



Business and Publication Model of Cardiology Journals

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Abstract

Objective: Traditional and open-access publishing strategies have been reviewed more recently, notably in light of the recent standoff between Elsevier and the University of California over cost and access. Although peer-reviewed publications are the primary means of disseminating science, the industry remains a mystery to many. We aimed to determine cardiology publisher market share, access type, geographic distribution, and relative research impact better to understand the traditionally opaque realm of academic publishing.

Methods: Scopus was queried in October 2022 to retrieve all items in the "Medicine" subcategory of "Cardiology." The following information was cataloged: journal name, publisher, SCImago Journal Ranking (SJR) score, nation, and publication model. Journals were grouped by their publication model, while publishers were grouped by ownership type. Overall trends were examined regarding publisher type, publication model, and geographic location.

Results: More than half of all cardiology journals commercial entities publish 73.6% (231/314). Within the category, Elsevier and Springer Nature together published 36.3%(114/314) of the journal titles. Universities provided 8% (25/314) of cardiology publications in the marketplace, while professional societies contributed 18.5 % (58/314). Europe and North America publish more than two-thirds of all cardiology journals together. SJRs were greatest for commercially published papers on average.

Conclusion: The publication of cardiology journals is substantially centralized within a few multinational commercial corporations. Although most cardiology journals were open-access, their influence was comparable to that of subscription journals. Further disagreements between universities and publishers could impact future manuscript submission, review, and citation, destabilizing existing publishing arrangements.

Keywords: Journal publishers; Publication model; Open access; Cardiology journals.

Introduction

The internet revolution has significantly impacted the scientific publishing industry, catalyzing them to transition from printed paper editions to electronic journals. [1] With the internet enabling easy and cost-effective distribution of scientific content, the publishers introduced access or publishing restrictions enabling them to monetize the material that may have been produced through public funding. [1] The publishers stated that these paywalls were installed to cover costs such as employing administrative staff, maintaining of journal's website, and evaluating and editing the article. [2] The publishing entities employ various business models to cover these costs, which are discussed subsequently.

The first model is the traditional subscription-based journals in which the literature can only be accessed via an institutional license, a journal subscription, or a fee per article set by the publisher. [1] The subscription payment covers the costs mentioned above. Many authors prefer to publish in subscription-based journals mainly because no charges are incurred upon them. Secondly, subscription-based journals have a higher impact than their open-access counterparts due to a long rigorous peer-review history. [3]

The second model is open access, in which no fees are levied on readers; however, writers must pay article processing fees (APC). [4] Through these APCs, the open access journals cover the costs associated with publishing an article. [4] Open access journals are the optimal way of disseminating ground-breaking research, plus the increased readership may also boost citations. [4] However, since these journals base their revenue on the number of articles published, many researchers have questioned the integrity of the peer-reviewing process and the standard of literature published in open access journals.

The third model is an amalgamation of open-access and subscription-based models that is a hybrid model in which authors possess the autonomy of publishing in either of the categories. Many publishing giants like Elsevier, Springer Nature, Wolters, and Kluwer have started publishing hybrid journals. [5] They cover the costs associated with publishing through both APC and subscription charges. Many researchers, however, have expressed reservations regarding this business model and accused journals of "double-dipping," which means that authors pay APC to publish their articles in open access and libraries subsequently pay for articles that are behind the subscription paywall due to haphazard indexing of articles in hybrid model journals. [6]

In recent years considerable increase in survival rates of patients diagnosed with cardiovascular illnesses has been observed. [7] This all has been due to the applications of research done in cardiology. [7] Hence, we aim to understand the business and publications model of cardiology journals and their effects on the output of cardiology-related research.

Methodology

Our study did not require approval from the Ethical review board as there was no human involvement, and data was freely accessible on the internet.

1. Data collection and organization:

A comprehensive literature search was done using Scopus, a multidisciplinary citation database covering nearly 36,377 titles from over 11,678 publishers. Maintained by Elsevier, Scopus provides access to journal discipline, category, and country to ensure channeled search. We explored surgery journals available on the site for the year 2022 to aid data collection & analysis.

Data regarding journal name, SCImago Journal Ranking (SJR), publisher name, country of origin, continent, publication model, and language were manually extracted for all surgery journals and entered on an Excel sheet, which was later reviewed by two authors. Journals that were inaccessible, discontinued or continued as different journals were excluded. SJR is a freely available portal for ranking journals based on the number of citations and the prestige of the journal. Journals that were not ranked using SJR were also excluded from the study. Publishers were categorized into commercial, university, and professional society while publication models were grouped into open access, subscription, and hybrid.

2. Data analysis

We used SPSS version 25.0 (IBM Corp, New York USA) for the data analysis. Categorical variables were reported as frequencies and percentages. A Fisher's Exact Test was carried out to evaluate the course of the publication model across the top 12 publishers. A Kruskal-Wallis test was employed to observe the division of SJR across the top 12 publishers, publisher type, publication model, and the continent of the publisher. Results were interpreted with 95% confidence intervals, and a p-value of less than 0.05 was considered significant. ANOVA test was not used since data were not normally distributed.

Results

General Trends:

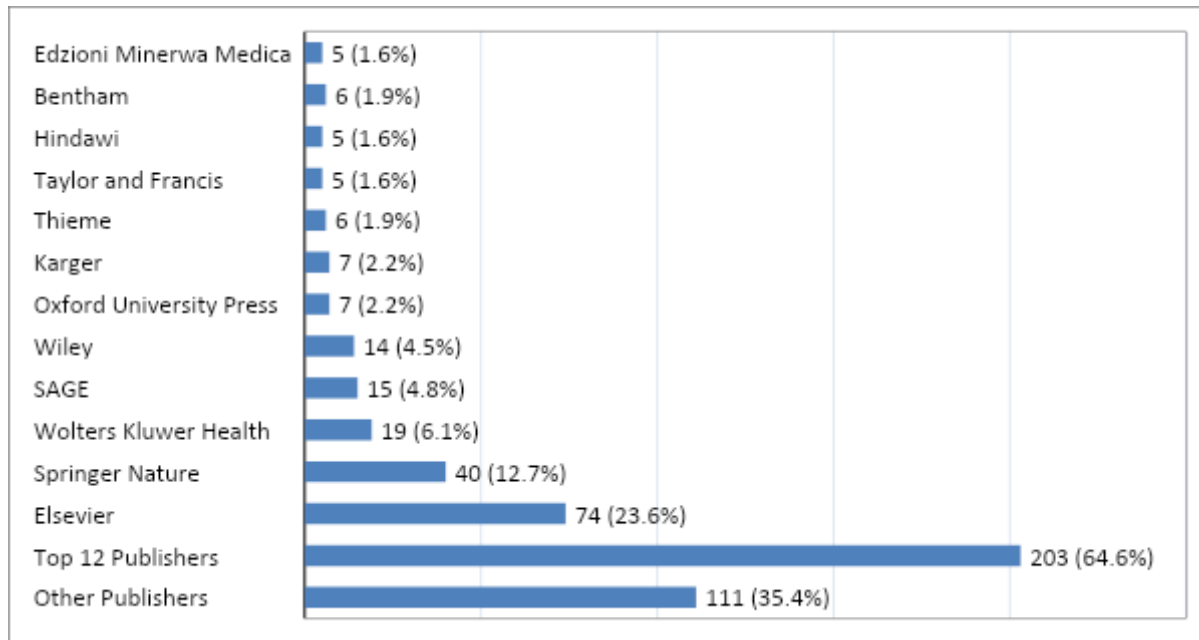
A total of 314 cardiology journals were identified through the SCOPUS database. Four or more journals used approximately twelve publishers, and other publishers were used by less than four journals. More than half of all cardiology journals (n=203, 64.6%) are published by the Top 12 publishing entities, as shown in Fig 1. Of this, Elsevier (23.6%, 74/314), Springer Nature (12.7%, 40/314), and Wolters and Kluwer (6.1%, 19/314) jointly accounted for 55.3% of all cardiology journals published. Regarding publisher type, commercial organizations publish more than half of all cardiology journals (73.6%, 231/314). Professional society accounted for 18.5% (58/314), whereas universities contributed 8% (25/314) of cardiology journals in the marketplace. Region-wise, Europe and North America jointly publish more than 2/3rd of all cardiology journals, as shown in Table 1.

Table 1. Distribution of SJR across top 12 publishers, publisher type, publication model, and continent of publisher.

	Median	Range	Mean	<i>p</i>
Top 12 publishers				.000
Elsevier	0.756	0.100-10.3	1.22	
Springer Nature	0.759	0.114-7.80	1.18	
Wolters Kluwer Health	0.700	0.255-4.90	1.73	
SAGE	0.740	0.203-2.45	0.925	
Wiley	0.806	0.404-5.15	1.20	
Oxford University Press	2.12	0.256-4.34	2.07	
Karger	0.806	0.547-1.22	0.843	
Thieme	0.404	0.200-1.59	0.668	
Taylor and Francis	0.501	0.112-0.809	0.464	
Hindawi	0.437	0.106-0.904	0.470	
Bentham	0.390	0.112-0.815	0.469	
Edzioni Minerwa Medica	0.259	0.149-0.794	0.400	
Publisher type				.937

Commercial	0.580	0.100-10.3	0.876	
Professional Society	0.483	0.101-7.80	1.14	
University	0.546	0.124-4.34	0.844	
Access type				.001
Subscription	0.555	0.100-7.80	1.07	
Open access	0.411	0.100-6.12	0.711	
Hybrid	0.689	0.112-10.3	1.05	
Continent				.000
Africa	0.378	0.106-0.904	0.402	
Asia	0.418	0.112-2.35	0.509	
Europe	0.541	0.100-6.12	0.774	
North America	0.793	0.101-10.3	4.34	
Oceania	0.643	0.429-0.892	0.652	
South America	0.183	0.101-0.400	0.206	

Fig. 1 Marketplace presence of the top 10 publishers of cardiology journals. The standalone numbers represent the number of journals owned by each publishing entity. Values in parentheses indicate the proportion of all cardiology journals (314) published by the respective entities. Publishers with four or fewer journals were designated as “other publishers”

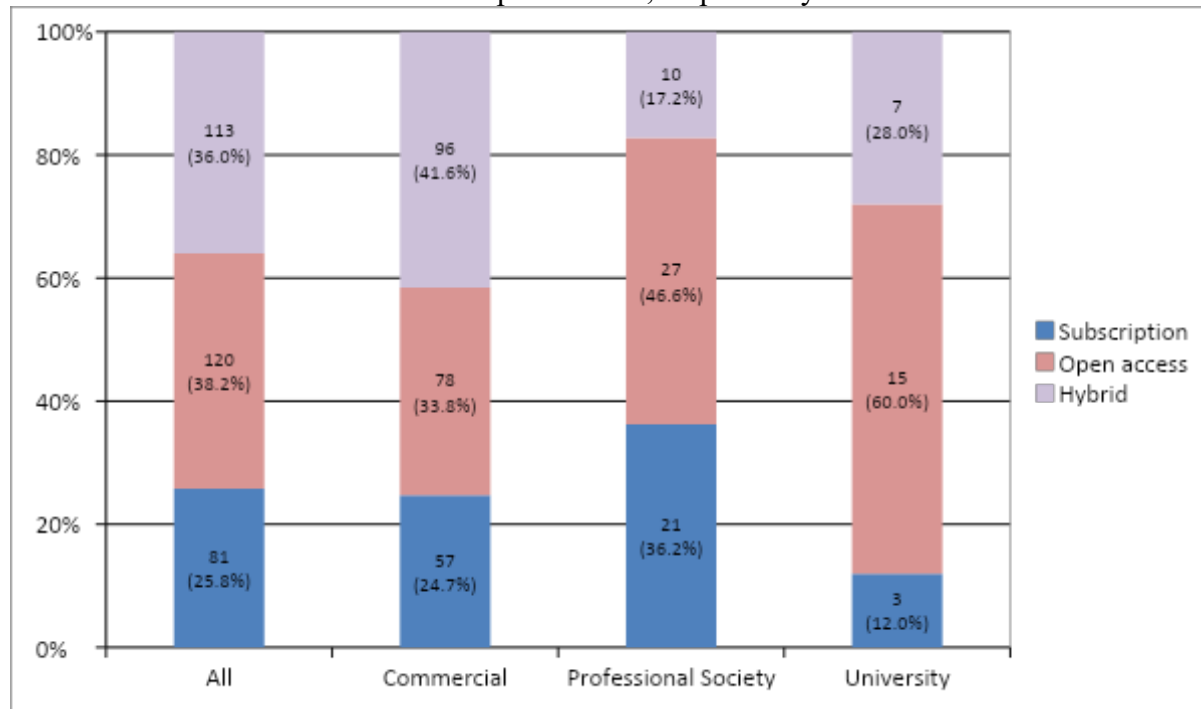


Publication Model:

Types of Publishers:

About one-third of the cardiology journals work upon the open-access model, as shown in [Table 1](#). The proportions of open access, subscription-based and hybrid journals across the commercial, university, and professional societies are shown in Fig 2. The distribution of journals was not significantly correlated with the three publisher types.

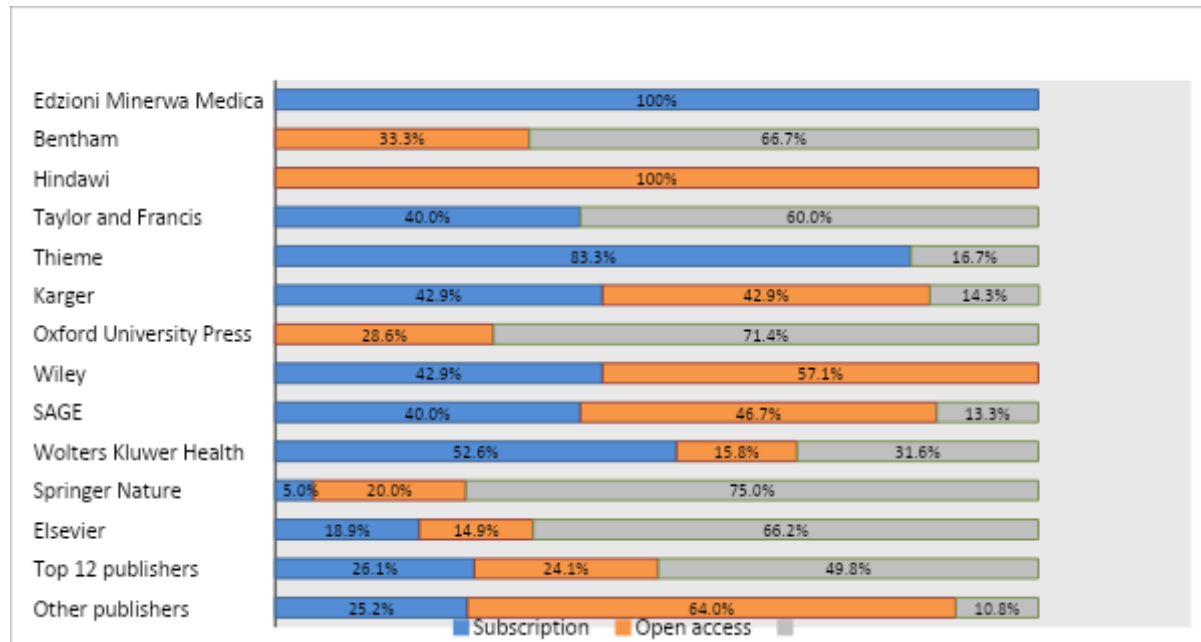
Fig. 2 Proportions of subscription-based, open-access and hybrid journals in commercial, professional society, university, and all publishers. The number of journals and proportions are represented by the standalone numbers and the values in parentheses, respectively



.Distribution of journals across individual publishers:

The distribution of open-access, subscription-based, and hybrid models across various publishing entities is shown in Fig 3. Amongst the Top 12 publishers, only one (Oxford University Press) was society-based. Edizioni Medica Minerva was the only publisher that did not contain any open-access journal of cardiology. Springer Nature (75%) and Bentham (66.7%) published the highest hybrid journals. More than half (64%) of other publishers' journals were of open-access type. There was a significant variation in distribution between the publication model between the top twelve publishing organizations. ($p < 0.001$)

Fig. 3 Proportions of subscription-based, open-access and hybrid journals by the top 12 publishers. Publishers with four or fewer journals were designated as “other publishers.”



SCImago Journal Rank (SJR) indicator:

Table 1 displays the mean SJR score for the twelve publishers, publishing model, access type, and continent-wise distribution of journals. There was a statistically significant variation in score between the twelve publishers, the business model of the journals, and the location where the journal is headquartered ($p < 0.05$). However, there was no statistically significant difference in scores across different publishing entities.

Discussion

The current study depicts key trends in cardiology journals' business model. This is the first extensive review to the best of our knowledge. Our analysis revealed that more than two-thirds of the market is contributed by commercial entities. Region-wise, Europe dominated the cardiology journals business market in contrast to the radiology journals market, in which North America is the highest contributor. [8] The region-wise discrepancy can partly be attributed to the fact that research funding is highly correlated with the publication output, which leads to a more significant number of journals published by some regions. [9]

We observed that a greater number of cardiology journals worked upon the open-access model, and less than one-third of the journals were subscription-based journals. This contrasts with Vijayasarathi et al., who reported that a greater number of radiology journals were subscription-based. This may be attributed to the fact that cardiovascular diseases are the leading cause of death worldwide which is why research in cardiology is vital to conduct and disseminate. [10] Open-access journals have a broader audience and are even accessible to people not belonging to the scientific field and hence have a more significant societal impact. [11,12] Furthermore, as evidenced by the fact that publications in open-access journals are expanding at a rate of 30% per year, the idea that open-access journals do not implement rigorous peer-review and publish sub-standard articles is quickly diminishing.[1]

Approximately more than one-third of the journals were based on the hybrid model. This can partly be due to the benefits provided by the hybrid model journals, such as dissolving the paywall of APC so that authors can publish their work in reputable open-access journals. [13] Furthermore, the hybrid model provides an opportunity for the publisher to observe the transition from a subscription-based model to a purely open-access model. [13] However, the hybrid model is not yet perfect, and several limitations have been pointed out. For instance, the APC of hybrid journals is much higher than pure open-access journals. [14] Hybrid model publishers have been accused of “double-dipping” by generating revenue both from APCs paid by authors and the subscription fees of relevant categories paid by the readers. [6] In addition, few publishers do not make articles fully accessible until APC has been completely received. This may consume months, and those articles can only be accessed by a fee, thus generating money from the articles that are supposed to be open access. Hence, this highlights an unclear demarcation between the two revenue streams. [15]

The study by Qureshi et al. revealed that two-thirds of cardiology publication output from the world is from high-income countries. Therefore, Europe and USA dominated the cardiology business marketplace region-wise. [16] High-income countries were associated with a higher output of research and lower cardiovascular morbidity rates, while in low-income regions, it was vice versa. [16] The analogy may explain that the high subscription fees or APCs cannot be afforded by the authors belonging to middle-income and low-income regions and therefore remain deprived of scholarly literature. [17]

There is an increasing awareness amongst researchers about the effects of journals' business model, which is evident by the cancellation or limitation of contracts between MIT, the University of North Carolina, the University of Idaho, the University of Virginia, and the State University of New York with Elsevier. [18] There is now a demand that publishers ease access and publishing restrictions so that the flow of research is not obstructed and improvement in public health is not hindered.

Limitations

Certain limitations must be considered while viewing the current study. Firstly, the SCOPUS database may not include articles that do not fall under the purview of typical cardiology journals. Secondly, the SCOPUS database is a branch of the publishing behemoth Elsevier. Even though SCOPUS is affiliated with an autonomous advisory group, the possibility of a conflict of interest cannot be overlooked. Thirdly, SCOPUS does not consider some publications' hybrid models that might overestimate or underestimate the number of open access or subscription-based journals. Furthermore, the SJR is not a

precise method for assessing a journal's impact and has its limitations [20]. SJR was chosen over Journal Impact Factor (JIF) as the citation metric since it provides open access, whereas JIF requires a subscription to the Journal Citation Reports Database. Both metrics have significant advantages and disadvantages outside this article's scope, and past literature has demonstrated that SJR can be a valuable tool for assessing journal quality. [19-21]

Conclusion

In summary, about 12 entities dominate the cardiology journals marketplace, out of which only one (Oxford university press) is society-based while the rest are commercial organizations. Region-wise, North America and Europe collectively publish more than two-thirds of all cardiology journals. In addition, out of the three models, the least amount of journals worked on a subscription-based model. The SJR score significantly differed across the top 12 publishers, business model, and the location of the journal. The publication paradigm is anticipated to be a key topic in future talks between institutions and leading commercial publishers. Future research about the influence of subscription cancellation on paper submission, access, review, and citation is necessary.

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