



## EU survey : Consultation on the White Paper on Artificial Intelligence – A European Approach

As pointed out by the white paper on AI, Europe needs to build a unified AI ecosystem of excellence to successfully pursue the digital transformation of industry and business, in particular SMEs, in accordance with European rules and values. In this regard, strong support from the European Commission is needed in the long term to:

- **Give full attention to the issue of skills, at all levels, as it is central to leverage the adoption of AI by companies and enable their economic development: this should be recognized as the mother of all battles.**
- Encourage and sustain hybridization of research with industry, through bi-directional interaction loops, assuring strong partnerships between academic research and industry, while at the same time enriching (fundamental) research through use-cases, user, infrastructure and data. The Commission's tools should focus on supporting existing organizations which commit themselves to build an European agenda with other existing organizations, rather than creating new structures.
- Promote entrepreneurship and the creation and scale-up of start-ups, in particular through the EIC's schemes.
- Ascertain a broad perspective of AI, including both symbolic and connectionist approaches and synergies existing between them, and more generally the interactions of AI with other research fields. Conduct research on the hybridization of all facets of AI, and with other sciences, with the aim of building trustworthy, robust and human-centric AI that is appropriate for modern usage but also sufficiently robust to exploit future advancements when they emerge.
- Unify efforts and provide structural support to enable the development of European AI technologies. The objective is for European companies to benefit from a privileged and fast access to AI technologies, developed from European research.
- Construct an effective governance, partly through the partnership between public and private sector and the ICT-48-2020 networks, in order to strengthen the links between existing European centres of excellence in AI (with a legal existence not via consortia). The sustainability of the policies being taken is a condition for their success.

More academic research is still needed to build the trustworthy European AI based on fairness, explainability, loyalty, and certifiably. This should translate into toolkits to audit or self-label systems that include AI algorithms, depending on the risks involved, as the European Commission suggests with the high-risk/low-risk classification.

The strong interaction between academic research, use cases, industrial data, etc. and the importance of the resulting real-time feedback loops should be clearly recognized with a renewal of some usual assessment framework for research and innovation policies which are not appropriate in the digital age. This includes the so-called TRL approach, which gives a false linear view of the

research and innovation momentum and which can only lead to failures in the case of software/AI/digital.

Future regulation on AI may clarify the global framework but there should be exceptions, so that academic research can generate and experiment disruptive ideas and that the burden will be limited for emerging companies (not limiting innovation). A good balance must be found between, on the one hand, the necessary respect for privacy and personal data and, on the other hand, the development of activities for which an easy access to data is crucial.

Hybridizing symbolic methods with Deep Learning (DL), improving thus causal learning, or pattern mining the activations of the neurons for DL are two approaches to the most necessary explainability, allowing the user to understand how she is calculated by the algorithm.

Scientific mediation to realistically assess the opportunities and threats of AI systems and technology, as well as citizen engagement in AI governance must be actively promoted in order to avoid a massive rejection of the AI-based systems, letting the power to other countries and/or Tech giants.

As illustrated by the Covid-19 crisis, Europe must be able to respond in an evolutionary and coordinated way to the different challenges of society and the future AI must be able to be one tool among others for this.

**As the crisis also illustrated, the ability to collect the data needed for AI algorithms is highly dependent on the control of computing and storage facilities, communication and social networks, and operating systems, whether for mobile devices or the Internet of Things. Ensuring European sovereignty in these areas is therefore of utmost importance for an effective and independent European AI.**

**The top priority should be the building of a coordinated agenda, implying some key European research organizations and companies, with clear commitments and KPIs in the short and mid-terms.**

## **1- Comments on chapter 4 of the white paper**

### **1.1- Research, training and innovation**

Focusing research efforts and establishing European governance tools on AI are major issues for avoiding fragmentation and obtaining a significant return on the investments made by the European Commission and Member States. Research is about taking risks, breaking down traditional scientific silos to discover new ideas and exploring all facets of a problem without *a priori*. It is therefore worth to recall the importance of public funding of research, and therefore from the Commission, as it allows exploring all approaches of AI, including symbolic and connectionist approaches and synergies between them, and studying the links between AI and other scientific disciplines, through a systemic approach. Public funding is a requirement for Europe to be able to lay the foundations for the future trustworthy AI. The GAFAMs and BATX do not occupy all the space: Europe has the potential to succeed in the hybridization process, because it is home to high-level experts concerned by an interdisciplinary approach and eager to find synergy between AI and other scientific fields.

AI can be viewed as nothing but a new stage in the digital transformation. As at any stage of this transformation, research must be carried out in strong interaction with the private sector and industries. On the one hand, the definition and specification of uses must come from the actors in the field. On the other hand, companies must be able to interact with high-level researchers, including in fundamental research, to support their strategy. Strong interaction loops must be installed, away from the traditional linear model, from research to industry. While GAFAM and BATX have taken over the B2C market, the B2B market still offers many opportunities for European companies, in particular by interweaving AI techniques with more traditional engineering approaches (embedded AI, digital twins, *etc.*).

Another expectation concerns the capacity to develop AI technologies in Europe, for which it is necessary to join efforts by providing structural support. This is the condition for European companies to have privileged and faster priority access to technologies resulting from European research. This includes setting up high-performance computing infrastructures, mixing different technologies (CPU, GPU, but also more specific processors, and, in the future, quantic accelerators), that all European stakeholders can easily access, and are closely linked to the research world.

The topic of AI literacy and of the skills required to use AI, or to do research in AI, are of major importance at the European level. AI knowledge is inherently based on digital literacy. The valuable European efforts should build on and leverage the already existing initiatives of stakeholders.

Citizen engagement initiatives and scientific mediation need to be strengthened so that citizens can help shape AI uses and ensure their widespread adoption.

All the initiatives that the Commission is equipping itself with should enable Europe to find its niche alongside the American and Chinese position, in scientific, industrial and societal terms. In particular, it is important, based on all these initiatives, to give a prominent place to the green deal and to demonstrate the capacity to respond, in an evolutionary and coordinated way, to the major challenges the society is facing (as illustrated by the Covid-19 situation). Consequently, the revised coordinated plan should include elements to quickly respond to changing (policy) priorities.

## **1.2- Tools of the European Commission**

**The priority should be given to support existing organizations with clear and strong commitments at the European levels, with KPIs dedicated to the digital European sovereignty, not to initiate new tools in the framework of the usual race for fund raising at the national and European levels.**

An AI-data-robotics partnership between public and private sectors is important as it can offer a strategic platform for exchange between the different communities involved. This partnership will only be effective if the relevant stakeholders (industry - including big companies, SMEs and start-ups -, academia and politics) are represented in a balanced manner and active. Consequently, in order to create a community at European level, working on a shared vision and enriching mutually, and to allow a real public-private hybridization, the activities of the AI-data-robotics partnership must necessarily include, in a significant way, academic research. Associations representing research on AI, data, and robotics should therefore be included as such in the construction and future governance of the partnership. In addition, a balance must be found in the governance on the participation of institutions and companies of the three different areas: AI, data and robotics. Similar balance must be ensured in the different Task Forces that are the operating tools of the Partnership. On the basis of these building blocks, the Partnership must be a catalyst for existing initiatives and should coordinate them. In the past, partnerships have proven to be moderately effective in stimulating disruptive R&D and were less accessible to SMEs and start-ups. Specific measures should be taken to mitigate that risk.

This AI-data-robotics partnership is clearly a high-risk initiative, but if successful, the gain will be high since EU industry could become the main provider of the AI technologies used in Europe.

The partnerships between public research and the private sector should also lead to the emergence of start-ups and entrepreneurial projects with very high research and innovation potential. The EIC must therefore be able to help European players positioning on emerging markets. The support brought by the EIC for the creation and scale-up of start-ups is well suited to the artificial intelligence sector.

The 4 networks of AI excellence centres, resulting from the ICT-48-2020 call, should enable the structuring of AI research at the European level on their respective perimeters and stimulate collaborations and cross-fertilization of research communities as light and as simple as possible. If successful, the question of their sustainability will have to be raised. **It is important not to multiply the tools and to take full advantage of them.**

In addition to the partnership between public and private sectors and the ICT-48 networks, the European AI ecosystem benefits from the existence of research organizations with a major international visibility. A lighthouse centre, if consisting of a tightly federated and highly selective network of a small number of such existing organizations, committed to a joint strategic roadmap, would be able to position Europe as a world leader in AI research and innovation.

One concluding remark is that the various tools and funding of the European Commission must be able to complement and coordinate each other, and create a unified vision of AI.

## **2. Comments on chapter 5 of the white paper**

The concept of transparency should be viewed through the prism of the entire value chain of an AI system. This makes the question of "Who needs this transparency" central: the developer of the algorithm, the owner/provider of the AI system, the regulatory authority, or the end users. One general remark is that more research is needed to qualify and quantify the risks associated with AI and to propose a toolbox for auditing algorithms along the multiple axes of trustworthy/transparency: fairness, explainability, loyalty, certifiably.

Also, similar to the Privacy Impact Assessment, different "impact assessments" should be created to allow software providers to demonstrate their good will: objective pursued in designing the algorithm, input-output analysis, evaluation of adverse effects, and key factors concerning overspecialization. These elements of transparency do not pose IPR at risk.

In addition to data themselves, a complete history of their origin and processing throughout the value chain, aka data traceability/provenance, will have to be kept for the purpose of ex-post regulation and identification of liability.

The white paper notes that "a key result of the feedback process" on the HLEG guidelines "is that while a number of the requirements are already reflected in existing legal or regulatory regimes, those regarding transparency, traceability/provenance and human oversight are not specifically covered under current legislation in many economic sectors". If a specific regulation is established on these points, it must make sure that the corresponding constraints can be well specified and that the technical tools to implement these constraints do exist. Furthermore, software providers should offer the dedicated APIs with their programs to allow the regulators to experimentally check that the constraints are indeed satisfied.

Enforcing the availability of APIs to verify the compliance of the results with the given descriptive elements is an important part of the audit, even more so for algorithms performing continuous/lifelong learning.

Many challenges exist for implementing legal AI liability:

- The data provider now enters the game, between the software designer and the end user, making responsibility even harder to determine.
- Complex interactions between the algorithm and the data sources, some of which may not be under the control of the same entity.
- Unexpected results related to the impossibility of testing all possible entry conditions when there is no formal proof of the system.
- Information asymmetries making it virtually impossible for data subjects to determine which potentially false information may have led to a particular algorithmic result concerning them

Current Machine Learning based software systems cannot be formally verified, and certification therefore has to be purely experimental – with the difficulty that it is not possible to grasp all possible contexts (data, real-world scenario, ...) in which the system will be used. Autonomous systems raise further issues, that are extreme when it comes to life-long learning agents, in which no guarantee can be enforced in the long term (we are still very far from Asimov's laws of robotic for instance).

Regulation, even if it concerns only high-risk applications, always carries the possibility of over-regulation, limiting research and innovation capacities and giving an excessive burden to start-ups and SMEs. On the other hand, by developing technologies that are respectful of strict regulations, European industry will have an edge at least on the European market, and hopefully on the global market if other countries choose to follow Europe in enforcing similar regulations.

An asymmetric regulatory approach, categorizing the actors, may also be implemented to avoid slowing down innovation.

Regarding the list of potential high-risk applications, sovereign matters such as defence, security, law enforcement, public health policy, etc. should fall within their scope, because of the impact on governments, public life and democracies. In addition, the use of AI by major players, such as structuring digital platforms, raise the need for specific regulation to counterbalance their ability to circumvent economic and competition regulations: e.g. user-dependent pricing, platform promoting their own products compared to those of competitors, etc. Recent examples of misuse of personal data (see Cambridge Analytica scandal) calls for further enforcement of existing regulations, and developments of more resources to track and suit them.

For low-risk applications and in order to build a competitive advantage in the international market, a voluntary labelling scheme must focus on the various aspects of transparency (see upwards), otherwise the value of the label will be further questioned. A toolbox should be proposed to the actors to carry out this self-labelling process. Ex-post mechanisms should also be put in place to monitor the label and contribute to a trustworthy-AI.

## **About Inria**

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*As a technology institute, Inria supports the development of numerous software products, sometimes making a global impact via the opensource model. Because technology start-ups are powerful channels for research outcomes, Inria also supports entrepreneurial risk-taking and start-up creation (Deeptech). Firmly established on major university campuses and in industrial ecosystems, the Institute is at the heart of the digital revolution.*

<http://www.inria.fr>

## **Contacts**

*Isabelle Herlin (Isabelle.Herlin@inria.fr)  
European Partnerships Department, Inria Officer by the EU*

*Marie-Hélène Pautrat (Marie-Helene.Pautrat@inria.fr)  
European Partnerships Department, Director*