxicology and Pharmaceutics	3698	761	20.58
Veterinary	820	159	19.39
Health Professions	252	47	18.65
Nursing	197	35	17.77
Engineering	11995	2051	17.10
Chemistry	21922	3297	15.04
Business, Management and Accounting	420	60	14.29
Materials Science	17661	2415	13.67
Arts and Humanities	104	13	12.50
Energy	4494	418	9.30
Economics, Econometrics and Finance	790	59	7.47

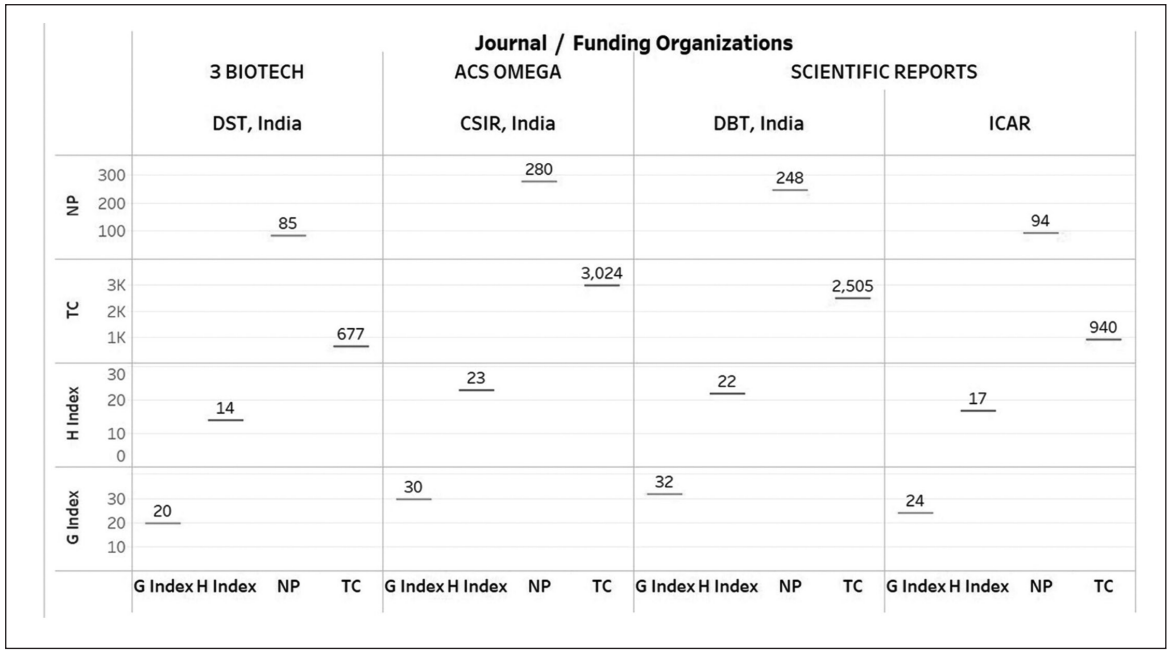
and OA publication share. In terms of total funded publications initiated by the undertaken funding agencies, the discipline Chemistry (21,922 publications) has the maximum funded publications, followed by Materials Science (17,661) and Physics and Astronomy (15,725). As for OA funded publications, Physics and Astronomy (4,463 OA publications) consist of the highest OA funded publications, which is followed by Biochemistry, Genetics and Molecular Biology (3,937 OA publications) and Chemistry (3,297 OA publications). However, this table ranks according to the OA funded publication share (%) of each subject category, where the Multidisciplinary (84.99 %) subject attains the top position, followed by Dentistry (52 %) and Medicine (41.91 %). Based on the OA publication share, it is seen that most medical sciences disciplines are more prone to publish in open access publications rather than natural sciences and life sciences disciplines.

6.9 Prolific OA Journals

Figure 6 displays the most prolific OA journals to support open access publishing in association with H- and G-index and also manifests the total citation acquired by the prolific OA journals. The ranking of OA journals for each funding organisation is based on the maximum number of open access funded publications.[19] Harzing (2016) has forwarded that the number of papers of a certain "quality" [citations] threshold, a threshold that rises as h rises; g allows citations from higher-cited papers to be used to bolster lower-cited papers in meeting this threshold. Scientific Reports is the most prolific journal to publish OA articles for DBT, India (248 OA publications) and (94 OA publications), with 22 and 17 h-index simultaneously; 32 and 24 g-index, respectively. ACS Omega is the top journal in CSIR, India's funding organisation, with 280. Open access publications are the maximum OA publications compared to other top prolific OA journals within the selected funded publications affiliated with the funder ICAR. The h and g-index for ACS Omega are 23 and 30, respectively. Whereas for DST, India, 3 Biotech is the most prolific OA journal with 14 h-index and 20 g-index, the lowest number of publications compared to other top OA journals. Based on citations received by the top OA journals of each Funder, ACS Omega leads with 3024 total citations followed by Scientific Reports (DBT, India = 2505 TC; ICAR = 940 TC) and 3 Biotech with 677 total citations. The prolific OA journal variation for each Funder outlines that with a greater total number of OA publications, the total citations, h and g-index gradually increase.

6.10 Author Distribution

Figure 7 discloses a graph of the authorship pattern of open access funded publications of the selected funding organisations. For CSIR, India, the total number of authors to receive grants from the funding agencies and published their work in open access journals is 23,177 contributors of which 51 were single authors and 23,126 authors were authors of multi-authored scholarly literature. These authors nearly made 920458 times appearances in the whole OA-funded publications of CSIR, India. The number of open access authors in DBT, India is 13686, where only 20 are single-authored documents and the rest 13666 are multi-authored documents with 24,818 times of appearances. However, the number of contributors in DST, India is the highest with 39983 due to a higher number of funded



Note(s): NP= Number of Publications TC= Total Citations

Figure 6. Distribution of prolific OA journals in association with H- and G-index.

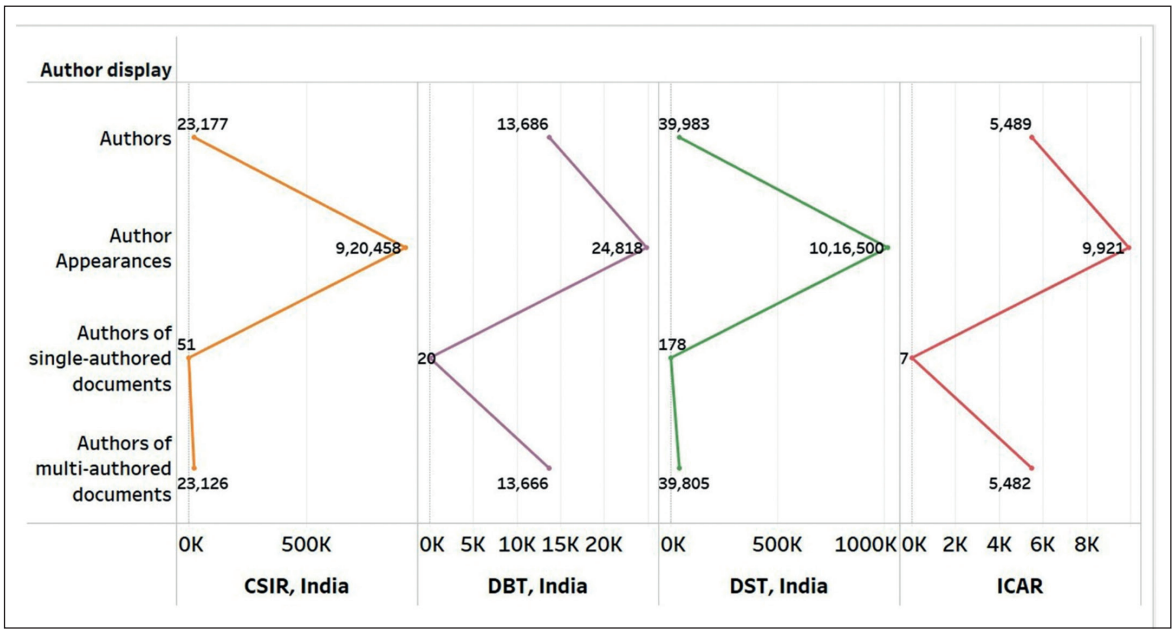


Figure 7. Display of OA authorship distribution.

Table 4. Ranking of Prolific authors of OA funded publicationsfor each funding organisation

	RANK	1st	2nd	3rd	4th		5th	
CSIR, India	AUTHOR	Thakur, S.	Kumar, S.	Gill, K.	Milosevic, J.		Guilbaud, M.	
	OAP	410	390	375	347		335	
	TC (2017-2021)	12244	13045	23398	11731		10700	
	h-index	55	56	64	55		54	
DBT, India	AUTHOR	Pandey, A.	Srinivasan, N.	Gupta, D.	Varshney, R.K.	Wadhwa, R.	Kaul, S.C.	
	OAP	20	19	17	16	16	15	
	T.C. (2017-2021)	127	103	64	102	73	72	
	h-index	8	6	6	9	6	6	
DST, India	AUTHOR	Thakur, S.	Kumar, S.	Hou, W.S.	Gill, K.		Aushev, T.	
	OAP	450	430	401	381		380	
	TC (2017-2021)	12187	13022	11623	15380		10604	
	h-index	55	56	55	60		54	
ICAR	AUTHOR	Kumar, D.	Singh, N.P.	Singh, N.K.	Jaiswal, S.	Singh, G.P.	Iquebal, M.A.	Rao, A.R.
	OAP	22	21	19	18	18	17	17
	T.C. (2017-2021)	89	170	127	80	68	73	113
	h-index	5	10	8	5	6	5	8

Note(s): OAP= Open access publications; TP= Total Citations

publications than the rest of the funders where these authors nearly appeared 1016500 times in the scholarly literature where 178 were single-authored documents and 39805 are multi-authored documents. The ICAR with the least open access funded publications also consists of lower numbers of OA contributors (5489 authors), which appeared 9921 times in articles- 7 single-authored documents and 5482 multi-authored documents. This illustration depicts that the OA-funded articles are initiated by very fewer single authors, and the reappearance of authors is very frequent.

6.11 Ranking of Prolific Authors of OA Funded Publications

Table 4 depicts the top OA contributors of each undertaken government funding organisation according to the number of open access publications.

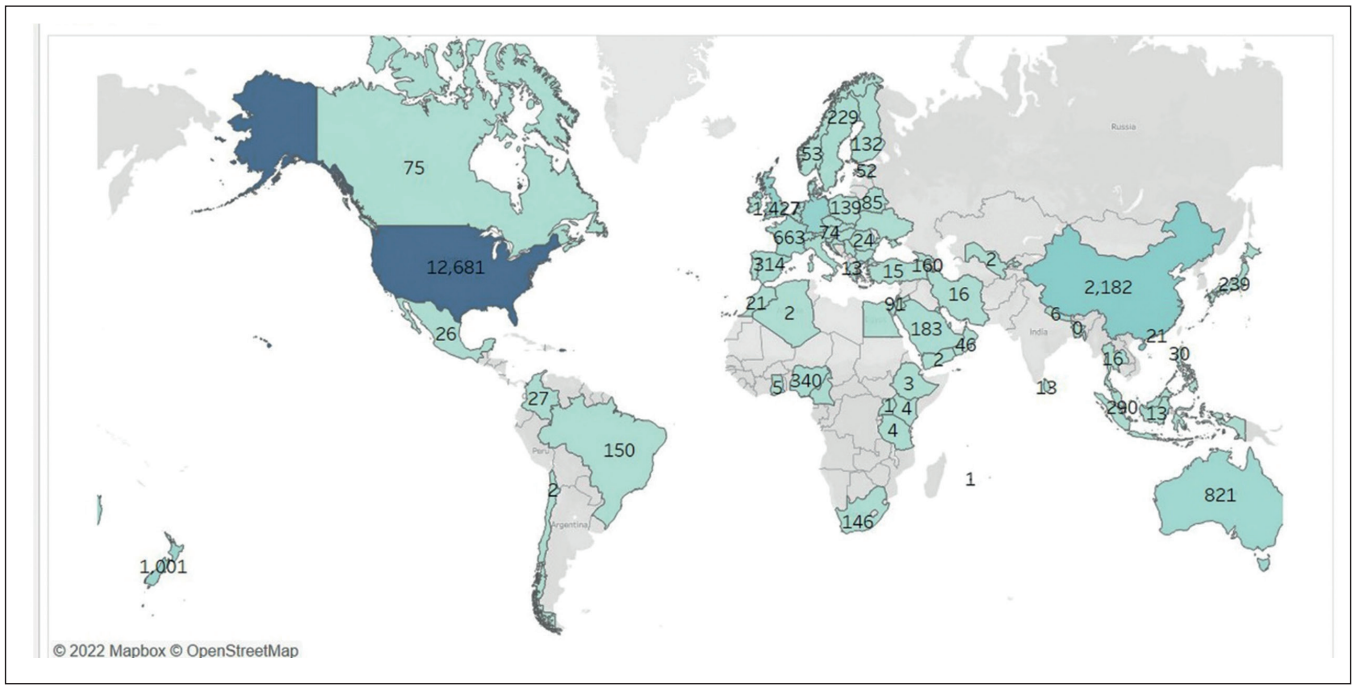


Fig 8. Global scenario of citations for the OA publications.

Thakur, Sanchari K. is the leading author from Variable Energy Cyclotron Centre, Kolkata, to contribute mainly in open access publishing in selected two funding organisations, i.e., CSIR, India and DST, India with 410 and 450 OA funded literature respectively.

As for the ICAR funding organisation, Kumar, D. is the most prolific OA author (22) from ICAR - Indian Agricultural Statistics Research Institute, and Pandey, A. is for DBT affiliated with the National Institute of Mental Health and Neuro Sciences, India with 20 OA literature compared to non-open access contributors. The prolific author for DBT, India, and ICAR changes to Rathore, A.S. (49) and Chakraborty, K. (63) accordingly. The performance impact of the open access authors of CSIR, India, and DST, India is highly recognised and acknowledged by the academic community based on the total citations they have received, whereas DBT, India, and ICAR must work more on improving the number of open access funded publications. The citations derived for the prolific authors of OA funded publications are based on the undertaken time frame 2017-21, within which Gill, K. (23398) with 64 h-index, have received maximum citation counts despite having a low number of publications compared to the top prolific author Thakur, K.

6.12 Top 10 Affiliated Institutions to Publish OA Publications

Table 5 (Annexure 1) ranks the top ten affiliated institutions based on the number of OA publications where the affiliated contributors adopt and publish peer review the scholarly literature on OA platform. It also highlights the citation attained by the OA funded publications during 2017-21 for each undertaken Funder to display the quality impact of the published literature. Indian Institute of Science (IISc) is a technical institute to appear frequently in the ranking by adopting OA publishing. In ranking of affiliated institutions, various academic (government and private), medical institutions; and research centers (national and international) have conquered the position in publishing OA funded publications. The citation perspective highlights that international institutes and research centres have gained more worldwide visibility and impactful citations than national organisations. However, for ICAR funding organisations, the organisations that hold the ranking in top affiliation to adopt OA publishing are affiliated associations or research organisations for various agricultural aspects.

6.13 Global Scenario for OA Funded Citations

Figure 8 portrays the global scenario of acquiring citations from the OA publications except for Indian citations. Indian contributors have mostly cited the OA publications; however, citations are not only confined to the region of India but international countries or regions. The OA publications funded by CSIR India, DBT India, DST India and ICAR have attained 112,600 citations majorly from India. India, the USA and China are the major regions to attain citations from the funded OA publications. However, the Asian countries have been part of the citations attained because of the OA publications funded by the selected funding organisations.

6.14 Category-wise Visualisation of Citations

Table 6 demonstrates the citation distribution of each funding agency of OA and non-OA funded publications. The citations are accounted for based on the year

Table 6. Citation visualisation of each funding agency

Funding agencies	OA category			Non-OA category			Total category		
	OA funded publications	OA citations (2017-21)	OA Average citation	Non-OA funded publications	Non-OA citations (2017-21)	Non-OA average citation	Total funded publications	Total citations (2017-21)	Total average citation
CSIR, India	5329	58707	11.02	16901	120440	7.13	22230	179147	8.06
DBT, India	3673	22174	6.04	5909	31065	5.26	9582	53239	5.56
DST, India	10764	92898	8.63	33580	212422	6.33	44344	305320	6.89
ICAR	1424	6633	4.66	4021	14607	3.63	5445	21240	3.90
Total	21190	180412	8.51	60411	378534	6.27	81601	558946	6.85

2017-21; deriving that those citations attained by the non-OA funded publications are more when compared to OA funded publications since the funded publications of each Funder have a great gap between both OA and non-OA categories. However, the average citation of OA funded publications is quite high (especially CSIR, India's OA average citation-11.02) compared to non-OA funded publications. DST, India despite having maximum funded publications in both OA and non-OA category yet have low average citation counts of 8.63 and 6.33 compared to CSIR, India's funded publication. Table 6 depicts that the number of citations received by non-OA funded publications of each funded is high yet the average citations of OA funded publications are more.

7. CONCLUSIONS

OA to government-funded research is an issue of tremendous importance to researchers, librarians and the general public. Since all funds disbursed by the Government funding bodies are public funds, the information and knowledge generated through the use of these funds must be made freely available to the public as soon as possible. Government funding bodies in the USA, Europe and other countries have adopted OA policy and mandated that studies they fund are required to make their results as OA within 12 months of publication using either online repositories and/or OA journals. Yet, there is evidence that authors are poorly compliant with this mandate. In India, some prominent government funding bodies such as CSIR, DBT, DST and ICAR have also adopted OA and mandated similar requirements from research fund recipients.

Against the above backdrop, the study investigated how beneficiaries (authors who received funds from these funding bodies in India) are compliant with this mandate. Based on the results it may be concluded that authors in India are poorly compliant with this mandate as only 26 % of the total funded articles published during 2017-21 are available as OA. Even though OA articles have a greater academic impact than non-OA articles, the authors, in India are reluctant to make the outcome of funded research OA. There are a few important implications of these findings for funding bodies, researchers, and the government. For funding bodies, a system of academic reward or punishment for authors is to be made to ensure the OA availability of funded research. For researchers, an awareness of the benefit of making research OA may be initiated by the funding bodies or the government.

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His contributions to the current study are: Conceptualisation of ideas, research frame work, manuscript editing, language editing, and referencing.

Annexure: 1

Table 5. Ranking of most prolific affiliations to publish O.A. funded publications

Rank	CSIR, India			DBT, India			DST, India			ICAR		
	Affiliation	**OA funded pub**	**O.A. citations (2017-2021)**	**Affiliation**	**OA funded pub**	**O.A citations (2017-2021)**	**Affiliation**	**OA funded pub**	**O.A citations (2017-2021)**	**Affiliation**	**OA funded pub**	**O.A. citations (2017-2021)**
1st	Academy of Scientific and Innovative Research AcSIR	604	4200	Indian Institute of Science	303	1754	Indian Institute of Science	1286	16928	Indian Council of Agricultural Research	548	2507
2nd	Indian Institute of Science	564	11331	Manipal Academy of Higher Education	159	839	Tata Institute of Fundamental Research, Mumbai	745	18838	ICAR - Indian Agricultural Research Institute, New Delhi	229	1323
3rd	University of Delhi	553	12144	University of Delhi Academy of Scientific and Innovative Research AcSIR	141	966 746	Indian Institute of Technology Madras	718	17336	Indian Veterinary Research Institute	92	489
4th	CNRS Centre National de la Recherche Scientifique	541	26090	Jawaharlal Nehru University	124	857	CNRS Centre National de la Recherche Scientifique	703	19358	ICAR - Indian Agricultural Statistics Research Institute, New Delhi	78	372
5th	Panjab University	477	13606	All India Institute of Medical Sciences, New Delhi	121	747	Panjab University	671	17281	ICAR - Central Marine Fisheries Research Institute, Kochi	73	240
6th	Universite Paris-Saclay	474	25512	Council of Scientific and Industrial Research India	113	724	University of Delhi	590	16847	ICAR - National Dairy Research Institute	62	238

7th	Istituto Nazionale di Fisica Nucleare - INFN	473	25917	Indian Council of Agricultural Research	107	528	Saha Institute of Nuclear Physics	574	13774	ICAR - Central Institute of Fisheries Education, Mumbai	57	172
8th	IN2P3 - Institut National de Physique Nucléaire et de Physique Des Particules	471	25705	National Centre for Biological Sciences	103	672	Indian Institute of Science Education and Research Pune	569	12996	ICAR - National Bureau of Plant Genetic Resources, New Delhi	50	167
	Institut de Physique des 2 Infinis de Lyon		25827				Universite Paris-Saclay		18056			
9th	Wigner Research Centre for Physics		25819	University of Hyderabad			National Institute of Science Education and Research			ICAR - Research Complex for North Eastern Hill Region, Umiam		170
	Istituto Nazionale Di Fisica Nucleare, Sezione di Padova	470	25787		99	475		565	14744	ICAR - National Rice Research Institute, Cuttack	46	288
										ICAR - National Research Centre on Plant Biotechnology, New Delhi		502
10th	Saha Institute of Nuclear Physics	466	13446	Indian Institute of Science Education and Research Pune	93	336	Indian Institute of Technology Bombay	559	9659	International Crops Research Institute for the Semi-Arid Tropics	39	471