



The ability to share, validate, re-use and discover research, theories and data has an essential role in increasing the credibility of research and speeding up the advancement of knowledge which can bring benefits and global solutions for all. Whilst we have seen great strides in OA, as a sector we need to move faster towards opening up all elements of research given how fundamental this is to trust, reproducibility and progress of science.

Open Access or Open Science?

Open access (OA) and open science can sometimes be used interchangeably, yet in reality the former is one element of the latter.

- OA is about making the research article free to access
- Open science is about making all of the elements behind the research itself openly accessible

What is needed for a full transition to open science? And what are the challenges in getting there?



1 Preprints

Preprints enable researchers to share their work immediately, ahead of formal peer review. They are a central way to enable early sharing and discussion of research.

- Early sharing catalyses peer collaboration, sharing of knowledge and interdisciplinary thinking. During the pandemic this drove knowledge forwards
- Preprint servers, such as Springer Nature's In Review, provide transparency and visibility over the steps the paper undergoes – can help researchers gain trust and knowledge in process of publication and peer review

Research shows that:

73% of early career researchers see preprints as a positive way forward for the publishing sector and development of research.

However,

- A 2021 [report released by RORI](#) showed that only 5% of all peer reviewed COVID-19 studies had an associated preprint
- Challenges around policy awareness and understanding, concern around data sharing, lack of credit/ recognition in sharing



2 Open Data

Data should be open, accessible and reusable.

Open Data is:

- Central to reproducibility
- Has an essential role in increasing the credibility of research
- Helps speed up the pace of discovery and its benefits to society

Recent research shows that 4 out of every 5 researchers is in favour of data being open as common practice

However researchers need:

- More training/information on policies for access, sharing and reuse
- Support for long term storage and data management strategies
- Clearer guidance on policies and credit given for sharing data



3 Open Code

Code is a central yet hidden part of many research outputs.

Sharing code encourages:

- Better data circulation and use within the scientific community
- Reduces duplication of effort
- Supports better transparency and continuity of work
- Enables reproducibility of results, within the larger scientific community

But, support around code lags behind other areas:

- Lack of code sharing policies
- Lack of right technological capabilities to share code
- Not as recognised in its own right



4 Open Protocols

Open protocols aim to clearly document and communicate research methods, enabling other researchers to replicate exact procedures.

Effectively supporting the use of detailed laboratory methods and protocols can:

- Help ensure results can be successfully replicated
- Reduce time and money spent on research

The importance of continued support of open protocols was further demonstrated by a study from PwC for the European Commission showing that:

Duplicating work due to a lack of awareness of existing research or negative results could cost up to €26 billion in Europe alone.

Despite the awareness of the benefits, and enthusiasm for an open research future, there are gaps between behaviour and action. **What can we do?**

Make full use of our publishing capabilities to drive the transition

Develop and implement policies which promote open science and transparency

Have the right processes and products in place to make implementing open science methods as easy as possible for authors

Create partnerships with others in the research community to drive forward industry-wide solutions on key areas of interest

Scan here to listen to more about the transition to open science

