Scholarly Metrics Recommendations *for* Research Libraries: Deciphering the Trees in the Forest

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INTRODUCTION

The digital era is bringing new and exciting changes to scholarly communication. Modern scientific libraries and information infrastructures are obliged to face these challenges in a professional way, and sooner rather than later.

The monitoring and execution of policies, the facilitation of Open Access publishing, and support for research data management are but a few examples of adaptation to the digital era. The use of scholarly metrics[1] is also an emerging field for academic libraries, brought on by digital change.

To foster this vision, LIBER's Innovative Metrics Working Group[2] has set out recommendations on how academic libraries and information infrastructures can deal with scholarly metrics, and how to get started with the development of services to support this.

The recommendations are grouped into four sections:

1. Discovery and Discoverability
2. Showcasing Achievements
3. Service Development
4. Research Assessment

Each section covers a set of activities, and makes suggestions for libraries which want to promote the transparent, standardized and responsible use of scholarly metrics.

As part of LIBER's focus on Open Science, the Working Group has placed a special emphasis on recommendations addressing open scholarly metrics.

The recommendations in this report are organised into three levels:

●   Initial Steps (circular bullet)
■   Intermediate Steps (square bullet)
▲   Advanced Steps (triangular bullet)

Which recommendations a library adopts will depend on their current level of engagement with scholarly metrics.

The order in which the recommendations appear are in correlation with the potential importance they can have for an institution.

These two indications of use were developed during the Working Group's workshop during LIBER's 2017 Annual Conference. They are there to assist in prioritizing, but are not mandatory to follow and are not dependent on each other.

OPEN SCHOLARLY METRICS

Open scholarly metrics are output and impact indicators whose data are open. We use 'open' in the sense of the Open Definition[3] and we apply it to data, metrics, indicators, methods, software, and services. In addition, open data should follow the FAIR Principles.[4]

When talking about data we mean (bibliographic) metadata, data related to scholarly outputs (e.g., number of published articles), data related to the impact of scholarly works (e.g., number of citations), and qualitative information about engagement with scholarly works and other stakeholders of the research enterprise (e.g., demographic information about users tweeting a scientific article and the tweet containing the DOI to the article).

Open should be the default way of providing scholarly metrics and of developing services and tools. Where openness is not possible (e.g., because of third party restrictions), transparency should be aimed for.

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[1] *Following Haustein (2016, p. 416) we define scholarly metrics as "indicators based on recorded events of acts (e.g., viewing, reading, saving, diffusing, mentioning, citing, reusing, modifying) related to scholarly documents (e.g., papers, books, blog posts, datasets, code) or scholarly agents (e.g., researchers, universities, funders, journals)". Concepts such as altmetrics or bibliometrics are subsumed under this definition.*
[2] *https://libereurope.eu/strategy/innovative-scholarly-communication/metrics*
[3] *https://opendefinition.org*
[4] *https://www.force11.org/group/fairgroup/fairprinciples*

About LIBER

LIBER *(Ligue des Bibliothèques Européennes de Recherche – Association of European Research Libraries)* represents 430 university, national and special libraries in 40 countries, making us Europe's largest research library network.

Our 2018-2022 Strategy, Powering Sustainable Knowledge in the Digital Age, outlines how libraries can prepare themselves for coming changes in the research landscape. It is based on three key focus areas: Innovative Scholarly Publishing, Digital Skills and Services, and Research Infrastructures.

By 2022, we envision a world where:

- Open Access is the predominant form of publishing;
- Research Data is Findable, Accessible, Interoperable and Reusable (FAIR);
- Digital Skills underpin a more open and transparent research life cycle;
- Research Infrastructure is participatory, tailored and scaled to the needs of the diverse disciplines;
- The cultural heritage of tomorrow is built on today's digital information.

OUR NETWORK

LIBER libraries are at the heart of our network. Staff from these libraries directly influence LIBER's work by serving on our Executive Board, Steering Committees and Working Groups.

The Innovative Metrics group which produced this document is one of nine current LIBER Working Groups. The activities undertaken by each group are varied but they share one common aim: to advance Open Science.

Anyone working in a LIBER library is invited both to follow the progress of these groups and to get involved. Participating in a Working Group is a wonderful way to exchange experiences and challenges with your professional peers, while at the same time making a valuable contribution to the wider research library community.

To learn more about participating, simply contact the chair of the group which you would like to join. Contact details are available on LIBER's website.

www.libereurope.eu

1. Discovery & Discoverability

Scholarly metrics can be used to discover scholarly works and researchers, and to highlight ways of increasing their discoverability. Context, such as reader demographics, helps when evaluating scholarly works. Context can also aid stakeholders of the scientific enterprise, for example, to address the right target group in articles or to find the right publication outlet for the topic. Metadata and scholarly metrics are rich sources for the provision of context on works, publication venues, institutions and individuals. Moreover, scholarly metrics support knowledge discovery. They can lead to the finding of information not explicitly mentioned in the dataset, such as influential authors in a scientific field. Re-using methods in studies of scholarly metrics can open new search opportunities and help library patrons — researchers, students and university administrators — to become acquainted with these methods.

1A. PROVIDE CONTEXTUAL INFORMATION TO ALLOW THE DISCOVERY OF RELATED WORK & USERS

- ▲ Track appearances of scholarly works and people from your institution. Link to or provide information on the context. To do this, a full list of scholarly works including bibliographic metadata and persistent identifiers is needed. Depending on whether searching for a scholarly document (work), an agent (person or institution) or an event, you may use CrossRef Event Data,[4] Web of Science[5] or Scopus,[6] Google Scholar,[7] Google Analytics,[8] ORCID,[9] Altmetric,[10] Plum Analytics,[11] a Twitter search query or other social networks (e.g., ResearchGate[12] or Mendeley[13]), to gather such information.

- ● Add available metadata to the scholarly works and people to provide rich contextual information. There are numerous resources to mine for valid information, such as Sherpa/ROMEO [14] for journals or ORCID or Google Citation Profiles[15] for authors.
- ■ Establish links between CRISs and digital repositories and provide interfaces to institutional research information services with shared infrastructures in the field of scholarly communication, such as ORCID. Demonstrate researchers' or institutions' compliance with open science principles by checking for open access versions of their articles via databases such as 1findr[16] or Unpaywall.[17]
- ■ Process context data and implement it accordingly with tools such as Publish or Perish,[18] rOpenSci,[19] or Open Knowledge Maps.[20] The list is expanding as you read.
- ● Reveal the relations between scholarly works by using ranking functionalities (by year, times cited, h-index, journal impact factor, usage, or other metrics or formal metadata).
- ▲ Visualize knowledge flows via citation networks (where does knowledge come from, i.e. reference list, where does it go, i.e. citations). Use tools like VOSViewer,[21] Gephi[22] or CitNetExplorer[23] to create maps of science through citation networks and enhance them with information from scholarly metrics just like Open Knowledge Maps do.
- ■ Reveal collaboration patterns (e.g., on institutional level) through co-authorship analyses. Take advantage of tools like VOSViewer or Pajek.[24]
- ▲ Reflect readership via usage information and show routes to other scholarly works and people also concerned with the topic (often outside of academia). Social media platforms often provide demographic and professional information about their users that add to the understanding of who is concerned with research results. Depending on the user base usage information can reflect societal impact of scholarly works, institutions, disciplines, and researchers. Readership and attention metrics can be found in services like Altmetric, PlumX Metrics and Kudos.[25]
- ■ Solicit platforms to focus after publication and where to engage in discussions by exploring mentions on social platforms. This context also provides authors of scholarly works with the full view of the scholarly debate around works or people.
- ■ Use scholarly metrics to aid discovery of research trends and upcoming topics, e.g., output and/or impact indicators. Take a look at tools such as AIDA – a tool co-developed -by TU Delft Library and the Leiden University's Centre for Science and Technology Studies – that visualizes and analyses of research areas and research trends.[26]

[4] *CrossRef Event Data, https://www.crossref.org/services/event-data*
[5] *Web of Science, https://clarivate.com/products/web-of-science*
[6] *Scopus, https://www.scopus.com*
[7] *Google Scholar, https://scholar.google.com*
[8] *Google Analytics, https://analytics.google.com*
[9] *ORCID, https://orcid.org*
[10] *Altmetric, https://altmetric.com*
[11] *Plum Analytics, https://plumanalytics.com*
[12] *Research Gate, https://www.researchgate.net*
[13] *Mendeley, https://www.mendeley.com*
[14] *Sherpa/ROMEO, https://www.sherpa.ac.uk/romeo*
[15] *Google Citations, https://www.scholar.google.com/citations*
[16] *1findr, https://1finder.1science.com*
[17] *Unpaywall, https://unpaywall.org*
[18] *Publish or Perish, https://harzing.com/resources/publish-or-perish*
[19] *rOpenSci, https://ropensci.org*
[20] *Open Knowledge Maps, https://openknowledgemaps.org*
[21] *VOSViewer, http://www.vosviewer.com*
[22] *Gephi, https://gephi.org*
[23] *CitNetExplorer, http://citnetexplorer.nl*
[24] *Pajek, http://mrvar.fdv.uni-lj.si/pajek*
[25] *Kudos, https://www.growkudos.com*
[26] *AIDA Toolbox, http://aida.tudelft.nl/toolbox*

- Support journal selection for articles via additional information about journals via impact indicators, e.g., readership demographics, impact factor etc. Tools about rankings, such as JCR[27] and SciMago,[28] should work together with services that provide journal information or impact indications, such as Impact Factor, SNIP, SJR, etc.
- Demonstrate impact of research works outside of academia by linking them with patents and policy documents that include bibliographic information. Google Patents can be a useful resource to start with, but also Dimensions.[29]

1B. EXPLOIT RICH NETWORK STRUCTURES & IMPLEMENT BIBLIOMETRIC METHODS TO ENABLE DISCOVERY OF EXPERTS, POTENTIAL COLLABORATORS & NON-ACADEMIC AUDIENCES

- Build a database that contains network data (e.g., citations), or use ready-to-go-products. The current market provides several options including Web of Science, Scopus, Microsoft Academic Search,[30] Google Scholar, and Initiative for Open Citations.[31]
- Use your own system to track impact indicators and engagement with library services and own databases. Use your data to analyse and optimise library-owned services.
- Analyze network data with bibliographic coupling or co-citation-analysis to create clusters of related scholarly works, topics or people. VOSviewer or Sci2[32] are powerful free tools to do so.
- ▲ Illustrate the topology of researchers' networks and use them to detect key scholarly works, key people, and communities; key people serve as bridges between communities. You may build these networks easily with NodeXL[33] or if you are more advanced to networks you may try Gephi and Pajek.

1C. ENCOURAGE SHARING OF LIBRARY COLLECTIONS UNDER OPEN LICENSES TO STRENGTHEN REUSABILITY & INCREASE DISCOVERABILITY OF SCHOLARLY WORKS & RESEARCHERS

- Publish data produced in your library in a standard format on a persistent platform. If possible publish your data as linked open data. If you do not own a platform to do so, then try Zenodo[34] or FigShare.[35]
- Choose a license complying with the open definition when publishing data and allow for accessing these datasets (e.g., provide persistent identifiers and support various types of APIs). Learn more about Open Data[36] and engage in discussions with the community).
- Increase usability of library data. Provide thorough documentation on how the data was collected, what it contains, what not, definition of fields, possible use cases, etc.
- Make your dataset referable by adding a persistent identifier from the plethora of options you have from DOIs and Handles to URNs and DataCite.[37]
- Increase visibility of the dataset by linking it with existing resources, sharing it via wikidata or Wikimedia etc. The GLAM-WIKI of WikiMedia[38] project supports GLAMs and other institutions to produce open-access, freely-reusable content for the public.
- ▲ Demonstrate reusability and value of data via training sessions or open hack events. Include the local community and promote success stories of reusability.
- Open your library data to enable service development which can be later reused across libraries.

[27] Journal Citation Report, https://jcr.incites.thomsonreuters.com

[28] Simago Journal & Country Rank, http://www.scimagojr.com

[29] Dimensions, https://dimensions.ai

[30] Microsoft Academic Search, https://www.microsoft.com/en-us/research/project/microsoft-academic-graph

[31] Initiative for Open Citations, https://i4oc.org

[32] Sci2, https://sci2.cns.iu.edu

[33] NodeXL, https://www.smrfoundation.org/nodexl

[34] Zenodo, https://zenodo.org

[35] FigShare, https://figshare.com

[36] as described in the Open Data Handbook

[37] DataCite, https://datacite.org

[38] GLAM-Wiki, https://outreach.wikimedia.org/wiki/GLAM

2. ★ Showcasing Achievements

These recommendations focus on how to share scholarly works and how to track and highlight the attention they receive. Sharing, access, online presence, visibility of scholarly works and researchers are keys in this endeavour. They also positively influence each other: sharing increases visibility, visibility increases access, access increases impact indicators, increased impact indicators enhance visibility. However, to fully exploit the benefits of the positive feedback loop, information on scholarly works and researchers must be complete and up-to-date. Libraries have to roles in these regards: they support knowledge building and provide resources that aid showcasing.

2A. INCENTIVIZE RESEARCHERS TO SHARE SCHOLARLY WORKS, PROMOTE ACHIEVEMENTS ONLINE & ENGAGE WITH AUDIENCES VIA OTHER MEANS THAN TRADITIONAL SCHOLARLY MEDIA

- Know about the online platforms and audiences that are of importance to your researchers (e.g., Academia[39] or Research Blogging[40]).
- Provide your customers with the resources to build an online presence. If you have a CRIS help them set up their webpage or advise them to create a blog page exploiting the CRIS information and infrastructure.
- ▲ Inform your customers about the various options, benefits (e.g., visibility), and pitfalls (e.g., copyright) of online social networking platforms for scholarly works and researchers

and present success stories (from your institution or the particular disciplines).

- Train your customers to use social media and online platforms and provide online-training material which discusses issues and benefits of being present online. Collaborate with the communications/marketing department.
- Provide an institutional repository or recommend trustworthy (inter-)disciplinary repositories from third parties and provide information about Open Access journals.[41] Arxiv,[42] bioRxiv[43] and other related services are very important as they hold a central position in the scholarly communication ecosystem.
- ▲ Establish sharing and citation guidelines just like Open Access NL[44] has done.

- Create a workflow to receive green Open Access versions of your researchers' works immediately after publication. Do not waste time as it is difficult to find the right version two years later and to remind them that any embargo has ended. Sherpa/ROMEO is always a trustworthy service to consult.
- Upload posters and presentations to public and/or university repositories and link to them in profile pages. From FigShare and F1000 Posters[45] to SlideShare and SpeakerDeck, there are numerous options to record talks of researchers and engage in public discussion.

39 *Academia.edu, https://www.academia.edu*
40 *Research Blogging, http://researchblogging.org*
41 *Directory of Open Access Journals, https://doaj.org*
42 *Arxiv, https://arxiv.org*
43 *bioRxiv, https://www.biorxiv.org*
44 *OpenAccess NL, http://openaccess.nl/en*
45 *F1000 Research – Posters, https://f1000research. com/browse/posters*

2B. ENCOURAGE RESEARCHERS TO SHOWCASE SCIENTIFIC CONTRIBUTIONS & MONITOR IMPACT TO BE AWARE OF WHO ENGAGES WITH WORK AND HOW

▲ Support and educate your researchers how to build an online identity and discuss the pros and cons of such an approach.

■ Demonstrate how researchers showcase their achievements and what tools they use. Discuss options for self-assessment, for example in relation to the academic age, i.e. years since the PhD degree or the first academic publication. A good example for self-assessment and showcasing is the portfolio template presented by the Acumen project.[46]

■ Support your researchers registering an ORCID or other author identifiers like ResearcherID,[47] show them how to use them, and explain their benefits. Similarly, explain the benefits of author badges and where to get them, e.g. Mozilla Authorship Contribution Badges.[48]

■ Make your researchers aware of the benefits of persistent identifiers for their works and show them where to get these. There is abundance of services for any aspect of their works, from Handles in institutional repositories to DataCite for datasets.

■ Provide your customers with complete information about their scholarly works. This requires keeping the institutional CRIS or university bibliography up-to-date.

● Track online attention around scholarly works and researchers. It is easy to set up citation alerts in any of your preferred services.

● Increase visibility (i.e. findability) of scholarly works and stakeholders of the scientific enterprise by optimizing academic search engines from your end.[49] Public databases containing information about scholarly works, researchers, and institutions should be machine-readable and findable (from websites to repositories).

[46] *Acumen Portfolio, http://research-acumen.eu/wp-content/uploads/MS5-ACUMEN-portfolio.pdf IDA Toolbox*

[47] *ResearcherID, http://www.researcherid.com*

[48] *Mozilla Authorship Contribution Badges, https://badges.mozillascience.org*

[49] *Academic search engine optimization, http://guides.library.ucla.edu/seo*

3. Service Development

These recommendations focus on service development by reusing existing services and tools and returning them to the community of academic libraries. Reuse and mash-ups of tools, data, methods, and services, as well as standardization and interoperability, are critical for exhaustive provision of responsible services around scholarly metrics. This enables tailoring services to the needs of academic libraries and increases the reusability of services and tools. This is especially important for small and medium-sized libraries that lack manpower and are therefore the main beneficiary of collaborative and open service development.

3A. JOIN FORCES WITH STAKEHOLDERS TO PROVIDE SERVICES REUSING EXISTING RESOURCES, TOOLS, METHODS & DATA

- Start with enriching existing sources and databases at your library (e.g., add scholarly metrics to the CRIS and/or institutional repository).[50]
- Learn about scholarly metrics via any possible means including libguides, summer schools and product presentations.[51]
- Engage with the scholarly metrics community. Attend conferences, workshops and summer schools, and joining mailing lists. Draw experience from existing services and tools. Tailor these services to your specific needs and capabilities. Collaborate when developing new services.[52]
- Learn about the usability and functionalities of these services and tools by running pilots and sharing the findings (e.g., via blogs).[53]

3B. VALUE VARIOUS LEVELS OF ENGAGEMENT; FAVOUR STANDARDIZED, WELL-ESTABLISHED PRACTICES & EASY-TO-USE TOOLS

- Find and define tasks that researchers can do by themselves, such as updating user profiles on social media platforms. (*Do It Yourself*-level of engagement). Provide information about the goals of the tasks and how to perform them (e.g., via websites, wikis, or trainings). Provide self-explanatory tools for execution.
- Find and define tasks that researchers or university administration and libraries should conduct together, such as planning the quantitative assessment of an individual (*We Do It Together*-level of engagement).

- Find and define tasks that academic libraries should conduct by themselves, such as the assessment of individuals and the interpretation of results.
- Standardize workflows that suit the needs of your researchers if you follow a *We Do It For You* mode of engagement. Reuse existing processes, methods, and data where possible.

[50] *Academic search engine optimization, http://guides.library.ucla.edu/seo*

[51] *For example, http://www.metrics-toolkit.org and https://www.openuphub.eu/assess*

[52] *For example, on the establishment of standardized bibliometrics services and workflows in libraries: Gorraiz, Wieland, & Gumpenberger (2016): Individual Bibliometric Assessment @ University of Vienna: From Numbers to Multidimensional Profiles. DOI: 10.5281/zenodo.45402*

[53] *For example, https://thebibliomagician.wordpress.com*

3C. MAKE FULL USE OF OPEN DATA SOURCES; SUSTAIN NOT-FOR-PROFIT ENTERPRISES WITH OPEN BUSINESS MODELS; OPENLY SHARE DATA, TOOLS & SERVICES

● Find, use and provide open data and tools for exercises including scholarly metrics[54] if they prove to be consistent, reliable, sustainable, and transparent.

● Identify the license for data reuse by third party (CC BY or CC0) and check whether the developed services in the libraries can comply with the requirements the license entails.

● Share your data and tools (eg., library-/institution-owned data sets such as loan statistics) with an open license. Open means to the internal community of library employees, researchers and university administrators **as well as** the public. Consult Open Definition and Fair Data for thorough and clear interpretations of 'open'. If this is not possible, aim for maximum transparency about data collection, processing, tools used, results and interpretation.

▲ Support alternative funding models (ie. models not based on licensing data and tools) when distributing your services. This also allows third parties to scrutinize data and methods and will act as quality check for your data.

● Make your spending for proprietary data sources and tools publicly available to increase transparency and build awareness on the costs of quantitative analyses based on scholarly metrics. Also, be transparent about how you collect data and use tools and for what purposes. Important institutions have prepared code of conducts, like the NISO Data Quality Code of Conduct for Altmetrics.[55]

3D. LEARN ABOUT PLATFORMS BEFORE IMPLEMENTING THEM IN SERVICES & HOMOGENIZE DIFFERENT SOURCES

■ Know about rankings that might be of major importance for your researchers, such as discipline-specific journal rankings or university rankings.

▲ Demonstrate the value of different types of impact indicators in comparison to citations.

● Look for open data sets in the required disciplines and use them in addition to proprietary databases (eg., Web of Science). RefSeer,[56] Paperscape,[57] PubMed,[58] Arxiv, Repec,[59] Scielo[60] and numerous others provide datasets to specialized communities.

▲ Be prepared for heterogeneous impact indicators that reflect engagement with scientific work (e.g., likes, shares, retweets, forks) that may require separate analysis and interpretation. The same holds for the platforms that record scholarly works.

3E. WORK WITH RESEARCHERS TO BUILD AWARENESS OF BENEFITS BUT EDUCATE ABOUT WEAKNESSES OF SCHOLARLY METRICS

● Address those that might be interested in scholarly metrics services (e.g., as strategic departments of the academic library and/or the university, faculties, and researchers). Learn about their goals so that you can tailor services to their needs. Consult case studies by universities such as Loughborough[61] and Vienna[61] for ideas.

■ Find out which level of engagement is really needed from libraries to meet the goals of their customers.

● To increase acceptance and trust in the data underlying scholarly metrics services, engage customers in data collection and make them an integral part of the system. For example, the system should be interactive and allow for correction or improvement of the content. Reuse existing data and workflows as much as possible to keep the user burden low.

● Educate your customers about the strengths and weaknesses of output and impact indicators as a proxy for quality (e.g., Journal Impact Factor, h-Index), and of data sources (e.g., citation databases such as Web of Science or Google Scholar) and altmetrics (e.g., altmetrics bookmarklet).[63] Make your explanations accessible and convincing by using in-house examples or disciplinary case studies.

[54] Such as Initiative for Open Citations
[55] https://www.niso.org/standards-committees/altmetrics
[56] RefSeer, http://refseer.ist.psu.edu
[57] PaperScape, http://paperscape.org
[58] PubMed, https://www.ncbi.nlm.nih.gov/pubmed
[59] Repec, http://repec.org
[60] Scielo, http://www.scielo.org
[61] Loughborough University – Assessment, http://www.lboro.ac.uk/research/scholcomms/assessment/respmetrics
[62] Bibliometric Services for the Administration at the University of Vienna, http://bibliothek.univie.ac.at/bibliometrie/en/fur_die_administration.html
[63] Altmetric.com Bookmarklet, https://www.altmetric.com/products/free-tools/bookmarklet

3F. EXPAND YOUR PERSPECTIVE WHEN DEVELOPING SERVICES; AVOID SINGLE-PURPOSE APPROACHES IN FAVOR OF ADDRESSING THE WIDER COMMUNITY

● Start on the level of the individual to allow for easy maintenance of scholarly metrics.
■ Build modular services that can serve individual as well as customer needs (e.g., including inter-changeable denominators for calculation of impact) and that allow for different levels of complexity.

3G. TEACH COLLEAGUES NEW SKILLS & LIBRARY GOALS & SERVICES; LIBRARIANS ARE MULTIPLIERS WHEN IT COMES TO PROMOTING METRICS SERVICES

▲ Provide material for self-education and provide resources for further information (e.g., mailing lists[64] or blogs[65]).
▲ Provide local trainings for staff, provide webinars, or encourage staff to attend to trainings by established institutions, such as the Summer School for Scientometrics by CWTS[66] or the European Summer School for Scientometrics.[67]
▲ Help by supporting each other (e.g., by arranging discussion groups on site).

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[64] *We indicate two mailing lists for start: JISC Bibliometrics, https://www.jiscmail.ac.uk/cgi-bin/webadmin?A0=LIS-BIBLIOMETRICS and ASIST SIGMETRICS http://mail.asis.org/mailman/listinfo/sigmetrics*
[65] *See for instance, https://thebibliomagician.wordpress.com*
[66] *CWTS Scientometrics Summer School (CS3), https://www.cwts.nl/training-education/cwts-scientometrics-summer-school*
[67] *European Summer School for Scientometrics, http://www.scientometrics-school.eu*
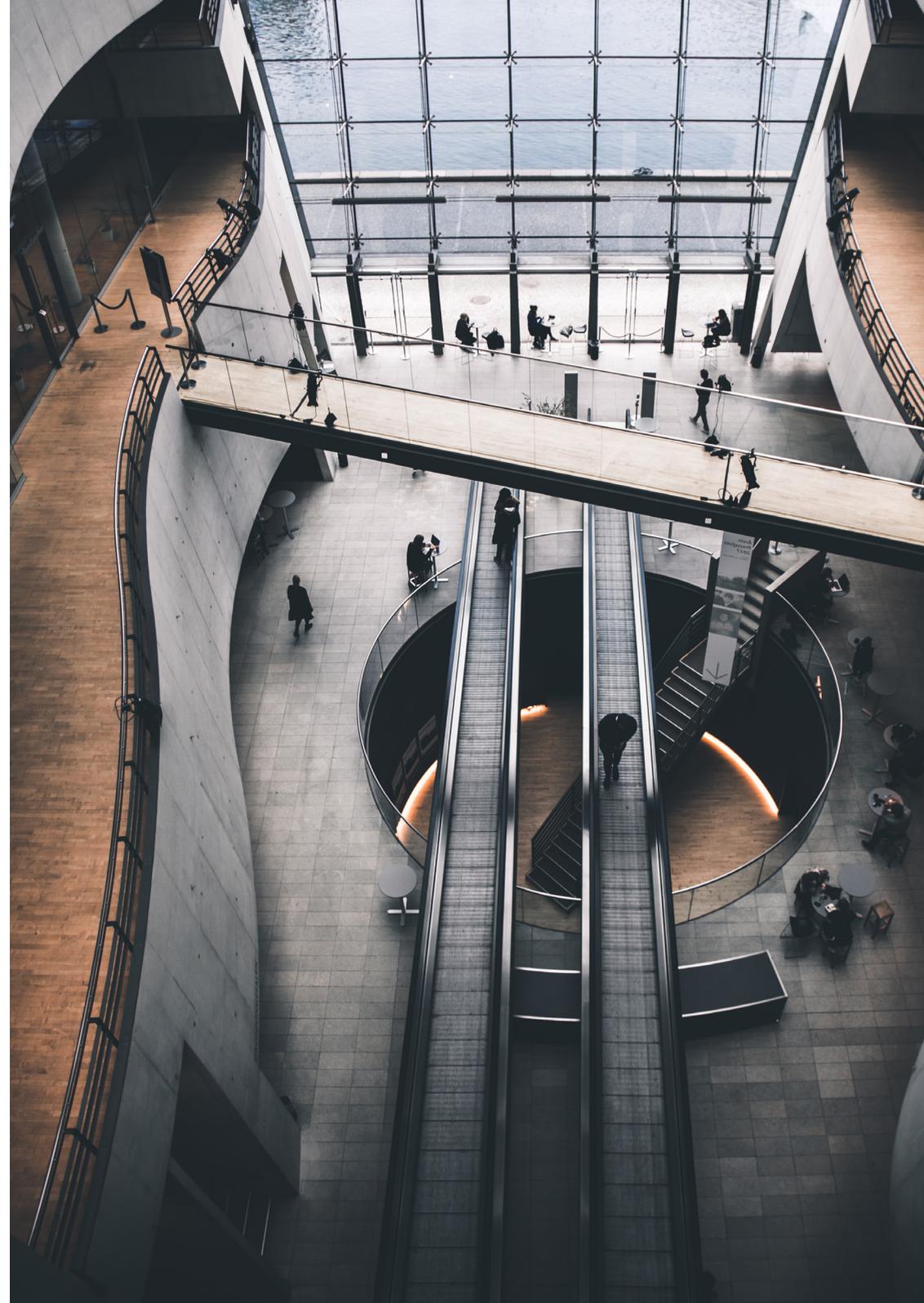
4. Research Assessment

The following recommendations focus on the use of scholarly metrics in the context of research assessment. They apply and can be used on various levels, from the individual researcher and librarian to larger conglomerations, which have not been sufficiently elaborated on in the Leiden Manifesto[68]. It is important to keep in mind that quantitative evaluation (i.e., bibliometrics) should always be accompanied by qualitative assessments such as peer-review and expert recommendations. When assessing individual researchers, it is especially important that guidelines and recommendations from documents such as the Leiden Manifesto, DORA,[69] Metric Tide Report (responsible use of metrics),[70] NISO Guidelines for Altmetrics,[71] and Next Generation Metrics Report from the EU expert Group on Altmetrics [72] be followed.

4A. ESTABLISH GOALS FOR ASSESSMENT EXERCISES BEFORE SELECTING DATABASES & METRICS; BE TRANSPARENT ABOUT USE & INTERPRETATION

- To insure transparency and increase credibility of the results, provide context and explain the procedure of the research assessment (e.g., goals, methods, databases, selection process, and scholarly metrics) in the final report. Also provide the raw and aggregated data used for the assessment to allow for scrutinization. Always discuss the results of the assessment with the researcher or other representatives (e.g., of the assessed department) to learn more about the context of their research and publication activities. This will prevent incorrect interpretation of raw data.

- ▲ The level of assessment (individual, institutions, countries, or disciplines) determines the use of databases, scholarly metrics, and indicators.
- When selecting databases, scholarly metrics and indicators, make sure to follow procedures that are standardized and grounded in research community (e.g., disciplines) needs and perceptions.
- Conduct structured interviews with principals to receive serious information about the goals of the research assessment. Ensure the researchers' perspective is included in the process. Always ask: What is it you want to measure? Reputation (what kind?), publication activity, visibility, impact (what type of impact?), etc. Pay attention to the work of the European Commission's Expert Group on Altmetrics and to initiatives like Responsible Metrics.

- ■ Scholarly metrics, indicators, and data used should correspond with what is to be measured.

4B. USE DIFFERENT DATA SOURCES TO INCLUDE VARIOUS SCHOLARLY WORKS & DISCIPLINARY COMMUNICATION & PUBLICATION CULTURES

- ▲ Use other data sources (e.g., patent databases) to include publication types and scholarly works that are not appropriately represented in generic citation databases.
- ▲ Alongside generic citation indexes and bibliographic databases (e.g.,WoS Core Collection or Scopus), try to include subject-specific databases which may better cover the discipline under study.

- ■ Use other sources, aside from citation databases, that reflect the attention that scholarly works and researchers have received in order to achieve a more complete picture of their impact. For instance, you may record any appearance in syllabi as 'essential reading', and underline the additional impact it has had.
- Add to the basket of metrics by providing scholarly metrics that can be produced and shared by your library. Get a sense of these by querying catalogues like WorldCat[73] to see where works are part of library collections, or check your catalogue for circulation figures.

[68] *Leiden Manifesto, http://www.leidenmanifesto.org. The role of the Leiden Manifesto for libraries has extensively been discussed in Coombs, S.K., & Peters, I. (2017). The Leiden Manifesto under review: what libraries can learn from it. Digital Library Perspectives, 33(4), 324-338. DOI: 10.1108/DLP-01-2017-0004*

[69] *San Francisco Declaration on Research Assessment Academic https://sfdora.org*

[70] *Responsible Metrics, https://responsiblemetrics.org*

[71] *NISO Guidelines for Altmetrics, https://www.niso.org/standards-committees/altmetrics*

[72] *Expert Group on Indicators, https://ec.europa.eu/research/openscience/index.cfm?pg=altmetrics_eg*

[73] *OCLC WorldCat, https://www.worldcat.org*

4C. RELY ON OBJECTIVE, INDEPENDENT AND COMMONLY-ACCEPTED DATA SOURCES TO PROVIDE SOUND & TRANSPARENT SCHOLARLY METRICS

- Increase objectivity of assessment based on scholarly metrics by analysing data from various platforms. You may need to harmonize before combining data. This is because each database has a different way of counting units (e.g., what is considered a research article?).
- Remember: all databases that can be used for analyses or scholarly metrics are subjective since they use normative selection procedures for their content. Even CRISs are subjective since it is the researchers themselves that provide the information about their scholarly works. Hence, data from these databases need to be edited, controlled, and harmonized. Elements of subjectivity should be made transparent and considered in the analyses with scholarly metrics.
- Use standards when building own databases for assessments with scholarly metrics. See as an example Snowball Metrics[73] that uses source- and system-agnostic services to facilitate reliable and commonly agreed benchmarking methods.

4D. AVOID USING COMPOSITE INDICATORS & CONFLATING DIFFERENT ASPECTS OF SCHOLARLY WORKS & IMPACT; DON'T LOSE THE MULTIFACETED NATURE OF METRICS & DISTORT INTERPRETATION

- ▲ Collect as much attention data as possible and use (i.e. display) a variety of simple output and impact indicators to allow for multidimensional interpretation of the results.
- Support understanding of those indicators by aiding interpretation (e.g., via discipline-based comparisons)..

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[74] *Snowball Metrics, https://www.snowballmetrics.com*
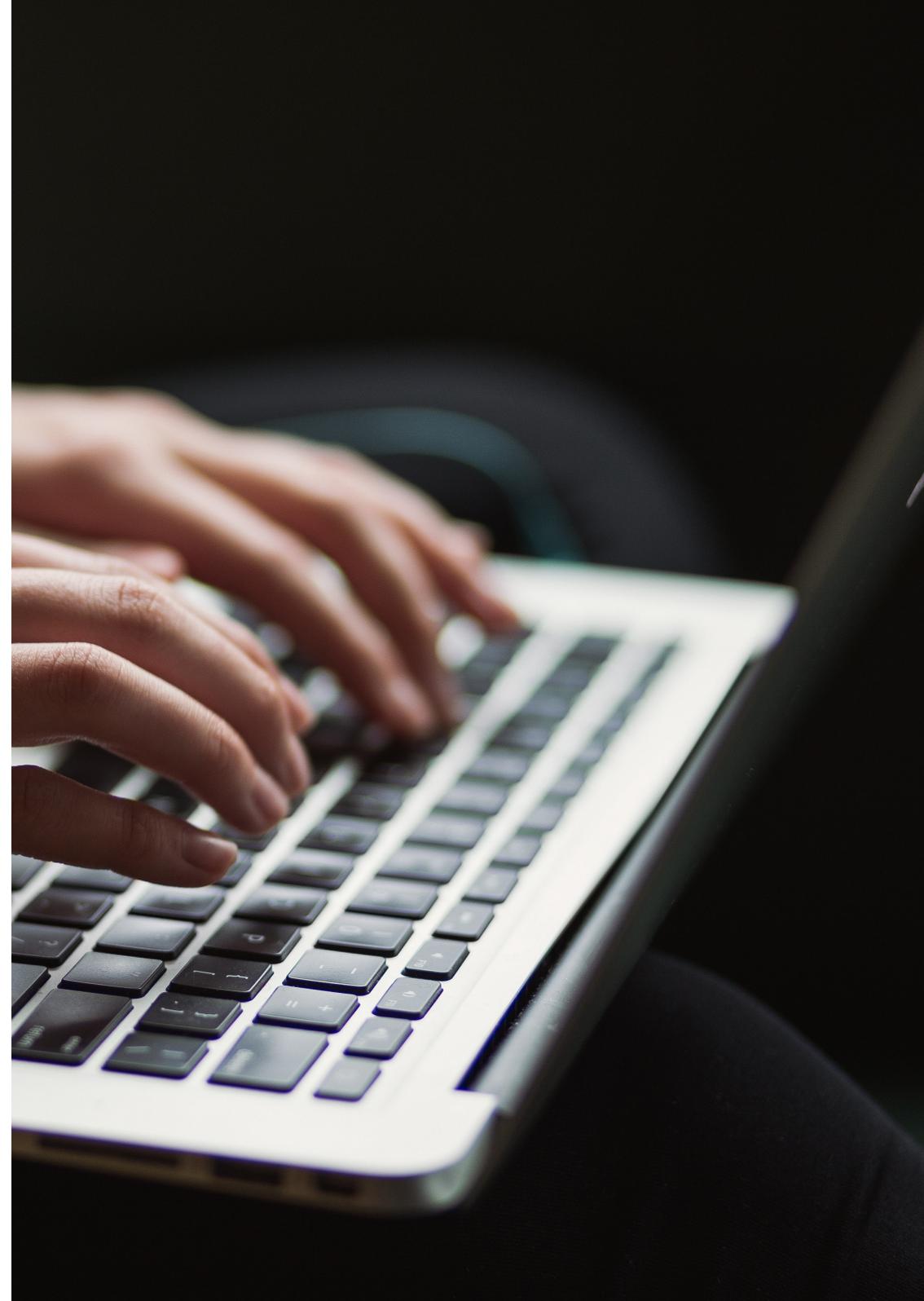
CONCLUSION & CALL FOR ACTION

The 16 sets of recommendations in this document were formulated by LIBER's Innovative Metrics Working Group. Our goal was to help research libraries worldwide to foster the understanding of available scholarly metrics, and to provide guidelines with respect to the increasing amounts of information regarding scholarly evaluation.

The recommendations aim to prepare librarians to take action: to enable and advance the use of scholarly metrics regardless of the level of expertise available at the institutional library.

However, these recommendations serve only as starting points for librarians and service providers. They are a first step of what the Working Group hopes will become a dialog among LIBER members, to encourage the formation of an international community of academic librarians, metrics service providers and research support staff.

We hope that this community will share best practices, introduce and develop new tools, build and expand skills and expertise, and inspire joint development of services for the use and application of scholarly metrics.

The Working Group encourages research libraries to jointly follow the road of responsible use and development of scholarly metrics for discovery and discoverability, showcasing scholarly achievements, service development, and research assessment.

References

Bik, H.M. & Goldstein, M.C., 2013. An Introduction to Social Media for Scientists. PLoS Biology, 11(4), p.e1001535. Available at: *http://dx.plos.org/10.1371/journal.pbio.1001535* [Accessed April 15, 2018].

Coombs, S.K. & Peters, I., 2017. The Leiden Manifesto under review: what libraries can learn from it. Digital Library Perspectives, 33(4), pp.324–338. Available at: *http://www.emeraldinsight.com/doi/10.1108/DLP-01-2017-0004* [Accessed April 15, 2018].

Gingras, Y., 2014. Criteria for evaluating indicators. In B. Cronin & C. R. Sugimoto, eds. Beyond Bibliometrics: Harnessing Multidimensional Indicators of Scholarly Impact. Cambridge, MA: MIT Press, pp. 109–125.

Gorraiz, J., Wieland, M. & Gumpenberger, C., 2016. Individual Bibliometric Assessment @ University of Vienna: From Numbers to Multidimensional Profiles. Available at: *http://arxiv.org/abs/1601.08049* [Accessed April 15, 2018].

Gumpenberger, C., Wieland, M. & Gorraiz, J., 2012. Bibliometric practices and activities at the University of Vienna. Library Management, 33(3), pp.174–183. Available at: *http://www.emeraldinsight.com/doi/ 10.1108/01435121211217199* [Accessed April 15, 2018].

Haustein, S., 2016. Grand challenges in altmetrics: heterogeneity, data quality and dependencies. Scientometrics, 108(1), pp.413–423. Available at: *http://link.springer.com/10.1007/s11192-016-1910-9* [Accessed April 15, 2018].

Haustein, S., Bowman, T.D. & Costas, R., 2016. Interpreting "altmetrics": viewing acts on social media through the lens of citation and social theories. In C. R. Sugimoto, ed. Theories of Informetrics and Scholarly Communication. De Gruyter, pp. 372–406. Available at: *http://arxiv.org/abs/1502.05701*.

National Information Standards Organization, 2016. Outputs of the NISO Alternative Assessment Metrics Project, Available at: *http://www.niso.org/apps/group_public/download.php/17091/NISO RP-25-2016 Outputs of the NISO Alternative Assessment Project.pdf*.

Peters, I. et al., 2014. Altmetrics for large, multidisciplinary research groups: Comparison of current tools. Bibliometrie - Praxis und Forschung, 3(0). Available at: *http://www.bibliometrie-pf.de/article/view/205* [Accessed April 15, 2018].

Wilsdon, J. et al., 2017. Next-generation metrics: Responsible metrics and evaluation for open science, Brussels. Available at: *https://publications.europa.eu/en/publication-detail/-/publication/b858d952-0a19-11e7-8a35-01aa75ed71a1/language-en* [Accessed April 15, 2018].

You may download the citations of this reference list at: *https://www.zotero.org/groups/2197598/liber_metrics*

Credits

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PHOTOS

The products and services mentioned herein are indicative and should not be conceived as the only one suitable. LIBER's Innovative Metrics Working Group is not promoting any product or service and has no conflicts of interest. To the knowledge of its members, the mentioned platforms reflect easy, accessible and affordable tools to support and generate scholarly metrics services.