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Emerging Patterns in Open Access Publishing: A Scopus-Based Analysis of Publishers, Countries, and Costs

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ABSTRACT

Open Access (OA) publishing has changed academic communication, making knowledge freely and quickly available to everyone. Major publishers are publishing more journals adopting hybrid and full OA models. The study will examine OA and hybrid journals of major publishers based on Scopus data, country-wise comparison of OA publications, subject-wise average publication fee analysis and emerging OA patterns. In the descriptive-analytic method, the data collected from the Scopus database is catalogued and analysed. Elsevier ranks first with 2588 total publications, followed by Springer Nature (2473) and Taylor & Francis (2364). Spain (43.84%) is the leader in OA percentage. The average publication fee in the Medicine category is $2,800, with no APC charged on the Diamond models. Open Access publishing is shaping a democratic, not-for-profit, data-driven movement for future search communication.

Keywords: Open Access Publishing, Gold Open Access, Diamond Open Access, Publishing Models, Open Access Journals, APCs.

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INTRODUCTION

Open access publishing is a method of making research articles and academic literature freely available over the Internet without any financial or subscription barriers (Mukherjee, 2010). Students, researchers and the general public can read, download and share this information without any restrictions (Kankam, Acheampong, & Dei, 2024). This kind of publication helps in dissemination of knowledge and enhances the impact of research. This will open the way for new discoveries by giving quick access to research.

There are several forms of open access: Gold OA-the author pays a fee for publication; Diamond OA-there is no fee for the author; Green OA-the author self-stores his article in the institution's repository; and Gratis and Libre OA-the recycling rights vary (Taylor & Francis, n.d.; and Springer Nature, n.d.). The purpose of all these models is the same-to make knowledge freely available to all.

The concept of Open Access (OA) originated with the expansion of the Internet in the 1990s. The idea was that online educational information could be shared around the world for free (Cordón-García *et al.*, 2013). In 2001, the Budapest Open Access Enterprise (BOAI) was announced, which gave rise to the definition of OA (Houck *et al.*, 2019). According to this, any person should have complete freedom to read, download and share research articles of his/her choice.

The Bethesda Statement in 2003 and the Berlin Declaration in 2008 gave a strong impetus to the OA movement (Roosendaal, Zalewska-Kurek, Geurts, & Hilf, 2010). Organisations such as the Public Library of Science (PLoS), Biomed Central (BMC), and DOAJ played an important role in this enterprise. After 2010, many universities and funding agencies took steps to make OA policies and research freely available to the public. All these steps strengthened the OA movement on a global scale.

Open Access (OA) publishing plays an important role in making knowledge equally available to all (Ghosh, & Das, 2007; Das, 2008; Logullo *et al.*, 2024). Traditionally, research articles and books were subscription-based and were not accessible to the general public or students and researchers from economically backward areas. OA breaks down these barriers and makes knowledge freely available to anyone at no charge.

It promotes educational equity by spreading knowledge beyond class, geographical and economic disparities. The OA model thus reinforces the principle that knowledge should not be determined by wealth or location. Students, teachers, doctors, researchers and the general public will be able to use important research without any hindrance. This will lead to global collaboration, innovation,

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and social progress. The OA concept considers knowledge as a whole as a democratic right (Figure 1).

Types of Open Access Models

Types of OA models as mentioned in the UNESCO's Open Access Curriculum are described below (Kanjilal & Das, 2015; Mishra & Das, 2015):

1. Gold Open Access: In this model, articles are made available to readers free of charge, exactly as soon as they are published. The authors or their organisations pay the Article Processing Charge (APC). The published articles are available on the official website of the publisher. For example: PLOS ONE, BMC journals etc.

2. Green Open Access: In this the author uploads the preprint or post-peer-review version of his article in the institution or the content digital repository. Sometimes there is an embargo period by the publisher. In this method there is no APC in addition to the article being available for free.

3. Hybrid Open Access: This is a model that provides an open access option for writers in subscription-based journals as well. If the author provides an APC, only their article will be open access; the rest of the articles will be on the paywall. Some call it "double-dipping."

4. Diamond/ Platinum Open Access (OA): In this model there is no charge for both the author and the reader. This is an open access model that is clean and efficient. Its management is carried out with the help of educational institutions, research centres or governments.

5. Bronze Open Access (Bronze OA): Although it is a free-to-read format, there is no explicit Creative Commons license for the published article. Free access to these articles may be temporary and may be removed by the publisher at any time.

6. Black Open Access: This is illegal and unconstitutional. Although paywall articles can be obtained for free on sites like Sci-Hub, this is ethically controversial. But it is also a sign of inequities in library access.

7. Gratis Open Access: In this model, articles are made freely available to readers, but there is control over reuse or redistribution. It's free to read, but hard to recycle.

8. Libre Open Access: Libre Open Access is free, just like the Gold or Green models, and comes with an explicit license (mostly Creative Commons). Available to read, edit and share. This is a more liberating model.

REVIEW OF LITERATURE

Recent literature highlights diverse global perspectives on Open Access (OA) publishing practices, models, and impacts. Hazarika and Sudhier (2025) examine the rapid growth of OA in digital archaeology, showing that gold OA dominates and that Creative Commons licensing enhances research visibility and impact. Walker *et al.*, (2024) compare green OA and toll-access publications in the chemical sciences, finding that green OA achieves comparable citation rates and greater social media engagement, advocating for non-parametric methods due to the non-normal distribution of bibliometric indicators. Soto-Herrera, Beigel, and Pallares (2025) provide a rare quantitative study on Article Processing Charges (APCs) in Argentina and Colombia, revealing substantial national expenditures and calling attention to the economic implications of the APC-based OA model. Similarly, Pastor-Ramon, Casado, and Campos (2024) analyze OA outputs from Horizon 2020 projects, identifying metadata and repository tracking gaps that hinder the discoverability of publicly funded research. Kankam, Acheampong, and Dei (2024) explore the perceptions of Ghanaian research scientists toward Open Access (OA) publishing, using Rogers' Diffusion of Innovation Theory as a framework. Their qualitative study reveals that while researchers recognize OA as a beneficial tool for disseminating scientific information, concerns over high Article Processing Charges (APCs) and journal credibility hinder broader adoption.

In the context of institutional strategies, Berni and Zucchini (2024) explore how transformative agreements at the University of Milan influence publishing behavior, noting that factors like journal ranking, discipline, and academic position affect authors' choices. Their findings reflect broader trends in the shifting scholarly publishing ecosystem, where evolving OA policies interact with academic norms and national research evaluation frameworks. Collectively, these studies underscore the transformative potential of open access, while also revealing practical, economic, and systemic challenges that must be addressed to optimize its global implementation and impact.

OBJECTIVES OF THE STUDY

The objective of this study is to analyse the publication status of open access and hybrid models based on Scopus data. It helps to identify the current trends in OA publishing by comparing the volume of publications and the publishing fee patterns according to the publisher, countries and subject areas.

What are the current patterns and trends in Open Access and hybrid publishing models among major international publishers indexed in Scopus?

How do different countries compare in terms of their contributions to Open Access publishing, and what role do leading publishers play in these outputs?

What are the variations in Article Processing Charges (APCs) across different subject areas, and how might this affect authorship and access equity?

How are emerging OA publishers and alternative models (e.g., Diamond OA) contributing to the diversification of the global OA publishing ecosystem?

To what extent do Read & Publish agreements influence the accessibility and affordability of OA publishing across institutions and regions?

Study Design

This study is based on descriptive-analytic search design. This methodology is useful for describing current trends in Open Access (OA) publishing and for conducting comparisons of the publishing patterns of major publishers. An internationally respected bibliographic database called Scopus has been selected for data collection. The data collected from this database on 21st May, 2025 includes details of fully open access and hybrid journals indexed by Scopus.

The main parameters used for data analysis are:

- Distribution of OA Models by Publisher.
- Number of Full Open Access (Full OA) and Hybrid OA journals.
- The index status and visibility of these journals in the Scopus database.
- Percentage of production of Open Access articles by major countries.
- Application Processing Fee (APC).
- Using this information, an in-depth analysis was made of the progress, impact, and scope of open access publishing.

RESULTS

Comparison of open access models according to the publisher

Table 1 revealed the Elsevier ranked first in total number of publications (2588) and full open access journals (581) and second in hybrid OA journals (2007). The Springer Nature Institute ranks second or third in all three categories, with a significant share with 2473 in total publications and 1959 in hybrid OA journals. Taylor & Francis ranks first in hybrid OA journals (2156) and third in total publications. It is clear from this analysis that major publishers are driving the open knowledge movement, with widespread adoption of hybrid and open access models.

Comparison of open access articles by country

According to Table 2 analysis, the United States leads in total number of open access articles and total number of publications with 6,295,410 (*) and 19,208,678 (*) articles respectively. China is second (†) and the United Kingdom is third (‡). However,

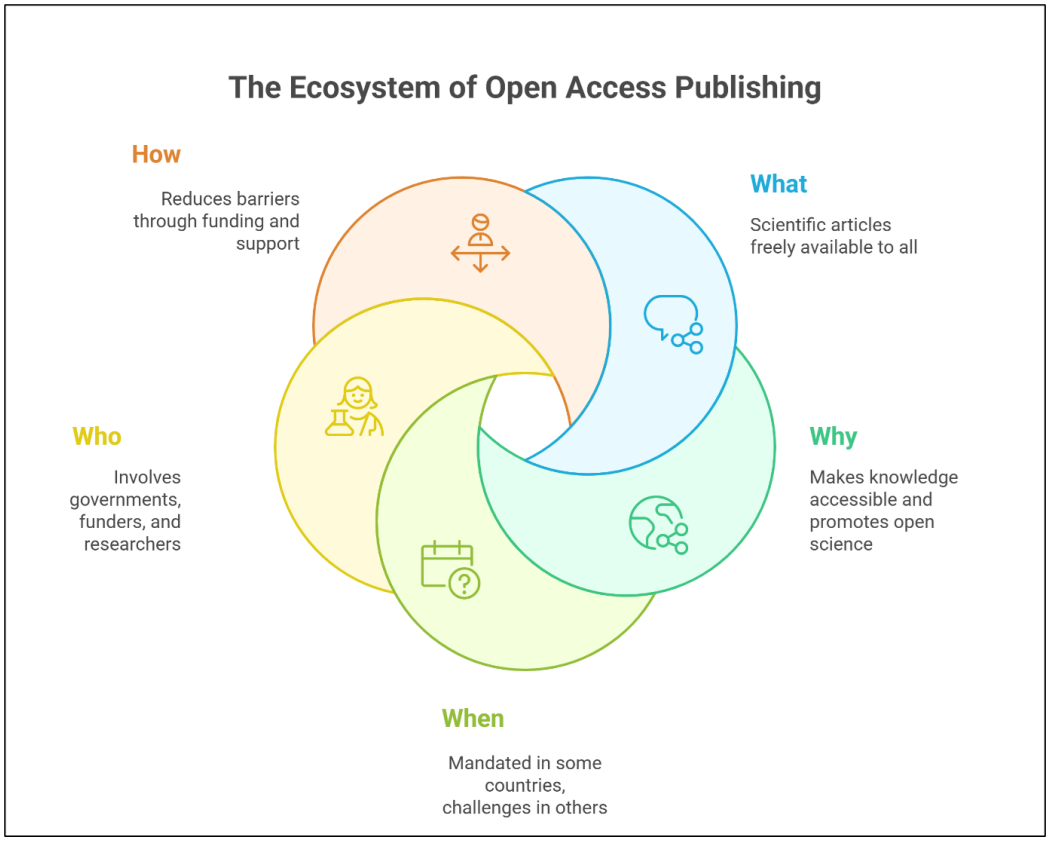

Figure 1: What is Open Access.

Table 1: Publisher-wise Comparison of Open Access Models.

Publisher Name	OA Model Type(s)	OA Journals	Hybrid OA Journals	Total Publications
Elsevier	Hybrid & Fully OA	581*	2007†	2588*
Springer	Hybrid & Fully OA	514†	1959‡	2473†
John Wiley & Sons	Hybrid & Fully OA	408‡	1326	1734
Multidisciplinary Digital Publishing Institute (MDPI)	Hybrid & Fully OA	273	46	319
Taylor & Francis	Hybrid & Fully OA	208	2156*	2364‡
Walter de Gruyter	Hybrid & Fully OA	165	292	457
SAGE	Hybrid & Fully OA	150	946	1096
Wolters Kluwer	Hybrid & Fully OA	140	331	471
KeAi Communications Co.	Hybrid & Fully OA	116	19	135
Frontiers Media S.A.	Fully OA	111	0	111
Total		2666	9082	11748

*, †, and ‡ indicate first, second, and third rank in specific columns, respectively.

Table 2: Top 10 Countries by Open Access Output.

Country	OA Articles Published	Total Publications	% OA	Leading Publisher(s)
United States	6295410*	19208678*	32.77	Springer, Elsevier
China	2868017†	10321041†	27.78	Springer, Elsevier
United Kingdom	2364345‡	5784829‡	40.87†	Springer, Elsevier
Germany	1584595	4720808	33.56	Springer, Elsevier
Japan	1522296	4149895	36.68	Springer, Elsevier
France	1109960	3084596	35.95	Springer, Elsevier
Italy	1019371	2726663	37.58‡	Springer, Elsevier
Canada	917082	2700515	33.95	Springer, Elsevier
Spain	899180	2051040	43.84*	Springer, Elsevier
Australia	806917	2168048	37.21	Springer, Elsevier

*, †, and ‡ indicate first, second, and third rank in specific columns, respectively.

the percentage of open access publications is highest in Spain (43.84%), followed by the UK (40.87%) and Italy (37.58%). These statistics make clear the share and leadership of different countries in the adoption of Open Access, and publishers such as Springer and Elsevier appear to be the leading providers in almost all countries.

Comparison of Average Publication Fee by Subject

According to Table 3, the discipline of medicine is a major and expensive discipline with an average publication fee of $2,800 (*), a maximum fee of $5,000 (*), and a minimum of $1,000 (). Physics was second with an average of $2,500 (†), followed by Life Science with $2,400 (‡). Social Science is in first place with $800 (*) in minimum publication fees. These figures show the difference in publishing costs by subject matter category, with publishers such as BMJ, Springer, IEEE and Frontiers leading the pack in expensive publishing areas.

Comparison of institutional Read & Publish agreements: A description of the major publishers

According to this Table 4, Springer Nature stands at the forefront with a complete APC (Article Processing Charges) masking system with 700+ organisations in 50+ countries. Elsevier is second with 500+ organisations and 45+ countries, while Wiley is third with 400+ organisations and 40+ countries. While Taylor & Francis and Cambridge University Press have some restrictions on the scope of APC open access, they are expanding their partnership in the Open Access Conventions. From this data, it is clear that the technical agreements of publishers with institutions play a significant role in the current open access behaviour.

Comparison of emerging open access publishers and models

According to the Table 5, emerging open access publishers in different countries have adopted different models. Brazil's SciELO

and Mexico's Redalyc are operating on the full Diamond OA model with no publishing fees. OpenJournals (South Africa) uses both Diamond and Gold and charges $600- $1,200, while KeAi (China) charges $900 on the Gold model and eLife (UK) follows the voluntary Platinum OA model. The differentiation of these models is encouraging the process of free sharing of knowledge along with reducing economic intrusion.

Year-over-year trends in open access publishing (2018-2024)

According to Table 6, there has been a substantial year-over-year growth in open access publications. Out of the total publications with 3.5 million articles in 2024 1.8 million OA articles in 2022-2023 and 54.54% Open Access Percentage, excellence has been achieved in this triennial period. But while the share of early-stage OA remained low, ranking third in 2018 across all criteria, the continued growth in subsequent years reflects the interest and partnership in the Open Access movement.

DISCUSSION

According to the discussion of this study, the major international publishers in open access publishing όπως Elsevier, Springer Nature, Wiley and Taylor & Francis have produced the majority adopting hybrid and full OA models. The United States, China, and the United Kingdom are the countries with the most OA articles published in the country-wise analysis, while Spain and Italy lead in percentage OA. There was a difference in the publication fee according to the subject disciplines, with the cost per article being higher in the medical subject and lower in the social sciences. Through Read & Publish agreements, publishers like Springer, Elsevier have tied up with academic institutions in many countries to make OA publishing easier for authors. Between 2018 and 2024, there has been a steady rise in open access publications, reflecting a major movement towards making access to knowledge accessible to the masses.

Another important consideration is that open access models are not only a transformation of the publisher's economic model, but also a big step in the direction of democratising knowledge. The adoption of Diamond, Gold, Green and Platinum OA models is happening in different ways in different countries and publishers, making many options available to authors. Emerging OA publishers such as SciELO, Redalyc, eLife are supporting social justice and educational equity through models with low or no publishing costs. With this, global research collaboration, citation volume and effectiveness of research are likely to increase as the availability of open access articles increases. All these factors are shaping the future of research curricula in a more open, equitable and collaborative manner.

Another critical dimension of Open Access (OA) publishing is its equity impact on researchers from developing nations, particularly regarding publication costs and access models. While OA facilitates global visibility of research, high Article Processing Charges (APCs) disproportionately disadvantage scholars in low- and middle-income countries who lack institutional funding or national-level Read & Publish agreements (Das & Das, 2024; Long *et al*., 2021). Studies such as those by Abrams *et al*., (2019)

Table 3: Average APC by Subject Area.

Subject Area	Average APC (USD)	High APC Range	Low APC Range	Most Expensive Publisher
Medicine	$2,800*	$5,000*	$1,000†	BMJ, Springer
Engineering	$2,200	$4,200‡	$1,200‡	IEEE, Elsevier
Social Sciences	$1,800	$3,500	$800*	SAGE, Taylor & Francis
Physics	$2,500†	$4,000†	$1,300	IOP, Wiley
Life Sciences	$2,400‡	$5,000*	$1,200‡	Frontiers, PLOS

*, †, and ‡ indicate first, second, and third rank in specific columns, respectively.

Table 4: Institutional Read & Publish Agreements.

Publisher	Number of Institutions	Countries Involved	Covers APC?	Notes
Springer Nature	700+*	50+*	Yes	Project DEAL, UK JISC
Elsevier	500+†	45+†	Yes	Dutch Consortium, CAUL Australia
Wiley	400+‡	40+‡	Yes	Big Ten, Max Planck, etc.
Taylor & Francis	300+	35+	Partially	Some hybrid-only agreements
Cambridge University Press	250+	30+	Yes	Covers both Gold and Hybrid OA

*, †, and ‡ indicate first, second, and third rank in specific columns, respectively.

Table 5: Emerging Open Access Publishers & Models.

Publisher Name	Country	Model Type	APC Policy	Notable Journals
SciELO	Brazil	Diamond OA	No APC	Rev Saúde Pública
OpenJournals (AOSIS)	South Africa	Diamond/Gold	$600–$1,200	SA J of Radiology
KeAi	China	Gold OA	$900	AI Open
Redalyc	Mexico	Diamond OA	No APC	Políticas Públicas
eLife	UK	Platinum OA	Voluntary APC	eLife

Table 6: Trends in OA Publications (2018-2024).

Year	Total Articles (millions)	OA Articles (millions)	% OA
2018	2.5‡	1.1‡	44‡
2019	2.7	1.2	44.44
2020	3	1.5	50
2021	3.3†	1.7†	51.51†
2022	3.3†	1.8*	54.54*
2023	3.3†	1.8*	54.54*
2024	3.5*	1.7†	48.57

*, †, and ‡ indicate first, second, and third rank in specific columns, respectively.

in the African context show that despite growing research output, systemic barriers like APCs and inadequate infrastructure prevent many African researchers from disseminating their work widely. As Singh (2023) highlights, true inclusivity in OA requires robust support for Diamond and Platinum OA models, regionally owned platforms, and targeted policy interventions to ensure fair participation and scholarly representation from the Global South.

CONCLUSION

This study primarily relied on data from the Scopus database, which, while comprehensive, does not fully represent the global picture of open access publishing. Other major sources such as Web of Science, PubMed, and DOAJ were not included, and the analysis did not evaluate journal quality or peer review rigor within specific disciplines—factors that may influence the generalizability of the findings. Despite these limitations, the study reveals that open access publishing is steadily evolving rather than undergoing a sudden revolution. The widespread adoption of hybrid and full OA models by leading publishers, along with varying levels of OA output among countries and disciplines, indicates a dynamic shift toward greater accessibility. The emergence of Read & Publish agreements and Diamond OA models further reinforces this progress. Ultimately, open access publishing is playing a pivotal role in shaping a more inclusive and collaborative global knowledge society through enhanced access to research, policies, and technological infrastructure.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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