OUTSELL®

SCIENTIFIC PUBLISHING ECOSYSTEM

Copyright Clearance Center

Central wheel: RESEARCH & DISCOVERY — AUTHORING & RESEARCH OUTPUT — PEER REVIEW — PUBLISH & DISTRIBUTE — POST-PUBLICATION — **DATA**

RESEARCH & DISCOVERY

RESEARCHER/SCIENTIST

ACTIONS
- Secure grants/funding
- Conduct research/ experiments
- Collaborate
- Manage & analyze data
- Exchange ideas
- Analyze data from tools (e.g., altmetrics)

INVESTMENTS
- Self-fund travel to conferences
- Invest time in collaboration
- Invest in research materials
- Invest in memberships

REWARDS
- Enhanced reputation
- Career advancement / tenure
- Improved peer network
- Potential new funding

WHAT KEEPS ME UP AT NIGHT
- Lack of funding opportunities
- Not complying with OA mandates
- Bias towards English language
- Lack of funding for developing countries
- How to collaborate with Chinese peers
- No incentives for investment in reproducibility
- Flawed rankings
- Administrative and teaching loads
- Success measured by publishing in high impact journals

INSTITUTION

ACTIONS
- Manage research budgets
- Secure grants for research
- Provide library support
- Host research results/data
- Report and track funds
- Balance support for established/junior researchers
- Analyze data from tools (e.g., altmetrics)

INVESTMENTS
- Invest in collaboration platforms
- Invest in research databases/ platforms
- Invest in benchmarking tools
- Invest in text/data mining tools
- Fund labs/salaries

REWARDS
- Solve global issues
- Create jobs
- Attract talent
- Attract more students
- Attract more research funding
- Keep government and administration happy
- Raise reputation

WHAT KEEPS ME UP AT NIGHT
- Lack of funding opportunities
- Not complying with OA mandates
- Bias towards English language
- Recognizing competition from Chinese peers
- Flawed rankings
- Complying with grant guidelines
- Pressure of university rankings
- Political and fiscal pressures on government funding

FUNDER/GOVT AGENCY

ACTIONS
- Solicit/review proposals
- Fund research / award grants
- Set research policies
- Vet researchers
- Raise funds
- Balance support for established/junior researchers
- Analyze data from tools (e.g., altmetrics)

INVESTMENTS
- Pay and develop staff
- Host trainings
- Fund research grants
- Allocate block grants to institutions
- Set policy agenda

REWARDS
- Fulfill mission and related goals
- Keep government and administration happy
- Secure additional funding to provide more grants

WHAT KEEPS ME UP AT NIGHT
- Creating funding opportunities
- Ensuring that funding supports our goals
- Bias towards English language
- Recognizing competition from Chinese peers
- Flawed rankings
- Securing funding for rare diseases
- Political and fiscal pressures on government funding

PUBLISHER

ACTIONS
- Provide curated resources
- Provide research and collaboration platforms
- Support for scientific networks
- Provide guidance for researchers
- Balance support for established/ junior researchers
- Analyze data from tools (e.g., altmetrics)

INVESTMENTS
- Investment in staff, technology and infrastructure
- Invest in research collaboration
- Invest in development of societies
- Invest in text/data mining tools

REWARDS
- Drive revenue
- Foster new products
- Attract new customers
- Raise reputation
- Build networks
- Support new discoveries
- Engage stakeholders
- Support society members

WHAT KEEPS ME UP AT NIGHT
- Lack of funding opportunities
- Threats from non-traditional publishing sources
- Recognizing competition from Chinese peers
- Anti-publisher sentiments
- Non-compliance with OA mandates

TOOLS AND SERVICES

Examples of organizations that serve research & discovery are: reference manager and collaboration software (Mendeley, F1000Workspace, openAire, Zotero); electronic lab notebooks (Hivebench, OneNote); grant writing software (GrantHub, Oracle PeopleSoft); collaboration networks (ResearchGate, Academia.edu); digital identifiers (ORCID, Ringgold, ISNI); discovery tools (Google Scholar/Google, ProQuest Summon, OCLC WorldCat, Dimensions, Symplectic Discovery, VIVO); A&I services (Scopus, ScienceOpen); data collection of posters/conferences (Morressier); and identifying experts in a specific field (Expert Lookup); non-publishing learned societies providing research collaboration, conferences, education, etc.

AUTHORING & RESEARCH OUTPUT

RESEARCHER/SCIENTIST

ACTIONS
- Research publishers
- Submit and revise manuscript/ patent/standard
- Suggest peer reviewers
- Collaborate wwto write up results
- Seek pre-submission guidance

INVESTMENTS
- Invest time/resources in research output
- Invest in professional development

REWARDS
- Enhanced reputation
- Career advancement/tenure
- Improved peer network
- Advance science/knowledge

WHAT KEEPS ME UP AT NIGHT
- Limited career opportunities
- Predatory journals

INSTITUTION

ACTIONS
- Self-publish research
- Host supplemental data
- Support peer review & editorial services
- Provide access to content
- Provide tools like Symplectic and Pure

INVESTMENTS
- Pay salaries
- Invest in collaboration tools
- Invest in research databases/platforms
- Invest in benchmarking tools
- Invest staff time for OA
- Invest in text/data mining tools

REWARDS
- Solve global issues
- Attract talent
- Attract more students
- Attract more research funding
- Raise reputation
- Advance science/ knowledge

WHAT KEEPS ME UP AT NIGHT
- Pressure on researchers/ talent
- Understanding open science practices
- Support for non-native English speakers
- Pressure on library budgets

FUNDER/GOVT AGENCY

ACTIONS
- Provide submission platform
- Provide block grants for OA
- Track compliance with funder mandates
- Fund further research
- Publicize funded research
- Set funding policies

INVESTMENTS
- Invest in submission platforms
- Raise and track funding

REWARDS
- Provide access to articles / data sets
- Enable sharing of research
- Recognition for advancement of science

WHAT KEEPS ME UP AT NIGHT
- Pressure to ensure open science
- Understanding open science practices
- Pressure of faulty research on our reputation

PUBLISHER

ACTIONS
- Provide submission/product platforms
- Provide authoring/ collaboration tools
- Structure OA agreements
- Provide pre-submission guidance

INVESTMENTS
- Invest in research/ collaboration platforms
- Invest staff time in pre-submission activities
- Invest in reviewer networks
- Invest staff time for OA

REWARDS
- Increase engagement with authors
- Foster new products
- Attract new customers
- Expand society membership
- Raise reputation
- Develop scientific networks
- Drive revenue
- Advance science/knowledge

WHAT KEEPS ME UP AT NIGHT
- Pressure on publishing ecosystem
- Understanding open science practices
- Support for non-native English speakers
- Competition for top talent

TOOLS AND SERVICES

Examples of organizations that serve authoring & research output are: editing services (Editage, Scribbr); authoring, reference manager and collaboration software (Mendeley, F1000Workspace, openAire, ReadCube papers, Authorea, Overleaf); research and data organization (labguru, figshare); licensing services for securing third-party rights to content used in research output (copyright.com, RightsLink, PLS)

POST-PUBLICATION

RESEARCHER/SCIENTIST

ACTIONS
- Post article
- Share content
- Market content
- Track impact
- Track altmetrics

INVESTMENTS
- Time/effort

REWARDS
- Advance science / solve global issues
- Enhanced reputation
- Career advancement/tenure

WHAT KEEPS ME UP AT NIGHT
- Ensuring post-publication compliance

INSTITUTION

ACTIONS
- Make articles accessible
- Archive articles/data
- Mine data sets
- Track usage statistics
- Ensure details are registered in CRIS

INVESTMENTS
- Subscription costs
- Library system technology costs
- Archiving costs
- Staffing costs
- Licensing costs

REWARDS
- Advance science / solve global issues
- Attract talent
- Attract more students
- Attract more research funding
- Raise reputation

WHAT KEEPS ME UP AT NIGHT
- Ensuring post-publication compliance

FUNDER/GOVT AGENCY

ACTIONS
- Measure impact of article
- Seek additional funding opportunities
- Check for compliance

INVESTMENTS
- Time/effort
- Staffing costs

REWARDS
- Advance science / solve global issues
- Attract more funding
- Raise reputation

WHAT KEEPS ME UP AT NIGHT
- Incomplete impact data

PUBLISHER

ACTIONS
- Archive articles and data
- Measure impact factor
- Track usage statistics
- Track altmetrics

INVESTMENTS
- Marketing costs
- New product development costs
- Operational costs for tracking
- Archiving costs
- Staffing costs

REWARDS
- Drive revenue
- Advance science / solve global issues
- Attract new customers
- Expand society membership
- Raise reputation
- Identify future authors

WHAT KEEPS ME UP AT NIGHT
- Sharing sites (Sci-Hub, ResearchGate) threaten revenue and value
- Pressure from CC-BY and other licensing mandates threatens licensing revenue

TOOLS AND SERVICES

Examples of organizations that serve post-publication are: altmetrics (Altmetric, Plum Analytics); reputation management (Kudos, ImpactStory); text & data mining tools, document delivery (RightFind, Reprints Desk); A&I services (Scopus, ScienceOpen); subscription agents (EBSCO, Harrasowitz); social media, collaborative networks (ResearchGate, Academia. edu); archiving software (LOCKSS, CLOCKSS); library system technology (ILS), open access (LOCKSS, CLOCKSS); library system technology (ILS), open access/institutional repositories (Figshare, Dryad, DIGITAL.CSIC, e-IEO); permissions software (RightsLink); open access directories (DOAJ, Sherpa/Romeo), Creative Commons, CCC); CRIS or Research Information Systems (Symplectic, Pure)

PUBLISH & DISTRIBUTE

RESEARCHER/SCIENTIST

ACTIONS
- Revise content
- Review proofs
- Publish content
- Publish supplementary data
- Promote research

INVESTMENTS
- Subscribe to marketing tools (e.g., Kudos)
- Time invested for author profiles, ORCID records, etc.

REWARDS
- Advance career/tenure
- Enhance reputation in institution
- Enhance reputation outside institution

WHAT KEEPS ME UP AT NIGHT
- Worry about impact of my research
- Pressure of "publish or perish"

INSTITUTION

ACTIONS
- Provide platforms to self-publish
- Host research-related data
- Catalog, tag, and archive research
- Assign DOIs for data
- Incentivize publication of negative results

INVESTMENTS
- Invest in websites/platforms/ repositories and appropriate processes
- Invest in integrated library system technology
- Subscribe to marketing tools (e.g., Kudos)
- Invest staff time in managing APCs and embargoes

REWARDS
- Achieve institutional mission
- Attract talent
- Attract more students
- Attract more research funding
- Raise reputation

WHAT KEEPS ME UP AT NIGHT
- Flat or diminishing library budgets
- How to support/fund publication/sharing of research data.
- The demands of negotiating OA
- Pressure from entities like Sci-Hub

FUNDER/GOVT AGENCY

ACTIONS
- Track research output
- Track compliance
- Provide platforms to self-publish research results
- Support sharing (data, code, MSS, etc.)
- Incentivize publication of negative results

INVESTMENTS
- Invest in platforms that enable self-publishing
- Invest in websites/ platforms/repositories and appropriate processes

REWARDS
- Achieve mission
- Raise reputation

WHAT KEEPS ME UP AT NIGHT
- Change in ecosystem due to OA
- How to support/fund publication/sharing
- Pressure on our mission due to disruption of ecosystem

PUBLISHER

ACTIONS
- Edit content
- Design and package
- Assign metadata / enable discoverability
- Publish
- Curate volumes/issues
- Distribute/host content directly
- Set up third-party distribution
- Deposit in repositories, archive content / manage data
- Manage permissions for reuse
- Liaise with society partners
- Market/preview content
- Incentivize publication of negative results
- Mine data sets

INVESTMENTS
- Invest in editorial and/or production platforms
- Invest in web sites/platforms/repositories and appropriate processes
- Pay distribution fees to aggregators
- Pay annual dues to standards organizations
- Pay typesetters and metadata taggers
- Invest in staff
- Pay other third-party fees

REWARDS
- Achieve revenue targets
- Gain new insights and products
- Attract new customers
- Raise reputation
- Enhanced growth in society membership

WHAT KEEPS ME UP AT NIGHT
- Funder pressure to publish in OA
- How to support/fund publication/ sharing
- Sharing sites (SciHub, ResearchGate) will reduce revenue
- The demands of negotiating OA
- Pressure to meet Horizon 2020/2021 demands

TOOLS AND SERVICES

Examples of organizations that serve publish & distribute are: digital content development and hosting services (HighWire, Ingenta, Hinari, Research4Life, Esploro, Zotero); open access publishing platforms (F1000Research, eLife); DOI registration (Crossref, DataCite); plagiarism technology (Similarity Check, Turnitin); aggregators (ProQuest, Ensco, Scielo, CHORUS); permissions software (RightsLink); open access/institutional repositories (Figshare, Dryad, DIGITAL.CSIC, e-IEO); discovery tools (Google Scholar/Google, ProQuest Summon, OCLC WorldCat); author marketing tools (Kudos); article level metrics (Altmetrics); open access directories (DOAJ, Sherpa/Romeo); integrated library system technology (GOBI, Innovative, OCLC); sharing "guidelines" (Creative Commons, CCC)

PEER REVIEW

RESEARCHER/SCIENTIST

ACTIONS
- Research editorial requirements
- Submit and revise manuscripts
- Suggest peer reviewers
- Seek OA funding once accepted
- Provide peer review
- Participate in / create new societies/networks

INVESTMENTS
- Invest time in submitting/revising manuscripts
- Fund APCs and/or seek funding after acceptance

REWARDS
- Enhanced reputation
- Career advancement / tenure
- Improved peer network
- Advance knowledge in field
- Compensation for peer review (when available)

WHAT KEEPS ME UP AT NIGHT
- Lack of peer review transparency
- Flaws in peer review process
- Requests to peer review
- No formal recognition for peer review
- Pressure on APC funding for research

INSTITUTION

ACTIONS
- Self-publish research results
- Host repositories
- Enable staff to access peer review services
- Host preprint servers

INVESTMENTS
- Pay editorial staff
- Pay staff to manage APCs
- Pay OA charges upon acceptance
- Invest in repositories
- Pay staff to handle repositories

REWARDS
- Enhanced reputation
- Career advancement / tenure
- Improved peer network
- Advance knowledge in field
- Compensation for peer review (when available)

WHAT KEEPS ME UP AT NIGHT
- Funder restrictions supporting OA
- Flaws in peer review process
- Pressure on APC block grants

FUNDER/GOVT AGENCY

ACTIONS
- Provide submission platform
- Approve and fund APCs or OA charges
- Track compliance
- Host preprint servers

INVESTMENTS
- Invest time in tracking compliance
- Track grants and funding
- Invest in altmetrics

REWARDS
- Provide access to articles / data sets
- Enable sharing of research
- Recognition for advancement of science

WHAT KEEPS ME UP AT NIGHT
- Slow peer review practices of publishers
- Underfunded OA publishing infrastructure of publishers

PUBLISHER

ACTIONS
- Manage peer review process
- Assess quality of science
- Establish fit with publishing program
- Accept manuscripts
- Host preprint servers

INVESTMENTS
- Invest in submission/ production platforms
- Invest APC e-commerce platforms
- Pay reviewer/editorial board honoraria (where available)
- Invest in peer review network
- Invest in development of altmetrics

REWARDS
- Expand scientific networks and brand recognition
- Identify research that fits editorial goals
- Uncover new talent
- Expand society membership
- Achieve high-quality research evaluation

WHAT KEEPS ME UP AT NIGHT
- Funders' restrictions to publish in OA
- Short funder funding cycles or lack of funding
- Flaws in peer review process and value

TOOLS AND SERVICES

Examples of organizations that serve peer review are: workflow software (ScholarOne, BenchPress, Editorial Manager); preprint servers (arXiv, bioRxiv, Authorea); peer review tools (PLoS Reviewer Center, StatReviewer, Publons); Open Access payment workflows and management tools (RightsLink, proprietary systems, Aptara); identifying experts in a specific field (Expert Lookup); repositories and tools for discovery, annotation, analytics, etc. (DSpace)

Scientific Publishing Ecosystem

September 23, 2019

Outsell/CCC Scientific Publishing Ecosystem

Background

In March 2019, during the London Book Fair, Outsell Inc. and Copyright Clearance Center (CCC) hosted an invitation-only roundtable program under the banner of "Open Dialogue: The Key to Advancing Scholarly Communications." Its goal: to facilitate a strategic discussion among key stakeholders across the globe — publishers, institutions, funders, policymakers, authors/researchers, and service providers — about emerging models to advance scholarly communications in an environment fraught with friction.

One outcome of the program was a shared sense that attendees lack a common understanding of one another's participation in that environment: the investments, activities, challenges, and opportunities faced by key stakeholders. In particular, there was a feeling that if the reward systems, both implicit and explicit, that underpinned the scholarly communications weren't understood, it would be harder to create the fundamental change necessary to thrive longer-term.

To solve this and help create transparency and support a more collaborative dialogue within the scientific publishing ecosystem, Outsell and CCC decided to create a map of the scientific publishing process, detailing the actions, investments, rewards, and challenges faced by each key stakeholder group.[*] The goal was not to construct a new, ideal process but rather to reflect today's common language and understanding of each stakeholder. This document and the infographic that accompanies it are the result of that effort. They will be the basis through which to advance further understanding and dialogue and will be discussed at another by-invitation event focused on unpeeling the ecosystem and improving understanding. This CCC & Outsell event will be held October 10, 2019, in London.

Methodology

In June 2019, Outsell and CCC selected Jennifer Goodrich (CCC's Director, Product Management, Publisher Solutions) and Jim Hydock (Outsell Consulting Partner) to lead the project team. In July, Goodrich and Hydock created a rough first draft of the map's content in Excel form along with a rough graphic to represent the flow of the ecosystem. They took this rough draft to CCC and Outsell colleagues for additional input and suggestions, which they incorporated into a second draft of the map.

---

[*] Like many in the industry, we use the term "scientific publishing" broadly to include all scholarly publishing, including the humanities and social sciences.

In August, Goodrich and Hydock posted the draft map on a private landing page and sent invitations to 50+ members of the scientific community to download the map and provide input within a two-week period. Invitations were sent to publishers (both commercial and society), researchers, funders, policymakers, academics, service providers, and librarians. The team received responses from 13 individuals, ranging from brief to detailed comments to extensive input running several pages. They then integrated many of the comments from the contributors into a final version of the map.

In September, a graphic designer from Outsell met with the team and discussed a variety of options to illustrate the scientific publishing process. The designer composed a high-level view of the ecosystem accompanied by graphics. In addition, Outsell and CCC developed a detailed, fully featured version in report format, which is this document.

Navigating with the Map

The map has five nodes or phases of the Scientific Publishing Process:

- Research & Discovery
- Authoring & Research Output
- Peer Review
- Publication & Distribution
- Post-Publication

We also used the term "publisher" broadly to be inclusive of commercial publishers, university presses, society publishers, and others.

We recognize that the scientific publishing process is not always linear and may differ geographically. The map reflects the work completed at each node by four main stakeholders — researchers, funders, institutions, and publishers — but the order of the work's execution may vary for publications, data sets, articles, etc. We depicted the process as circular, recognizing that published science begets more science and new research can rely on published research that came before it. The system of science is ever-expanding, and prior work feeds new work in a virtuous circle; thus, we represent the process as circular. Not all science feeds new science, but the essence of innovation is to build on prior work, so we felt the diagram benefited from a circular depiction.

In addition, we believe the ecosystem is dependent on a number of sophisticated tools and services that enable it to function; these are listed at each node and sometimes overlap from node to node. In addition to improving workflow, these tools and services generate data that can be vital to understanding trends and issues within the ecosystem. These examples are representative and not meant to be exhaustive. Further data is becoming increasingly important to the system functioning well, with data reproducibility being core. The importance of data to reproducibility, including that which comes off the back of tools and services, is why we depicted data at the center of the ecosystem. We believe it is increasingly playing a more vital role in all stages.

Note, too, that since manuscripts are accepted during the peer review process, and publishers often trigger the payment of article processing charges (APCs) at acceptance, we included the APC payment process in the Peer Review node. Researchers are likely to have less or no involvement in the APC payment process as the traditional one-off APC transaction model shifts to an aggregated APC or "publish" payment as part of Read and Publish, Publish and Read, and pure Publish agreements between publishers and institutions.

Open science requires a broader set of research output than the current ecosystem supports. It's clear that research output will continue to expand beyond the traditional manuscript to include data, code, supplemental materials, and more. In fact, a significant area of concern to stakeholders (see "What Keeps Me up at Night" in each node) is the tension related to producing, managing, and granting and gaining access to critical data sets, yet another reason why we put data in the center of our map.

Key Context for the Map

Open access models, Plan S, and Projekt Deal initiatives are some of the indicators that the scientific publishing process is undergoing fundamental realignment. Values are shifting among stakeholders, meaning greater collaboration becomes more important, with the ultimate focus being the quality of research and the benefits of that research to society as a whole, whether they be health-related,

environmental, social, humanitarian, or other. With that in mind, it's vital to understand some of the key points of context for this map:

- **Time**: This map is a snapshot from the summer of 2019 — a snapshot taken next summer is likely to be somewhat different. As mentioned above, values are shifting, new trends are emerging, and players may or may not be collaborating differently. The aim is to update this map periodically to reflect those potential changes.

- **Tension**: In all industries undergoing changes, there is tension among stakeholders as long-held tenets disappear or shift, business models fluctuate, and new models spring up. The intent of this map is to illustrate as accurately as possible the current roles and responsibilities of stakeholders to provide a common understanding and, in the words of one respondent, "...to align the differing needs of all the actors in the process to evolve the ecosystem to become sustainable, diverse, and to enable research to be applied to the benefit of people globally."

- **Trust**: An integral part of a successful realignment is that stakeholders demonstrate trust in one another's actions: the trust to easily and securely share data; acknowledge the value of open science practices by researchers regarding tenure, awards, or promotion; recognize the need for rapid publication cycles; ensure that APCs are equitable; ensure that research outputs are high-quality, reproducible, and validated; and make sure that the "voice of the researcher" is heard throughout the publishing value chain.

Transformation is good, but it is not without pain. Structural fractures in the publishing value chain brought on by technology, budget pressures, jockeying for competitive advantage, and rogue disruption (e.g., Sci-Hub) are endemic. The outcome of Outsell and CCC's March 2019 meeting signaled an agreement that stakeholders want to take concrete steps to address these challenges as the ecosystem evolves. This map is the first step in that process. We will report on the results of our October 10 event as both organizations work to advance the dialogue that is essential to moving the industry forward.

The Map in Detail

Below are five sections that provide a detailed description of each part of the map; these align to the infographic that accompanies this text.

Research & Discovery

Tools and Services

The ecosystem is dependent on a number of sophisticated tools and services that enable it to function. In addition to improving workflow, these tools and services generate data that can be vital to understanding trends and issues within the ecosystem. These examples are representative and not meant to be exhaustive.

Some key examples:

- Reference manager and collaboration software (Mendeley, F1000Workspace, openAire, Zotero)
- Electronic lab notebooks (Hivebench, OneNote)
- Grant writing software (GrantHub, Oracle PeopleSoft)
- Collaboration networks (ResearchGate, Academia.edu)
- Digital identifiers (ORCID, Ringgold, ISNI)
- Discovery tools (Google Scholar/Google, ProQuest Summon, OCLC WorldCat, Dimensions, Symplectic Discovery, VIVO)
- A&I services (Scopus, ScienceOpen)
- Data collection of posters/conferences (Morressier)
- Identifying experts in a specific field (Expert Lookup)
- Non-publishing learned societies providing research collaboration, conferences, education, etc.

Researchers/Scientists

Examples include researchers from corporate, academic, and government/NGO settings.

Actions

- Secure grants/funding.
- Conduct research and experiments.
- Collaborate with team/scientific peers.

- Manage and analyze data.
- Exchange ideas and early research with other researchers.
- Analyze data sourced from post-publication tools (e.g., altmetrics) to identify rich areas for further research.

Investments

- Self-fund travel to conferences.
- Invest time in peer-to-peer collaboration.
- Invest in individual research and course materials.
- Invest in memberships to scientific and professional societies/organizations.

Rewards

- Enhanced reputation in scientific community.
- Career advancement/tenure.
- Improved peer network.
- Potential new funding.

What Keeps Me up at Night

- Lack of opportunities for interdisciplinary funding.
- If I (or my institution) do not comply properly with OA mandates, then funding for future research and related research output will be denied.
- Language as a barrier; bias towards research published in English.
- Lack of funding for researchers from developing countries.
- How best to collaborate with Chinese peers given varying open access funding models.
- No formal incentives for investment in reproducibility and replicability.
- Rankings based on flawed or problematic measures of research quality.
- Administrative and teaching load encroaching on research time.
- Success is too often measured by publishing outcomes or securing next rounds of funding; accordingly, I may have to concentrate my research on short-term research projects that may not allow for enough research to produce the breakthrough results required by many of the most pressing challenges facing our world. Moreover, pressure to publish in a high-impact journal can lead to dangerous selectivity of results.

Institutions

Examples include Max Planck Society, Univ. College London, Cambridge University, and the California University Library System.

Actions

- Manage institutional research budgets.
- Secure grants for research.
- Provide library support for curating projects and related data.
- Host research results and related data.
- Reporting and tracking of funds.
- Balance support for established researchers with support for junior researchers who may offer novel approaches.
- Analyze data sourced from post-publication tools (e.g., altmetrics) to identify rich areas for further research.

Investments

- Invest in research collaboration platforms.
- Invest in citation indexes, content databases, trademark services, and research intelligence platforms.
- Invest in benchmarking tools to measure productivity and research output.
- Invest in text and data mining tools.
- Fund labs, research management offices and research salaries.

Rewards

- Solve global issues.
- Create jobs.
- Attract talent.
- Attract more students.
- Attract more research funding.
- Keep government and administration happy.
- Raise reputation.

What Keeps Me up at Night

- Lack of opportunities for interdisciplinary funding.
- If we do not comply properly with OA mandates, my institution and my research teams may not get future funding.
- Language as a barrier; bias towards research published in English.
- Recognizing competition from Chinese peers because of different funding models and government policy.
- Rankings based on flawed or problematic measures of research quality.
- Making sure our researchers are complying with all of the guidelines in grant awards.
- The pressure of university ranking methodologies.
- Political and fiscal pressures on government funding mean we may not hire as many young researchers as we would like. Non-government funding may be too closely tied to commercial interests rather than to rigorous scientific outcomes, impacting both our institution's standing in the research community and our ability to attract future students and future talent.

Funders / Government Agencies

Examples include NIH, Wellcome, Gates Foundation, Max Planck Society, Novartis, BASF, IBM, and Intel.

Actions

- Solicit/review proposals.
- Fund research/award grants, including annual APC block grants.
- Set framework policy for research, publication, data sharing, and reporting results.
- Pre-screen and vet researchers and/or assemble research teams for specific research.
- Raise funds.
- Balance support for established researchers with support for junior researchers who may offer novel approaches.
- Analyze data sourced from post-publication tools (e.g., altmetrics) to identify rich areas for further research.

Investments

- Pay and develop staff.
- Host training sessions.

- Fund research grants.
- Allocate annual APC block grants to the institution.
- Set policy agenda for funded research.

Rewards

- Fulfill mission and related goals.
- Keep government and administration happy.
- Secure additional funding to provide more grants.

What Keeps Me up at Night

- How to create opportunities for interdisciplinary funding.
- Ensuring that our funding policies support our organization's goals or mission by investing properly in both individual projects and long-term research conducted by labs.
- Language as a barrier; bias towards research published in English.
- Recognizing competition from Chinese peers because of different funding models and government policy.
- Rankings based on flawed or problematic measures of research quality.
- Securing outside funding for rare or non-priority diseases that don't attract large donations or gifts.
- Lawmakers or government agency administrators may cut support if a controversy erupts in research we have funded. Government can also apply pressure against certain research areas (e.g., climate change) thus compromising our research efforts; as a result, we will suffer opportunity costs.

Publishers

Examples include Elsevier, American Chemical Society, IOP, BMJ, Frontiers, PLOS, elife, and IEEE.

Actions

- Provide curated content research resources.
- Provide research and collaboration platforms.
- Provide support for scientific networks.
- Provide early contact and guidance for researchers during the presubmission process.

- Balance support for established researchers with support for junior researchers who may offer novel approaches.
- Analyze data sourced from post-publication tools (e.g., altmetrics) to identify research trends.

Investments

- Investment in staff, technology, and infrastructure.
- Investment in research collaboration, engagement, and advisory groups; identify "hot topics."
- Invest in the development of societies and services for members.
- Invest in text and data mining tools.

Rewards

- Drive revenue.
- Foster new products.
- Attract new customers.
- Raise reputation.
- Build networks.
- Support new discoveries.
- Engage stakeholders / support society members.

What Keeps Me up at Night

- Lack of opportunities for interdisciplinary funding.
- When funders step beyond funding research to include hosting of publishing and distribution platforms, I worry that our role in the scholarly publishing and scientific ecosystem will be diminished.
- Recognizing competition from Chinese peers because of different funding models and government policy.
- Anti-publisher sentiments from funders, institutions, and others.
- Non-compliance with regional, national, or international OA mandates may lead to denial of funding for future research and related research output.

Authoring & Research Output

Tools and Services

The ecosystem is dependent on a number of sophisticated tools and services that enable it to function. In addition to improving workflow, these tools and services generate data that can be vital to understanding trends and issues within the ecosystem. These examples are representative and not meant to be exhaustive.

Some key examples:

- Editing services (Editage, Scribbr)
- Authoring, reference manager, and collaboration software (Mendeley, F1000Workspace, openAire, ReadCube papers, Authorea, Overleaf)
- Research and data organizations (labguru, figshare)
- Licensing services for securing third-party rights to content used in research output (copyright.com, RightsLink, PLS)
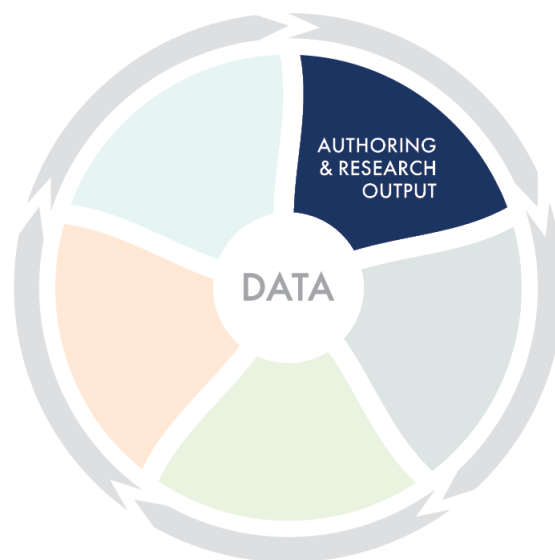
Researchers/Scientists

Examples include researchers from corporate, academic, and government/NGO settings.

Actions

- Research publishers.
- Submit and revise manuscript/patent/standard.
- Suggest peer reviewers.
- Collaborate to write up research results.
- Seek presubmission advice and guidance.

Investments

- Invest time and resources in writing, editing, and submitting research output (i.e., articles, book content, data tables, etc.).

- Invest time and resources in own professional development and certifications.

Rewards

- Enhanced reputation in scientific community.
- Career advancement / tenure.
- Improved peer network.
- Advance science/knowledge.

What Keeps Me up at Night

- If I can't publish in a high-profile journal or platform, either because of funding mandates related to open access or because of high rejection rates, my career opportunities will be severely limited. I also worry about research competitors, given the enormous pressure to disclose my data sets to everyone.
- If I inadvertently publish in predatory journals, my professional reputation is put at risk.

Institutions

Examples include Max Planck Society, Univ. College London, Cambridge University, and the California University Library System.

Actions

- Self-publish research.
- Host supplemental data.
- Support staff in providing peer review and editorial and editorial board services.
- Provide access to content and research in support of authorship.
- Provide institutional tools like Symplectic and Pure to manage content created by institutional authors.

Investments

- Pay salaries of researchers and embedded librarians and invest in professional development/certifications
- Invest in research collaboration platforms and in tools to support institutional research content management.

- Invest in citation indexes, content databases, trademark services, and research intelligence platforms.
- Invest in benchmarking tools to measure productivity and research output.
- Invest staff time in creating frameworks for negotiating APC and transformative agreements and to track OA spend.
- Invest in text and data mining tools.

Rewards

- Solve global issues.
- Attract talent.
- Attract more students.
- Attract more research funding.
- Raise reputation.
- Advance science/knowledge.

What Keeps Me up at Night

- The constant pressure to achieve ambitious research rating benchmarks may frustrate my researchers, leading to burnout and poor science, damaging all our reputations. Those same pressures may also prevent us from hiring the talent we need to attract new funding and thus may negatively impact our overall research programs.
- Understanding drivers and barriers for researchers to adopt open science practices and design the appropriate (community-specific) incentives.
- The challenges of supporting non-native English-speaking researchers.
- The increasing expectations and costs of APCs are putting pressure on fixed library acquisition/subscription budgets.

Funders / Government Agencies

Examples include NIH, Wellcome, Gates Foundation, Max Planck Society, Novartis, BASF, IBM, and Intel.

Actions

- Provide submission platform.
- Provide block grants for APCs or open access publication charges.

- Track compliance with funder mandates.
- Fund further research.
- Publicize funded research.
- Set funding policies and issue mandates.

Investments

- Invest in building or buying submission platforms.
- Raise, allocate, and track funding.

Rewards

- Provide immediate access to published articles, full data sets, and related infrastructure.
- Enable broad and immediate sharing of research results.
- Recognition for use of funds and infrastructure for the advancement of science.

What Keeps Me up at Night

- Without evidence of high impact from funded research, future budget allocations will remain flat or decline. In addition, it is difficult to enforce certain mandates (e.g., those related to data); thus, we worry about how to achieve truly open science.
- Understand drivers and barriers for researchers to adopt open science practices and design the appropriate (community-specific) incentives.
- A controversial author or an inappropriate research agenda may damage our reputation. Are negative results of research being reported to prevent other researchers from wasting time/money?

Publishers

Examples include Elsevier, American Chemical Society, IOP, BMJ, Frontiers, PLOS, elife, and IEEE.

Actions

- Provide submission and product platforms.
- Provide authoring and collaboration tools.
- Structure APC / open access funding agreements.
- Provide presubmission guidance.

Investments

- Invest in research and collaboration platforms.
- Invest staff time in supporting presubmission activities.
- Invest in building reviewer networks.
- Invest staff time in creating frameworks for negotiating APC and transformative agreements.

Rewards

- Increase engagement with established authors, rising stars, and potential new authors.
- Foster new products.
- Attract new customers.
- Expand society membership.
- Raise reputation.
- Develop scientific networks.
- Drive revenue using collaboration platforms and other authoring tools.
- Advance science/knowledge.

What Keeps Me up at Night

- As a publisher, we worry that a power imbalance in the ecosystem will render our role irrelevant. As a society publisher, membership may decline enough to threaten the organization's sustainability.
- Understand drivers and barriers for researchers to adopt open science practices and design the appropriate (community-specific) incentives.
- Challenges of supporting non-native English-speaking researchers.
- Attracting top authors may become increasingly difficult if pre-print, university, and alternative publishing platforms (Subscribe to Open and F1000) continue to evolve and gain market share.
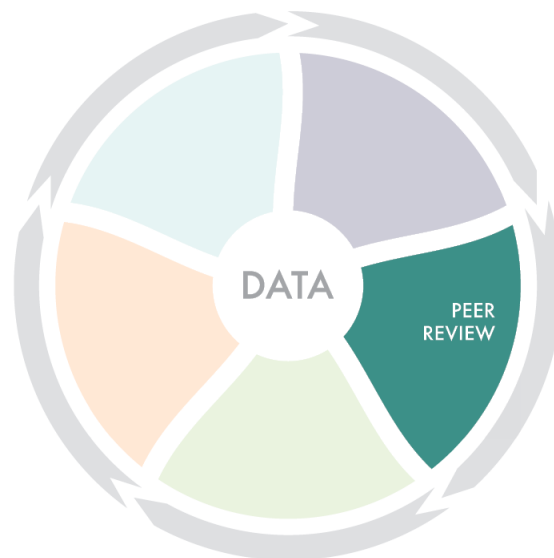
Peer Review

Tools and Services

The ecosystem is dependent on a number of sophisticated tools and services that enable it to function. In addition to improving workflow, these tools and services generate data that can be vital to understanding trends and issues within the ecosystem. These examples are representative and not meant to be exhaustive.

Some key examples:

- Workflow software (ScholarOne, BenchPress, Editorial Manager)

- Preprint servers (arXiv, bioRxiv, Authorea)

- Peer review tools (PLoS Reviewer Center, StatReviewer, Publons)

- Open Access payment workflows and management tools (RightsLink, proprietary systems, Aptara)

- Identifying experts in a specific field (Expert Lookup)

- Repositories and tools for discovery, annotation, analytics, etc. (DSpace)

Researchers/Scientists

Examples include researchers from corporate, academic, and government/NGO settings.

Actions

- Research publishers and editorial requirements.

- Submit and revise manuscripts based on peer review / editorial comments using publisher- or funder-required submissions systems.

- Suggest peer reviewers.

- Seek APC or open access publication funding once manuscript accepted.

- Provide peer review.

- Participate in or create new academic societies and peer networks that — in collaboration with libraries and repositories — provide research evaluation.

Investments

- Invest time in submitting, revising, and reviewing manuscripts by all relevant research team members.
- Fund APCs out of pocket and/or manage the process of seeking non-centralized funding approval after manuscript is accepted.

Rewards

- Enhanced reputation in the scientific community.
- Career advancement / tenure.
- Improved peer network.
- Advance knowledge in field.
- Compensation for peer review (when available).

What Keeps Me up at Night

- The current peer-review framework is insufficiently transparent or collaborative; as a result, I will receive poor reviews and will lack the information or opportunity necessary to address any concerns.
- High rejection rates of submitted manuscripts mean I won't get published in one of the top journals in my field and thus I won't get tenure or advance in my career. Peer review can be time-consuming, leading to a delay in publishing my research results. I may not be able to comply with the amount of required data disclosure and may jeopardize my research funding.
- I am constantly bombarded with requests to review, and I don't have time.
- Absence of formal recognition for my work as reviewer.

Institutions

Examples include Max Planck Society, Univ. College London, Cambridge University, and the California University Library System.

Actions

- Self-publish research results.
- Host and maintain research-related data in institutional repositories.
- Enable staff to access peer review and editorial services through research platforms.

- Approve and fund APCs or open access publication charges once manuscript is accepted.
- Host and/or maintain preprint servers.

Investments

- Pay staff who act as editorial board members and reviewers.
- Pay staff to manage APC payment workflows.
- Pay APCs or open access publication charges after manuscript is accepted.
- Invest in repository technologies and infrastructure.
- Pay library staff to handle new repository features (e.g., discovery, annotation, analytics, etc.).

Rewards

- Carry out institutional mission for advancing open communication in science.

What Keeps Me up at Night

- Funders restricting APC funding to pure OA journals or repositories only, reducing rates of published works in high-impact and commercial journals.
- Professional and competitive pressures on researchers may lead to incomplete and/or ill-considered peer reviews. In addition, a lack of transparent or collaborative peer review may lead to low-quality reviews and thus lengthened publication cycles for the research we care about.

Funders / Government Agencies

Examples include NIH, Wellcome, Gates Foundation, Max Planck Society, Novartis, BASF, IBM, and Intel.

Actions

- Provide submission platform.
- Approve and fund APCs or open access publication charges.
- Track compliance with funding mandates.
- Host and/or maintain preprint servers.

Investments

- Invest time in tracking and managing compliance with funding mandates.
- Continue to track and approve grant applications and allocate funding.
- Invest in the development of altmetrics for reviewer reputation.

Rewards

- Immediate access to published articles, full data sets, and related infrastructure.
- Broad and immediate sharing of research results.
- Recognition for use of funds and infrastructure for producing quality research and thus advancing knowledge / fulfilling the organization's mission.

What Keeps Me up at Night

- Peer-review practices of commercial and society publishers are not adapting quickly enough to ensure rapid publication of funded research; consequently, we may need to reconsider policy and investments in competing peer review and publishing platforms.
- If publishers and institutions don't invest heavily enough in creating and automating the open access publishing infrastructure, the research we have funded will come in over budget and be slow to be published.

Publishers

Examples include Elsevier, American Chemical Society, IOP, BMJ, Frontiers, PLOS, elife, and IEEE.

Actions

- Manage peer review process.
- Assess quality and reliability of science.
- Establish fit with scope of the journal and publishing program.
- Accept manuscripts.
- Host and/or maintain preprint servers.

Investments

- Invest in submission/production platforms.
- Invest APC e-commerce platform and workflows.
- Pay reviewer/editorial board honoraria (where available).
- Invest in building and maintaining peer review network.
- Invest in the development of altmetrics for reviewer reputation.

Rewards

- Expand scientific networks and brand recognition.
- Foster new works, identifying research that fits editorial goals of program or individual publications.
- Uncover new talent, converting peer reviews into authors, editors, readers, etc.
- Expand society membership.
- Achieve high-quality research evaluation.

What Keeps Me up at Night

- Funders restricting APC funding to pure OA journals or repositories only, challenging where authors can publish, business models, and P&Ls.
- When funders focus on shorter funding cycles or when funding dries up altogether, we may be investing heavily in evaluating low-quality science that doesn't match our editorial standards, leading to very high and costly rejection rates.

Publish & Distribute

Tools and Services

The ecosystem is dependent on a number of sophisticated tools and services that enable it to function. In addition to improving workflow, these tools and services generate data that can be vital to understanding trends and issues within the ecosystem. These examples are representative and not meant to be exhaustive.

Some key examples:

- Digital content development and hosting services (HighWire, Ingenta, Hinari, Research4Life, Esploro, Zotero)
- Open access publishing platforms (F1000Research, eLife)
- DOI registration (Crossref, DataCite)
- Plagiarism technology (Similarity Check, Turnitin)
- Aggregators (ProQuest, Ensco, Scielo, CHORUS)
- Permissions software (RightsLink)
- Open access / institutional repositories (Figshare, Dryad, DIGITAL.CSIC, e-IEO)
- Discovery tools (Google Scholar/Google, ProQuest Summon, OCLC WorldCat)
- Author marketing tools (Kudos)
- Article-level metrics (altmetrics)
- Open access directories (DOAJ, Sherpa/Romeo)
- Integrated library system technology
- Sharing "guidelines" (Creative Commons, CCC)
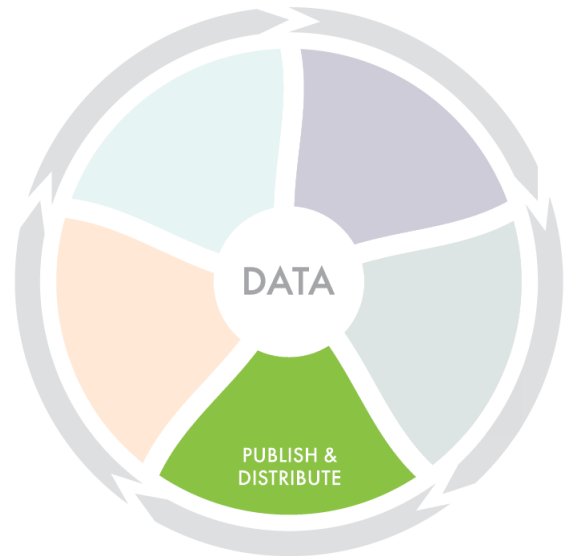
Researchers/Scientists

Examples include researchers from corporate, academic, and government/NGO settings.

Actions

- Revise content.

- Review proofs.
- Publish content.
- Publish supplementary data.
- Promote research output.

Investments

- Subscribe to marketing tools for authors (e.g., Kudos).
- Time invested in manuscript revisions and adding publication information to author profiles, ORCID records, etc.

Rewards

- Advance career/tenure.
- Elevate personal standing in department or institution.
- Enhance reputation outside the institution.

What Keeps Me up at Night

- Once published, I worry whether others will read my articles and validate my research. I want my research to have an impact on the scientific community.
- Professional advancement remains dependent on my publishing in the most prestigious journals, while at the same time, many open access journals do not show a high "impact factor."

Institutions

Examples include Max Planck Society, Univ. College London, Cambridge University, and the California University Library System.

Actions

- Provide platforms to self-publish research results.
- Host research-related data.
- Catalog, tag, and archive research.
- Assign DOIs for data.
- Incentivize/reward publication of negative results.

Investments

- Invest in web sites / platforms / repositories and appropriate processes, policies, and positions to facilitate publication of scholarly articles / research output.
- Invest in integrated library system technology.
- Subscribe to marketing tools for authors (e.g., Kudos).
- Invest in staff time and expertise in managing APCs and publication embargoes.

Rewards

- Achieve institutional mission.
- Attract talent.
- Attract more students.
- Attract more research funding.
- Raise reputation.

What Keeps Me up at Night

- Flat or diminishing library acquisition budgets will make it impossible for the institution to fund subscriptions, APCs, and new data products.
- How to better support/fund the publication and sharing of supplemental and underlying research data.
- The demands of negotiating and implementing transformative agreements in a timely fashion given the ever-changing OA landscape.
- Entities like Sci-Hub may acquire researcher credentials, creating liability potential for individual researchers and the institution.

Funders / Government Agencies

Examples include NIH, Wellcome, Gates Foundation, Max Planck Society, Novartis, BASF, IBM, and Intel.

Actions

- Track research output.
- Track compliance with publication and research deposit mandates.
- Provide platforms to self-publish research results.
- Continue/extend requirements for sharing (data, code, MSS, etc.).

- Incentivize/reward publication of negative results.

Investments

- Invest in platforms that enable self-publishing of research results.
- Invest in web sites / platforms / repositories and appropriate processes, policies, and positions to facilitate publication of scholarly articles / research output.

Rewards

- Achieve mission.
- Raise reputation.

What Keeps Me up at Night

- The pace of change in moving from subscription to open access publishing means funded research may not reach the intended audiences, may not have the desired impact on society, or both.
- How to better support/fund the publication and sharing of supplemental and underlying research data.
- If publishing and peer review platforms break down, then our organization's mission to publish and disseminate research results as quickly as possible will not be met.

Publishers

Examples include Elsevier, American Chemical Society, IOP, BMJ, Frontiers, PLOS, elife, and IEEE.

Actions

- Edit content.
- Design and package.
- Assign metadata / enable discoverability.
- Publish.
- Curate volumes/issues.
- Distribute/host content directly.
- Set up third-party / channel distribution to ensure access by developing countries.
- Deposit in repositories; archive content/manage data.

- Manage permissions for reuse.
- Liaise with society partners.
- Market/preview content.
- Incentivize/reward publication of negative results.
- Mine data and data sets.

Investments

- Invest in editorial and/or production platforms.
- Invest in web sites / platforms / repositories and appropriate processes, policies, and positions to facilitate publication of scholarly articles / research output.
- Pay distribution fees to aggregators.
- Pay annual dues to standards organizations.
- Pay typesetters and metadata taggers.
- Invest in editorial, production, marketing, sales, and data management staff.
- Pay other third-party fees.

Rewards

- Achieve revenue and profit targets.
- Gain new insights and foster new products.
- Attract new customers.
- Raise reputation.
- Enhanced growth in society membership.

What Keeps Me up at Night

- When funder mandates require publishing in pure OA journals or repositories only, current and future authors will publish elsewhere, threatening the organization's viability.
- How to better support/fund the publication and sharing of supplemental and underlying research data.
- Sharing sites (SciHub, ResearchGate) will reduce my P&L to unsustainable levels.
- The demands of negotiating and implementing transformative agreements in a timely fashion given the ever-changing OA landscape.
- If our publishing and institutional sales programs are unable to meet the Horizon 2020/2021 demands for publishing content in pure open access journals or repositories only.

Post-Publication

Tools and Services

The ecosystem is dependent on a number of sophisticated tools and services that enable it to function. In addition to improving workflow, these tools and services generate data that can be vital to understanding trends and issues within the ecosystem. These examples are representative and not meant to be exhaustive.

Some key examples:

- Altmetrics (Altmetric, Plum Analytics)
- Reputation management (Kudos, ImpactStory)
- Text & data mining tools, document delivery (RightFind, Reprints Desk)
- A&I services (Scopus, ScienceOpen)
- Subscription agents (EBSCO, Harrassowitz)
- Social media, collaborative networks (ResearchGate, Academia. edu)
- Archiving software (LOCKSS, CLOCKSS)
- Library system technology (ILS), data collection of posters/conferences (Morressier)
- Licensing services (copyright.com, RightsLink, PLS, Creative Commons)
- CRIS or Research Information Systems (Symplectic, Pure)
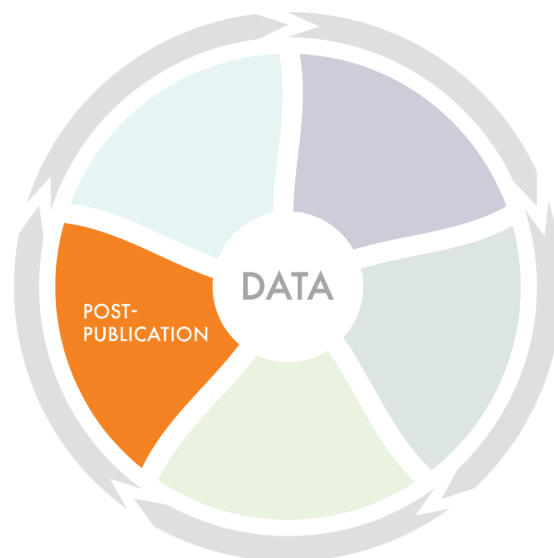
Researchers/Scientists

Examples include researchers from corporate, academic, and government/NGO settings.

Actions

- Post article to personal/professional web site (copyright permitting).
- Share on collaborative networks.
- Market content, write blog posts, etc.
- Track impact (bibliometric/social).
- Track altmetrics.

Investments

- Time/effort.

Rewards

- Advance science / solve global issues.
- Enhanced reputation in the scientific community.
- Career advancement / tenure.

What Keeps Me up at Night

- Any post-publication lack of compliance with funding mandates could put future research funding at risk.

Institutions

Examples include Max Planck Society, Univ. College London, Cambridge University, and the California University Library System.

Actions

- Make articles accessible via discovery tools or library systems.
- Archive articles and data.
- Mine data and data sets.
- Track usage statistics.
- Ensure publication details are registered in CRIS.

Investments

- Subscription costs.
- Library system technology costs.
- Archiving costs.
- Staffing costs.
- Licensing costs.

Rewards

- Advance science / solve global issues (e.g., climate change).
- Attract talent.
- Attract more students.
- Attract more research funding.
- Raise reputation.

What Keeps Me up at Night

- Any post-publication lack of compliance with funding mandates could put future research funding at risk.

Funders / Government Agencies

Examples include NIH, Wellcome, Gates Foundation, Max Planck Society, Novartis, BASF, IBM, and Intel.

Actions

- Measure impact of articles: scientific, social, economic, etc.
- Look for additional funding opportunities.
- Check for compliance with funding mandates.

Investments

- Time/effort.
- Staffing costs.

Rewards

- Advance science / solve global issues (e.g., climate change).
- Attract more funding.
- Raise reputation.

What Keeps Me up at Night

- If data used to measure success is incomplete or substandard, then we may not fund the most promising people, labs, or science.

Publishers

Examples include Elsevier, American Chemical Society, IOP, BMJ, Frontiers, PLOS, elife, and IEEE.

Actions

- Archive articles and data.
- Measure impact (journal impact factor).
- Track usage statistics.
- Track altmetrics.

Rewards

- Drive revenue.
- Advance science / solve global issues (e.g., climate change).
- Attract new customers.
- Expand society membership.
- Raise reputation.
- Identify future authors.

Investments

- Ongoing marketing costs.
- New product development costs.
- Operational costs for tracking.
- Archiving costs.
- Staffing costs.

What Keeps Me up at Night

- Sharing sites (Sci-Hub, ResearchGate) threaten my revenue and the perception of value, thus threatening the organization's ongoing viability.
- CC-BY and other licensing mandates from funders, institutions, and policy makers directly threaten licensing revenue; as a result, the diverse revenue streams necessary to fund publishing activities would diminish or disappear. APCs alone do not cover the costs of running a quality publishing program.

About the Authors

Jim Hydock
Consulting Partner
Outsell, Inc.

jhydock@outsellinc.com

Jennifer Goodrich
Director, Product Management, Publisher Solutions
Copyright Clearance Center

jgoodrich@copyright.com

About Outsell

Outsell is the only research and advisory firm serving information industry CEOs and their teams, and investors in media, tech, data and information. Our solutions are built from the ground up leveraging a unique set of assets: proprietary data, industry leading analysts, world class events, and a thriving and growing peer-to-peer community. Through deep industry relationships, we ensure our clients make great decisions for their businesses on a wide spectrum of topics, including competition and markets, operating and sales performance, M&A and due diligence, and critical trends. We stand by our work 100% and guarantee results. That's how fanatical we are about our clients' success.

www.outsellinc.com

contact_us@outsellinc.com

Burlingame, CA USA
650-342-6060

London, United Kingdom
+1 +44 (0)20 8090 6590

About Copyright Clearance Center

Copyright Clearance Center (CCC) builds unique solutions that connect content and rights in contextually relevant ways through software and professional services. CCC helps people navigate vast amounts of data to discover actionable insights, enabling them to innovate and make informed decisions. CCC, with its subsidiaries RightsDirect and Ixxus, collaborates with customers to advance how data and information is integrated, accessed, and shared while setting the standard for effective copyright solutions that accelerate knowledge and power innovation. CCC is headquartered in Danvers, Mass. and has offices across North America, Europe and Asia.

www.copyright.com