Open Science & Research Assessment: How can they go together?

Image Source (CC BY 2.0): https://www.flickr.com/photos/bernd_thaller/46411222255/

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Open Science = diverse practices & workflows

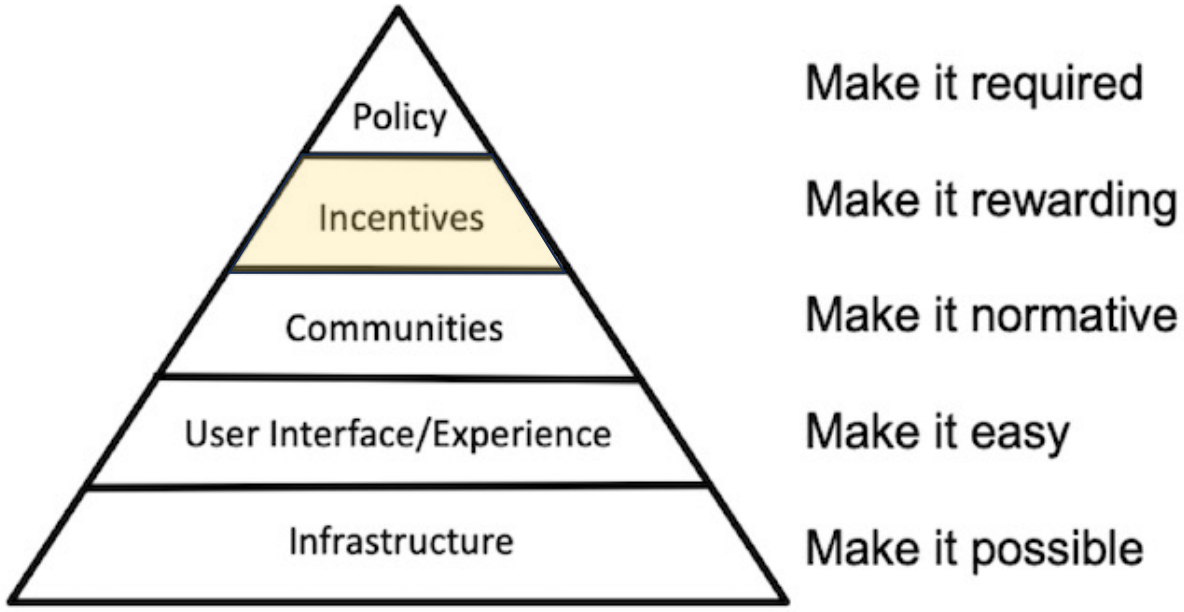
- Publishing a paper in an OA journal or book (or other peer-reviewed media) („OA publishing“)
- Deposit of a preprint* or final author manuscript in a repository („OA via repositories“)
- Making data available via a repository (FAIR data and open data)
- Making own research (more) reproducible
- Engaging societal actors and citizens in research
- …

But this may also involve some **challenges**: e.g. additional effort to make data and software FAIR, costs of publishing, trust in the quality of the journal, intellectual property rights, etc.

* **Preprint** = final author manuscript (before peer review), submitted or ready for submission to a publisher

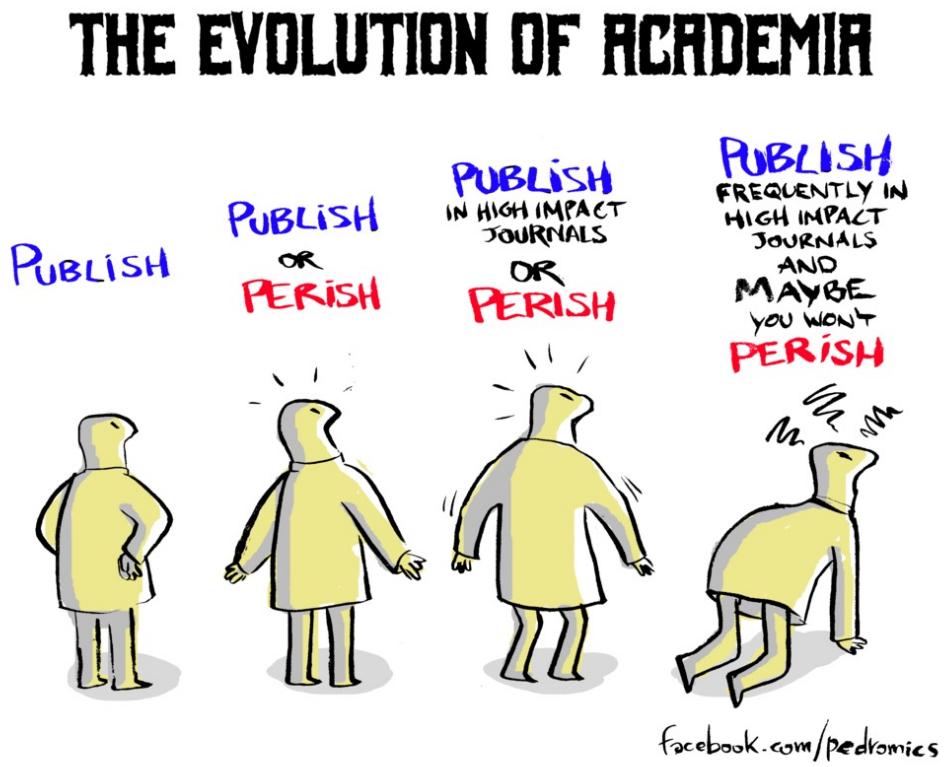
Open Science requires cultural change

- Open science/scholarship targets a broad **cultural change** in research, education & communication
- **Bottom-up and top-down efforts** are combined
- A range of **benefits** can be achieved, e.g. broader access to and (re)use of research outcomes (publications, data, code, etc.)
- However, **incentives and rewards** are still rather limited

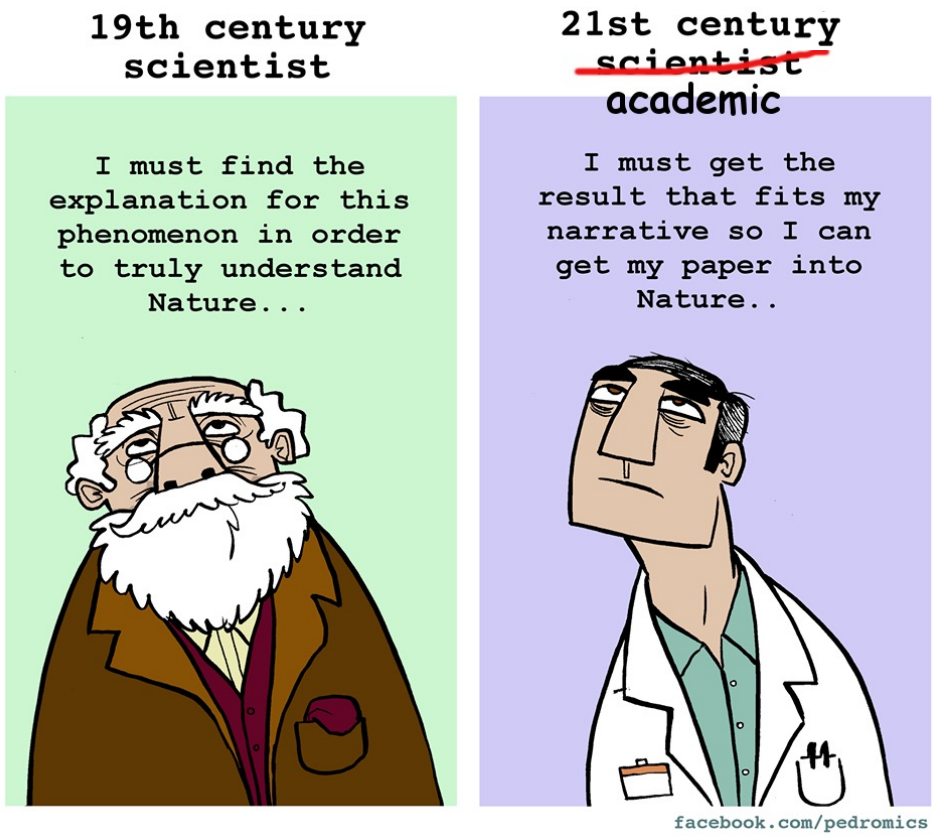


Open Science: Strategy for Cultural Change
(Nosek, 2019, https://www.cos.io/blog/strategy-for-culture-change)

Research careers, a publish or perish trap



Researcher role realities



Source: https://pandelisperakakis.files.wordpress.com/2017/05/scientist_vs_academic.png

… and a constant need to secure grants

Adapted from: Polyp cartoons,
http://www.polyp.org.uk/cartoons/consumerism/polyp_cartoon_Rat_Race.jpg

Scholarly communication attitudes of early career researchers

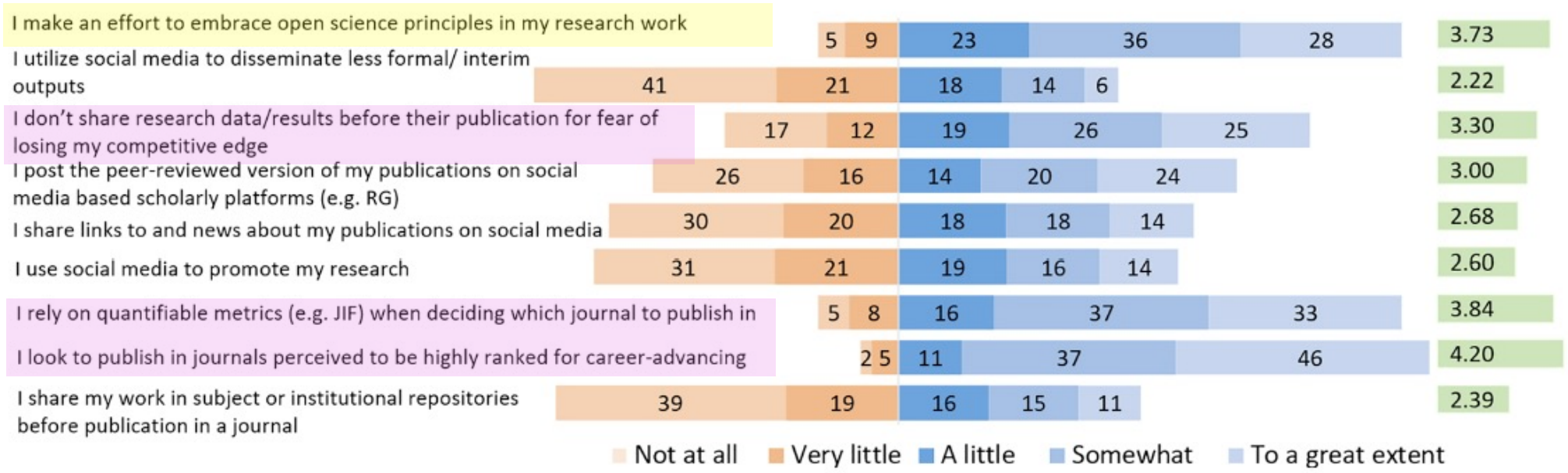
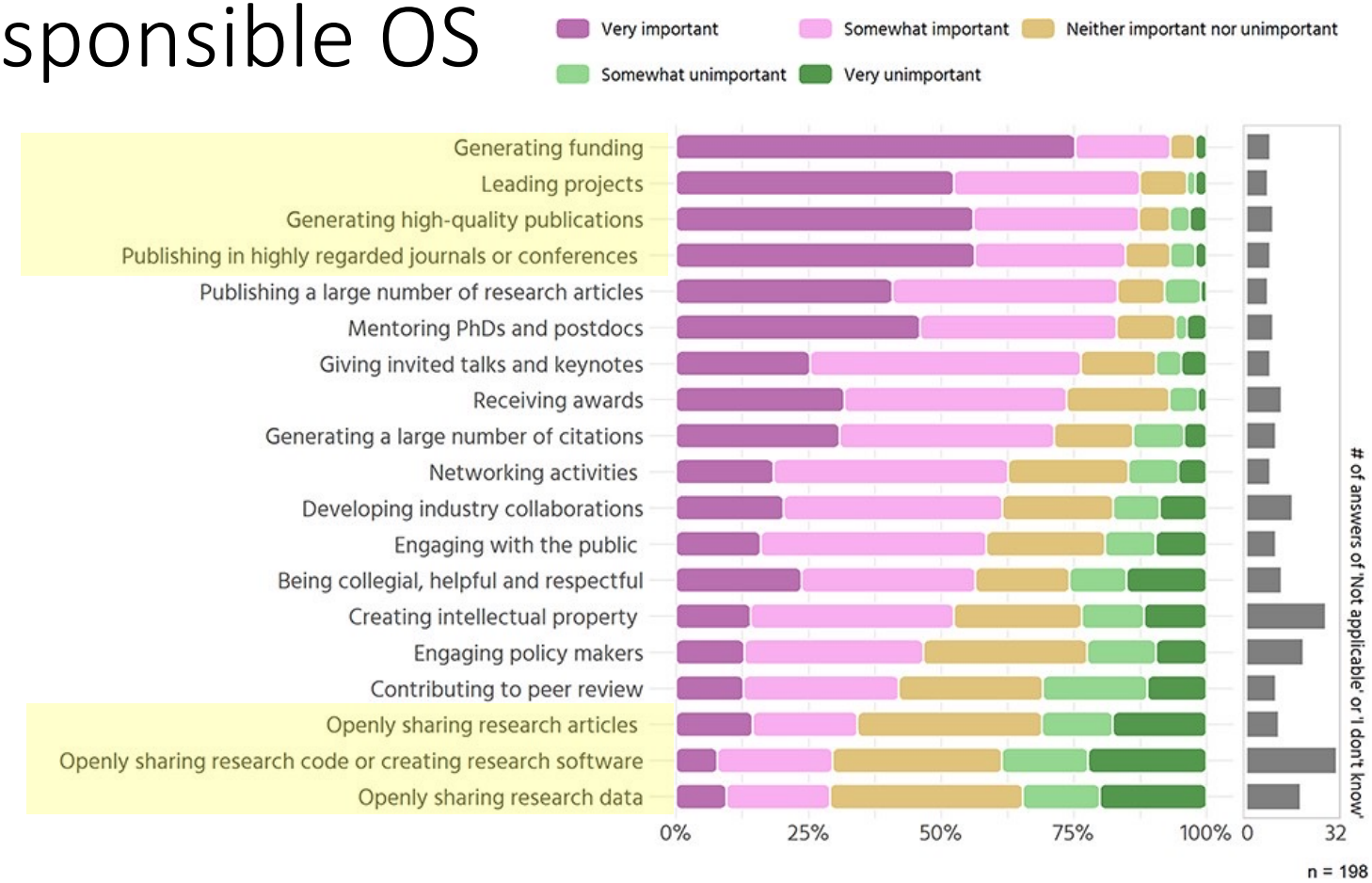


FIGURE 3 Percentages and mean value for 'To what extent are the following statements true about your current practices concerning publishing?' (N = 1,533).

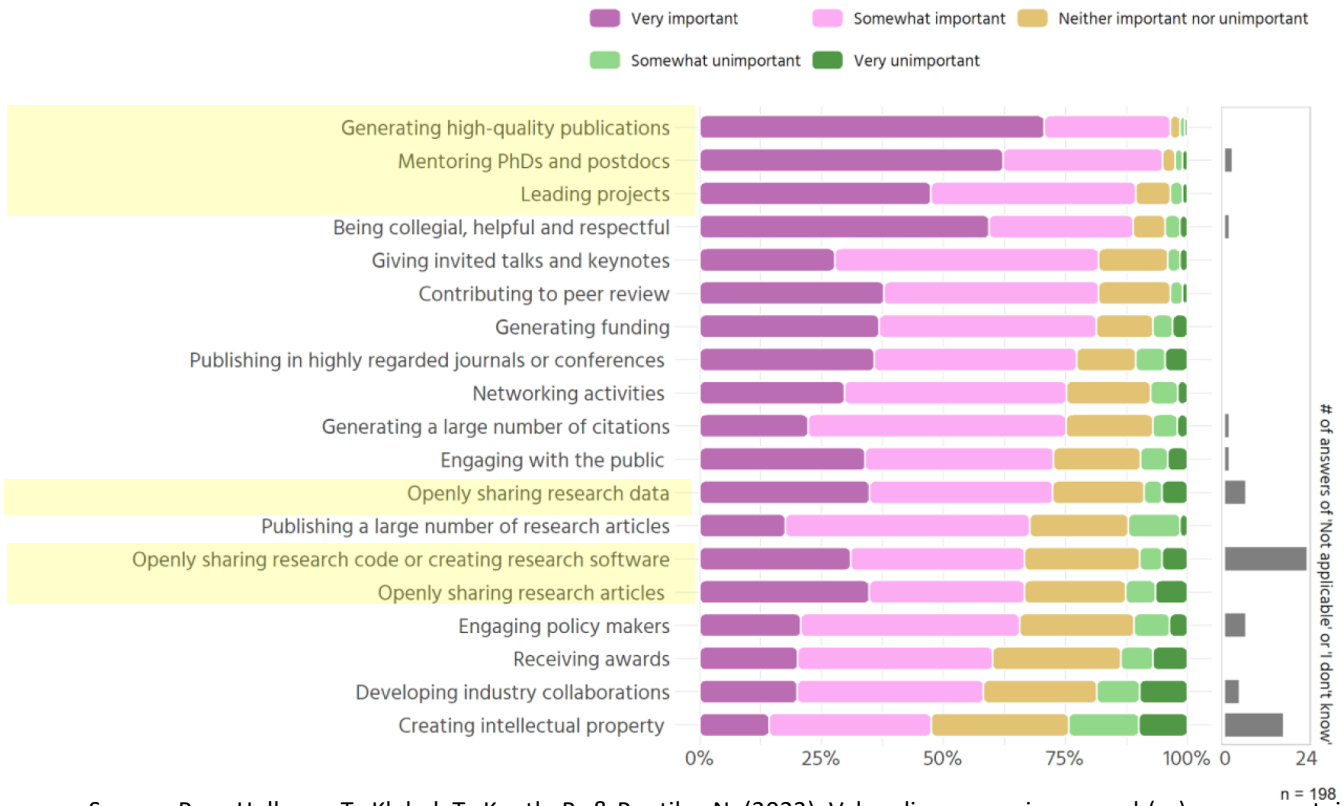
Source: Nicholas, D., Jamali, H. R., Herman, E., Watkinson, A., Abrizah, A., Rodríguez-Bravo, B., Boukacem-Zeghmouri, C., Xu, J., Świgoń, M., & Polezhaeva, T. (2020). A global questionnaire survey of the scholarly communication attitudes and behaviours of early career researchers. *Learned Publishing*, *33*(3), 198–211. https://doi.org/10.1002/leap.1286

Mismatch between promotion criteria and responsible OS



Source: Ross-Hellauer, T., Klebel, T., Knoth, P., & Pontika, N. (2023). Value dissonance in research(er) assessment: individual and perceived institutional priorities in review, promotion, and tenure. *Science and Public Policy*. https://doi.org/10.1093/scipol/scad073

Researchers opinion on how important promotion criteria **should be**



Source: Ross-Hellauer, T., Klebel, T., Knoth, P., & Pontika, N. (2023). Value dissonance in research(er) assessment: individual and perceived institutional priorities in review, promotion, and tenure. *Science and Public Policy*. https://doi.org/10.1093/scipol/scad073

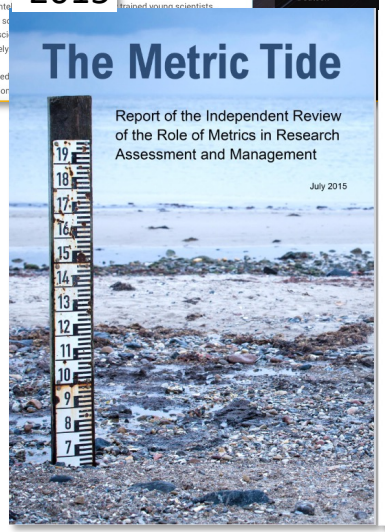
Reform movements

- **From evaluative bibliometrics to responsible metrics** (DORA, 2013; Leiden Manifesto, 2015; Metric Tide report, 2016; Hong Kong Principles, 2020)
- From a narrow focus on publications and grants to **a broader set of activities, principles and values**
  - Diversity, equity, inclusiveness, collaboration (in terms of activities and practices, outputs, skills, roles, disciplines, career stages, etc.)
  - Openness, reproducibility
  - Research integrity
  - Expected impacts (e.g. contributions to SDGs)
- However, there is **a gap between positive views on the potential of reforms and their actual implementation.**

Towards Reforming Research Assessment

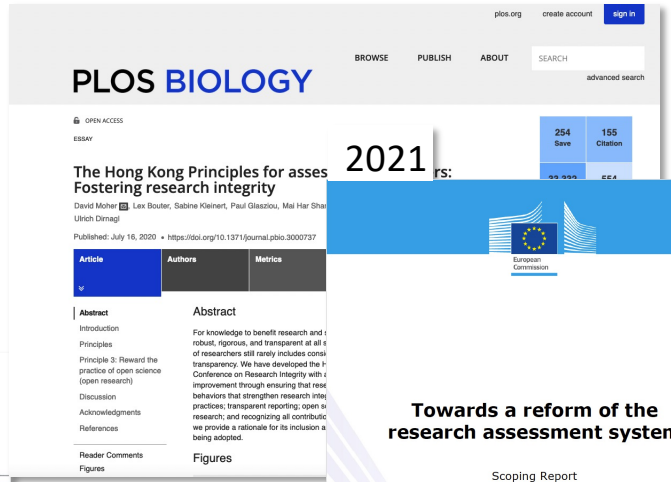
2013

2015



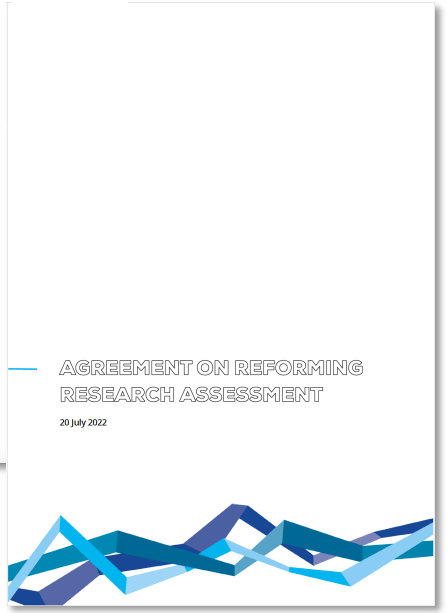
2015

2020



2021

2022



Comparison of approaches

Table 1: Elements of international recommendations for responsible assessment[2]

	RECOMMENDATIONS	DORA	LEIDEN	METRIC TIDE	HONG KONG
METHOD	• **Journal-metrics as surrogate measure of quality**	✓			
	• Quantitative evaluation support qualitative assessment		✓	✓	
	• Qualitative judgment based on portfolios		✓		
	• Misplaced concreteness and false precision		✓		
CRITERIA	• **Explicit criteria used in evaluating**	✓			
	• Systemic effects of assessment and indicators		✓	✓	
	• Scrutiny and regular updating of indicators		✓	✓	
DATA	• **Open and transparent data and methods**	✓	✓	✓	
	• **Licence allowing unrestricted reuse**	✓			
	• Allowing those evaluated to verify data and analysis		✓	✓	
	• Best possible data in terms of accuracy and scope			✓	
VALUE DIVERSITY	• **All research outputs and broad range of impacts**	✓	✓	✓	✓
	• Missions of the institution, group or researcher		✓		
	• Excellence in locally relevant research		✓		
	• Variation by field in publication and citation practices		✓	✓	
	• Plurality of research and career paths			✓	✓
	• Responsible practices, complete reporting, open science				✓
	• Research activities and contributions				✓
	• Multilingualism and outputs in all languages				

Source: EUTOPIA-TRAIN. (2022). *Open Science in research assessment. An overview of quantitative and qualitative approaches*. Zenodo. https://doi.org/10.5281/zenodo.7097264

What if, RRA does not take OS into account?

- **Reinforces the status quo** of evaluation and ignores the changes in research workflows and communication
- **Conflicts** with research policies: Open availability to research outputs and additional open practices are increasingly mandated / encouraged by research funders
- **Missed opportunities** to incentivize and reward good practices, e.g. enable reproducibility, data sharing and reuse, make research accessible for different audiences

Funder requirements: European Commission

Mandatory vs. **recommended** Open Science practices

- Proposers **have to provide concrete information on how they plan to comply with the mandatory OS practices**
- OS practices will be evaluated under the '**Excellence**' criterion (in particular under methodology) and under '**Quality and efficiency of implementation**'
- A clear explanation on how **recommended OS practices** are adopted will result in a **higher evaluation score**.

Mandatory open science practices

- Some open science practices are **mandatory for all beneficiaries per the grant agreement.** They concern:
  - open access to scientific publications under the conditions required by the grant agreement;
  - responsible management of research data in line with the FAIR principles of 'Findability', 'Accessibility', 'Interoperability' and 'Reusability', notably through the generalised use of data management plans, and open access to research data under the principle 'as open as possible, as closed as necessary', under the conditions required by the grant agreement;
  - information about the research outputs/tools/instruments needed to validate the conclusions of scientific publications or to validate/re-use research data;
  - digital or physical access to the results needed to validate the conclusions of scientific publications, unless exceptions apply;
  - in cases of public emergency, if requested by the granting authority, immediate open access to all research outputs under open licenses or, if exceptions apply, access under fair and reasonable conditions to legal entities that need the research outputs to address the public emergency[19].

These obligations are described in the Model Grant Agreement (Article 17) and detailed guidelines on complying with them are provided in the Annotated Grant Agreement (Article 17).

Source: European Commission. Horizon Europe Programme Guide, 19 July 2021, https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/programme-guide_horizon_en.pdf

Example: Netherlands

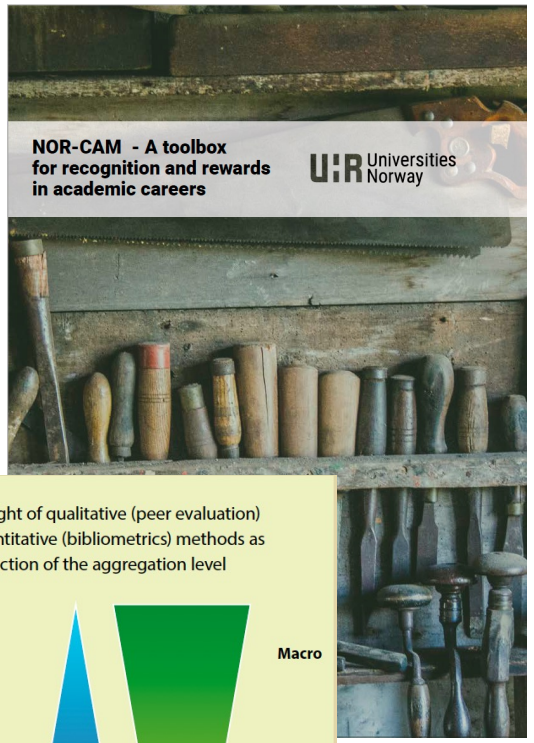
Position paper published in 2018 by the Association of Universities in the Netherlands (VSNU), Netherlands Federation of University Medical Centers (NFU), Royal Netherlands Academy of Arts and Sciences (KNAW), Dutch Research Council (NWO), and Netherlands Organization for Health Research and Development (ZonMw)

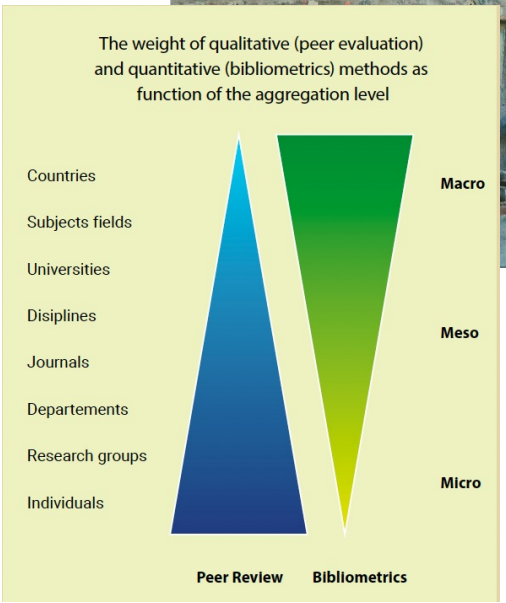
Main aims:

1. Enable the diversification and vitalization of career paths
2. Acknowledge the independence and individual qualities and ambitions of academics as well as recognizing team performances
3. Emphasize quality of work over quantitative results (such as number of publications)
4. **Encourage all aspects of open science**
5. Encourage high quality academic leadership

Example: Norwegian Career Assessment Matrix (NOR-CAM)

- Developed by a working group commissioned by Universities Norway (32 universities and university colleges), published in Nov 2021
- 6 principles + 4 recommendations
- Principles
  - #1 Balancing quantitative and qualitative measures
  - #2 Everybody should not do everything
  - **#3 Open Science as a fundamental principle**
  - #4 Transparency in assessment and identifying what earns merit
  - #5 Promoting gender balance and diversity
  - #6 Assist in the concrete practice of job vacancy announcements and assessment processes locally
- Six competence areas: A. Research output, B. Research process, C. Pedagogical competence, D. Impact and innovation, E. Leadership, and F. Other experience





Examples from CoARA Action Plans

- Reference to **institutional guidelines and policies** on OS, publication metrics, principles include that data and methods used, and the results are as open and transparent as possible
- Reference to **national frameworks** (e.g. NOR-CAM, FIN-CAM) and **initiatives** (e.g. UKRN OR4 project)
- **Evaluate practices, criteria and tools** based on solid evidence and state-of-the-art research on research and make data openly available for evidence (Commitment 10)
- Active monitoring of the development of **open data sources** (e.g. OpenAlex) and analysis tools related to publication metrics alongside the commercial ones (WoS, Scopus)
- Raise **awareness, training and monitoring** of open research and responsible research assessment

https://zenodo.org/communities/coara_action_plans/

ENLIGHT joint actions on Open Science

"If you want to go fast, go alone.
If you want to go far, go together."

- Identify and spell out your values and goals: **ENLIGHT Open Science Principles** (Nov 2023)
- Make your values known: **OS Ambassadors** (launched in Sept 2022), supported by the OS Experts Network
- Recognize and reward accordingly: Implementation of an **OS Award** (Spring 2023)

ENLIGHT OPEN SCIENCE PRINCIPLES

Endorsed by the ENLIGHT Rectors on 23 Nov 2023, Uppsala.
https://enlight-eu.org/index.php/university-about-us/news-events/158-news/1043-enlight-rectors-endorse-joint-open-sciences-principles

ENLIGHT Open Science principles:

1. **Promotion of Open Science**
   The ENLIGHT alliance recognizes that Open Science is a key component of their scholarly processes. Therefore we
   - Enhance the sharing of knowledge and good practices at the institutional level and across the ENLIGHT alliance.
   - Aim to support Open Science broadly, including via training and skills development.
   - Support the development and realization of an Open Science agenda and policy.

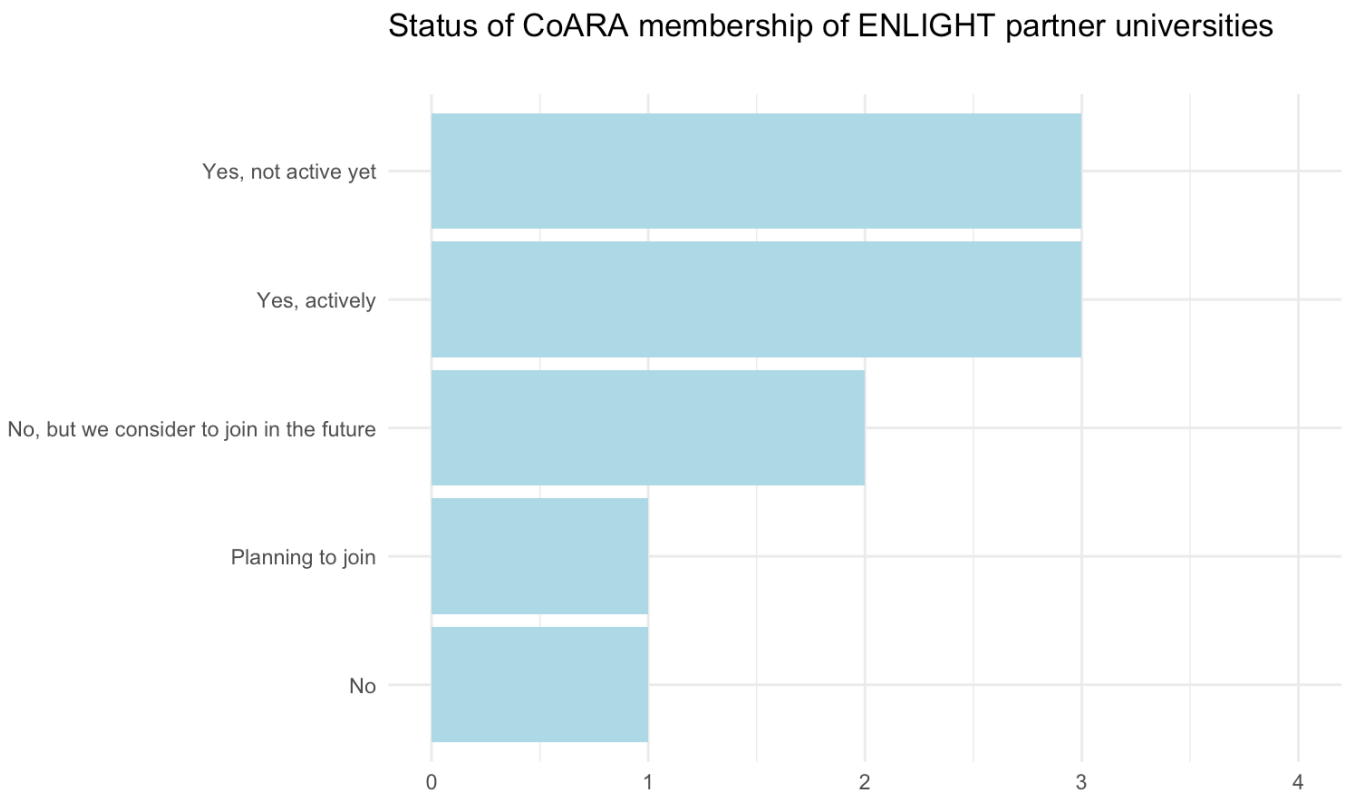
2. **FAIR and Open Data**
   The ENLIGHT alliance stresses the importance of the FAIR data principles (**F**indable, **A**ccessible, **I**nteroperable and **R**eusable) and will
   - Support the implementation of FAIR, for example by developing or contributing to FAIR-enabling infrastructures, and/or by guiding researchers towards such existing infrastructures.
   - Optimize access to research data and the use of such digital research data wherever possible ("as open as possible as close as necessary").
   - Work towards using and contributing to a distributed and open infrastructure for research data, including integration with the European Open Science Cloud (EOSC).

3. **Open Access**
   The ENLIGHT alliance underlines the value and benefits of unrestricted and immediate open access to scholarly publications and thus will
   - Encourage and support researchers in providing free and unrestricted online access to all research publications, ideally immediately after publication.
   - Promote bibliodiversity and increase awareness of various open access routes available as an alternative to author-pays models of open access.
   - Support researchers in retaining their original rights to share and publish their works and other research outputs under an open license.

4. **Open Education**
   The ENLIGHT alliance supports Open Education as a valuable part of a diverse and inclusive environment and will
   - Encourage their research and teaching staff to create, share and use open educational materials and methodologies.
   - Strive to support training and development opportunities for the research community that facilitate an understanding of open educational tools and methodologies.

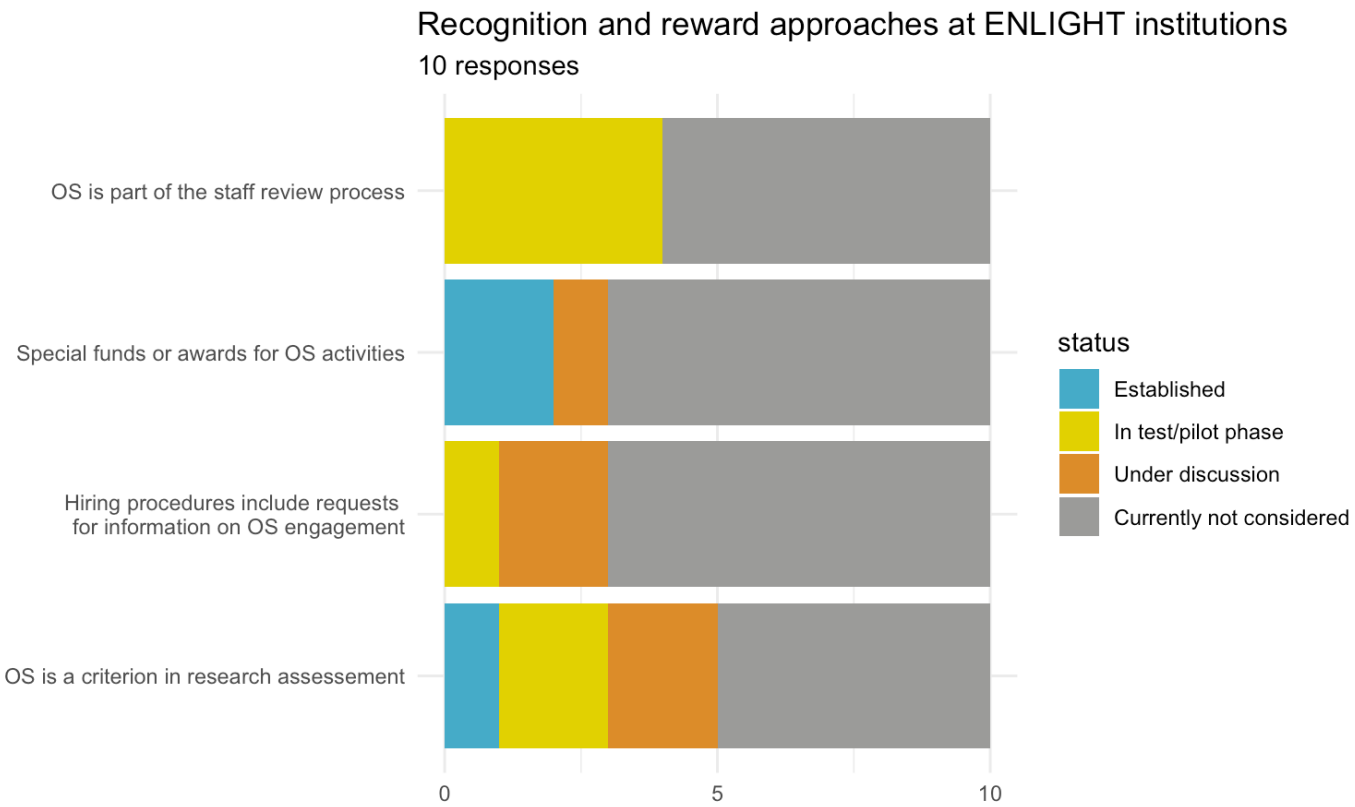
5. **Responsible Research Assessment**
   The ENLIGHT alliance promotes the inclusion of Open Science principles in research assessment and will
   - Raise awareness for the different aspects of research assessment reform and commit to high quality standards in their own research assessment procedures.
   - Align with the Declaration on Research Assessment (DORA) or the Agreement on Reforming Research Assessment (CoARA), wherever possible.
   - Incentivize Open Science practices as means for enhancing the quality and impact of research.

ENLIGHT OS Survey: Engagement with CoARA



ENLIGHT Update on OS Survey, March 2024, notebook and data, https://github.com/gitti1/ENLIGHT_OS

Has OS arrived in recognition and reward approaches? (institutional perspective)



ENLIGHT Update on OS Survey, March 2024, notebook and data, https://github.com/gitti1/ENLIGHT_OS

Examples at ENLIGHT universities

University of Groningen: Open Science Award, annual, in place since 5 years

- Case studies on open research and/or open education practices
- E.g. making research outputs freely accessible, online tools and services, alternative models of publication and peer review, open collaborative methods
- Submissions are screened for eligibility
- 3 prizes are drawn randomly from all submissions

https://www.rug.nl/research/openscience/open-research-award/submission-guidelines

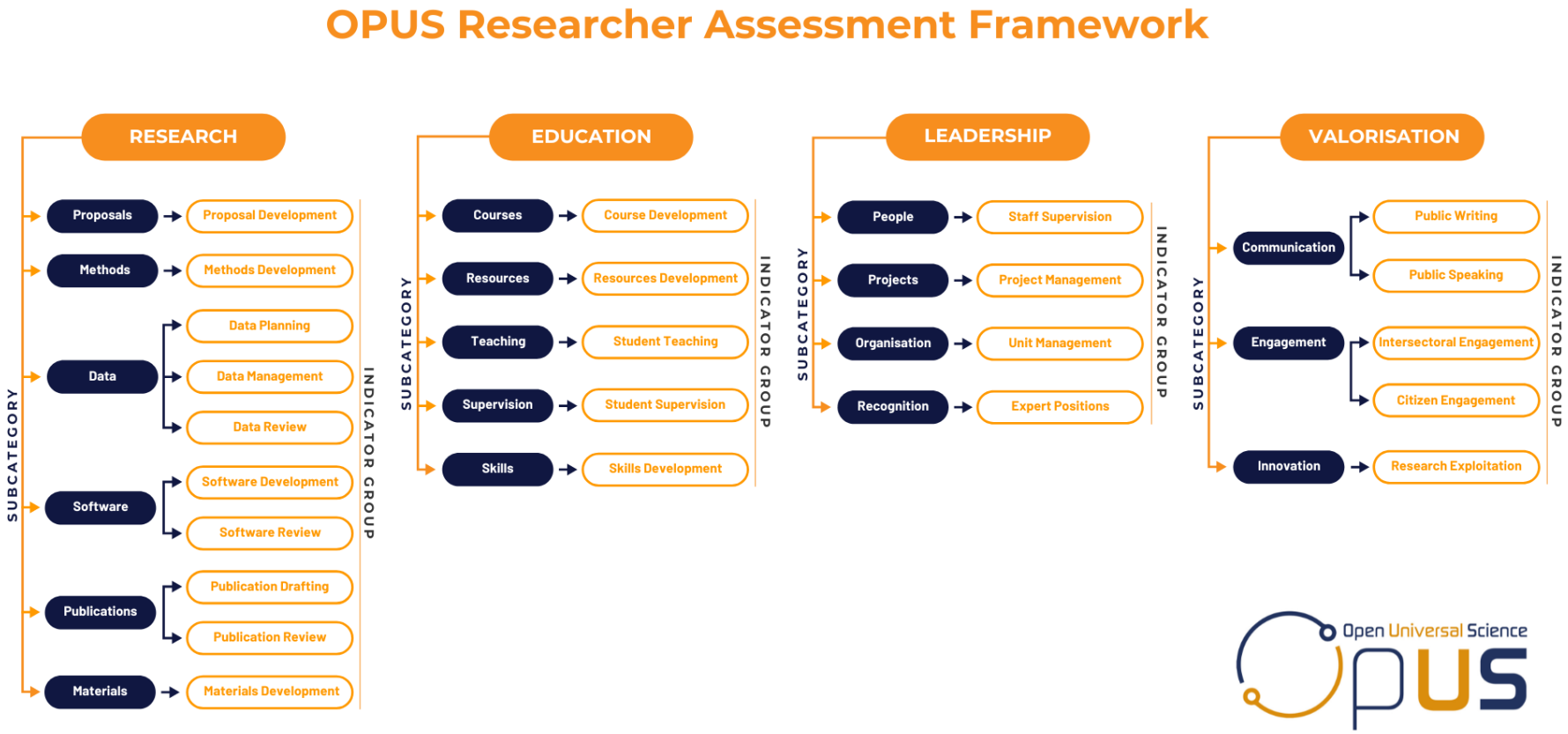
University of Gent: Since 5 years full professors can report on Open Science activities in research evaluations. This is voluntary and it remains unclear how often this actually happens.

University of Göttingen: Some academic hiring comittees for professorships have used a clause that requests the candidates to indicate past and future plans in engagement for open, transparent and reproducible research (e.g. Clinical Psychology and Psychotherapy, Scientific Information Analytics).

A brief look at OS-RRA frameworks

- **Generic frameworks and data infrastructure** under development, e.g.
  - PathOS - Open Science Impact Pathways: Evaluates and develops indicators to measure academic, societal and economic impacts of OS (handbook on OS impact indicators).
  - OPUS - Open Universal Science: has developed the **OPUS Researcher Assessment Framework** (building on OS-CAM, European Commission 2017) and pilot implementations.
  - GraspOS - Next Generation Research Assessment to Promote Open Science: Develops an **Open Science Assessment Framework (OSAF)**, builds an infrastructure for metrics (data-tools-services, not published yet) and conducts pilot studies.
  - SciLake - Democratising and making sense out of heterogeneous scholarly content: With focus on Knowledge Graphs the project creates open data infrastructures and services in support of discovery and research assessment.
  - TARA – Tools to Advance Research Assessment, a project run by the DORA initiative, e.g. toolkit, practical implementation guide for responsible research assessment
- **Disciplinary and institutional implementation approaches**, e.g.
  - psychology research community
  - institutional approach in the medical sciences

Projects: OPUS



Source: O'Neill, G. (2024). Graphical Representation of the OPUS Researcher Assessment Framework. Zenodo. https://doi.org/10.5281/zenodo.10670853
Related report: O'Neill, G. (2024). OPUS Deliverable 3.1: Indicators and Metrics to Test in the Pilots. Zenodo. https://doi.org/10.5281/zenodo.10670779

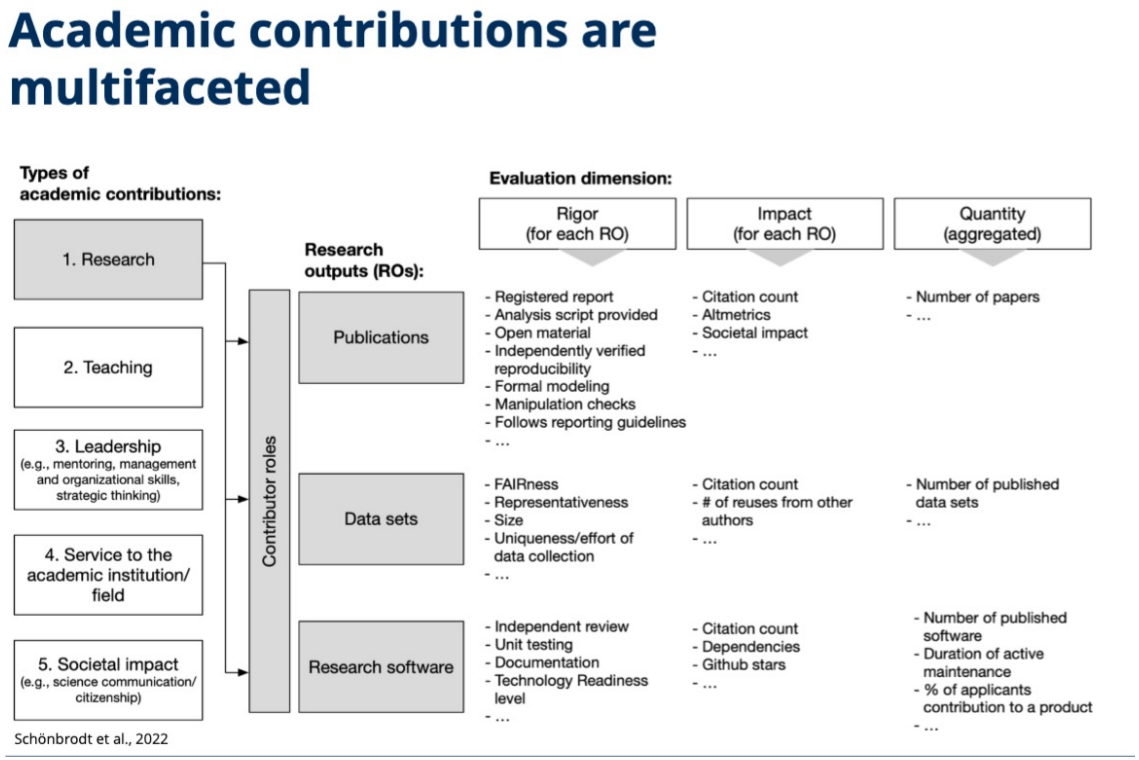
Example indicator: Research data

Table 21: Open Science Indicators and Metrics for Category Research Subcategory Data

Indicator Group	Indicator Type	Quantitative Metric
Data Planning	Process	# of (FAIR) Developing Data Management Plans Openly Available
	Output	# of (FAIR) Finalised Data Management Plans Openly Available
	Outcome	# of (FAIR) Implemented Data Management Plans Openly Available
Data Management	Process	# of Developing (FAIR) Data Sets Openly Available
	Output	# of Finalised (FAIR) Data Sets Openly Available
		# of Archived (FAIR) Data Sets Openly Available
	Outcome	# of Openly Available (FAIR) Data Sets Accessed
		# of Openly Available (FAIR) Data Sets Cited
Data Review	Process	# of Draft (FAIR) Data Set Peer Reviews Openly Available
	Output	# of Submitted (FAIR) Data Set Peer Reviews Openly Available
	Outcome	# of Accepted (FAIR) Data Set Peer Reviews Openly Available

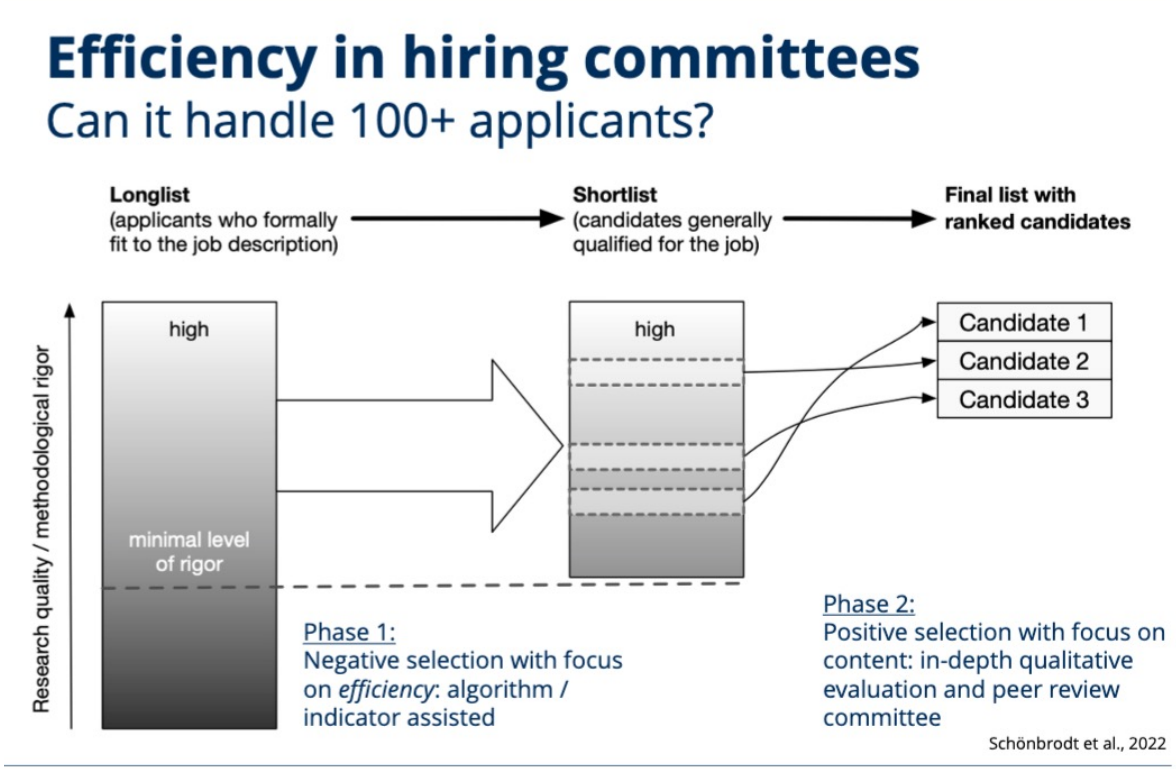
Source: O'Neill, G. (2024). OPUS Deliverable 3.1: Indicators and Metrics to Test in the Pilots. Zenodo. https://doi.org/10.5281/zenodo.10670779

Disciplinary approaches: Psychology – I



Schönbrodt, F., Gärtner, A., Frank, M., Gollwitzer, M., Ihle, M., Mischkowski, D., Phan, L. V., Schmitt, M., Scheel, A. M., Schubert, A.-L., Steinberg, U., & Leising, D. (2022). *Responsible Research Assessment I: Implementing DORA for hiring and promotion in psychology*. PsyArXiv. https://doi.org/10.31234/osf.io/rgh5b

Disciplinary approaches: Psychology – II



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Institutional approaches: Open data incentives

Example: Charité, Berlin Institutes of Health

Criteria for datasets to qualify as open data for performance-oriented funding at the Charité and indicator-oriented funding at BIH 2024

Data have to be shared in the context of an article publication; i.e. stand-alone data are not considered.

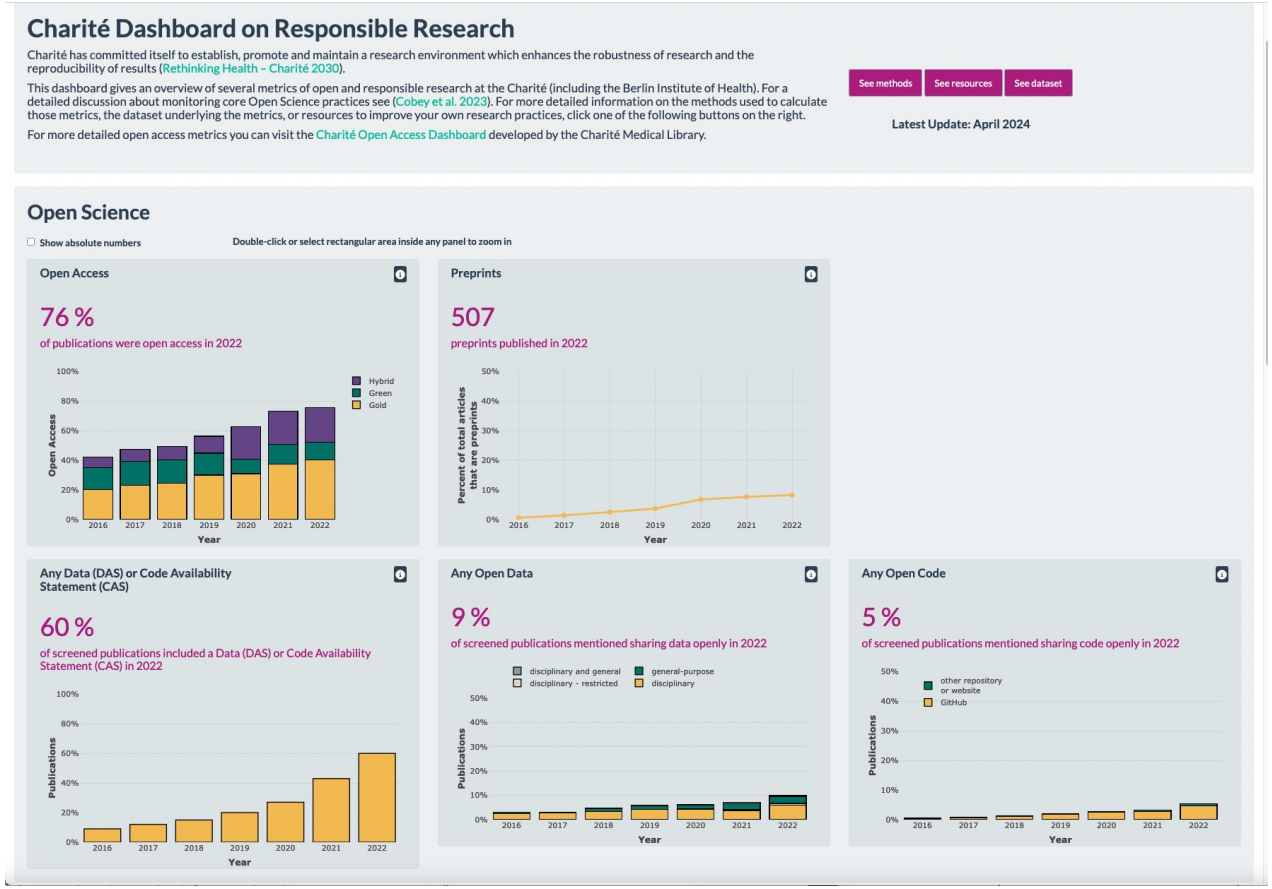
Source: https://www.bihealth.org/en/translation/innovation-enabler/quest-center/projects/project/einfuehrung-von-open-data-als-zusaetzlicher-indikator-fuer-die-interne-leistungsorientierte-mittelvergabe-lom-forschung

The criteria for the open data incentive as of 2024 are as follows:

Research data have been made freely accessible by researchers of the Charité/BIH
OR the data have been shared with restricted access and meet the following requirements:

- Data is stored in an external repository (or archive, database, registry)
- A standardized access route is named, i.e. the access requirements, the procedure for a request and the responsible persons or offices are described
- The reason for the restricted access is stated or is directly evident from the data being subject to data protection
- Access is possible for all academic researchers – at least from the European Economic Area
- Co-authorship of articles is not a condition for the provision of the data
- The access to the data is free of charge or maximally requiring compensation of expenses

Institutional approaches: Responsible Research Dashboard



https://quest-dashboard.charite.de

Landscape Surveys

- Hyrkkänen, A.-K. et al. (2023). *GraspOS Deliverable D2.1 OS-aware RRA approaches landscape report.* https://zenodo.org/records/11098095
  - Review of relevant initiatives and the current state of the reform
  - Survey in May 2023, 54 responses, predominantly from HE institutions, main challenge to engage in RRA: complexity of the reform, concerns over costs
- Morris, J., & Saenen, B. (2024). *Strategic Approaches to, and Research Assessment of Open Science*. https://doi.org/10.5281/zenodo.13961124
  - Review of strategic approaches to OS, incl. research assessment, monitoring and evidence-gathering
  - Survey, March-June 2024, 36 out of 40 members responded (32 research funders, 1 research performing organisation, 3 in both roles)
- CoARA Working Group ACA. (2024). Mapping academic career assessment reform initiatives - survey outcomes (CoARA Working Group ACA). Zenodo. https://doi.org/10.5281/zenodo.14548157
  - Gather information on the status of planning, initiating or implementing reform on academic career assessment at HE and research institutions, incl. motivations, challenges, expectations, first achievements
  - Survey, Febr – April 2024, 236 valid responses from 41 countries

GrapsOS report: Openness practices currently taken into account

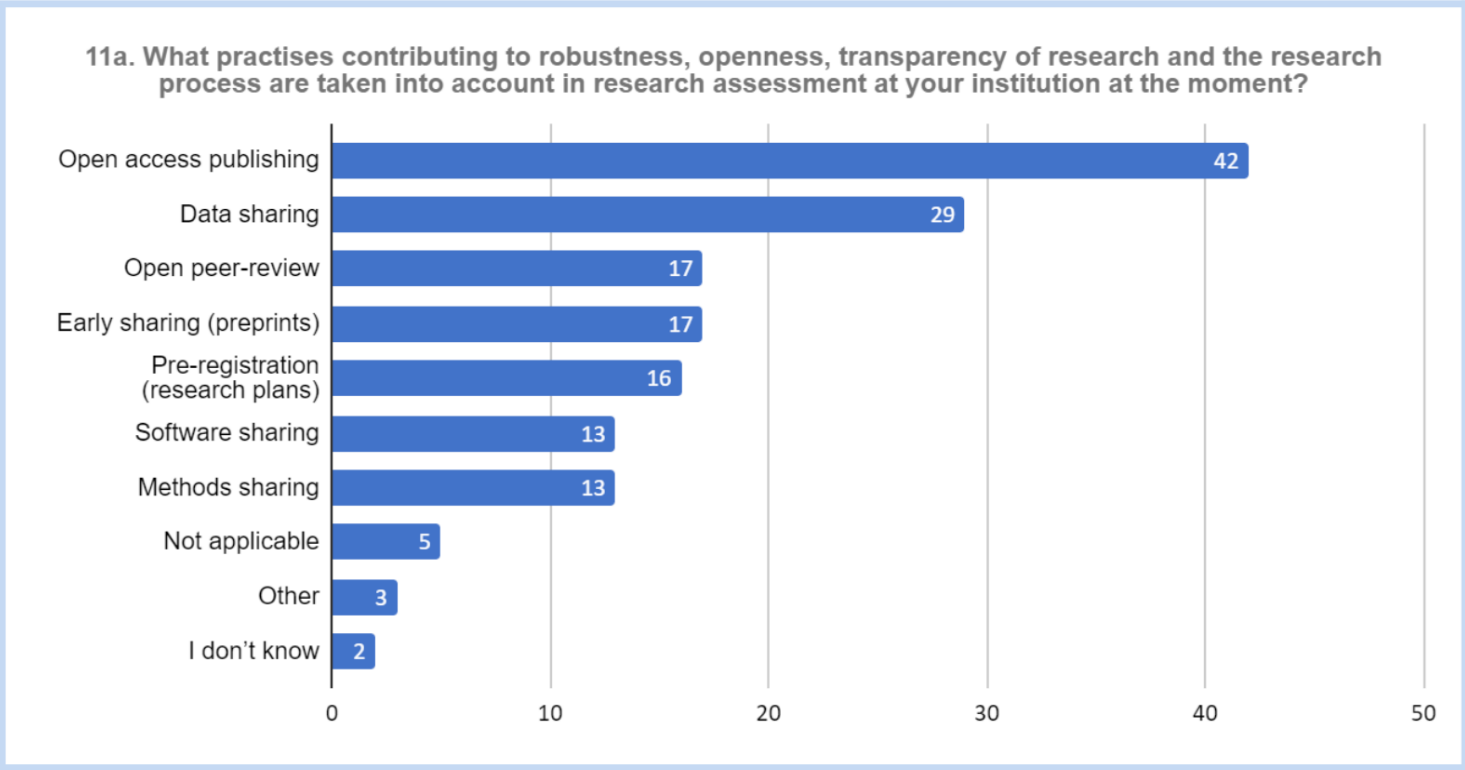
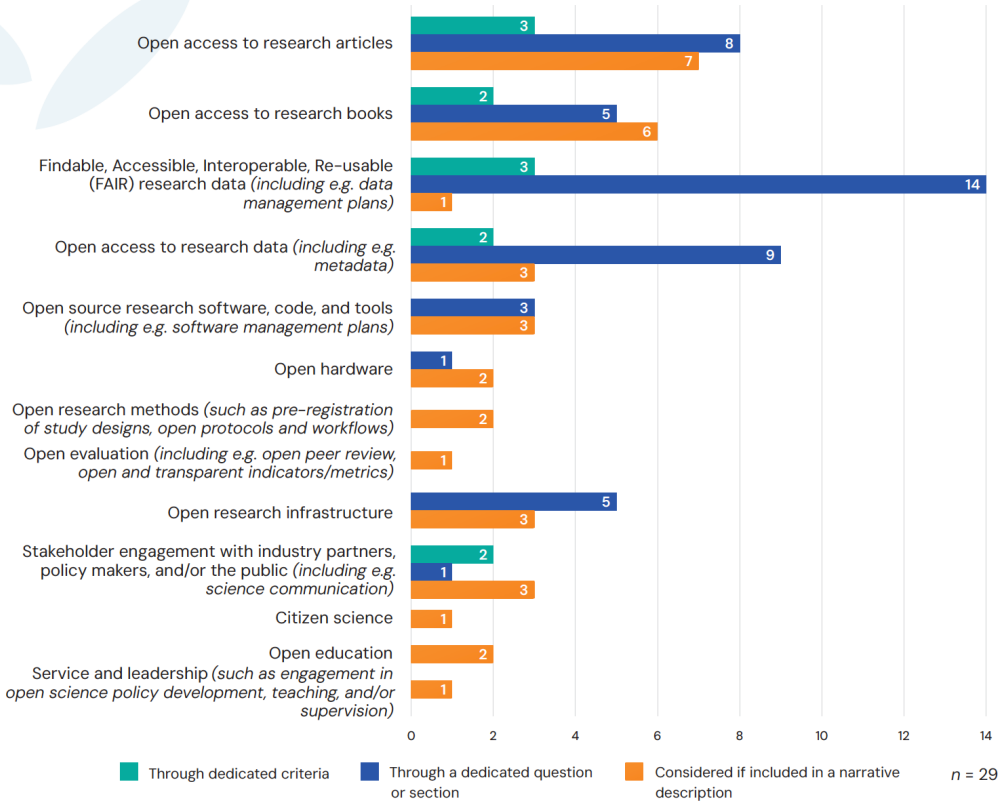


Figure 6.3 *GraspOS landscape analysis survey on Reforming Research Assessment: answers to question 11a.*

Source: Hyrkkänen, A.-K. et al. (2023). *GraspOS Deliverable D2.1 OS-aware RRA approaches landscape report.* https://zenodo.org/records/11098095

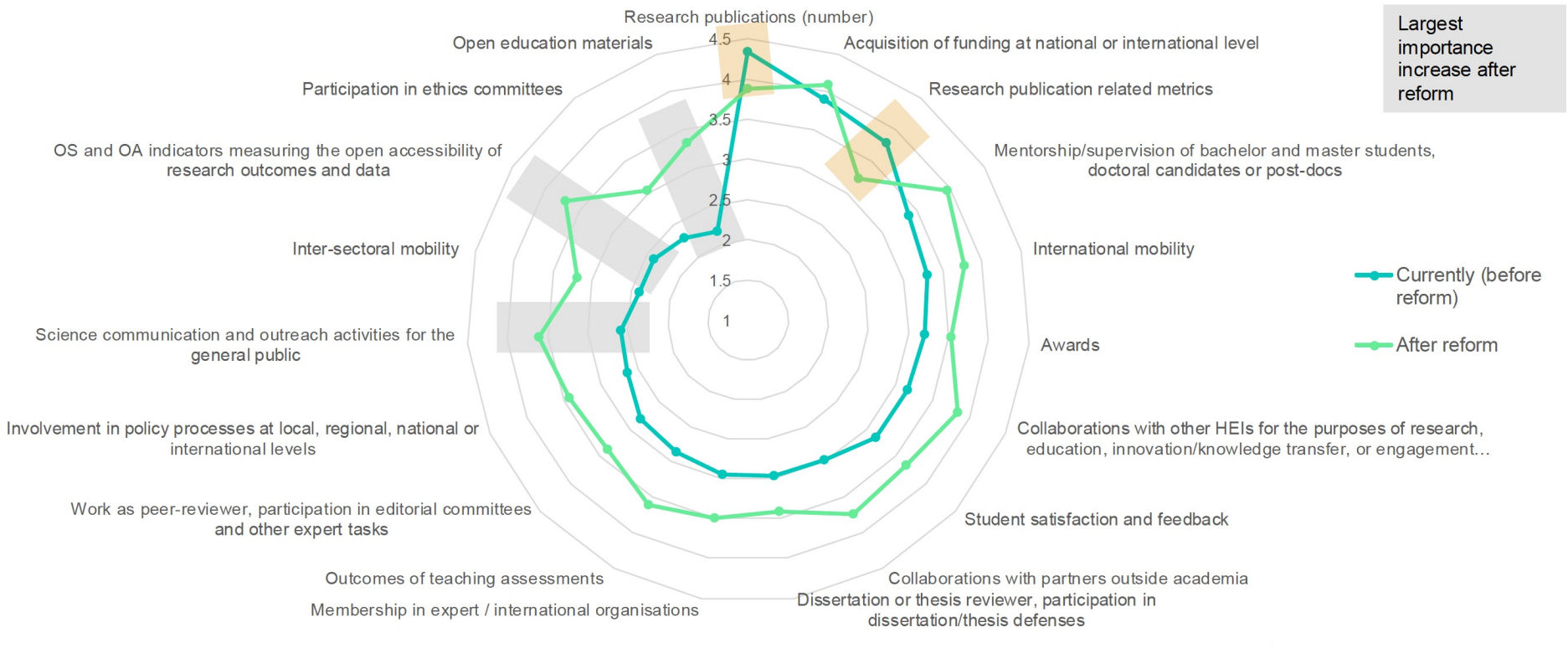
Science Europe Survey: OS in Funding Programmes

FIGURE 11 The ways in which information is collected at application stage on the funding requirements made for open science



Source: Morris, J., & Saenen, B. (2024). *Strategic Approaches to, and Research Assessment of, Open Science*. https://doi.org/10.5281/zenodo.13961124

Indicators for assessing academic careers



Source: CoARA Working Group ACA. (2024). Mapping academic career assessment reform initiatives - survey outcomes (CoARA Working Group ACA). Zenodo. https://doi.org/10.5281/zenodo.14548157

Conclusions on how RRA can integrate OS at the institutional level

#1 Review assessment methodologies, data and indicators

- Transparency of methods and indicators, reproducibility of quantitative analysis
- Collect information on OS activities and outputs (via quantitative and qualitative methods)
- Support the move towards open research information & open infrastructures (Barcelona Declaration)

#2 Enable interventions, interlink policies, create incentives and rewards

- Review and revise evaluation criteria in grant selection, hiring and promotion
- Implement and promote what is expected (e.g. job announcements, CV template, guidance)
- Share the status of achievements (e.g. via dashboards, case studies)

#3 Take into account frameworks under development

- Research funder and national frameworks
- Disciplinary approaches
- EU projects (GraspOS, OPUS, PathOS, SciLake, etc.) & International (DORA & TARA, RDA, etc.)

Thank you for listening.
Your comments or questions?

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Example: Norwegian Career Assessment Matrix (NOR-CAM)

6 assessment areas, results and competences, documentation, reflection

Source: https://www.uhr.no/en/resources/nor-cam/

1. Area of competence	2. Results and competencies (examples)	3. Documentation	4. Reflection
A. Research output	-Published works -Datasets -Software -Methodologies -Artistic results -Research reports	CRIS systems (e.g. Cristin) and other databases	Reflection on the relevance and quality of the results. Emphasis is placed on open access to published works and other results, as well as whether the data adhere to the FAIR principles.
B. Research process	- Leadership and participation in research groups -Working across disciplines - Research integrity/RRI - Editorial activity - Peer reviews - Building consortia - External funding - Development of research infrastructure -Leadership and participation in clinical trials	CRIS systems and other databases. Narrative CV system with links to source data.	Reflection on roles and relevance. How and why various actors within and outside academia have been involved in the research process. Emphasis is placed on transparency in the research process.

GraspOS report: Aspects of diversity in Responsible RA

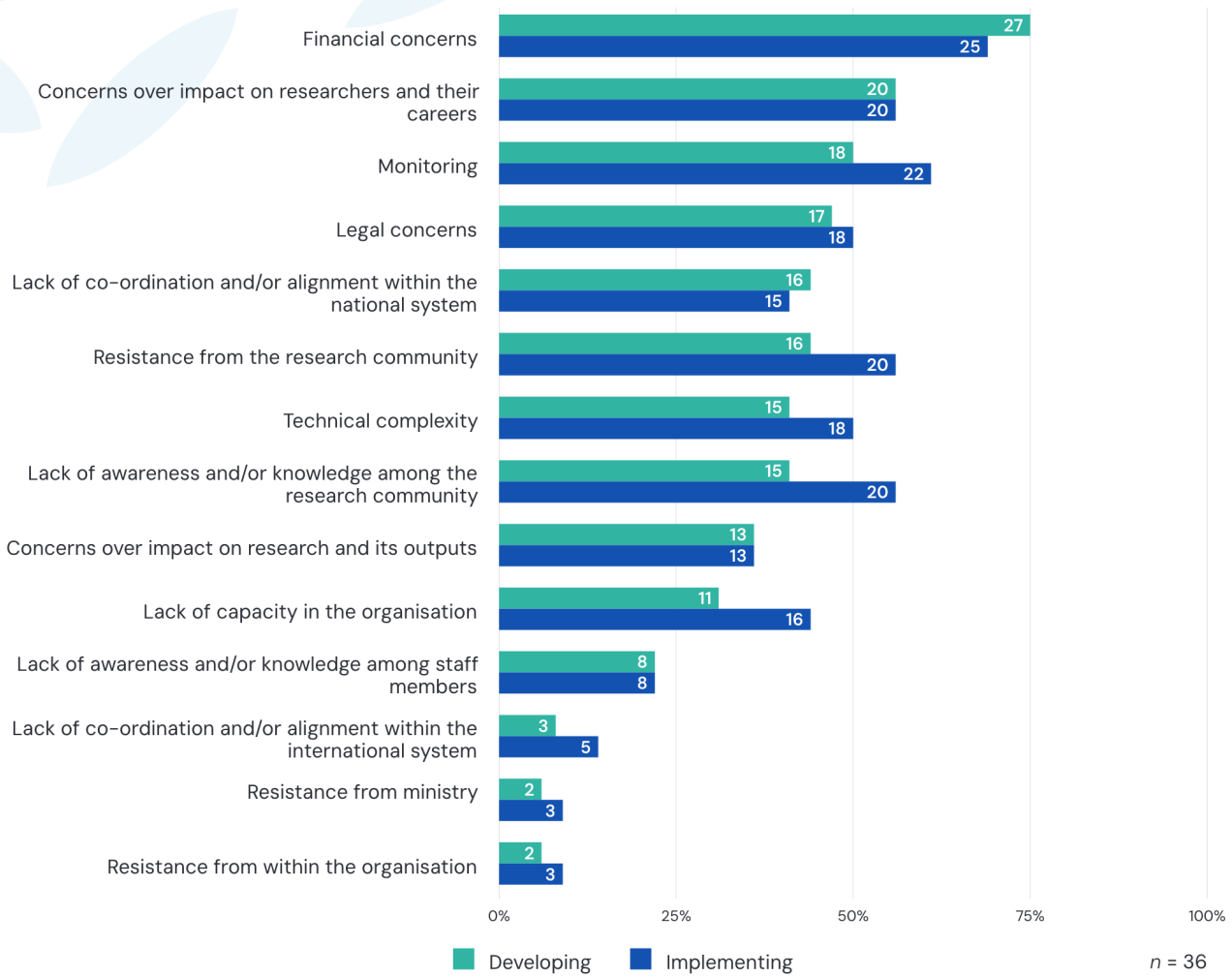
Table 5.3 *Aspects of diversity to be considered in Responsible Research Assessment (not an exhaustive list of examples) based mainly on the Agreement on Reforming Research Assessment.*

Diversity of research outputs	**Open research practices**	**Diversity of activities and roles**	**Inclusive aspects of diversity**
Journal articles Book articles Conference articles Monographs Datasets Software Data models Methods Theories Algorithms Protocols Workflows Exhibitions Strategies Policy contributions	Open collaboration Pre-registrations Preprinting Open access Data sharing Software sharing Methods sharing Open peer-review Citizen science	Team science Contributor roles Peer review Data stewardship Software engineering Teaching Training, mentoring & supervision Knowledge valorisation Science communi-cation & outreach Science advice and diplomacy Leadership roles Entrepreneurship Industry-academia cooperation Roles outside of academia Skills/ competences	Career stage Field or discipline Multi-, inter-, and trans-disciplinarity Basic vs. applied research Inter-sectorality Gender Sexual orientation Racial/ethnic origin Socio-economic status Disability Language

Source: Hyrkkänen, A.-K. et al. (2023). *GraspOS Deliverable D2.1 OS-aware RRA approaches landscape report.* https://zenodo.org/records/11098095

Science Europe Survey – II

FIGURE 7 Main challenges to developing and implementing strategic approaches to open science
(multiple choice)



Source: Morris, J., & Saenen, B. (2024). *Strategic Approaches to, and Research Assessment of, Open Science*. https://doi.org/10.5281/zenodo.13961124