



Scientific and Technical Information Department - CNRS

White Paper — Open Science in a Digital Republic

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Summary of proposals for Open Science

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Strategic opinions

Opinion 1: *Le numérique et la science : faire circuler les connaissances*
(Science in the digital age: Getting knowledge to circulate), Bruno David, President of the French Natural History Museum

Multiple practices among the different scientific communities

- 1 The results of the survey on the uses and needs of STI among research units conducted with the directors of the CNRS institutes and the directors of publishing units revealed a continuum of practices between the disciplines, over a wide range of uses.
- 2 The developments in scientific and technical information will therefore have to be defined on the basis of what they have in common, without setting the different communities against one another, and while outlining guidelines that incorporate the diversity of practices and uses.

Scientific publishing in the digital age

- 3 In addition to the routine management of the publications that pass through their laboratories, research teams expect to have tools with which to analyse the content to allow them to work at the forefront of scientific endeavour, first by analysing external publications, to keep abreast of current progress, but also by analysing the research produced in their own laboratories to assist with assessment and guidance.
- 4 If we compare the digital repositories of scientific publications to traditional libraries, where it took days to summarise content, the quasi-automatic and quasi-instantaneous access to content and the possibility of extracting signals make such repositories formidable strategic tools.

The exploration and sharing of research data

- 5 Access to large knowledge bases and the possibility of text and data mining (TDM) are of major importance in the digital age. TDM is like using a telescope, because of the quantity of data it brings within reach, but also like a microscope, because of the detailed examination it allows.
- 6 The organisation and condensation of data related to scientific articles are essential to allow researchers to examine content as broadly as possible, that is to say by having access to both the signals from the content of publications and to all the data on which the results are based.
- 7 This is where there is greatest room for progress: data are currently accessible on a case-by-case basis, so the digital transformation would be a great step forward and would allow global access and the possibility of leading on to new questions and investigations.
- 8 Research data are a formidable commonly owned asset. It must be possible to share them without constraint between the scientific communities.
- 9 These changes are before us, and research must be able to grasp the opportunities they present.

Bruno David, President of the French Natural History Museum

Opinion 2: New practices for sharing knowledge: Metrics for scientific publications – Daniel Egret, astronomer, Adviser to the President of Paris Sciences et Lettres University (PSL) on bibliometrics

Sharing knowledge better by digital means

- 10 In only a few decades, the eruption of digital technologies has profoundly changed the practices and the challenges of the sharing of scientific information. Every laboratory or research unit must now have a website or a digital portal opening a window onto the unit's scientific activities. This portal often goes no further than to provide a general overview, pointers and contacts, but there is a considerable thirst for information among the scientific community – and among society in general, particularly regarding those fields of science that attract most public interest – and there is likely to be growing impatience for something meatier. It has become imperative to better inform our research colleagues and our fellow citizens about our research activity and the results we produce (and above all our scientific publications, our instrumental achievements, our innovations, etc.). It is also imperative that we organise wider access to the datasets produced by this activity. Digital technologies offer a wide range of technical solutions, but of course the human cost and the necessary mobilisation of resources and skills remain the most difficult obstacles to overcome.

Characterising scientific production by metrics

- 11 More specifically, in the field of scientific publications, it is necessary not only to provide even better ways of sharing knowledge and research data, but also to establish

ways of making the scientific production of laboratories and institutions easier to identify, view and access, so that it can be analysed, compared and assessed.

- 12 This is crucial for French research because it is indispensable for extending the reach and impact of the research produced in our laboratories. Providing users, regardless of their function, with the professional tools and services they need to assess the impact of publications is one way of helping them respond appropriately to the challenges of assessment and international comparison, which are sometimes perceived as threatening.
- 13 It is also necessary to provide institutions (research organisations, research universities and other such bodies), as well as assessment bodies, with the tools and services they need to exploit this scientific production, assess the impact on knowledge and on society, and make more balanced comparisons.
- 14 Finally, the new uses of metrics should not only encourage the sharing and dissemination of bibliographic information, but also make it easier to exploit the content and thus provide a sounder basis for our understanding of the new research processes, and of practices in the production, use and exploitation of the results of research. TDM tools thus become the next generation of observation instruments, at the service of the activities of research and innovation, giving access to new worlds of results.

Daniel Egret, astronomer, Adviser to the President of Paris Sciences et Lettres University (PSL) on bibliometrics

Proposals

- 15 The full range of the proposals received can be summarised by the following diagram:

