

Chapter 1

Access to Knowledge: Academic Publishing

This chapter examines social, technical, and political developments in academic publishing to demonstrate how a ‘closed’ system of publishing evolved that excludes many people from accessing scholarly texts. Publishing practices within academia help to determine who has access to knowledge and how that access is mediated. The process of making printed works available has traditionally been mediated by publishers, who continue to fulfil this role despite the shift from print to digital formats and other technological developments that have changed the ways in which information is shared, as discussed below. The commercialisation¹ of the publishing industry has played an important role in the transformation of publishing practices. The ties between academic labour, publishing practices, and career progression are shown to be key factors determining the ways in which the academic publishing system has been constructed. Critics of the direction academic publishing has taken propose the idea of open access publishing as an alternative.²

Before progressing any further, a few definitions are needed to give clarity to the discussion. The term *scholarly communication* is an umbrella term encompassing a wide range of activities; the Association of College & Research Libraries (ACRL) defines it as “the system through which research and other scholarly writings are created, evaluated for quality, disseminated to the scholarly community, and preserved for future use” (Association of College & Research Libraries 2003). This definition is useful because it excludes the more ephemeral and private forms of communication between scholars, such as written letters or emails between individuals, and concentrates on those forms which are typically made available by academic publishers and collected by academic libraries. On the other hand, it still leaves a great deal of ambiguity as to exactly what ‘counts’ when we are talking about scholarly communication – for example, a presentation of research at a conference may be a public performance that communicates verbally to a small number of people, or it may also be written down, disseminated in a journal or collection of conference papers, and preserved in an archive. Since the ACRL is a library association perhaps it is not surprising that its definition is geared towards the kind of research objects that are usually collected by libraries – namely, published texts in the form of books and journal articles.

In attempting to define one term, the preceding paragraph has used a number of other terms which themselves need clarifying. Even the term *publishing*³ is not straightforward. Bhaskar’s theory of publishing, for instance, goes beyond the surface notion of ‘making public’ – which

1 [define]

2 [This paragraph is intended as a kind of abstract for the chapter but it needs re-writing.]

3 [sentence or two here on historical approaches to publishing?]

in the web era no longer needs specialist intermediaries – and narrows it down to a core group of activities: filtering, framing, and amplification (Bhaskar 2013: 103–136). The filtering or selection of content, and the amplification of that content in order to find a public audience, are functions that would be familiar to a contemporary journal publisher (see Morris et al. 2013: 2–4).⁴ As to the *content*, i.e. what it is that is being published, for the purposes of this chapter the term *research* will be used to refer to the content of the written texts that are published.⁵ In the terminology of research assessment,⁶ texts that are written by researchers and published by professional publishers as books or journal articles are often referred to as *research outputs* (see REF 2011: 13). Since the results that researchers generate in their work take many forms, a wide variety of research objects can be considered as research outputs, such as data, software, or the creative outputs of arts disciplines. In this chapter, the main object of discussion is *research that is published in the form of books or journal articles*. For most academic disciplines⁷ these published texts are the primary research outputs, and are of central importance to both the economy of prestige that governs academic careers (see below) and also the political and economic aspects of scholarly communication that come to the fore in discussions about open access.

Even within the narrow scope of academic book and journal publishing, this is still a fairly heterogeneous area. Book publishing alone can be regarded as having multiple differentiated fields (Thompson 2005: 37–40), such as *academic book publishing*, which is primarily concerned with monographs (though edited collections also fall into this category), and *textbook or educational book publishing*. There can be significant overlap between different areas of book publishing, and other categories such as trade publishing – featuring accessible writing for a non-specialist audience – are also important for some areas of scholarship, particularly in humanities disciplines such as history; further categories such as reference, legal, and professional publishing also play a vital role for higher education and research. However, since the focus of this thesis is on access to research, this chapter will largely be restricted to discussing academic book and journal publishing because they are the primary venues for original research.

The beginning of academic journal publishing

The ‘Republic of Letters’ is the term historians use to refer to the way scholars in the early modern period corresponded by letter to exchange knowledge; an intellectual community was formed by this network of individual written documents (Goodman 1996: 136–138), although in-person interactions also remained crucial for forming these networks and establishing trust

4 [Has the meaning of ‘published’ changed over time?]

5 The term *scholarship* is sometimes used as a synonym for research, and so the terms *academic publishing* and *scholarly publishing* are used interchangeably. But since some universities define scholarship as ‘keeping up with the literature’ and ‘research’ as the writing of it, in this chapter the terms ‘research’ and ‘academic publishing’ are used throughout.

6 [by whom? In which country, at which time?]

7 With important exceptions such as conference papers in computer science and the practice-based outputs of arts disciplines.

(Lux and Cook 1998). The change from one-to-one communications into a more public method of exchanging ideas was formalised with the invention of the academic journal.⁸ *Journal des Sçavans* and *Philosophical Transactions of the Royal Society*, both first published in 1665 (Fyfe, McDougall-Waters, and Moxham 2015; Gross, Harmon, and Reidy 2002: vii, 31; Kronick 1976: v), allowed scholars to exchange ideas and, in particular, the results of scientific experiments. Since scholarly publishing has always been reliant on the printing technologies of its time, the production of these first journals was a labour-intensive process:

Periodicals had been typeset by hand, printed on hand-presses on hand-made paper, and folded and stitched by hand. During the nineteenth century all of these processes were mechanized, and the unit costs of paper, printing and, eventually, typesetting fell. During the same period, the reproduction of images was transformed by innovations, from lithography to photography.

(Fyfe, McDougall-Waters, and Moxham 2015)⁹

So the political-economic changes affecting the rest of society throughout the period of industrialisation had significant impact on the production of scholarly texts. Business models for funding publication also saw some experimentation: the first commercially published scientific journal, *Observations sur la physique, sur l’histoire naturelle et sur les arts*, was founded in France in 1771 by François Rozier. After ‘observing the way scientific communication was passing from the reading of books by individuals to the giving of papers by scientific society members’, Rozier was able to successfully make a profit by offering monthly subscriptions to a journal that reported on the latest scientific developments to anyone willing and able to pay the price, rather than only to society members (Brock and Meadows 1998: 89–90).

Throughout the nineteenth century a growing number of scientific periodicals were published, containing original research papers, general scientific news, and reports from scholarly societies, including translations from other European journals. By one estimate, in Britain almost two-thirds of these journals were published commercially (Brock 1980: 95), but this claim may be a result of the slippery distinction between ‘publisher’ and ‘printer’ (see Bhaskar 2013: 23–24) because it does not align with most histories of this period. For example, Baldwin states that in the late nineteenth-century ‘most scientific journals were affiliated with a scientific society’ (Baldwin 2015: 37; see also Cox 2002: 273), and, according to a history of Taylor & Francis, prior to the Second World War the firm had ‘been unusual in publishing a leading science journal commercially’ (Brock & Meadows 1998: 193). The fact that learned society journals were usually *printed* by separate commercial

8 Although, printed books had been around for over 200 year by this point, following the introduction of printing to Europe in the fifteenth century based on technologies originating in ancient China (Bhaskar 2013: 121–125; Johns 1998: 329–330) ...

9 [clearly signpost that commercial processes were already involved – the later commercialisation did not appear from nowhere]

firms,¹⁰ at a time when the businesses of printing and publishing were less distinct than they are today, could account for the ambiguity around the extent of commercial publishing in the nineteenth century.

Structural and financial developments in academic publishing often follow social changes within academic culture. (An example of how intertwined the social circles of people involved in universities, scholarly societies, and publishers/printers were in nineteenth century London is that Richard Taylor, founder of Taylor & Francis, was the printer for both the Royal Society, of which his brother was a member, and the newly-formed University of London, where he was a council member and treasurer (Brock and Meadows 1998: 44–58).) The growth of discipline-specific journals correlates to birth of disciplines¹¹ themselves; as researchers organised themselves into more narrowly-defined groups, they launched publications to host their work. This can be seen clearly in the US, where journal publishing boomed in the final quarter of the nineteenth century with a spate of discipline-specific journals published by those universities that had become oriented towards producing original research (Geiger 2015: 330–332).

In the nineteenth century, as science was evolving into a more professionalised endeavour with proliferating specialisms, scholarly journals played an important role as a public site for the exchange of ideas and the presentation of scientific knowledge to the wider world. Baldwin argues that journals such as *Nature* (launched in 1869) fulfilled this role ‘with the added benefit of making letters and observations available to many readers at the same time [...] a forum where individuals interested in the advancement of scientific knowledge could talk to one another and discuss the intellectual and social issues affecting scientific work’ (Baldwin 2015: 8). In a sense, this function was similar to the idea of the older ‘republic of letters’ but enhanced and made into a more public process by then-modern technologies and publishing practices. The speed of publication was also important, with prominent scientists sending letters and abstracts to the multidisciplinary *Nature* more regularly than original research articles, in order to ensure rapid dissemination and to claim priority for their ideas (Baldwin 2015: 53–55, 64–65; Baldwin 2015a).

[Emerging in Germany in the early nineteenth century, the Humboltian notion of scientific research had long been resisted in the ancient English universities. But by the 1880s this was beginning to change. The rise of the chemical and electrical industries in Britain had created a demand for scientific innovation and educated labour. Aware of Germany’s growing industrial might, British politicians and men of business called upon universities to style themselves more closely after German institutions. The increasing complexity of all the disciplines meant they were no longer as accessible to the amateur or dilettante as they previously had been; laboratories, publications, specialised knowledge, equipment and skills were all

10 [M.E.: Parallel with current print-on-demand stuff? I also think of the museum of old printing presses at Cambridge UP from when they did it in-house.]

11 [See Sam Weber, *Institution and Interpretation*]

becoming more and more important. Not only did science no longer require investments that only large organisations such as universities could afford, but the changing politics of knowledge meant that these were investments that universities could not afford to neglect. (Pietsch 2013: 29)]

In the late-nineteenth and early-twentieth centuries science became more professionalised,¹² as the growth in the university sector (see Chapter 2) allowed an increasing number of scientists to be employed on a full-time basis rather than conducting their research as a personal interest alongside other work (Fyfe et al. 2017). At the same time, scientific research was internationalised, including aspects of scholarly communication such as international conferences (see Crawford 1992: 35–41). Despite this more outward-looking professional environment, Baldwin has asserted that researchers during this period tended to focus their publication strategies in a national context and submit work primarily to the most prominent journals in their home nation (Baldwin 2015: 121). This was made easier in the settler colonies (see Chapter 2, Note [19]) by the foundation of journals and societies dedicated to local and regional research, ‘functioning as crucial sites for the construction of colonial identity among the growing middle classes’ (Pietsch 2013: 24; see also Dubow 2006: 35–78). By the 1930s, on the other hand, the contributors to *Nature* had become highly geographically diverse (Baldwin 2015: 131) – although the extent to which this is representative of other journals is unclear – thus facilitating communication of the results of research beyond the country in which it was undertaken.¹³ These national and international publication strategies of scientists were not necessarily replicated by researchers working in other areas; much work in the humanities is focused on more local culture¹⁴ so it is more likely to appear in publications devoted to particular localities, and to be written in the languages of those localities.

So by the beginning of the twentieth century, academic journals held an established role in the culture of research, and the business of publishing them was a mature one with a mixed ecology of commercial and non-commercial interests. The following section shows how the increased political attention towards the results of research led to a change in the balance between these interests.

12 [M.E.: One of the most recurrent tropes that I think could benefit from more attention is your assertions about the professionalisation of science/academia. In the first place, I think this needs more background sourcing on where and how this happened. Beyond that, though, I wondered whether all disciplines changed at the same time/rate and for the same reasons. I suspect not... For instance, Ted Underwood has done quite a bit on the history of the discipline of English and the way it professionalised itself to avoid the encroaching threat to its existence (in his *Why Literary Periods Mattered*). On the other hand, though, the reasons that scientific disciplines professionalised seems less to do with legitimation and more about the need for a division of labour in an increasingly niche set of investigative areas. Kuhn’s paradigm of “normal science” seems to have a lot to do with this, arguing that it is through the accumulation of knowledge in discrete areas, as opposed to in monumental leaps, that we progress.]

13 Pietsch has shown how ‘personal networks were [...] crucial to bringing settler research to publication in Britain’, as prior to ‘the advent of airmail in the late 1930s’ contacts in Britain helped researchers in Australia, New Zealand, and Canada with the publication process at British journals (Pietsch 2013: 112–113).

14 [citation(s) needed]

Post-war commercialisation

There was a rapid expansion of journal publishing after the Second World War, driven by US government spending on military research and development during the cold war (Cox 2002: 273; Morris et al. 2013: 9; Oreskes 2014: 18–22; Wolfe 2013: 21–27). For-profit publishers only started to play a major role in scholarly journal publishing from the 1950s onwards, to meet the demand generated by increased funding for research and the concurrent rise in number of published articles. Robert Maxwell's Pergamon Press played a key role in the commercialisation of academic journal publishing (Cox 2002). As well as founding their own new journals, commercial publishers also took on publishing duties on behalf of many scholarly societies (see Fyfe, McDougall-Waters, and Moxham 2015), deepening their existing relationships (see above). The increasing influence of commercial firms was met with some scepticism:

The new journals often filled genuine gaps in the literature, for the learned societies were slow to cater for new specialities as they arose. New societies were formed, but usually only after the speciality had established itself. In the meantime, a commercial publisher could step in and produce an appropriate journal. Despite this advantage, suspicion of commercial journals died hard. Many scientists feared that they lowered standards, were not really essential, and cost too much. In consequence, from 1950 onwards scientists, paradoxically, assisted in the foundation of commercial journals while continuing to worry about the consequences.

(Brock and Meadows 1998: 193)

The commercialisation of academic publishing corresponded with an increasing concentration in the market. It is typical for a media or communications industry to move towards a situation whereby a handful of commercial entities dominate the market (see Wu 2010), and as Thompson states regarding book publishing in general:

Since the 1970s the book publishing industry has been the focus of intensive merger and acquisitions activity, and the structures of ownership and control in some sectors of the industry now bear little resemblance to the world of publishing that existed forty or fifty years ago. Today a handful of large conglomerates, many operating in an international and increasingly global arena, wield enormous power in the publishing world and harbour a growing number of formerly independent imprints under their corporate umbrellas.

(Thomson 2005: 2)

Thompson argues that *academic* book publishing has not seen such marked concentration¹⁵

¹⁵ Educational textbook and professional publishing *has* seen greater concentration (Thompson 2005: 60), but that is a different publishing field.

due to the important role of university presses (Thomson 2005: 8, 61). These organisations are usually a formal part of the university, and so share in the parent institution's scholarly focus – although this is not always reflected in legal structures; Oxford University Press was only granted tax-exempt status due to a charitable mission in 1976 (Bhaskar 2013: 150). University presses form a diverse group which are numerous in the US but rarer in the UK, where Cambridge University Press, founded in the 1580s (McKitterick 1992: 4), and Oxford University Press, founded in the mid seventeenth century (Peacey 2013): 51–77), are vastly larger than any others.¹⁶ In academic *journal* publishing, however, the market concentration has been particularly extreme with four large corporations – Elsevier, Wiley, Springer, and Taylor & Francis – taking over 50% of the market share, increasing to over 70% in some subject areas (Larivière, Haustein, and Mongeon 2015). In some disciplines, Elsevier's share alone may account for over 40% of published journal articles.¹⁷ This oligopoly formed after a period of mergers and acquisitions accelerating from the late 1990s onwards (Larivière, Haustein, and Mongeon 2015), coinciding with the transition to online digital publication.¹⁸ And the process of consolidation continues – in 2015, Springer and Nature Publishing Group merged to form Springer-Nature. Competition authorities in the UK and EU have both expressed interest in the academic publishing market (see European Commission 2006; Office of Fair Trading 2002) but have so far not taken any action to counter publishers' activities.

The relationship between academia and commercial interests may have always been closer than some would like to admit, but the changes seen in the past few decades – a time period which correlates with the rise of neoliberalism (see Chapter 4) – have deepened the ties in ways which are now extremely difficult to untangle.

The changed nature of publishers' mission, from that of scholarly partner to profit-driven service provider, has implications for how publishers think about the level of access that should be granted to their works. The affordances created by the possibilities of open online dissemination of research can appear as a threat rather than an opportunity to organisations that are required to maximise return on investment. (The ways in which publishers are currently engaging with web-based dissemination, such as open access funding models, is discussed further in other chapters.) In the case of academic book publishing, Thompson (2005: 7–8, 45–46, 174–180, 280–285) argues that the higher education sector and academic publishing sector are subject to different internal logics which are sometimes in tension – the symbolic economy of prestige within academia (see below) is very different to the commercial interests that govern much of publishing.

16 A number of new open access university presses have been founded in the UK in the past few years (Keene et al. 2016), so although in terms of output the two ancient universities still dominate, the landscape is becoming more diverse.

17 [figure from competition inquiry]

18 [more on 1990-2000s historical context]

Academia's prestige economy¹⁹

Academia has been described as a *prestige economy*, in which certain markers of esteem fulfil an economic function as symbolic capital (Bourdieu 1977, 1988; Eve 2014: 43–55).

Publishing is a pivotal aspect of this prestige economy – the prestige accrued by researchers through publishing in particular venues (see Eve 2014 44–47; Thompson 2005: 83) is fundamental for building a career in academia. For this reason, although contemporary researchers regard the role of publishers in *disseminating* works as important (Wolff-Eisenberg, Rod & Schonfeld 2016, 2016a), it is the *accreditation* function of publishing that to a large extent determines how and where researchers publish their work.

The uses of media, whether they are print or electronic, are bound up with social practices (Thompson 2005: 326). Trends in publishing tend to follow, or co-develop with, trends in the wider research community – for example, the internationalisation of science is what led to international journals, rather than the other way round (see Baldwin 2015: 198). So any technological developments cannot be understood separately from the social context in which they exist.

For academic publishing, this means that the accreditation function of publishing for academic careers remains a key determinant of the ways in which new technologies are used. In other words, the ‘gatekeeping’ function of publishing, whereby under conditions of scarcity the brand of a journal title or publishing house confers prestige on authors to use as symbolic capital in their career development, is by no means automatically reduced by the shift to online publishing. The political sociologist Horowitz recognised this fact even in the pre-web digital era of the late 1980s (Horowitz 1990: 22, 162–168) and the need to publish in particular venues appears to be as strong today as ever. Academic publishing in its current form is therefore intrinsically linked with academic labour. Not only is published content the product of academics’ labour, but the system of accreditation conferred through the proxy of publisher brands is used to outsource hiring decisions within the higher education workplace, by delegating the evaluation of the ‘quality’ of research to two (usually) unknown peer reviewers at a journal rather than being undertaken by those doing the hiring. [Smith 2013; Waters 2001]²⁰

As mentioned above, the symbolic logic of prestige within academia is in tension with the dominant commercial practices of publishers.²¹ In the humanities, academics continue to rely on publishing monographs in order to secure tenure and promotion (Maxwell, Bordini & Shamash 2017), but these are not profitable enough for many commercial publishers so they have shifted their focus away from monographs and towards other kinds of books such as textbooks (Thompson 2005: 166). This ‘monograph crisis’, in which humanities researchers

19 [This section needs work. I still need to read Bourdieu.]

20 [more on academic labour needed – precarity, casualisation of staff in US and UK...]

21 The tension between these logics has occurred despite the fact that both sectors became increasingly marketised throughout the later twentieth century (see Chapter 5 on the marketisation of higher education).

are chasing...

Barriers to accessing scholarly texts

In this chapter, the evolution of academic publishing from the twentieth century onwards has been shown to have undergone a commercialisation which has led to publishers pursuing different goals to the researchers whose work they publish. As a result of the complex interplay of researchers' career needs and publishers' financial imperatives (see Fyfe et al. 2017), there is now a situation whereby actually making research available to as many potential readers as possible is not always at the top of the agenda for either publishers or researchers. In this section some of the barriers to accessing research are highlighted, before moving on the final section of the chapter in which the ability (or otherwise) of academic libraries to provide access to research is considered.

The first barrier to consider is language. The history of publishing outlined in this chapter – as with so much of the work in this thesis – is almost entirely based in Western Europe, with a shift in emphasis towards the US in the mid-twentieth century. This is partly due to the central focus of the thesis on the UK's open access policy; partly due to the biases in global research cultures which reflect power imbalances along colonial lines, resulting in the world's largest publishers – and purchasers – of scholarly publications being based in Western Europe and North America; and partly due to the dominance of the English language as the 'international language' of scholarship.²² Prior to the twentieth century, French and German had at least equal prominence in Western European scholarship, but by the early decades of the twentieth century English had supplanted all other languages (Ammon & McConnell 2002; Crystal 1997: 63) and now the term 'international journal' is largely a euphemism for an English-language journal based in Europe or North America.

Another way in which language affects the ability of the general public – or perhaps it would be more accurate to refer to multiple non-academic *publics* – to access research is through writing style. The style and presentation of scientific articles has evolved significantly over the past 350 years,²³ and not only in correlation with the general changes that occur in

22 Access to research publications has been subject to political restriction at various times and places, such as under the Nazi and Soviet regimes (Baldwin 2015: 137–142, 189–192). In the mid-twentieth century this resulted in a 'cold war publishing divide' between Western and Soviet states which publishers such as Pergamon helped to bridge by translating Russian research. 'In effect, university presses and other academic publishers were being subsidized indirectly by a federal government which saw the expansion of higher education as part of its Cold War strategy' (Thompson 2005: 181).

23 There is not space in this thesis to discuss at length the changes in the *form* of journal articles through time, but a few notes on this history can provide some context. Although early journals share some characteristics with the contemporary academic journal, both the form and content has changed significantly over the centuries. In a sense, the contemporary form of a journal article is 'the outcome of the long evolution of a form that emerged during the late seventeenth and early eighteenth centuries' (Holmes 1989: 165), although it subsequently continued to evolve. This can be seen in the standardisation of form and increasingly impersonal writing style that accompanied the professionalisation of scientific research around the turn of the twentieth century (Gross, Harmon, and Reidy 2002: 118). In long-running journals such as the *Philosophical Transactions* we can see the slow evolution of many aspects of publishing that are taken for

language over time: scientific writing has become more technical, ‘designed to convey information of great cognitive complexity from expert to expert’ (Gross, Harmon, and Reidy 2002: 9). The complexity of language in scientific articles appears to be continually increasing (Plavén-Sigray et al. 2017). Writing in the humanities disciplines is often of a highly technical nature as well, with choices of terminology and syntax rendering arguments opaque to non-expert readers. Although across much of the world a fairly high proportion of the population has at least some training in understanding research writing, particularly since the boom in higher education attendance in recent decades (see Chapter 2), this training tends to be discipline-specific and the highly specialised nature of much academic research can make comprehension between disciplines difficult (Vilhena et al. 2014). So issues around access to knowledge do not end at online availability, because the language choices of academics are also important. (See Bammer and Boetcher Joeres (2015) for a series of discussions on writing for various publics.)

While this thesis is about *access*, it is also necessary to consider the related concept of *accessibility*, in particular with regards to disability. There are numerous barriers to accessing research faced by people with disabilities or cognitive disorders. For instance, some visually impaired people require technologies such as Braille or screen-readers in order to read print or electronic text.

Whether a person has access to knowledge is often subject to cultural, political, and economic factors; issues around accessibility also ...²⁴

In the next chapter, the history of access to research will be investigated in terms of the ability for people to participate in higher education, looking at how education reform in the UK from the nineteenth century onwards altered the possibility for an increasingly educated and technically-literate workforce to read research. However, while the historical problems in accessing higher education discussed in that chapter – whereby certain groups of people, based on characteristics such as race or gender, were wholly or mostly excluded – may have eased in the current era of mass participation, they have not entirely disappeared. *Cost*²⁵ remains a strong barrier to entry for both participation in education and access to publications, and this barrier disproportionately affects marginalised groups. To access publications, even if they are open access, requires access to computers and internet connectivity, thus excluding those for whom this is not possible (see Clark 2016). In the final section, the place of

granted today. For example, despite sporadic use from the early 1800s, peer review was not actually the norm for scholarly articles until the late twentieth century (see Moxham & Fyfe 2016: 3, 29), and now the prospect of open peer review – whereby authors and reviews are aware of each other’s identities and reviews are sometimes made available online – could potentially alter the norms again (although, as so often with ‘new’ innovations, it has been tried before; a form of open peer review was experimented with as early as the 1830s (Moxham & Fyfe 2016: 15).). The fact that even those attributes of articles that have endured for centuries are still historically contingent practices that continue to be in flux is an important reminder of the mutability of scholarly communications. [take a look at Jerome McGann’s *New Republic of Letters*]

24 [I need to do more reading around this subject before I can write this paragraph properly.] [M.E.: ‘you might want to consider an initial mention of DRM and the challenges emerging with free (or even fully openly licensed) material that is nonetheless locked down by DRM. This, of course, has implications for accessibility to a range of users with visual or motor impairments.’]

25 [e.g. tuition fees, student debt etc., access for part-time and mature students...]

academic libraries in facilitating access to research is considered in more detail.

Academic libraries

In exploring the historical context around access to knowledge, it is also necessary to understand how libraries fit in to this picture. While the vital role that public libraries play in ensuring that the scholarly works can make their way into the hands of the general public is discussed in Chapter 2, this section concentrates on academic libraries. In the higher education sector, the main purchasers of published academic books and journals are the libraries that belong to higher education institutions, so access to scholarly works is largely mediated by these institutions. This is true for both print and electronic texts. A consideration of current library acquisition practices and budgeting issues will highlight the complexity of trying to adequately fund the publication of research while also providing access to all those who need it.

The combination of a continual increase in the global number of researchers²⁶ plus a ‘publish or perish’ culture, in which a constant stream of publications is required for academics’ career progression, has resulted in a consistent rise in the number of published journal articles. Accurate estimates of article numbers are notoriously difficult to quantify in the absence of a comprehensive database of all articles, but reported long-term growth trends of around 3% a year are common (see Bornmann and Mutz 2015; Ware and Mabe 2015) with Bornmann and Mutz (2015) calculating a higher rate of 8-9% in the post-war period. A perpetually increasing number of new publications means that the cost to libraries of acquiring access to research has spiralled beyond their ability to keep up, increasing far quicker than their acquisition budgets. This situation has been termed the ‘serials crisis’ (Douglas 1990; Panitch & Michalak 2005). A squeeze on library budgets took hold from the 1980s, and in the UK they have not risen in real terms for many years.²⁷ Since this ‘crisis’ has occurred in parallel to the increased commercialisation and concentration in the journal market, academic libraries now tend to spend a large proportion of their serials expenditure on acquiring access to content from the publishing oligopoly described above.²⁸ At the same time, although a greater proportion of library expenditure has been on journals rather than books (Morris and Roebuck 2017: 9; SCONUL 2012: 2), monographs continue to be exceedingly important to the humanities and have themselves been published at an increasing rate (Crossick 2015: 13–16, 21). Some have suggested that the serials crisis could be more accurately called a ‘monograph crisis’²⁹ because the proportion of newly published monographs that an individual library can afford to purchase has shrunk significantly compared to a few decades ago.³⁰

26 [citation needed – is it in line with population growth, or is it more than that?] [As the number of students and universities rose, so did the number of academics, with an estimated [~15/20 million – citation needed] active researchers as of 2016.]

27 [citation needed]

28 [graphs or charts in this section?]

29 [citation needed]

30 [citation needed]

Technological developments have made a huge impact on academic publishing, especially due to the introduction of electronic journals. By the mid-1990s major publishers had websites where subscribers could access research articles online, such as *Nature*'s first online offering in 1998 (Baldwin 2015: 233). Over time, libraries began switching from print journal subscriptions towards purchasing combined 'print and electronic' licenses, or eliminating the print versions entirely. And although the serials crisis began before the transition to online publication, it has been exacerbated even further by it. This is because of a combination of two things: site licenses for institutional access electronic journals, and 'big deals' which bundle a large number of journals into a single package for libraries to purchase access to (Lawson, Gray & Mauri 2016).

As well as the transition of traditional print journals to online publication, the internet has also facilitated alternative ways of disseminating research. The original intention of the web's inventor, Tim Berners-Lee, was to create a means for researchers to access knowledge and share it with colleagues around the world in a more efficient way (Berners-Lee 2000). Berners-Lee worked at the CERN research laboratory and it is no coincidence that the high-energy physics community was quick to make use of the web for sharing their work. There was a long-standing tradition in this community of sharing preprints, i.e. early copies of research articles before they were subjected to peer review at a journal. Before the web, these were circulated as paper copies, and at CERN there was a large filing system where researchers stored them. In 1991, the physicist Paul Ginsparg at the Los Alamos National Laboratory in the US created an online archive called arXiv (pronounced 'archive') that transferred the sharing of preprints online – they could be uploaded to a server for anyone with internet access to read (which at the time mostly meant other researchers at universities and research institutes) (Luce 2001).³¹ The idea of hosting an online collection of research organised at the discipline level (subject repositories) later influenced the creation of digital archives that stored research for a specific research organisation (institutional repositories). Managing an institutional repository is now a standard part of an academic library's function.

[I've still got a few paragraphs to write here...]

In the early 1990s online-only peer reviewed journals were founded.

[Liu and Gee's econometric analysis confirmed that commercial publishers overcharge for journal subscriptions (2017).]

Research4Life (Meadows 2015).

Library-based publishing.

³²[piracy is used to gain access to knowledge if it is inaccessible or unaffordable. Piracy is not a new phenomenon – it is older than modern intellectual property law, which is a relatively

31 Initially the server was accessed via FTP (File Transfer Protocol) before transferring to the web in 1993 (Luce 2001).

[need to explicitly link to libraries]

32 [this paragraph is a placeholder... might add in some of the stuff from my *Insights* article. Does it belong in this chapter or the previous one?]

recent invention (mid-nineteenth century) (Johns 2009: 5–7). The idea that scholarly knowledge is a thing which can be owned is not natural or inevitable but an invented idea which should be questioned. Academic piracy websites have existed for some time. At the time of writing, the largest are Sci-Hub and Library Genesis (see also aaaaarg). Different countries have different access problems and Sci-Hub is successful because it solves them all. Sci-hub as an ‘exogenous shock’ that shakes the complacency of incumbents. Piracy as a stop-gap solution which does not address structural issues.]

[Piracy shows that the demand for access goes beyond traditional power bases, and encompasses a wider public. As such, the role played by public libraries is important.]

Conclusion

In this chapter the evolution of the academic publishing system has been revealed as the outcome of a long historical development. The reward systems of academia’s ‘prestige economy’ are deeply entangled with the publication practices of researchers, and commercial publishers have exploited this to maintain a publishing market that is highly lucrative for some companies but has high barriers to access for many. As a result, open access has been proposed as means to increase the availability of research to a wider public. In the next chapter,

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