EARTO Paper:
Towards a Balanced Approach Between IPRs and Open Science Policy

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Introduction

The role of Research, Development and Innovation (RD&I) is essential to fulfil Europe's ambitions such as boosting its economic competitiveness and prosperity, building resilience and technology sovereignty in strategic value chains, or mastering the twin transitions towards a green and digital society. To reach those objectives in the current context of fierce global competition, ensuring the right framework conditions to stimulate knowledge and technology co-creation in Europe and prevent unwanted regulatory barriers hampering European innovation capacity has never been more essential.

Europe now needs to strike the right balance between the benefits of the EU Open Science (OS) policy to enhance the accessibility and re-use of RD&I results on the one hand, and the essential role of Intellectual Property Rights (IPR) to strengthen the collaborative development of knowledge and technology while fostering industry's uptake of RD&I results on the other.

To that end, EARTO hereby puts forward a set of recommendations to promote a balanced approach between IPRs and Open Science policy in Europe:

- **Recommendation 1: Ensure a stable and robust EU Regulatory and Policy framework recognising IP's crucial role in fostering knowledge co-creation, which is essential to boost technology development and industry's uptake of innovation, for high socio-economic impact.** This can be done by: (1) raising awareness of the value of IPR in EU RD&I ecosystems; (2) promoting the efficient exploitation of RD&I results by fostering a balanced and flexible IPR policy; (3) simplifying the IPR clauses in Horizon Europe; (4) recognising the importance of Standards and their complementarity with patents; (5) improving the regulatory framework for RD&I public procurements in Europe.
- **Recommendation 2: Foster a balanced approach between Open Science and IP policies in Europe. The concepts of Open Science and Open Innovation based on IPR should be promoted hand in hand. By ensuring that RD&I partners can capture part of the value created in common, Open Innovation enables to connect the fruits of Open Science to their efficient commercialisation in the market**. This can be done by: (1) putting the emphasis of the EU OS policy on the availability and dissemination of knowledge rather than on the absence of pricing; (2) focusing the EU OS policy on scientific publication and digital research data; (3) aligning the EU data sharing policy on the principle "as open as possible, as closed as necessary"; (4) mainstreaming the use of data management plans; (5) organising trainings for researchers on OS policy and IPR framework; and (6) adopting a balanced approach towards Open Source Software.

EARTO remains at the disposal of the EU institutions to further discuss these recommendations and support the set-up of a balanced approach between Open Science and IPR policies in Europe.

1. The Essential Role of IPRs in Open Innovation & Co-creation

Recent technology trends have changed the way companies do RD&I: technology is more complex, technology cycles are shorter, knowledge becomes global. New products and services often require combining different technologies together, which necessitates the integration of a wide range of skills and infrastructures. Such complexity and the interdisciplinarity of technology make it more difficult for industry to fully capture its full value creation potential. In addition, market-ready solutions increasingly require clear added-value that go beyond mere problem-solving, which necessitates an important understanding of non-technological aspects as well. As a consequence, responding to today's complex societal and industrial challenges requires RD&I collaboration and co-creation at global scale.

1.1 Value Creation and Value Capture: Both Needed to Enable Collaborative Risk-Sharing

In opposition with the "closed model" where the entire innovative process is carried out internally by companies, "open innovation" offers a collaborative model to develop knowledge and technology based on both internal and external resources with several RD&I actors (RTOs, universities, large and small companies, citizens, etc.). As coined by Henry Chesbrough, open innovation is characterised by the simultaneous presence of:

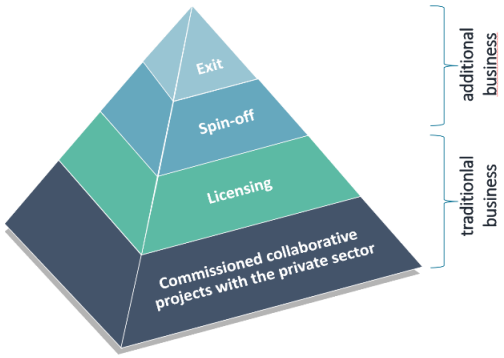
- **"value creation"** by the partners working in collaboration, co-creating knowledge to boost innovation output, and
- **"value capture"** under conditions that enable each partner of the collaboration to capture a share of the economic value created in common.

When both conditions are met, powerful incentives exist for knowledge and technology creators like RTOs and universities, and technology buyers like industry, to interact and collaborate with each other, thereby creating a thriving technology marketplace and jointly developing solutions to societal challenges.

Open innovation is about collaborative risk-sharing: the costs and benefits of RD&I are allocated proportionally between all entities that invest in a research project, thereby reducing the costs of RD&I for single firms and shortening the time needed for technology development and maturation. In that context, IPRs are a key tool to organise the transfer of knowledge and technology between the different partners in an open innovation model.

1.2 Open Innovation: At the Core of RTOs' Business Model

Open innovation is embedded in European RTOs' business models. They are developing and co-creating knowledge and technology with a wide range of RD&I actors across the whole value-chain, from low to high TRL. RTOs develop new breakthrough technologies, with a market-oriented approach and the objective to develop strong Intellectual Property. This enables them to ensure that the technology they develop reaches the market with high impact. They have different ways to do so:



- **Directly commissioned collaborative projects with private partner(s):** RTOs and their private partners collaborate in a co-creation setting, with a common objective and agreement on the reasonable efforts needed to fulfil such objective. There is a fair division of work between the partners, who often share the technological, scientific, and other risks - even though one of the partners may bear the financial risks on its own (including its own costs and the RTOs' full costs as well). The partners also often share the research results: IPRs and access rights can be allocated to the different partners with respect to the value of their contribution and respective interest and needs. Most of the time, in the case of a commercial exploitation by the private partner, RTO keeps ownership of the results it creates and licence them to the private company which pays royalties to the RTO. Royalties are attributed to the RTO with respect to the value of their contribution and the value of the technology. Non-IPR results (e.g. publications, data, software) are widely disseminated through conferences, journals, repositories, etc.
- **IP licencing among various participating partners is an important model of "open innovation" collaboration.** A license is a consent by the owner to the use of IP in exchange for a compensation (money or otherwise). Licenses may either be for certain IPRs only, or for all the IPRs that are necessary to reproduce, make, use, market, and sell products or services based on a type of technology.
- **Spin-off creation**: RTOs provide essential support for the creation of these deep-tech start-ups[1]. RTOs indeed have the capabilities and support mechanisms in place to create successful spin-offs based on strong and exclusive sectorial IP licences that are transferred to the new start-up. IP is indeed essential to set up a spin-off company, in particular for the valuation of the spin-offs, as outside investors use IP as collateral. Venture capital would not invest if start-ups are not equipped with strong and exclusive IPRs.

RTOs support any incentive given to the exploitation and dissemination of technology, under conditions that enable each collaborating partner to capture a share of the economic value created in common, as detailed in a business and exploitation plan and a clearly defined roadmap.

1.3 IPRs: An Essential Part of the Innovation Cycle:

As detailed by the World Intellectual Property Organisation (WIPO), IP is a broad concept. It includes many different intangibles, such as patents, copyright, know-how, trade secrets, trademarks, industrial designs. In the frame of an RD&I project, it is also important to distinguish between:

- **Background IP**: IP existing prior to the effective date of the agreement, and/or acquired by a party outside but in parallel of a specific project, whereby such party is not prevented from licencing.
- **Foreground IP**: IP generated in the performance of the project.

[1] EARTO paper, How to Exploit the Untapped Potential of RTOs' Deep-Tech Start-Ups, 2017

The long-standing experience of RTOs shows that industry is usually only willing to invest in RD&I leading to a competitive edge over entities that have chosen not to invest. This requires protecting certain results with IPRs. **IP systems are designed in large part to provide adequate incentives for creators and inventors to invest in the production of novel ideas and content, while at the same time encouraging beneficial diffusion of knowledge.**

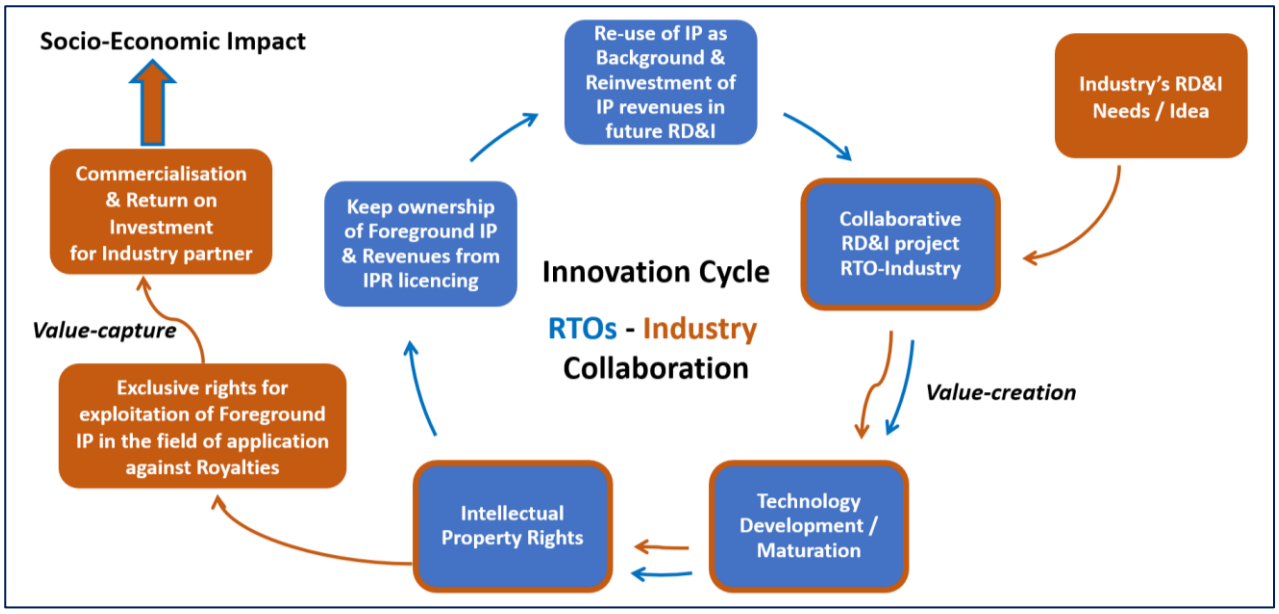
For the Innovation Cycle to be efficient (Figure 1):

- **RTOs' industry partner in general acquires exclusive rights for the foreground IP for the field of application**, and benefits from the RTOs' background IP on a non-exclusive basis, thereby gaining competitive advantages.
- **RTOs retain ownership of the foreground IP**, which enables them to perform further RD&I work, often in very different fields of application (see "IP coordination role" below).

The limited nature of the exclusive licence to a certain field of application and/or for specific products/services offers public organisations like RTOs the possibility of exploiting the same technology in other sectors, increasing the potential impact of the initial technological investment. If RTOs' industrial partners would obtain all rights to the foreground IP, further RD&I work by RTOs would be severely affected. This would effectively be cutting off any option for RTOs to further work on the diffusion of their technologies and scale-up by other industrial sectors.

The sectorial exclusivity gives a competitive advantage to the RTOs' industry partners in the field of application considered, which in turn ensures a return on investment. This is particularly the case for SMEs and highly innovative start-ups which need exclusivity in order to develop and compete. The holding of exclusive (licences to) IP rights is also a requirement of venture capital investors to invest in start-ups. Finally, a patent owner or an exclusive licensee can sue a possible infringer while a non-exclusive licensee cannot without the collaboration of the IP owner. However, to defend the public interest, exclusive licenses by domain (or sectorial) must be limited in time and matched with thresholds of obligations to exploit commercially so that the private company does not block innovation: (1) below an exploitation threshold (which is measured by the level of royalties), it loses exclusivity; and (2) in the event of no exploitation, the license is terminated. This is often implemented by means of antishelving-clauses in license agreements.

Figure 1: The Innovation Cycle - RTOs-Industry Collaboration - *Source: Fraunhofer (modified by EARTO)*



IPRs play at least two different important roles for RTOs in RD&I ecosystems:

1. **A coordination and trust-creating role (main role of IP for RTOs): IP is used as a mean to create new collaborations with partners, mainly industry (large and small).** For RTOs, this is the most important role of IPRs: a way of giving value to technology. Together with their extensive know-how, RTOs use their IP portfolio as a tool to signal their competences and market their know-how as the background of future RD&I collaborations with industry. This explains why keeping ownership or at least joint ownership of IP when collaborating with industry is important for RTOs to increase their pool of proprietary IP. It fosters further collaboration in an open innovation model. In addition, waiving the ownership of the IP to industry would mean that RTOs

lose the possibility to have new agreements with other partners in various (industrial) sectors, which would in turn significantly limit technology diffusion and would counter the public interest. IP also play a key role to structure, secure and facilitate tacit knowledge exchanges between partners during collaborative projects.

2. **An incentive role (secondary role of IP for RTOs): IP provides legal certainty, enabling RTOs to mitigate the costs of patent filing by earning royalties.** However, this is never RTOs' main objective when filing patents. The cost of patenting itself justifies the need for royalties' income. Indeed, filing a patent itself is done against a fee, and the interviews between patent attorneys and inventors can also be quite costly. The annual fee for keeping the patent increases progressively each year, with the patent's 20th anniversary fee being the highest. This warrants that patents are not needlessly maintained by RTOs. In some cases, researchers are rewarded for transferring their results to the private sector and often earn a part of the royalties received by their employer. In some Member States this rewarding is even mandatory by law.

These two roles of IP are deeply interconnected as the royalties earned by an RTOs (incentive role) often follow a collaborative project with an industrial partner (coordination role).

1.4 Recognising the Complementarity Between Patents and Standards

European and international technical standards are of great importance to allow European industry to scale up technology developments to new products and services that will be internationally competitive and as such further develop the European Digital Single Market. RTOs are actively participating in Standard Setting Organisations (SSOs), Standard Development Organisations (SDOs) and digital standardisation communities (e.g. CEN-CENELEC, ETSI, ISO, ITU, DVB, ATSC, IETF, OMG). This allows RTOs to support the development of essential technical standards.

Due to the current political debate in Europe, there is a risk that possibilities to enforce Standard Essential Patents (SEPs) are weakened[2]. The complementarity between patents and standards needs to be recognised and acknowledged, as the combination of the two contributes to maximising the impact of EU projects. However, **standardisation is costly and time-consuming: it should be further supported and incentivised at EU level, especially in the frame of EU Framework Programmes (EU FPs).** For instance, the drafting of a technical standard should be funded through EU FP projects if the standardisation draft document is written during the RD&I tasks (e.g. CEN CENELEC Workshop Agreement - CWA). Technology providers and research organisations should be encouraged to file SEPs and to licence them on FRAND conditions. For instance, the inclusion of standardisation activities during the project implementation should be encouraged whenever a potential standardisation contribution is envisaged. In general, mentioning the EU support in the standard seems to be easily feasible.

1.5 Fostering the Exploitation of Research Results

EARTO of course fully agrees on the principle that research results need to reach the market as fast as possible and deliver impact of public interest, even more in the case of public emergency. The public mission of non-profit research organisations like RTOs is to make RD&I with impact for society. However, the way to reach this objective cannot be done with a one-size fits all approach.

Flexible Approach Needed

It is essential to foster and promote the best usage and valorisation of RD&I results, without creating counterproductive barriers that risk limiting the interest of RD&I stakeholders to engage in the development and commercialisation of RD&I results in that field. **The best way for research results to reach the market is rarely through non-exclusive royalty-free licencing. For the results of RD&I investments to be taken up by industry, conveying a form of exclusivity is essential for the industrial buyer or licensee to create a business case for further development.** For instance, highly innovative SMEs and start-ups need such exclusivity in order to develop and be competitive in the market. Venture capital will not invest in highly innovative SMEs and start-ups if they are not equipped with exclusive IPRs. In addition, for very IP-intensive sectors (such as the life-science one), licences need to be granted under exclusivity provisions. This protection enables to (1) lower the risks for companies to heavily invest in the expensive and often long-term development and manufacturing of new technology-based products and services (value creation) and (2) secure their return on investments afterwards (value capture). In some sectors, because of the long-term development needs before a technology reaches the market, the patents used only have a few years of protection left. Without such IP protection, the risk would be that no company would decide to invest in the technologies developed,

[2] See EARTO Position Paper on the EU licencing framework for Standard Essential Patents, November 2017, EARTO's View on the EC Communication on Standard Essential Patents, December 2017

that very good research results would never reach the market or would reach it at a very late stage[3], and that highly competitive start-ups and SMEs would never find the investors that they need.

Reciprocity at Global Level
In addition, as the global race for innovation escalates, Europe should seek to foster that the RD&I results generated by European RD&I organisations have an impact for European citizens, while ensuring the EU technology sovereignty. This can be done through various means, including by ensuring that EU RD&I results are quickly protected and secured against theft and undesirable technology transfer to non-European third countries. **The EU should also seek to ensure reciprocity between the EU RD&I policy rules and measures and those of the third countries with which the EU has RD&I partnership agreements.** As stated in the Open Science Policy Platform (OSPP) final report: *"Dissemination of research knowledge should also take place on a reciprocal basis, especially at a global level. […] Open Science policies can boost the performance of both the European economy and global economy, while IPR ensures the added value falls within European boundaries when appropriate".*

1.6 Role of IPR: The Example of Pre-Commercial Procurements

Public procurements of innovation enable to share the risks and benefits of designing, prototyping and testing a limited volume of new products and services with the suppliers. It helps creating the optimum conditions for the wide commercialisation and uptake of RD&I results, in a limited setting. A public purchase of RD&I often involves a RD&I phase at high TRLs, followed by a manufacturing & commercialising phase, both requiring investments of resources. However, public procurement of innovation (pre-commercial procurement - PCP) remains underused in Europe compared to our global competitors, despite the efforts undertaken by the EC to promote such instrument in Europe (including in H2020).

This is mainly due to the separation of EU public procurement into two distinct phases with two distinct calls for tenders: 1) the research and development phase and 2) the phase for the manufacturing of commercial volumes of end products. This is not the case in other countries such as the US. In addition, even when a company owns the IP they create in the RD&I phase, the public buyer could oblige them to grant a non-exclusive licence to the winner of the manufacturing phase. This process is very demotivating for companies and their eventual RD&I partners. Additionally, capital venture would not invest in start-ups owning IP but being obliged to grant non-exclusive licences to other companies.

Providing the possibility to have only one call for tender for both phases would provide additional incentives for companies to take part in the RD&I phase. They would then be assured to get an opportunity to recover part of their RD&I investment made during the RD&I phase in the commercialisation phase by bringing their innovation to the market[4]. It would also provide additional incentives for RTOs to take part in the RD&I phase of public procurements in partnership with companies, as this one-phase process would be more aligned with their IPRs' policies. This would allow RTOs to:

- Keep ownership of the foreground IP it created (e.g. when the foreground IP created in the PCP is new or an improvement of a RTO's background IP).
- Possibly grant an exclusive sectorial license on such foreground IP to the industrial company they partner with, acting as their RD&I provider (which is not possible in the two phases process).
- Develop the IP in other industrial sectors, through licensing to other industrial companies in other sectors.

A clear improvement should be brought to the RD&I public procurement legislation in the EU, including in the EU state aid rules for RD&I.

2. A Balanced Open Science Policy Focused on the Optimal Reuse of Research Results

As stated in the recently published Open Science Policy Platform (OSPP) final report: "*Open Science is a vital instrument which, when used responsibly, can fuel a faster, more effective, more reliable, more trustworthy, more equitable and more innovative shared research knowledge system. Openness for its*

[3] e.g. the discovery of penicillin by Alexander Fleming in 1929 was widely disseminated but never patented, and no private companies therefore invested in clinical tests and other development needed for it to reach the market. It is only 15 years later, during the war, that the UK and US governments funded the necessary clinical trials and that penicillin reach the market to heal the war wounded.
[4] See EARTO Answer to the EC consultation on public procurement of RD&I, December 2017,
EARTO Paper on How to Boost Pre-Commercial Procurement in Horizon 2020, April 2016,
EARTO Response to the EC Public Consultation on the EU State Aid Framework for RD&I, February 2014

own sake has never been the goal." The report adds that "*Open Science must ultimately be embedded as part of a larger more systemic effort to foster all practices and processes that enable the creation, contribution, discovery and reuse of research knowledge more reliably, effectively and equitably."*

2.1 Complementarity Between Open Science and IPRs

The general aim of the EU Open Science policy is to enable the replicability and/or the uptake of research results by others. The end goal of such policy should be to enable these research results to be used in an Open Innovation context, thereby speeding up the uptake of innovation with high impact for society. However, there are several ways to reach this objective, including by means of IPRs. **An unbalanced one-size-fits-all European Open Science policy where the concept of Open Science is still too often associated with "free of charge access for all" would be highly detrimental to European RD&I ecosystems.** This would prevent industry from securing the element of shared "value capture" essential to Open Innovation.

Promoting a balanced approach between Open Science and IPR is therefore essential to provide the right framework for research organisations like RTOs to fulfil their strategic role: solving both societal and industrial challenges. **The IPR framework is an essential tool to facilitate, regulate and secure Open Science, by ensuring that the efforts from different contributors are correctly rewarded.** IPR are key to offer balanced rights to both the users and creators of Open Science content.

- As detailed in the JRC report on IPRs, technology transfer and open science, "*there are no incompatibilities between IPRs and Open Science. On the contrary the IPRs framework, if correctly defined from the onset, becomes an essential tool to regulate open science and ensure that the efforts from different contributors are correctly rewarded*".
- The OSPP also calls for "*the right balance between Open Science, the potential to maximize the use and re-use of research data and outputs, IPR, and private companies' competitiveness*" to be promoted, stating that it must become a central feature of a shared research knowledge system. The report adds that "*There are limits to openness and these must be acknowledged and taken into account as the system changes."*

It should also be recognised at EU level that part of the public mission of non-profit research organisations' like RTOs is to strategically decide what to do with their know-how so it can have the highest impact in fulfilling their public mission.

2.2 Open Science and Quality Assurance

Ensuring the quality of RD&I publications and results is also essential, in particular in times of public emergency such as the Covid-19 crisis. *Immediate* open access to scientific publications and research data whose scientific quality has not been verified by experts, preferably through a peer reviewing process, can turn out to be counterproductive and detrimental. If such verification by experts is not possible, it should be clearly notified that the peer review process has not yet taken place when making the publication openly accessible. This important point of ensuring the quality of scientific publications also needs to be addressed together with the issue of accessibility. Making the existence of the generated RD&I results immediately available can be important to foster fast collaboration, especially in times of public emergency, but it should not be promoted at the expense of quality.

2.3 Data Sharing: Optimising the Re-usability of Research Data

"As Open as Possible, as Closed as Necessary"
Regarding research data, **the European policy should focus on the optimum re-use of research data, following the principle "as open as possible, as closed as necessary"[5], while taking into account the necessary acknowledged safeguards, including concerns related to IPRs, privacy, security, legitimate commercial interests, global EU competitiveness, etc.** While the value of research data increases with the digital transition, there is limited true intellectual property protection that can be applied by the research organisations which produce and maintain the data. Any obligation to publish further data, pre-prints, intermediary findings, or software associated with the publication could also make it incompatible with IPR protection, and technology transfer: it needs to be avoided. In addition, there are often many ethical and legal considerations to make before opening-up other research data (e.g. personal data, security, etc.). Accordingly, data owners should be able to decide which parts of their data to share, with whom, and under which conditions. It is important to distinguish between the research data associated with scientific publications, which needs to be made available already to peer-reviewers

[5] See Joint Statement on the Revision of the PSI Directive, November 2018

while being Findable, Accessible, Interoperable and Reusable (FAIR) to ensure the reliability and quality of the publication, and other research data, which should first and foremost be made FAIR to enable their re-usability.

Data Management: FAIR is not Open

All RD&I organisations must of course ensure a sound management of the research data that they produce in a FAIR way. FAIR is broadly understood as a standard for data management, fostering a common language for how to create, host and steward data. This is a precondition for making data re-usable. Such responsible management of research data can be ensured by mainstreaming the use of data management plans, including within the EU FPs[6]. **However, it is important to clarify that FAIR is not necessarily open. FAIR data can be either open or closed, but open data needs to be FAIR first in order to be re-usable.** As stated in the OSPP report: "*Future regulatory systems should distinguish between the concepts of 'FAIR' versus 'open'. FAIR does not automatically mean open nor free of charge; it only provides standards for how data should be packaged so that it can be found, accessed, shared and reused. FAIR data are not openly and freely available per se because the data can be stored, for example, in repositories or servers that are not meant nor conceived to be openly accessible by any internet user.*"

Cost/Benefits Analysis

Besides, managing and curating research data for long-term periods in a way that it can be made available for re-use requires an investment by the data creator. Such investment needs to be recognised and taken into account when establishing the conditions for re-use. **A cost/benefits analysis should therefore be undertaken by data creators to make sure that the potential benefits from making data accessible over a long-term period outweighs the costs that making such data accessible under FAIR conditions would entail.** This would ensure a maximum societal impact of the public research funding spent. In the end, only high-quality data can/will be re-used. In general, the EC needs to take into account the high cost of collecting, storing and curating data prior to make it mandatory. In such case, the costs of making research data FAIR should be eligible in the EU FPs.

2.4 Towards an Efficient European Open Science Cloud

Through the establishment of the European Open Science Cloud (EOSC), **the EU should favour a bottom-up approach, encouraging the establishment of a technical interface to enable interoperability and data exchange between the existing RD&I data repositories, platforms and storages that are already in use, including national ones**. It should also be noted that some Member States do not have any national data repository in place, and that the user-friendliness of some of the already existing national data repositories could be improved.

On top of the cloud-based storage system for storing and sharing large scale scientific datasets, the EOSC should also seek to provide a computing infrastructure for analysing those large-scale datasets. **The EOSC should also aim to integrate and adapt to the needs and use of the different scientific and research fields and focus first on those with the greatest needs.** A clear distinction should also be made between (1) input data needed to carry out a RD&I project, and (2) output data of the RD&I project itself, with different access rights. Finally, ensuring reciprocity of access with third countries' own RD&I data cloud systems is also essential.

2.5 Open Source: Balanced Approach Needed

The perspective of Open Source Software can of course be of great interest in selected fields (e.g. in eGovernment where data interchange is of paramount importance). Most RTOs do publish certain code in Open Source and contribute to Open Source projects. However, **Open Source should not be considered as a suitable generic replacement for the existing IP-based processes.** Instead, Open Source should be seen as one of the many instruments that RD&I organisations need to achieve their innovation goals and societal impact. Technology can be protected via different IP intangibles (e.g. copyright, patents, trademarks, trade secrets) and made accessible through different models (e.g. proprietary, open source, mixed models). For instance, an efficient business model to enable technology transfer in the software field implies integrating an Open Source kernel with proprietary add-ons.

As stated by Henry Chesbrough[7]: "*Open Innovation is sometimes conflated with Open Source methodologies for software development. Open Innovation explicitly incorporates the business model as the source of both value creation and value capture. This latter role of the business model enables the*

[6] See EARTO Feedback on the EC H2020 Data Management Plan's Template, July 2020

[7] Henry Chesbrough, "*Open Innovation: a new paradigm for understanding Industrial Innovation* ", University of California Berkeley (chapter 1)

organisation to sustain its position in the industry value chain overtime. While Open Source shares the focus on value creation throughout an industry value chain, its proponents usually deny or downplay the importance of value capture".

Supporting Open Source licences as the preferred licensing model for technology transfer in the software field could hamper the development of the Digital Single Market, and it would prevent the creation of technology-based start-ups in the digital field. For instance, in the field of Artificial Intelligence (AI), the difference between the European high research output and the low European patent output can be explained by the lack of incentives to file patents in the digital and software fields in Europe. In that context, the EU policy should address the Open Source model in a balanced and neutral way and encourage research organisations to file more patents in the digital field. The choice between using Open Source or IP protection should be left to the stakeholders in the respective markets. It is also important to underline that the model of technology transfer between public research and the private sector should be clearly distinguished with the business model chosen by the private company when exploiting the technology[8].

3. EARTO Recommendations Towards a Balanced Approach Between IPRs and Open Science Policy in Europe

Promoting a balanced approach between IPRs and Open Science in Europe is essential. It would ensure the right framework conditions to stimulate knowledge and technology co-creation in Europe.

Recommendation 1: Ensure a stable EU regulatory and policy framework recognising IP's crucial role in fostering knowledge co-creation, which is essential to boost technology development and industry's uptake of innovation for high socio-economic impact. This requires to:

1. **Support licencing models and other IP tools and raise awareness of the value of IPR in the European RD&I ecosystem, and especially the coordination role of IPR as a means to strengthen collaboration and co-creation of knowledge and technology.** The new EC IP Action Plan should be used to promote the use of IP in the EU RD&I landscape, and support research organisations to protect their diverse IP in key technologies. Incentives and support to RD&I organisations and to their researchers to efficiently disseminate and exploit their research results and encourage their translation into the commercial world, especially through patent filing, should be promoted in the EU FPs, including in public-private partnerships' projects.

2. **Promote the exploitation of research results by fostering a balanced and flexible-enough IP policy with the aim to make sure that research results speedily reach the market: a one-size-fits-all approach would be counterproductive.** Non-profit organisations like RTOs and universities have the experience to know what the best means for research results to reach the market in the most efficient manner would be (often not done by the absence of pricing). For instance, the best way for research results to reach the market is rarely through non-exclusive royalty-free licencing. In fact, this could even create counterproductive barriers that could limit the interest of RD&I stakeholders to engage in the development and commercialisation of those RD&I results. For the results of RD&I investments to be taken up by industry, especially for the development and commercialisation of expensive technology-intensive products and services, conveying a form of exclusivity is essential for the buyer or licensee to create a business case for further development. And thus, to secure returns on investment to balance out the risks. In addition, royalty-free conditions should be avoided whenever possible. In general royalties do not provide substantial income (licencing is not often a profitable activity), but they enable public research organisations to finance activities such as IP management and maintenance, internal incentives for IP protection, or support to start-ups and SMEs for the protection and defence of their IPRs.

3. **Simplify the IPR clauses in Horizon Europe Model Grant Agreement (MGA) and its Annotated version (AGA) to encourage not-for-profit organisations to efficiently disseminate their results through licensing.** The prerogative of exploiting or using research results should always lie with their owner(s). The conditions that enable each partner of the collaboration to capture a share of the economic value created in common should be clearly defined in the projects' roadmaps and business and exploitation plans. The AGA should state that,

[8] e.g. Google benefited from technology transfer from Stanford university in the form of an exclusive license of the patent on the search engine, but Google's business model involves offering free services and open source applications with an indirect return through "traffic generated by its sponsored links"

in principle, an appropriate compensation should be provided for the economic use of not-for-profit research organisations' research results, and of the background needed to commercially exploit those results. Similarly, a joint owner should provide an appropriate compensation for the economic use of joint results, while the exploitation of jointly owned results through further research and innovation activities should in principle remain royalty-free. Indeed, given the efforts and costs incurred by patent filings and long-term maintenance of patents, a generalisation of the use of royalty-free options for the economic use of research results could demotivate public research organisations to file patents, which would in turn weaken the potential for the adoption and commercial exploitation of results by industry and significantly reduce the impact of EU FPs.

4. **Recognise the importance of European and International Technical Standards to allow European industry to scale-up technology developments to new products and services that will be internationally competitive.** The complementarity between patents and standards also needs to be acknowledged, as the combination of the two contributes to maximising the impact of RD&I projects. As standardisation is costly, it should be further supported and incentivised at EU level: (1) technology providers and research organisations should be encouraged to file (potential) Standard Essential Patents (SEPs) and to licence them on FRAND conditions; (2) the inclusion of standardisation activities during the implementation of EU FPs projects should be encouraged whenever a potential standardisation contribution is envisaged (i.e. not only RD&I activities in order to validate the technical specifications of a standard, but also the drafting of the standardisation documents like CEN-CENELEC Workshop Agreements), these costs should be eligible and the EU support should be mentioned in the standard; (3) the participation of European non-profit RD&I organisations in Standard Setting Organisations (SSOs), Standard Development Organisations (SDOs) and digital standardisation communities (e.g. CEN-CENELEC, ETSI, ISO, ITU, DVB, ATSC, IETF, OMG) should be further promoted and incentivised both at national and EU levels.

5. **Improve the EU regulatory framework and leverage the potential of public procurement of RD&I in Europe.** This would already be feasible by removing the restrictive clause stating that "*the public procurer can impose on the suppliers to concede non-exclusive licences to all third parties that would request it*" in the EU Pre-Commercial Procurement (PCP) rules. In addition, providing the possibility for public purchasers to make public procurement of RD&I in one single call for tender for both the RD&I phase and the manufacturing/commercialisation phase would also be highly beneficial. This should be clear both in the EU Public Procurement Directives and in the Horizon Europe PCP's rules. This could require for Europe to negotiate a derogation with the World Trade Organisation's Government Procurement Agreement committee (WTO GPA) to exclude the procurement of the goods resulting from successful RD&I for the small businesses (commercialisation phase) from the scope of the WTO GPA to have the same rules as those negotiated by the US.

Recommendation 2: Foster a balanced approach between Open Science and IP policies in Europe. The concepts of Open Science and Open Innovation based on IPRs should be promoted hand in hand. By ensuring that RD&I partners can capture part of the value created in common, open innovation enables to connect the fruits of open science to their efficient commercialisation in the market. This requires to:

1. **Put the emphasis of the EU Open Science policy on the availability and wide dissemination of knowledge and technology rather than on the absence of pricing. The promotion of a "one-size-fits-all" Open Science policy should also be avoided. A bottom-up Open Science policy adapted to the different scientific & research fields should rather be fostered.** This would ensure efficient collaboration and co-creation of knowledge, preserving scientific freedom and stakeholders' legitimate interests. It is indeed essential to balance out the envisaged benefits from openness for society at large against the proven needs of the existing technology marketplace. The latter requires a clear competitive edge and return on investments to ensure the effective exploitation of knowledge and technology.

2. **Focus the EU Open Science policy on the accessibility of scientific publication and digital research data (especially the data underlying scientific publications): not all research results can/should be made publicly available.** The term "research output" used in a few EU documents is also too broad and should not be used in relation to Open Science. In addition, to ensure legal certainty to EU FPs' beneficiaries, new obligations should not be added while Horizon Europe is ongoing. Accordingly, any reference to not-yet-defined "further open science principles and practices" in the Horizon Europe MGA and AGA should be strictly avoided. Finally, with regards to scientific publications (magazine articles), both *immediate* open access and delayed open access after an embargo period (publication in a subscription journal for a few months followed

by open access publications) should be fostered in EU FPs. Besides, Article Processing Charges (APCs) should also be eligible in Horizon Europe projects if the article is published in hybrid journals or Gold open access journals. Imposing *immediate* open access to publications in Horizon Europe could create unbalances and a lack of reciprocity with our global competitors.

3. **Focus the EU FPs' data sharing policy on the optimum re-use of research data, in line with the principle "as open as possible as closed as necessary" while applying the relevant acknowledged safeguards (IPR, confidentiality, commercial interests, etc.)** as cited in the Horizon Europe Regulation's Common Understanding (Art.10). This approach needs to be mainstreamed throughout all EU policies addressing research data, to ensure a stable and reliable regulatory framework. In addition, EU FPs' beneficiaries' decision not to open their data based on one of these safeguard clauses should not require further justifications. It should also not have any negative consequences on the evaluation and financing of a proposal/project.

4. **Mainstream the use of data management plans to ensure that research data are produced, managed, curated and archived following the FAIR (Findable, Accessible, Interoperable and Re-usable) principles, thereby ensuring their re-usability.** FAIR data management principles are a precondition for possible opening of data, but FAIR is not necessarily open. The FAIR principles should be clearly dissociated from the concept of "free of charge, immediate access to all". This needs to be clearly reflected in the Horizon Europe MGA and AGA. Incentives should be given for EU FPs beneficiaries to use the EC DMP template, but this should not be made compulsory as some beneficiaries have developed advanced and tailored DMPs in compliance with EU rules and requirements. EARTO provided feedback and recommendations[9] to the EC as input for the update of the EC Data Management Plan template for Horizon Europe. FAIR obligations also need to be covered by adequate project funding, and a solution needs to be provided to cover the costs for the long-term data curation after the project ends.

5. **Organise trainings for researchers in the frame of EU FPs projects to increase their awareness of the requirements deriving from the EU Open Science policy and how to integrate them with IPR considerations from the conception of projects up to the dissemination of the research results**. These trainings should also cover the EU FPs' data management policy to enable researchers to fulfil these requirements based on proper data management plans. Such trainings should be organised by the EC and cover several topics including IPR protection, the standardisation of meta-data, FAIR principle, etc.

6. **Adopt a balanced approach towards Open Source Software. The perspective of Open Source Software can of course be of great interest in selected fields, however Open Source should not be considered as a suitable generic replacement for the existing IP-based processes.** Open Source is only one of the many instruments that RD&I organisations need to achieve their innovation goals and societal impact. Supporting Open Source licences as the preferred licensing model for software involved in digital standards could hamper the development of the Digital Single Market. It would prevent the creation of technology-based start-ups in the digital field. Accordingly, EU policies should encourage research organisations to file more patents in the digital field. The choice between using Open Source or IP protection should be left to the stakeholders in the respective markets.

EARTO remains at the disposal of the EU institutions to further discuss these recommendations and support the set-up of a balanced approach between Open Science and IPR policies in Europe.

RTOs - Research and Technology Organisations: *From the lab to your everyday life. RTOs innovate to improve your health and well-being, your safety and security, your mobility and connectivity. RTOs' technologies cover all scientific fields. Their work ranges from basic research to new products and services development. RTOs are non-profit organisations with public missions to support society. To do so, they closely cooperate with industries, large and small, as well as a wide array of public actors.*

EARTO - European Association of Research and Technology Organisations: *Founded in 1999, EARTO promotes RTOs and represents their interest in Europe. EARTO network counts over 350 RTOs in more than 20 countries. EARTO members represent 150.000 highly-skilled researchers and engineers managing a wide range of technology infrastructures.*

[9] See EARTO Feedback on the EC H2020 Data Management Plan's Template, July 2020