# Visualising Sustainable and Universal Access to Scholarly Information through the Prism of Open Access: A Selective Review

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## ABSTRACT

**Introduction:** The existing model of research communication is tilted heavily in favor of a capitalist mindset wherein selective profit-making publishing establishments monopolize the lion's share of research publications and put a premium on access to the content of publicly funded research outcomes and thereby creating information starvation. As a viable alternative, the concept of Open Access has been doing the rounds. The present work is a selective review of existing literature on the research on Open Access and its different facets. **Methods:** The Library, Information Science and Technology Abstracts (LISTA) database was searched for the identification and selection of bibliographic details along with abstracts and keywords of relevant literature on OA practices. In the extracted literature, key concepts like "Open Access adoption", "Open Access publishing", "Open Access tools", and "Citation advantage of Open Access ", etc were singled out and a further Google Scholar search on these topics retrieved more related works. The literature thus selected was used to carry out the review. **Results:** The lack of a uniform OA adoption policy has resulted in variation in the adoption of OA across different disciplines, countries, institutions, publishers, and individual levels. Higher education and research institutes have welcomed OA and this is reflected in the adequate awareness of OA among academics and research scholars. At the country level, formulation and implementation of OA policy have not progressed much due to persistent misconceptions and misapprehensions about OA publishing. Article processing charges discourage the adoption of the open access publishing model among scholars. **Conclusion:** The review is expected to help understand the implications of OA not only in the ecosystem of universal access to scholarly information but also in the larger context of sustainable development goals 2030.

*Keywords: Open Access; Sustainable Development Goals; Open Access Tools; Gold Open Access; Green Open Access*

## Introduction

Since the Second World War, there has been tremendous growth of research output in almost all the domains of human knowledge with special reference to science, technology,

engineering, and medicine (STEM). The tectonic shift from 'Little Science' to 'Big Science' (Fortin & Currie 2013) has been the cornerstone of development and is characterized by the involvement of groups of researchers under an institutional setup and supported by public funding. The benefits of research entail democratic dissemination of research output so that research results could be utilized for not only finding solutions to societal problems but also for furthering research as has been depicted in Ranganathan's 'Spiral of Scientific Method' (Satija & Chander, 2021).

But the existing model of research communication is tilted heavily in favor of a capitalist mindset wherein selective profit-making publishing establishments monopolize the lion's share of research publications and put a premium on the content whereby a selective elite, capable of paying an exorbitant price for the content, can enjoy the benefits of publicly funded research outcomes. This has undermined democratic dissemination and universal access to publicly funded research output and resulted in information starvation which is severely limiting further research initiatives across the globe.

Arguably, the Open Access Movement through the BBB declaration (Budapest in 2002, Berlin in 2003, and Bethesda in 2003) could be viewed as the earliest initiative to set the stage ready to challenge the capitalist mindset of research communication and put the Open Science Movement in proper perspective which resulted into surfacing of a number of concepts such as open access, open archiving, open data, open peer review, open evaluation, open source software, etc. Recognizing the power of these open standards in facilitating universal access to information for innovation and competition without barriers, UNESCO now advocates for Open Access (*Access to Information*, 2021), including free and affordable access to journals and books, and open archives for scientific information which is thought to directly contributes to the achievement of Goal 9 of Sustainable Development Goals (SDGs) (UNESCO, 2020).

The present work is a selective review of existing literature on the research on open access (henceforth OA) and its different facets. The review is expected to help understand the implications of OA not only in the ecosystem of universal access to scholarly information but also in the larger context of sustainable development goals for 2030.

**Objectives of the Study**

The objectives of the study are as follows:

- To understand the extent of adoption of OA across different disciplines, at country, institutional, publisher, and individual levels.
- To understand the new scholarly publishing business models and their sustainability based on the concept of OA.
- To find the efficacy of different OA tools and platforms in searching and finding OA resources.
- To try to know if there exists any citation advantage of OA resources over their traditional closed counterparts.

- To assess the role of Library and Information Science professionals in promoting OA within the institutional setup and beyond.
- To get an idea of the impact of OA on an overall free flow of information and thereby its role in supporting UNESCO's work on the promotion of universal access to information through Open Solutions.

## Methodology

A two-tier exploratory search was made to find the relevant corpus of literature on OA for the review. In the first stage, a search was conducted in the Library, Information Science & Technology Abstracts (LISTA) database, hosted by EBSCO (Basic Search: EBSCOhost) for the identification and selection of bibliographic details along with abstract and keywords of relevant literature on OA practices. After an initial search, a number of filter options like peer-reviewed articles, articles published in English, academic journals, and the 2000- 2022 time span were applied to narrow down the search results to the most relevant literature. Duplicate entries along with editorial communication, letter to the editor, short communication, and book reviews were removed. Finally, 50 articles were found to be appropriate for the study. Abstracts and keywords of the selected articles were carefully studied for key concepts and in case of further clarification of the complexity of any research article, the full text was read in detail. In this way, key concepts like "Open Access adoption", "Open Access publishing", "Open Access tools", "Citation advantage of Open Access ", etc were singled out.  In the second stage, for a comprehensive understanding of the contour of OA, a Google Scholar search was carried out on "Open Access adoption", "Open Access publishing", "Open Access tools", "Citation advantage of Open Access ", etc for further related works. The literature thus selected was used to carry out the review.

## Literature Review

## Adoption of Open Access

## Adoption of OA at The University Level

OA presents itself in many hues such as OA journals, OA books, OA datasets, and OA repositories or archives. On the other hand, OA contents may present themselves as Gold OA, Green OA, Pale Green OA, and Grey OA (depending on the rights of the authors). Naturally, it is expected that there would be different patterns of adoption of OA. Hobert *et al.* (2021), while investigating the nature of adoption of OA in German research institutions, confirmed the growth of the OA share mirroring the international trend reported in related studies. Although subject-specific repositories were found to be the most prevalent type of OA, a steep increase in the percentages for both publication in full OA journals and OA via institutional repositories was also noticed. Is there any correlation between performance and effort Expectancy of faculty of a university and their adoption of OA scholarly publishing? This issue was investigated by NnennaOtubelu and Anunobi (2021) at five Nigerian state universities. Their findings showed that there is a high and positive relationship between performance expectancy and effort expectancy of lecturers and their adoption of open-access

scholarly publishing in state universities. They recommended that the management of the universities should reward the lecturers' performance through grants to enable them to engage more in open-access scholarly publishing together with the provision of more training and workshops on the use of open-access outlets to enhance the lecturers' capability to use such a system.

It is of paramount importance to understand the level of awareness, attitude towards, and acceptance together with the adoption of OA among the scholarly community at the university and research institute level covering both faculty and researchers.Towards this end, the research by Chewe *et al.* (2021) on scholars of the University of Zambia revealed that misapprehension about OA and the digital divide have been the major challenges to the adoption of OA. Although, neither was there any lack of awareness about OA among scholars nor were they hesitant about accessing OA contents. But a certain reservation for OA publishing was noticed. This could be due to doubt about the quality of integrating OA resources into libraries and managing OA funding (Whitt & Campbell, 2021). Sensitising the scholarly community at the university level may effectively increase the popularity of OA.

## Gender and OA Adoption

The OA movement is touted to provide equitable access to scholarly content irrespective of gender, caste, financial and social status and to democratise research by providing equal opportunity. But, could there be any influence of gender inequality in adopting OA, especially in emerging countries? Or are female researchers underrepresented in OA journals? Vuong *et al.* (2021) investigated the extent of involvement of Vietnamese female researchers in OA publications in social science and humanities. They found that the number of women as first authors remained lower than men and contrary to Bayesian analysis, there was a negative association between Vietnamese female author participation and the likelihood to publish OA which might be due to the gender inequality induced by cultural and socio-economic factors. The mismatch in the trend was observed in hybrid journals where women are on par with men.

## Geographical Distribution of OA Adoption

Beyond North America and major European countries, the growth and adoption of OA have been sporadic across the globe. The majority of small north European countries like Estonia do not have a national OA policy or financial support for OA publishing and there is a lack of awareness of OA among academics and researchers. Pendse (2021) in his article found that OA remains a robust complementary alternative to proprietary databases in Estonia. Estonian institutions have shown a keen initiative and interest in the development of OA sources. Dandawate and Dhanmjaya (2021) studied Open Access Initiatives in Western Asia. They found that even with support from international groups like EIFL and OpenAIRE, the region's open access market has not taken to the skies and lags behind that of more developed countries. Only Turkey and the United Arab Emirates (UAE) are exceptions among Western Asian states. Notably, Cyprus took the important initiative of instituting a national public OA policy.

Capturing the trend of use of OA books may consolidate the understanding of the difference in acceptance of OA books Vs their closed counterparts. While assessing the benefits of OA for scholarly books, Neylon et al (2021) showed higher geographic diversity of usage, higher numbers of downloads, and more citations for open access books across all strata. One very significant finding of their study was the confirmation of the positive role of open-access books in increased access and usage for traditionally underserved populations.

**Institutional Repositories and social media as OA Dissemination Channels**

Institutional repositories, especially open-access institutional repositories, can be potential hubs for democratic dissemination of carefully curated quality research contents of institutional research output to the associated faculty and research scholars. A thorough understanding of the factors that affect the implementation and effective use of the OA institutional repository would help to strategize properly. In this regard, Utulu and Ngwenyama (2021) did a multilevel analysis of factors affecting open-access institutional repository implementation in Nigerian universities and found that Institutional Repository implementation barriers evolved from global, organisational, and individual implementation levels in the research contexts. Side-by-side, the level of awareness of OA among academic staff and research scholars of a university would likely determine the acceptance, popularity, and effective use as well as satisfaction with the services of the institutional repository of that particular university. There could be different perceptions about OA and institutional repositories among scholars depending on the age of the users and the subject area they are interested in. All these issues were reflected in a study on the academic staff of a research-oriented Spanish university by Serrano-Vicente, Melero and Abadal (2016) where they found a consensus among academic staff on the need for OA as well as on making publications open access based on academic reward and professional recognition. But significant differences surfaced on the matter of the adoption of OA practices. Participation in OA practices was found to increase with the seniority of members of staff with tenure and positions of authority at the university. The services of institutional repositories were generally well accepted, although the intensity of engagement with repositories varied with the age and subject area of respondents.

Different social media platforms could act as supplementary diffusion channels for journal papers along with OA journal publications due to the speed of content delivery and a wide network of actual and potential target readers (Vílchez-Román & Vara-Horna, 2021). This may generate usage data at the article level and eventually would assist in judging the scholarship of an article. Vílchez-Román, Huamán-Delgado and Alhuay-Quispe (2021) while trying to prove that, Social dimension activates the usage and academic impact of Open Access publications in Andean countries applied Partial Least Squares – Structural Equation for modeling the information-seeking behavior, at the document level, found positive evidence for the path social → usage → citation, but a negative and nonsignificant association between the social dimension and citation.

## OA and Institutional Ranking

Rankings of higher educational institutions and universities across the globe depend on a number of parameters and contribution to research is one such vital parameter which is mostly determined by the number of research publications in the form of journal articles in reputed and prestigious journals, conference papers, patents awarded to university faculty and researchers. In the case of a journal article, the number of citations accrued over time plays an important role not only in determining the worthiness of the article but may also come in handy in improving the overall score of a particular higher education institution on the global ranking list. OA gives an article global visibility, more readership and speedy dissemination over closed access articles and thereby helps to accrue more citations. Naturally, it is intriguing to know whether any relationship exists between open access presence and the ranking of universities onthe global stage. Ezema and Ugwuanyi (2021), While studying this relationship in the context of African universities, I found a highly significant positive but moderate correlation between open access presence and the ranking of African universities. They suggested that the science policy of African universities may be reviewed in line with open access initiatives to enhance the visibility and ranking of the university globally.

## Open Access Publishing

As the OA practices gain a wider foothold among researchers and faculty due to their perceived benefits as opposed to the traditional restricted model of publication, dissemination, and access, it is a natural consequence that the traditional scholarly publishing industry would likely to venture into this uncharted territory either to remain relevant to the contemporary scholarly publishing business or to find out about new OA business models. But what are the main motivating factors that influence a journal's flipping to OA? Can bibliometric measures reflect the flipping of the journal? Do journal managers support the flipping process wholeheartedly or harbor certain reservations? In order to find answers to these questions, Bautista-Puig, López-Illescas and Moed (2021) interviewed a number of Spanish journal managers and found that the concept of OA is well known to them. An increase in the manuscript submission traffic, wider visibility, and internationalization are the most valued traits of OA and are playing decisive roles in convincing Spanish managers to switch to the OA publishing model. The managers also expressed their apprehension about the challenges in terms of the need for funding, lack of resources, capacity for technical support, and the creation of alliances. It may not be out of tune to pay special attention to the challenge of OA funding vis-a-vis the traditional scholarly publishing model which has flourished on hefty subscription costs and individual pay-per-view.

Also, there exists a complex equation between public policy for access to information, green open access, and copyright protection. Koutras (2020) examined the interplay between public policy and green OA through the prism of copyright protection and based on his study, proposed a theoretical framework that relies on the publishing model of open access and aims to develop a standard concerning stakeholders' interests through public policy.

On the other hand, public research funding for important projects expects the wider dissemination of funded research outcomes so that the extended research community along with common people can reap the benefits of research. Democratically this is only possible in OA publications, as the subscription-based access or pay-per-look access cost in traditional closed publications acts as the main barrier to the free flow of knowledge. Perianes Rodríguez and Olmeda-Gómez (2021) in their study, they tried to determine the access policies of the journals chosen by researchers benefiting from the European Research Council's funding to disseminate their findings. They found that the research proposed, reviewed, and funded by scientists delivered highly influential and visible results which while complying with OA publication recommendations and mandates, grantees preferred to publish their papers in non-gold OA journals.

**Challenges of OA Publishing**

Probably the most controversial issue regarding OA publishing is Article Processing Charges (APC) which authors are to pay to get their papers published in OA mode. Currently, there are no universally accepted standards to guide authors to source funds or negotiate the APC. Halevi and Walsh (2021) in their research found that the majority of research scholars, although supporting the concept of OA, expressed their concerns about too high APC, and in consequence, almost half of the respondents included anticipated APC costs in their grant applications. Only a handful of scholars would pay APCs using personal funds. Ironically, OA publishing, funded by article processing charges and implemented by most of the commercial for-profit large publishing bodies, is the preferred model with the highest OA output at present. Most of the time, APC is very high, yet due to the associated reputation of these publishing bodies among the research fraternity, this OA publishing model has been successful in terms of the number of OA publication (Jurchen, 2020). But this pay-to-publish OA model has the potential to further marginalise peripheral scholars and incentivize the development of sub-standard and predatory journals (Dudley, 2021). Bruns, Rimmert and Taubert (2020), while analysing the possible financial effects of Gold Open Access based on article processing charges, concluded that cost-sharing models would become an issue in the debate on how to shoulder a transformation toward Open Access.

Apart from article processing charges and subscription costs, there is another paywall i.e., the language paywall. English has almost become synonymous with the lingua franca of modern scholarly communication. Although there are other regional languages in which research papers are being published, their share remains minimal in comparison to the sheer volume of scholarly communication in the English language. This compels researchers from non-English speaking countries to either hire technical translation services to translate their manuscripts into English before submitting them to a reputed journal or run the risk of losing a wider global audience. There are two-fold consequences of this scenario- firstly, authors confront a hidden paywall in the name of translation services and secondly, global audiences would be deprived of an important piece of research work which may trigger repetition of the same research in different parts of the world. MoChridhe (2019), while nurturing the idea of linguistic equity as OA, suggested revisiting the 19th and 20th-century proposals for the use

of a constructed auxiliary language as an aid to global scholarship and feasible alternatives to traditional scholarly publishing with the help of contemporary developments in publishing technology and machine translation.

## OA Publishing Models

Out of a number of OA publishing models, collaboration between research institutes and for-profit small or large publishers is the most common model. It would be intriguing to know if this collaboration has anything to do with the global visibility and academic influence of an OA journal. Asai (2021) examined the effects of the collaboration between research institutes and large and small for-profit publishers for the publication of 15 gold open access journals on the journals' internationality and academic influence and found evidence of improvement in the internationality and academic influence for most of the journals following the collaboration but this improvement was not dependent on the size of a publisher. But large publishers' acquisitions of small ones and collaboration with research institutes may strengthen the large publishers' presence in the open access journal market. This requires continuous monitoring.

Hollister, Bjork and Brower (2021) demonstrated a multi-institutional model for advancing open access journals when the open access journal Communications in Information Literacy (CIL) got migrated from Online Journals Systems (OJS) and a commercial web host to Portland State's Digital Commons (bepress) publishing platform, PDXScholar. This is an example of a viable, sustainable, and transformational publishing model where content migration from OJS to PDXScholar, post-migration actions to correct metadata, the introduction of functioning DOIs, and coordination with both free web and commercial indexers have been integrated under one roof.

The 'Austrian Transition to Open Access' (AT2OA), a collaborative project, to enable the large-scale transformation of publishing outputs from closed to open access (OA) in Austria, secured funding for a second four-year cycle from the Austrian Federal Ministry of Education, Science and Research to help establish a national OA monitoring data hub and transformative agreements with major publishers. This project materialised the launch of institutional OA publishing funds across the country and explored alternative publishing models together with the emergence of a nationwide network of OA experts.

## The Issue of Publishing Lag

In both traditional print and contemporary electronic publishing, publishing lag is a burning issue in scholarly communication. Lin (2021) in his study tried to analyse the differences in the time of communication between articles published under the open access (OA) model and in the article in press (AIP) format based on the characteristics of publication lag and first-citation speed together with the exploration of the correlation of publication lag and first-citation lag to the journal evaluation indicators. He concluded that the OA mechanism can influence the lag of publication without forming a citation advantage. Moreover, the AIP mechanism affects citation speed but does not have any significant relation with publication

lag. So, it is clear from the analysis that OA and AIP mechanisms contribute to the efficiency of scholarly communication at different stages.

## OA Publishing in Different Disciplines

At present, there are no uniform guidelines for OA publishing across all disciplines. But with the ever-increasing popularity of OA publications due to their global visibility, recognition and accelerated accumulation of citations, more and more universities, institutions and faculty members are seriously considering getting their papers published on OA platforms. This fact was proven by Torres and Manjarrez-Dominguez (2021) During a bibliometric analysis of open access (OA) and non-open access (non-OA) publications from the accounting departments of the University of Arkansas-Fayetteville, the University of Tennessee-Knoxville, and Auburn University wherein, a steady increase in the volume of published OA articles by professors of accounting was observed. Dhule (2021) studied the Directory of Open Access Journals (DOAJ), a database of fully open access peer-reviewed scholarly journals, to elicit the pattern of OA publications in law journals. He found that OA Law journals were published in 38 different languages and English was the most dominant language of publication. Double-blind peer-reviewed journals were in the majority. Demeter, Jele and Major (2021) analysed a cross-country and cross-disciplinary development of open access publishing from 2000 to 2019 covering seven world regions and nine scholarly fields. Their analysis revealed a significant increase in the overall share of OA journals over the last two decades but it also highlighted important differences across both the analysed world regions and disciplines. They noted a comparatively lower proportion of open access journals among the journals ranked in the Q1 quartile of Scopus database than in the general field except neuroscience. Barik and Jena (2021) applied Lotka's Inverse Square Law of Scientific Productivity to know whether the authors' productivity pattern of library and information science (LIS) open access journals adheres to Lotka's Law and to set a baseline for future studies on author productivity of LIS open access journals. They found the dominance of single authorship patterns in the LIS open access journals covered in this study. Selvam and Amudha (2020) did a bibliometric study on OA library and information science journals in the Directory of Open Access Journals. They identified 176 OA indexed journals and 53959 OA articles under Library and Information Science with differentiating elements like license Type, Journals published in different Languages, Country wise contribution, and Review systems.

Highlighting the other side of OA publishing, there are instances when early adopters of OA publishing like chemists lose the stream of publishing research in OA mode (Pagliaro, 2020). In order to instil a positive attitude towards OA publishing and encourage scholars belonging to different subject fields beyond chemical science to adopt OA, scholars need to be sensitised about enhanced citations, collaboration, job and funding opportunities.

## OA Publishing in Different Countries

Footprints of traditional core countries with a very high rate of research publications and enviable journal portfolio are well documented and reflected in Journal Citation Report by Clarivate Analytics or Scopus database by Elsevier over the years, But what about the

visibility of contributions from the periphery or semi-periphery countries? Barik and Jena (2021) studied the Directory of Open Access Journals as of 31st March 2020 to find that the contribution of India to open access journals in the world stood at only 1.97%. Can OA papers improve the visibility of research in these countries? Which disciplines have contributed the majority of OA papers? What is the status of OA publishing policy at the government level in these countries? To find answers to these questions, Macan, Škorić and Petrak (2020) studied and analysed papers of Croatian authors published in 2017 from Web of Science Core Collection citation indexes with special emphasis on OA papers. They found the overall prevalence of OA papers (74.4%) over non-OA papers. Croatian journals were thickly populated with OA papers and humanities and social sciences contributed a lion's share to it. Most of the OA papers in humanities and social sciences were written in the Croatian language, although, the majority of papers including those in Croatian journals were written in English. This may be due to the desire to have a wider reader base. Besides, most of the Croatian journals were found to be non-commercial OA journals and receive government subsidies for being OA and for not demanding any article processing charge. So, OA might enhance the international visibility of journals from the periphery or semi-periphery countries.Tracking OA journal article use patterns may throw light on a host of issues such as demand for the type of resources (based on time of publication), languages in which articles are being published, diversity of users, etc. In one such study, Pölönen *et al.* (2021) analysed the aforementioned parameters based on use of open access articles on the Finnish Journal.fi platform to find that apart from students, researchers, and teachers, there are private citizens, journalists, civil servants, entrepreneurs and politicians who regularly access OA Finnish journals both in English and Finnish. Moreover, not only new publications but also there exists a large reader base of older materials, especially among students. They concluded that open access to publications in national languages is vital for the local relevance and outreach of research.

**Longevity of OA Journals**

Amid the proliferation of OA journals, a pertinent question may be raised about the longevity of such journals. Starting a new OA journal seems to be easier than maintaining the active and ethical publication status of that journal as most of the time OA journals do not have strong financial support for their upkeep. A weak financial backing may force an OA journal to disappear from the scholarly arena. Laakso, Matthias and Jahn (2021) studied this phenomenon and found 174 OA journals covering all major research disciplines that, through lack of comprehensive and open archives, vanished from the web between 2000 and 2019 and raised concern for the integrity of the scholarly record and highlighted the urgency to take collaborative action to ensure continued access and thereby prevent the loss of more scholarly knowledge.

**Open Access Tools**

The problem of searching and identifying OA articles accurately in the least possible time, especially when the request for articles comes from an interlibrary loan (ILL) arrangement, has led to the search for efficient OA search tools. With the advent of Information

Communication Technology (ICT), several internet browser extension tools have surfaced to help information seekers find OA versions of scholarly articles that are generally kept behind a paywall by for-profit entities.Open Access Button, Lazy Scholar, Kopernio, and Unpaywall are some of the most popular and frequently reviewed browser extensions. Are these tools user-friendly? Do they require a user to invest considerable time to get familiar with their mode of operation? To find answers to these questions, Azadbakht and Schultz (2020) conducted a usability study of the browser extension tools involving undergraduate students and faculty of a large research university in the USA. They noticed that both students and faculty preferred simple, clean design elements and straightforward functionality in browser extensions that enabled them to use the tools with limited instruction. Participants familiar with other browser extensions preferred tools like Open Access Button, whereas those with limited or no exposure to other extensions preferred tools that load automatically, such as Unpaywall. On the other hand, Determining the comparative efficacy of these tools could help us to select the best OA search tool/s according to situational requirements. Duffin (2020) compared six OA search tools such as OAIster, Open Access Button, OpenDOAR, JURN, Google scholar, and Google and found that both Google and Google scholar outperformed the rest but the very large number of retrieval led to some irrelevant documents. Schultz *et al.* (2019) while experimenting with the efficacy of OA finding tools against Google Scholar, noted the successful hits the tools registered and advocated their inclusion in searches for OA versions of scholarly contents.

Retail websites for books such as Amazon, usually deploy a recommender system to recommend the most relevant offerings after collecting data about their customers and at the expense of their privacy. This could be viewed as a kind of unethical practice. As an alternative, Snijder (2021) used a Text Mining algorithm to find the most important themes of an open access book or chapter as well as closely related books. The algorithm opened up many possibilities such as finding connected books across languages, using the algorithm for several use cases, not just recommender systems, creating benchmarks for publishers, or creating a collection of connected titles for libraries are other possibilities.

## OA Citation

There is a long-standing debate on the citation advantage of OA articles versus closed-access articles.  OA publishing, with different flavours, may influence citation advantages differently when compared with non-OA articles. Sotudeh, Arabzadeh and Mirzabeigi (2019) in their study compared the OA models' (Green-only OA, Article Processing Charge-only OA, and Green-Article Processing Charge OA) citation performances to non-open access (NOA) model's and investigated the relationship between the quantities of their papers. The outcome of their study established citation advantage over the NOA articles, despite their lower number and the mixed APC-Green, which gained the highest citation compared to the other access models. But the negative association between Green OA and APC-funded OA in terms of the greater number of Green OA articles than APC-funded OA articles signifies the popularity of Green OA articles over others. Basson, Blanckenberg and Prozesky (2021), in another study, conducted a bibliometric study to investigate whether OA articles published in Directory of

Open Access Journals (DOAJ) listed journals experience a citation advantage in comparison to subscription journal articles, specifically those of which no self-archived versions are available. They noticed that OA journal articles experienced a citation advantage in very few subject areas and, in most of these subject areas, the citation advantage was found on only a single measure of citation advantage, namely whether the article was cited at all. They concluded that access status accounts for little of the variability in the number of citations an article accumulates.

Comparative studies could be used to understand the most economic OA model with the best citation rate. To this end, Zhang and Watson (2017) compared the citation counts of articles published through gold and green models as reflected in the Web of Science database. They found that citation rates were comparable for green open access and non-open access articles, but citation rates for gold open access articles were lower. Although, among gold open access articles, citation rates were highest for open access journals with article processing charges. They concluded that green open access is the most economical approach to comply with open access policies and that it provides researchers with at least as much research impact as gold open access.

**Role of Library and Information Professionals**

Library and Information Science professionals, owing to their nature of work and responsibilities as custodians and disseminators of knowledge resources, especially at the university and research institute level, may bring significant differences in the mindset of the larger research community and sensitize as well as influence their decision towards adoption of OA practices in accessing, publishing, and disseminating research results. Now, for this to happen, it is required to assess the preparedness of LIS professionals and their mindset toward OA adoption. Borteye *et al.* (2021) undertook a study to examine the use of open access journals by librarians in Ghana to establish the familiarity, attitude, and benefits of open access journals among librarians in Ghana. It was established in the study that librarians in Ghana are aware of the benefits of OA journals but are not committed to publishing their works in OA journals. The more the librarians embrace OA by using OA resources and disseminating their research through OA mode, the more they will feel comfortable with OA ideas and in turn will promote OA culture among scholars.

The concept of OA has changed the role of academic librarians from gatekeepers of knowledge to gate openers. It would be interesting to know whether professionals in the librarianship profession have changed their attitude towards OA or not. Are they ready to accept OA as the new normal? Results of a survey on UAE librarians by Boufarss and Harviainen (2021) revealed that librarians are aware of OA and are reinventing their role as gate-openers along with supporting OA by managing OA infrastructure. Librarians are aware of OA and its pitfalls, such as predatory journals. Most librarians educate users on the use of OA resources and OA publishing as well as predatory publications and at the same time, they are harnessing and marketing OA resources alongside paywalled resources.

## Discussion

As there is no uniform OA adoption policy, variations in the adoption of OA have been noticed across different disciplines, at the country, institutional, publisher, and individual levels. Chemical Sciences have been among the early adopters of OA. Although in the later period significant decrease in the OA mode of publishing has been noticed. Higher education and research institutes have shown a healthy trend in OA adoption. Adoption and implementation of OA policy at the university level would sensitise the stakeholders to participate in accessing as well as disseminating research works in OA mode (Narayan & Luca, 2017). At the country level, apart from North America and Europe, there has not been much progress in formulating and implementing OA policy at the government level. Yet the review finds adequate awareness about OA among academics and research scholars. Although, there persist some misconceptions and misapprehensions about OA publishing (Corbett, 2009; Morris & Thorn, 2009), with proper training and discussion, the misconceptions could be ironed out. At the author level, the gender inequality in terms of the lower representation of females as the first author needs to be addressed.

Article Processing Charges in open access publishing have been the bone of contention (Togia & Korobili, 2014; Mischo & Schlembach, 2011) and it undermines the very foundation of equitable access to information irrespective of cast, creed, geographical location, and financial capability. Open access institutional repositories, archives, and academic social networking platforms could be considered alternatives for disseminating research results, so that the dependency on for-profit publishers could be avoided (Beverungen, Böhm & Land, 2012).

## Conclusion

The monopoly and severe restrictions exercised by a handful of for-profit industry players at different stages of academic and research publication as well as dissemination have been challenged by the Open Access movement. Several stakeholders at different points in time voiced their concern about the inaccessibility of reports of public-funded research in the form of journal articles and conference papers that are being published by for-profit industry behemoths and put behind a paywall. This arrangement has created an artificial class of elites who by virtue of their financial power are privileged to access the restricted contents and thereby disrupting the free flow of information to every nook and corner of the world and depriving human civilisation of the possibility of giving birth to new innovative ideas based on the outcome of completed and on-going research, be it in science, social science or the humanities. Open access and its sister concepts such as open data, open educational resources, and open peer review are being seriously considered as the solution to the problem with traditional scholarly publication and dissemination practices. Perhaps, government initiatives on a strong OA policy framework would, in the long run, prove to be strong support and a foundation for democratic decentralization of information for education, research, and development. UNESCO's Sustainable Development Goals 2030 could give a fillip to the Open Access Movement and hopefully bring a new paradigm shift where equitable access to information would fuel future growth and prosperity.

## Acknowledgment

## References

Right to Information. (2021) UNESCO. September 28, 29 from https://www.unesco.org/en/right-information

Asai, S. (2021). Collaboration Between Research Institutes and Large and Small Publishers For Publishing Open Access Journals. *Scientometrics*, *126*(6), 5245-5262. https://doi.org/10. 1007/s11192-021-03949-4

Azadbakht, E., & Schultz, T. (2020). At The Click of a Button. *Information Technology and Libraries*, *39*(2). https://doi.org/10.6017/ital.v39i2.12041

Barik, N., & Jena, P. (2021). Author Productivity Pattern and Applicability of Lotka's Inverse Square Law: A Bibliometric Appraisal Of Selected LIS Open Access Journals. *Digital Library Perspectives*, *37*(3), 223-241. https://doi.org/10.1108/DLP-10-2020-0103

Barik, N., & Jena, P. (2021). Does India Move Toward Open Access of Publications?. *Journal of Archival Organization*, *18*(1-2), 51-62. https://doi.org/10.1080/ 15332748.2021. 1992203

Basson, I., Blanckenberg, J. P., & Prozesky, H. (2021). Do Open Access Journal Articles Experience a Citation Advantage? Results And Methodological Reflections of An Application of Multiple Measures To An Analysis By Wos Subject Areas. *Scientometrics*, *126*(1), 459-484. https://doi.org/10.1007/s11192-020-03734-9

Bautista-Puig, N., López-Illescas, C., & Moed, H. F. (2021). Journal Flipping to Open Access: The Perception of Spanish Journal Managers. *Publishing Research Quarterly*, *37*(4), 525-545. https://doi.org/10.1007/s12109-021-09831-8

Beverungen, A., Böhm, S., & Land, C. (2012). The Poverty of Journal Publishing. *Organization*, *19*(6), 929-938. https://doi.org/10.1177/1350508412448858

Boufarss, M., & Harviainen, J. T. (2021). Librarians As Gate-Openers in Open Access Publishing: A Case Study In The United Arab Emirates. *The Journal of Academic Librarianship*, *47*(5), 102425. https://doi.org/10.1016/j.acalib.2021.102425

Bruns, A., Rimmert, C., & Taubert, N. (2020). Who Pays? Comparing Cost Sharing Models for A Gold Open Access Publication Environment. *Journal of Library Administration*, *60*(8), 853-874. https://doi.org/10.1080/01930826.2020.1820275

Borteye, E. M., Atiso, K., Lamptey, R. B., & Kammer, J. F. (2021). Use of Open Access Journals by Librarians In Ghana. *Library Philosophy & Practice*.

Chewe, P., Zulu, Z., Sakala, G., Chitumbo, E. M., Makondo, F. N., & Musonda, Y. (2021). Open Access Scholarly Communication Practices at The University of Zambia. *Library Philosophy and Practice*, 1-17.

Corbett, H. (2009). The Crisis in Scholarly Communication, Part I: Understanding The Issues And Engaging Your Faculty. *Technical Services Quarterly*, *26*(2), 125-134. https://doi.org/ 10.1080/07317130802268522

Dandawate, V. S., & Dhanmjaya, M. (2021). Open Access Initiatives in Western Asia. *Slavic & East European Information Resources*, *22*(1), 85-103. https://doi.org/10.1080/15228886. 2021.1874349

Demeter, M., Jele, A., & Major, Z. B. (2021). The International Development of Open Access Publishing: A Comparative Empirical Analysis Over Seven World Regions And Nine Academic Disciplines. *Publishing Research Quarterly*, *37*(3), 364-383. https://doi.org/ 10.1007/s12109-021-09814-9

Dhule, S. (2021). Evaluative Study of Open Access Law Journals In Doaj. *Library Philosophy & Practice*.

Dudley, R. G. (2021). The Changing Landscape of Open Access Publishing: Can Open Access Publishing Make the Scholarly World More Equitable And Productive? *Journal of Librarianship and Scholarly Communication*, *9*(1). https://doi.org/10.7710/2162-3309.2345

Duffin, K. I. (2020). Comparing Open Access Search Tools to Improve Interlibrary Loan Fulfillment Efficiency. *Technical Services Quarterly*, *37*(4), 415-431. https://doi.org/10. 1080/07317131.2020.1810442

Ezema, I. J., & Ugwuanyi, R. N. (2021). An Informetric Analysis of Relationship Between Open Access Presence And Ranking of African Universities. *Webology*, *18*(2). https://doi.org/10.14704/WEB/V18I2/WEB18304

Fortin, J. M., & Currie, D. J. (2013). Big Science Vs. Little Science: How Scientific Impact Scales with Funding. *PloS one*, *8*(6), e65263. https://doi.org/10.1371/journal. pone.0065263

Halevi, G., & Walsh, S. (2021). Faculty Attitudes Towards Article Processing Charges for Open Access Articles. *Publishing Research Quarterly*, *37*, 384-398. https://doi. org/10.1007/s12109-021-09820-x

Hobert, A., Jahn, N., Mayr, P., Schmidt, B., & Taubert, N. (2021). Open Access Uptake in Germany 2010–2018: Adoption In A Diverse Research Landscape. *Scientometrics*, *126*(12), 9751-9777. https://doi.org/10.1007/s11192-021-04002-0

Hollister, C., Bjork, K., & Brower, S. (2021). A Multi-Institutional Model for Advancing Open Access Journals And Reclaiming Control of The Scholarly Record. *The Serials Librarian*, *80*(1-4), 59-64. https://doi.org/10.1080/0361526X.2021.1863141

Jurchen, S. (2020). Open Access and The Serials Crisis: The Role of Academic Libraries. *Technical Services Quarterly*, *37*(2), 160-170. https://doi.org/10.1080/07317131.2020.1728136

Koutras, N. (2020). The Public Policy Basis for Open Access Publishing: A Scientific Approach. *Publishing Research Quarterly*, *36*, 538-552. https://doi.org/10.1007/s12109-020-09772-8

Laakso, M., Matthias, L., & Jahn, N. (2021). Open Is Not Forever: A Study of Vanished Open Access Journals. *Journal of the Association for Information Science and Technology*, *72*(9), 1099-1112. https://doi.org/10.1002/asi.24460

Lin, W. Y. C. (2021). Effects Of Open Access and Articles-In-Press Mechanisms On Publishing Lag And First-Citation Speed: A Case On Energy And Fuels Journals. *Scientometrics*, *126*(6), 4841-4869. https://doi.org/10.1007/s11192-021-03956-5

Macan, B., Škorić, L., & Petrak, J. (2020). David Among Goliaths: Open Access Publishing in Scientific (Semi-) Periphery. *Learned Publishing*, *33*(4), 410-417. https://doi.org/10.1002/leap.1320

Mischo, W. H., & Schlembach, M. C. (2011). Open Access Issues and Engineering Faculty Attitudes and Practices. *Journal of Library Administration*, *51*(5-6), 432-454. https://doi.org/10.1080/01930826.2011.589349

MoChridhe, R. (2019). Linguistic Equity as Open Access: Internationalizing The Language of Scholarly Communication. *The Journal of Academic Librarianship*, *45*(4), 423-427. https://doi.org/10.1016/j.acalib.2019.02.006

Morris, S., & Thorn, S. (2009). Learned Society Members and Open Access. *Learned Publishing*, *22*(3), 221-239. https://doi.org/10.1087/2009308

Narayan, B., & Luca, E. (2017). Issues And Challenges in Researchers' Adoption of Open Access and Institutional Repositories: A Contextual Study of A University Repository. *Information Research: an international electronic journal.* https://opus.lib.uts.edu.au/handle/10453/121438

Narayan, B., & Luca, E. (2017). Issues And Challenges in Researchers' Adoption of Open Access and Institutional Repositories: A Contextual Study of A University Repository. *Information Research: an international electronic journal.* https://doi.org/10.1629/uksg.558

NnennaOtubelu, B., & Anunobi, C. V. (2021). A Critique of Relationship Between Performance and Effort Expectancy of Lecturer's and Their Adoption of Open Access Scholarly Publishing In Nigerian Universities. *Library Philosophy & Practice.*

Pagliaro, M. (2020). Open Access Publishing in Chemistry: A Practical Perspective Informing New Education. *Authorea Preprints.* https://doi.org/10.1629/uksg.540

Pendse, L. R. (2021). Open Access in Estonia. *Slavic & East European Information Resources*, *22*(1), 69-84. https://doi.org/10.1080/15228886.2021.1874332

Perianes-Rodríguez, A., & Olmeda-Gómez, C. (2021). Effect of Policies Promoting Open Access in The Scientific Ecosystem: Case Study of ERC Grantee Publication Practice. *Scientometrics*, *126*(8), 6825-6836. https://doi.org/10.1007/s11192-021-03966-3

Pinhasi, R., Hölbling, L., & Kromp, B. (2021). Austrian Transition to Open Access: A Collaborative Approach. *Insights*, *34*(1). https://doi.org/10.1629/uksg.561

Pölönen, J., Syrjämäki, S., Nygård, A., &Hammarfelt, B. (2021). Who Are the Users of National Open Access Journals? The Case of The Finnish Journal.Fi Platform. *Learned Publishing*, *34*(4), 585–592. https://doi.org/10.1002/leap.1405

Satija, M. P., & Chander, H. (2021). Ranganathan's Spiral: An Aerial View of Scientific Method. *Library Herald*, *59*(3), 19-30. https://doi.org/10.5958/0976-2469.2021.00019.1

Schultz, T. A., Azadbakht, E., Bull, J., Bucy, R., & Floyd, J. (2019). Assessing The Effectiveness of Open Access Finding Tools. *Information Technology and Libraries*, *38*(3), 82-90. https://doi.org/10.6017/ital.v38i3.11009

Selvam, M., & Amudha, G. (2020). A Bibliometric Study on Open Access Library and Information Science Journals In DOAJ. *Library Philosophy and Practice*, 1-11.

Serrano-Vicente, R., Melero, R., & Abadal, E. (2016). Open Access Awareness and Perceptions In An Institutional Landscape. *The journal of academic librarianship*, *42*(5), 595-603. https://doi.org/10.1016/j.acalib.2016.07.002

Snijder, R. (2021). Words Algorithm Collection-Finding Closely Related Open Access Books Using Text Mining Techniques. *LIBER Quarterly: The Journal of the Association of European Research Libraries*, *31*(1), 1-22. https://doi.org/10.53377/lq.10938

Sotudeh, H., Arabzadeh, H., & Mirzabeigi, M. (2019). How Do Self-Archiving and Author-Pays Models Associate and Contribute To OA Citation Advantage Within Hybrid Journals. *The Journal of Academic Librarianship*, *45*(4), 377-385. https://doi.org/10. 1016/j.acalib. 2019.05.004

UNESCO. (14th January 2020). *Sustainable Development Goals for Communication and Information.*https://en.unesco.org/sustainabledevelopmentgoalsforcommunicationinformation

Togia, A., & Korobili, S. (2014). Attitudes Towards Open Access: A Meta-Synthesis of The Empirical Literature. *Information Services & Use*, *34*(3-4), 221-231. https://doi.org/10. 3233/ isu-140742

Torres, J. M., & Manjarrez-Dominguez, A. (2021). Toward An Understanding of Open Access Trends In Business Schools: A Bibliometric Analysis of The Open Access Faculty Publications of Accounting Departments at Three Universities. *Journal of Business &*

*Finance   Librarianship*, *26*(3-4),   179-199.   https://doi.org/10.1080/08963568.2021. 1919822

Utulu, S. C. A., & Ngwenyama, O. (2021). Multilevel Analysis of Factors Affecting Open-Access Institutional Repository Implementation In Nigerian Universities. *Online Information Review*, *45*(7), 1322-1340. https://doi.org/10.1108/OIR-10-2018-0319

Vílchez-Román, C., & Vara-Horna, A. (2021). Usage, Content and Citation In Open Access Publication:   Any   Interaction   Effects? *Scientometrics*, *126*(12),   9457-9476. https://doi.org/10. 1007/s11192-021-04178-5

Vílchez-Román, C., Huamán-Delgado, F., & Alhuay-Quispe, J. (2021). Social Dimension Activates the Usage and Academic Impact of Open Access Publications In Andean Countries: A Structural Modeling-Based Approach. *Information Development*, *37*(2), 209-220.  https://doi.org/10.1177/0266666920901849

Vuong, Q. H., Nguyen, H. T. T., Ho, M. T., & Nguyen, M. H. (2021). Adopting Open Access In An Emerging Country: Is Gender Inequality A Barrier In Humanities And Social Sciences?. *Learned Publishing*, *34*(4), 487-498. https://doi.org/10.1002/leap.1387

Whitt, B., & Campbell, C. (2021). Optimizing Library Services - How Open Access and OA Agreements Can Support Diversity, Equity, & Inclusion? *Against the Grain*, *33*(5), 52–55

Zhang, L., & Watson, E. M. (2017). Measuring The Impact of Gold and Green Open Access. *The journal of academic librarianship*, *43*(4), 337-345.  https://doi.org/10.1016 /j.acalib.2017.06.004