



## **Foresight on Open Science: Expert panel workshop prior to NL Presidency Conference on Open Science (4 & 5 April, Amsterdam)**

*The workshop provided its results at various tracks at the NL presidency conference on Open Science. The outcomes as presented here don't represent institutional views but solely points on which the expert panel apparently agreed or simply are remarkable statements of individual experts which received a positive echo.*

*The workshop brought together 30 experts from Academia, science policy, national authorities, and the European Commission.*

*All points made refer to how Open Science can or should be in a more advance state, and addressing issues beyond the current 8 Open Science Ambitions of Commissioner Moedas. The statements are listed under each of the 8 Open Science Ambitions.*

*Rene von Schomberg, 4 April 2016*

### ***By 2020, Funders and stakeholders have taken a common position on alternative metrics to replace/complement the Journal Impact Factor and citation counts (OS Altmetrics)***

- Responsible metrics should be robust, respect expert judgement, transparent, and diverse taking into account the nuances of disciplines, career paths, and be reflexive (No Gaming)
- Beyond 2020 infrastructure for altmetrics
- Metadata about publicly funded Research should be part of infrastructure and these are now privately owned

### ***By 2020, FAIR Data sharing is the default for funding scientific research (OS FAIR Open Data)***

- We have made some progress but funder mandates can only go that far: the problem is with enforcing these mandates across different funders (public, foundations, industry).
- We need to switch from a passive to a truly open model, where it is in the interest of researchers to share: link to incentives.
- We need to identify tangible items to implement in the next years, both a bottom up and a top down may be needed.

### ***By 2020, all peer reviewed scientific publications are freely accessible (OS changing business models in scientific publishing)***

- 'Freely accessible' is not enough: conditions for 'fair' open access to peer-reviewed scientific publishing, which are discipline-based, must be met e.g.
- Ownership (or emancipation): Editorial boards (or learned societies) take the responsibility of the essential task of peer-reviewing and therefore owns the journal (its title and assets), while publishers are service providers and no more owners of journals.
- Copyright: Authors keep the copyright and, possibly, a CC-BY licence applies.
- Funding: Where the case, Article Processing Charges are low(er), transparent, negotiable, and in proportion to the work carried out by the publisher, and there is no more so-called 'double dipping'. However, when a journal is recognised to be useful to scientific

community and as long as its editorial board can prove good peer-reviewing practices, it is published for free using publishing platforms, which are publicly-owned and publicly-funded infrastructures using open source software, designed on the model of super-computing centres.

- Green open access: we don't know what new, innovative models may emerge (including solutions from publishers). Unlike Gold open access, Green open access allows the plurality of future business models to be preserved, in view of a smooth transition. Therefore authors are allowed to immediately deposit the published version in a repository (where the case, the lowest embargo period applies).

***By 2020, All publicly funded research in the EU adheres to commonly agreed Open Science Standards of Research Integrity (OS Research Integrity)***

- Research integrity is not just about formulating standards; it's about enabling scholars and scientists with the knowledge, tools and motivation to uphold these standards.
- Open Science in \*all\* stages of the research workflow holds great possibilities for researchers to make their research practices responsible and accountable.
- Three aspects of Open Science that can contribute to research integrity are preregistration, open materials and open peer review.
- Although individual ethics are important in safeguarding research integrity a European Code of Conduct for researchers is necessary but not enough to deal with questionable research practices;

***By 2020, All young scientists in Europe have the necessary skills and support to apply Open Science research routines and practices (OS education and Skills)***

- How can we best prepare next generation of students? Beyond utilitarian approach towards technology and skills Values vary across universities and cultures. Will open science bring different disciplinary approaches together or bring them apart? In the second case we have a problem. Can digital immigrants lead digital natives? Universities insist on traditional methods Role models needed We should not wait until the PhD or graduate phase but start much earlier.
- Danger of standardisation - science needs diversity New technologies lead to new specialities (laser technology), then becomes routine (mri). In health: linking with engineering Making data open is much more difficult in SSH Many experiments in psychology cannot be reproduced
- In many fields open science can become part of the training, e.g. In specialities
- Paradox: People need to specialise more at the same time we see a mixing of the sciences. We need to get out of the disciplinary silos
- In order to do so we need to change funding mechanism and review processes
- We need to foster the right attitude: some disciplines are not confident about OS
- We also need a conductor to steer these processes

***By 2020, Citizen scientists will significantly contribute and be recognised as a valid knowledge producer of European Science (OS Citizen Science)***

- Involving citizens will lead to better research questions: it will help reframing research questions by adding different paradigms. E.g. Earth quakes are measured for their strength, however citizens may be more disturbed by smaller, but frequently occurring earth quakes (example from the Netherlands province of Groningen). E.g. Involving patients in medical research changes the research question.

- Involving citizens will lead to faster and wider innovation. Example: Netherlands has the most Personal computers in the World per citizen. This started by involving citizens since the 80s. The acceptance of solar panels increases if citizens are part of the research into energy efficiency (example from Utrecht)
- The university will become a "platform" collecting and sharing research data with citizens. These data are collected in living labs and more true to life situations than data from laboratory settings, clinical trials or data from interviews. (The challenge will be to make sure citizens are empowered through access to these data, and not merely a "substrate" for third parties using their data)
- Citizens making valuable contribution in terms of science agenda setting, funding (crowd funding), mobilizing attention, improve access to science, and Valorisation of science

***By 2020, European research career evaluation will fully acknowledge OS activities (OS rewards)***

The right infrastructure but also changes in the research culture are needed to make smart selections:

- Play collective: All stakeholders (including the EU and national funders) need to take substantially more action in improving the standardized identification, attribution and measurement of sharing and (re)use of all types of research output.
- Play at home: Research institutions themselves, mainly universities, should be engaged in demanding that all \*their\* researchers' output be taken into account in evaluations and assessments for tenure, promotion, awards, funding and institutional comparisons and rankings.
- Be inspired: We need to start thinking about collaboration and sharing/publication spaces that have fine grained attribution and acknowledgement systems built in from the start, and in doing that even imagine futures in which the scientific paper will have lost some of its primacy.

This is important for both young and 'seasoned' researchers, despite the differences in the stage and dynamics of their careers.

***By 2020, all European researchers are able to deposit, access and analyse European scientific data through the Open Science Cloud, without leaving their desk (OS Cloud)***

- We will have no more journals by 2030.
- The European Open Science Cloud will be fully integrated in the global internet.
- Furthermore, non interoperable data will not exist in mainstream science any more.
- Proper legislation will be in place governing what can be done with the data Computer power will not be a central infrastructure anymore, it will be everywhere (personal devices and beyond) One petabyte of data will be created for each person per day Africa and Asia will have the same smartphone density as Europe and will participate equally in the data driven economy. However, at the moment OS is still regarded as a threat in many academic institutions in these countries.
- Keeping data closed will be possible but will be expensive and will pay for the costs of open data. It was discussed whether primarily underlying data should be open. The example of data journals was given