



MINISTRY OF HIGHER EDUCATION, RESEARCH AND INNOVATION

## Keynote address for Open Science at LIBER

**Madame Minister Frédérique Vidal**

Mr President of the University of Lille, dear Jean-Christophe

Mr President and CEO of the French national research agency, ANR, dear Thierry

Mr Deputy Director General for Research of CNRS, dear Alain

Ladies and gentlemen,

As soon as I took office, I decided to make open science one of my priorities. There were three reasons for this.

- The first one is the important change in paradigm which is opening up science in all academic spheres and beyond them for society as a whole. It is thus an indispensable factor for attaining the objective set by the President of the Republic concerning “recognition of the role played by knowledge, research, innovation and education in furthering the promise of progress embodied in the Republic”.
- The second reason is the risk that France might miss the ongoing global shift towards open science.
- And finally, the inadequate exploitation of our scientific potential in the framework of closed practices that still hold sway.

**At the present time we are not sufficiently committed to a strategy of open science.** You have to pay to have access to our researchers' publications. Of course, this is not an obstacle for the richest universities in the world and for the large industrial groups. But it severely limits the potential impact of our research on campuses around the world, on society, on industry.

Peter Suber, the global open access specialist, has shown that Yale, which is not exactly a poverty-stricken institution, had 25% fewer subscriptions than... Harvard. And India's richest academic institution, the Indian Institute of Science, has access to only 12% of the subscriptions that Harvard can afford. This clearly means that publishing as it evolved in the 19th and 20th centuries with constraints and economic models based on paper, has become inadequate.

**This traditional publishing system has furthermore become obsolete in the age of the web and digital ubiquity.** It was originally set up to disseminate knowledge. Unfortunately, it now seems to be working in reverse, reinforcing ignorance and building glaring inequalities that block the quest for knowledge. The capacity to access publications varies from one place to another, from one country to another, from one university to another, even from one research laboratory to another. This is paradoxical, at a time when public research is funded by all and given that the Web provides an infrastructure for accelerating the flow of knowledge. Denial of access is even more striking for non-governmental organizations, the media, small and medium-

sized companies or teachers, all of whom have a growing need to access the products of scientific research. But the stakes are considerable and very real.

**While false news is very easily accessible, scientific publications are protected behind paywalls that act as barriers preventing access to knowledge.** It takes ten minutes to invent and spread a false, crisp story that is surprising and easy to understand. But it takes ten years to produce a scientific demonstration that provides high-quality scientific information. As scientists, our duty is to enlighten our fellow citizens. We must be able to disseminate our results quickly, transparently and fully to all citizens. Open science is the ideal vehicle for conveying knowledge when rumours abound. I cannot accept that we must confine our scientific results behind a paywall, separating those who have knowledge from those who don't. I also consider that Wikipedia is particularly important as it has become a major source of information for society as a whole. It is now the fifth most-visited site in the world, and by far the largest source of encyclopaedic information in the world. Open science is the only way to make Wikipedia sustainable. There are currently tens of thousands of citations from scientific articles in the French Wikipedia. I want us to go even further, by weaving a close link between general knowledge and scientific knowledge, by relentlessly making our publications available to all, thus transforming them into public commons.

**But apart from contributing to social progress, open science is also the key to better scientific research.** In 1675 Isaac Newton wrote in a letter to Robert Hooke: "If I have seen further, it was by climbing on the shoulders of giants". He used a metaphor from the 13th century that remains valid today: one cannot do good research without relying on the discoveries of previous researchers. But this is less and less true, as it is becoming impossible to have access to all the world's scientific literature. Overpriced publications and inaccessible research data are profound obstacles impeding the progress of cumulative scientific research.

**In choosing open science we allow our scientists to find the audience for their work, the broad and universal readership they deserve.** Thus, dozens of studies have revealed a very significant increase both in the reading of articles and books that are freely accessible and in citations from them. Moreover, thanks to this type of publishing, the potential for multi-disciplinary research is greatly enhanced. Indeed, it is less easy to cross from one discipline to another when access is fettered by subscriptions. With open science, the serendipity enabled by the absence of documentation boundaries offers many heuristic perspectives.

**Of course, it is very tempting to keep one's publications and data for oneself.** However, science is a common good, which we must share as widely as possible. The role of public authorities is to restore the initial function of science as a factor of collective enrichment. This is important because the dissemination of scientific knowledge has a direct impact in terms of economic, health and social development. I am inspired by the strategy that was adopted for the Human Genome Project, which cost \$3.8 billion but for which it was decided that the results would be made public and considered part of the heritage of humanity. That decision cleared the way for the incredible scientific and medical exploitation that we all know. Moreover, it has been estimated that in 2012 this project had an economic impact of \$796 billion. Astronomy data are traditionally released after an embargo of one year. Two thirds of the scientific literature in astronomy is based on open data! This enormous potential, exploited by astronomers, is not yet exploited in all disciplines.

**One might say that the library is burning.**

A large study of data sets built by researchers in 1991 has shown that they were wasting away rapidly, at a rate of 17% per year. Given that a significant part of research funding is allotted to corpus building, data collection, carrying out experiments... the pace at which this data and the discoveries they enable, are being lost, is worrying in that it reduces the weight of

scientific evidence.

This is poor management of public funds, because lost data can no longer be reused or matched with new data... This limits new discoveries all the more.

When we look back at research conducted ten years ago, and it is no longer possible to re-establish the data that led to important conclusions, there is cause for concern. At a time when scientific integrity is so vital for defending the role of science in society, it is essential to maintain a firm hold on data over time.

**So, the first thing to be done is to structure and preserve the data, prior to making them freely available.** This is done very well by about a fifth of the scientific community, but the rest is largely left to individual decisions and random events that occur, during the service life of USB drives, or like laptop thefts from car trunks or failures of individual hard drives, etc.

As Minister of Higher Education, Research and Innovation, one of my objectives is to ensure that all communities and stakeholders, where this is not already the case, develop a structured approach to preserve their data and take the necessary steps to ensure that these data comply with the FAIR principle (Findable, Accessible, Interoperable, Reusable). Once this has been done, we can make science more open, more transparent and more universally accessible. **These data can serve as an educational tool, a scientific substrate and a catalyst for innovation.**

**The problem is not primarily technical, it is first and foremost a human one.** I am aware of the contradictory injunctions imposed on researchers with respect to this issue, between making data available and keeping them under wraps. To meet the challenges of open science, we must thoroughly reform our entire system so that the openness of publications and data is finally recognized as **good practice**. The assessment system, subject as it is to a dated, mechanistic and reductive metrics, must also evolve towards openness. Yes, we must seriously review the evolution of assessment systems and methods, both for researchers and institutions. That is why I support the open citation movement, which is going in the right direction. We must also abandon excessive quantitative assessment, for which the impact factor reigns supreme, and develop a much more qualitative approach. In this area, I hope that France will follow the proposals of the San Francisco Declaration on Research Assessment (DORA) and apply the principles of the Leiden Manifesto.

**I am also aware of the need to change daily practices, and therefore also the skills involved.** We have too often learned the digital aspects of professions by trial and error. And we have often purchased research equipment without thinking about requiring or getting the data described in open formats, that can be interpreted elsewhere than in the manufacturer's equipment and ecosystem. We have also de facto abandoned the intellectual property of our journals to publishers who gradually were in the position to impose unacceptable financial conditions on us [more than 100M€ of subscriptions for public research in France per year]. I therefore hope that negotiations with the major publishers will achieve a significantly reduced level compared with current practices and more in line with the very significant contribution made by the research community.

Open science is not a fashion, it is not a discipline, it is a paradigm. It thus involves new practices and new skills. I will take great care to ensure that these are regarded as being part of the initial background skills of young researchers. Open science will not be the business of a small group of specialists; it will have to permeate the entire research world.

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As you have understood, open science can only be conceived as a comprehensive

approach that integrates all facets of scientific activity.

We can eventually **achieve the figure of 100% of French scientific publications** being available through open access.

We must initiate **processes to open research data** to all, whenever it is reasonable, ethical and legal to do so.

We must **develop training courses, new tools and new services**, or simplify and improve existing ones.

But we must also be part of the **global Open Science movement**. I would like France to be a proactive leader in the field of open science, participating fully in its global reach. France supports, in particular, the initiatives of the European Union which, since 2012, has adopted voluntary policies with respect to open science. This is why we will support the "S plan" for open publications that ScienceEurope and Robert-Jan Smits have developed and which will be announced at the EuroScience Open forum (ESOF) Congress in Toulouse in the presence of Commissioner Carlos Moedas. We will thus be in sync with the implementation of the Conclusions of the May 2016 Competitiveness Council in full support of Commissioner Moedas' Open Science agenda.

**The national plan for open science lays down the conditions for its development in France.** It consists of three major commitments, which will place French research firmly within the global movement for Open Data and transparent public action. It consists in contributing to the Open Government Partnership (OGP), an international coalition that upholds the principles of transparency, the involvement of citizens and democratic innovation. In his address to the UN as co-chair of the OGP, Emmanuel Macron said that he wanted "to make the digital revolution an opportunity to profoundly transform democracies, to make them more effective, accountable and participatory". The plan fits perfectly into this dynamic.

#### **[First commitment: generalise open access to publications]**

The first commitment of this national plan for open science consists in generalising open access to publications.

1. Developing open access will increase the influence and accessibility of French research. This is why I have decided that **we will make open access mandatory for the dissemination of research articles and books resulting from publicly funded calls for projects.**

2. The scientific community has lost a lot of control over publishing. Yet it is an essential system for science to progress smoothly. Because we should remember that open science cannot be conceived without publishers. In France, we have a diverse, high-quality scientific editorial community, for example in mathematics and the human and social sciences. This diversity must be cultivated through a relationship based on trust and dialogue. It is essential to move towards greater diversity and balance in the editorial landscape. To develop this 'bibliodiversity', **I have decided to create a fund for open science.** This will contribute to the development of innovative French and international solutions, both from a technical and economic point of view. For example, we should explore the development of participatory funding models involving all the world's libraries. France will thus help the scientific community regain control of publishing.

3. We have a unique asset in France, with the national open repository, HAL. In particular, it allows articles which have been published in closed journals to be deposited for open access. It also guarantees long-term conservation of national publications and is an open archive. We have already greatly simplified the procedures for researchers so that it now only takes a third of the time previously needed, to deposit publications. **I have decided to support HAL and further simplify the enrichment process** by developing semi-automatic filing

functions.

**[Second commitment: structure research data and make it available through open access]**

The second commitment of this national plan for open science is to structure and, as far as possible, make research data available to all as Open Data.

4. Research **data** form the foundations for future knowledge. Structuring, preserving and opening up research data will promote the sharing, cross-fertilisation and matching of data to produce new knowledge. **This is why the President of the Republic announced during his major speech on artificial intelligence that he was going to set up an Open Access obligation for the dissemination of research data resulting from publicly funded calls for tenders.** It goes without saying that this opening process will depend on compliance with the regulations, particularly as regards personal data or data protected by professional, industrial and commercial secrecy regulations, and that best practices will be defined by the scientific community. An **ANR FLASH call** will be published shortly to accelerate the structuring, citing and opening up of research data produced by French teams.

5. In order to coordinate national action, **I have decided to create the position of Chief Data Officer at the Ministry of Higher Education, Research and Innovation.** The CDO will coordinate public action concerning scientific data in order to optimize their structuring, conservation and dissemination. The CDO will also coordinate a network of data administrators in the institutions.

6. **Finally, I have decided to encourage the association of structured and open data with articles published by researchers.** This is a first step towards a more consistent association of data with articles. We shall also encourage the development of "*data papers*", which describe how the data were constructed.

**[Third commitment: Be part of a sustainable European and international open science dynamic]**

The third and final commitment aims to place France in a sustainable European and international open science dynamic.

**Making France an open science country means both transforming scientific practices so that they integrate and adopt open science on a routine basis into everyday practice and contributing to the structuring of the international open science landscape.**

To do this, we will develop the skills needed for open science. This involves, on the one hand, generalising the daily practices of open science, particularly with respect to publications, data, intellectual property and peer reviewing.

On the other hand, it involves contributing to an ecosystem that is at once resilient, regulated and transparent, working in the interests of the scientific community.

7. **We are committed to a profound cultural change, both for institutions but also and above all for researchers.** If researchers are to publish their publications, data and source code openly, it will be necessary to develop new skills, particularly in doctoral programmes. This is why we will encourage open science training, in particular through special funding from the Ministry, which will encourage the development and sharing of training materials.

**8. I now call the universities and research organisations to adopt an open science**

**policy combining the issues of publications, data, skills and assessment.** I invite you to deploy the measures of this Open Science Plan in your institutions and laboratories, and to adapt them to your respective organisations and regulations.

**9. We must also coordinate our national actions with European and international initiatives.** This is why we are participating in the European Commission's European Open Science Cloud (EOSC) and in GO FAIR, a joint initiative of the Netherlands, Germany and France to involve all scientific communities in the data transformation movement to make data Findable, Accessible, Interoperable and Reusable (FAIR).

**I would like to conclude by saying that we have been talking about open science for too long.** It is now time for **action.** This plan makes open access mandatory for publications and research data from research funded by public grants. It sets up an Open Science Committee and supports major structuring initiatives concerning publications and data. Finally, it has a training component and an international component that are essential for mobilising the scientific communities and for France's influence in this landscape, which is currently being created. We need courage and determination to finance this policy, which is not based solely on good intentions. This plan will therefore have a budget of €5.4M the first year and €3.4M the following years.

The plan will succeed because it is necessary! As our colleagues expressed so well in a text published by *Le Monde* in 2013, "knowledge that is kept locked up is sterile knowledge". With this plan, I am giving you the keys today to open the doors and the means to lower the barriers. I ask you to adopt them, to use them, to disseminate your practices. Because the success of this open science policy is in your hands! It is only by working together, really together, that we will make open science a real tool for collective enrichment.

Thank you very much.

4<sup>th</sup> July 2018