The Garden of Forking Paths: Applying the Social Construction of Digital Technology Framework to the Open Access Movement

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Table of Contents

Introduction

What is the open access movement?

Open access (OA) is the ideal that academic literature should be free and publicly available for all to access. The 2002 Budapest Declaration on OA contains a widely cited and highly influential definition of open access;[1] by 'open access' to academic literature, the drafters of the declaration mean

> its free availability on the public internet, permitting any users to read, download, copy, distribute, print, search, or link to the full texts of these articles, crawl them for indexing, pass them as data to software, or use them for any other lawful purpose, without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. The only constraint on reproduction and distribution, and the only role for copyright in this domain, should be to give authors control over the integrity of their work and the right to be properly acknowledged and cited.[2]

In the scholarly communication context, OA is achieved in practice primarily through the 'green' and 'gold' models.[3] Green OA is a form of self-archiving in which authors submit articles to publicly accessible online archives such as institutional repositories or preprint servers.[4] Institutional repositories are typically administered by a university or research institution to which authors can upload preprints[5] or, usually with publisher permission, submit for inclusion peer-reviewed, published works.[6] Preprint servers are online archives to which authors can submit manuscripts prior to peer review and publication for the purpose of registering discoveries and with the expectation that peers will offer commentary.[7] Green OA is intended as

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[1] S.A. Moore, 'Revisiting "the 1990s debutante": Scholar-led publishing and the prehistory of the open access movement', *Journal of the Association for Information Science and Technology*, 71/7 (2020), pp. 856-866; p. 857.
[2] 'Read the declaration: Budapest Open Access Initiative', *BOAI*, 14 February, 2002, <https://www.budapestopenaccessinitiative.org/read/> (9 July, 2022), n. pag.
[3] R. Anderson, *Scholarly Communication: What everyone needs to know* (Oxford: Oxford University Press, 2018), p. 205.
[4] J.P. Tennant, F. Waldner, D.C. Jacques, P. Masuzzo, L.B. Collister and C.H. Hartgerink, 'The academic, economic and societal impacts of open access: An evidence-based review', *F1000Research*, 5/632 (2016), pp. 1-54; p. 4.
[5] L. Chan, 'Supporting and enhancing scholarship in the digital age: The role of open access institutional repositories', *Canadian Journal of Communication*, 29/3 & 4 (2004), pp. 277-300; p. 280.
[6] Anderson, *Scholarly Communication*, pp. 215-216.
[7] Ibid., pp. 77-78.

an ‘overlay on the existing publishing system’,[8] and is not strictly speaking a form of ‘publishing’ in its own right.[9] Gold OA is a publishing model in which academic journals publish peer-reviewed articles and make them openly available online with no restrictions, usually recovering publication costs through Article Processing Charges (APCs) paid by the author or their funders.[10]

The term ‘OA’ is often used interchangeably with ‘OA movement’;[11] however, OA as defined above is a publishing and business model, whereas the OA movement is a broad coalition of stakeholder groups advocating for the adoption of OA principles in scholarly communication.[12] Subsequent chapters of this thesis will detail the innovations in OA proposed by major stakeholder groups and thus will explore the history of the OA movement in more detail, but in order to understand the extent to which the OA movement has represented a ‘paradigmatic shift’ in scientific communication,[13] some context is necessary here.

Academic publishing as an industry can be traced back to 1665, with the founding of the *Journal des Sçavans* in France, and the *Philosophical Transactions of the Royal Society of London.* These journals ‘served as a model for a number of scholarly journals in Europe during the17th and 18th centuries’ and introduced the concept of registering scientific discoveries and peer review.[14] During this time academic journals were typically published by non-profit universities and learned societies.[15] The mid-nineteenth century saw a shift in both the means of publishing scholarly works and in the professionalization of academia, as scholarly journals came to be recognized as ‘the fastest and most convenient way of disseminating new research results and their number grew exponentially’.[16] Commercial interests also joined the field by the mid-nineteenth century, and soon came to represent a ‘significant proportion’ of academic

[8] Anderson, *Scholarly Communication*, p. 208.
[9] Ibid., p. 77.
[10] Ibid., p. 205.
[11] openaccess.nl, ‘What is open access?’, n. date. <https://www.openaccess.nl/en/what-is-open-access> (9 July, 2022), n. pag.
[12] Moore, ‘Revisiting “the 1990s debutante”’, p. 856.
[13] J.C. Guédon, *In Oldenburg's long shadow: Librarians, research scientists, publishers, and the control of scientific publishing* (Washington, DC: Association of Research Libraries, 2001), p. 2.
[14] T. Eger and M. Scheufen, *The Economics of Open Access: On the Future of Academic Publishing* (Cheltenham: Edward Elgar Publishing, 2018), p. 12.
[15] Ibid.
[16] V. Larivière, S. Haustein and P. Mongeon, ‘The oligopoly of academic publishers in the digital era’, *PloS ONE*, 10/6 (2015), pp. 1-15; p. 2.

publishers.[17] As the scholarly journal grew in importance throughout the nineteenth century, university reforms and the increasing professionalization of academic scholarship in this period also meant that the quality and quantity of a researcher's publications came to be central to their reputation as a scholar and instructor.[18] The academic publishing industry thus came to be central to the 'reward structure of academia',[19] as a 'list of publications' within recognized, prestigious outlets became the primary means of judging a scholar's 'intellectual merit' and 'disciplinary expertise'.[20]

The academic publishing industry grew further after the Second World War. Commercial publishers came to dominate the market at this time, relying on a subscription model whereby academic libraries and learned societies paid subscription fees for print journal services, to which students and scholars had access.[21] In STM, scholars relied particularly on publishing within academic journals, the market for which 'had grown much faster, larger, and much more uniformly than that for published scholarship in the Humanities' after the Second World War.[22] Within HSS disciplines therefore, smaller commercial and non-profit firms took up producing monographs and other text forms[23] which still occupy a central position within these fields.[24]

With the advent of the World Wide Web (the Web) and the portable document format (PDF) in the 1990s, academic publishing moved mostly online.[25] Although the idea of openly sharing research outputs pre-dates the OA movement,[26] some saw potential in the 'digital revolution' as a means of lowering subscription fee costs. The move online did not, however, fundamentally change the scholarly journal publishing model.[27] The PDF 'became the

[17] Larivière et al., 'The oligopoly of academic publishers in the digital era', p. 2.
[18] A. Fyfe, K. Coate, S. Curry, S. Lawson, N. Moxham and C.M. Røstvik, 'Untangling academic publishing: A history of the relationship between commercial interests, academic prestige and the circulation of research', *Discussion Paper*, University of St. Andrews (2017), pp. 1-23; p. 5.
[19] Eger and Scheufen, *The Economics of Open Access*, p. 10.
[20] Ibid., p. 6.
[21] Ibid., p. 12.
[22] F.E.W. Praal, *Symbolic capital and scholarly communication in the humanities: An analysis of sociotechnical transition* (Leiden, The Netherlands: Doctoral dissertation, Leiden University, 2020), p. 98.
[23] Ibid.
[24] Ibid., p. 48.
[25] Larivière et al., 'The oligopoly of academic publishers in the digital era', p. 2.
[26] P.A. David, 'Understanding the emergence of "open science" institutions: Functionalist economics in historical context', *Industrial and Corporate Change*, 13/4 (2004), pp. 571-589; p. 573.
[27] Larivière et al., 'The oligopoly of academic publishers in the digital era', p. 2.

established format of electronic journal articles' as a mimic of print, and academic publishers retained their subscription model by instituting electronic subscription access to their journals.[28]

Subsequent decades have seen academic libraries, the main subscribers to academic journals, struggle to keep pace with commercial publishers' high subscription access fees. 'Drastic' journal price increases over the past thirty years, combined with generally 'stagnating library budgets' have resulted in what is now known as the serials crisis.[29] Libraries have been forced to cancel subscriptions to some journals and have reduced monograph purchases in order to accommodate rising costs. [30] This 'monograph crisis'[31] has in turn adversely impacted both scholars in the Humanities, who rely heavily on publishing book chapters and monographs, and the smaller, usually non-profit university and society presses that publish their work.[32] Generally speaking, major commercial academic publishers have been able to maintain control over much of the academic publishing market; currently, the 'big five' academic publishers in STM – Wiley-Blackwell, Springer Nature, Elsevier, the American Chemical Society (ACS), and Taylor & Francis– control up to seventy-five percent of this market.[33] In HSS, the 'big five' includes Sage in place of ACS,[34] although university presses and scholarly societies remain the 'dominant' publishers in the Humanities.[35] The large commercial publishers – the big five – have generally seen their revenues increase, with current profit margins of between thirty-five and forty percent.[36] By contrast, libraries as customers have less economic power in this relationship, and have little choice but to subscribe to expensive journals while prices for access have continued to rise.[37] Compounding the issue is that publishing is now central to the reward structure of academia, and many researchers still have to access articles from and submit their research to the high-impact journals owned by the big five academic publishers.[38]

[28] Larivière et al., 'The oligopoly of academic publishers in the digital era', p. 2.
[29] Eger and Scheufen, *The Economics of Open Access*, pp. 23-24.
[30] Ibid., p. 24.
[31] Fyfe et al., 'Untangling academic publishing', p. 8.
[32] Ibid., p. 10.
[33] S. Puehringer, J. Rath and T. Griesebner, 'The political economy of academic publishing: On the commodification of a public good', *PLoS ONE*, 16/6 (2021), pp. 1-21; p. 2.
[34] Larivière et al., 'The oligopoly of academic publishers in the digital era', p. 3.
[35] B.C. Björk and T. Korkeamäki, 'Adoption of the open access business model in scientific journal publishing: A cross-disciplinary study', *College & Research Libraries*, 81/7 (2020), pp. 1080-1094; p. 1089.
[36] Eger and Scheufen, *The Economics of Open Access*, p. 13.
[37] Larivière et al., 'The oligopoly of academic publishers in the digital era', p. 11.
[38] Eger and Scheufen, *The Economics of Open Access*, p. 35.

OA and the Social Construction of Digital Technologies framework

The OA movement, which Suber describes as a problem-solving mechanism,[39] arose partially in response to the academic publishing oligopoly and the serials crisis.[40] Although OA is a simple idea,[41] the movement that has grown around it has become increasingly convoluted, involving a 'complex network of relationships and interdependencies' among stakeholder groups.[42] The OA movement is not a 'centralized entity', but rather a 'cluster of loosely coordinated publishing ventures' and 'advocacy groups' comprised mainly of researchers and librarians working towards the shared goal of making 'freely accessible in online journals scientific and scholarly research, particularly that done with public funding'.[43] Each of these stakeholder groups advocate for their own interests within a specific 'social, cultural, legal, political, economic, and technological' environment.[44] Each stakeholder has proposed myriad solutions to the academic publishing oligopoly and the serials crisis, and this complexity makes understanding the evolution of the OA movement challenging. The Social Construction of Digital Technology (SCODT) theory advanced by Van Baalen, Van Fenema, and Loebbecke, provides a valuable means of disentangling the many threads of the OA movement by analyzing it through a social group or stakeholder lens.

SCODT theory is an extension of Pinch and Bijkers' Social Construction of Digital Technology (SCOT) theory. SCODT theory proposes a novel way of analyzing technological innovation through a sociological lens that can illuminate the myriad ways in which social actors respond to technological change. The OA movement as a response to the problem of the academic publishing oligopoly, and the serials crisis it perpetuates maps closely to the SCOT framework proposed by Pinch and Bijker (1984). SCOT takes the position that the process of technological innovation and adoption is not linear, but one that is shaped by the social groups, or stakeholders, for whom a technological artifact is relevant.[45] In 'SCOT, the developmental process of a technological artifact is described as an alternation of variation and selection. This

[39] P. Suber, *Open Access* (Cambridge, Massachusetts: MIT Press, 2012), p. 29.
[40] Ibid.
[41] Ibid., pp. 8-9.
[42] T.L. Reinsfelder, 'Open access publishing practices in a complex environment: Conditions, barriers, and bases of power', *Journal of Librarianship and Scholarly Communication*, 1/1 (2012), pp. 1-16; p. 3.
[43] C.A. Schwartz, 'Reassessing prospects for the open access movement', *College and Research Libraries*, 66/6 (2005), pp. 488-495; p. 489.
[44] Reinsfelder, 'Open access publishing practices in a complex environment', p. 5.
[45] T.J. Pinch and W.E. Bijker, 'The social construction of facts and artifacts: Or how the sociology of science and the sociology of technology might benefit each other', *Social Studies of Science*, 14/3 (1984), pp. 399-441; p. 414.

results in a 'multi-directional model' [of technological innovation], in contrast with the linear models used explicitly in many innovation studies, and implicitly in much history of technology'.[46] Solutions to technological problems are proposed and adopted by different stakeholders that have been impacted by the artifact, and those solutions that are seen to solve the problem become more widely adopted. Stakeholders who are impacted by the artifact decide which problems are relevant; however, not all stakeholders impacted by the artifact will have found the artifact to be problematic, or they may not find the proposed solutions satisfactory. These groups will then propose alternative innovations, thus resulting in a multi-directional model of change.[47] Those relevant stakeholders who have found the solution to be satisfactory will, according to SCOT, attempt to close the discussion and 'stabilize the artifact', claiming the problem to be solved and entrenching the adopted solution through a process of rhetorical closure and closure by redefining the problem.[48] Closure in technology

> involves the stabilization of an artifact and the "disappearance" of problems. To close a technological "controversy" the problems need not be solved in the common sense of that word. The key point is whether the relevant social groups see the problem as being solved.[49]

Social groups also attain closure by redefining the original problem 'in such a way as to establish consensus with other social relevant groups – thereby neutralizing arguments for alternative interpretations'.[50] According to the SCOT framework, tracing the stabilization of an artifact and closure of the debate surrounding it typically requires analysis across more than one 'social group'[51] or stakeholder. Stakeholders may have specific problems with respect to a given artifact that do not impact the other stakeholders at all or to the same degree; thus, different stakeholders will propose 'conflicting solutions to the same problem'.[52] This 'interpretive

[46] Pinch and Bijker, 'The social construction of facts and artifacts', p. 411.
[47] Ibid., p. 414.
[48] Ibid., p. 424.
[49] Ibid., pp. 426-427.
[50] P. van Baalen, P. Van Fenema and C. Loebbecke, 'Extending the Social Construction of Technology (SCOT) framework to the digital world', Paper presented at International Conference Information Systems, Dublin, Ireland (2016), pp. 1-8; p. 3.
[51] Pinch and Bijker, 'The social construction of facts and artifacts', p. 424.
[52] Ibid., pp. 415-416.

flexibility' results in the multi-directional paths of technological innovation that characterizes Pinch and Bijker's SCOT framework.[53] Van Baalen, Van Fenema, and Loebbecke's SCODT framework extends this idea of conflict to include digital ecosystems within which stakeholder relations 'may be characterized as cooperative or coopetitive';[54] stakeholder groups do, however, tend to 'strive for dominance' within this ecosystem, resulting in 'complex protagonist-antagonist interactions'.[55] SCODT also goes further than SCOT in this respect in that SCODT takes into account the power asymmetries around which societies are structured. The relative power positions of stakeholders in turn have an influence upon which innovations come to dominate a given digital ecosystem.[56]

Reinsfelder, in his application of the SCOT framework to OA publishing, argues that stabilization with respect to OA publishing remains 'elusive' due to stakeholder conflict, which he contends is mainly social and economic.[57] Guédon, in his SCOT analysis of institutional repositories, also explicitly connects power asymmetries among OA movement stakeholders with Pinch and Bijker's notion that social groups draw upon diverse 'cultural resources'[58] to bolster their innovations.[59] Specifically, Guédon contends that these resources – or sources of power – are economic, political, and cultural.[60]

The SCOT framework offers a means of revealing the interests and narratives of various stakeholder groups and of 'explaining socio-technical phenomena of in the context of system construction'.[61] Yet Van Baalen, Van Fenema, and Loebbecke argue that SCOT is not sufficient for exploring the 'digital ecosystems' that have emerged with the rise of digital technologies, and they propose extensions to the SCOT theory to make it relevant for the digital era. They build upon the evolutionary implications of the variation and selection model of technological innovation described by SCOT by situating technological change with a digital ecosystem,

[53] Pinch and Bijker, 'The social construction of facts and artifacts', p. 409.
[54] The authors use the term 'coopetitive' rather than 'competitive' to indicate that stakeholders with competing interests may cooperate to achieve common goals.
[55] Van Baalen, Van Fenema and Loebbecke, 'Extending the Social Construction of Technology (SCOT) framework', p. 4.
[56] Ibid., p. 5.
[57] Reinsfelder, 'Open access publishing practices in a complex environment', p. 2.
[58] Pinch and Bijker, 'The social construction of facts and artifacts', p. 404.
[59] J.C. Guédon, 'It's a repository, it's a depository, it's an archive...: Open access, digital collections and value', *Arbor*, 187/937 (2009), pp. 581-595; p. 583.
[60] Ibid.
[61] Ibid., p. 5.

defined by McCormack as 'the combination of all relevant digital touchpoints, the people that interact with them, and the business processes and technology environment that support both'.[62] The Social Construction of Digital Technologies (SCODT) theory that Van Baalen, Van Fenema and Loebbecke propose takes 'into account the nature of digital technologies underpinning digital ecosystems, networked individualists as active stakeholders, the sociodigital context, and the interaction between people and digital technologies'.[63]

Van Baalen, Van Fenema, and Loebbecke extend SCOT along the four dimensions of technologies, interaction, social groups, and context. The 'technologies' dimension extends the unit of analysis to digital ecosystems from information systems, based on 'pervasive, global digital technologies'.[64] The dimension of interaction takes into consideration human-technological innovation, expanding the site of analysis from SCOT's interpersonal interaction model to include 'interpersonal, person-technology, technology-technology and technology-physical environment interactions'.[65] Recognizing that the Web has allowed for the growth of 'fragmented, opportunistic, fast connecting individuals and organizations forming temporary relevant social groups', SCODT extends SCOT's conception of relevant social groups to include these networked individuals.[66] Finally, SCODT acknowledges that the context of SCOT has moved from a merely social context to a socio-digital one, and recognizes that power asymmetries which 'give different relevant social groups asymmetric access to (information) resources that are relevant in the construction of technology' may have implications for the construction of digital ecosystems.[67]

The SCODT framework extends the SCOT model such that its applicability reaches beyond the mere technological artifact; thus, the OA movement can be viewed as a 'digital touchpoint' open to analysis from the point of view of SCODT.[68] The SCODT framework as applied to the current OA publishing ecosystem opens rich areas of analysis from the perspectives of relevant social groups. Each chapter of this thesis will apply SCODT theory to a

[62] Quoted in Van Baalen, Van Fenema and Loebbecke, 'Extending the Social Construction of Technology (SCOT) framework', p. 4.
[63] Van Baalen, Van Fenema and Loebbecke, 'Extending the Social Construction of Technology (SCOT) framework', p. 5.
[64] Ibid.
[65] Ibid.
[66] Ibid.
[67] Ibid.
[68] Ibid.

relevant stakeholder, exploring a problem posed by the technologies that led to the OA movement – namely, the Web and the PDF. These artifacts solved the problem of open sharing, but impacted all relevant stakeholders in myriad ways, resulting in a cascade of problems and proposed solutions. This has made the OA movement difficult to analyze, and various metaphors have been used to describe the complex interplay of actors involved. SCODT favors the ecosystem metaphor; this thesis will follow the example of Pinch and Bijker, drawing upon Jorge Luis Borges' fictitious 'garden of forking paths' as a thread. Each innovation follows a path, but in SCODT multiple paths can branch out concurrently.[69]

Chapter one will apply SCODT theory to innovations developed and / or adopted by the academic community, the Web and the PDF, as potential solutions to the serials crisis and the academic publishing oligopoly. The term 'academic community' refers in this analysis to the stakeholder group of researchers, in both STM and HSS disciples, who compose the majority of authors and readers of scholarly literature.

Chapter two will explore the impact of the OA movement on academic publishers, and their response to problems posed to them by the Web and the PDF. Publishers under consideration include all those engaged in academic publishing regardless of the size of the firm, but the chapter will focus mainly on the 'big five' commercial academic publishers in STM and HSS.

Chapter three will explore the response of academic libraries to the serials crisis and academic publishing oligopoly, and their role key role as OA advocates in the stabilization and closure of the OA movement as solution to these problems.

Some theorists include governments and public funding bodies as stakeholders in the OA movement.[70] Certainly, from the earliest days of 'modern' science, state bodies have exerted an influence on the development of scientific scholarship and communication.[71] Governments have a stake in the results of scientific discovery as representatives of the public, the taxpayers who partially fund scientific research and who stand to benefit from the products of this research.[72] Yet this analysis will exclude governments and public funding bodies as stakeholders as this

[69] Van Baalen, Van Fenema and Loebbecke, 'Extending the Social Construction of Technology (SCOT) framework', p. 3.
[70] Björk and Korkeamäki, 'Adoption of the open access business model in scientific journal publishing', p. 1091.
[71] David, 'Understanding the emergence of "open science" institutions', p. 582.
[72] P. Suber, 'The taxpayer argument for open access', *SPARC Open Access Newsletter, issue # 65*, 4 September, 2003. <https://dash.harvard.edu/bitstream/handle/1/4725013/suber_taxpayer.htm> (15 April, 2022), n. pag.

group is not directly involved in the creation and dissemination of scientific research to the degree to which the academic community, academic publishers, and academic libraries have been and continue to be. SCODT leaves room for interpreting how the wider social context influences the stabilization and closure of problems within and among social groups.[73] In this light, this analysis will occasionally consider the role of governments and funding bodies as an external force emerging from wider social contexts that has aided the three major stakeholder groups outlined above in the stabilization and closure of their proposed solutions to the problems posed by the OA movement.

Finally, the conclusion will draw together the threads of this analysis across stakeholder groups and will illustrate how the SCODT framework is a valuable lens through which to view the complexities of the scholarly communications ecosystem. Emerging stakeholder alliances and the solutions that they propose to the serials crisis and the academic publishing oligopoly will also be explored.

[73] Van Baalen, Van Fenema and Loebbecke, 'Extending the Social Construction of Technology (SCOT) framework', p. 3.

Chapter 1: Applying the SCODT framework to the academic community

The academic community bears the most responsibility for creating and driving the OA movement, developing both the technological innovations that made it possible,[74] as well as its legal and ethical underpinnings.[75] The academic community is a diverse one, consisting of researchers across the STM (science, technology, medicine) and HSS (humanities and social sciences) fields.[76] STM and HSS are broad categories in themselves, and their constitutive disciplines break into further sub-groups. The OA movement has impacted scholars in significantly different ways across these disciplines and along language and geographical lines, and sub-groups have emerged that have had their own reaction to the OA movement.[77] While some of these sub-groups merit mention in the stabilization, closure, and redefining sections below, this paper will not include a detailed exploration of these sub-groups and their suggested innovations. The intention here is to examine, through applying the SCODT theoretical framework, the broad influence that the 'academic community' of researchers in both STM and HSS who constitute the major producers and consumers of scholarly literature have had on the OA movement.

The Web and the PDF: Paving the way for open access

The ideal of publicly sharing research outputs is not a new one,[78] though two technological innovations laid the groundwork for the modern OA movement: the World Wide Web and the PDF for text files.[79] These innovations came out of the fields of high energy physics and computer science, respectively.[80] Computer scientists working at the Defense Advanced Research Projects Agency (DARPA) and the Massachusetts Institute of Technology (MIT)

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[74] P. Mounier, 'Open access: An opportunity to redesign scholarly communication in history', in (S. Noiret, M. Tebeau, and G. Zaagsma, eds.) *Handbook of Digital Public History* (Berlin: De Gruyter, 2022), pp. 121-129; pp. 121-122.
[75] A.G. González, 'Open science: Open source licenses in scientific research', *North Carolina Journal of Law & Technology*, 7/2 (2006), pp. 321-366; p. 332.
[76] Anderson, *Scholarly Communication*, p. 173
[77] Björk and Korkeamäki, 'Adoption of the open access business model in scientific journal publishing', p. 1082-1083.
[78] Mounier, 'Open access: An opportunity to redesign scholarly communication in history', p. 121.
[79] E. Martinez Aguilar, *Electronic distribution of searchable technical documentation libraries* (Montreal, Quebec: Doctoral dissertation, Concordia University, 2003), p. 3.
[80] Mounier, 'Open access', pp. 121-122.

developed the theoretical and mechanical structure of the Internet in the 1960s and 1970s.[81] By the 1980s scientists in the fields of computing and physics were already in the habit of sharing information by means of electronic mailing lists. Longer strings of text such as journal articles were also shared in this manner,[82] but text file sharing prior to the invention of the PDF was inconvenient as it required interoperability across software, devices, and printers.[83] Introduced by Adobe Systems in 1992, PDF files offered 'reliability, consistency, and flexibility', allowing users to share documents in a format that is consistent across operating systems, devices, and printers.[84] The PDF 'became the established format of electronic journal articles, mimicking the print format'.[85] Computer scientist Tim Berners-Lee invented the Web in 1989,[86] and the mid-1990s saw the rapid, widespread adoption of the Web for commercial and public use, facilitating easy information sharing for users around the globe.[87] In effect, the Web and the PDF appeared to obviate the role of publishers in formatting and sharing, allowing scholars to easily cite electronic text documents.[88]

As the technological foundations of OA were being set, the legal and ethical case for OA was being made by the academic community as well. The development of free and open-source software (OSS) mirrors in many ways the development of OA.[89] Computer programmer and 'open source evangelist' Richard Stallman founded the Free Software Foundation (FSF) in 1984 in order to gain financial support for GNU licensing.[90] The FSF took the position that software should be free: not necessarily free of cost, but free as in openly available for users to run, modify, and redistribute.[91] This led to the development of a number of OSS licensing models, the

[81] B.M. Leiner, V.G. Cerf, D.D. Clark, R.E. Kahn, L. Kleinrock, D.C. Lynch, J. Postel, L.G. Roberts, and S.S. Wolff, 'The past and future history of the Internet', *Communications of the Association for Computing Machinery*, 40/2 (1997), pp.102-108; pp. 102-103.
[82] M. Laakso, P. Welling, H. Bukvova, L. Nyman, B.C. Björk and T. Hedlund, 'The development of open access journal publishing from 1993 to 2009', *PLoS ONE*, 6/6 (2011), pp. 1-10; p. 1.
[83] Martinez Aguilar, *Electronic distribution of searchable technical documentation libraries*, pp. 2-3.
[84] Ibid., p. 3.
[85] Larivière et al., 'The oligopoly of academic publishers in the digital era', p. 2.
[86] CERN, 'A short history of the Web', n. date. <https://home.cern/science/computing/birth-web/short-history-web#:~:text=Tim%20Berners%2DLee%2C%20a%20British,and %20institutes%20around%20the%20world.> (24 September, 2022). n. pag.
[87] Leiner et al., 'The past and future history of the Internet', p. 108.
[88] Ibid., p. 12.
[89] González, 'Open science', pp. 323-324.
[90] M.W. Wu and Y.D. Lin. Wu and Lin note that 'GNU is a recursive acronym for "GNU's Not Unix" and a homophone for "new"'; 'Open source software development: An overview', *Computer*, 34/6 (2001), pp. 33-38, p. 33.
[91] Ibid.

most well-known being GNU's General Public License (GPL) which allows for the 'free', as in open, distribution and modification of software.[92] OSS licensing models in turn provided the inspiration for new copyright models that could be applied to scholarly communication, and scholars sought ways to 'translate' OSS licensing models to the dissemination of 'scientific research outputs'.[93] Thus emerged in 2002 the nonprofit organization Creative Commons (CC) and their CC licensing model, under which authors who owned the copyright to their work could choose to distribute it under a variety of licenses with varying degrees of openness.[94] Copyright holders wishing to use CC licensing can select from the elements of attribution (naming the author), share-alike (any derivatives must be shared under the same license), non-commercial (derivatives cannot be sold for profit), and no derivatives (alterations cannot be made to the original) to share their work openly but with some restrictions. The CC license has been broadly adopted as the standard model for OA initiatives and is the 'best known and most widely used'.[95] Through their standardized options for use restrictions, the GPL and CC models introduced the idea of *libre* (free to use) vs. *gratis* (free of cost) open access.[96] This is an important difference, as the distinction between *libre* vs. *gratis* OA have become, in a SCODT analysis, a significant point of 'redefining' for OA movement stakeholders. This will be explored in the closure and redefining section below.

The Web and the PDF, in combination with open licensing models, seemed to some to give the academic community the means and the justification to work around the traditional academic publishing model, or to even eliminate the need for academic publishers completely.[97] Many members of the academic community noted, however, that academic publishers have a crucial gatekeeping role to play in quality control and distribution; peer review mechanisms still need to be in place for science to be effective, thus problematizing self-archiving and sharing systems.[98] In addition, the academic reward structure does not favor OA sharing outside of the traditional academic publishing model, as '[p]romotion and tenure assessment mechanisms rely

[92] Wu and Lin, 'Open source software development', p. 34.
[93] González, 'Open science', pp. 324.
[94] 'The story of Creative Commons', *Creative Commons*, n. date. <https://certificates.creativecommons.org/cccertedu/chapter/1-1-the-story-of-creative-commons/> (27 December, 2022), n. pag.
[95] Suber, *Open Access*, pp. 68-69.
[96] Ibid., p. 65.
[97] Puehringer, Rath and Griesebner, 'The political economy of academic publishing', p. 2.
[98] Anderson, *Scholarly Communication*, p. 59.

to an extraordinary degree on publications in long-established journals'.[99] Publishers are also able to effectively provide copyediting, marketing, and other services.[100]

Getz identifies three innovations in OA that attempted to solve the problem of the role of the publisher as gatekeeper: pre- and post-print archives, quality-assured (i.e., peer-reviewed) OA journals, and OA indices to the scholarly literature.[101] Applying the SCODT framework, the problem of the role of the publisher as gatekeeper in open scholarship can be said to have led to several proposed solutions, the most successful of which are the 'green' and 'gold' routes of OA.

'Green OA', 'a key component' of the OA publishing model,[102] typically consists of authors sharing scholarly material to OA pre- and post-servers and repositories.[103] Pre- and post-print archives include both subject- and discipline-centric Web-based archives as well as institutional repositories that collect scholarly material created within a specific university or research institution. Pre-print archives, generally known as pre-print repositories or servers, are archives of scholarly materials that have yet to pass through formal editorial or peer-review processes before posting.[104] Post-print repositories share a similar function but include materials that have been peer-reviewed and published and are being openly shared with the cooperation of the academic publisher.[105] The first discipline-centric pre-print repository, arXiv, was established at Cornell University in 1991 as a means for physicists to immediately share their research results.[106] Other archives across disciplines, such as CogPrints (1997) were founded early on.[107] Pre- and post-print repositories grew slowly at first, particularly outside of 'the arXiv disciplines',[108] but have since become a common means of registering and sharing research prior to formal publication.[109]

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[99] J. Velterop, 'Open access: principle, practice, progress', *Serials*, 18/1 (2005), pp. 26-29; p. 27.
[100] Anderson, *Scholarly Communication*, p. 59.
[101] M. Getz, *Three frontiers in open access scholarship* (Cornell: Internet-First University Press, 2005), p. 1. OA indices are somewhat outside of the scope of this analysis. The main point here is that, early on, it was not easy to find OA materials as they were being shared in disparate sources. Innovations such as the Directory of Open Access Journals (DOAJ) and Google Scholar would provide a partial solution to the OA index problem.
[102] Chan, 'Supporting and enhancing scholarship in the digital age', p. 277.
[103] Laakso et al., 'The development of open access journal publishing from 1993 to 2009', p. 2.
[104] Chan, 'Supporting and enhancing scholarship in the digital age', p. 282.
[105] Laakso et al., 'The development of open access journal publishing from 1993 to 2009', p. 2.
[106] Mounier, 'Open access', p. 122.
[107] Chan, 'Supporting and enhancing scholarship in the digital age', p. 282.
[108] Getz, *Three frontiers in open access scholarship*, p. 6.
[109] Anderson, *Scholarly Communication*, p. 40.

Institutional repositories (IRs) are electronic archives in which scholars at universities and research institutes can share their work openly. These materials may include peer-reviewed and published materials (with the publisher's permission) as well as theses, dissertations, conference presentations, and other assorted research outputs. IRs typically have loose quality-control measures that have been established by the founding institution.[110] An early and influential IR was MIT's DSpace, founded in 2002. When MIT released the DSpace software under an open-source license, this generated a 'great deal of excitement', and 'encouraged a second wave of institutions to begin installing, testing and evaluating the software for local use'.[111] IR's have grown significantly in the last twenty years, largely due to the efforts of academic librarians who have facilitated the use and advocated the value of IRs to researchers who are often skeptical or unaware of their IR.[112] Institutional and funder mandates that require the archiving of research outputs have also led to the growth of IRs and increased faculty participation.[113] As of June 2022, the Cybermetrics Lab of the Consejo Superior de Investigaciones Científicas' 'Ranking Web of World Repositories' includes well over 4000 global IRs.[114]

Pre- and post-print repositories and IRs are a means of open sharing, but they are supplements rather than alternatives to the traditional academic publishing model.[115] The green route is not feasible as a solution to the problem of role of the publisher in scholarly publishing, nor to the serials crisis. This is because the green route ultimately relies upon the publishing industry for quality control checks in the form of peer-review as well as the reputational and career necessity of publication in established and reputable journals. Green OA works in

[110] Chan, 'Supporting and enhancing scholarship in the digital age', p. 282. For example, the pioneering TSpace IR at the University of Toronto includes specific content guidelines requiring all material be sponsored by a faculty member and to be a finished work that it scholarly or pedagogical in nature. ('TSpace Repository Policies and Guidelines', University of Toronto, n. date, <https://tspace.library.utoronto.ca/about/collectionpolicies.jsp> (December 27, 2022), n. pag.)
[111] Chan, 'Supporting and enhancing scholarship in the digital age', p. 283.
[112] A.C. Butterfield, Q. Galbraith and M. Martin, 'Expanding your institutional repository: Librarians working with faculty', *The Journal of Academic Librarianship*, 48/6 (2022), pp. 1-5; p. 1.
[113] E. Dubinsky, 'A current snapshot of Institutional Repositories: Growth rate, disciplinary content and faculty contributions', *Journal of Librarianship and Scholarly Communication*, 2/3 (2014), pp. 1-22; p. 2.
[114] Consejo Superior de Investigaciones Científicas, 'Transparent ranking: CRIS by Google Scholar (14th edition, June 2022)', n. date. <https://repositories.webometrics.info/en/cris> (15 June, 2022), n. pag.
[115] D. W. Lewis, 'The inevitability of open access', *College and Research Libraries*, 73/5 (2012), pp. 493-506; p. 494.

conjunction with gold OA but is not in itself a solution. It may solve the accessibility problem, but it does not solve the affordability problem.

OA journals and the 'gold' OA business model have been the most successful (as in widely adopted) solutions posed thus far, as these journals provide quality control and other services typically taken on by the publisher. OA journals allow the reader to access articles for free on a journal's website with no cost or access restrictions.[116] The first OA journals to emerge in the 1990's had been newly-founded by 'independent academics on websites they created themselves, and such journals were not to be found in recognized journal indexes'.[117] The 'business model' of these journals 'commonly consisted of voluntary labor combined with the possibilities of using the editor's university web servers free of cost'.[118] These early efforts operated outside of the traditional academic publishing system, as peer-review was performed by the academics who ran these journals, and funding for them to operate was typically provided by their affiliated universities or research institutes.[119] Academic publishers would later establish OA business models whereby articles are published OA for a fee. This route is known as 'gold OA'.

Stabilization and closure

As outlined in the preceding section, the academic community during the late 1980s and 1990s laid the technological and ethical foundations of what would become the OA movement. Although the stabilization of a digital touchpoint such as the OA movement and closure of the debate surrounding it are difficult to measure, Laakso et al. offer a timeframe for the adoption of the OA publishing model that illustrates the growing acceptance of OA across stakeholder groups from 1993 to 2009.[120] The Pioneering years (1993-1999) saw the establishment, across both STM and HSS disciplines, of pre-print and subject-specific archives and institutional repositories, as well as scholar-led OA journals.[121] Throughout the 1990's, 'year-to-year growth for both [OA] articles and journals was aggressive';[122] however, these early OA journals were

[116] Suber, *Open Access*, p. 4.
[117] Björk and Korkeamäki, 'Adoption of the open access business model in scientific journal publishing', p. 1081.
[118] Laakso et al., 'The development of open access journal publishing from 1993 to 2009', p. 8.
[119] Moore, 'Revisiting "the 1990s debutante"', p. 858.
[120] Laakso et al., 'The development of open access journal publishing', p. 8. The authors note that they mark 1993 as the start of the Pioneering years due to the paucity of sources for quantitative analysis prior to that year, even though some individual journals had already been established or had adopted OA models of publishing before that.
[121] Ibid.
[122] Ibid.

typically newly-founded by independent academics using home-made websites.[123] These journals were not available in 'recognized journal indexes [sic]'[124] and have now been somewhat forgotten as the OA movement has become more mainstream.[125] These pioneering repositories and early OA journals were established outside of the traditional academic publishing model. Moore notes that 'some of the scholar-publishers' in this period were 'explicitly antagonistic towards the publishing industry and were hoping that electronic publishing would be a space unoccupied by profiteering publishers'.[126] However, the entrance of 'powerful commercial players' into the OA arena – academic publishers such as Elsevier and Springer[127], who had far greater access to financial resources[128] – would soon subsume these early efforts.

The Innovation years (2000-2004) can be said to have begun the process of stabilizing the OA movement as an alternative to the traditional academic publishing and business model. This period saw the growing 'visibility' of OA advocacy within the academic community.[129] As OA sharing and publishing ventures gained a foothold during the late 1990s and early 2000s, those in the academic community who viewed the OA movement as a means of wresting control of the scholarly communication system from commercial academic publishers[130] rallied around the OA 'revolution'.[131] They did so by encouraging peers to publish in OA and by lobbying university administrators and funding groups to invest in OA initiatives. Peach, for instance, argued that the 'next step' in promoting OA 'is to encourage the researchers… to publish their research articles in open-access journals where a suitable journal exists'.[132] The philosopher Peter Suber, an influential voice for the OA movement, launched his Open Access Newsletter in 2003 to promote the uptake of OA among the academic community,[133] particularly to his colleagues in the HSS fields.[134] By 2004, Chan noted that OA was no longer a

[123] Björk and Korkeamäki, 'Adoption of the open access business model in scientific journal publishing', p. 1081.
[124] Ibid.
[125] Moore, 'Revisiting "the 1990s debutante"', p. 858.
[126] Ibid., p. 859.
[127] Ibid.
[128] Guédon, 'It's a repository, it's a depository, it's an archive...', p. 587.
[129] Laakso et al., 'The development of open access journal publishing from 1993 to 2009', p. 9.
[130] Puehringer, Rath and Griesebner, 'The political economy of academic publishing', p. 2.
[131] K. Peach, 'Join the open-access revolution', *CERN Courier, June* (2005), p. 50.
[132] Ibid.
[133] 'SPARC Open Access newsletter', Community-wealth.org, n date. <https://community-wealth.org/content/sparc-open-access-newsletter> (24 September, 2022), n. pag.
[134] P. Suber, 'Promoting open access in the humanities', *Syllecta Classica*, 16/1 (2005), pp. 231-246; p. 243.

> marginal, scholar driven initiative but a mainstream movement that [was] receiving worldwide attention from researchers, institutional leaders, policymakers, and funding bodies as well as commercial publishers.[135]

The Innovation years were also characterized by the emergence of OA publishing and business models on a 'wider scale', and 'strong growth' for published OA journals and articles.[136] During this period, gold OA publishing proved its viability with the establishment of the Public Library of Science (PLoS) and BioMed Central (BMC), respectively. PLoS was founded in 2001, explicitly as a non-profit alternative to the traditional publishing model.[137] PLoS began launching OA journals in 2003 with grant funding from a private foundation. BMC was a 'purely commercial enterprise' founded and funded by venture capitalists.[138] PLoS and BMC are now 'the two leading OA publishers',[139] and their successful publishing model emerged from a new innovation, the Article Processing Charge (APC). In this model, the author pays for their article to be published OA with no delays or embargoes. This 'flips' the traditional publishing structure from one of a 'reader pays' to an 'author pays' system. APCs are borne by authors, but this usually means that their funders or institutions pay these charges through grants and budget allocations.[140] Guédon suggests that this model is more accurately termed 'author-proxy-pays'.[141]

The success of BMC as a for-profit OA publishing venture seemed to have signaled to other commercial academic publishers that APCs provided a means of adapting innovations from the OA movement for their own purposes. The role of academic publishers in the OA movement will receive more attention in chapter two, but it is useful here to mention that academic publishers adapted the OA publishing and business models in response to the threat that these innovations, initiated by the academic community, another stakeholder, posed to their traditional business model. As OA journals began to be bought up or established by commercial publishers,

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[135] Chan, 'Supporting and enhancing scholarship in the digital age', p. 280.
[136] Laakso et al., 'The development of open access journal publishing from 1993 to 2009', p. 9.
[137] 'Leading a transformation in science communication', *PLoS*, n. date. <https://plos.org/about/> (15 June, 2022), n. pag.
[138] Björk and Korkeamäki, 'Adoption of the open access business model in scientific journal publishing', p. 1088.
[139] Ibid.
[140] D.J. Solomon and B.C. Björk, 'A study of open access journals using article processing charges', *Journal of the American Society for Information Science and Technology*, 63/8 (2012), pp. 1485-1495; p. 1485.
[141] Guédon, 'It's a repository, it's a depository, it's an archive...', p. 592.

so emerged gold OA and the APC as the most common means of publishing OA; currently, most OA articles are published by means of the APC model.[142]

The Innovation years also saw the establishment of the 'central principles of OA'[143] which helped to stabilize OA as a cohesive, cross-stakeholder movement. The OA movement coalesced around three influential public statements: the Budapest Open Access Initiative (February 2002), the Bethesda Statement on Open Access Publishing (June 2003), and the Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities (October 2003).[144] These statements were the product of an alignment of stakeholders from the academic community, academic publishers, and libraries. The so-called 'BBB' statements[145] represent a significant act of stabilization of the artifact, in this case, the OA movement and its publishing and business models. They provided the OA movement with a stated philosophical and ethical framework and signaled widespread support for OA across the academic community and other stakeholder groups. National funders, universities, and advocacy groups such as the librarian-led Scholarly Publishing and Academic Resources Coalition (SPARC) signed on,[146] and on the advice of the academic community pledged to adopt principles and practices in support of OA initiatives.[147]

The 'BBB' statements were a 'compromise' between the academic community and commercial academic publishers.[148] The Budapest Open Access Initiative (BOAI) in particular represented a shift away from academic community-led OA initiatives towards OA ventures controlled by commercial academic publishers.[149] The goal of subverting or circumventing the traditional publishing structure through OA was sidelined as 'the BOAI declaration instilled the idea that OA research can be achieved without the dominant cultures of market-based publishing needing to change'.[150] Moore argues that the 'BBB statements' represent a 'tacit approval' among the academic community of commercial academic publishers' practices which has

[142] M. Berger, 'Bibliodiversity at the centre: Decolonizing open access', *Development and Change*, 52/2 (2021), pp. 383-404; p. 388.
[143] Laakso et al., 'The development of open access journal publishing from 1993 to 2009', p. 9.
[144] Suber, *Open Access*, p. 7-8
[145] Ibid., p. 7.
[146] Björk and Korkeamäki, 'Adoption of the open access business model in scientific journal publishing', p. 1088.
[147] Chan, 'Supporting and enhancing scholarship in the digital age', p. 280.
[148] Moore, 'Revisiting "the 1990s debutante"', p. 863. Academic libraries participated in but arguably suffered from this compromise, as will be discussed in chapter three.
[149] Ibid.
[150] Ibid.

continued to influence OA discourse to the present day.[151] For instance, the aforementioned Peter Suber, one of the drafters of the BOAI statement, made this clear in an issue of the 'SPARC Open Access Newsletter', in which he insisted that he 'will never support an initiative whose direct purpose is to undermine publishers'.[152] The attitude of the academic community in this period seems to have, in a SCODT framing, become 'cooperative and coopetitive' rather than simply competitive.[153]

The Consolidation years (2005-2009) saw OA flourish thanks in part to these cooperative efforts of the academic community and commercial academic publishers. The Open Access Scholarly Publishers Association (OASPA), whose mission is to 'encourage and enable open access as the predominant model of communication for scholarly outputs'[154], was founded in 2008 as a coalition of members from across all OA stakeholder groups, including prominent OA advocates from the academic community.[155] Indeed, during the Consolidation years, new commercial academic publishers entered the OA market, and long-established publishers began to offer OA journals and 'hybrid' green / gold OA sharing options.[156] The annual share of articles published OA continued to grow, with 'publishing volume numbers dwarfing those of the earlier time periods'.[157]

The decade and more subsequent to the Consolidation years as defined by Laakso et al. might be termed the 'closure years', or the 'entrenchment years'.[158] OA publication statistics reflect a 'constant rise' during this time.

> Between 2009 and 2018 the percentage of Open Access publications in total publications in many nations of the European Union as well as in the USA was as high as 40%, in

[151] Moore, 'Revisiting "the 1990s debutante"', p. 863.
[152] P. Suber, 'Helping scholars and helping libraries', *SPARC Open Access Newsletter, issue # 84*, 2 April, 2005. <https://dash.harvard.edu/bitstream/handle/1/4552051/suber_helping.htm> (28 September, 2022). n. pag.
[153] Van Baalen, Van Fenema and Loebbecke, 'Extending the Social Construction of Technology (SCOT) framework to the digital world', p. 4.
[154] Open Access Scholarly Publishing Association, 'Mission', n. date. <https://oaspa.org/about/mission-and-purpose/> (24 September, 2022), n. pag.
[155] Open Access Scholarly Publishing Association, 'History', n. date. <https://oaspa.org/about/history/> (24 September, 2022), n. pag.
[156] Laakso et al., 'The development of open access journal publishing from 1993 to 2009', p. 9.
[157] Ibid.
[158] Author's coinage.

some countries even close to 50%, and in clinical medicine, 44% of all articles are published Open Access.[159]

The OA megajournal, another innovation of the post-Consolidation era, also helped to expand the reach of OA. Megajournals operate on an OA publishing model that privileges soundness of research method rather than anticipated impact or originality. They are web-based and are 'invariably funded by APCs', allowing them to publish thousands, even tens of thousands, of articles a year.[160] *PLoS ONE* was the first megajournal to rise to prominence on a non-profit APC model. Commercial academic publishers would follow their lead, establishing APC-based, for-profit 'clone' megajournals.[161] The rise of the megajournal has further entrenched gold OA as the primary mode of OA publishing.

The academic community seems, in the past decade, to have adopted OA as the way forward and has facilitated rhetorical closure of the issue by promoting OA – and gold OA in particular – as the inevitable future of academic publishing. OA advocates among the academic community 'have stated that it is inevitable that in the future the vast majority of research will be published as OA'.[162] For instance, in a 2011 address to the Public Knowledge Project conference in Berlin, SPARC Board member Lars Björnshauge touted the success of Nature Publishing Groups' commitment to gold OA, and declared that OA advocates have now 'won the discussion, the argument about open access, no doubt about that'.[163] In his seminal 2012 monograph *Open Access*, Suber assumed that the complications arising from conflicting OA publishing and business models are cultural, and that despite these conflicts we are moving towards a world in which 'OA is the default for new research'.[164]

The embrace of green OA and of the gold OA business model by the academic community during the last twenty years represents a significant move towards closure by

[159] J. Jähne, 'The future of scientific publication is Open Access, but needs diversity, equability and equality!', *Innovative Surgical Sciences*, 6/2 (2021), pp. 49-51; p. 49.
[160] Anderson, *Scholarly Communication*, p. 212-213.
[161] P. Binfield, 'PLoS ONE and the rise of the open access megajournal', *National Institute of Informatics: The 5th SPARC Japan Seminar, 2011* (2012), pp. 1-9; p. 3.
[162] R. Mounce, 'Open access and altmetrics: Distinct but complementary', *Bulletin of the American Society for Information Science and Technology*, 39/4 (2013), pp. 14-17; p. 15.
[163] L. Björnshauge, 'We have won the argument about Open Access – Now we have to bring things together and make it work!', *ScieCom Info*, 7/3 (2011), pp. 1-4, p. 2.
[164] Suber, *Open Access*, p. 8.

'redefining the problem'.[165] The problems facing the academic community as researchers in the adoption of OA included the role of the publisher in quality control, and the need to publish in well-established, reputable journals.[166] Solutions to these problems included the founding of new OA journals by scholars and advocating for OA in principle. As the OA movement has developed, the gold OA model has become the standard means of publishing in OA journals, and the academic community has widely accepted that the 'author-pays model for scientific publishing must be the future'.[167] The problem has been redefined; it is no longer 'How do we replace the publisher?', but 'Who pays for services that publishers provide?'. Influential members of the academic community facilitated this closure rhetorically by endorsing gold OA explicitly. For example, CERN's Scientific Information Policy Board released, in 2005, a statement endorsing the OA publishing and business models. In this document, CERN encouraged the use of pre- and post-print repositories, and 'explicitly endorse[d] the "author pays" model'.[168]

Rhetorical closure of this nature has been successful on ethical grounds, as it is difficult for members of the academic community to argue that open sharing is not a worthy goal. After all, OA in principle 'is consistent with the fundamental ethos of science',[169] and scholars have recognized that OA may provide benefits to them, certainly in the form the potential to reach more readers, and possibly in increased citation statistics.[170] Arguably, however, the early utopianism of the OA 'revolution' has been replaced with acquiescence to market-based OA business models through rhetorical closure and redefining. The adoption of gold OA and the acceptance of paying APCs represents a compromise between the ideals of open science and the realities of publishing within a 'prestige'-based academic system and a publisher-dominated scholarly communication ecosystem.[171] Power differentials and personal relationships also exist among stakeholder groups, and the degree to which the academic community has acquiesced to the interests of academic publishers is worthy of note. The gold OA model and the APC system disadvantage the academic community in economic terms, although the fact that APCs are

[165] Pinch and Bijker, 'The social construction of facts and artifacts', p. 425.
[166] Velterop, 'Open access', p. 27.
[167] F. Gannon, 'Open access: Scientists as paradoxical consumers', *Learned Publishing*, 18/4 (2005), pp. 295-299; p. 295.
[168] G. Altarelli, 'Continuing CERN action on open access', *e-lis*, Unpublished report (2005), pp. 1-5; p. 5.
[169] Björk and Korkeamäki, 'Adoption of the open access business model in scientific journal publishing', p. 1080.
[170] Suber, *Open Access*, p. 15.
[171] Guédon, *In Oldenburg's long shadow*, p. 16.

typically paid by funders and institutions in the 'author-proxy-pays' scenario can ease the burden on the individual author.[172] This model does not however benefit the academic community uniformly, as 'publishing patterns in the social sciences and in the arts and humanities differ significantly from those in the physical science disciplines'.[173] APC funding is not as readily available for scholars in HSS disciplines, therefore offering commercial academic publishers little incentive to establish APC-funded OA journals in these fields.[174] OA publishing in HSS typically takes the form of 'new digital-born' OA journals,[175] and open access books, ebooks, and book chapters typically published by university presses.[176] Smaller commercial academic publishing firms such as Brill that cater to HSS scholars do offer OA options to authors, but the growth of OA journal publishing in these disciplines has been slower than it has been in the STM fields.[177]

Despite these imbalances in the uptake of OA, particularly in its gold form, Lewis argues that gold OA is beneficial for the academic community, claiming that '[a]uthors should find a system dominated by Gold OA journals to be to their advantage, as their work will be widely distributed and available to all who have a need for it'.[178] Of greater concern to the academic community may be fear of losing the 'essentially friendly, productive relationship of mutual self-interest it has had with the publishing community'.[179] This is to be expected in a SCODT analysis, wherein stakeholders also attain closure by redefining the original problem 'in such a way as to establish consensus with other social relevant groups – thereby neutralizing arguments for alternative interpretations'.[180] Certainly, the academic community has made a compromise with academic publishers in adopting gold OA and APCs as the solution to the problem of the role of the publisher. The author-publisher relationship will be explored further in chapter two.

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[172] Guédon, 'It's a repository, it's a depository, it's an archive...', p. 592.
[173] Björk and Korkeamäki, 'Adoption of the open access business model in scientific journal publishing', p. 1080.
[174] Ibid., p. 1089.
[175] Mounier, 'Open access', p. 122.
[176] Ibid., p .124.
[177] J. Lange, 'Guest post: Plan S and Humanities publishing', *The Scholarly Kitchen*, 2 July, 2019. <https://scholarlykitchen.sspnet.org/2019/07/02/guest-post-plan-s-and-humanities-publishing/> (22 January, 2023), n. pag.
[178] Lewis, 'The inevitability of open access', p. 501.
[179] R.S. Berry, '"Full and open access" to scientific information: an academic's view', *Learned Publishing*, 13/1 (2000), pp. 37-42; p. 41.
[180] Van Baalen, Van Fenema and Loebbecke, 'Extending the Social Construction of Technology (SCOT) framework to the digital world', p. 3.

The SCODT framework allows room for other forms of closure besides rhetorical closure and closure by redefining the problem;[181] apathy or indifference towards the artifact could be a form of closure as well. While the OA movement within the academic community has been driven by those with a keen interest in disrupting or adapting the scholarly communication landscape, not all members have expressed equal enthusiasm or interest.[182] Guédon suggested that most members of the academic community are indifferent to OA, because the actual day-to-day work of publishing has not changed that much since the OA revolution.[183] Schwartz claims that

> scholars are, by and large research-productivity utility maximizers who have little or no interest in participating in schemes for an across the-board restructuring of the scholarly communication system. Their concerns are predominately discipline centric.[184]

Some members of the academic community may not be invested in the broader ethical issues of OA but have passively adopted it as the way forward because this movement has gained so much momentum in the past thirty years as to seem 'inevitable'.[185] Some institutions and funding bodies have required the open sharing of research outputs, thus providing extrinsic motivation for adopting OA.[186]

The SCODT framework is particularly useful for pointing out tensions and conflict among stakeholder groups.[187] These conflicts arise during all phases of the adoption of a technological innovation, and it is crucial to remember that in the SCODT framework, not all stakeholder groups will see the problem as having been solved by the proposed innovation. Nor does it always matter to one stakeholder group whether their proposed innovations are seen as relevant or useful to other groups.[188] In this instance, the academic community as stakeholder has

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[181] Van Baalen, Van Fenema and Loebbecke, 'Extending the Social Construction of Technology (SCOT) framework to the digital world'. The authors note that 'Pinch and Bijker (1984) distinguish two mechanisms for technology closure (but there are many more)' (p. 3). These mechanisms have not all been delineated, and so this section is taking advantage of the 'many more' clause.
[182] Guédon, *In Oldenburg's long shadow*, p. 35.
[183] Guédon, *In Oldenburg's long shadow*, p. 35.
[184] Schwartz, 'Reassessing prospects for the open access movement', p. 493.
[185] Lewis, 'The inevitability of open access', p. 493.
[186] Eger and Scheufen, *The Economics of Open Access*, p. 11.
[187] Pinch and Bijker, 'The social construction of facts and artifacts', pp. 415-416.
[188] Ibid., pp. 426-427.

broadly adopted OA publishing and business models and has left other stakeholder groups to sort out their own reactions. For example, Pelizzari found that the academic community doesn't necessarily care about the serials crisis as it is seen as a 'librarians' problem'.[189] From the point of view of academic libraries, gold OA has not resolved the serials crisis, and has further entrenched the power of academic publishers over the scholarly communication ecosystem.[190] This will be addressed in chapter three.

Every solution posed to a technological problem creates a reaction of either adoption or rejection both within and among stakeholder groups. Certainly not all members of the academic community agree that the OA movement is the way forward. As will be explored in the conclusion, the twenty years since the 'BBB' statements have seen further fragmentation of the OA movement into new stakeholder groups. The emerging rift between OA 'utopians' and OA realists has grown ever wider, and new stakeholder sub-groups and cross-stakeholder alliances are emerging that have posed further solutions to the problems engendered by the OA movement. The next chapter will explore how academic publishers have posed their own solutions to problems that the OA movement has created for them, and how a SCODT analysis can further illuminate intra-stakeholder conflict.

[189] E. Pelizzari, 'Harvesting for disseminating: Open archives and the role of academic libraries', *The Acquisitions Librarian*, 17/33-34 (2005), pp. 35-51; p. 47.
[190] Puehringer, Rath and Griesebner, 'The political economy of academic publishing', p. 3.

Chapter 2: Applying the SCODT framework to academic publishers

Academic publishers as stakeholders in the OA movement represent a diverse group of publishing firms. Broadly speaking, academic publishers can be divided into two categories: for-profit commercial publishers, and non-profit enterprises operated by scholarly societies and universities. Some major publishers such as Oxford University Press (OUP) and the American Chemical Society (ACS) are outliers that don't fit neatly into either category; OUP is a university-run publisher, for example, and ACS is a learned society publisher.[191] Despite these exceptions, commercial academic publishers represent the largest firms operating within the scholarly publishing market.[192]

Commercial academic publishers are also a diverse group in terms of the size of the publishing house[193] and the academic disciplines in which they publish.[194] For both STM and HSS, however, the top four commercial academic publishers, in terms of proportion of papers published, are Elsevier, Wiley-Blackwell, Springer, and Taylor & Francis. The 'Big Five' publishers in STM include the top four publishers and ACS, whereas the 'Big Five' in HSS includes Sage.[195] In the Humanities specifically, the many university presses, society publishers, and smaller commercial publishers (for example Brill and De Gruyter) remain predominant.[196]

Academic publishing as a whole is considered as a major stakeholder in the OA movement, and this chapter will consider academic publishers' response to OA as a stakeholder group with essentially aligned or 'coopetitive' interests. This chapter recognizes that academic publishing firms of various sizes and across the diversity of academic disciplines have posed unique solutions to problems posed to academic publishers by the OA movement; however, the following chapter is focused primarily on the big five commercial academic publishers.

Innovations and the OA movement as posing problems for academic publishers

The previous chapter considered the OA movement from the perspective of the academic community, the stakeholder group most responsible for driving the technological innovations and the legal and ethical frameworks that made the OA movement possible. It was the academic

[191] Anderson, *Scholarly Communication,* p. 75.
[192] Larivière et al., 'The oligopoly of academic publishers in the digital era', p. 5.
[193] Björk and Korkeamäki, 'Adoption of the open access business model in scientific journal publishing', p. 1091.
[194] Ibid., p. 1082.
[195] Larivière et al., 'The oligopoly of academic publishers in the digital era', p. 3.
[196] Björk and Korkeamäki, 'Adoption of the open access business model in scientific journal publishing', p. 1089.

community, broadly speaking, who developed the Web and adopted PDF technology, and who pioneered the first preprint servers, IRs, and fully OA journals.[197] The OA movement that these innovations gave rise to during the 1990's presented, to the academic community, a potential means of bypassing or 'subverting' the academic publishing oligopoly.[198] Many OA advocates in the academic community and in academic libraries (the latter to be discussed in chapter three) considered OA as a solution, or as the solution, to the serials crisis[199] and to the academic publishing oligopoly;[200] from the perspective of the academic publisher, however, the serials crisis and their own oligopolistic control over scholarly publishing were not problems at all. Rather, for commercial academic publishers, technological innovations in digital publishing and the OA movement these technologies made possible created problems – OA represented an existential threat to their highly successful business model.[201] As a stakeholder group, academic publishers had the most to lose with the rise of OA. As Suber succinctly phrased it, 'conventional publishers regard easy online sharing as a problem while researchers and libraries regard it as a solution'.[202]

In a recent article about the late rise in popularity of preprint servers, Johnson and Chiarelli (2019) summarize the three-front approach academic publishers could take in response to the disruption that these technologies could cause for academic publishers.[203] The analysis Johnson and Chiarelli offer pertains to a specific technology – the preprint server – and its impact on the traditional publishing industry, but this analysis can be historically applied to approaches that academic publishers took in response to the 'problem' of the OA movement. Johnson and Chiarelli base their analysis on Joshua Gans' *The Disruption Dilemma*. According to Gans, organizations facing an existential threat from 'disruptive innovations' will have a delayed reaction while they consider the uncertainty of the situation and the cost of reaction.[204] Eventually, organizations that adapt to disruption will do so using three key strategies:

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[197] Mounier, 'Open access', pp. 122-123.
[198] Puehringer, Rath and Griesebner, 'The political economy of academic publishing', p. 2.
[199] Eger and Scheufen, *The Economics of Open Access,* p. 13.
[200] Larivière et al., 'The oligopoly of academic publishers in the digital era', p. 3.
[201] Ibid., p. 47.
[202] Suber, *Open Access,* p. 35.
[203] R. Johnson and A. Chiarelli, 'The second wave of preprint servers: How can publishers keep afloat?', *The Scholarly Kitchen,* 16 October, 2019. <https://scholarlykitchen.sspnet.org/2019/10/16/the-second-wave-of-preprint-servers-how-can-publishers-keep-afloat/> (11 November, 2022), n. pag.
[204] Summarized in Johnson and Chiarelli, 'The second wave of preprint servers', n. pag.

> Beat them – attack by investing in the new disruptive technology.
> Join them – cooperate with or acquire the market entrant.
> Wait them out – use critical assets that new entrants may lack.[205]

In Johnson and Chiarelli's specific analysis, 'they' are preprint server developers and advocates; in applying these strategies to the broader scholarly communication context, 'they' are OA movement advocates with whom traditional commercial academic publishers are in conflict. Gans' disruption management approach as summarized by Johnson and Chiarelli fits neatly into a SCODT analysis. The technological innovations that were seen by some OA advocates among the academic and library communities as potential solutions to the serials crisis and the academic publishing oligopoly created problems for academic publishers. Thus, academic publishers as a stakeholder group had to formulate their own solutions to the problems created by the OA movement. They tended to react by adopting various strategies to 'beat' the OA movement, 'join' it, or 'wait it out'.

Before OA was an established movement, the Web and the PDF had massively disrupted the print model of scholarly publishing. The 'digital revolution' was a paradigmatic shift that has permanently altered the scholarly communication landscape, and academic publishers were quick to adapt to it.[206] Academic publishers began moving their journals and ebooks online and establishing toll access to licensed content. The 'form of the scholarly journal was not changed by the digital revolution', as publishers essentially moved their subscription print model to the web.[207] As was the case with print journals, the main subscribers to this material are academic libraries and research institutes, who attempted to keep up with rising subscription costs by entering into 'big deals' with academic publishers, typically through library consortia agreements.[208] 'Big deals' consist of 'hundreds or thousands of high-demand and low-demand' electronic journals offered to libraries as part of a subscription bundle, granting libraries access to a greater number of journals for a lower cost per title.[209] Library consortia are groups of

[205] Johnson and Chiarelli, 'The second wave of preprint servers', n. pag.
[206] Fyfe et al., 'Untangling academic publishing', p. 4.
[207] Larivière et al., 'The oligopoly of academic publishers in the digital era', p. 2.
[208] Puehringer, Rath and Griesebner, 'The political economy of academic publishing', p. 3.
[209] Suber, *Open Access*, p. 32.

independent libraries that work together to 'achieve common goals',[210] including pooling funds to purchase access to electronic resources offered in big deals. Big deals and their ambivalent impact on academic libraries will be discussed further in chapter three.

Electronic publishing costs were also 'marginal' compared to printing costs, so publishers have been able to increase production without sacrificing commensurate profits.[211] In the case of the Web and the PDF, academic publishers 'beat' challengers to their publication model by investing heavily in web technologies and establishing licensing and subscription frameworks.

Publishers also consolidated market power by purchasing many smaller commercial and society publishers.[212] The 'digital revolution' soon became a 'counter-revolution' as the move online allowed major academic publishers to increase their economic power, thus entrenching their oligopolistic control of the scholarly publishing system.[213] It is now 'generally believed that the digitization of knowledge diffusion has led to a great concentration of scientific literature in the hands of a few major players',[214] these players being the 'big five' publishers in STM and HSS, respectively.[215] Currently, the top five publishers in STM and HSS control up to 75 percent of scholarly output, and these publishers report 'over proportional profit margins of about 40%'.[216]

Publishers wield great economic power as a stakeholder in a SCODT framing of the OA movement. Although Guédon contends that publishers only have 'financial resources' to leverage over other OA stakeholders,[217] publishers also have significant cultural power over the academic community and academic libraries. Academic publishers have been able to establish control over the academic publishing market because the academic community continues to rely upon publishers for career advancement.[218] In their tenure and promotion processes, academics face pressure to publish in well-established, reputable journals with a high impact factor. Major academic publishers offer value to the academic community in the form of 'branding' and

[210] G. Liu and P. Fu, 'Shared next generation ILSs and academic library consortia: Trends, opportunities and challenges', *International Journal of Librarianship*, 3/2 (2018), pp. 53-71; p. 53.
[211] Larivière et al., 'The oligopoly of academic publishers in the digital era', p. 12.
[212] G.S. McGuigan, 'Publishing perils in academe: The serials crisis and the economics of the academic journal publishing industry', *Journal of Business and Finance Librarianship*, 10/1 (2004) pp. 13-26; p.15.
[213] Guédon, *In Oldenburg's long shadow*, p. 39.
[214] Larivière et al., 'The oligopoly of academic publishers in the digital era', p. 2.
[215] Ibid., p. 3.
[216] Puehringer, Rath and Griesebner, 'The political economy of academic publishing', p. 2.
[217] Guédon, 'It's a repository, it's a depository, it's an archive...', p. 587.
[218] Puehringer, Rath and Griesebner, 'The political economy of academic publishing', p. 4.

'validation' through peer-review,[219] and academics may be hesitant to publish in newly-founded OA journals or share their work in OA repositories.[220] Puehringer, Rath and Griesebner argue that

> in the highly concentrated market of academic publishing a small number of publishing companies ("big five") benefit from the highly competitive academic culture and the intrinsic motivation of individual researchers.[221]

Academic publishers also have cultural and economic power over academic libraries, which will be discussed further in chapter three. Publishers may be 'waiting out' their OA rivals, as they leverage their cultural and economic power over both academics and libraries. They are attempting to beat OA by joining it, involving themselves in the discussion on this topic and influencing important OA initiatives such as the 'BBB' statements, and by establishing cross-publisher OA advocacy groups such as OASPA.[222]

The emergence of the OA movement

During the Pioneering years (1993-1999) of the OA movement as outlined in the preceding chapter, the academic community developed the technological infrastructure and the legal and ethical framework of OA sharing. Preprint servers, IRs, and scholar-led OA journals began to be established, and academics interested in the topic began to express their advocacy of this new means of scholarly communication.[223] In a 2004 review of the publisher response to the nascent OA movement, Lingle observed that, during the 1990's, commercial academic publishers were largely silent on the topic of OA, at least in the published literature.[224] They were at this time perhaps adopting a 'wait them out' stance in respect to OA publishing, in the hopes that this movement would prove unsustainable. Commercial academic publishers were, however, taking notice of these 'pioneer' efforts at OA publishing, and

[219] Guédon, 'It's a repository, it's a depository, it's an archive...', p. 588.
[220] Ibid., p. 587.
[221] Puehringer, Rath and Griesebner, 'The political economy of academic publishing', p. 17.
[222] Open Access Scholarly Publishing Association, 'History'.
[223] Laakso et al., 'The development of open access journal publishing from 1993 to 2009', p. 8.
[224] V.A. Lingle, 'What are publishers saying about open access? Discussion in the non-library literature', *Journal of Electronic Resources in Medical Libraries*, 1/4 (2004), pp. 59-70; p. 60.

> representatives of commercial publishing houses regularly attended the early conferences in scholarly electronic publishing, often intervening vigorously to contest the possibility of much cheaper publication costs, or worse, the suggestion that e-journals might become freely accessible.[225]

During the Innovation years (2000-2004), however, and particularly in the period from 2002 to 2004, publishers came to accept that OA might be a serious challenge to their dominance of scholarly publishing. Lingle notes in her literature review that during this period the 'tone of the articles' representing the publishers' responses to the OA movement

> shifts from "open access will never happen," to "it may have possibilities," to "it may take some time, but this might actually work to some degree," to reports of actual projects in operation.[226]

The path to stabilization

In the same way that commercial academic publishers adapted the Web and the PDF to their own ends, publishers have been able to adapt to the OA movement by joining it. Publishers initially responded to early OA efforts with 'alarm', but soon realized that they had better 'study the situation closely, and revise their business strategies accordingly' as 'benign neglect could mean losing a lucrative business'.[227]

Initial threats to the academic publishing oligopoly came in the form of pioneering preprint servers and OA repositories such as arXiv, CogPrints, and the MIT DSpace Institutional Repository.[228] Commercial publishers' reaction to preprint servers was 'not long in coming', as some publishers responded to the threat of OA repositories by creating 'commercial variations on the archive movement'.[229] For example, in 2000, Elsevier established their Chemical Preprint Server (CPS), an OA archive for chemistry preprints. Many publishers have accepted green OA

[225] Guédon, *In Oldenburg's long shadow*, p. 37.
[226] Lingle, 'What are publishers saying about open access?', p. 60.
[227] Guédon, *In Oldenburg's long shadow*, p. 37.
[228] Chan, 'Supporting and enhancing scholarship in the digital age', pp. 282-283.
[229] Guédon, *In Oldenburg's long shadow*, p. 54.

sharing by allowing authors to share their articles to preprint and institutional repositories.[230] Academic publishers' increasing acceptance of green OA in these instances represents a move toward co-optation of the OA movement. Commercial academic publishers could not ignore emerging OA publishing and business models, and Elsevier reacted to the online archive movement by attempting to join it. Guédon argues that this was a clever move on the part of Elsevier, as, from the stakeholder's point of view, there 'is no better way to understand a potentially threatening movement than to be part of it, the better to manipulate it or deflect it in harmless directions'.[231]

These green OA initiatives were less of a concern for academic publishers as green OA has generally been 'marginalized' in the OA movement, at least as a solution to the serials crisis.[232] Green OA does not provide the 'branding' or prestige of a peer-reviewed publication in a reputable journal, and articles only submitted to preprint servers or housed in IRs cannot typically be used by academics in their promotion and tenure applications. Although arguments have been made in favor of universities changing their tenure and promotion policies to accommodate alternative forms of publishing, and to de-couple evaluation from impact factor, these efforts have not yet been universally adopted.[233] Green OA does allow academic publishers to reframe the problem of the cost of scholarly materials to one of access. It also allows them to comply with government mandates on access without sacrificing profits. Even green OA leaves researchers beholden to publishers; for

> green OA via repositories, primarily at the university and national levels is provided with respect to publisher-dictated embargos, meaning research articles are not made available until a publisher allows them to be. In either the gold or green scenario, researchers are still largely beholden to the traditional publishing industry.[234]

Academic publishers in fact benefit from OA mandates as the author pays – or rather, author-proxy-pays model – allows scholars to publish OA at no personal financial cost, as APCs are

[230] Suber, *Open Access*, p. 18.
[231] Guédon, *In Oldenburg's long shadow*, p. 57.
[232] Guédon, 'It's a repository, it's a depository, it's an archive...', p. 589.
[233] A. Clobridge, 'Open access: Progress, possibilities, and the changing scholarly communications ecosystem', *Online Searcher*, 38/2 (2014), pp. 42-52; pp. 46-48.
[234] Moore, 'Revisiting "the 1990s debutante"', p. 863.

generally paid for through research grant funding.[235] The serials crisis is also solved for publishers as they have offered OA options for libraries.[236] This will be explored further in chapter three.

The emergence of OA journals constituted a greater threat to the power of academic publishers. Early, scholar-led OA journals established during the Pioneering and Innovation years represented a very small proportion of publications and tended to be established in the Humanities disciplines.[237] It was the emergence of Public Library of Science (PLoS) as a potential rival that truly got the attention of commercial academic publishers. PLoS was established in 2001 as a not-for profit OA publisher, subsidized by grant funding.[238] Operating on an author-pays model, PLoS charged a $1500 USD APC; published articles would then be accessible for free online.[239] PLoS was founded with the stated aim of 'ushering in an era of open access'.[240] In a 2003 *Science* article, Michael Eisen, one of the founders of PLoS, was quoted as stating that the aim of PLoS is to 'overturn an obsolete system that no longer serves the best interests of science or scientists'.[241] *The Guardian* reported in November 2003 that banking firm Citigroup Smith Barney noted a drop in share prices for Elsevier (then known as Reed Elsevier) specifically due to the emergence of PLoS as an OA rival. 'Reed insiders' consulted for the piece claimed that OA is not a 'long-term threat because it is neither economically sustainable nor a more efficient way of publishing scientific journals'.[242] In February 2004, however, *The Guardian* again reported that that 'the highly lucrative scientific publishing empire' Elsevier was 'under threat from the growth of a new system of publishing on the internet known as open access'.[243] An *Information World Review* article from June 2004 characterized PLoS and the emerging OA movement as an 'an open access assault' on Elsevier and Nature Publishing Group

[235] Moore, 'Revisiting "the 1990s debutante"', p. 863.
[236] Guédon, 'It's a repository, it's a depository, it's an archive...', p. 589.
[237] Moore, 'Revisiting "the 1990s debutante"', p. 856.
[238] 'Leading a transformation in science communication', *PLoS*, n. date. <https://plos.org/about/> (15 June, 2022), n. pag.
[239] D. Malakoff and E. Francisco, 'Opening the books on open access', *Science*, 302/5645 (2003), pp. 550-554; p. 550.
[240] Ibid.
[241] Ibid.
[242] R. Wray, 'Market forces: Free access may constrain Reed', *The Guardian*, 1 November, 2003. <https://www.theguardian.com/business/2003/nov/01/4> (28 July, 2022).
[243] R. Wray, 'Open access threat to Reed's publishing empire', *The Guardian*, 19 February, 2004. <https://www.theguardian.com/media/2004/feb/19/pressandpublishing.citynews> (5 November, 2022).

(now known as Springer Nature).[244] On the commercial side of publishing, BioMed Central (BMC), funded by venture capital as a for-profit OA publisher, was founded in 1999.[245] BMC pioneered the APC with PLoS and also became a highly successful OA publisher, thus also establishing the viability of the gold OA model funded by APCs.[246]

During the Innovation (2000-2004) and Consolidation years (2005-2009) of the OA movement, commercial publishers increasingly ventured into OA publishing.[247] 2004 proved to be a watershed year for OA, as mainstream commercial publishers did – despite their claims about the unsustainability of OA publishing as a business model – begin 'experimenting' with 'hybrid' publishing models.[248] Hybrid OA is a publishing model whereby journals share some articles OA while charging toll access to others. Typically, in the hybrid model the author will choose to pay an APC for their article to be published OA.[249] Commercial academic publishers also founded fully OA journals at this time and continued to purchase and 'flip' established journals to OA. For example, Springer launched their 'Open Choice' options in 2003,[250] and purchased BMC in 2008[251]. Oxford University Press (OUP) flipped their journal *Nucleic Acids Research* to APC-funded OA in 2005.[252] Taylor & Francis entered OA publishing in 2011 by establishing new OA journals and converting current titles to OA.[253] Academic publishers took a 'beat them' approach by establishing new, fully OA journals funded by APCs, and a 'join them' approach by buying up already-established OA journals. APCs offered academic publishers a new business opportunity, making OA more acceptable to them.[254] Thus gold OA has emerged as the standard means of publishing in OA journals.[255]

These moves by the most economically powerful academic publishers contributed greatly to the stabilization of the gold OA business model as a solution to problems that the OA

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[244] 'Medical journals face open access threat from PLoS rival', *Information World Review*, 203 (2004), n. pag.
[245] Björk and Korkeamäki, 'Adoption of the open access business model in scientific journal publishing', p. 1088.
[246] Ibid.
[247] Laakso et al., 'The development of open access journal publishing from 1993 to 2009', p. 9.
[248] Ibid.
[249] Suber, *Open Access*, p. 140.
[250] R. Wray, 'Springer hires open access pioneer', *The Guardian*, 17 August, 2005. <https://www.theguardian.com/technology/2005/aug/17/media.pressandpublishing> (28 July, 2022), n. pag.
[251] Laakso et al., 'The development of open access journal publishing from 1993 to 2009', p. 9.
[252] Björk and Korkeamäki, 'Adoption of the open access business model in scientific journal publishing', p. 1088.
[253] 'Taylor & Francis opens access with new OA program', *Informa*, 20 December, 2011, <https://www.informa.com/media/press-releases-news/latest-news/taylor--francis-opens-access-with-new-oa-program/> (28 July, 2022).
[254] Puehringer, Rath and Griesebner, 'The political economy of academic publishing', p. 5.
[255] Berger, 'Bibliodiversity at the centre', p. 388.

movement created for publishers. Gold OA and the participation of commercial academic publishers has also benefitted the OA movement as a whole, for, if the OA movement had relied solely upon newly-founded OA journals, OA publishing could not have grown to the extent that it has since the late 1990s.[256] By converting well-established, reputable journals to OA, commercial academic publishers could leverage their 'prestige and editorial networks' to their advantage.[257] Academics concerned about the impact of OA publishing on their careers could publish OA without worrying about how it might impact tenure and promotion.

Stabilization and closure

As discussed in the previous chapter, the 'BBB statements' represent a significant act of stabilization of the OA movement. Representatives from across stakeholder groups allied with each other to define the guiding principles of the OA movement and pledged to advocate for and promote OA within and across their respective stakeholder groups.[258] The BBB statements were carefully designed not to alienate commercial academic publishers,[259] and kept the meaning of OA open to interpretation.[260] The BBB statements did not prescribe the adoption of specific OA publishing or business models, but called for 'both gratis and libre OA'.[261]

The influence of government policy on the stabilization and closure of the OA movement cannot be ignored as it was arguably the driving factor behind commercial academic publishers' move towards adopting OA.[262] National funding agencies in Western Europe, the UK, the US, and elsewhere passed OA mandates and pushed governments to pass legislation demanding open access to publicly-funded research. For example, the Wellcome Trust in the UK introduced their OA mandate in 2006, requiring the deposit of all Wellcome-funded research into the OA database PubMed Central within six months of publication. In another milestone for the OA movement, the Howard Hughes Medical Institute and the National Institutes of Health in the US successfully lobbied their government to pass legislation in 2008 requiring the deposit of publicly-funded research articles into PubMed Central after a twelve-month embargo. [263]

[256] Björk and Korkeamäki, 'Adoption of the open access business model in scientific journal publishing', p. 1081.
[257] Ibid.
[258] Chan, 'Supporting and enhancing scholarship in the digital age', p. 280.
[259] Moore, 'Revisiting "the 1990s debutante"', p. 857.
[260] Ibid., p. 863.
[261] Suber, *Open Access*, p. 71.
[262] Eger and Scheufen, *The Economics of Open Access*, p. 48.
[263] Ibid., pp. 48-52.

Although 'initially fearful' of OA, publishers have begun to see that OA is the future of publishing as well and have come to terms with it.[264] They have done so by successfully 'deflecting' the goals of the OA movement to their own ends through the gold model of OA publishing funded by APCs. The 'gold road of OA publishing' has demonstrated 'phenomenal growth since the year 2000',[265] and major academic publishers including the 'big five' in STM and HSS now dominate the OA market in addition to the traditional non-OA subscription market.[266] Moore claims that the OA movement now 'favors publishers', and that the 'tacit approval of free market practices' among OA stakeholders 'has led to the rise of APCs and the continued stranglehold of publishing by a handful of large for-profit publishers'.[267] Indeed, almost half of all APC revenues to date have gone to only three companies: Elsevier, Wiley, and Springer-Nature.[268] Now that the threat of OA has been neutralized, the 'prevailing feeling at progressive [academic publishing] houses is that any model that works will do just fine'.[269] Academic publishers have been so successful at adopting OA that it has become 'a truism among publishers that new journals nowadays can be brought to market only if they are open access; a new journal has no real future if it is placed on the subscription track'.[270]

Publishers have successfully facilitated closure of the OA debate by redefining the problem from one of cost to one of access by adopting the gold OA publishing model and accepting green OA in the form of author self-archiving. The stabilization and closure of the OA movement as the future of academic publishing has been the result of cross-stakeholder alliances among academic publishers, the academic community, and academic libraries. Closure in a SCODT framing generally requires cross-stakeholder agreement.[271] Academic publishers have joined the academic community and academic libraries in agreeing to promote and advocate for OA, but have been able to maintain – and even grow – their profits and their control over the

[264] R. Boissy and B. Schatz, 'Scholarly communications from the publisher perspective', *Journal of Library Administration*, 51/5-6 (2011), pp. 476-484; p. 482.
[265] Eger and Scheufen, *The Economics of Open Access*, p. 29.
[266] Puehringer, Rath and Griesebner, 'The political economy of academic publishing', p. 3.
[267] Moore, 'Revisiting "the 1990s debutante"', p. 863.
[268] Ibid., p. 856.
[269] Boissy and Schatz, 'Scholarly communications from the publisher perspective', p. 482.
[270] R. Schimmer, K.K. Geschuhng and A. Vogler, 'Disrupting the subscription journals' business model for the necessary large-scale transformation to open access', *Open Access Policy White Paper*, Max Planck Digital Library (2015), pp. 1-11; p. 2.
[271] Pinch and Bijker, 'The social construction of facts and artifacts', p. 424.

scholarly publishing ecosystem by leveraging their financial resources and their cultural power over the academic community.

Certainly, the stabilization and closure of the OA movement represents a win-win for academic publishers and the academic community. Such win-win situations in SCODT can facilitate closure of the problem, but in these instances, the winning stakeholders often 'keep silent about a potentially losing third estate'.[272] Academic libraries as a stakeholder group have arguably been considered as that silent third estate as regards the OA publishing and business models. This will be elaborated on in the final chapter, which will consider the OA movement from the perspective of academic libraries as stakeholder group.

[272] Guédon, *In Oldenburg's long shadow*, p. 27.

Chapter 3: Applying the SCODT framework to academic libraries

Academic libraries are the stakeholder group most impacted by the serials crisis and the academic publishing oligopoly. Academic libraries include those that provide services to institutions of higher education, including colleges and universities.[273]

The patrons that academic librarians serve generally include students, faculty, and researchers. The major services that libraries provide to their patrons include access to scholarly materials with functions of 'brokerage, access, and curation'.[274] Academic librarians act as brokers between publishers and their patron communities, negotiating with the former to ensure access to scholarly materials, including journal subscriptions and monographs, for the latter. Part of securing access to scholarly materials involves curating vast amounts of materials to ensure that these meet the needs of their patron communities.[275] Libraries of research institutions, such as the Max Planck Institute or CERN, that do not serve a student body but the needs of affiliated researchers, can also be considered academic libraries in this context as these institutions are subject to the same academic publishing market and patron demands as are institutions of higher education.

Academic publishing and the role of the academic library

The history of academic libraries in the West is of course bound up with the history of the institutions of higher education which they serve.[276] The first universities were established in Europe in the eleventh century,[277] and many had libraries whose functions over the succeeding centuries were to collect, curate, and provide access to hand-written manuscripts and, eventually, to printed materials including books and scholarly journals.[278] The first modern research library, in the sense that we understand such institutions as information hubs tasked with collecting and organizing research materials across a diverse range of academic disciplines, was established at the University of Berlin in 1810.[279] Although the scope of services performed by academic libraries and the types of materials that academic libraries collect have changed significantly

[273] Anderson, *Scholarly Communication*, p. 113.
[274] Ibid. p. 114.
[275] Ibid. pp. 114-116.
[276] W. Bivens-Tatum, *Libraries and the Enlightenment* (Los Angeles: Library Juice Press, 2012), p. 47.
[277] Ibid.
[278] Anderson, *Scholarly Communication*, p. 132.
[279] Bivens-Tatum, *Libraries and the Enlightenment*, p. 47.

over the centuries, librarians' role in brokering access to scholarly materials has remained in principle much the same: academic libraries buy from academic publishers books and scholarly journal subscriptions.[280] In the era of print, academic libraries and research institutes would purchase this material for patrons to borrow or read in person. In the digital era, when academic publishers moved their journals online (although some publishers have maintained print editions of journals, these represent a 'dwindling share' of the whole) and established toll-access, academic libraries moved online as well.[281]

Academic library budgets are controlled by their host institutions. Typically, the college, university, or research institute will allocate funds to their libraries for infrastructure and operational maintenance including facilities, equipment, and software, and collections purchases including print books, e-books, and subscriptions to academic journals.[282] Academic journal subscriptions usually take up the bulk of an academic library's budget.[283] Costs per institution vary greatly and publishers encourage libraries not to disclose subscription fees,[284] but a 2019 estimate indicates that academic libraries now spend about 40 percent of their total budgets on scholarly journal subscriptions alone. This represents a significant increase from 1998, when libraries spent about 25 percent of their budget on subscriptions.[285] Money allocated specifically to collections tends to follow the '80/20 rule', with 80 percent of collections funds spent towards the purchase of journal subscriptions, and 20 percent to scholarly monographs.[286] On average, journal subscription costs have risen about 6 percent per year since 2012, outpacing inflation and increasing pressure on library budgets which have tended to stabilize or decline.[287]

Academic libraries have little choice about which journals to subscribe to. Collections decisions must reflect the needs of their patron base, whose members include students, teaching faculty, and researchers. Libraries are 'obligated' to subscribe to the journals that researchers

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[280] Bivens-Tatum, *Libraries and the Enlightenment*, pp. 114-116.
[281] Eger and Scheufen, *The Economics of Open Access*, p. 12-13.
[282] Anderson, *Scholarly Communication*, p. 114.
[283] B. Rodríguez-Bravo, A. Fernández-Ramos, M. De-la-Mano and M. Vianello-Osti, 'The evolution and revision of big deals: A review from the perspective of libraries', *Profesional de la información*, 30/4 (2021), pp. 1-22; p. 2.
[284] Suber, *Open Access*, p. 33.
[285] D. Pollock and A. Michael, 'News and views: Library spending and the serials crisis', *Delta Think*, 3 May, 2020 <https://deltathink.com/news-views-library-spending-and-the-serials-crisis/> (26 December, 2022), n. pag.
[286] S. Bosch, B. Albee, and S. Romaine, 'Are we there yet?: Periodicals price survey 2022', *Library Journal*, 14 April, 2022. <https://www.libraryjournal.com/story/Are-We-There-Yet-Periodicals-Price-Survey-2022> (26 December, 2022), n. pag.
[287] S. Jurchen, 'Open access and the serials crisis: The role of academic libraries', *Technical Services Quarterly*, 37/2 (2020), pp. 160-170; p. 161.

most want access to, including expensive, high-impact journals published by major firms.[288] As explained in chapter two, the big five commercial academic publishers control access to the majority of these journals, and have established a publishing oligopoly over this material in the post-World War II era.[289] Due to this oligopoly, libraries are 'more or less helpless' in the face of high subscription fees.[290] The serials crisis is not new and has been cited in the literature since the 1980s as a problem facing academic libraries.[291] The shift from print to digital in the 1990s did not create the serials crisis, and has had an ambivalent impact on academic libraries:[292] the digital revolution has allowed commercial academic publishers to strengthen their hold on the scholarly communication system, but it has also offered to academic libraries potential solutions to the serials crisis in the form of OA sharing.[293]

Academic libraries and the digital revolution

As the previous chapters have demonstrated, the academic community drove the shift in scholarly communication from print to digital, while 'large commercial publishers were early adopters of online academic publishing and remain the most influential players' in this realm.[294] Academic libraries were also quick to adapt to the move to digital during the 1990's. They were often 'leaders' in establishing a Web presence on their respective campuses, and as print journals moved online, academic libraries kept pace with technological developments.[295] Meideiros notes that the 'evolution of library reaction to electronic journals was not gradual but supersonic', as librarians found themselves needing to make large electronic journal collections available to patrons 'overnight'.[296] This evolution was not necessarily by choice, however, as academic libraries are beholden to the needs of their patron communities and 'must adopt and adapt to the new tools provided by computer science, continuing to provide storage and retrieval

[288] McGuigan, 'Publishing perils in academe', p. 19.
[289] Fyfe et al., 'Untangling academic publishing', p. 14.
[290] Larivière et al., 'The oligopoly of academic publishers in the digital era', p. 11.
[291] Fyfe et al., 'Untangling academic publishing', p. 13.
[292] Larivière et al., 'The oligopoly of academic publishers in the digital era', p. 2.
[293] Puehringer, Rath and Griesebner, 'The political economy of academic publishing', p. 4.
[294] Fyfe et al., 'Untangling academic publishing', p. 4.
[295] N. Medeiros, 'Of budgets and boycotts: The battle over open access publishing', *OCLC Systems and Services: International Digital Library Perspectives*, 20/1 (2004), pp. 7-10; p. 8.
[296] Medeiros, 'Of budgets and boycotts', p. 8.

independently of the medium (on-paper or on-line)' to remain relevant to the needs of these communities.[297]

Funds have also been diverted to subscription journal packages and away from monograph purchases, as libraries' budgets have not been able to keep pace with journal price increases.[298] This 'monograph crisis' has impacted HSS disciplines in particular, as monograph publishing is a more common means of knowledge dissemination within those fields than it is within STM disciplines.[299] 'Big deals' – bundles of high- and low-demand journals sold together in a subscription package – were also offered to academic libraries beginning in the 1990s as a means of mitigating the budget crunch facing libraries and in order to stave off subscription cancellations.[300] Nearly 'all the major publishers of scientific journals opted for [the big deal] model at the turn of the millennium', with Elsevier, Springer, Taylor and Francis, and Wiley offering the greatest share of big deal packages.[301] However, big deals would come to exacerbate the serials crisis. Big deals make it impractical for libraries to cancel subscriptions to individual journals and 'reduce the bargaining power of libraries and the cost-cutting options available to them', thereby allowing publishers to protect low-demand journals from cancellation, to 'protect their own profits', and to 'shift the [economic] devastation to library budgets'.[302] Academic libraries have tried to mitigate the serials crisis by banding together in consortia to better negotiate with academic publishers,[303] while some libraries and consortia have launched boycotts of major publishers in protest of exorbitant subscription fees.[304] Although big deals, consortia arrangements, and boycotts have mitigated the serials crisis for libraries somewhat, they have not challenged the scholarly communication structure in a lasting way. Paying for access to scholarly materials remains a problem for academic libraries.[305]

[297] H. Bosc and S. Harnad, 'In a paperless world a new role for academic libraries: Providing open access', *Learned Publishing*, 18/2 (2005), pp. 95-99; p. 95.
[298] Suber, *Open Access*, p. 33.
[299] Fyfe et al., 'Untangling academic publishing', p. 14.
[300] Suber, *Open Access*, p. 32.
[301] Rodríguez-Bravo et al., 'The evolution and revision of big deals', p. 2.
[302] Suber, *Open Access*, p. 32.
[303] Rodríguez-Bravo et al., 'The evolution and revision of big deals', p. 3.
[304] Larivière et al., 'The oligopoly of academic publishers in the digital era', p. 13.
[305] Jurchen, 'Open access and the serials crisis', p. 161.

Open access as potential solution to the serials crisis

Academic libraries played a key role in the OA movement from its inception. Some librarians were explicit in their advocacy of OA publishing as a solution to the serials crisis and the commercial academic publishing oligopoly. Jurchen notes that

> Many academic librarians were early advocates of the OA movement in part because its goal of expanding access to research supports core values of librarianship, but also for its potential as a solution to the problem of serials pricing and budget pressures.[306]

Some OA advocates issued a 'call to arms', encouraging librarians to use the disruptive possibilities of OA sharing to their advantage as 'the best chance librarians will ever have to break the chains that have bound them and their budgets'.[307] As academic libraries play a 'critical role' in the scholarly communication process, librarians could not 'afford to ignore open-access venues' of publication and sharing.[308]

During the Pioneering years of the OA movement, therefore, academic libraries were active in adopting digital technologies necessary for the stabilization of OA. Academic libraries were early to promote and support scholar-led OA publishing; for example, Lund University in Sweden established several OA journals early on,[309] and many of the scholar-led journals created during this time were supported by librarians and hosted on library servers.[310] Academic libraries also took the lead in establishing institutional repositories and pre-print archives, becoming the 'standard bearer for the advent and implementation of e-prints archives and Open Archives services'.[311] For example, academic libraries were eager to adapt MIT's DSpace repository technology for their own institutions after this open-source software was released in 2002.[312]

Academic libraries also pioneered efforts to catalogue and organize access to disparate e-journals, preprint servers and other OA materials across the Web.[313] The Open Archives

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[306] Jurchen, 'Open access and the serials crisis', p. 161.
[307] B. Quint, 'Now or never!', *Searcher*, 10/1 (2002), pp. 6-7; p. 6-7.
[308] K.D. Schmidt, P. Sennyey and T.V. Carstens, 'New roles for a changing environment: Implications of open access for libraries', *College & Research Libraries*, 66/5 (2005), pp. 407-416; p. 407.
[309] Bosc and Harnad, 'In a paperless world a new role for academic libraries', p. 98.
[310] Getz, *Three frontiers in open access scholarship*, p. 8.
[311] Pelizzari, 'Harvesting for disseminating', p. 48.
[312] Chan, 'Supporting and enhancing scholarship in the digital age', p. 283.
[313] Bosc and Harnad, 'In a paperless world a new role for academic libraries', p. 98.

Initiative (OAI) was in particular a 'significant step forward' for the OA movement.[314] The OAI, co-created in 1999 by an academic librarian and a computer scientist,[315] is a metadata-tagging protocol that libraries could use to make OA archives on the Web interoperable, making it 'possible to search, navigate and harvest all the distributed archives jointly, as if they were only one global virtual archive'.[316] The Directory of Open Access Journals (DOAJ), still the most 'authoritative catalogue' of peer-reviewed OA journals,[317] was established by Lund University Libraries in 2003.[318] This was followed by their Directory of Open Access Books (DOAB) in 2012.[319] These and other directories made OA journals and e-books easier to locate and to incorporate into library cataloguing systems, thus increasing findability for patrons.[320] These initiatives were intended to aid in the uptake of OA by making this material far easier to access, and, ideally, to make OA more appealing to members of the academic community as a means of sharing their research.[321]

OA advocates among academic librarians were a key voice in the stabilization and rhetorical closure of the OA movement as solution to the scholarly communications problems facing academic libraries. Academic librarians tended to be early adopters of OA technologies and staunch advocates for OA sharing.[322] During the Pioneering years of the OA movement, for instance, technical services librarians 'authored some of the earliest scholarship on integrating OA into library services', while librarians in public service and scholarly communications roles contributed publications 'about services and programming to engage an array of users in OA education and adoption'.[323] Harvard Widener Library's Peter Suber, for example, is an 'internationally leading OA expert'[324] who helped draft the BOAI statement, was a founding

[314] Bosc and Harnad, 'In a paperless world a new role for academic libraries', p. 96.
[315] H.V.D. Sompel and C. Lagoze, 'The Santa Fe convention of the Open Archives Initiative', *D-Lib Magazine*, 6/2 (2000), n. pag.
[316] Bosc and Harnad, 'In a paperless world a new role for academic libraries', p. 96.
[317] Suber, *Open Access*, p. 72.
[318] Björk and Korkeamäki, 'Adoption of the open access business model in scientific journal publishing', p. 1092.
[319] L. Stenson, 'Why all these directories? An introduction to DOAJ and DOAB', *Insights*, 25/3 (2012), n. pag.
[320] 'For Librarians', Directory of Open Access Books, n. date. <https://www.doabooks.org/en/librarians> (8 December, 2022), n. pag.
[321] Guédon, 'It's a repository, it's a depository, it's an archive...', p. 589.
[322] Björk and Korkeamäki, 'Adoption of the open access business model in scientific journal publishing', p. 1092.
[323] R.E. Scott, C. Harrington, and A. Dubnjakovic, 'Exploring open access practices, attitudes, and policies in academic libraries', *Portal: Libraries and the Academy*, 21/2 (2021), pp. 365-388; p. 366.
[324] Björk and Korkeamäki, 'Adoption of the open access business model in scientific journal publishing', p. 1092.

member of SPARC, and has promoted OA through blogs, scholarly publications, and advocacy work.[325]

As the OA movement began to grow, so did intra-stakeholder conflict emerge and new alliances form. Just as the academic community acquiesced to the market model of OA publishing and business models, so too did academic librarians compromise with academic publishers and become 'less militant' about the serials crisis.[326] These compromises are evident in a few major developments of the OA movement. As early as 1998, OA advocates among the academic library community created the Scholarly Publishing and Academic Resources Coalition (SPARC). SPARC is a cross-national, cross-library advocacy group that was founded to promote new means of academic publishing outside of the traditional publishing model.[327] Founding SPARC member and then-Director, University of Wisconsin-Madison Libraries Ken Frazier made it clear in a 2000 article that SPARC was established not to antagonize commercial academic publishers, but to 'introduce alternative publishing models'[328] within a competitive, market-based publishing system.[329] While acknowledging some of the problems created by the traditional academic publishing system such as high subscription costs, Frazier claims that

> the true goal of SPARC is not to create a revolution in publishing, but, instead, to promote a renaissance of values that have always been present in the international community of scholars and scientists.[330]

SPARC played a major role in the development of the 'BBB' statements and was a signatory to all three. As discussed in chapters two and three, the BBB statements were the result of a cross-stakeholder alliance of academic publishers, the academic community, and academic libraries. As SPARC founders were careful not to antagonize academic publishers, the BBB statements

[325] P. Suber, 'Peter Suber', 22 December, 2022, <https://cyber.harvard.edu/~psuber/wiki/Peter_Suber> (26 December, 2022).
[326] Guédon, 'It's a repository, it's a depository, it's an archive...', p. 586.
[327] R. Wellen, 'Taking on commercial scholarly journals: Reflections on the "open access" movement', *Journal of Academic Ethics*, 2/1 (2004), pp. 101-118; p. 107.
[328] K. Frazier, 'SPARC: Encouraging new models of disseminating knowledge', *Collection Building*, 19/3 (2000), pp. 117-123; p. 118.
[329] Ibid., p. 120.
[330] Frazier, 'SPARC', p. 123. Frazier states that the values SPARC hopes to promote are 'those of the European Enlightenment' (p. 123).

were also designed to not alienate this powerful stakeholder.[331] Once more, academic librarians contributed significantly to these statements, which adopted a neutral stance towards market-driven OA. As Schwartz observed, for 'political and practical, but primarily economic' reasons, the OA movement 'does not challenge the for-profit establishment, preferring to label itself "constructive, not destructive"'.[332]

This marks the shift towards closure by redefining the problem from one of cost to one of access. As Poynder notes,

> OA advocates were almost exclusively focused on the accessibility problem, but when the costs of open access (the affordability problem) could no longer be ignored, [OA advocates] encouraged publishers to introduce a deeply problematic business model – pay-to-publish open access funded by means of article-processing charges (APCs).[333]

Indeed, academic librarians were early advocates of the gold OA business model as well. Advocacy of the 'author-pays'/'author-proxy-pays' model contributed to closure of the problem of the serials crisis by redefining it as one of access rather than cost. Lewis explicitly redefines the serials crisis in this fashion in his endorsement of gold OA as the way forward, claiming that OA in both its green and gold forms is a solution to the serials crisis for academic libraries on ethical grounds because it has allowed them to increase access to scholarly materials on behalf of their patrons.[334] In particular,

> gold OA is a disruptive innovation that we [academic librarians] should embrace. We should do everything we can to encourage and support its growth, because in the end it is a disruption whose success will make our world better.[335]

Despite Lewis' optimistic assertion, gold OA has not yet solved the serials crisis nor mitigated the academic publishing oligopoly. Rather, APC-funded gold OA has introduced its own set of

[331] Moore, 'Revisiting "the 1990s debutante"', p. 857.
[332] Schwartz, 'Reassessing prospects for the open access movement', p. 489.
[333] R. Poynder, *Open access: Could defeat be snatched from the jaws of victory?* (Lincoln, Nebraska: DigitalCommons@University of Nebraska-Lincoln, 2019), p. 7.
[334] Lewis, 'The inevitability of open access', p. 495.
[335] Ibid., p. 504.k

problems for academic libraries. As noted above, APC-funded gold OA is a 'problematic' business model as it can help solve accessibility problems but does not solve the affordability problem.[336] APC costs, just like journal subscription rates, have risen faster than has inflation, and the most prestigious commercial academic publishers have been able to charge extremely high rates for OA publication.[337] Springer's journal *Nature*, for example, charges an 'astronomical' $10,000 or more USD per OA article;[338] for comparison, *PLoS* journals currently charge between $1800 and $5300 USD per article depending on subject area, with the average charge about $3000 USD per article.[339] While some academic libraries provide APC funding to researchers, APC funds are for the most part provided by the author's research funder or university. The emergence of APC-funded gold OA as the standard for OA publishing has had the effect of diverting funds from academic libraries' collections budgets towards covering APC costs.[340] So-called 'transformative agreements' (also known as 'read-and-publish' or 'publish-and-read' deals), whereby academic libraries subsidize OA publishing by major firms by shifting funds away from subscriptions,[341] have also had this effect. At the same time, policy initiatives such as Plan S in Europe, which require publicly-funded research to be openly available, rely heavily upon the APC publishing model. This has served to further establish the gold model as the standard form of OA publishing and has further entrenched the economic power of academic publishers.[342]

Stabilization and closure

At least in its green form, OA appeared to some academic librarians to have the potential to solve the problem of the serials crisis and the academic publishing oligopoly. OA scholar-led journals that operated outside of the traditional academic publishing market also had the potential to disrupt academic publishing for the benefit of libraries. However, as gold OA funded by APCs emerged as the most popular OA business model, little has changed for academic libraries in

[336] Poynder, *Open access*, p. 7.
[337] Jurchen, 'Open access and the serials crisis', p. 164.
[338] C.M. Noûs, 'Message from the grassroots: Scholarly communication, crisis, and contradictions', *Canadian Journal of Academic Librarianship / Revue canadienne de bibliothéconomie universitaire*, 7 (2021), pp. 1-27; p. 8.
[339] 'Publication fees', *PLoS*, n. date. <https://plos.org/publish/fees/> (9 December, 2022), n. pag.
[340] Jurchen, 'Open access and the serials crisis', p. 166.
[341] L.J. Hinchliffe, 'Transformative agreements: A primer', *The Scholarly Kitchen*, 23 April, 2019. <https://scholarlykitchen.sspnet.org/2019/04/23/transformative-agreements/> (28 December, 2022), n. pag.
[342] Jurchen, 'Open access and the serials crisis', p. 168.

terms of costs.[343] As explored in chapter two, academic publishers were able to co-opt the OA movement to increase revenue streams.[344] Academic publishers established 'hybrid' journals offering OA options, 'flipped' existing journals to OA, and created new gold OA journals funded by APCs.[345] Despite the rise of OA as the apparent 'future' of scholarly communication, the traditional subscription model of access to scholarly literature is still the 'mainstream' form of academic publishing.[346] Academic libraries are still obligated to pay subscription fees to both traditional (non-OA) and hybrid OA journals, and still face shrinking budgets.[347] In the case of hybrid journals, academic libraries often pay twice over, as they are subsidizing both the OA and non-OA articles published within the hybrid journal – a practice known as 'double-dipping' on the part of academic publishers.[348]

Academic libraries' apparent acquiescence to the interests of commercial academic publishers within the OA movement is a result of the economic power these publishers wield over them. Academic libraries must still subscribe to traditional, non-OA journals, and have little choice about which journals they must subscribe to; the publishing oligopoly the major firms have established has made it essentially impossible for even the wealthiest of libraries to keep up with subscription costs.[349] Academic librarians therefore may be hesitant to antagonize academic publishers given their reliance on them for access to the bulk of their journal collections. Consortial arrangements among libraries have given them some leverage with academic publishers; however, Nesta observed that '[s]ome consortia have been criticised [sic] as being mere buyers' clubs, only concerned with lowering costs but not using their financial leverage to obtain longer-term benefits',[350] while others note that for 'some consortial leaders, maintaining good relations with vendors is more important than solidarity with other consortia'.[351] Indeed, agreements with publishers take a lot of labor and time for library consortia to arrange, and libraries must be fully prepared to lose subscription access to valuable journals if negotiations break down as '[b]luffing is rarely successful, regardless of whether done by an individual

[343] Jurchen, 'Open access and the serials crisis', p. 162-163.
[344] Puehringer, Rath and Griesebner, 'The political economy of academic publishing', p. 3.
[345] Björk and Korkeamäki, 'Adoption of the open access business model in scientific journal publishing', p. 1081.
[346] Ibid., p. 1092.
[347] Jurchen, 'Open access and the serials crisis', p. 161.
[348] Puehringer, Rath and Griesebner, 'The political economy of academic publishing', p. 2.
[349] Suber, *Open Access*, p. 30.
[350] F. Nesta, 'Consortia from past to future', *Library Management*, 40/1-2 (2019), pp. 12-22; p. 17.
[351] Guédon, 'It's a repository, it's a depository, it's an archive...', p. 585.

library or a collective of libraries'.[352] Consortial boycotts of large commercial publishers have met with limited success. For example, Projekt DEAL in Germany, a nation-wide consortium of academic and research libraries tasked with pursuing 'transformative "publish and read" [OA] agreements with the largest commercial publishers of scholarly journals'[353] saw negotiations with Elsevier break down in 2018, and to date Projekt DEAL institutions remain cut off from access to the latest Elsevier publications.[354] The academic community, the patron base whose interests the academic library must serve, demands access to this material as well, and engaging in conflict with academic publishers over costs puts librarians at risk of alienating another powerful stakeholder.

Paradoxically, academic libraries do benefit in some ways from the complexities that the OA movement has introduced to scholarly communications.[355] As the PDF and the Web threatened the primacy of the academic publisher as information provider, so too did these technologies create an existential threat to libraries as information brokers. The advent of the Internet and search engines such as Google has 'eroded patrons' reliance' on libraries as information sources,[356] and the OA movement which has made so much more quality research available online has also allowed patrons to bypass resources offered by the library. The complexities of OA publishing and business models have therefore provided librarians with job security and means of value-proving, including new roles and professional categories within libraries specifically designed to advocate for, implement, and monitor OA initiatives.[357]

Academic librarians have adopted OA in principle and have both tacitly and explicitly accepted and promoted market-based OA business models. Academic libraries remain at the forefront of promoting and advocating for OA within and outside of their own institutions, and have a key role to play in the adoption of OA publishing and business modes in the mainstream of scholarly communication.[358] Although it is clear that the OA movement as it currently situates itself is not the solution to either the serials crisis or the academic publishing oligopoly,[359] new

[352] L. Busby, 'Our friends are killing us', *The Serials Librarian*, 61/2 (2011), pp. 160-167; p. 166.
[353] Projekt DEAL, 'What is DEAL?', n. date. <https://www.projekt-deal.de/about-deal/#> (21 January, 2023), n. pag.
[354] Projekt DEAL, 'Elsevier News', n. date. <https://www.projekt-deal.de/elsevier-news/> (21 January, 2023), n. pag.
[355] Scott et al., 'Exploring open access practices, attitudes, and policies in academic libraries', p. 380.
[356] Schmidt et al., 'New roles for a changing environment', p. 410.
[357] Ibid., pp. 410-414.
[358] Anderson, *Scholarly Communication*, p. 136.
[359] Noûs, 'Message from the grassroots', p. 22.

stakeholders and cross-stakeholder alliances are emerging that may finally challenge the role of the market in scholarly communications.[360] These new groups and alliances will be discussed briefly in the conclusion.

[360] Noûs, 'Message from the grassroots', pp. 20-21.

Conclusion

In the post-Consolidation years of the OA movement, it appeared that progress on OA had 'reached an impasse'.[361] Green reports that, in the period from 2010 to 2016, the average number of OA articles per journal began to decline.[362] The COVID-19 pandemic that emerged in late 2019 led to a resurgence of interest in OA sharing, as members of the academic community and academic librarians called on commercial academic publishers to openly share all COVID-19-related materials and encouraged researchers to share their research and data in preprint servers and IRs.[363] This momentary spike in OA sharing and publishing had mixed results,[364] and did not result in a 'systemic' uptake of OA publishing, particularly not outside of biomedical research.[365] The widespread and controversial[366] implementation of Plan S in Europe in 2021 has also given a boost to the OA movement, but this is unlikely to become a permanent solution to the serials crisis and academic publishing oligopoly as it relies upon 'unsustainable' APC-funded gold OA models.[367] Commentators have long predicted that the traditional publishing system will continue to exist alongside OA publishing and sharing initiatives, and this is the likely to be the state of scholarly communication for the foreseeable future.[368]

The OA movement is it is currently constituted has perhaps become too diffuse and too complex to provide a single solution to the problems of the serials crisis and the academic publishing oligopoly. This very complexity has made the OA movement easier for academic publishers to co-opt and exploit. As Guédon has observed,

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[361] R. Pells and R.J. Smits, 'Plan S has fundamentally re-shaped academic publishing: As we emerge from the pandemic it should not return to how it was before', *Impact of Social Sciences Blog*, 16 February, 2022 <https://blogs.lse.ac.uk/impactofsocialsciences/2022/02/16/plan-s-has-fundamentally-re-shaped-academic-publishing-as-we-emerge-from-the-pandemic-it-should-not-return-to-how-it-was-before/> (2 January, 2023).
[362] T. Green, 'Is open access affordable? Why current models do not work and why we need internet-era transformation of scholarly communications', *Learned Publishing*, 32/1 (2019), pp. 13-25; p. 13.
[363] A. Odone, S. Galea, D. Stuckler, C. Signorelli and the University Vita-Salute San Raffaele COVID-19 literature monitoring working group, 'The first 10,000 COVID-19 papers in perspective: Are we publishing what we should be publishing?', *European Journal of Public Health*, 30/5 (2020), pp. 849-850, p. 849
[364] Ibid.
[365] J.N. Lane and H. Lifshitz-Assaf, 'Dismantling the ivory tower's knowledge boundaries: A call for open access as the new normal in the social sciences post-COVID', The Brookings Institution, 15 February, 2022. <https://www.brookings.edu/research/dismantling-the-ivory-towers-knowledge-boundaries-a-call-for-open-access-as-the-new-normal-in-the-social-sciences-post-covid/> (7 January, 2023), n. pag.
[366] S.C.L. Kamerlin, D.J. Allen, B. de Bruin, E. Derat and H. Urdal, H., 'Journal open access and Plan S: Solving problems or shifting burdens?', *Development and Change*, 52/3 (2021), pp. 627-650; p. 641.
[367] Jurchen, 'Open access and the serials crisis', p. 168.
[368] Schmidt et al., 'New roles for a changing environment', p. 414.

> the richest and most powerful among the publishers have maneuvered very efficiently to divide researchers and librarians and coopt a fraction of each group. They have also managed to cloud the issues sufficiently to make researchers indecisive and librarians less militant.[369]

SCODT theory lights a way through this 'cloudiness', through the garden of forking paths that is the reaction of diverse stakeholders to the OA movement. It allows one to delineate power differentials among stakeholder groups and possibilities for new alliances across and within these groups. This thesis has applied the SCODT framework to the OA movement from the early 1990s to roughly the present, and argues that the initial problems that the OA movement were intended to solve – namely, the serials crisis and the academic publishing oligopoly – are the responsibility of the commercial academic publishers.[370] The serials crisis continues to severely impact library budgets, while the academic publishing oligopoly has exacerbated this crisis as it ensures that libraries have no alternative market options.[371] The academic community and academic libraries saw the OA movement as a potential solution to both of these problems.[372] Commercial academic publishers, however, saw OA itself as the problem, and were able to leverage their considerable financial power into co-opting and neutralizing the OA movement, using cross-stakeholder alliances with members of the academic community and within academic libraries to accomplish this.[373] Academic publishers retain cultural power over academics who must for career advancement publish in and read articles from the journals that they own,[374] and publishers have successfully used their considerable economic power over libraries to continue to extract money from them in the form of traditional journal subscriptions.[375] OA advocates among the academic community and academic libraries have acceded to this co-optation because the problem has been redefined as one of access rather than cost, deflecting scrutiny away from academic publishers' oligopolistic practices.[376] APC-funded gold OA has in particular allowed publishers to redefine the problem facing the academic

[369] Guédon, 'It's a repository, it's a depository, it's an archive...', p. 586.
[370] Guédon, *In Oldenburg's long shadow*, p. 1.
[371] Larivière et al., 'The oligopoly of academic publishers in the digital era', p. 11.
[372] Noûs, 'Message from the grassroots', p. 4.
[373] Guédon, 'It's a repository, it's a depository, it's an archive...', p. 586.
[374] Puehringer, Rath and Griesebner, 'The political economy of academic publishing', p. 2.
[375] Jurchen, 'Open access and the serials crisis', p. 161.
[376] Noûs, 'Message from the grassroots', p. 4.

community and academic libraries in this fashion. The academic community is generally happy to go along with this, as researchers will publish OA if mandated to, particularly as APC costs are usually borne by their research funders.[377] Academic librarians have taken on, or have been 'coerced' to take on, the role of access providers and facilitators within the OA movement out of professional obligation to their patrons and university administrators,[378] and in the absence of the economic power that would be required to affect change to the market-driven, oligopolistic academic publishing structure.[379]

It appears that new cross-stakeholder alliances are needed to posit novel solutions to the problems of the serials crisis and the academic publishing oligopoly. 'Networked individuals'[380] are emerging as prominent critics of the OA movement, and new cross-stakeholder sub-groups and alliances are forming that have recognized the need for OA solutions that operate outside of the market-based model that currently dominates the mainstream of the OA movement.[381] For example, the emergence of 'pirate OA' has become a controversial response to the affordability problem. Kazakh neuroscientist Alexandra Elbakyan established SciHub – a server to which individuals can, usually illegally, share paywalled articles for free access – in 2011 'as a reaction to the high cost of paywalled articles'.[382] Some scholars and librarians see SciHub and academic piracy in general as a form of 'electronic civil disobedience', and therefore as an acceptable response to a publisher-dominated scholarly communications ecosystem.[383]

The Radical Open Access group was founded in 2015 by a coalition of publishers, scholars, academic librarians, and others in HSS disciplines as a 'radical "alternative" to the conservative versions of open access that are currently being put forward by commercially-oriented presses, funders and policy makers'.[384] Similarly, in 2020, a 'group of scholar-publishers and editors' also in the HSS disciplines published an 'Open Access Manifesto for

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[377] Jurchen, 'Open access and the serials crisis', p. 163.
[378] Noûs, 'Message from the grassroots', p. 15.
[379] Larivière et al., 'The oligopoly of academic publishers in the digital era', p. 12.
[380] Van Baalen, Van Fenema and Loebbecke, 'Extending the Social Construction of Technology (SCOT) framework to the digital world', p. 5.
[381] Noûs, 'Message from the grassroots', p. 18.
[382] J.E. James, 'Pirate open access as electronic civil disobedience: Is it ethical to breach the paywalls of monetized academic publishing?', *Journal of the Association for Information Science and Technology*, 71/12 (2020), pp. 1500-1504; p. 1502.
[383] James, 'Pirate open access as electronic civil disobedience', p. 1503.
[384] 'About the collective', Radical Open Access, n. date, <http://radicaloa.disruptivemedia.org.uk/about/> (7 January, 2023), n. pag.

Freedom, Integrity, and Creativity in the Humanities and Interpretive Social Sciences'.[385] This manifesto calls for the 're-politicization' of OA

> in order to challenge existing rapacious practices in academic publishing—namely, often invisible and unremunerated labour, toxic hierarchies of academic prestige, and a bureaucratic ethos that stifles experimentation.[386]

Some advocates among academic librarians have also called for their colleagues to reject the OA movement as a market-dominated entity. A pseudonymous collective of (presumably) academic librarians writing under the name Camille Marcos Noûs advocates for a strategy of 'resistance' to and 'refusal' of the traditional academic publishing structure and market-driven OA initiatives and policies. Academic librarians

> need to reject that our roles are only to offer access to literature, and we should refuse to acknowledge structures such as APCs that continue to deny the ability of all to participate on equal terms.[387]

As these new alliances and stakeholder groups emerge, it is clear that the OA movement will likely become increasingly complex and difficult to navigate. What makes SCODT so useful as a framework for analyzing the OA movement is that it can be applied in a very granular fashion. Sub-groups emerge as solutions to one problem generate more problems for other stakeholders. Alliances shift, and new sub-groups emerge. Individuals use their influence to propose even more solutions, and so on. The SCODT model also allows relevant stakeholder groups to map out possible outcomes for the future, and possible new alliances that can be formed in response

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[385] S. Batterbury, 'Open but unfair: The role of social justice in open access publishing', *Impact of Social Sciences Blog*, 24 October, 2020. <https://blogs.lse.ac.uk/impactofsocialsciences/2020/10/24/publishing-articles-concerned-with-social-justice-issues-in-unjust-journal-outlets-seems-wrong-open-access-qa-with-simon-batterbury/> (28 July, 2022).
[386] A. Pia, S. Batterbury, A. Joniak-Lüthi, M. LaFlamme, G. Wielander, F.M. Zerilli, S.M. Nolas, J. Schubert, N. Loubere, I. Franceschini and C. Walsh, 'Labour of love: An Open Access manifesto for freedom, integrity, and creativity in the humanities and interpretive social sciences', *The Commonplace*, 16 July, 2020 <https://commonplace.knowledgefutures.org/pub/y0xy565k/release/2> (28 December, 2022), n. pag.
[387] Noûs, 'Message from the grassroots', p. 18.

to the problems facing scholarly communication. It is clear that new stakeholder alliances will be necessary for the truly ‘revolutionary’ promise of the OA movement to be realized.

Bibliography

Published secondary materials

Altarelli, G., 'Continuing CERN action on open access', *e-lis*, Unpublished report (2005), pp. 1-5.

Anderson, R. *Scholarly communication: What everyone needs to know* (Oxford: Oxford University Press, 2018).

Baalen, P. van, P. Van Fenema and C. Loebbecke, 'Extending the Social Construction of Technology (SCOT) framework to the digital world', Paper presented at International Conference Information Systems, Dublin, Ireland (2016), pp. 1-8.

Batterbury, S., 'Open but unfair: The role of social justice in open access publishing', *Impact of Social Sciences Blog*, 24 October, 2020. <https://blogs.lse.ac.uk/impactofsocialsciences/2020/10/24/publishing-articles-concerned-with-social-justice-issues-in-unjust-journal-outlets-seems-wrong-open-access-qa-with-simon-batterbury/> (28 July, 2022).

Berger, M., 'Bibliodiversity at the centre: Decolonizing open access', *Development and Change*, 52/2 (2021), pp. 383-404.

Berry, R.S., '"Full and open access" to scientific information: An academic's view', *Learned Publishing*, 13/1 (2000), pp. 37-42.

Binfield, P., 'PLoS ONE and the rise of the open access megajournal', *National Institute of Informatics: The 5th SPARC Japan Seminar, 2011* (2012), pp. 1-9.

Bivens-Tatum, W., *Libraries and the Enlightenment* (Los Angeles: Library Juice Press, 2012).

Björk, B.C. and T. Korkeamäki, 'Adoption of the open access business model in scientific journal publishing: A cross-disciplinary study', *College & Research Libraries*, 81/7 (2020), pp. 1080-1094.

Björnshauge, L., 'We have won the argument about Open Access – Now we have to bring things together and make it work!', *ScieCom Info*, 7/3 (2011), pp. 1-4.

Boissy, R. and B. Schatz, 'Scholarly communications from the publisher perspective', *Journal of Library Administration*, 51/5-6 (2011), pp. 476-484.

Bosc, H. and S. Harnad, 'In a paperless world a new role for academic libraries: Providing open access', *Learned Publishing*, 18/2 (2005), pp. 95-99.

Bosch, S., B. Albee and S. Romaine, 'Are we there yet?: Periodicals price survey 2022', *Library Journal*, 14 April, 2022. <https://www.libraryjournal.com/story/Are-We-There-Yet-Periodicals-Price-Survey-2022> (26 December, 2022).

Busby, L., 'Our friends are killing us', *The Serials Librarian*, 61/2 (2011), pp. 160-167.

Butterfield, A.C., Q. Galbraith and M. Martin, 'Expanding your institutional repository: Librarians working with faculty', *The Journal of Academic Librarianship*, 48/6 (2022), pp. 1-5.

Chan, L. 'Supporting and enhancing scholarship in the digital age: The role of open access institutional repositories', *Canadian Journal of Communication*, 29/3 & 4 (2004), pp. 277-300.

Clobridge, A., 'Open access: Progress, possibilities, and the changing scholarly communications ecosystem', *Online Searcher*, 38/2 (2014), pp. 42-52.

David, P.A., 'Understanding the emergence of "open science" institutions: Functionalist economics in historical context', *Industrial and Corporate Change*, 13/4 (2004), pp. 571-589.

Dubinsky, E., 'A current snapshot of Institutional Repositories: Growth rate, disciplinary content and faculty contributions', *Journal of Librarianship and Scholarly Communication*, 2/3 (2014), pp. 1-22.

Eger, T. and M. Scheufen, *The Economics of Open Access: On the future of academic publishing* (Cheltenham: Elgar, 2018).

Frazier, K., 'SPARC: Encouraging new models of disseminating knowledge', *Collection Building*, 19/3 (2000), pp. 117-123.

Fyfe, A., K. Coate, S. Curry, S. Lawson, N. Moxham and C.M. Røstvik, 'Untangling academic publishing: A history of the relationship between commercial interests, academic prestige and the circulation of research', *Discussion Paper*, University of St. Andrews (2017), pp. 1-23.

Gannon, F., 'Open access: Scientists as paradoxical consumers', *Learned Publishing*, 18/4 (2005), pp. 295-299

Getz, M., *Three frontiers in open access scholarship* (Cornell: Internet-First University Press, 2005).

González, A.G., ‘Open science: Open source licenses in scientific research’, *North Carolina Journal of Law & Technology*, 7/2 (2006), pp. 321-366.

Green, T., ‘Is open access affordable? Why current models do not work and why we need internet-era transformation of scholarly communications’, *Learned Publishing*, 32/1 (2019), pp. 13-25.

Guédon, J.C., ‘It’s a repository, it’s a depository, it’s an archive...: Open access, digital collections and value’, *Arbor*, 187/937 (2009), pp. 581-595.

—., *In Oldenburg's long shadow: Librarians, research scientists, publishers, and the control of scientific publishing* (Washington, DC: Association of Research Libraries, 2001).

Hinchliffe, L.J., ‘Transformative agreements: A primer’, *The Scholarly Kitchen*, 23 April, 2019. <https://scholarlykitchen.sspnet.org/2019/04/23/transformative-agreements/> (28 December, 2022).

Jähne, J., ‘The future of scientific publication is Open Access, but needs diversity, equability and equality!’, *Innovative Surgical Sciences*, *6*/2 (2021), pp. 49-51.

James, J.E., ‘Pirate open access as electronic civil disobedience: Is it ethical to breach the paywalls of monetized academic publishing?’, *Journal of the Association for Information Science and Technology*, 71/12 (2020), pp. 1500-1504.

Johnson, R. and A. Chiarelli, ‘The second wave of preprint servers: How can publishers keep afloat?’, *The Scholarly Kitchen*, 16 October, 2019. <https://scholarlykitchen.sspnet.org/2019/10/16/the-second-wave-of-preprint-servers-how-can-publishers-keep-afloat/> (11 November, 2022).

Jurchen, S., ‘Open access and the serials crisis: The role of academic libraries’, *Technical Services Quarterly*, 37/2 (2020), pp. 160-170.

Kamerlin, S.C.L., D.J. Allen, B. de Bruin, E. Derat and H. Urdal, ‘Journal open access and Plan S: Solving problems or shifting burdens?’, *Development and Change*, 52/3 (2021), pp. 627-650.

Laakso, M., P. Welling, H. Bukvova, L. Nyman, B.C. Björk and T. Hedlund, ‘The development of open access journal publishing from 1993 to 2009’, *PLoS ONE*, 6/6 (2011), pp. 1-10.

Lane, J.N. and H. Lifshitz-Assaf, ‘Dismantling the ivory tower’s knowledge boundaries: A call for open access as the new normal in the social sciences post-COVID’, The Brookings Institution, 15 February, 2022. <https://www.brookings.edu/research/dismantling-the-

ivory-towers-knowledge-boundaries-a-call-for-open-access-as-the-new-normal-in-the-social-sciences-post-covid/> (7 January, 2023).

Lange, J., 'Guest post: Plan S and Humanities publishing', *The Scholarly Kitchen*, 2 July, 2019. <https://scholarlykitchen.sspnet.org/2019/07/02/guest-post-plan-s-and-humanities-publishing/> (22 January, 2023).

Larivière, V., S. Haustein and P. Mongeon, 'The oligopoly of academic publishers in the digital era', *PLoS ONE*, 10/6 (2015), pp. 1-15.

Leiner, B.M., V.G. Cerf, D.D. Clark, R.E. Kahn, L. Kleinrock, D.C. Lynch, J. Postel, L.G. Roberts and S.S. Wolff, 'The past and future history of the Internet', *Communications of the Association for Computing Machinery*, 40/2 (1997), pp. 102-108.

Lewis, D.W., 'The inevitability of open access', *College and Research Libraries*, 73/5 (2012), pp. 493-506.

Lingle, V.A., 'What are publishers saying about open access? Discussion in the non-library literature', *Journal of Electronic Resources in Medical Libraries*, 1/4 (2004), pp. 59-70.

Liu, G. and P. Fu, 'Shared next generation ILSs and academic library consortia: Trends, opportunities and challenges', *International Journal of Librarianship*, 3/2 (2018), pp. 53-71.

Malakoff, D. and E. Francisco, 'Opening the books on open access', *Science*, 302/5645 (2003), pp. 550-554.

Martinez Aguilar, E., *Electronic distribution of searchable technical documentation libraries* (Montreal, Quebec: Doctoral dissertation, Concordia University, 2003).

McGuigan, G.S., 'Publishing perils in academe: The serials crisis and the economics of the academic journal publishing industry', *Journal of Business and Finance Librarianship*, 10/1 (2004), pp. 13-26.

Medeiros, N., 'Of budgets and boycotts: The battle over open access publishing', *OCLC Systems and Services: International Digital Library Perspectives*, 20/1 (2004), pp. 7-10.

'Medical journals face open access threat from PLoS rival', *Information World Review*, 203 (2004), n. pag.

Moore, S.A., 'Revisiting "the 1990s debutante": Scholar-led publishing and the prehistory of the open access movement', *Journal of the Association for Information Science and Technology*, 71/7 (2020), pp. 856-866.

Mounce, R. ‘Open access and altmetrics: Distinct but complementary’, *Bulletin of the American Society for Information Science and Technology*, 39/4 (2013), pp. 14-17.

Mounier, P., ‘Open access: An opportunity to redesign scholarly communication in history’, in (S. Noiret, M. Tebeau, and G. Zaagsma, eds.) *Handbook of Digital Public History* (Berlin: De Gruyter, 2022), pp. 121-129.

Nesta, F., ‘Consortia from past to future’, *Library Management*, 40/1-2 (2019), pp. 12-22.

Noûs, C.M., ‘Message from the grassroots: Scholarly communication, crisis, and contradictions’, *Canadian Journal of Academic Librarianship / Revue canadienne de bibliothéconomie universitaire*, 7 (2021), pp. 1-27.

Odone, A., S. Galea, D. Stuckler, C. Signorelli and the University Vita-Salute San Raffaele COVID-19 literature monitoring working group, ‘The first 10 000 COVID-19 papers in perspective: Are we publishing what we should be publishing?’, *European Journal of Public Health*, 30/5 (2020), pp. 849-850.

Peach, K., ‘Join the open-access revolution’, *CERN Courier*, *June* (2005), p. 50.

Pelizzari, E., ‘Harvesting for disseminating: Open archives and the role of academic libraries’, *The Acquisitions Librarian*, 17/33-34 (2005), pp. 35-51.

Pells, R. and R.J. Smits, ‘Plan S has fundamentally re-shaped academic publishing: As we emerge from the pandemic it should not return to how it was before’, *Impact of Social Sciences Blog*, 16 February, 2022 <https://blogs.lse.ac.uk/impactofsocialsciences/2022/02/16/plan-s-has-fundamentally-re-shaped-academic-publishing-as-we-emerge-from-the-pandemic-it-should-not-return-to-how-it-was-before/> (2 January, 2023).

Pia, A., S. Batterbury, A. Joniak-Lüthi, M. LaFlamme, G. Wielander, F.M. Zerilli, S.M. Nolas, J. Schubert, N. Loubere, I. Franceschini and C. Walsh, ‘Labour of love: An Open Access manifesto for freedom, integrity, and creativity in the humanities and interpretive social sciences’, *The Commonplace*, 16 July, 2020 <https://commonplace.knowledgefutures.org/pub/y0xy565k/release/2> (28 December, 2022).

Pinch, T.J. and W.E. Bijker, ‘The social construction of facts and artefacts: Or how the sociology of science and the sociology of technology might benefit each other’, *Social Studies of Science*, 14/3 (1984), pp. 399-441.

Pollock, D. and A. Michael, 'News and views: Library spending and the serials crisis', *Delta Think*, 3 May, 2020 <https://deltathink.com/news-views-library-spending-and-the-serials-crisis/> (26 December, 2022).

Poynder, R., *Open access: Could defeat be snatched from the jaws of victory?* (Lincoln, Nebraska: DigitalCommons@University of Nebraska-Lincoln, 2019).

Praal, F.E.W., *Symbolic capital and scholarly communication in the humanities: An analysis of sociotechnical transition* (Doctoral dissertation, Leiden University, 2020).

Puehringer, S., J. Rath and T. Griesebner, 'The political economy of academic publishing: On the commodification of a public good', *PLoS ONE*, 16/6 (2021), pp. 1-21.

Quint, B., 'Now or never!', *Searcher*, 10/1 (2002), pp. 6-7.

Reinsfelder, T.L., 'Open access publishing practices in a complex environment: Conditions, barriers, and bases of power', *Journal of Librarianship and Scholarly Communication*, 1/1 (2012), pp. 1-16.

Rodríguez-Bravo, B., A. Fernández-Ramos, M. De-la-Mano and M. Vianello-Osti, 'The evolution and revision of big deals: A review from the perspective of libraries', *Profesional de la información*, 30/4 (2021), pp. 1-22.

Schimmer, R., K.K. Geschuhng and A. Vogler, 'Disrupting the subscription journals' business model for the necessary large-scale transformation to open access', *Open Access Policy White Paper*, Max Planck Digital Library (2015), pp. 1-11.

Schmidt, K.D., P. Sennyey and T.V. Carstens, 'New roles for a changing environment: Implications of open access for libraries', *College & Research Libraries*, 66/5 (2005), pp. 407-416.

Schwartz, C.A., 'Reassessing prospects for the open access movement', *College and Research Libraries*, 66/6 (2005), pp. 488-495.

Scott, R.E., C. Harrington and A. Dubnjakovic, 'Exploring open access practices, attitudes, and policies in academic libraries', *Portal: Libraries and the Academy*, 21/2 (2021), pp. 365-388.

Solomon, D.J. and B.C. Björk, 'A study of open access journals using article processing charges', *Journal of the American Society for Information Science and Technology*, 63/8 (2012), pp. 1485-1495.

Sompel, H.V.D. and C. Lagoze, 'The Santa Fe convention of the Open Archives Initiative', *D-Lib Magazine*, 6/2 (2000), n. pag.

Stenson, L., 'Why all these directories? An introduction to DOAJ and DOAB', *Insights*, 25/3 (2012), n. pag.

Suber, P., *Open access* (Cambridge, Massachusetts: MIT Press, 2012).

—, 'Promoting open access in the humanities', *Syllecta Classica*, 16/1 (2005), pp. 231-246.

—, 'Helping scholars and helping libraries', *SPARC Open Access Newsletter*, issue # 84, 2 April, 2005, <https://dash.harvard.edu/bitstream/handle/1/4552051/suber_helping.htm> (28 September, 2022).

—, 'The taxpayer argument for open access', *SPARC Open Access Newsletter, issue # 65*, 4 September, 2003. <https://dash.harvard.edu/bitstream/handle/1/4725013/suber_taxpayer.htm> (15 April, 2022).

Tennant, J. P., F. Waldner, D.C. Jacques, P. Masuzzo, L.B. Collister and C.H. Hartgerink, 'The academic, economic and societal impacts of open access: An evidence-based review, *F1000Research*, 5/632 (2016), pp. 1-54.

Velterop, J., 'Open access: principle, practice, progress', *Serials*, 18/1 (2005), pp. 26-29.

Wellen, R., 'Taking on commercial scholarly journals: Reflections on the "open access" movement', *Journal of Academic Ethics*, 2/1 (2004), pp. 101-118.

Wray, R., 'Market forces: Free access may constrain Reed', *The Guardian*, 1 November, 2003. <https://www.theguardian.com/business/2003/nov/01/4> (28 July, 2022).

—., 'Open access threat to Reed's publishing empire', *The Guardian*, 19 February, 2004. <https://www.theguardian.com/media/2004/feb/19/pressandpublishing.citynews> (5 November, 2022).

—., 'Springer hires open access pioneer', *The Guardian*, 17 August, 2005. <https://www.theguardian.com/technology/2005/aug/17/media.pressandpublishing> (28 July, 2022).

Wu, M.W. and Y.D. Lin, 'Open source software development: An overview', *Computer*, 34/6 (2001), pp. 33-38.

Websites

'About the collective', Radical Open Access, n. date, <http://radicaloa.disruptivemedia.org.uk/about/> (7 January, 2023).

CERN, 'A short history of the Web', n. date. <https://home.cern/science/computing/birth-web/short-history-web#:~:text=Tim%20Berners%2DLee%2C%20a%20British,and%20institutes%20around%20the%20world.> (24 September, 2022).

Consejo Superior de Investigaciones Científicas, 'Transparent ranking: CRIS by Google Scholar (14th edition, June 2022)', n. date. <https://repositories.webometrics.info/en/cris> (15 June, 2022).

'For Librarians', Directory of Open Access Books, n. date. <https://www.doabooks.org/en/librarians> (8 December, 2022).

'Leading a transformation in science communication', *PLoS*, n. date. <https://plos.org/about/> (15 June, 2022).

Open Access Scholarly Publishing Association, 'History', n. date. <https://oaspa.org/about/history/> (24 September, 2022).

Open Access Scholarly Publishing Association, 'Mission', n. date. <https://oaspa.org/about/mission-and-purpose/> (24 September, 2022).

Projekt DEAL, 'Elsevier News', n. date. <https://www.projekt-deal.de/elsevier-news/> (21 January, 2023).

Projekt DEAL, 'What is DEAL?', n. date. <https://www.projekt-deal.de/about-deal/#> (21 January, 2023).

'Publication fees', *PLoS*, n. date. <https://plos.org/publish/fees/> (9 December, 2022).

'Read the declaration: Budapest Open Access Initiative', *BOAI*, 14 February, 2002, <https://www.budapestopenaccessinitiative.org/read/> (9 July, 2022).

'SPARC Open Access newsletter', *Community-wealth.org*, n date. <https://community-wealth.org/content/sparc-open-access-newsletter> (24 September, 2022).

'The story of Creative Commons', *Creative Commons*, n. date. <https://certificates.creativecommons.org/cccertedu/chapter/1-1-the-story-of-creative-commons/> (27 December, 2022).

Suber, P. 'Peter Suber', 22 December, 2022, <https://cyber.harvard.edu/~psuber/wiki/Peter_Suber> (26 December, 2022).

‘Taylor & Francis opens access with new OA program’, *Informa*, 20 December, 2011, <https://www.informa.com/media/press-releases-news/latest-news/taylor--francis-opens-access-with-new-oa-program/> (28 July, 2022).

‘TSpace Repository Policies and Guidelines’, University of Toronto, n. date, <https://tspace.library.utoronto.ca/about/collectionpolicies.jsp> (27 December, 2022).

‘Who we are: Open access’, BioMed Central, n. date. <https://www.biomedcentral.com/about/open-access> (15 June, 2022).