

# The academic eBook ecosystem reinvigorated: A perspective from the USA

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## Abstract

The development of infrastructure to support new forms of long-form digital scholarship that go 'beyond the eBook' has been an active area of humanities publishing over the last 5 years. Proactive philanthropic support for this work has energized the US non-profit publishing community, especially university presses and library-based publishers. This article describes the various strands of work that are ongoing and identifies some common themes: an emphasis on shared values; a focus on building an ecosystem of interoperable platforms and tools; and engagement with the challenges facing new-form digital publications (especially preservation, discovery, and accessibility). This article also considers how publishers who are looking for new platforms and processes can navigate the variety of options now on offer.

## INTRODUCTION

Frequent news stories about the persistence of print and a stable and possibly shrinking market for direct-to-consumer eBooks obscure the significant digital transformation that monographic publishing is undergoing. Over the last 5 years speculative discussions of what it would mean to go 'beyond the book' such as the Academic Book of the Future initiative (Lyons & Rayner, 2014) have morphed into pilot and prototype projects. These in turn are now entering production in the form of new workflows, new production tools, and a proliferation of technology platforms. The implementation of new infrastructure is happening across the world and in all sectors of academic book publishing. In Europe, for example, the HIRMEOS project (Bertino, 2017) is taking a systematic approach to developing common standards and linkages between platforms. In the commercial world, Bloomsbury's turn towards a 2020 digital strategy focused on transforming academic book content features dramatically enhanced eBook-based products like the Bloomsbury Architecture Library, Screen Studies, and Applied Visual Arts Library (Bloomsbury.com, n.d.). In the UK, the proliferation of new university and academic-led presses is leading to new initiatives around shared infrastructure and

open access business models (Adema, Stone, & Keene, 2017). While recognizing the broad spread of activity, this article focuses narrowly on an overview of the current state of innovation among non-profit humanities book publishers in the USA: a space where focused philanthropic funding has created an environment of unprecedented change and constructive upheaval.

## THE ROLE OF THE ANDREW W. MELLON FOUNDATION

The National Endowment for the Humanities (NEH) and the Institute of Museum and Library Services (IMLS) are both US government agencies with a strong interest in scholarly communication in the humanities. But while these agencies and several other private funders selectively support publishing initiatives, the dominant force in transforming humanities publishing in the US is undoubtedly the Andrew W. Mellon Foundation through its long-running Scholarly Communication programme. Not only does the level of Mellon support dwarf other financial investments, but the programme officers are very proactive in working with potential and current grantees to shape and improve their programmes.

**Key points**

- The discussion about how digital affordances will impact academic book publishing has moved from 'speculation' to 'action' as new platforms and workflows are implemented.
- The world of US non-profit book publishers has been energized by funding support, particularly from the Andrew W. Mellon Foundation, aimed at creating new infrastructure for long-form scholarship.
- Separate initiatives now align around shared values and seek interoperability with an emerging ecosystem of largely open source scholarly communication tools.
- Shared challenges are being identified, especially related to preservation, discoverability, and accessibility.
- The plethora of new tools offers special value to smaller book publishers but is difficult to navigate and make sense of.

Mellon also partners strategically with other funders. For example, the Foundation has collaborated with NEH to create the Humanities Open Book Program under the auspices of which 1,965 out-of-print humanities books have been made available to the public as free eBooks, often with additional digital affordances (Hindley, 2018).

In 2014, Mellon announced a substantial new programme of grantmaking focused on academic eBooks. While some seed funding had already been granted by the time a broader request for proposals was issued, most university presses first heard about the funding programme dedicated to a rethinking of the scholarly book in a 22 May 2014 e-mail from senior programme officer for scholarly communications, Don Waters. This called on scholars and publishers to 'develop and experiment with ways to produce, disseminate, and make easily discoverable high quality digital works of long-form interpretive scholarship, including monographs, that interact effectively with related materials on the web as well as with online readers'. The particular focus of the 2014 funding, the e-mail from Waters explained, was to enable 'university presses to collaborate with each other and with other organizations to develop shared capacity and infrastructure in one or more of the following areas of long-form digital publishing for the humanities: (a) editing; (b) clearing rights to images and multimedia content; (c) the interaction of the publication on the Web with primary sources and other related materials; (d) production; (e) re- and post-publication peer review; (f) marketing; (g) distribution; and (h) maintenance and preservation of digital content'. While open access outputs were not explicitly required, the e-mail also explained that the Foundation was 'especially interested in developments that would support new business models, such as those in which authors or their institutions, rather than readers, pay for the costs of producing and distributing works on the web, or those that generate other new sources of revenue'.

The grant funding offered was generous (proposals should request funding of approximately \$600,000–900,000 with the grant period to be determined by the project partners, but not exceeding 3 years) and the e-mail well-timed, preceding by about a month the annual meeting of the Association of University Presses. Many meetings were scheduled and conversations provoked. Successful awards began to be announced in December 2014 and the author's own institution, University of Michigan, was one of the recipients of funding. As of June 2018, the Digital Monograph Initiative had provided funding of \$25.3 million spread over 58 grants (Waters, 2018).

Several reviews of the intent and progress of the Mellon Foundation's intervention have been published, both by the funder itself and by scholars supported by the funder (Maxwell, Bordini, & Shamash, 2017; Waters, 2016). A planned follow-up landscape study of the digital monograph initiative by John Maxwell, conducted under the auspices of the MIT Press, has recently been announced. That the exact list of projects supported varies between articles reflects the depth and breadth of the Foundation's influence and its capacious vision of the scholarly communications system. Because projects are funded through a variety of mechanisms (including smaller planning grants and larger project grants), start at different dates, and last for different lengths of time, keeping track of the various initiatives is sometimes difficult. While other important projects such as Vega, Scalar, and Hypothes.is will be mentioned, the focus of this article is on the initiatives listed in Table 1. Representatives of these projects were invited to a digital monograph initiative meeting hosted by the Foundation in New York on 27 and 28 September, 2017, to promote collaboration between publishing platform and tool developers. The vibrancy of the meeting and the further conversations it provoked revealed many links and common interests.

The original 2014/2015 grants were for 2 or 3 years. Therefore, in 2018 most of the projects listed in Table 1 have launched their platforms and tools and/or reached decision points around applying for further support. Several projects have applied for additional grant funding with a focus on reaching a point of self-sustainability, both financially and in terms of community support. Others are evaluating their next steps, often by bringing together stakeholder gatherings. It seems like a good time to take stock of what these projects have achieved and look to the future of the ecosystem they are starting to create.

## TOWARDS A SCHOLARLY PUBLISHING OPEN SOURCE ECOSYSTEM

Applying the concepts developed in the study of natural ecosystems and biological evolution to software ecosystems and software evolution has become popular in computer and information sciences over the last decade (Hanssen, 2012; Mens, Claes, Grosjean, & Serebrenik, 2014). Such approaches are much newer to the field of academic publishing but the ecosystem metaphor has become ubiquitous in recent conference presentations and is an

**TABLE 1** Mellon-funded monograph publishing platform and tool projects (2014–2018).

Title of project	Lead organization(s)	Project output
Collaborative services platform for university presses	University of North Carolina Press	<a href="http://www.longleafservices.org/our-story">www.longleafservices.org/our-story</a>
Web-based content management system for OA monograph publishing	University of California Press and California Digital Library	<a href="https://editoria.pub/">https://editoria.pub/</a>
Electronic portal for art and architecture books	Yale University Press	<a href="http://www.aeportal.com">www.aeportal.com</a>
Platform for management of monographic source materials	University of Michigan Press	<a href="http://www.fulcrum.org">www.fulcrum.org</a>
Developing the iterative scholarly monograph	University of Minnesota Press and City University of New York	<a href="https://manifoldapp.org/">https://manifoldapp.org/</a>
Digital publishing platform for interactive scholarly works	Stanford University Press and Stanford University Library	<a href="http://www.sup.org/digital">www.sup.org/digital</a>
Infrastructure for enhanced networked monographs	New York University Libraries and Press	<a href="https://wp.nyu.edu/enmproject/">https://wp.nyu.edu/enmproject/</a>
A distribution platform for open access monographs	Johns Hopkins University Press	<a href="https://muse.jhu.edu/museopen/">https://muse.jhu.edu/museopen/</a>
Open webbooks prototype for scholarly monographs	REBUS Foundation	<a href="https://rebus.foundation/">https://rebus.foundation/</a>
Platform for multimedia books in indigenous studies	University of British Columbia Press and University of Washington Press	<a href="https://uwpressblog.com/2016/04/28/ubcpres-uwapres-mellon-grant-to-help-develop-indigenous-studies-digital-publishing-platform/">https://uwpressblog.com/2016/04/28/ubcpres-uwapres-mellon-grant-to-help-develop-indigenous-studies-digital-publishing-platform/</a>

especially helpful theoretical framework as a diversity of 'organisms' (platforms, workflow tools, reading interfaces) proliferate in the marketplace, explore ways of connecting with each other, and attempt to find their unique niches.

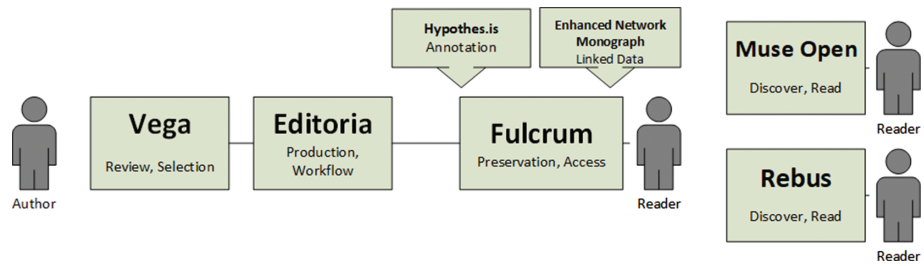
In April 2018, for example, the Joint Roadmap for Open Science Tools (JROST) project was initiated noting that 'while open technologies and services are becoming essential in science practices, so far there has been no holistic effort to align these tools into a coherent ecosystem that can support the scientific experience of the future' (Angell, 2018). A May 2018 preconference convened by the Library Publishing Coalition showcased a number of open-source platforms and tools created in the last few years under the title 'Owned by the academy: A preconference on open source publishing software'. The meeting included presentations by PubSweet (Coko), Janeway (Birkbeck College, University of London), Vega (Wayne State University), Hypothes.is, PKP Publishing Services and OJS, Pressbooks, PubPub (MIT), Quire (Getty), Ubiquity Press, Scalar, Fulcrum (Michigan), and Manifold (Minnesota). As its title suggests, the Library Publishing Coalition preconference was not just about promoting technical interoperability but also about shared values.

This emphasis on scholarly values strongly intersects with the HumetricsHSS initiative, also funded by the Mellon Foundation, which has focused on identifying a core set of values for the humanities and qualitative social sciences (Agate *et al.*, 2017). These are currently articulated as 'collegiality, quality, equity, openness, community' and a central focus of the initiative is how these values manifest in various academic contexts such as create a syllabus, contributing an annotation, reviewing a tenure case, or

preparing and publishing an academic book. Recent meetings of non-profit publishing groups in the USA have been notably more focused on articulating a values-based field of academic publishing that, the participants claim, is distinct from that of commercial rivals, with a strong focus on articulating ethical frameworks and a particular interest in issues of diversity, equity, and inclusion.

A strong focus on 'equity' is one way in which several of the platforms described above manifest these values. For example, in constructing their 'platform for multimedia books in indigenous studies', the University of British Columbia Press (lead) and University of Washington Press (partner) teams have emphasized the importance of including indigenous Native American communities in all aspects of the publishing workflows and tools that are used to disseminate scholarship by and about them. This involves including 'community review' alongside other forms of peer review during the selection process and allocating indigenous knowledge categories to content management system (Mukurtu) which underlies the publishing platform, allowing selective access restriction based on community norms, for example. As discussed further below, accessibility to blind and partially sighted users has been a strong focus of several of the platforms, also very connected to principles of equity and inclusion.

'Collegiality' is an underlying value often referenced in identifying the particular strengths of the different platforms and tools and finding ways to connect them. The extent of this activity can be exemplified by the University of Michigan's interactions with other grant recipients regarding its platform, Fulcrum. Figure 1 shows a potential workflow that Michigan is exploring for the production and publication of an enhanced eBook based on



**FIGURE 1** An enhanced eBook publication workflow based entirely on Mellon-funded elements.

extensive interactions with Mellon-funded projects. While there is some overlap in the systems (Manifold or Vega, e.g., are also presentation platforms) the illustration shows how Mellon's investments have been structured around a publishing workflow concept that bolts onto tools employed during the author's research workflow. Encouragement from the programme officers and associated funding for travel have encouraged a spirit of collegiality between many of the platforms. For example, New York University, University of Minnesota, and University of Michigan have met in person each year of their initial grants to share challenges and seek opportunities for collaboration. This is not to say that the projects do not engage in competition for clients and resources, but the relationships are also intensively collaborative. This may best be described as 'coopetition' (Bengtsson & Kock, 2000). Figure 1 may suggest a misleadingly closed system; however, not shown are other relationships with both commercial and non-profit partners, often facilitated by open application programming interfaces (APIs). For example, Fulcrum is working to deposit enhanced media content through its University of Michigan Library parent into distributed preservation networks such as APTTrust. It also has a relationship with Digital Science and Google to manage analytics and multiple arrangements with vendors like EBSCO and ProQuest to enable discovery through library systems.

'Openness' is also a value often expressed. Taking advantage of the openness of the software frameworks that underlie these systems, further opportunities for integration are being explored by several third parties. The Collaborative Knowledge Foundation (Coko), for example, is providing modular components to link several of the projects in its quest to 'build modular, open source publishing software using collaborative development to ensure the technology underlying research communication enables innovation and rapid publishing' (Coko Foundation, n.d.). LYRASIS, meanwhile, is creating an incubator environment to introduce hosted versions of several open source software platforms to its member community of over 1,000 libraries, archives, and museums (About LYRASIS, n.d.). Its IMLS-sponsored 'It takes a village' project has involved several of the platforms in strategic planning around sustainability. Through this project, a useful framework has been expressed as a 'sustainability wheel' in which governance, technology, community engagement, and resources form the four quadrants. Best practices during three phases of development ('getting started', 'growing', 'stable but not static') are defined (Arp & Forbes, 2018).

The idea of a values-based ecosystem of open source tools has sometimes manifested in discussions of an alternative

network of tools, a 'parallel ecosystem', that would not be accountable to the interests of commercial shareholders but aligned with the values of the academic community. This rhetoric has sometimes become quite heated. As Jefferson Pooley characterizes it, 'there's a contest underway, pitting non-profit platforms and initiatives, supported by foundations like Andrew W. Mellon and Alfred P. Sloan, against projects underwritten by the legacy publishing industry and Silicon Valley venture-capital firms. The contest isn't really about feature sets or new formats: the basic values of the academic enterprise are at stake. We have the chance to disrupt (to repurpose a stale verb) the strange, if explainable, joint-custody arrangement we currently have: non-profit universities and for-profit publishers. A publishing ecosystem centered on scholarly values – rather than 30 per cent, Elsevier-style profit margins – is within reach. For that to happen, we have to throw our weight behind the non-profits, before it's too late' (2017).

While the vision may be compelling, such a framing also risks being divisive and exclusionary; indeed at odds with the values it espouses. There are many mission-driven publishers who are not categorized as non-profit and many non-profit book publishers in the USA continue to rely on experienced and robust platform services from commercial organizations like Wiley Atypon, Ubiquity Press, Silverchair, PubFactory, Ingenta, and HighWire. Publishers like Allison Belan from Duke University Press note that any argument that such entities are not values-based, unfairly caricatures their substantial investments in advancing important open source standards like EPUB 3, COUNTER, Shibboleth, and LOCKSS. They also point out that the single-minded focus of such organizations on maintaining systems and relationships frees publishers up to focus on content development.

As T. Scott Plutchak has written, in the context of the controversial Elsevier acquisition of Berkeley Electronic Press, the commercial owner of the Digital Commons publishing/repository platform widely used by libraries, 'a scholarly communication ecosystem managed entirely within the academy, with no need or room for commercial players, dedicated to no cost sharing of the products of research globally, remains the holy grail for many librarians who've dedicated their work lives to scholarly communication issues. I remain deeply skeptical of efforts to create an entirely separate ecosystem without engaging the people in commercial publishing. These are talented and committed people with a wealth of knowledge about how scholarly communication systems actually work. Certainly they have their blind spots, but that's why all of the other stakeholders need to be tightly engaged. We count on the others to help us past our own blind

spots' (2017). Don Waters also notes that 'our trustees actually do not respond favorably to arguments for the use of Mellon funds based solely on the perceived need to stand up competitors to existing commercial organizations. However, they are persuaded when there is a need to open new pathways that simply do not now exist' (personal communication, June 2, 2018).

## IDENTIFYING COMMON CHALLENGES AND SEEKING SHARED SOLUTIONS

As real scholarly works start to be published on the new platforms and the various connecting tools and workflows start to be deployed, the participants in the developing ecosystem described above are identifying a number of common challenges to the publication of enhanced eBooks, especially around preservation, discoverability, and accessibility. A number of workshops, many supported in whole or in part by Mellon, have been exploring how best to address these issues. How to divide roles and responsibilities between authors, libraries, publishers, and digital humanities centres has been a consistent theme. While out of scope of this article, a parallel stream of Mellon Foundation funding is supporting libraries and digital humanities centres to conceptualize their roles in supporting new forms of digital scholarship, particularly in the earlier stages of a work's production, as described by Maxwell and colleagues (2017). A particular area of negotiation is at what point the preparation of a work of long-form digital scholarship is handed off from a library or humanities centre to a publisher, if at all.

While the challenges around preservation, discoverability, and accessibility are similar in kind they vary in extent depending on the complexity of the types of work being published. Such complexity can be conceptualized as varying across a continuum from 'simple eBook' through 'enhanced eBook' to 'expansive digital humanities project'. While a taxonomy of these new types of work is lacking (and needed), 'enhanced' describes an eBook which may include digital affordances such as time-based multimedia (audio, video), annotations, interactive timelines, or maps but is still enclosed within a container such as an EPUB file. 'Expansive' is a term usefully defined by researchers from Duke University as referring to 'projects that are interactive and dynamic in their content as they span and often grow over time across multiple content types, audiences, and contributors' and manifest in ways that extend beyond a single container (Hansen, Milewicz, & Mangiafico, 2018). A similar comparison has been made by Michael Elliott who contrasts 'long-form scholarship published digitally that is substantially enhanced by the digital format' with 'digitally published, long-form scholarship that is not suitable for print publication' in a taxonomy developed at Emory University (Elliott, 2015).

### Preservation

Leading North American commentators like Clifford Lynch and Peter Brantley have been eloquent over the last 5 years in

identifying the preservation of eBooks as a looming challenge, particularly for libraries (Brantley, 2012; Lynch, 2013). Preservation organizations based in the USA such as Portico, HathiTrust, and LOCKSS have started to wrestle with the demands of enhanced eBooks and the Library of Congress announced proposed mandatory deposit of electronic-only books in April 2018. However, none of the services currently offer the capacity to curate even the simplest of enhancements such as embedded multimedia. A recent Digital Preservation Coalition report notes that 'ownership of the responsibility for the preservation of different large categories of digital artefacts that fall under the rubric of eBooks is not clearly established. Nor are the costs for carrying out the preservation, and establishing sufficient permanent funding to meet those costs' (Kirchhoff & Morrissey, 2014).

Among the Mellon-funded platform projects, divergent approaches to digital preservation are being explored, oriented around the distinction between 'emulation' and 'migration' strategies. Emulation involves using a program that imitates the original, obsolete, hardware or software to render a digital object. In emulation, the original bit stream (the information that comprises the file) is saved and used. In contrast, in migration, the original bit stream is changed over to a new, current file format (Stuchell, 2013). Stanford University Press, which has published several complex digital publications on Scalar, is now exploring emulation and virtualization approaches. University of Michigan Press is focused on migration of content as a core feature of its Fulcrum publishing platform which is built on the same Samvera Fedora stack as the University of Michigan Library's Deep Blue institutional data repository and shares its preservation policies as well as infrastructure.

### Discoverability

The challenges of discovering open access monographs have been explored by the 'Mapping the free Ebook supply chain' project which investigated how readers found, acquired, and used a sample of open access eBooks published by Open Book Publishers and University of Michigan Press (Watkinson, Welzenbach, Hellman, Gatti, & Sonnenberg, 2017). While the situation is being improved by the work of organizations such as JSTOR, Ingenta Open, DOAB, and OAPEN since the study was completed, the 'Mapping' project revealed that the dominant role of commercial infomediaries in eBook discovery and the rigidity of their systems has made discovery of open access eBooks through libraries very challenging. This same rigidity of systems creates discovery obstacles for titles that include additional digital affordances, irrespective of whether they are sold or made open access, since they are oriented to expect works that are presented in familiar containers. For example, Google Scholar (where many researchers naturally turn for journal articles) does not yet index and rank scholarly eBooks at the same depth and breadth; the library discovery services ecosystem is in a constant state of commercial consolidation and transition, making integrations between platforms/publishers and services challenging to establish and maintain; and these same systems insert a number of jumps between the place where the

content is discovered, the place where it is linked, and the place where it is accessed/consumed. As Allison Belan at Duke University Press has noted, each jump introduces a point of discovery-to-access failure, making it difficult for either the library or the publisher to understand where the user's disconnect is happening (Belan, personal communication, June 4, 2018).

A Mellon-funded project engaging specifically with discoverability challenges is Muse Open which aims to deliver open access book content cost effectively in a browser-native format and provide a discovery layer for new forms of content, such as the 'Black Press in America' multimodal project published by Johns Hopkins University Press in collaboration with the University's Sheridan Libraries (Barbara Kline-Pope, 2018; Schonfeld, 2016). Closely connected with the issue of discoverability is that of information about use and engagement. Finding ways to present measures of impact is important so that authors of new formats, already potentially viewed with suspicion by more conservative academic administrators, can demonstrate the reach and impact of their work. Project Muse has always placed an emphasis on providing high quality usage information to participating publishers and has placed transparent usage reporting at the heart of their new platform. A new Mellon-funded project led by the Book Industry Study Group is engaging with the issue of gathering usage information from multiple platforms to tell a coherent story of open access eBook usage (BISG, 2018).

Important work on the 'last mile' of eBook delivery (how a user interacts with the content once they have discovered it) has been done by JSTOR Labs and the Rebus Foundation, both using a combination of design thinking exercises and survey approaches. These have resulted in two white papers (Humphreys, Spencer, Brown, Loy, & Snyder, 2018; McGuire *et al.*, 2018). JSTOR has created several tools to imbed in their platform to improve engagement with eBooks, notably Topicgraph and Text Analyser (<https://labs.jstor.org/projects/>). The Rebus Foundation, meanwhile, is now engaging with the problem of ensuring that eBooks spread across a variety of platforms, including Manifold and Fulcrum, can be collected and organized in a common web-based interface by a scholarly reader.

## Accessibility

Encouraged by the Mellon foundation, accessibility has been a challenge that many of the new platforms have been wrestling with as have many others across the publishing industry (Conrad & Kasdorf, 2018). As well as fulfilling legal responsibilities and engaging with the needs of users with print disabilities, the publishers of enhanced eBooks see that designing platforms and content with accessibility in mind also catalyses good digital design. Enriched image descriptions aid discoverability while a user experience designed for screen reading software also facilitates other forms of machine reading. Several Mellon grant recipients have been developing guidelines and resources to help streamline the work required to make content accessible, with initiatives such as the Describing Visual Resources Toolkit (supported by the Samuel H. Kress Foundation and University of

Michigan Library) bringing representatives of a number of the organizations together (<https://describingvisualresources.org/>).

A growing concern, however, has been with the amount of additional labour that requiring accessibility for multimodal publications imposes on authors and publishers. Audio and video files need to be captioned or transcribed, images need alt-text to be written, and more complex digital objects, such as 3D models, need explanations to be written that explain why they may not be fully accessible. Susan Doerr has described the results of time tracking the labour involved in entering metadata for projects to be published on Manifold and Fulcrum and the questions of sustainability this raises (Doerr, 2017). While no publishers underestimate the importance of providing accessible content, it is clear that best can sometimes be the enemy of the good.

## CONCLUSION: PICKING AND CHOOSING

The proliferation of new platforms, tools, and workflows has created excitement and uncertainty in the scholarly book publishing ecosystem in the USA. For the projects funded by the Andrew W. Mellon Foundation a condition for receiving a grant is that the software products are openly licensed. Not only are there now a plethora of GitHub repositories filled with open source software objects, but in many cases a hosted option of the tool or platform is also being offered for a fee with incentives for early adopters.

For a publisher looking to take advantage of this new environment, picking and choosing among the new technology and service options vying for attention is intimidating. Which projects will survive and which will become extinct is dependent on how well the different creators can identify and inhabit their unique niches, symbiotically partner with other existing and emergent life forms, and create a large enough community of software developers, content producers and users to become keystone species. OSS Watch from the University of Oxford provides nine 'top tips for selecting open source software' (Metcalf, 2013). Three of the criteria listed seem particularly relevant in this context:

- Its reputational fit with the publisher's own disciplinary focus.
- A commitment to open standards and interoperability with other systems.
- The presence of a large enough community to sustain continued development.

While some of the workflows and tools are generalizable, it is increasingly clear that the different platforms will have particular resonance with certain communities of scholarly practice. Michigan's Fulcrum, for example, offers a durable, flexible, and discoverable solution for multimedia content which is attractive to scholars in visually rich fields, especially those that deploy time-based media. Yale's Electronic Portal for Art and Architecture Books has sophisticated tools for managing the licensing restrictions that shape the practice of art history and is deeply

embedded in the museum community. Minnesota's Manifold and MIT's PubPub are optimized for collaborative public scholarship in which a community of researchers work iteratively to develop new knowledge. Vega's design is shaped by the concerns of digital rhetoric for preserving the form of an author's work as well as its content. In short, certain platforms will fit particular publishers better than others and in other cases they may supplement rather than replace other online delivery mechanisms. It seems clear that an increasing number of US publishers will be maintaining their own content on multiple platforms rather than just one.

Formal partnerships between many of the organizations responsible for tool maintenance and creation are being formed and these promise to create a coherent set of services for publishers who wish to make bold moves. However, at least as important is a commitment to interoperability with existing systems. The availability of APIs allow connections with commercial systems as well as other open source tools and cater to publishers who have already invested substantially in workflows that they are not willing to abandon wholesale. Potential client publishers should look for providers with useful, open, well-defined, consistent, and stable APIs.

One vulnerability for open source software providers lies in the size of the community of developers supporting a particular product. Martin Eve and Andy Byers describe the advantages of using a popular programming language in the creation of their Janeway journal publishing system (Eve & Byers, 2018). Fulcrum is part of the Samvera community in which a number of institutions, including the University of Michigan, commit to contributing to development work in a formal community framework (Awre & Green, 2017). Building a community of users also increases the chance of sustainability, especially as they commit increasing quantities of content to the platform or imbed the workflow tool integrally in their processes. Potential client publishers should look closely at the robustness of the underlying open source software as well as the strength and commitment of the producer and user community.

As this article makes clear, much has happened in the eBook infrastructure space since 2014. The challenge for the next few years lies in whether the tools and platforms described can sustain themselves financially as well as technologically. While one source of income lies in selling software as a service there are other discussions around pooling library resources to support open source infrastructure, most eloquently expressed by 'the 2.5% commitment initiative'. This envisions libraries devoting at least 2.5% of their budgets to sustaining open source infrastructure, rather than purchasing and licensing published resources (Lewis, Goetsch, Graves, & Roy, 2018). The idea is exciting and builds on collaborative funding models for open access initiatives such as Knowledge Unlatched and the Lever Press. There is some concern that library funders would not invest sufficiently in the growth and further development of open source projects which require substantial surplus funds to stay current with changing needs. However, the prospect of base institutional funding in addition to a fee-for-service model is exciting and will further

encourage publishers interested in embracing some of the new technology options.

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