

## National strategies on Artificial Intelligence A European perspective in 2019

### Country report – France



In March 2018, The President of the French Republic presented his vision and strategy to make France a leader in artificial intelligence (AI). The French AI strategy is entitled [AI for humanity](#) (France, 2018a) and has been developed on the basis of the [AI policy report](#) (France, 2018b) prepared by French deputy Cédric Villani.

The main objectives of the French AI strategy as highlighted by the French President are to:

- Improve the AI education and training ecosystem to develop and attract the best AI talent;
- Establish an open data policy for the implementation of AI applications and pooling assets together;
- Develop an ethical framework for a transparent and fair use of AI applications.

To this purpose, the French government will dedicate €1.5 billion to the development of artificial intelligence by the end of 2022, including €700 million for research.

### 1 Human capital

To ensure a smooth transition towards an AI-oriented economy, a thorough transformation of learning paths is needed, involving both reforms to the initial education of upcoming generations and opportunities of vocational training and lifelong learning for the current and upcoming workforce.

The AI for Humanity strategy highlights two important prerequisites for the successful development of human capital in AI. A first prerequisite relates to the inclusion of effective and compulsory digital and AI-related disciplines at all levels of the education and training curricula. This requires both reforms to the course content and to the teaching methods used. A second prerequisite is that the proposed education pathways should be free of any social inequality. This could be achieved by setting up incentive policies to ensure more diversity and to achieve more equality in participation rates, with a special attention to counteract any form of gender stereotyping (e.g. by incentivising participation of women into digital and AI courses).

In terms of **formal education and training policies**, the French strategy foresees to:

- Launch AI training and education programmes at all levels of education, with a particular focus on higher education programmes at the [Interdisciplinary Institutes of Artificial Intelligence \(3IA\)](#). The aim is to double the number of students in AI;
- Foster education of all players involved in the "algorithmic chain" (designers, professionals, citizens) and enable each citizen to improve its digital literacy to better understand the inner working of machines and the benefits of AI.

In terms of **vocational training and lifelong learning** initiatives, the French government highlights:

- The formation of the Grande Ecole du Numerique (GEN): the [GEN](#) has been created to support training that help to integrate people at risk of unemployment to the job market by developing their digital skills;
- The need for governmental funding support for vocational training of employees.

The deployment of AI technologies will have a major impact on the job market. According to France's Employment Orientation Council roughly half of the occupations could be automated. To tackle this issue, the French AI strategy devotes

particular attention to a **better understanding of future labour demand and skill needs** to prepare successfully for professional transitions. The following policy recommendation is targeting increased labour market intelligence and forward-looking skills predictions:

- The creation of a public laboratory on the transformation of work to encourage reflection on the ways in which automation is changing occupations and to provide support for professional transitions. In this respect the Global Partnership for AI (initiative lead by France and Canada) may come up with the setting of a Labour Lab. This will be discussed in the near future by the experts enrolled.

## 2 From the lab to the market

The ambitious goals set by the AI for Humanity strategy are extensively relying on research and innovation. The responsibility for coordinating the research side of the AI for Humanity strategy has been given to the French national research institute for the digital sciences ([Inria](#)), with a clear objective: to strengthen the entire French AI sector. Among others, the research institute will coordinate the strategy's implementation, provide scientific and technological expertise and develop bilateral cooperation initiatives, in particular with Germany.

One of the main AI flagships that Inria is currently leading and coordinating is the establishment of 3IA Institutes, a network of AI research institutes within universities to **foster nation-wide AI research**:

- The creation of interdisciplinary AI institutes (3IA) in selected public higher education and research establishments. Four different institutes – Paris, Toulouse, Grenoble and Nice – were chosen to become [interdisciplinary institutes on Artificial Intelligence \(3IA\)](#). Each of these research centres took part in formulating a 3IA Institute project to foster AI research between regional academic and industry ecosystems. The four selected 3IA projects to spearhead research on AI in France are:
  - The “[MIAI@Grenoble-Alpes](#)” project sets up a Multidisciplinary Institute in Artificial Intelligence (MIAI) at Grenoble with two main research themes: Future AI Systems and AI for Human Beings and the Environment. It will pay particular attention to the fields of personalised healthcare, medical devices, the environment and energy;
  - The “[3IA Côte d'Azur](#)” project led by the Université Côte d'Azur in Nice brings together over a hundred researchers around training, research and transfer projects, particularly in the fields of healthcare and regional development.
  - The “[PRAIRIE](#)” project launches an institute with several academic and industry partners. The Paris Artificial Intelligence Research InstitutE (PRAIRIE) aims to drive progress in fundamental knowledge in AI. The objective of the institute is to be a catalyst for exchanges between the academic and industrial world, and to play a role in leading and coordinating the community. It will focus in particular in the fields of healthcare, transport and the environment.
  - The “[ANITI](#)” project sets up an Artificial and natural intelligence Toulouse Institute (ANITI) led by the University of Toulouse. The strategic application sectors targeted by the institute are mobility and transportation, and robotics/cobotics for the industry of the future. It will bring together 200 researchers from universities, research organisations and companies.
  - The launch of AI research and teaching chairs: a [multi-year programme](#) of 40 Chairs in Artificial Intelligence presented by the Minister of Higher Education, Research and Innovation and the Secretary of State for Digital Technology to provide necessary resources and support to host institutions for ambitious research projects in AI. The chairs need to be organised outside the 3IA Institutes mentioned above.

The AI for Humanity strategy proposes to target policy support for research and innovation to **specific sectors** that show sufficient maturity to embrace major AI transformations: **health, transport, the environment, defence and security**. Hence, this will require sector-specific policy, including sector-specific data platforms for data compilation and exchange, large-scale computing infrastructures and testing facilities. While many of these aspects touch upon infrastructure (cf. below), the French government advocates **creating test areas to facilitate the design and deployment of AI technologies**:

- Implement test areas and innovation sandboxes to facilitate experimentation in real-life conditions while temporarily reducing the regulatory burdens to help testing innovations.

## 3 Networking

The advantages of **networks and collaborations in AI** are manifold. It allows for multidisciplinary research and avoids thematic redundancy across institutions. Above all, it allows for an efficient sharing of knowledge associated to AI across

the various stakeholders and increases their motivation to participate to cutting-edge AI research. Following initiatives are envisaged:

- [Inria](#) will coordinate the network of French AI expertise by means of the development of the 3IA Institutes and other research-oriented collaborative support mechanisms;
- Trilateral French-Japanese-German Research Projects on Artificial Intelligence: The French National Research Agency ([ANR](#)) together with the German Research Foundation ([DFG](#)), and the Japan Science and Technology Agency ([JST](#)) is announcing the first trilateral call for research proposals on AI. This [call](#) is intended to support collaborative projects of trilateral research teams over 3 years, bringing together research partners from France, Germany, and Japan;
- Fostering of public-private laboratories, so called LabComs to encourage collaborative AI research and innovations.

To **foster the international attractiveness of AI** in France, the French strategy expresses the need for policies to boost France's appeal to expatriates and foreign talent by improving working conditions and salaries of researchers.

## 4 Regulation

Ethical matters to ensure a fair and transparent use of AI technologies and algorithms are central to the French AI strategy. In this regard, Cédric Villani recommends in his policy report the creation of a “*digital technology and AI ethics committee in charge of leading public discussion in a transparent way, and organized and governed by law*” (p. 16). To this purpose, a Digital Committee has been created with the National Consultative Committee for Ethics. The **ethical principles** take shape through the following policy recommendations, among others:

- To guarantee ethical awareness from the design stage, ethics could be incorporated into the training of engineers and researchers studying AI;
- Strengthening ethics within businesses (e.g. setting up ethics committees, dissemination of sector-specific good practices, revising pre-existing codes of professional conduct, foresee ethical codes for research programs).
- Setting up a national platform for auditing algorithms. Evaluating the conformity to legal and ethical frameworks would increase transparency and reduce potential abuses to the use of AI;
- Launching a Global Partnership for AI (GPAI): a declaration has been signed with Canada to start a project on the creation of an international AI study group focused on developing responsible AI. This initiative will be launched in the near future with the support of the OECD.

Besides a well-defined ethical framework, it is essential to develop an ambitious legislation to control the boundaries and performance of AI systems and impede any forms of infringements. In this respect, the French strategy foresees the following pieces of law:

- Launch of the Digital Republic Act: a [law](#) to open up public data, to strengthen the protection of users' rights and data privacy and to ensure that the opportunities due to digitalisation benefit to all;
- Implementation of the cyber security directive: this directive properly known as the Directive on security of network and information systems (NIS) requires Member States to adopt a national cyber-security strategy. In France it has been implemented by the [French Act](#) No. 2018-133 in February 2018.

## 5 Infrastructure

Data is raw material of AI, and essential for the development of new AI practices and applications. To maximise its economic and social utility, policies should target the creation of a data infrastructure and ecosystems that do not only foster the collection of high-quality data, but also promotes – where possible – data circulation between stakeholders, while preserving elementary data protection rules and ensuring citizens' control on their personal data. While free access to private data is not always desirable, the French AI strategy proposes to adopt sector-specific data policies. In this way data policies could apply in particular to the public sectors, while others are targeting private sectors, with differentiations across priority areas such as health, transport and environment.

The French strategy highlights the following **data policy** initiatives:

- Data sharing in private sector: the government must encourage the creation of data commons and support an alternative data production and governance model based on reciprocity, cooperation and sharing. This includes also data sharing between private actors;
- Data of public interest: the government should encourage the access to databases, which could be freely accessible or restricted at sector levels. This perspective is reflected in the [Open Science policy](#) established by Inria and [the National Plan for Open Science](#);

- Increased data portability: The right to data portability should be supported, allowing migration of data from one service ecosystem to another without losing data history.

In terms of **digital and telecom infrastructure** to encourage the development of machine learning and AI algorithms, the French strategy foresees the following policy initiative:

- Investment in a supercomputer worth €115 million: this computer will have a processing power of over 10 Petaflops. It is meant to be functional in 2020 and will be installed at the “plateau de Saclay” – a scientific research hub to the South-West of Paris.

## 6 Update

Inria, the French national research institute for the digital sciences, has committed to play a prominent role as coordinator of the national AI strategy. It will be responsible for its implementation, in particular on its research and innovation side. Inria will report annually on its coordination activities to the ministerial steering committee of the national AI strategy.

## References

France (2018a). AI for Humanity: French Strategy for Artificial Intelligence. President of the French Republic.  
<https://www.aiforhumanity.fr/en/>

France (2018b). For a Meaningful Artificial Intelligence: towards a French and European Strategy. Cédric Villani, Member of the French Parliament.  
[https://www.aiforhumanity.fr/pdfs/MissionVillani\\_Report\\_ENG-VF.pdf](https://www.aiforhumanity.fr/pdfs/MissionVillani_Report_ENG-VF.pdf)

## Background information

This country report has been prepared in the context of [AI Watch](#) and the [OECD AI Policy Observatory](#).

AI Watch is the European Commission knowledge service to monitor the development, uptake and impact of Artificial Intelligence (AI) for Europe, launched in December 2018.

The OECD AI Policy Observatory (OECD.AI) is an inclusive hub for public policy on AI. It aims to help countries encourage, nurture and monitor the responsible development of trustworthy AI systems for the benefit of society.

This country report has been created on the 25<sup>th</sup> of February 2020. Please visit <https://ec.europa.eu/knowledge4policy/ai-watch/france-ai-strategy-report> for regular updates.

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