



Answer to the European Consultation

European Innovation Agenda

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Support for innovation, mainly technological, is at the heart of the CEA's missions. Like other European technological research organisations (RTOs), CEA actively contributes to innovation through two main channels: the technology transfer of its research results to the industry¹, and an active policy of creating innovative start-ups whether from its laboratories or supported by the organisation.

Promoting and consolidating European innovation ecosystems

Technological innovation is largely based on the ability to mobilise research results to create new innovative products or services. In this context, collaboration between public research and the private sector, and in particular the industry, is a key issue Europe must make progress in. To this end, two lines of action seem to be a priority within those that could be taken by the EU.

Developing technological infrastructures, the heart of innovation ecosystems

Disruptive innovations, especially in the deeptech field, which requires heavy development resources, do not emerge spontaneously. They are the result of dynamic innovation ecosystems, where public research organisations and private companies (large or small) can jointly develop new R&D activities, technologies and processes, and prepare future commercial innovations.

These innovation ecosystems are generally organised around technological infrastructures oriented towards applied research, technological development and transfer to industry. They enable the crossing of an essential bridge between the academic laboratory and the production unit, helping to accelerate the innovation process along the value chain and to stimulate the creation of start-ups.

Technology infrastructures are a direct response to Europe's long-recognised difficulty in fully exploiting the economic and social value of its excellent science base. The EU has created powerful instruments to address this weakness: in particular, public-private R&D partnerships, or the European Institute of Innovation and Technology's (EIT) 'Knowledge and Innovation Communities' (KICs), and more recently the European Innovation Council (EIC). In fact, the success of these tools is largely based on support for projects that build on the technological infrastructure available in Europe.

¹ Transfers to industry are often part of collaborative RD&I agreements, whether bilateral and co-funded by industry or in consortia with industry and other research partners in institutional projects funded by institutional programme agencies (such as the Framework Programme).

But as such, this type of infrastructure, which is in line with the research infrastructures covered by ESFRI, while differing from them as it has higher TRL levels and different stakeholder communities, has not been identified as a topic for specific initiative and support by the EU (or the Member States) until very recently.

The global race for technology infrastructures is making it increasingly difficult for individual states or organisations to pay the enormous sums needed to build and operate this state-of-the-art experimental equipment. However, the realisation of the Union's ambitions in the climate, energy and digital transitions, and the issues of sovereignty and strategic autonomy, require precisely such capacities, which are the condition for the emergence of innovative industrial sectors in these fields.

Furthermore, due to these high costs, a technology infrastructure is generally not an affordable nor a profitable investment for companies (even large ones) that do not need it permanently. Public investment in such facilities is therefore essential. Technology and other research organisations are the most appropriate actors to host technology infrastructures, as their open environment can stimulate collaborative links with many different partners from academia to industry, in particular SMEs and high-tech start-ups that would otherwise have no possibility to access this type of service.

European action to structure an approach to the EU's needs, based on strategic industrial value chains, would thus be fully in line with the new EU innovation strategy. It would make it possible to organise the networking of technological infrastructures and associated services (legal and intellectual property in particular), and to propose support methods for coordinated investments between the EU, Member States, regions and stakeholders in the technology infrastructures needed to ensure Europe's technological leadership.

This action in favour of public investment in strategic technological infrastructures should also be supplemented by *ad hoc* support, either directly or through calls for projects, for the direct and indirect operating costs of such facilities. Without these native resources, the infrastructures would quickly lose their capacity to fulfil their missions and would therefore no longer be able to meet the needs of economic players (neither academic nor industrial).

For an active intellectual property management policy at the service of innovation²

In addition to infrastructure, the intellectual property management strategy is a key dimension of dynamic collaboration between private research and industry. In this respect, the CEA recommends the adoption by the EU and in the Member States of measures encouraging the development of intellectual property management strategies in public research organisations³.

These provisions are inspired from the American example of the *Bayh Dole Act* of 1980 for universities and the *Stevenson Act* of 1980 for federal laboratories. Both have proven their worth in transferring knowledge to industry and disseminating technological innovation in the United States over the past four decades. Moreover, they would be more effective if adopted and implemented consistently throughout the EU.

² This paragraph simplifies the main elements of a more detailed argument available here:

- https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12510-Plan-d%E2%80%99action-en-matiere-de-propriete-intellectuelle/F540811_fr

- « Avis du CEA sur la nouvelle stratégie industrielle pour l'Europe », June 2020

³ <https://www.cea.fr/Documents/charte-propriete-intellectuelle-partenariats-industriels.pdf>

They are based on the following principles:

- public entities should own the research results they have developed and protect them through patents, which is a major factor of credibility and attractiveness for companies and for the creation of start-ups;
- the transfer must be made to industrial partners by granting rights of use adapted to the needs of the industrialist, in the form of operating licences. These licences may be exclusive in a given field of application and for a predefined period of time. To defend the public interest, exclusive licences by field must be limited in time and accompanied by thresholds in order to avoid blocking innovation through lack of exploitation: below a threshold of exploitation (which is measured by the level of royalties received), the exclusivity is lost; in the absence of any exploitation, the licence is terminated;
- these licences granted by public research organisations to companies must give rise to a financial consideration. Moreover, in the case of an exclusive licence, both the patent owner and the exclusive licensee may take legal action against a possible infringer;
- the *Bayh Dole Act* and the *Stevenson Act* of 1980, which govern the conditions of intellectual property in projects financed by the major US federal agencies (DoE, DoD, NASA, NIST, etc.), contain clauses to protect the economic and industrial sovereignty of the USA. For example, in the case of an exclusive licence per field, exploitation must be carried out on US soil and preferably by SMEs. CEA recommends that a “first exploitation within the European Union” clause be introduced in programmes financed with 100% public funding, notably Horizon Europe. This would be a measure of reciprocity with existing provisions in other regions of the world:
 - in China: article 21 of the “Law of the People’s Republic of China on Progress of Science and Technology” of the 1st July 2008 provides that: *“The State shall encourage the exercise of the intellectual property rights obtained in projects covered by the scientific and technological fund established with government funds, or by scientific and technological plans, within the territory in the first place”*;
 - in the United States : title 35, chapter 18, section 209-b) of the US Code provides that: *“A federal agency shall normally grant a license under section 207(a)(2) to use or sell any federally owned invention in the United States only to a licensee who agrees that any products embodying the invention or produced through the use of the invention will be manufactured substantially in the United States.”*
- CEA also recommends that the European authorities maintain a good balance between the requirements of intellectual property protection and the development of open science:
 - CEA wishes to recall **that Open Science and Open Data approaches do not dispense with the imperative of protecting intellectual property**, nor are they incompatible with it. In particular, it is important to avoid confusion between Open Science and “free, unrestricted and generalized access” to research data and results, which is counterproductive to the ambition of transferring knowledge and supporting innovation and of European industrial and technological sovereignty;
 - in this area, the application of the principle **“as open as possible, and as closed as necessary”** allows for a balanced approach. **Its implementation can be based on**

“data management plans”, in application of the FAIR⁴ principles, which make it possible to distinguish for each project between data that can be disseminated (if necessary for a fee), confidential data with a view to future patent protection, and sensitive data with regard to criteria such as (cyber)security.

Supporting the creation and growth of start-ups

The second priority for action to strengthen the EU's innovation capacity concerns support for start-ups. In particular, the creation of “deep tech” companies, which relies heavily on R&D works carried out in public research organisations, raises a number of specific challenges.

Access to financing

The first challenge in this context is to facilitate access to financing. “Deep tech” refers to all start-ups that offer products or services based on disruptive technological innovations. It is based on cutting-edge research, whether fundamental or applied.

The “deep tech” sector is characterised by:

- **high investment needs** in infrastructure and skills, **and long and uncertain payback periods**;
- **longer time-to-market** than for traditional start-ups;
- **a costly industrialisation process** due to the scaling up of production and the complexity of the technological process, in particular in contrast to start-ups in the digital economy;
- **technological locks that are difficult to remove**, representing high barriers to entry.

These innovative companies need to be supported at all stages of investment in innovation, from creation to maturity with seed funding, then early stage capital with the first revenues and finally late

⁴ CEA also refers to the recommendations published by the EARTO association, of which it is a member, as well as to a common position of the Association of European Universities, Science Europe, EARTO, Business Europe and Digital Europe on the management of Research Data. In this respect, the main conclusions of the report “IPR, Technology Transfer & Open Science - challenges and opportunities” published by the European Commission (DG RTD and JRC TTO) can also be mentioned:

- 1. *There are no incompatibilities between IPR and Open Science. On the contrary the IPR 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. Their definition is depending on the objective of the research,*
- 2. *The European Commission has a role in promoting open science and its balance with IPR. This is especially important at the time when policy on copyright and definition are being redefined and the Open Science Cloud is being established. These new policies will build the framework for the leadership of Europe in Open Science,*
- 3. *Draw inspiration from existing best practices. For instance, by understanding how public research institutes with societal commitments and strong industrial partnerships are striking the right balance between IPR and open knowledge. And by using the licences offering balance right between creators and users for Open Science content.”*

stage capital in the commercial and industrial acceleration phase. In the first phase, they reduce the risks carried out by the technology by transforming it into a product or service that meets important market needs, and then they enter a phase of commercial and industrial growth.

Today, the number of French and European start-ups moving to the industrialisation stage remains limited. Several explanations can be put forward, such as the **administrative and regulatory obstacles**, for example, public procurement of innovation (see below) and the risk of putting in place administrative and regulatory constraints for patents that are essential to standards (see below). There is also a **lack of funding** for projects in the industrialisation phase – considered too risky by certain French and European private investors. This situation may lead the start-ups concerned to favour development outside Europe, despite the stakes of sovereignty. There is therefore a challenge today to strengthen the mobilisation of private financing and investment in these companies in the advanced growth phase (late-stage). This is particularly true in the field of “deep tech” where it is difficult to finance the transition to industrial scale and international development.

Talent and gender in entrepreneurship

It is important to continue and strengthen European measures to support female entrepreneurship such as Women TechEU (and thus investment in women-led start-ups). A 2019 Women Equity Partners study of over 40,000 medium-sized companies showed that those run by women were 32% more profitable.

Pre-commercial procurement

While public-private R&D partnerships contain elements of flexibility that make it possible to apply the incentive principles of intellectual property management described above, it should be emphasised that these are often medium to long-term partnerships (3 to 5 years) that are not compatible with the necessary speed of start-up development. **In this respect, pre-commercial procurement is a more effective tool for the development of start-ups, as it generally lasts less than two years.**

However, **innovation procurement remains largely underused in Europe** compared to other parts of the world, despite the Commission's efforts to promote this instrument (including in the Framework Programme). This is mainly due to the separation of EU innovation procurement into two distinct phases, with two separate calls for tenders and therefore re-tendering between the two phases:

1. the high TRL research and development phase;
2. the manufacturing of the corresponding products or services, with re-competition between the two phases.

While the first phase may be restricted to European players, the second phase is open to the whole world.

This is not the case in other countries such as the United States where, for example, half of the SBRI (*Small Business Research and Innovation Act*) programmes are used by large federal programme agencies to make public purchases of innovation to fulfil their own agenda. Thanks to the interlocking nature of the *Bayh Dole Act* and the *Small Business Act*, large US federal agencies, and more generally

US public purchasers can make these innovation purchases in a single phase and set them aside for SMEs. Thus, creating intellectual property conditions consistent with the above principles when SMEs respond to these public innovation purchases in collaboration with public research. Then, these purchases can also be reserved for US SMEs, for whom the intellectual property conditions are consequently more attractive.

The promotion of innovation through procurements therefore depends very much on the ability of public authorities to purchase the innovative products developed. Having a single tender for both phases would provide a greater incentive for companies, particularly for innovative start-ups and SMEs. They would participate in these tenders as they would be assured of the possibility of getting part of their RD&I investment back when the products are commercialised to bring their innovation to the market. It would also provide additional incentives for RTOs to participate in the RD&I phase in partnership with companies, including start-ups and innovative SMEs, as this one-stage process would be more aligned with their IP policies, respecting the above principles.

CEA supports an improvement of the EU regulatory framework for public procurement of innovation and for harnessing the potential of public R&I procurement in Europe. This implies undertaking the following steps (see EARTO documents on this FP⁵):

1. negotiate a waiver with the World Trade Organisation Government Procurement Agreement (WTO GPA) Committee on public procurement of innovation. Such a negotiation should aim at excluding the procurement of goods (second phase of innovation procurement) resulting from a successful first phase of RD&I for small companies (commercialisation phase) from the scope of the WTO GPA in order to have the same rules as those negotiated by the US;
2. amend the EU public procurement directives accordingly. These amendments should aim at excluding from their scope not only the provision of RD&I services (current first phase), but also the subsequent purchase of products resulting from successful RD&I (current second phase), which follows from the possibility of making a single-phase public purchase of innovation;
3. amend the EU State aid rules for RD&I for public procurement of innovation and for the rules for public procurement of innovation in Horizon Europe.

As the ENIRI study explains⁶: “There is no doubt that the United States has created an engine of innovation through its public procurement policies. However, the [European] Union, through Pre-Commercial Procurement (PCP), cannot copy the American system without making profound legal adjustments.” **Indeed, many international economists point to the very significant advantages of US legislation on public procurement of innovation over EU legislation**⁷. The legislation on pre-commercial public procurement of RD&I in the EU should therefore be significantly improved.

⁵ <https://www.earto.eu/wp-content/uploads/EARTO-Recommendations-for-European-RDI-Policy-Post-2020.pdf> et <https://www.earto.eu/wp-content/uploads/EARTO-Answer-to-EC-Consultation-on-Public-Procurement-of-R-I-final.pdf>

⁶ EC Commissioned study, ENIRI - “State aid support schemes for RD&I in the EU’s international competitors in the fields of Science, Research and Innovation” (p.622-625)

⁷ For example David Connell in: « *Secret of the World’s Largest Capital Fund - how the US government uses its Small Business Innovation Research (SBIR) Program and Procurement Budgets to Support Small Technology Firms* », 2006

Improving European legislation on pre-commercial public procurement of RD&I would stimulate entrepreneurship and accelerate the development of innovative start-ups and SMEs by speeding up their first order, and thus bridging the funding gap. Indeed, numerous analyses have confirmed that for an innovative start-up or SME, having a first commercial order, notably from a prestigious public buyer, is one of the most important steps in its development. This facilitates venture capital investment and gives bankers confidence to invest in their business case, which is almost validated by this first order. Getting the first order by winning a single-stage public innovation procurement will help start-ups/SMEs reach new customers and investors, significantly reducing time to market and strengthening both the technology and venture capital sectors.

For an active policy of standardisation in the service of innovation

CEA welcomes recent European standardisation strategy to spread innovation⁸, especially in the most innovative sectors. It also welcomes the possibility of making standardisation tasks eligible in Horizon Europe, as well as the introduction of a new tool in Horizon Europe⁹ that only supports standardisation-related tasks.

In this respect, CEA recommends further developing the standardisation booster (frequency of calls for projects, associated funding) because the issue of costs related to standardisation is the main obstacle to increased participation of researchers in standardisation.

Furthermore, CEA recommends not to increase the administrative and regulatory constraints concerning patents essential to standards, which would slow down start-ups and innovative SMEs holding such patents. In order not to unbalance in a counterproductive way the balance of incentives between the holders of patents essential to standards and their users, CEA recommends in particular not to introduce regulations concerning the control by third parties of the essential character of patents involved in standards. It would be detrimental to the dissemination of innovation by lengthening negotiations and leading to more litigation and lawsuits:

- in particular, it would harm the development of start-ups and SMEs holding patents essential to the standards by causing substantial additional costs in a phase where licensing revenues cannot normally be expected yet. And, such an essentiality study would have to be repeated with standards that are often under constant revision, especially in the digital field, jeopardising the cash flow of innovative start-ups and SMEs holding these patents;
- moreover, if such obligations only concern standards issued by standardisation bodies and not *de facto* standards (imposed *de facto* on an entire sector by a few large private players), these obligations could distort the innovation ecosystem and encourage the main players to create their own *de facto* standards.

Such an approach is strongly discouraged as it would harm innovative start-ups and SMEs to the benefit of a few large private players.

More generally, and for the same reasons, the regulation concerning the transparency of licensing negotiations for standards-essential patents should not be made more burdensome¹⁰.

⁸ <https://ec.europa.eu/docsroom/documents/48598> (février 2022)

⁹ The standardisation booster : <https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/horizon-widera-2021-era-01-32>

¹⁰ FRAND conditions: Fair, Reasonable And Non Discriminatory