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The State of Open Science: A Review of Core Practices and Emerging Directions

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Abstract

This review article explores the open science ecosystem by examining its foundational pillars and policy frameworks to understand the current state of its implementation and challenges. A narrative thematic review of the literature retrieved from the Web of Science database was employed to analyse relevant research articles published between 2020 and 2025. Major themes that emerged include core practices, scope for inclusivity, impacts and benefits, infrastructure, policies and implementation, challenges and future directions. Open Science (OS) is a value-driven movement that relies on integrating core practices, such as Open Access, Open Data, Open Evaluation, etc. with global governance and technological infrastructure to enhance research transparency and reproducibility. However, equitable adoption of OS is currently fragmented and challenged by disparities which necessitate stronger government policies and incentives like compulsory training and research recognition to support a globally inclusive environment. To eradicate existing divisions and disparities, practical implications suggest the need for stronger government policies focused on the education sector.

Keywords: Open Science, Open Research, Research Integrity, Open Science Practices.

1. Introduction

Throughout history, cultural interchange and dominance have taken place, with science being an important part of it. However, with the emergence of knowledge-based economies, knowledge has changed into somewhat of a commodity, creating markets for the wealthy nations. Progress of science is beneficial for society only when fast dissemination of newly acquired knowledge happens through research practices (Gutam & Das, 2023). All scientific knowledge from the past should be globally accessible free of charge, and for this to happen in a beneficial way, requires a common platform for respectful "global polylogue" (Dominik et al., 2022).

Open science as a movement for open research practices has been discussed over the past two decades. It started off from the scientific research community as a "grassroots phenomenon" that encourages research and innovation of the "good kind" and which every researcher can practice without any implications of "greed for profit" (Dominik et al., 2022). While many scholars and institutions take "open science" to be synonymous with "open access" of data and research, the argument is that it should go further.

UNESCO (2021) defines Open Science as “practices aiming to make multilingual scientific knowledge openly available, accessible and reusable for everyone, to increase scientific collaborations and sharing of information for the benefits of science and society, and to open the processes of scientific knowledge creation, evaluation and communication to societal actors beyond the traditional scientific community”. A simple notion of open science is that it “covers open access, open publications, open research data and methods, open-source software, open educational resources, open evaluation and citizen science” (Miedema, 2021).

Doing science openly helps improve accuracy, trust and use of resources, encouraging more people to get involved. Open science helps bring more citations, more chances for collaboration, more media coverage, more research funding and more job opportunities.

2. Research Method

The article offers a narrative thematic review on Open Science to explore its diverse applications and challenges. Relevant research articles were identified through Web of Science using Boolean query:

TI = (("Open Science" OR "Open Research") AND (" Practices" OR Polic OR Challenges OR Barriers)).*

Since the initial search retrieved a sufficient body of relevant literature, the scope was not extended to further databases. The search results retrieved from WOS provided quality literature to support the narrative thematic analysis undertaken in this study. A total of 40 relevant articles were shortlisted for the review based on the inclusion-exclusion criteria as follows.

Criterion	Inclusion	Exclusion
Date of Publication	2020-2025	Pre 2020
Language	English	All other languages
Document Type	Journal Articles	Book Reviews, Reports, etc
Title Specification	Explicit mention of "Open Science" in the article title.	Open Science themed without specific mention in the title.

Of the selected studies, 32 articles were deemed to provide substantive content for an inductive content analysis. The analysis followed an inductive coding approach to identify recurring concepts, resulting in the primary codes. These codes, categorized into themes as mentioned in the table below, were used for further exploration and conceptualization of the reviewed literature. An additional 9 papers were purposively selected to provide further conceptual clarity on some key themes, bringing the total sample to 41.

Themes	Codes
Definition of Open Science	1. Notion of Open Science 2. Key Characteristics 3. UNESCO Recommendations
Core Practices of OS	1. Open Access (OA) Publishing 2. Open Data Sharing 3. Open Evaluation (Open Peer Review) 4. Other Core Practices/Pillars
Scopes for inclusivity in OS	1. Citizen Science 2. Public Engagement 3. Open Educational Practices (OER)
Impact and Benefits of OS	1. Societal and Scientific Progress 2. Improved Research Quality 3. Funding for Open Science
Open Science Infrastructure	1. Technological Advancements 2. Open Science Platforms 3. AI incorporation
Policies and Implementation of OS	1. Policies and Mandates 2. Global Initiatives 3. Implementation Status 4. Government's Role
Challenges and Future Trends of OS	1. Challenges and Barriers 2. Future Trends 3. Recommendations

3. Core Practices of Open Science

Steinhardt et al. (2023) mentions the categorization of open science practices into categories such as open production, open distribution and open consumption. Core open science practices for institutional monitoring includes open access publishing, data and code sharing, adherence to reporting guidelines, pre-registration of research, sharing of research materials and resources, declaration of conflicts of interest and funding, utilization of persistent identifiers, open peer review, public engagement and communication, use of open lab notebooks, sharing of negative results, application of open licenses, registration of clinical trials and systematic reviews, use of standardized metadata and data management plans, provision of open educational resources, and regular reporting of open science metrics (Cobey et al., 2023).

Other relevant open science practices include transparent peer review, open dialogue and engagement strategies, and the use of open summaries for broader public communication (Kremmel & Isbell, 2024). Torka et al. (2023) also highlights the importance of implementing registered reports, replication studies, and open science badges within organizational contexts. Furthermore, practices such as ethics approval, plagiarism policies, adherence to the Committee on Publication Ethics (COPE) standards, and protocol registration further strengthen institutional commitment to open science (Kashif Al-Ghita et al., 2024).

4. Open Access (OA) Publishing and Models

The open access movement began in the early 1990s aiming to make research papers and other scholarly content freely available online to anyone by removing the previously existing barriers. It is an alternative to traditional publishing and requires authors to pay to publish articles. Instead of subscriptions, many journals have chosen the path of Article Processing Charges (APCs). There are two main types of open access (OA) journals: Gold OA, where all articles are freely available, and hybrid OA, where some articles are freely available, while others are available through subscription. At the same time, feasible alternatives such as the Green, Platinum, and Diamond open access models can only be useful if researchers have an inclination for open publishing practices (Sanderson, 2023).

One of the early steps toward open science was the adoption of open access by the European Commission in 2012. Launched in September 2018, Plan S is an Open Access (OA) publishing initiative promoted by cOAlition S, an international research financing consortium. Plan S mandates that starting from 2021, scientific articles arising from publicly funded research to be available open access.

5. Open Data and Research Reproducibility

The Framework for Open and Reproducible Research Training (FORRT) defines open data as “data which can be accessed and used by others ‘without charge or restrictions’, with an additional need for ‘more selective access options’ for sensitive data” (FORRT, 2021). Data sharing basically means making research data available to the public with minimal to nominal restrictions using open data platforms or infrastructure.

The FAIR Guiding Principles were introduced as a means to improve the infrastructure that supports the reuse of scholarly data. With the wide acceptance of FAIR Guiding Principles, data sharing doesn't just focus on making data public, but also ensures that it is “findable, accessible, interoperable, and reusable”.

Open science is not just about adhering to certain rules or regulations, rather it goes beyond that by embracing research practices that promote transparency and reproducibility. Open science aims to tackle issues like credibility and reproducibility in research. For example, many psychological studies have failed to be reproduced, raising concerns about their reliability (Fuentes et al., 2022). Replication studies are one of the open practices where other researchers can check and replicate the results and help ensure that scientific studies are reliable and trustworthy. Digital archiving of experimental data and activities is already being made possible by major publications requiring authors to disclose raw data and methods.

Despite these datasets being publically available, there are issues concerning the shared data's reliability on where it was collected. This plausible bias calls for a standardized format for sharing data, where the datasets need to be inclusive and shareable and have clear structures (Norori et al., 2021). Most researchers take “sharing data” to be a good thing, but they keep reporting about the barriers they encounter making it hard for them to share data in a public domain (Thoegersen & Borlund, 2022).

6. Open Evaluation (Open Peer Review)

Peer review is integral for research evaluation as it involves experts giving feedback to each other. It does more than just correct mistakes; it also helps clarify the writing style, offer

insights on results, and validate relevant literature. Early inclusion of peer reviewers in scientific processes enables reviewers to bring in new perspectives that can impact the direction of the research (Matuk et al., 2023). However, the current system of pre-publication peer review seems to lack transparency and validity in evaluation with concerns being raised about its accuracy, impartiality, quality, and potential to evaluate the effectiveness of scientific publications. Replication failures of peer-reviewed studies published in renowned journals have been repeatedly demonstrated in recent years, suggesting the inefficiency of reviewers to filter out inaccurate results.

Open peer review (OPR), one of the most recent aspects of the open science movement to gain widespread acceptance (Wolfram et al., 2020), introduces a fresh approach to scholarly evaluation by aiming to enhance transparency and engagement in the review process (Melero et al., 2022). Open peer review is a recent development in open science that affects scientific journals by showing who the reviewers and authors are when evaluating a scientific paper. It can also include sharing reviewers' comments openly and even letting the public join in the review (Thelwall et al., 2021).

Studies reveal that open peer review has been steadily rising since 2001, with a significant increase since 2017, especially in the medical and scientific disciplines (Wolfram et al., 2020). However, the adoption of open peer review by academic journals remains limited, with most journals still preferring the traditional peer review models (single or double-blind) (Melero et al., 2022). A recent study based on the journal PeerJ states that articles which are openly peer reviewed received comparatively more citations than those with closed peer review histories (Zong et al., 2020). But people are still of the notion that open peer review can worsen pressure and favoritism, hindering reviewers' critical independence (Melero et al., 2022).

7. Policy and Infrastructure for Open Science

i) Technological Impact

The rapid technological advancements are changing how science works as well as speeding up the adoption of open science norms. Digital technology and Information and Communication Technology (ICT) have completely changed the academic world, making scholarly work more visible and accessible to everyone (Parray et al., 2023). Shmagun et al. (2022) have pointed out how scientists now have better and more affordable access to faster networks, more computational power, and greater storage options.

Since transparent, accessible and participatory science needs platforms for collaboration, Artificial Intelligence (AI) presents significant potential to further revolutionize open science practices, moving towards a transparent and collaborative future of scientific inquiry. Taking this into account, AI technology can be incorporated into the publishing process to help journal editors by speeding up the process of reviewing and checking the quality of papers, which would make publishing cheaper and faster. It can also help researchers find the right papers to reference and stay up-to-date with the latest research. In the future, AI might even help rank papers based on quality and impact, a job that is currently done by the top-tier journals (Arita et al., 2024).

Artificial Intelligence seems promising in extracting hidden insights from raw data, complementing human analysis. However, scenarios like Generative AI might bring in bias

or limitations that might negatively impact the core values of open science such as transparency, fairness and integrity (Hosseini et al, 2025; Ghai et al., 2025).

ii) Policy Implementation

Governments are crucial to the implementation of open science policy and the financing of open science-related research. In a process known as knowledge flow feedback, government organizations that fund and encourage open science research also incorporate that research into their own reports (De Filippo & Sastrón-Toledo, 2023). Since the adoption of the UNESCO Recommendation on Open Science in 2021, there has been a global call to contribute towards the best practices that can be used to implement open science at all levels of research (individual, institutional, regional, national, and international) (Norori et al., 2021).

According to the Balkan Innovation Report on the existing open science practices in the Western Balkan countries (European Union, 2020), a systematic approach is still required to address open science challenges related to the existing strategies, recommendations, policies, and technical infrastructure in fostering open science practices in the Western Balkan countries. Onie (2020) talks about setting appropriate national policies, retooling universities for research, training for open science, making space for open infrastructure, and reflecting on and adapting open science policies for enhancing research in developing countries in Asia, Africa and Latin America.

Countries like USA, France, Portugal, Finland, Greece, and Netherlands have implemented open science policies both in scientific research initiatives as well as national level plans (De Filippo & Sastrón-Toledo, 2023). In March 2023, Italy's Ministry of University and Research declared full implementation of open science plans by 2027 with the help of a steering group which would identify the financial resources, timelines, priorities, and monitoring required for it (Rossi et al., 2021).

iii) Infrastructure

Open sharing of research and data basically requires open platforms or infrastructure with minimal to nominal restrictions for public access. Initiatives aimed at advancing open science also incorporate infrastructural provisions, examples including OpenAIRE Open Science Monitor, European Open Science Cloud (EOSC), etc. Chiware and Skelly (2022) emphasised the urgent need for government and research institutions to seize the opportunity presented by the open science movement and develop better research infrastructure. They suggest viewing open science environments more as "tools to solve broader societal problems" than just as an "infrastructural development".

8. Scope for Inclusivity through Open Science

i) Citizen Science and Public Engagement

Citizen science initiatives enhance scientific literacy in public by allowing them to participate in the research process. Citizen science is a multifaceted concept encompassing various approaches to public engagement in scientific processes. While its precise definition may vary depending on context, scientific discipline and geographical location, the term generally refers to a range of methodologies that involve non-professional participants in scientific

research (Haklay et al., 2021). By involving in collaborative data collection projects alongside professional scientists, citizen scientists potentially democratize scientific research. Since public participation in study conceptualization and assessment is becoming less common, citizen science initiatives can help people become more scientifically literate by encouraging them to explore subjects that catch their curiosity and by exposing them to community-driven methods that can produce scientific information (Matuk et al., 2023). By involving in collaborative data collection projects alongside professional scientists, citizen scientists potentially democratize scientific research.

ii) Open Educational Resources (OER)

Open science, without open educational practices, is practically incomplete. The open science principles to teaching and learning are not just about using free textbooks; they are about students and teachers contributing to shared knowledge in meaningful ways. Open Educational Resources (OER) and Open Licenses can add much more value to the traditional educational practices leading to ways for Open pedagogy. The fundamental values of open science such as inclusivity, transparency, accessibility, and reproducibility should be incorporated in teaching as well. Open science methods become the standard by incorporating open scholarship into higher education and training the next generation of researchers, which progressively strengthens the groundwork for a more reproducible and equitable scientific community (Azevedo et al., 2022).

9. Challenges and Future Directions

i) Existing Challenges and Barriers

Open science investigates the social and scientific ramifications of ongoing transformations in research institutions, exploring how challenges such as market forces, advanced technologies, and restricted data access can impede scientific progress and societal well-being (Krishna, 2020). Although enthusiastic, the implementation of open science practices is fragmented among scientific domains, denoting the disparity of awareness within the scholarly community. Major challenges include the open science infrastructure versus digital divide, risk of qualitative research techniques being devalued because of reproducibility norms, potential biases in transparent evaluation methods and unequal involvement of researchers, stakeholders and public (Ross-Hellauer et al., 2021).

Another downside is the ‘author-pays’ model of open access, since the fees are often not affordable, especially for funders from middle-income countries (Hagger, 2022). To eradicate this division requires stronger policies by governments with a special focus on the education sector. This emphasizes the necessity for precise and focused policies such as compulsory training during graduate studies and incentives for promotions (Gownaris et al., 2022). However, challenges remain, particularly regarding privacy concerns and the transition from traditional written notebooks to digital databases.

ii) Future Directions

Progress towards the universally advocated open science practices is ongoing and there needs more promotion and advocacy. A change in the way of conducting research can only be brought about with basic levels of understanding of the open science policies and practices (Heise & Pearce, 2020; Armeni et al., 2021). Open science practices promote the production

of credible outcomes, the integrity of the field, and communication processes (Dienlin et al., 2020). But this knowledge of open science practices depends on whether the research organizations or the leading journals embrace these practices on their own.

With an increase in such promotional measures towards open science, "all publications will be freely and openly accessible, raw data and methods will be well described and reproducible, software will be released, and peer review reports will be openly published and will no longer be anonymous" (Ciriminna & Pagliaro, 2023). Practices such as preregistration of research and preprint publication can encourage open and transparent communication and timely accessibility of research and thus ensure credibility (Adler et al., 2023). Improved forms of recognition for participating in open science practices like awarding scores or research incentives will promote a culture of open collaboration in the future scientific community (Gutam & Das, 2023).

Scholars should be encouraged to embrace intellectual and cultural humility while engaging with open science movements in the future since without it, an environment of diverse representation cannot thrive. In the same context of diversity in science, there have been suggestions for focused training for professionals and scholars and involving important stakeholders in the early stages of policy implementation (Fuentes et al., 2022). The future anticipates significant changes in the field of open science, especially when it comes to the regulation of legal frameworks within the academic community (Banovic, 2020). Equitable, inclusive and democratic principles of Open science require global cooperation through scientific leadership.

10. Conclusion

Open science has emerged as a value-driven movement harnessing technology to improve scientific practice. The new way of doing science with technology is more efficient and makes it easier to share knowledge within and outside of the scientific community. Open scienc results in an increase in research impact, collaborations, job opportunities, media attention, and funds. The findings of the paper are evidence that researchers who adopt an open science mindset and implement open research practices help improve research than those who continue to follow the traditional closed practices.

There are generally more hopes associated with open science than fears and the reasons for a diminished positive attitude towards data sharing is because of a lack in cost/benefit considerations. Open science recognizes the importance of extending openness beyond research itself, as open educational practices ensure accessibility and understanding of the research process, while citizen science initiatives serve as a fundamental component by engaging the public in research and thereby enhancing scientific literacy.

References

1. Adler, S.J., Sharma, P.N., & Radomir, L. (2023). Toward open science in PLS-SEM: Assessing the state of the art and future perspectives. *Journal of Business Research, 169*, 114291. https://doi.org/10.1016/j.jbusres.2023.114291
2. Arita, M., Pulverer, B., Uemura, T., Sakuma, C., & Hayashi, S. (2024). Publishing in the open access and open science era. *Genes to Cells, 29*(4), 275-281. https://doi.org/10.1111/gtc.13100
3. Armeni, K., at al. (2021). Towards wide-scale adoption of open science practices: The role of open science communities. *Science and Public Policy, 48*(5), 605-611.

https://doi.org/10.1093/scipol/scab039
4. Azevedo, F., Liu, M., Pennington, C.R., Pownall, M., Evans, T. R., Parsons, S., Elsherif, M.M., Micheli, L., & Westwood, S.J. (2022). Towards a culture of open scholarship: The role of pedagogical communities. *BMC Research Notes, 15*(1). https://doi.org/10.1186/s13104-022-05944-1
5. Banovic, J. (2020). The future of science – Open science and open data. *Infotheca, 20*(1-2), 47-55. https://doi.org/10.18485/infotheca.2020.20.1_2.3
6. Chiware, E.R.T., & Skelly, L. (2022). Open science in Africa: What policymakers should consider. *Frontiers in Research Metrics and Analytics, 7*. https://doi.org/10.3389/frma.2022.950139
7. Ciriminna, R., & Pagliaro, M. (2023). Open science in Italy: Lessons learned en route to opening scholarship. *European Review, 31*(6), 647-661. https://doi.org/10.1017/S1062798723000121
8. Cobey, K.D., Haustein, S., Brehaut, J., Dirnagl, U., Franzen, D.L., Hemkens, L.G., Presseau, J., Riedel, N., Strech, D., Alperin, J.P., & Costas, R. (2023). Community consensus on core open science practices to monitor in biomedicine. *PLOS Biology, 21*(1), e3001949. https://doi.org/10.1371/journal.pbio.3001949
9. De Filippo, D., & Sastrón-Toledo, P. (2023). Influence of research on open science in the public policy sphere. *Scientometrics, 128*(3), 1995-2017. https://doi.org/10.1007/s11192-023-04645-1
10. Dienlin, T., Johannes, N., Bowman, N.D., Masur, P.K., Engesser, S., Kümpel, A.S., Lukito, J., Bier, L.M., Zhang, R., Johnson, B.K., Huskey, R., Schneider, F.M., Breuer, J., Parry, D.A., Vermeulen, I., Fisher, J.T., Banks, J., Weber, R., Ellis, D.A., & Smits, T. (2020). An agenda for open science in communication. *Journal of Communication, 71*(1), 1-26. https://doi.org/10.1093/joc/jqz052
11. Dominik, M., Nzweundji, J.G., Ahmed, N., Carnicelli, S., Mat Jalaluddin, N.S., Fernandez Rivas, D., Narita, V., Enany, S., & Rios Rojas, C. (2022). Open science-for whom? *Data Science Journal, 21*(1), 1–8. https://doi.org/10.5334/dsj-2022-001
12. European Union. (2020). *Report on the existing open science practice in the Western Balkan countries.* https://www.balkaninnovation.com/download/docs/Report-OS-in-WBC.pdf/b9eda267a016c92c74ca9db8e48eb81b.pdf
13. FORRT. (2021). *Open data*. FORRT—Framework for Open and Reproducible Research Training. https://forrt.org/glossary/open-data/
14. Fuentes, M.A., Zelaya, D.G., Delgado-Romero, E.A., & Butt, M. (2022). Open science: Friend, foe, or both to an antiracist psychology? *Psychological Review, 130*(5). https://doi.org/10.1037/rev0000386
15. Ghai, S., Thériault, R., Forscher, P., Shoda, Y., Syed, M., Puthillam, A., Peng, H.C., Basnight-Brown, D., Majid, A., Azevedo, F., & Singh, L. (2025). A manifesto for a globally diverse, equitable, and inclusive open science. *Communications Psychology, 3*(1), 16. https://doi.org/10.1038/s44271-024-00179-1
16. Gownaris, N.J., Vermeir, K., Bittner, M.I., Gunawardena, L., Kaur-Ghumaan, S., Lepenies, R., Ntsefong, G.N., & Zakari, I.S. (2022). Barriers to full participation in the open science life cycle among early career researchers. *Data Science Journal, 21*(1), 2. https://doi.org/10.5334/dsj-2022-002
17. Gutam, S., & Das, S. (2023). *An overview of publication patterns in India's agricultural research community: Journals, open access, and preprints*. Research Square. https://doi.org/10.21203/rs.3.rs-2565275/v3
18. Hagger, M.S. (2022). Developing an open science mindset. *Health Psychology and Behavioral Medicine, 10*(1), 1-21. https://doi.org/10.1080/21642850.2021.2012474
19. Haklay, M., Fraisl, D., Greshake Tzovaras, B., Hecker, S., Gold, M., Hager, G.,

Ceccaroni, L., Kieslinger, B., Wehn, U., Woods, S., Nold, C., Balázs, B., Mazzonetto, M., Ruefenacht, S., Shanley, L.A., Wagenknecht, K., Motion, A., Sforzi, A., Riemenschneider, D., & Dorler, D. (2021). Contours of citizen science: A vignette study. *Royal Society Open Science*, *8*(8). https://doi.org/10.1098/rsos.202108

20. Heise, C., & Pearce, J.M. (2020). From open access to open science: The path from scientific reality to open scientific communication. *SAGE Open*, *10*(2), 215824402091590. https://doi.org/10.1177/2158244020915900
21. Hosseini, M., Horbach, S.P., Holmes, K., & Ross-Hellauer, T. (2025). Open science at the generative AI turn: An exploratory analysis of challenges and opportunities. *Quantitative Science Studies*, *6*, 22-45. https://doi.org/10.1162/qss_a_00337
22. Kashif Al-Ghita, M., Cobey, K., Moher, D., Leeflang, M.M., Ebrahimzadeh, S., Lam, E., Rooprai, P., Khalil, A.A., Islam, N., Algodi, H., & Dawit, H. (2024). Cross-sectional evaluation of open science practices at imaging journals: A meta-research study. *Canadian Association of Radiologists Journal*, *75*(2), 330-343. https://doi.org/10.1177/08465371231211290
23. Kremmel, B., & Isbell, D.R. (2024). Open science practices in language assessment: Introducing the special issue. *Language Testing*, *41*(4), 697-702. https://doi.org/10.1177/02655322241264092
24. Krishna, V.V. (2020). Open science and its enemies: Challenges for a sustainable science–society social contract. *Journal of Open Innovation: Technology, Market, and Complexity*, *6*(3), 61. https://doi.org/10.3390/joitmc6030061
25. Matuk, C., Yetman-Michaelson, L., Martin, R., Vasudevan, V., Burgas, K., Davidesco, I., Shevchenko, Y., Chaloner, K., & Dikker, S. (2023). Open science in the classroom: Students designing and peer reviewing studies in human brain and behavior research. *Instructional Science*, *51*(5), 793-845. https://doi.org/10.1007/s11251-023-09633-9
26. Melero, R., Boté-Vericad, J., & López-Borrull, A. (2022). Perceptions regarding open science appraised by editors of scholarly publications published in Spain. *Learned Publishing*, *36*(2). https://doi.org/10.1002/leap.1511
27. Miedema, F. (2021). *Open science: The very idea*. Springer Nature.
28. Norori, N., Hu, Q., Aellen, F.M., Faraci, F.D., & Tzovara, A. (2021). Addressing bias in big data and AI for health care: A call for open science. *Patterns*, *2*(10). https://doi.org/10.1016/j.patter.2021.100347
29. Onie, S. (2020). Redesign open science for Asia, Africa and Latin America. *Nature*, *587*(7832), 35-37. https://doi.org/10.1038/d41586-020-03052-3
30. Parray, U.Y., Khan, A., Mir, A.A., & Mir, S.M. (2023). Unveiling the present status of open access repositories: A comparative analysis of India and China. *Library Management*, *44*, 120-132. https://doi.org/10.1108/lm-09-2022-0084
31. Ross-Hellauer, T., Reichmann, S., Cole, N.L., Fessl, A., Klebel, T., & Pontika, N. (2021). Dynamics of cumulative advantage and threats to equity in open science: A scoping review. *Open Research Online*. https://doi.org/10.31235/osf.io/d5fz7
32. Rossi, G., Caso, R., Castelli, D., & Giglia, E. (2021). *National research program 2021–2027: National plan for open science*. https://www.mur.gov.it/sites/default/files/2023-01/PNSA_2021-27_ENG.pdf
33. Sanderson, K. (2023). Who should pay for open-access publishing? APC alternatives emerge. *Nature*, *623*(7987), 472-473. https://doi.org/10.1038/d41586-023-03506-4
34. Shmagun, H., Shim, J., Choi, K.N., Shin, S.K., Kim, J., & Oppenheim, C. (2022). Korea's national approach to open science: Present and possible future. *Journal of Information Science*. https://doi.org/10.1177/01655515221107336
35. Steinhardt, I., Bauer, M., Wünsche, H., & Schimmler, S. (2023). The connection of open science practices and the methodological approach of researchers. *Quality &*

Quantity, 57(4), 3621-3636. https://doi.org/10.1007/s11135-022-01524-4
36. Thelwall, M., Allen, L., Papas, E.R., Nyakoojo, Z., & Weigert, V. (2021). Does the use of open, non-anonymous peer review in scholarly publishing introduce bias? Evidence from the F1000Research post-publication open peer review publishing model. *Journal of Information Science, 47*(6), 809-820. https://doi.org/10.1177/0165551520938678
37. Thoegersen, J.L., & Borlund, P. (2022). Researcher attitudes toward data sharing in public data repositories: A meta-evaluation of studies on researcher data sharing. *Journal of Documentation, 78*(7), 1-17. https://doi.org/10.1108/jd-01-2021-0015
38. Torka, A.K., Mazei, J., Bosco, F.A., Cortina, J.M., Götz, M., Kepes, S., O'Boyle, E.H., & Hüffmeier, J. (2023). How well are open science practices implemented in industrial and organizational psychology and management? *European Journal of Work and Organizational Psychology, 32*(4), 461-475. https://doi.org/10.1080/1359432X.2023.2206571
39. UNESCO. (2021). *UNESCO recommendation on open science*. https://doi.org/10.54677/mnmh8546
40. Wolfram, D., Wang, P., Hembree, A., & Park, H. (2020). Open peer review: Promoting transparency in open science. *Scientometrics, 125*(2). https://doi.org/10.1007/s11192-020-03488-4
41. Zong, Q., Xie, Y., & Liang, J. (2020). Does open peer review improve citation count? Evidence from a propensity score matching analysis of PeerJ. *Scientometrics, 125*(1), 607-623. https://doi.org/10.1007/s11192-020-03545-y

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