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Open Science – a business view on Open Research Data

KEY MESSAGES

- 1** BusinessEurope acknowledges the huge potential of Open Science, which should not be an end in itself but rather a way to enhance Europe's values, economic competitiveness and interests. We call for a renewed debate about the benefits and limits of Open Research Data.
- 2** There are no easy criteria allowing for a simple decision for or against the use of Open Research Data. Regulators should therefore refrain from enforcing a one-size-fits-all approach. Instead, they should provide a framework that ensures flexibility according to the type of research data considered, building upon the "as open as possible, as closed as necessary" principle.
- 3** To overcome the current simplistic dichotomy "open vs closed", we put forward a set of principles for Open Research Data, which should lead to smart provisions for research data sharing. Based on these principles, the European Commission should prepare a guidance on the degree of openness depending on the type of research projects.



Open Science – a business view on Open Research Data

BusinessEurope is supportive of the objectives of Open Science and keen on contributing to its agenda-setting.¹ Yet, we note that the business perspective has been missing when developing policies around Open Science: a lot of ink has been spilled on “**how**” to drive and implement Open Science, particularly within universities and for academic research. This paper will address the “**what**” question - i.e. what type of research data should be subject to Open Science; what principles should apply. It will particularly focus on Open Research Data and define – from a business perspective – the guiding principles to Open Research Data.

The EU business community believes European policy makers should not see Open Science as an end in itself, but rather as a way to enhance Europe’s values, economic competitiveness and interests. We are convinced that the way forward is to **apply a variety of approaches of Open Science**, each building upon the “as open as possible, as closed as necessary” principle. We are confident that this approach will solve the current simplistic dichotomy (i.e. open vs closed) and ultimately promote an efficient European Research Area.

1. DEFINITION

Open Science is commonly defined as the creation of transparent and accessible scientific knowledge that is shared and developed through collaborative networks. Since Open Science covers the entire research lifecycle, it includes the practices of Open Access (i.e. providing unhindered access to scientific publications) and Open Research Data (i.e. the sharing of research methodologies and protocols, as well as all research data underlying a publication with the scientific community and the general public). Open Science also includes elements such as societal engagement at all stages of research (including citizen science), transparent peer review, research integrity and ethics, development of new skills and novel research metrics.

This paper mainly focuses on **Open Access to Research Data** (i.e. the publication of primary research data), as this is – from a business perspective – the most complex element of Open Science. As such, it requires particular attention from both the research and the policy sides.

Open Research Data has multiple benefits: it allows other researchers to verify a published work and re-walk the path from data to conclusion; this makes Open Research Data a powerful promoter of scientific quality and provides sound scientific evidence to support public policy making. Furthermore, Open Research Data allows researchers to re-examine and combine such data sets to gain additional scientific insights (e.g. cross-disciplines). In short, sharing research data has the potential to improve the efficiency, impact and effectiveness of research and to accelerate innovation.

¹ https://www.businesseurope.eu/sites/buseur/files/media/position_papers/iaco/2016-03-17_open_access_to_scientific_publications_and_research.pdf



These arguments suggest that Open Research Data should be the default way of working in any research undertaking. They also explain why Open Science and Open Research Data have been consistently promoted by the European Commission², and made a prominent element of the current Horizon 2020 and upcoming Horizon Europe programme — even if comparable research programmes outside of Europe seem to take a far less pronounced approach towards Open Science.

This being said, we note that most of the funding of Horizon 2020 and the future Horizon Europe programmes will be for Research & Innovation Actions (RIA) and Innovation Actions (IA). Yet, the obligations of open access to research data will apply to all these RIA and IA projects, while ignoring the *innovation* dimension both in terms of wording (i.e. “open *research* data”) and underlying reasoning/argumentation (i.e. the whole thinking behind Open Science stems from and is applicable primarily to academic research, whereas it is now also being applied to industrial R&D, technology and innovation in the business sector). For these reasons, it is of prior importance to now consider the business and innovation components of Open Research Data.

Our reflection starts from considering the international arena in which Europe is involved in a geopolitical and economic competition between major economic players (EU, US, China). As such, it is worth asking the question **what type of research result from Europe would benefit Europe if it were shared with the global community**. The research community and policy makers should collectively call for reciprocity of Open Research Data, so as to preserve Europe’s values, global competitive position and interests. It is also worth discussing the exact **meaning of research data and their degree of sharing**, so as to develop an Open Research Data approach fit for European science and industry.

From our analysis, it appears clear that Open Research Data should not be interpreted as a black-and-white dichotomy, but rather as a spectrum of opening up research activities and outputs that is dependent upon the sensitivity of the research, the ability and interest to make the research open and the urgency to access/reuse the research results. The role of data and IPR indeed depends on the sector considered. In other words, researchers at CERN investigating the very fabric of the universe are naturally keen on making all of their results public, whereas military research will need to be a closely kept secret. In between these extremes, there is a considerable grey zone, in particular at the interface between academic research (aiming at increasing knowledge) and industrial R&D (aiming at creating or preserving a competitive advantage). For this grey zone, tailored approaches to Open Research Data are needed (see chapter 3).

² Particularly, the then-Commissioner for research and innovation, Carlos Moedas, has promoted a “Open Europe”, i.e. open innovation, open science and open to the world. More recently, new reward systems for researchers are under discussions: the aim is to broaden the basis for assessing a researcher’s output based not only on the quantity and quality of his/her publications, but also the adoption of Open Science principles.



2. THE QUEST FOR SIMPLE CRITERIA

The intuitive approach to Open Research Data would assume that publicly funded research should follow open data principles, whereas privately funded research should be exempted. However, this reasoning is flawed for several reasons.

Firstly, publicly funded research can be sensitive. For example, some academic research, such as the development of quantum computers or secure quantum communication, needs a careful reflection on which parts of such research should be made available to the global public, or kept partially confidential to support the emergence of a European quantum computing industrial competence to feed a possible new European strategic value chain.³

Secondly, research often relies on a mix of public and private funding. Most of the research to be carried out under the second pillar of Horizon Europe requires participating companies to provide approximately 50%⁴ of the overall costs, based on the realistic assumption that companies will sooner or later use the results for commercial purposes. With mixed funding schemes, the nature of the research data resulting from them is not easy to determine, and a clear definition of scientific data needs to be provided.

Finally, companies should also be encouraged to think about the value of Open Research Data even for fully privately funded research: such research results sometimes need to be made public in order to realise their full commercial potential for their provider.

If the criterion “public vs private funding” is not adequate to decide on the applicability of Open Research Data, another angle could be to differentiate research by the commercial value of the results. Following this idea, results that have an immediate commercial value, backed by a company committed to realising it, should be exempt from Open Research Data, whereas all other research should be subject to it. However, this approach is also fraught with difficulties.

For instance, a large part of the global stock of software is open source and hence freely available; prominent examples include Kubernetes (the software to orchestrate web services) or Docker (software container technology). It has been mainly contributed by companies who understood that the sharing of software often realises a higher business value than the commercialisation of it — for the companies themselves as well as for their ecosystem partners. As such, even for commercially-minded companies the sharing of results may make a lot of sense. The Linux Foundation, which is the most important foundation driving open source software development, estimates the commercial value of the open source software developed under their patronage to be approximately 16 billion USD.

³ This is in line with Art. 179 TFEU: “The Union shall have the objective of strengthening its scientific and technological bases by achieving a European research area in which researchers, scientific knowledge and technology circulate freely, and **encouraging it to become more competitive, including in its industry**, while promoting all the research activities deemed necessary by virtue of other Chapters of the Treaties”.

⁴ The picture becomes even more mixed if we take into consideration the companies’ in-kind contribution related to their research & engineering staff as well as their experiences and competence building over years.



On the other hand, even research results that do not have an immediate path to commercialisation may still not be an obvious candidate for Open Science. As such, Open Research Data may not be recommended for those researches that risk being detrimental to the EU's interests and values.

The bottom line is that there are no simple criteria allowing for a simple decision for or against the use of Open Research Data, and therefore **regulators should refrain from enforcing a one-size-fits-all approach**, and rather **provide a smart framework allowing researchers and other stakeholders to adopt an Open Research Data approach which is most appropriate for the type of research data considered**.

3. PRINCIPLES FOR ADOPTING OPEN RESEARCH DATA METHODS

The EU business community believes that the following cumulative principles should guide the adoption of Open Research Data methods. We propose them as a contribution of the business perspective for continuing the discussions with the broader scientific community, including policy makers, research funding organisations, universities and research agencies.

Building upon these principles, the European Commission should develop a guidance on the degree of Open Research Data that is appropriate for the type of research projects. The “as open as possible, as closed as necessary” principle is a well-known basis from which to define such a guidance. However, it is clearly too simple and generic to guide researchers in proposing the right Open Research Data approach for their project, and to help evaluators judge such proposals. This guidance would help beneficiaries to understand when and why research data have to be shared, and when other considerations (e.g. privacy, commercial reasons⁵) have to be prioritised.

1/ Characteristics of the business sector: Companies differ from other entities in that they take risks to build products or offer services. They therefore sometimes (e.g. in case of confidential business information, competitiveness) need to restrict the access to their results by other parties for a certain period of time to gain a temporary competitive advantage and recover the company's initial investment. As such the “as open as possible, as closed as necessary” principle, as established for EU funding programmes, should always apply, whilst guidelines should further elaborate its corollaries. Possibly, to encourage companies to share their data, the principle could be amended with “as open as possible, as closed as necessary; and as early as possible, as late as necessary”. Until today, European companies have not been strongly represented in the policy setting of Open Science, which has been dominated by contributors from academia. This is unfortunate because companies are a major contributor to European R&I, and they are typically better placed in assessing the value of research data in relation to Europe's economic interests. To better take companies along the Open Science journey and EU policy makers understand the business/commercial interests behind research data, companies should be directly involved in advisory/expert groups working on Open Science activities (e.g. European Open Science Cloud).

⁵ As recognised in Art 35 of the Partial General Agreement on Horizon Europe.



2/ Different degrees of openness: A decision not to adopt a full Open Research Data approach does not automatically translate into “Closed Data”. Research groups should commit to sharing their research data with any trustworthy entities, while retaining the freedom to assessing their credibility and trustworthiness, and exercise control over the use of the data. This can be realised through different publication models, such as (i) full publication for unrestricted use, (ii) full publication, but only for non-commercial use, (iii) publication of meta data, with access to full data being granted upon request, (iv) access to meta data, with access to full data granted upon request to non-commercial entities (potentially under a Non-Disclosure Agreement), (v) publication of research data with a delay. This approach would support the ongoing efforts to make European universities and research entities more sensitive of the risks and geopolitical threats involved with working with non-European research partners. Although some non-European examples of open science exist, the EU is the only one providing research funds to promote a dedicated policy framework on Open Science, while the UN agenda is still far from being fully defined. As such, reciprocity should clearly be a condition to be fulfilled in the selection of the partners for sharing of research data.

3/ Conscious decision taking: One of the main reasons for the currently limited adoption of Open Science and Open Research Data globally is that it requires a Copernican change of habits, funding and culture in the entire research cycle. Consequently, for every research undertaking there should be a reflection on the value of the expected research data for European industry, science and society, followed by a conscious decision on the right approach to Open Research Data. Such decisions should take into account various implications of the research work and data, including the impact on long-term European competitiveness, ethical considerations or security concerns. The right Open Research Data approach should strike the right balance between different stakeholders’ interests.⁶

4/ No “holy cows”: The obligation to take a conscious decision on the most appropriate approach to Open Research Data should be applicable to all types of research projects, regardless of their funding source. For research that is fully or partially funded privately, the funding companies should refrain from assuming that such research is never suitable for Open Research Data. There are abundant examples of companies already promoting Open Research Data practices and sharing commercially valuable results with the public, thus reaping far greater benefits than it would have been possible without sharing anything. For companies, the question is therefore what kind of Open Research Data approach may be the best path to realise the full commercial potential of their research data/results. Likewise, it would be quite wrong to assume that for a fully publicly funded research project only a full Open Research Data approach is acceptable.

5/ Decision without bias: Research that is suitable for Open Research Data is neither better nor worse than any other research. As a matter of fact, good research will still be carried out even if there are sound reasons against opening up Open Research Data completely. Therefore, a policy push towards Open Research Data should not result in a situation where research projects adopting a less pronounced approach to Open Research Data are considered to be inferior in any way. Researchers should be

⁶ Relevant provisions in Horizon 2020 and the current Partial General Agreement on Horizon Europe, as well as the Council Conclusions on Open Science of May 2016 aim at striking this balance.



encouraged to take a fact-based decision on the appropriate degree of Open Research Data, apply the best level of openness in sharing data and not feel a need to go for a full Open Research Data approach only to please funding agencies. This is particularly true for industrial research, which needs to take a pragmatic approach to Open Research Data.

6/ Funding without bias: In the same spirit, the awarding of research funding should not be biased towards research adopting a full Open Research Data approach. As such, a research proposal should be submitted after a careful reflection on which approach of Open Research Data is the most valuable, and the quality of that reflection should be the sole selection criterion with respect to its approach to Open Science. In particular, there should be no preferential treatment for research proposals that have chosen to adopt a full Open Research Data approach. If a research proposal makes a good case against Open Research Data (e.g. an expected commercial success for the European industry), then the proposal should not be discriminated against. Also, the forms used to submit research proposals should be designed in an inclusive way, avoiding discrimination through an “opt-out”/“exception” option, which is often mistaken as a refusal to not comply.

7/ Non-discriminatory reward systems: At present, the work of academic researchers is assessed through the quantity and quality of their publications, with the number of citations used as a proxy for quality. Since most companies allow their researchers to publish in scientific journals (usually with safeguards to avoid the accidental publication of patentable results), this practice allows for evaluating both academic and industrial researchers. On the other hand, if the level of Open Science (and in particular Open Research Data) became a major criterion for research performance, then industrial researchers would be at a clear disadvantage. The cross-sector mobility of researchers would be severely impacted, and hence Europe’s ability to translate scientific results into industrial practice. Reward systems with focus on Open Science should thus be designed in a way to minimise the discrimination against industrial researchers.

CONCLUSION

We consider Open Research Data as a means to an end (i.e. boosting Europe’s competitiveness and thereby positively impacting the well-being of the European society). European companies clearly acknowledge that Open Research Data has a lot of potential for Europe, that is to a large extent still waiting to be realised.

The EU business community is willing to **embrace an Open Research Data approach which is fit for the EU’s interests and values as well as for industry and economic competitiveness**. As such, we believe the above-mentioned principles will be key to drive the adoption of Open Research Data within the business community.