

There is a baseline awareness of Open Science that can be built on.

The concept of Open Science appears to be generally well socialised across the academic research areas surveyed, even if it exists mainly as a 'buzzword'. It is at least understood as something that benefits research and the research process generally, with early career researchers and graduate students being more accepting of data sharing and Open Access publishing as desirable and beneficial outcomes for their research practices.



DOMAIN SPOTLIGHT Biodiversity

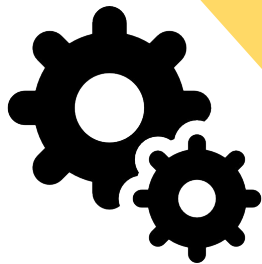
The field of Biodiversity deals with organisms that move across borders or have a global distribution. Research has benefitted from the leadership of communities of practice that recognise the importance of data exchange to a global ecosystem.

Addressing the challenge: A lack of understanding and support for putting principles into practice.

While collaboration is important to the field, project-specific agreements can limit data sharing. Biodiversity still lacks uptake in standards that promote interoperability and needs more support for training in this area. As more researchers connect with global infrastructures, the more successful the field is becoming.

[View the disciplinary info sheet for Biodiversity](#)





Many disciplines report that there is good or acceptable access to resources and tools for data sharing, suggesting that most domains can find the technical resources needed to create and share FAIR data.

FAIR enabling tools are becoming more readily available, but there is often not equitable access even within the disciplines.



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DOMAIN SPOTLIGHT Chemistry

Work in the lab is still manual, and collaboration tends to happen only in small, localised groups. Replicating data does not have a high cost so there is less of a need to seek out existing data before proceeding with research. There are some community-driven initiatives that are encouraging the interoperability of chemistry standards and repositories with other disciplines.

Addressing the challenge: Tools developed for specific disciplinary audiences may be used by other disciplines with different needs, but it requires trailblazing individuals to demonstrate how to utilise them.

Chemistry will benefit from more collaboration with other disciplines, such as Biology and Materials Sciences, as well as access to tools and workflows piloted in engaged sub-disciplines.

[View the disciplinary info sheet for Chemistry](#)



DOMAIN SPOTLIGHT

Materials Sciences and Engineering

Precise characterisation of materials and other samples requires diverse experimental and computational approaches, but much of the discipline still relies on manual workflows which are hard to translate to digital tools and platforms. Repositories and community resources are being developed, but collaboration is hindered by siloed funding and inward-focused, location-specific research cultures.

Addressing the challenge: *The individual costs and 'extra labour' required for data sharing can be reduced by improving access to shared workflows and expertise.*

Research infrastructures like EOSC are helping to share workflows and practices, but Open Science is still human-oriented and uptake is motivated by a few people keen to help others to succeed.

[View the disciplinary info sheet for Materials Sciences and Engineering](#)



There is a high degree of frustration with the extra labour of data sharing along with the potential financial costs for proprietary tools, deposit or publishing fees, or acquiring expertise (such as hiring a data steward). Some researchers have better access to funds or institutional support, but across the disciplines there is a sense that participating in Open Science has personal costs.

Open Science cannot be sustained on unpaid and unrewarded effort.



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The European Open Science Cloud has the potential to be a much-needed collaboration space.

DOMAIN SPOTLIGHT Wind Energy

Digitisation is both easing and speeding up collaboration, as well as making research results more accessible, but the community has yet to rise to the challenge of making these resources truly reusable.

Addressing the challenge: There is a need for a cross-cutting collaboration space that traverses disciplinary and geographic borders.

Industry is an important source of data in this field, but there is often no clear guidance on how to share data obtained from these partnerships. Collaboration models need to refocus on standardisation and sharing through common repositories, with important changes needed in research culture towards social solutions.

Most of the disciplines surveyed struggled with collaboration, even in circumstances where there was some consensus around tools and standards. Where collaboration happens, it is sometimes executed under constraints which limit possible collaborating partners. Big data projects rely on collaboration more than disciplines that typically work with smaller datasets, leaving small data projects less well-supported in this goal.

