



Scholarly journal publishing in Australia

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Abstract

This article describes the nature and extent of scholarly journal publishing in Australia. Australian journals are defined as journals that belong to or are affiliated with an Australian entity. There are currently 651 active Australian journals. The oldest started in the 19th century, and the 1990s was the top decade in terms of starting new journals. Australian journals mostly belong to or are affiliated with non-profit organizations (e.g., learned societies) (364, 55.9%), or educational institutions (168, 25.8%). While most of the journals (426, 65.4%) are published by their owners (self-publish), the publication of 162 journals has been outsourced to international commercial publishers, with most of these linked to non-profit organizations. About 39.8% of Australian journals are open access and most of them do not charge author-processing charges. Half of the Australian journals (326) are indexed in Scopus and slightly less than half (301) are included in Web of Science (WoS). Arts, Humanities and Social Sciences are well represented in the disciplinary focus of journals, although journals indexed in Scopus and WoS are more likely to be in health, life and physical science disciplines.

Keywords: Australia, journal publishing, local journals, national journals, scholarly journals

INTRODUCTION

Journal publishing has become a complex and challenging task for universities, research institutions and learned societies with so many different business models, and a competitive market, in which small publishers are disappearing as they are acquired by

large international publishers. Many such journals have had to outsource their publication to international publishers, but such decisions come with consequences. These consequences have been partly documented. For instance, the editor in chief of the *Medical Journal of Australia* (MJA) was sacked over his opposition to the outsourcing of the journal's sub-editing and production

functions to Elsevier and all 19 members of the journal's editorial advisory committee subsequently resigned (Mcinerney, 2015). The various models of open access (OA) publishing have added to the complexity of how local journals deal with international publishers (Brown & Froude, 2014).

Besides the challenges mentioned above, national journals, also sometimes called local or domestic journals (Bocanegra-Valle, 2019) face other challenges such as publication drain because researchers increasingly prefer to publish in prestigious international journals (Salager-Zeyer, 2015). While some such as Salager-Zeyer (2015) suggests the solution for local journals is to internationalize, it is generally believed that local journals play important roles in research (as explained below), and therefore, understanding the issues around the publication of local journals and improving their sustainability is critical. Here we take the first step in understanding Australian journals and their characteristics. In the rest of the introduction, we first discuss the roles of local journals, and then discuss the tension between local and international journals and finally we explain why studying Australian journals matters.

Role and function of local journals

While national journals like all other journals serve as a record of scholarship and the building blocks of accepted truths, they have other functions that might be more significant for them. They have educational (Loadsman, 2019; Mills et al., 2009) as well as professional and societal roles (Sambunjak et al., 2009) which are tied to the educational system and culture in each country. They connect practitioners with academics and support interaction between theory and practice (Hughes, 2015), especially in fields such as medicine where practice differs widely between different countries (Groeneveld, 2010). They are more likely to publish applied research that is more closely linked to the industrial sector of a country (Sanz et al., 1995). They make the science of a country visible and accessible (Leta, 2012) and cover research in disciplines in which a country has a unique position (e.g., faster or more comprehensive coverage, Ma, 2019) and they tend to be preferred outlets for research on issues with local significance (Sivertsen, 2016).

Local versus international journals

International and national journals might contain two different sets of literature at least in certain disciplines such as social sciences (Hicks, 2004) and therefore, they can have different audiences and functions. They should co-exist and supplement one another. Journals in certain disciplines such as arts, humanities and social sciences are more likely to have a local orientation (Sivertsen, 2016), and therefore, scholars in these fields are more likely to publish in local journals. A study showed this was the case in Australia (Royle & Over, 1994). However, there has been a trend to push local journals towards internationalization. Internationalization has brought about challenges and tensions for scholarly journals that must negotiate between traditional and

Key points

- Australian journal publishing is characterized by journals mostly belonging to universities and non-profit organizations that are self-published.
- International commercial publishers provide publishing service to a quarter of Australian journals and the majority of them are published using hybrid model.
- About a third of journals are open access without any charge for authors which indicate they rely on funding from their owner or parent body for publication.

new audiences (Koch & Vanderstraeten, 2021). Two factors contribute to this internationalization trend, one is the dominant metric culture in research systems, that puts pressure on journals to be indexed in major citation databases (e.g., Scopus) (Koch & Vanderstraeten, 2021) and the other is increasing a country's share in the global research output by having national journals indexed in databases (Basu, 2010; Leta, 2012) which has implications for the international prestige of a country's research. Getting indexed in citation databases affects the national orientation of journals (i.e., they publish more international articles) and their citation impact (Moed et al., 2020). However, the metric culture and the pressure to publish in highly ranked journals is a concern in Australia as it makes researchers orient 'away from more local concerns' (Haddow, 2021).

Due to the factors mentioned above, many national journals have moved towards internationalization. The internationality of journals can be defined or perceived differently. The scope and topical coverage of journals can be an indicator of a national focus. While international journals often have a requirement for 'general interest' (Rowland, 2005, p. 301), national journals might focus on research or data concerning a specific region, or on specific topics that have local significance. However, authors might also link internationality with prestige. Rowland (2005) wrote that:

the term 'international journals' almost invariably refers to ones published in the USA or the UK, or English-language journals published in mainland European countries. 'National journals' with titles like *The Canadian Journal of ...* or *Acta ... Scandinavica* are often, rightly or wrongly, perceived as being of more parochial interest and perhaps of lower quality than international journals (p. 301).

In most bibliometrics studies, however, the authorship composition of a journal's articles is an indicator of its internationality. Past studies show an increase in the number of articles by foreign authors (authors from a country other than that of the publishing country) in journals published by national publishers

(Gazni, 2015). Moreover, past research shows that journals from national publishers internationalize faster than those from multi-nationals (Gazni & Ghaseminik, 2016) and that after journals are indexed in Web of Science (WoS) or Scopus they publish more papers by international authors (Gazni & Ghaseminik, 2016; Moed et al., 2021). Nationally-oriented journals have a significantly lower impact factor than journals with a more international focus (Moed et al., 2021).

Why study Australian journals?

Australia has a unique natural history with distinct flora, fauna, geology, ecology and geography. It has a rich and ancient history with its First Nations people. Australian journals play a critical role in recording knowledge of all these distinct aspects, and they ensure that there are quality outlets for Australian researchers to publish work on topics that might be of particular interest in Australia.

Australia is a scientifically advanced country with a relatively large higher education sector that had AUD 37.9 billion revenue in 2017 (TEQSA, 2018) and a considerable amount of research output [ranked 10th in the world in terms of output (natureindex.com)]. Moreover, its language (English) is the *lingua franca* of science. Australian researchers have long been engaged with journal publishing and there are many journals with the words 'Australia' or 'Australian' in their titles, some more than a century old (such as the *Australian Medical Journal*).

Despite the importance of national journals for Australia, there has been little research on Australian journals, with only a few very old and limited studies that dealt mostly with the performance and coverage of Australian journals in citation indexes. In the 1990s, when scholarly communication was being transformed by online publishing, Royle (1994) observed that Australian journals did 'not rank highly compared to overseas journals on the basis of impact factor or citations received' (Royle, 1994, p. 170). Royle (1994) maintained that the reasons for the lower ranking of Australian journals were their national focus, lower circulation and poor coverage by major abstracting and indexing services.

Royle and Over (1994) found that in the 1990s only 27% of Australian social science journals, and 87% of the science journals, were indexed by the Institute for Scientific Information (ISI). Later, Smyth (1999) found that only one of the five major Australian economics journals was indexed in WoS. A citation analysis of Australian universities' research output by Butler and Visser (2006) showed that coverage of their humanities and social science output by ISI was very low (between 6% and 28%), which indicates that Australian journals in those fields were not well covered by ISI. East (2006) checked 59 Australian humanities journals and found only 19 of them were included in the ISI Master Journals List. The study also found that the journals performed poorly in terms of the level of holdings in large overseas academic libraries. Haddow and Genoni (2010) confirmed that the coverage of Australian social sciences journals by WoS and Scopus was low.

There have been some studies on journal publishing in other countries, though mostly outdated, including studies on the cost of journal publishing in the United States (Tenopir & King, 1997), New Zealand journals (Crothers, 2017; Gush, 2011; Rowland, 2005), challenges of journal publishing in Malaysia (Hew, 2001) and some specification of Malaysian journals including the number of papers or number print runs (Zakaria & Rowlands, 2006). The study of journals of New Zealand, Australia's neighbour, showed that although their editors perceived them as international, they had more national status (Rowland, 2005), perhaps meaning that journals' main function was to publish papers relating to New Zealand (or perhaps Australasia and the Pacific region), and/or to publish papers by authors based in New Zealand.

Research questions

What is reported here is the first in a series of studies on journal publishing in Australia that will address challenges, strengths, risks and issues in this area. This article aims to map the landscape of journal publishing in Australia and specifically answer the following questions:

- How many Australian journals are currently published, and how are they distributed by field of research?
- How has the number of Australian journals changed over time?
- Which type of organizations owns these journals, what type of publishers publish them and how are different types of owners and publishers linked?
- How many Australian journals are indexed in Scopus, WoS, and appear in the Excellence in Research for Australia (ERA) 2018 journal list?
- What is the open access publishing status of Australian journals?

By Australian journals in this study, we mean journals that are owned by or affiliated with an Australian entity.

METHODS

Data sources

A variety of sources were used to generate the data for this study. Ulrich's Global Serials Directory was the primary source of data. Ulrich's Directory is a specialized database for serials. However, since Ulrich's relies on publishers and journals to request inclusion in the database, its coverage is not necessarily universal. To ensure the identification of potentially Australian journals was as comprehensive as possible, journal lists were also downloaded from *Scopus*, Directory of Open Access Journals (DOAJ), WoS and the 2018 ERA list (Australian Research Council, 2019). Journals found in these lists that were not already included in Ulrich's data were added to the data set.

Finding and identifying Australian journals

As the study concerns Australian journals, and there is no existing list of such journals, a method was needed to find potentially Australian journals within the various data sources described above and then to verify whether each journal is indeed Australian.

There are two approaches for finding journals that might potentially be Australian in databases. The first is to search for journals with Australia as the country/location of publisher. The second is to search for journals with words such as 'Australia(n)' in their titles. Both approaches have their limitations. Some Australian journals do not necessarily use 'Australia(n)' in their titles (e.g., *Eras*). There are also a few non-Australian journals (especially predatory journals) that use Australia(n) in their title. Location of publication can also be misleading, especially for journals published by international commercial publishers. Some Australian learned societies have their journals published by international publishers such as Wiley-Blackwell or Springer-Nature. There are also discrepancies in databases in terms of how the Country of Publication is recorded. For example, the *Journal of the Australian Library and Information Association* is published by Taylor & Francis. The country of publisher is recorded as Australia in WoS. However, in Scopus, the location is recorded as the United Kingdom because the office of the publisher is based in the United Kingdom. Another problem is that the location of publisher for some non-Australian journals is recorded as Australia. This is particularly the case for some Asian and Asia-Pacific journals that are published by the regional branch of international publishers. For instance, *Japanese Psychological Research* is published by 'Wiley-Blackwell Publishing Asia' and therefore, its country of publisher in Ulrich's is recorded as Australia. Due to the above-mentioned limitations, both approaches (title and location) were used to generate a more comprehensive list of potentially Australian journals.

Journals in the resulting list were then subjected to a verification process. To determine whether a journal was Australian, we needed to verify that it either belonged to or was affiliated with an Australian entity (i.e., university, institution, publisher, etc.). Information about institutional affiliation is recorded as 'Corporate Author' in the data field 'Publisher & Ordering Details' in Ulrich's database. One cannot search for a specific corporate author in Ulrich's, but it can be viewed or exported as part of each record. Corporate Author in Ulrich's is defined as an organization or body that sponsors the editorial content of the journal, and in many cases, corporate authors are owners of the journals. For instance, the Corporate Author of *The Australian Journal of Anthropology* is the Australian Anthropological Society and its publisher is Wiley-Blackwell Publishing Asia. Therefore, when available, corporate author was used to determine if a journal should be considered as an Australian journal. Scopus, WoS and DOAJ do not have information about corporate author. Therefore, in the case of journals retrieved from these databases and the journals from Ulrich's that did not have information about corporate author, the journals' websites were consulted to determine a corporate author. The only exception was 17 journals

published by international commercial publishers (Taylor & Francis and LexisNexis) that had no Australian corporate author but had a focus on Australia and serve the Australian scholarly community and therefore, we decided to keep those journals in the set. The final dataset is freely available on Figshare (Jamali, 2022).

The procedure

In summary, to collect and analyse the data the following procedure was followed:

1. Searches were conducted in Ulrich's for all Active English Peer-reviewed Scholarly/Academic journals with Australia as Country of Publisher and all journals with any of the following words in title: Australia, Australian, Australasia, Australasian, Asia Pacific, Asia-Pacific, Asian Pacific and Oceania. This search resulted in 810 unique journals.
2. Searches were conducted in the 2018 ERA list, DOAJ, WoS and Scopus for journals with the above geographic terms in titles and journals with Australia as country of publisher (country was only available in WoS, Scopus and DOAJ), which resulted in the discovery of an additional 278 titles. These two steps generated a total of 1088 journals.
3. Besides information obtained from Ulrich's, journals' websites were consulted to determine whether a journal was Australian (as explained in the section above) and whether it was still active. This resulted in the removal of 184 journals that had been listed as 'active' journals in Ulrich's but were found to have ceased publication; 158 of these were judged to be Australian journals. From the remaining 904 journals, 651 journals were identified as Australians and the rest (253) were identified as non-Australian. Journals that were published by Australian entities but specifically had a non-Australian corporate author were removed from the set. This is because in those cases the Australian entity simply provides a publishing service to a non-Australian journal. There were only a few such journals including one journal published by CSIRO for the University of South Pacific in Fiji.

For each journal, the following information was recorded and reported here:

- Start year, as recorded in Ulrich's or determined by consulting the journal website.
- Type of corporate author using the following six categories. These categories are adapted from those used by Tenopir and King (1997) for the American journals and Navas-Fernández et al. (2018) for Spanish journals.:

1. Commercial International, used for large international commercial publishers (e.g., Wiley-Blackwell, Springer-Nature, Routledge, Sage, Elsevier).

2. Commercial small, used usually for smaller publishers, mostly Australian-based publishers.
3. Government, includes Commonwealth Scientific and Industrial Research Organization (CSIRO) which is an Australian Government agency responsible for scientific research.
4. Non-profit organizations, including societies, associations, networks, academies and so on.
5. Educational, including universities and other educational institutions.
6. Other, including stand-alone individual journals such as amsj.org.

- Type of publisher. The same categories listed for corporate author was used, except that a category was added for situations when the corporate author was also the publisher. This category is named 'self-publish'.
- Inclusion in databases including Scopus, WoS and ERA 2018 journal list. To check if a journal was in any of these three lists, their titles or ISSNs (when available) from our list were cross-referenced with lists generated in Scopus, WoS and ERA.
- OA status. This was done by checking the journals' inclusion in DOAJ list and consulting their website for information about their public availability or financial business model (OA, subscription, etc.).
- Subject area based on the Australian and New Zealand Standard Research Classification (ANZSRC) (Australian Government, 2008). ANZSRC includes a list of hierarchical Field of Research (FoR) Codes. ERA 2018 list included such codes for each journal (up to three FoR codes for each journal). For journals that were not in ERA list and therefore, had no FoR codes, we determined their FoR codes based on their subject coverage, if necessary more than one FoR code.

FINDINGS

We found 651 journals that were active at the time of data collection (September–October 2021). Some of these journals were established more than a century ago (Fig. 1), with the oldest

TABLE 1 Types of corporate authors of journals

Corporate author type	Number of journals	Percentage
Non-profit organizations	364	55.9
Educational institutions	168	25.8
Small commercial publisher	48	7.4
Government	32	4.9
Other	22	3.4
International commercial publisher	17	2.6
Grand total	651	100

journals being those of Royal Societies (e.g., Royal Societies of Tasmania and Victoria). However, most of the journals started after the Second World War. The 1990s was the peak of establishing new journals with 129 new journals and the year 1993 was the top year, with 17 new journals. Two hundred and four journals had the words 'Australia' or 'Australian' and another 57 had 'Australasian' or 'Australasia' in their titles.

Publishers and owners of Australian journals

More than half of the journals (364 journals, 55.9%) belong to or are affiliated with non-profit organizations, which includes learned societies and professional associations (see Table 1). Some 107 of these organizations had the word 'society' and another 136 had the word 'association' in their names. Journals associated with educational institutions (typically universities) were the second largest group with 168 journals (25.8%). The Government category included CSIRO which is the biggest single non-commercial journal publisher in Australia publishing 26 Australian journals. The 'Other' category included entities or journals that could not be categorized in any other category, such as stand-alone journals (e.g., *Australian Medical Student Journal*).

The majority of journals are self-published, that is, they are published by their corporate authors (426 journals, 65.4%). However, as Table 2 shows, some journals outsource their publishing to a publisher or another institution. International commercial publishers provide publishing services to 162 (24.9%) Australian journals, of which 141 are journals from non-profit organizations (mostly learned societies) and another 21 are journals from the educational sector. This supports the results of a recent survey of learned societies, which found that self-publishing was less common than outsourcing (Wise & Estelle, 2020). A few large publishers are very active in Australian journal publishing. Taylor & Francis publishes the largest number of journals (75 journals, 11.5%), followed by Wiley-Blackwell with 54 (8.3%), Elsevier, SAGE and LexisNexis with 13 each (2%), and Springer with 10 journals (1.5%). We could not determine the country of publisher for all journals and as explained in the method section, there could be variation depending on which database is the source of information. However, based on the information we had, at least 88% of journals published in Australia.

Coverage of Australian journals in citation indexes

The inclusion of journals in lists and indexes that are used for research evaluation purposes is important both for journals and for researchers. It can affect the number of submissions, editorial policy and scope of the journal, and authorship profile. In Australia, Scopus and a ranking system based on it (Scimago) are used by many universities to measure and evaluate the research impact. The ERA list is also important as in the last round of ERA in 2018, only articles published in the journals listed in the ERA list were eligible for submission by universities. The Venn diagram (Fig. 2) shows the inclusion of journals in the three lists and

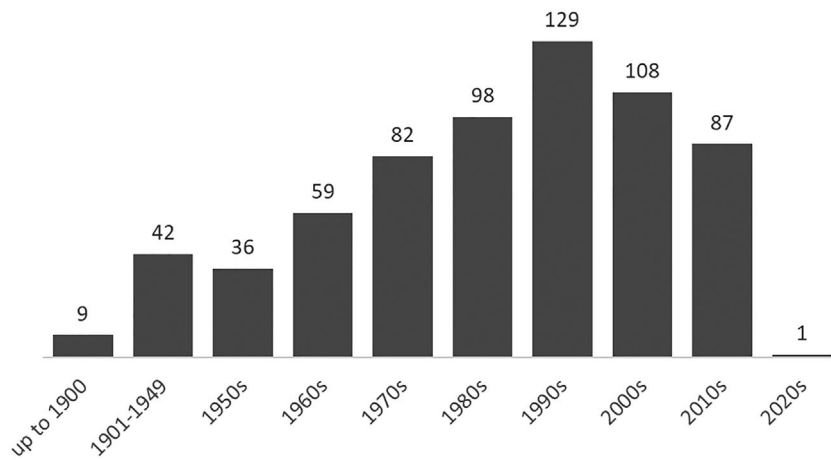


FIGURE 1 Number of journals launched each year from 1800 to mid-2021.

TABLE 2 Distribution of Australian journals by type of publisher and type of corporate author

Corporate author ↓	Self-publish	International commercial publisher	Educational institution	Small commercial publisher	Government	Total
Non-profit organization	177 (48.6%)	141 (38.7%)	22 (6%)	12 (3.3%)	12 (3.3%)	364
Educational institution	131 (78%)	21 (12.5%)	11 (6.5%)	3 (1.8%)	2 (1.2%)	168
Small commercial publisher	48 (100%)	0	0	0	0	48
Government	32 (100%)	0	0	0	0	32
Other	21 (95%)	0	1 (4.5%)	0	0	22
International commercial publisher	17 (100%)	0	0	0	0	17
Total	426 (65.4%)	162 (24.9%)	34 (5.2%)	15 (2.3%)	14 (2.1%)	651

databases and their overlap. The majority of the Australian journals were included in the ERA list (569), about half (326) were indexed in Scopus and slightly less than half (301) were indexed in WoS. It should be noted that 123 out of 301 journals indexed in WoS were included in its Emerging Sources Citation Index, which has different inclusion criteria and generally is not considered to have the same level of prestige as the other three WoS citation indexes (See Table 3). Moreover, 140 journals indexed in Scopus and WoS are journals published by international commercial publishers.

Disciplinary distribution of Australian journals

The distribution of disciplinary codes across Australian journals is shown in Table 4. Some 194 journals had two FoR codes and another 81 journals had three FoR codes, explaining why the total number of codes (1007) exceeds the number of journals (651). Medical and health sciences is the top field in terms of the number of journals (126). What is notable is the considerable number of journals published in fields related to arts, humanities and social sciences (i.e., fields 13 to 22). These journals appear to play an important role in the dissemination of research relating to

TABLE 3 Number of journals in different Web of Science indexes

Web of Science citation indexes	N	Percentage
Arts and humanities citation index	14	4.7
Emerging sources citation index	123	40.9
Science citation index	80	26.6
Science citation index, and arts and humanities citation index	1	0.3
Science citation index, and social sciences citation index	17	5.6
Social sciences citation index	57	18.9
Social sciences citation index, and arts and humanities citation index	9	3.0
Grand total	301	100

local or national issues. For instance, the *Australian Journal of Political Science* has played a role in increasing the number of articles about Indigenous politics (Simms & Stokes, 2015).

Table 4 also shows the percentage of journals in each field of research that are included in ERA, Scopus and WoS. Journals that

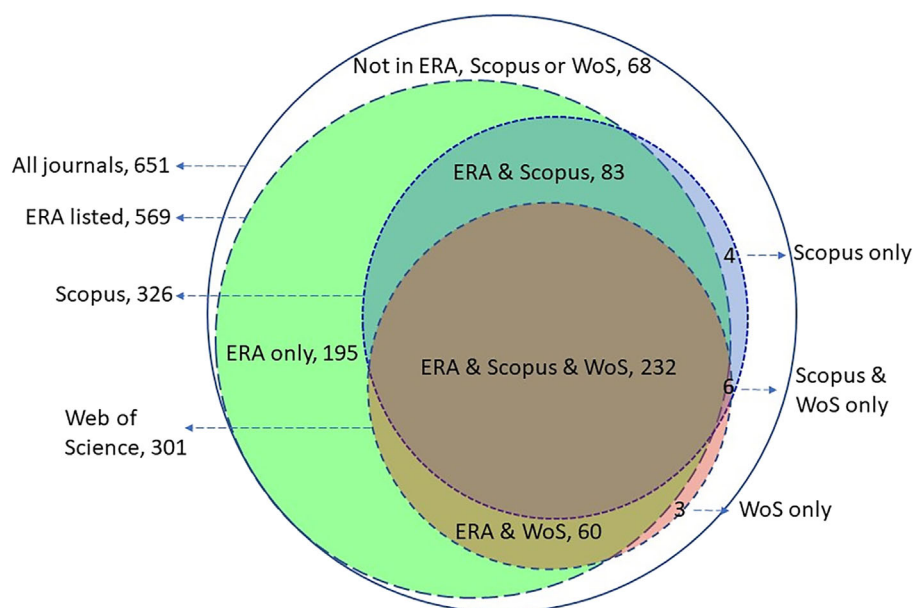


FIGURE 2 Venn diagram of the inclusion of Australian journals in databases.

TABLE 4 Field of research and database inclusion of Australian journals

2-digit FoR code	Number of journals	Percentage in ERA	Percentage in Scopus	Percentage in WoS
01 mathematical sciences	16	100	68.8	62.5
02 physical sciences	11	100	81.8	72.7
03 chemical sciences	11	81.8	72.7	36.4
04 earth sciences	16	87.5	62.5	56.3
05 environmental sciences	46	100	80.4	65.2
06 biological sciences	52	88.5	73.1	48.1
07 agricultural and veterinary sciences	20	75.0	65.0	70.0
08 information and computing sciences	18	94.4	22.2	44.4
09 engineering	20	90.0	85.0	50.0
10 technology	3	100	66.7	0.0
11 medical and health sciences	126	84.1	68.3	63.5
12 built environment and design	11	100	54.5	63.6
13 education	99	94.9	49.5	49.5
14 economics	29	100	69.0	82.8
15 commerce, management, tourism and services	67	94.0	32.8	50.7
16 studies in human society	98	96.9	54.1	59.2
17 psychology and cognitive sciences	27	100	51.9	66.7
18 law and legal studies	69	94.2	21.7	33.3
19 studies in creative arts and writing	61	93.4	44.3	37.7
20 language, communication and culture	82	91.5	36.6	29.3
21 history and archaeology	61	88.5	31.1	24.6
22 philosophy and religious studies	28	85.7	35.7	42.9
MD multidisciplinary	36	69.4	55.6	44.4
Total	1007	91.4	51.6	49.8

were not listed in ERA were mostly medical journals (21 journals from code 11) and humanities and social sciences (37 journals from codes 13 to 22). Scopus' coverage is better in broad areas of life, health and physical sciences (codes 01–11) than in arts, humanities and social sciences (codes 13–22) except for economics and psychology. The same goes for WoS as it has a very low coverage of arts and humanities (history, philosophy, creative arts). In the case of WoS, as mentioned above, almost half of the

Australian journals are in its Emerging Sources (ESCI); 158 out of 205 journal-codes (77%) indexed in ESCI (emerging sources) are from arts, humanities and social sciences disciplines (codes 13–22). The inclusion of journals in these lists and indexes has a mixed impact. Academics might be evaluated based on outputs that are included in these lists, and therefore lack of inclusion would mean that their publications might not receive recognition for evaluation purposes. On the other hand, the inclusion of those journals in Scopus or WoS might affect the editorial policies and orientation of journals in a way that would adversely affect the coverage of local issues.

TABLE 5 Open access status of journals

OA status	N	%
OA, APC	35	5.4
OA, No APC	224	34.4
Embargo (Bronze OA)	11	1.7
Hybrid	194	29.8
Subscription	187	28.8
Total	651	100

Open access status of Australian journals

The open access status of Australian journals is shown in Table 5. About 39.8% of journals (259 journals) were freely available one way or another, either with article processing charges, APC (35, 5.4%) or without (224, 34.4%), out of which 82 (31.7% of OA journals and 12.3% of all journal) were listed in DOAJ. This is aligned with the global DOAJ inclusion figure that indicates about 33% of OA journals are covered in DOAJ (Bruns et al., 2019).

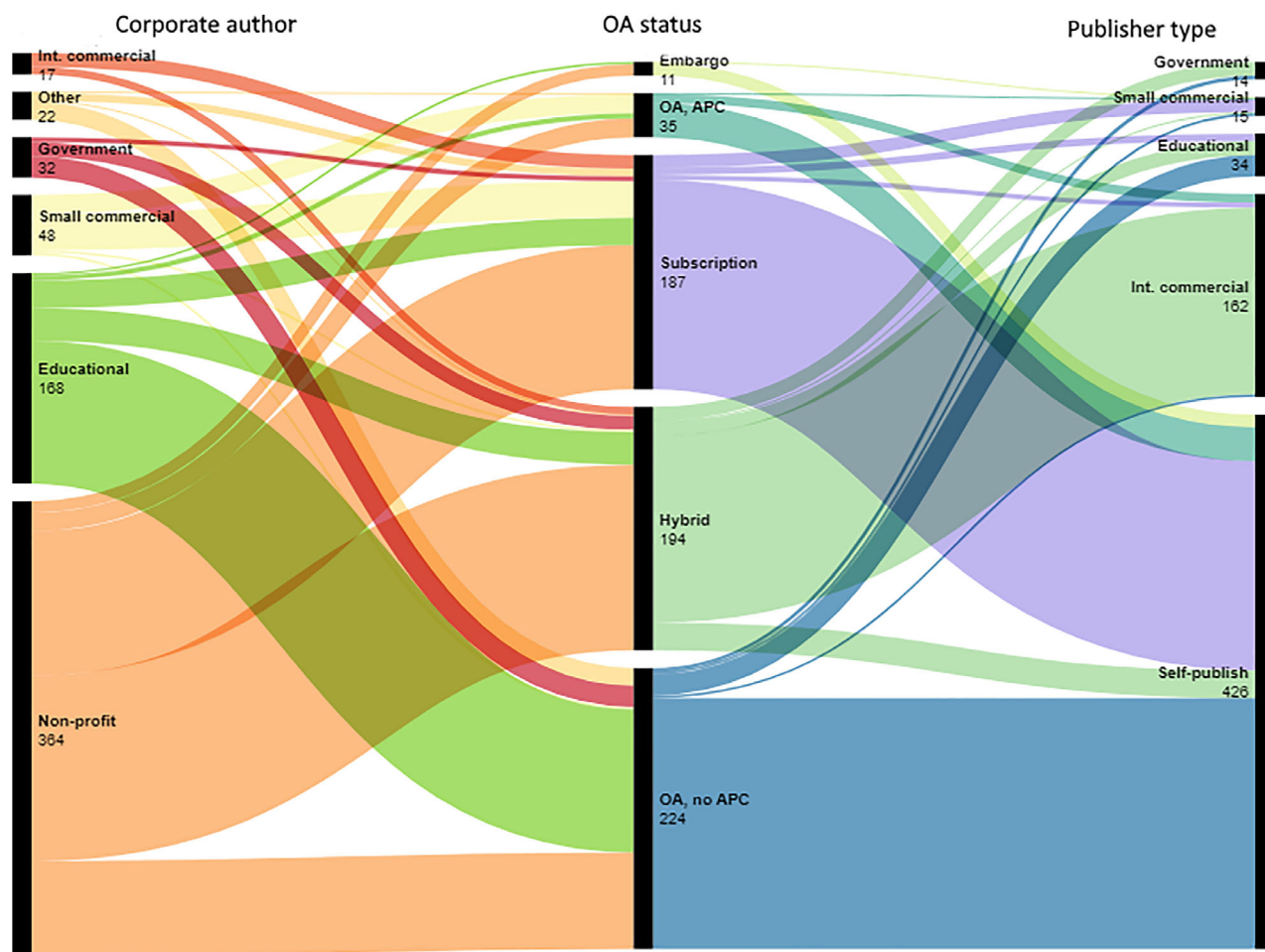


FIGURE 3 OA status by type of corporate authors and publisher.

Forty-two journals stated that they are OA but had no information to determine whether they charge an APC or not. Here we have assumed that the journal does not charge an APC. These were mostly individual journals published using Open Journal System (OJS) which is an open-source software application for journal management. Most of them had had a standard identical statement about OA, which is the default OJS text. Seventeen other journals did not have any information on their site about OA, however, their articles were freely available to the public on their website and they have therefore been categorized as OA. The embargo category describes journals that make their published articles available open access after a certain period. For journals in our study, this period varied between 6 and 24 months. This model is now sometimes described as Bronze OA.

Figure 3 shows how journals are distributed by different corporate authors and publishers. The obvious trend is that the majority of journals published by non-profit organizations are either hybrid or subscription based. This seems to be aligned with a recent survey of learned societies that showed hybrid was a common publishing model among learned societies across different subjects (Wise & Estelle, 2020). This is not surprising as non-profit organizations (societies and associations mostly) do rely on the revenue from their journals for their finance (Johnson et al., 2018). The majority of hybrid journals (150 out of 194) are those published by large international commercial publishers. Most OA journals that do not charge APC belong to educational institutions. This might be because universities, in comparison to learned societies, for instance, are more likely to have resources to financially support the publication of a journal. It might also be partly because financial management of APC payments can be a tricky task for universities.

CONCLUSION

The study identified 651 active Australian journals published mostly by non-profit organizations and the education sector. The journals are distributed in all fields of research and there is a relatively good representation of fields of research related to arts, humanities and social sciences. The journals in these fields are not covered in citation databases as comprehensively as STM journals are. These are also the fields that are more likely to have a national orientation (Hicks, 1999). It would be useful to investigate (using bibliometrics and text analysis techniques) the extent to which Australian journals in these fields focus on local and national issues in their scope and coverage and the extent to which international authors contribute to these journals.

Slightly less than two-fifths (39.8%) of Australian journals are OA and most of them (224 out of 259) do not seem to charge an APC. OA journals belong mostly to educational institutions (118, 45.6%) or non-profit organizations (92, 35.5%). Publishing OA journals without APC means that journals probably rely on funding from their owner or parent body for publication. Funding

this number of OA journals, most of which do not charge APCs, is significant, and it is important to understand how sustainable these journals are, especially in the case of non-profit organizations such as learned societies that have often historically relied on revenues generated from their journals. OA journals not charging APCs might have more dependence on the voluntary work of researchers for their editorial processes, and in the case of educational institutions, they might rely on the financial support of the institutions. This raises the question of the impact of situations such as economic austerity or pandemics (when jobs are lost, and universities take every measure to cut costs) on the publication of journals. Publication of about a quarter of journals has been outsourced to international commercial publishers, and many of these journals have adopted a hybrid model of publications. Little is available in the public domain to guide non-profit organizations or educational institutions in their negotiation with publishers for outsourcing their publishing processes, or for adopting a business model such as hybrid. A few academic papers on the topic such as Ware (2007) might be already outdated given rapid changes in the scholarly communication landscape. In light of recent discussions and recommended strategies for how learned societies can transition to OA publishing (Wise & Estelle, 2020), further investigation is needed to look at the willingness of learned societies in Australia to adopt such strategies and the feasibility of such strategies for them.

The results presented here form part of a larger project which also identified journals that had ceased publishing (Jamali et al., 2022), and the large number we discovered (158) is alarming, especially as our study of 140 of these journals and a survey of their editors showed that funding was a key factor in their discontinuation. The survey also found that not all journals had a plan for the conservation of their content, some discontinued journals' content might not be accessible and some discontinued journals are only available through services such as web archiving services that are not optimal for use of scholarly content. Long-term conservation is an issue, especially as a recent study (Laakso et al., 2021) found 174 OA journals that, through lack of comprehensive and open archives, vanished from the web. The other issue about the long-term sustainability of journals is the impact of the COVID-19 pandemic on journal publishing. Many journals had statements on their site acknowledging the challenges the pandemic has caused for authors and journal editorial processes (delayed peer-review and so on). However, for some journals the impact appears to have been more significant, resulting in them no longer accepting new submissions (e.g., *Journal of New Business Ideas & Trends*) or stopping the publication altogether (e.g., *Flinders Law Journal*). The impact of COVID-19 in the publication of journals, especially those published by learned societies and universities that rely more on voluntary work merits further investigation. It was estimated that one in five jobs (about 40,000) in Australian higher education was lost during the pandemic (Littleton & Stanford, 2021) and surely this will impact journals that relied on the academics who lost their jobs for editorial and review processes. While there has been some discussion on the impact of COVID-19 on scholarly

publishing (e.g., Miller & Tsai, 2020), such discussion focuses on research productivity or open access. The impact on journal publishing, especially outside the commercial sector, has not been investigated.

Finally, the size of journals is another factor in their sustainability. In this study, we did not consider the size of journals, each title was considered as one. Some journals publish only a dozen articles a year and some publish more than a hundred articles. The resources required to sustain a large journal are much greater than for a small journal. The impact (in the sense of influence on its field) of a big journal is also likely to be more significant. These matters in turn affect the business model adopted to manage the journal.

LIMITATIONS AND FUTURE RESEARCH

The study had some limitations in terms of data. We relied on Ulrich's and a few other databases and queries for words in titles and country of publisher. No database is comprehensive and the data about the country of publisher in databases can have inaccuracies as explained in the method. Therefore, there might be still a few more Australian journals that we did not find to include in this study. The fact that we found 158 journals that were listed as active journals in Ulrich's but were not active anymore is an indication that at least the currency of the data need to be checked. In this case, we manually checked most of the journals by looking at the information on their site. As mentioned, this article represents the first in a series of studies on Australian scholarly journal publishing.

Our future research will aim to better understand the strengths, challenges and risks of journal publishing in Australia and help increase its sustainability. For this, we will survey and interview editors and publishers. A bibliometric study of journal articles and a survey of international authors publishing in Australian journals will be undertaken to understand the authorship profile of Australian journals and how these journals are perceived by international authors.

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Hamid R. Jamali: Conceptualization, Data curation, Formal analysis; Hamid R. Jamali, Simon Wakeling and Alireza Abbasi: Methodology, writing – original draft preparation, writing – review and editing.

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